

STATE FAUNA SERIES, 17

FAUNA OF TAMILNADU

(PART - 2)



ZOOLOGICAL SURVEY OF INDIA

State Fauna Series, 17

FAUNA OF TAMIL NADU

(PART-2)

Edited by
The Director, Zoological Survey of India, Kolkata



सत्यमेव जयते

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Kolkata

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STATE FAUNA SERIES
FAUNA OF TAMIL NADU

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MARINE SPONGES

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INTRODUCTION

The peninsular coastlines of the Indian subcontinent provide a veritable habitat for a large number of sponges. The peninsular coastlines provide varied topographic conditions for the survival and reproduction of the sponge species. A review of literature indicates the taxonomic information of the sponges of peninsular Indian coastline.

Although initial studies of this fauna were made over a century ago by Bowerbank (1873b), subsequent studies of Tamil Nadu and adjacent Islands in the Gulf of Mannar consists the work of Ali (1956), Annandale (1915 b), Burton (1928, 1930, 1937), Burton and Rao (1932), Carter (1880, 1881), Dendy (1887, 1889, 1905), Kumar (1925), Pattanayak and Manna (2001), Rao (1941), Thomas (1968a, 1968b, 1968c, 1968d, 1968e, 1969, 1970, 1970a, 1970b, 1972, 1973a, 1974, 1975, 1976, 1977, 1979, 1979a, 1980a, 1984, 1985), Thomas, Ramadoss and Vincent (1993).

Taxonomic studies on sponges of the Gulf of Mannar and Palk Bay are provided by the authors as follows. Carter (1880) described 45 species, Carter (1881) described one species, Dendy (1887) described one species, Dendy (1889) described 4 species, Dendy (1905) described 106 species, Annandale (1915b) described two species, Kumar (1925) described 11 species, Burton (1928) described 2 species, Burton (1930) described 10 species, Burton (1937) described 88 species, Burton and Rao (1932) described 23 species, Rao (1941)

described 25 species, Ali (1956) described 8 species, Thomas (1968a) described 2 species, Thomas (1968b) described 2 species, Thomas (1968c) described 2 species, Thomas (1968d) described 2 species, Thomas (1968e) described 2 species, Thomas (1970) described 8 species, Thomas (1970a) described 2 species, Thomas (1970b) described 3 species, Thomas (1972) described 14 species, Thomas (1973a) described one species, Thomas (1974) described one species, Thomas (1975) described one species, Thomas (1976) described one species, Thomas (1977) described one species, Thomas (1979) described 16 species, Thomas (1979a) described one species, Thomas (1980a) described one species, Thomas (1984) described one species, Thomas (1985) described 275 species, Thomas, Ramadoss and Vincent (1993) described 5 species of sponges from this region. Pattanayak (1999) gave an Annotated checklist of marine sponges of the Indian region which included 451 species. Pattanayak and Manna (2001) listed the species of sponges in India with their distribution and the authors who described them.

Pattanayak and Manna (2001) mentioned 323 species of sponges recorded from the region of Gulf of Mannar and Palk Bay. This work describes 67 species, 39 genera, 23 families from the coast of Tamil Nadu State present in the recent and old collections of ZSI.

The higher classification of sponges and the *Definitions* upto the genus level are described here follows Hooper and Van Soest, 2002.

MATERIAL AND METHOD

Material studied in this work consists of old and recently collected preserved museum specimens of sponges deposited in the Zoological Survey of India. Specimens were collected during the period from 1884-1913 by S.W. Kemp from 1915 to 1930, Marine Survey units and present scientists of Zoological Survey of India. For some species due to non-availability of the other material, type specimens were restudied and re-description of the same is incorporated. Holotype is written as the same is written in the original label.

For the study of the skeletal architecture two microscopical sections were prepared from the specimens preserved in 70% ethanol or dry specimens. One section was of the surface to obtain a tangential view of the ectosomal skeleton and the other section was perpendicular to the surface to examine the choanosomal skeleton. The sections were dried and mounted in Canada balsam on a microscopical slide.

For the study of different categories of spicules fragments of both ectosomal and choanosomal regions were boiled directly on a glass slide in concentrated nitric acid, mounted in Canada balsam and examined under light microscope.

For the study of spongin fibres thick hand cut sections were made perpendicular to the surface, soaked in saturated solution of phenol and xylene, mounted either in water or in glycerine and studied under light microscope.

While studying the spicules, measurements were made with the aid of micrometer and are given in mm. Figures were drawn with the aid of a camera lucida, Photographs of the specimens are given in the plates.

LIST OF SPONGES

Phylum PORIFERA Grant, 1836

Class DEMOSPONGIAE Sollas, 1885

Subclass TETRACTINOMORPHA Levi, 1953

Order SPIROPHORIDA Bergquist and Hogg, 1969

Family TETILLIDAE Sollas, 1886

Genus **Cinachyra** Sollas, 1886

1. *Cinachyra arabica* (Carter, 1869)

Genus **Cinachyrella** Wilson, 1925

2. *Cinachyrella tarentina* (Pulitzer-Finali, 1983)

Genus **Paratetilla** Dendy, 1905

3. *Paratetilla bacca* (Selenka, 1867)

Order ASTROPHORIDA Sollas, 1888

Family ANCORINIDAE Schmidt, 1870

Genus **Ecionemia** Bowerbank, 1864

4. *Ecionemia acervus* Bowerbank, 1864

Genus **Rhabdastrella** Thiële, 1903

5. *Rhabdastrella globostellata* (Carter, 1883)

Genus **Stelletta** Schmidt, 1862

6. *Stelletta clavosa* Ridley, 1884

7. *Stelletta purpurea* Ridley, 1884

Family GEODIIDAE Gray, 1867

Genus **Geodia** Lamarck, 1815

8. *Ceodia inconspicua* (Bowerbank, 1873)

Order HADROMERIDA Topsent, 1894

Family CLIONIDAE D'Orbigny, 1851

Genus **Cliona** Grant, 1826

9. *Cliona ensifera* Sollas, 1878

10. *Cliona lobata* Hancock, 1849

11. *Cliona mucronata* Sollas, 1878

12. *Cliona viridis* (Schmidt, 1862)

Genus **Cliothosa** Topsent, 1905

13. *Cliothosa quadrata* (Hancock, 1849)

Genus **Pione** Gray, 1867

14. *Pione vastifica* (Hancock, 1849)

Genus **Spheciospongia** Marshall, 1892

15. *Spheciospongia inconstans* (Dendy, 1887)

Family SUBERITIDAE Schmidt, 1870

Genus **Suberites** Nardo, 1833

16. *Suberites carnosus* (Johnston, 1842)

Family TETHYIDAE Gray, 1848

Genus **Tethya** Lamarck, 1814

17. *Tethya diploderma* Schmidt, 1870

Genus **Stellitethya** Sara, 1994

18. *Stellitethya repens* (Schmidt, 1870)

- Genus *Xenospongia* Gray, 1858
 19. *Xenospongia patelliformis* Gray, 1858
 Order LITHISTIDA Schmidt, 1870
 Family THEONELLIDAE Lendenfeld, 1903
 Genus *Discodermia* du Bocage, 1870
 20. *Discodermia papillata* Carter, 1880
 Genus *Theonella* Gray, 1868
 21. *Theonella swinhoei* Gray, 1868
 Family DESMANTHIDAE Topsent, 1893
 Genus *Petromica* Topsent, 1898
 Subgenus *Petromica*
 22. *Petromica (Petromica) massalis* Dendy, 1905
 Subclass CERACTINOMORPHA Levi, 1953
 Order POECILOSCLERIDA Topsent, 1928
 Suborder MICROCIONINA Hajdu, van Soest & Hooper, 1994
 Family MICROCIONIDAE Carter, 1875
 Subfamily MICROCIONINAE Carter, 1875
 Genus *Clathria* Schmidt, 1862
 Subgenus *Microciona* Bowerbank, 1862
 23. *Clathria (Microciona) atrasanguinea* (Bowerbank, 1862)
 Subgenus *Thalysias* Duchassaing & Michelotti, 1864
 24. *Clathria (Thalysias) vulpina* (Lamarck, 1814)
 25. *Clathria (Thalysias) procera* (Ridley, 1884)
 Subgenus *Clathria* Schmidt, 1862
 26. *Clathria (Clathria) indica* Dendy, 1889
 Family RASPAILIIDAE Hentschel, 1923
 Subfamily RASPAILIINIAE Nardo, 1833
 Genus *Endectyon* Topsent, 1920
 Subgenus *Hemectyon* Topsent, 1920
 27. *Endectyon (Endectyon) thurstoni* (Dendy, 1887)
 Genus *Aulospongos* Norman, 1878
 28. *Aulospongos tubulatus* (Bowerbank, 1873)
 Subfamily ECHINODICTYINAE Hooper & Van Soest, 2002
 Genus *Echinodictyum* Ridley, 1881
 29. *Echinodictyum clathratum* Dendy, 1905
 30. *Echinodictyum longistylum* Thomas, 1968
 Family RHABDEREMIIDAE Topsent, 1928
 Genus *Rhabderemia* Topsent, 1890
 31. *Rhabderemia acanthostyla* Thomas, 1968
 32. *Rhabderemia indica* Dendy, 1905
 33. *Rhabderemia prolifera* Annandale, 1915
 Suborder MYXILLINA Hajdu, van Soest & Hooper, 1994
 Family COELOSPHAERIDAE Dendy, 1922
 Genus *Coelosphaera* Thomson, 1873
 Subgenus *Coelosphaera* Thomson, 1873
 34. *Coelosphaera (Coelosphaera) encrusta* (Kumar, 1925)
 Genus *Lissodendoryx* Topsent, 1892
 Subgenus *Lissodendoryx* Topsent, 1892
 35. *Lissodendoryx (Lissodendoryx) balanophilus* Annandale, 1913
 36. *Lissodendoryx (Lissodendoryx) ternatensis* Thiele, 1903
 37. *Lissodendoryx (Ectyodoryx) lissostyla* (Thomas, 1970)
 Family HYMEDESMIIDAE Topsent, 1928
 Genus *Hymedesmia* Bowerbank, 1864
 38. *Hymedesmia (Hymedesmia) mannarensis* Thomas, 1970
 39. *Hymedesmia (Hymedesmia) stylophora* Thomas, 1970
 Family TEDANIIDAE Ridley & Dendy, 1886
 Genus *Tedania* Gray, 1867
 Subgenus *Tedania* Gray, 1867
 40. *Tedania (Tedania) anhelans* (Lieberkuhn, 1859)
 Suborder MYCALINA Hajdu, van Soest & Hooper, 1994
 Family DESMACELLIDAE Ridley & Dendy, 1886
 Genus *Biemna* Gray, 1867
 41. *Biemna tubulata* (Dendy, 1905)
 Family MYCALIDAE Lundbeck, 1905
 Genus *Mycale* Gray, 1867
 Subgenus *Aegogropila*
 42. *Mycale (Aegogropila) crassissima* (Dendy, 1905)

Subgenus **Mycale** Gray, 1867

43. *Mycale (Mycale) grandis* Gray 1867
44. *Mycale (Mycale) indica* (Carter, 1887)
45. *Mycale (Mycale) mannarensis* Thomas, 1968
46. *Mycale (Mycale) monanchorata* Burton & Rao, 1932

Subgenus **Carmia** Gray, 1867

47. *Mycale (Carmia) mytilorum* Annandale, 1914

Subgenus **Paresperella** Dendy, 1905

48. *Mycale (Paresperella) bidentata* (Dendy, 1905)

Order HALICHONDRIDA Gray, 1867

Family AXINELLIDAE Carter, 1875

Genus **Stylissa** Hallmann, 1914

49. *Stylissa carteri* (Dendy, 1889)

Genus **Axinella** Schmidt, 1862

50. *Axinella donnani* (Bowerbank, 1873)

51. *Axinella tenuidigitata* Dendy, 1905

Family HALICHONDRIIDAE Gray, 1867

Genus **Amorphinopsis** Carter, 1886

52. *Amorphinopsis foetida* (Dendy, 1889)

Genus **Topsentia** Berg, 1899

53. *Topsentia halichondrioides* (Dendy, 1905)

Order HAPLOSCLERIDA Topsent, 1928

Suborder HAPLOSCLERINA Topsent, 1928

Family CALLYSPONGIIDAE de Laubenfels

Genus **Callyspongia** Duchassaing & Michelotti, 1864

54. *Callyspongia cellaria fusca* Rao, 1941

55. *Callyspongia pambanensis* Rao, 1941

Subgenus **Cladochalina** Schmidt, 1870

56. *Callyspongia (Cladochalina) fibrosa* Ridley & Dendy, 1886

57. *Callyspongia (Cladochalina) spinosissima* (Dendy, 1905)

58. *Callyspongia (Cladochalina) diffusa* (Ridley, 1884)

Family CHALINIDAE Gray, 1867

Genus **Haliclona** Grant, 1836

Subgenus **Haliclona** Grant, 1836

59. *Haliclona (Haliclona) oculata* (Pallas, 1766)

Subgenus **Soestella** De Weerd, 2000

60. *Haliclona (Soestella) implexa* (Schmidt, 1868)

Subgenus **Reniera** Schmidt, 1862

61. *Haliclona (Reniera) madrepora* (Dendy, 1889)

Genus **Chalinula** Schmidt, 1868

62. *Chalinula camerata* (Ridley, 1884)

Family NPHATIDAE Van Soest, 1980

Genus **Gelliodes** Ridley, 1884

63. *Gelliodes carnosus* (Dendy, 1889)

Suborder PETROSINA Boury-Esnault & Van Beveren, 1982

Family PHLOEODICTYIDAE Carter, 1882

Genus **Aka** de Laubenfels, 1936

64. *Aka diagnoxea* Thomas, 1968

65. *Aka minuta* Thomas, 1973

Family PETROSIIDAE van Soest, 1980

Genus **Xestospongia** de Laubenfels, 1932

66. *Xestospongia testudinaria* (Lamarck, 1815)

Order DICTYOCERATIDA Minchin, 1900

Family THORECTIDAE Bergquist, 1978

Subfamily PHYLLOSPONGIINAE Bergquist, Sorokin and Karuso, 1999

Genus **Carteriospongia** Hyatt, 1877

67. *Carteriospongia foliascens* (Pallas, 1766)

TAXONOMIC ACCOUNT OF SPONGES

Phylum PORIFERA Grant, 1836

Class DEMOSPONGIAE Sollas, 1885

Definition : Porifera with siliceous spicules and/or a fibrous skeleton, or occasionally without a skeleton. Spicules are either monaxonic (either monactine or diactine) or tetraxonic (tetractine), never triaxonic. The axial filament is embedded in a triangular or hexagonal cavity.

Subclass ETRACTINOMORPHA Levi, 1953

Definition : Demospongiae with parenchymella or blastula larvae,

predominantly oviparous reproduction (although in some genera young sponges are incubated within the parent and set free as small adults; Bergquist, 1978). Megascleres are tetraxonic and monaxonic, occurring together or separately; microscleres are astrose forms and derivatives; skeletal structure is usually radial or axially compressed.

Order SPIROPHORIDA Bergquist and Hogg, 1969

Definition : Tetractinomorpha with triaene megascleres and sigmaspire microscleres.

Family TETILLIDAE Sollas

Definition : Spirophorida with sigmaspire microscleres and a radiate skeleton of triaenes and oxeas.

Genus *Cinachyra* Sollas, 1886

Definition : Tetillidae with cortex reinforced by auxiliary oxeas, with flask-shaped porocalices.

Type species : *Cinachyra barbata* Sollas, 1886a : 183

1. *Cinachyra arabica* (Carter, 1869)

(Fig. 1 a-d; Plate I A)

Tethea arabica Carter, 1869, p.15, pl. I, figs. 1-8, pl. ii, figs. 19 & 20

Tetilla arabica Sollas, 1888. p.42.

Cinachyra arabica Burton & Rao, 1932, p.326; Pattanayak, 2006, p.13. pl. IA, fig.1a-d.

Material examined : P.3520/1, one ex., Krusadai Island, Gulf of Mannar, date of coll. Feb. 1925, Coll. B.N. Chopra and H.S. Rao; P3561/1, one ex., Arkadutarai, Dt. Nagapattinam, Shore collection, 23.03.2004, Coll. J.G. Pattanayak.

Description : Spherical, attached with substratum with broad base, tough, incompressible, surface hispid due to projection of protriaenes and anatriaenes; Colour – light gray, Oscules – small, scattered all over surface.

Skeleton – Protriaenes, anatriaenes, oxeas radially arranged, reach upto surface; microxeas

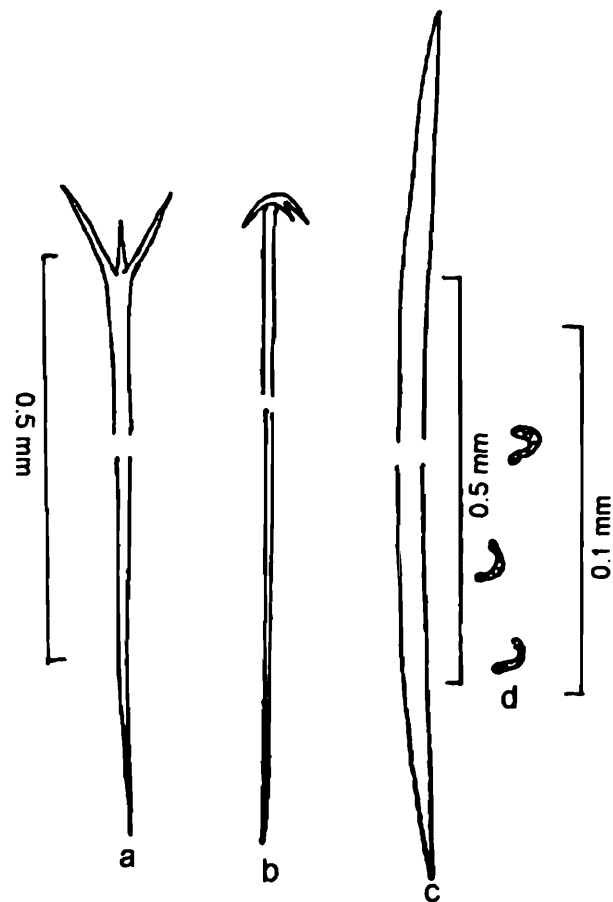


Fig. 1. *Cinachyra arabica* a. protriaene b. anatriaene c. oxea d. sigmaspires

absent; sigmaspires distributed throughout sponge.

Megascleres – (1) Protriaenes, shaft 2.1-2.8 mm long, 0.014-0.016 mm wide; clads 0.03-0.07 mm long; (2) Anatriaenes 2.5-3.5 mm long, 0.01-0.015 mm wide; Clads 0.04 mm, chord 0.07 mm maximum long; (3) Oxeas slightly curved 1.5-3.5 mm long, 0.01-0.04 mm wide.

Microscleres – Sigmaspires only, size of chord 0.012 mm.

Distribution : In India : Andaman and Nicobar Islands, Krusadai Island, Arkadutarai.

Elsewhere : North East coast of Arabia (Carter, 1869)

Genus *Cinachyrella* Wilson, 1925

Definition : Tetillidae with undifferentiated porocalices, without cortex, without auxiliary megascleres.

Type species : *Tetilla hirsute* Dendy, 1889 : 75.

2. *Cinachyrella tarentina* (Pulitzer-Finali, 1983)

(Fig. 2a-e; Plate I B)

Cinachyra australiensis Carter, 1881 sensu Burton, 1936 (corrected identification)

Tethya cranium var. *australiensis* Carter, 1886, p. 127.

Tetilla australiensis Sollas, 1888, p. 43.

Cinachyra australiensis Burton and Rao, 1932, p. 326, Burton, 1934, p. 523; Lévi, 1961a, p. 129; 1961b, p. 510; George & George, 1987, p. 225; Pattanayak, 2006, p. 14, pl. I B, fig. 2a-e.

Cinachyra cavernosa (Lamarck, 1815 sensu Tsurumal, 1969) (corrected identification)

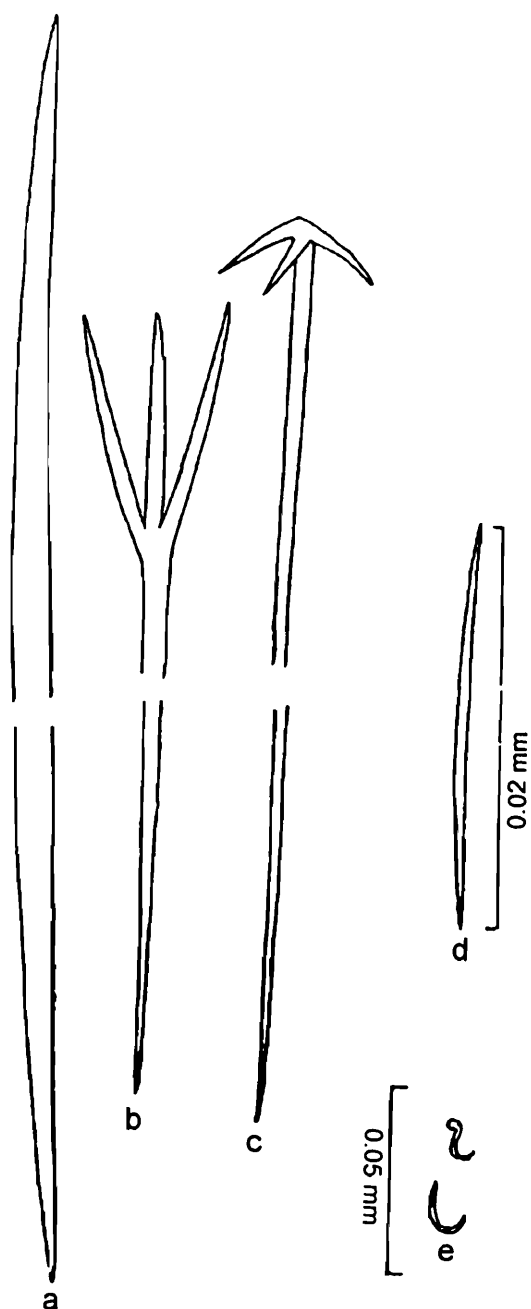


Fig. 2. *Cinachyrella tarentina* a. oxea b. protriaene c. anatriaene d. microxea e. sigmaspires

Cinachyra tarentina Pulitzer-Finali, 1983 (genus transfer), p. 477.

Cinachyrella tarentina Soest, R.W.M. Van (2001), p. 85.

Material examined : P3603/1, 2 ex., Nagapattinam, Dt. Nagapattinam, Shore collection, 27.03.2004, Coll. J.G. Pattanayak.

Description : Spherical, attached to substratum by broad base; surface hispid, consistency fleshy; colour – pale yellow; oscules – inconspicuous, small, scattered all over body.

Skeleton – Ectosomal skeletal framework radial, protriaenes and anatriaenes project out of surface considerably; oxeas radiate from center and diverge just beneath surface; microscleres microxeas and sigmaspires abundant.

Megascleres – (1) Protriaenes with stout clads projecting out of surface, shaft 1.8-2.5 mm long, 0.010-0.012 mm wide, clads 0.05-0.10 mm long, maximum width 0.015 mm. (2) Anatriaenes long and slender, shaft 1.5-3.5 mm long, 0.005-0.007 mm wide, clads sharp, recurved, 0.04 mm; chord 0.8mm. (3) Oxeas slightly curved, 1.5-3.5 mm long, 0.01-0.04 mm wide.

Microscleres – (1) Microxeas slightly curved and sharply pointed average 0.2 mm long, 0.004 mm wide. (2) Sigmaspires microspined, chord 0.02 mm.

Distribution : In India : Andamans, Ganjam coast, Gulf of Mannar, Palk Bay and Nagapattinam.

Elsewhere : Port Phillip Heads, South Australia (Carter, 1886). Great Barrier Reef (Burton, 1934); Zamboanga, Philippines (Levi, 1961b); Vietnam (Levi, 1961a); Bodgaya Island (Sabah : Malaysia) and Palau Sipadan (George & George, 1987).

Genus *Paratetilla* Dendy, 1905

Definition : Tetillidae with porocalices, with mgascleres including calthrops-like short-shafted triaenes.

Type species : *Tethya merguensis* Carter, 1883

3. *Paratetilla bacca* (Selenka, 1867)
(Fig. 3 a-f; Plate I C)

Stelletta bucca Selenka, 1867, p. 569, figs 14-15.

Paratetilla bacca Lindgren, 1897, p. 485; Dendy, 1905, p. 97; Dendy, 1921, p. 21; Kumar, 1925, p. 217; Burton and Rao, 1932, p. 325; Thomas, 1980a, p. 16; Thomas, 1985, p. 342, pl. VII, fig. 22; Pattanayak, 2006, p. 15, pl. IC, fig. 3a-f.

Material examined : P3521/1, one ex., Kilakarai, Ramnad dist. Coll. S.W. Kemp; P3604/1, one ex., Akkaraighori, Dt. Cuddalore, Shore collection, 01.04.2004, Coll. J.G. Pattanayak.

Description : Spherical, surface hispid; consistency fleshy; Colour – light brown in spirit; Oscule – inconspicuous, small scattered all over body. Skeleton – Bundles of spicules

radiate from center and project through the surface; oxeas, anatriaenes, protriaenes, orthotriaenes form skeleton, sigmaspires abundant, no loose spicule lying between the radial bundles.

Megascleres – (1) Orthotriaenes, shaft short 0.16-0.30 mm long, 0.020-0.024 mm wide; clads 0.35-0.40 mm long, 0.015-0.018 mm wide, (2) Protriaenes, shaft 3.00-3.25 mm long, 0.010-0.015 mm wide; clads 0.05-0.12 mm, (3) Anatriaenes, shaft 3.5-4.5 mm long, 0.005 mm wide, chord 0.05 mm gradually tapers, extremely thin at end. (4) Oxeas, 2.0-3.5 mm long, and 0.02-0.03 mm wide mostly straight, some slightly curved.

Microscleres – (1) Microxeas 0.17-0.25 mm long, 0.002 mm wide. (2) Sigmaspires 'c' or 's' shaped, uniformly granulated, chord length 0.015-0.020 mm.

Distribution : In India : Andamans, Gulf of Mannar, Palk Bay, Akkaraighori and Minicoy Island.

Elsewhere : Gaspar Straits, Java Sea (Lindgren, 1897); Mergui Archipelago (Burton & Rao, 1932); Indonesia (ZMA database)

Order ASTROPHORIDA Sollas, 1888

Definition : Demospongiae with aserose microscleres, sometimes with microxeas and microhabds, and with tertractinal megascleres and oxeas radially arranged at least peripherally.

Family ANCORINIDAE Schmidt, 1870

Definition : Astrophorida with long-rhabdome triaenes, which may be reduced or even absent, and oxeas. Microscleres are euasters, sanidasters or microhabds.

Genus *Ecionemia* Bowerbank, 1864

Definition : Ancorinidae with oxeas and triaenes as megascleres, euasters (but never oxyasters) and spiny microhabds as microscleres.

Type species : *Ecionemia acervus* Bowerbank, 1864

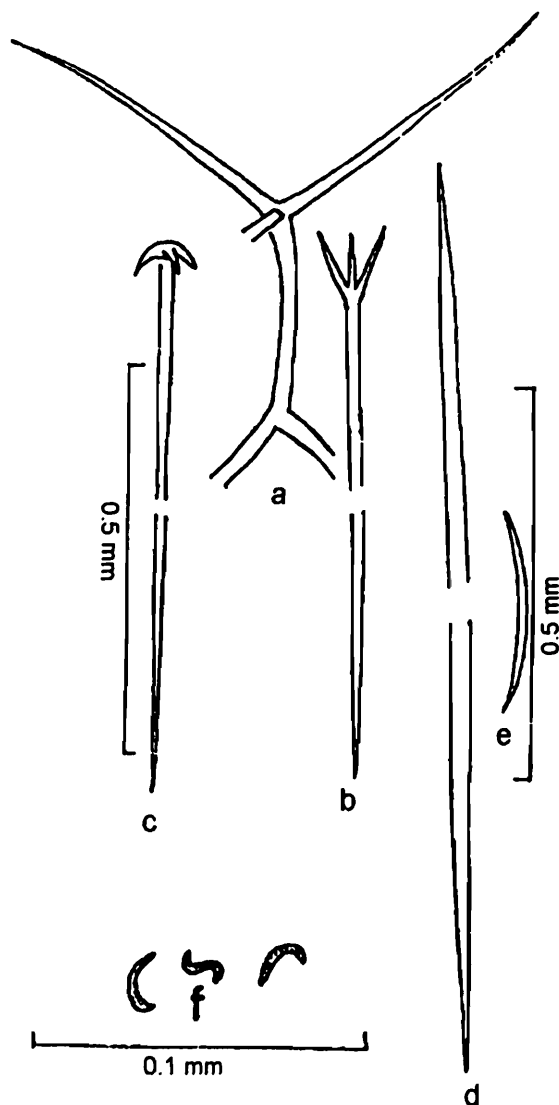


Fig. 3. *Paratetilla bacca* a. orthotriaene b. protriaene c. anatriaene d. oxea e. microxea f. sigmaspires

4. *Ecionemia acervus* Bowerbank, 1864
(Fig. 4 a-i; Plate I D)

Ecionemia acervus Bowerbank, 1864, p. 173, Thomas, 1985, p. 334, pl.VII, fig. 6; Pattanayak, 2006, p. 18, pl.I E, fig. 5a-i.

Stelletta bacillifera Carter, 1887, p. 78, pl. vi, fig. 9-14.

Ecionemia carteri Dendy, 1905, p. 59, pl. 1, fig. 5, pl. 3, fig. 1; Burton and Rao, 1932, p. 318.

Ancorina novae-zealandiae Dendy, 1924, p. 301, pl.viii, fig. 8-15 b.

Ecionemia bacillifera Burton, 1937, p.5, pl.1,fig. 2.

Ancorina acervus Bergquist, 1965, p. 191, fig. 31 a, b; Bergquist, 1968, p. 38.

Material examined : P3605/1, 2 ex., Arkadutarai, Dt. Nagapattinam, Shore collection, 23.03.2004, Coll. J.G. Pattanayak.

Description : Small, irregularly spherical body, massive; surface hispid due to presence of projecting spicules; consistency hard, incompressible; oscules in groups of 3-6 and located in shallow depressions; pores minute 0.5-0.7 mm diameter; Colour – dark to whitish gray, Cortex about 0.2-0.3 mm thick, deeply

pigmented; clads of triaenes arranged at various levels in cortex.

Skeleton – Ectosomal skeletal arrangement radial, consisting of closely packed bundles of oxeas and triaenes, clads of triaenes arranged in various levels in cortex, choanosomal skeleton radial with orthotriaenes, anatriaenes, protriaenes. Oxeas; microxeas, misrostrongyles, strongylaster euaster microscleres scattered.

Megascleres – (1) Orthotriaenes, with shaft conical, straight; shaft 0.015-0.040mm wide; each clad 0.065-0.175 mm long, 0.015-0.045 mm, (2) Anatriaenes, shaft 0.8-2.5 mm long, 0.008-0.015 mm wide diameter of cladem 0.04-0.05 mm across, (3) Prottriaenes, shaft 2.5-2.7 mm long, 0.014-0.018 mm wide, each clad 0.04-0.07 mm long, 0.008-0.010 mm wide, (4) Oxeas, amphioxea, 1.8-2.5 mm long, 0.008-0.015 mm wide.

Microscleres – (1) Microxeas, straight or slightly curved, 0.2-0.3 mm long, 0.002-0.003 mm wide at center, (2) Microstrongyles straight with bulged central portion and minutely granulated, 0.015-0.020 mm long, 0.001-0.002 mm wide, (3) Strongylaster euaster, 6-9 rays, diameter 0.012-0.018 mm.

Distribution : In India : Andaman and Nicobar Islands, Gulf of Mannar, Palk Bay, Arkadutarai and Minicoy Island.

Elsewhere : Western Pacific Ocean (Bowerbank, 1862), King Island, Mergui Archipelago (Carter, 1887), Coast of Ceylon (Dendy, 1905), Palau Archipelago (Bergquist, 1965), New Zeland (Bergquist, 1968).

Genus *Rhabdastrella* Thiele, 1903

Definition : Ancoronidae with euasters, among which, large spherasters or sterrospherasters are abundant.

Type species.: *Coppatias distinctus* Thiele, 1900

5. *Rhabdastrella globostellata*

(Carter, 1883)

(Fig. 5 a-h; Plate IE)

Stelletta globostellata Carter, 1883, p. 353, pl. 14, figs. 5a-h.

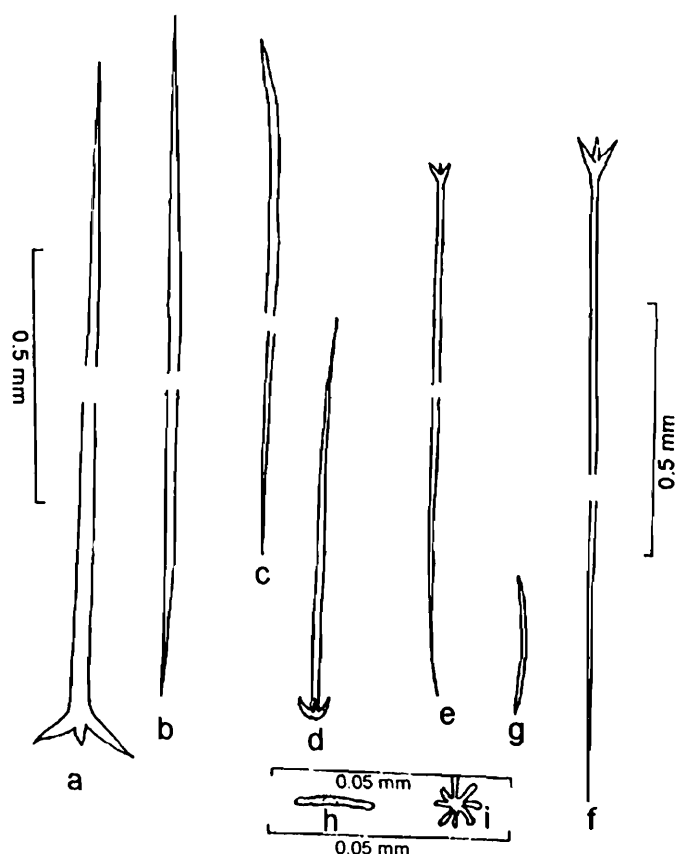


Fig. 4. *Ecionemia acervus* a. orthotriaene b, c. oxeas d. anatriaene e, f. prottriaene g. microxea h. Microstrongyle i. strongylaster euaster

Aurora globostellata Sollas, 1888, p. 187; Dragnewitsch, 1906, p. 440; Burton and Rao, 1932, p. 317; Thomas, 1976a, p. 459; Thomas, 1985, p. 336.

Aurora providentiae Dendy, 1916b, p. 246, pl. XLVI, fig. 2; Thomas, 1985, p. 337.

Rhabdastrella globostellata Pattanayak, 2006, p. 20, pl. I F, fig. 6a-h.

Material examined : P3606/1, 5 ex., Mamallapuram, Dt. Kanchipuram, Shore collection, 04.04.2004, Coll. J.G. Pattanayak.

Description : Irregular in shape, surface reticulate and inner surface showing sieve-like group of vents; consistently hard; oscules – in groups and located in basin-like depressions, pores scattered, diameter about 0.5mm; cortex well developed and densely packed with spherasters.

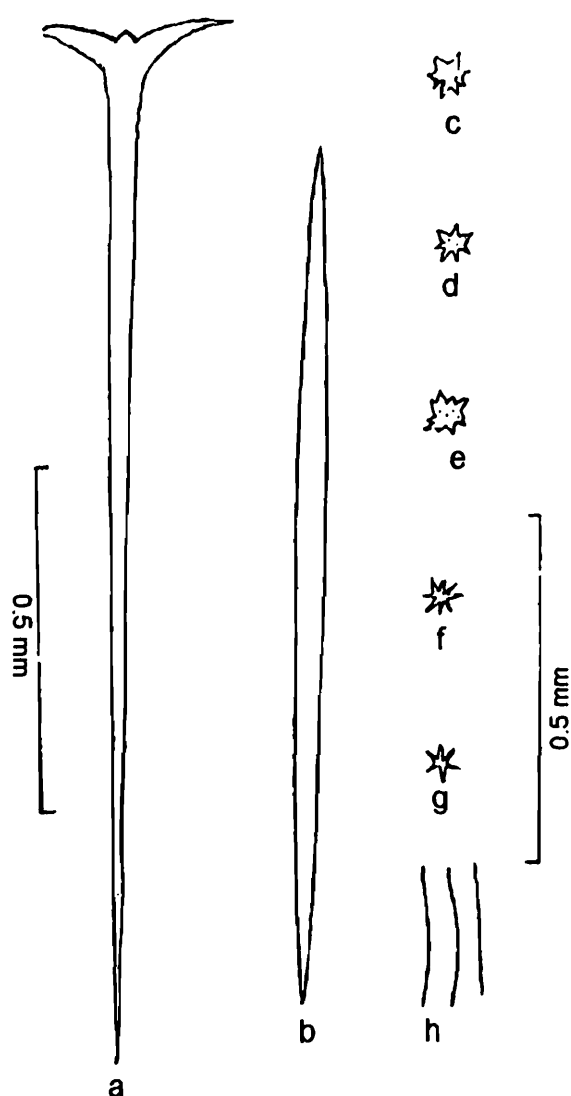


Fig. 5. *Rhabdastrella globostellata* a. orthotriaene b. oxea c, d, e. spherasters f, g. oxyasters h. raphides

Skeleton – Ectosomal skeletal framework radial peripherally by loosely scattered spicules; choanosomal skeletal architecture confused, consisting of orthotriaenes, of which shafts directed interior, clads towards surface; oxeas accompanied by scattered spherasters, oxyasters and raphides microscleres.

Megascleres – (1) Orthotriaenes with clads at right angles with shaft, shaft 0.35-1.05 mm long, 0.015-0.042 mm wide; clads 0.05-0.12 mm long, 0.015-0.035 mm wide; (2) Oxeas, amphioxea, 0.45-1.25 mm long, 0.005-0.030 mm wide.

Microscleres – (1) Spherasters with small centrum, rays 1/3 of total diameter, diameter 0.02-0.07 mm, (2) Oxyasters with 4-10 slender rays with rough surface, centrum very small, diameter 0.015-0.075 mm, (3) Raphides slender, straight to slightly curved, hair-like, 0.15-0.25 mm long.

Distribution : In India : Andamans, Gulf of Mannar, Palk Bay and Mamallapuram.

Elsewhere : Singapore (Dragnewitsch, 1906), Indonesia (ZMA database).

Genus *Stelletta* Schmidt, 1862

Definition : Ancorinidae with euasters without a marked centrum (oxyasters, chiasters and tylasters) as the main microscleres.

Type species : *Stelletta grubei* Schmidt, 1862.

6. *Stelletta clavosa* Ridley, 1884 (Fig. 6a-f; Plate IF)

Stelletta clavosa Ridley, 1884, p. 474, pl. xiii, fig. 1; Dendy and Burton, 1926, p. 246, Burton and Rao, 1932, p. 311; Pattanayak, 2006, p.21, pl. II A, fig. 7a-f.

Myriastras clavosa Sollas, 1888, p. 115; Lindgren, 1897, p. 485; Dendy, 1905, p. 72; Wilson, 1925, p. 387; Brondsted, 1934, p. 5; Thomas, 1985, p. 336, fig.9.

Myriastras clavosa var. *quadrata* Sollas, 1888, p. 116, pl. xii, figs. 34-43, pl xiv, figs. 29-30.

Material examined : P3607/1, 3 ex., Mamallapuram, Dt. Kanchipuram, Shore collection, 04.04.2004, Coll. J.G. Pattanayak.

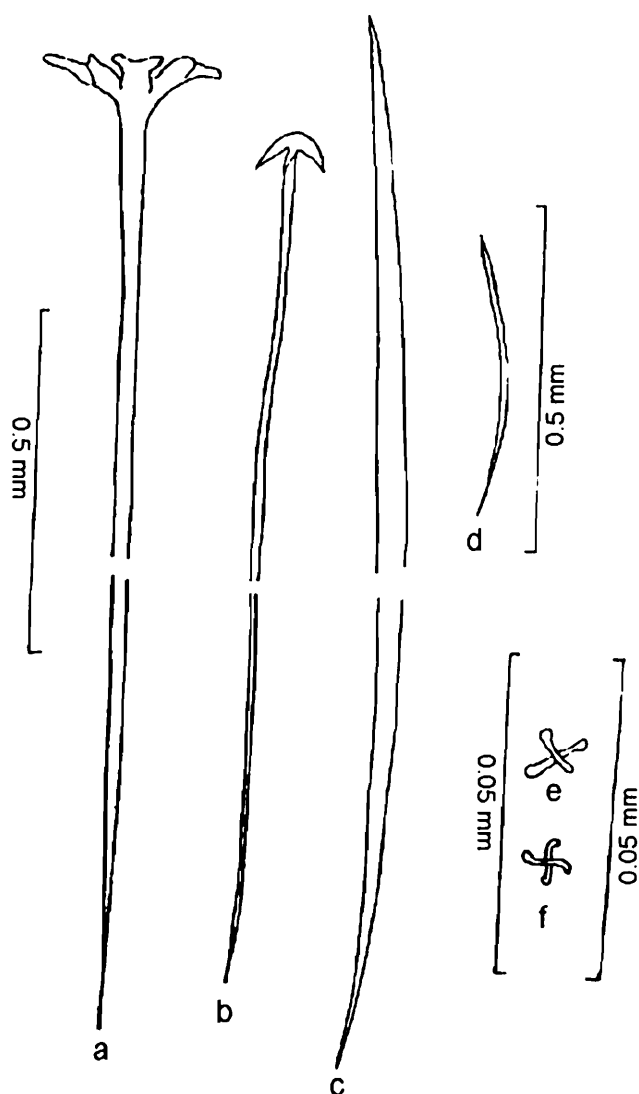


Fig. 6. *Stelletta clavosa* a. dichotriaene b. anatriaene c. oxea d. cortical oxea e., f. tylaster euasters

Description : Spherical, small, solitary, surface rough to touch; colour – grayish brown; oscules – terminal, circular and with a distinct rim, 1mm diameter.

Skeleton – composed of triaenes, oxeas in bundles arranged radially.

Megascleres – (1) Dichotriaenes, shaft straight, taper to sharply pointed end, 2.25-3.50 mm long, 0.03-0.04 mm wide, protocladome 0.07-0.1mm across, deutero cladome 0.25-0.3 mm across, (2) Anatriaenes, shaft 2.5-3 mm long, 0.002-0.003 mm wide, tapering to end, distal half very thin, each clad 0.04-0.05 mm long, (3) Oxeas, amphioxea, 2.5-3.5 mm long, 0.015-0.025 mm wide; cortical oxeas 0.03-0.4 mm long, 0.008-0.009 mm wide.

Microscleres – Tylaster euaster, diameter 0.008-0.10 mm.

Distribution : In India : Andaman and Nicobar Islands, Gulf of Mannar and Mamallapuram.

Elsewhere : Indo-Pacific region (Ridley, 1884), Singapore (Lindgren, 1897), Ceylon (Dendy, 1950), Philippines (Wilson, 1925), Mergui Archipelago, Kabusa Island (Burton and Rao, 1932), Vietnam and Indonesia (Brondsted, 1934).

7. *Stelletta purpurea* Ridley, 1884 (Fig. 7 a-f; Plate II A)

Stelletta purpurea Ridley, 1884, p. 473, pl. XL, fig. e, pl. XLIII, fig. j, p; Burton 1926, p. 14; Burton and Rao, 1932, p.310; Burton, 1937, p.4, pl. 1, fig. 1; Pattanayak, 2006, p. 22, pl. II B, fig. 8a-f.

Pilochrota purpurea Sollas, 1886, p. 190.

Myriastra biformis Brondsted, 1924, p.437, fig.1, a-e.

Myriastra purpurea de Laubenfels, 1954, p. 239, fig. 164, a-d; Bergquist, 1961, p.201, fig. 19a, b; Thomas, 1985, p. 336, pl. VII, fig. 8.

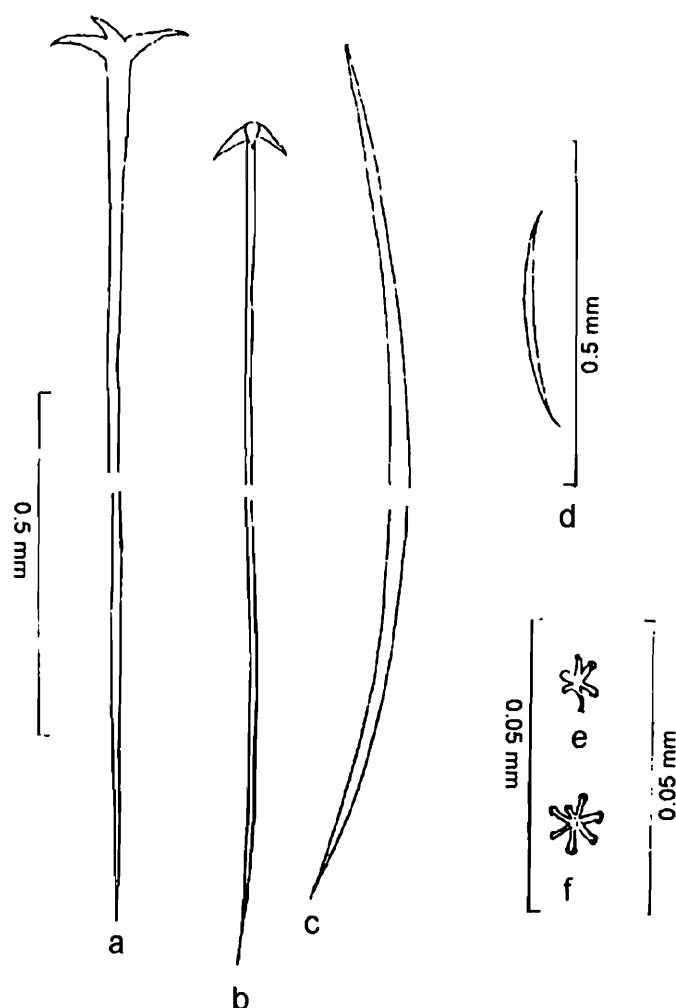


Fig. 7. *Stellata purpurea* a. orthotriaene b. anatriaene c. oxea d. cortical oxea e, f. tylaster euasters

Material examined : P3608/1, 5 ex., Kanyakumari, off shore collection, 06.09.2003, Coll. Ch. Satyanarayana; P1139/1, 4ex. Single Island, Gulf of Mannar, Govt. Mus. Madras.

Description : Small, spherical, with centrally placed circular vent at apex, surface hispid; consistency hard, incompressible; oscules – slit-like, protected by a sphincter, 1-2mm diameter; colour – pale yellow to a purplish brown.

Skeleton - Consists of oxeas, orthotriaenes, anatriaenes in bundles arranged radially.

Megascleres – (1) Orthotriaenes, shaft straight, sharply pointed end, 0.4-1.3 mm long, 0.015-0.040 mm wide, each clad 0.05-0.15 mm long, 0.015-0.035 mm wide. (2) Anatriaenes, shaft straight or curved, tapering to pointed end, 0.35-1.45 mm long, 0.004-0.020 mm wide, and each clad 0.015-0.45 mm long. (3) Oxeas, amphioxea, 0.12-1.35 mm long, 0.01-0.03 mm wide, Cortical oxeas, 0.22-0.35 mm long.

Microscleres – Tylaster euasters with 6-10 slightly granulated rays, swollen at end, diameter 0.009-0.014 mm.

Distribution : In India : Gulf of Mannar, Palk Bay, Kanyakumari, Tuticorin Pearl Oyster Banks and Nicobars.

Elsewhere : Indo-Pacific region (Ridley, 1884), New Zealand (Brondsted, 1924), South Africa (Burton, 1926), Preparis Island, Burma (Burton & Rao, 1932), West Central Pacific (de Laubenfels, 1954), Chatham Island, New Zealand (Bergquist, 1961), Brazil (Mothes and Moraes, 1985).

Family GEODIIDAE Gray, 1867

Definition : Astrophorida with large oxeas and triaenes as megascleres. Microscleres are sterrasters, together with euasters, spherules or microrhabds.

Genus *Geodia* Lamarck, 1815

Definition : Geodiidae with large oxeas and regular triaenes arranged radially at or near the surface. Globular sterrasters and euasters as microscleres. Inhalant and exhalant conducts and cribriporal.

Type species : *Geodia gibberosa* Lamarck, 1815

8. *Geodia inconspicua* (Bowerbank, 1873) (Fig. 8 a-h, Plate II B)

Pachymatisma inconspicua Bowerbank, 1873, pp. 319-333, pls XXVIII-XXXI.

Geodia inconspicua Burton and Rao, 1932, p. 322; Thomas, 1985, p. 339, pl. VII, fig. 16.

Material examined : P3609/1, five ex., Kasimedu fishing harbour, Chennai, off shore collection, 07.04.2004, Coll. J.G. Pattanayak; P3593/1, one ex, February, 1925, Coll. B. N. Chopra and H. S. Rao.

Description : Sponge massive and sessile. Surface even, hispid. Colour, light brown. Oscules and pores not traceable. Cortex. 0.5 mm thick.

Skeleton – Radiate at periphery and confused towards the interior, Sterrasters and oxyasters dispersed within the choanosome.

Megascleres – (1) Orthotriaenes. Shaft 2.0-2.5 mm long, 0.033-0.035 mm wide. (2) Protriaenes. Very rare, 1.5-1.8 mm long, 0.014-0.015 mm wide (3) Anatriaenes. Rare, size 1.96

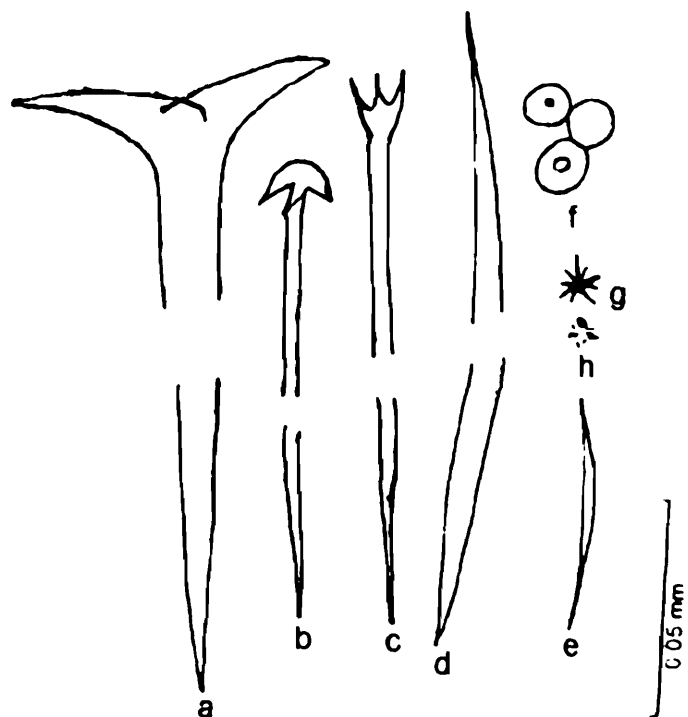


Fig. 8. *Geodia inconspicua* a. orthotriaene b. anatriaene c. protriaene d. oxea e. cortical oxea f. sterrasters g. spheraster h. oxyaster

× 0.004 mm. 1.9-2.0 mm long, 0.004-0.005 mm wide (4) Oxeas. Size, 1.9 × 0.024 mm. 1.8-2.05 mm long, 0.022-0.025 mm wide (5) Cortical oxeas. Size, 0.35-0.45 mm long, 0.035-0.040 mm wide.

Microscleres – (1) Sterrasters. Spherical, diameter 0.06 mm. (2) Spheresters. Rays cylindrical, truncate; diameter, 0.006 mm. (3) Oxyasters. Choanosomal: diameter, 0.006 mm.

Distribution : In India : Gulf of Mannar and Chennai.

Elsewhere : widely distributed in Indo-Australian region.

Order HADROMERIDA Topsent, 1894

Definition : Demospongiae with monaxonic megascleres (tylostyles, subtylostyles, oxeas, or derivatives) forming radiate or subradiate skeletal arrangement, sometimes only obvious in the peripheral skeleton; ectosomal spicules usually smaller than choanosomal ones, and where present they may produce a cortical skeleton; spongin often sparse producing firm non-elastic consistency; microscleres may include various forms of eusters, spirasters, rhabds, microxeas and/or raphides in trichodragmata, or absent in many taxa.

Family CLIONAIDAE D'Orbigny, 1851

Definition : Excavating Hadromerida with tylostyles and a great variety of microscleres; microscleres, including spirasters, amphiasters, microxeas, spiral microstrongyles, and derivatives may be lacking altogether.

Genus *Cliona* Grant, 1826

Definition : Excavating, mostly cryptic Clionaidae without elaborate aquiferous morphology; with microscleres composed of raphides or spirasters, including amphiastrose modification of spirasters or entirely smooth forms (sinuous microrhabds).

Type species : *Cliona celeta* Grant, 1826

9. *Cliona ensifera* Sollas, 1878 (Fig. 9 a-e)

Cliona ensifera Sollas, 1878, p. 54; Thomas, 1972, p. 346, pl. 1, figs. 7, 7c; Thomas, 1985, p. 320, pl. VI, fig. 18; Pattanayak, 2006, p. 30, pl. III C, fig. 14a-e.

Material examined : P3610/1, 4 ex., Marina beach, Chennai, 08.04.2004, Coll. J.G. Pattanayak.

Description : Boring on shells, chambers of cavities spherical, 2-3 mm in diameter and inter chamber canal 0.2-0.4 mm diameter; openings through which incurrent and excurrent papillae project out small, 0.5-1.0 mm in diameter; colour – grayish.

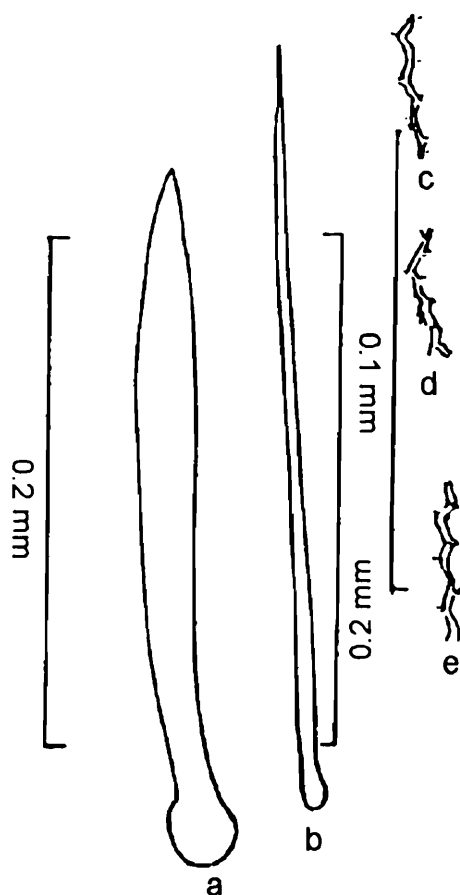


Fig. 9. *Cliona ensifera* a. ensiform tylostyle b. slender tylostyle c-e. spirasters

Megascleres – (1) Ensiform tylostyles, slightly curved, spherical head, sharply pointed tip, size 0.25-0.35 mm long and 0.01-0.02 mm wide, (2) slender tylostyles slightly curved shaft, sharply pointed tips and globular or trilobed head, 0.2-0.3 mm long, 0.002-0.005 mm wide.

Microscleres – Spirasters with 3-5 bends, sharp pointed spines at angles only; size 0.025-0.040 mm long, 0.001 mm wide.

Distribution : In India : Andamans, Gulf of Mannar and Chennai.

Elsewhere : Widely distributed in Indian Ocean. (Sollas, 1878; Thomas, 1972), Indonesia (ZMA database).

10. ***Cliona lobata*** Hancock, 1849
(Fig. 10 a-f)

Cliona lobata Hancock, 1849, p. 341, pl. 12, figs. 4, 8; Burton, 1937, p.16, pl. 8, fig. 53; Thomas, 1985, p. 318, pl. VI, fig. 14; Pattanayak, 2006, p.31, pl. III D, fig. 16a-f.

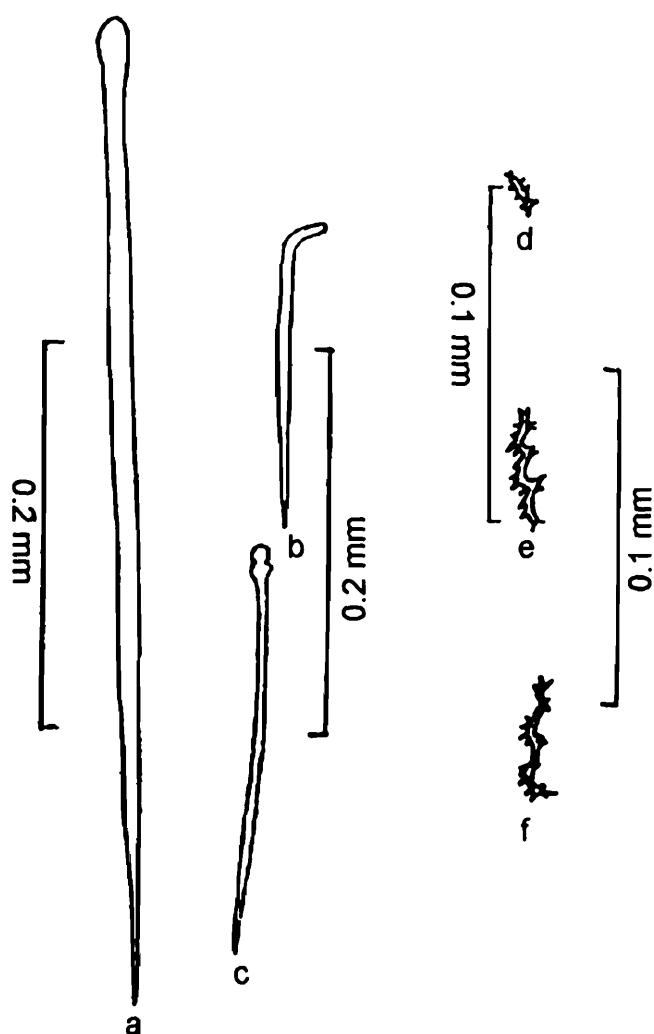


Fig. 10. *Cliona lobata* a-c. tylostyles d-f. spirasters

Material examined : P3611/1, 6 ex., Kodikkarai, Dt. Nagapattinam, Shore collection, 24.03.2004, Coll. J.G. Pattanayak; P1145/1, one ex, Coll. Gravely.

Description : Boring on molluscan shells; incurrent papillae 0.3-0.4 mm diameter; excurrent papillae 0.8-1.3 mm diameter; colour – pale brown.

Skeleton – Tylostyles form main skeleton of linear and reticulate pattern.

Megascleres – Tylostyles with trilobed heads, 0.15-0.45 mm long, 0.004-0.008 mm wide; Oxeas absent.

Microscleres – Spirasters of two types (a) spines distributed throughout body. (b) spines at angles and ends only. Spirasters 0.02-0.07 mm long and 0.003-0.05 mm wide.

Distribution : In India : Andamans, Gulf of Mannar, Kodikkarai.

Elsewhere : Atlantic Ocean (Hancock, 1849), Indonesia (ZMA database).

11. ***Cliona mucronata*** Sollas, 1878
(Fig. 11 a-e)

Cliona mucronata Sollas, 1878, p. 60; Dawydoff, 1952, p. 48; Thomas, 1972, p.347, pl. 1, figs. 8A-D; Thomas, 1985, p. 320, pl. VI, fig. 19; Pattanayak, 2006, p. 32, fig. 17a-e.

Material examined : P3612/1, 2 ex., Kodikkarai, Dt. Nagapattinam, Shore collection, 24.03.2004, Coll. J.G. Pattanayak.

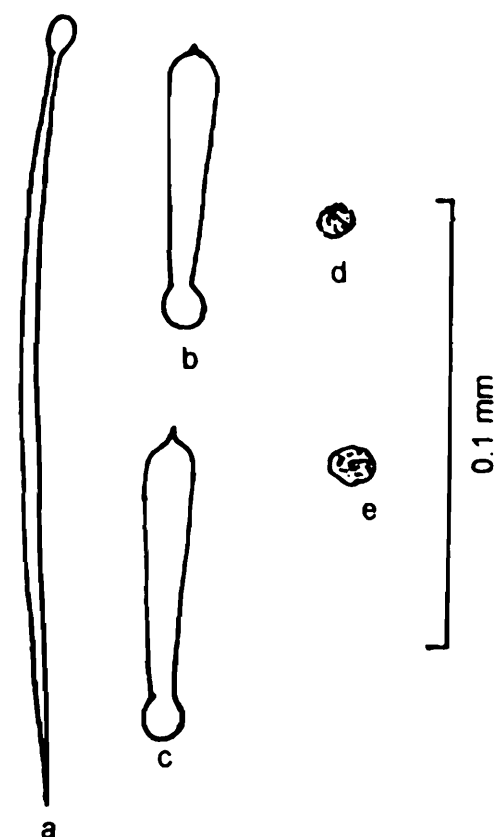


Fig. 11. *Cliona mucronata* a. tylostyle b,c. mucronate microscleres d,e. spherules

Description : Boring into mollucan shells, irregular cavities, 2-4 mm diameter; interchamber connection slender, provided with a sphincter formed of mucronate spicules; openings on surface of coral through which incurrent and excurrent papillae protrude out; solitary or in groups and 0.5-1.0 mm diameter; colour – pale yellow.

Megascleres – Tylostyles straight or slightly curved with spherical trilobed head, size 0.12-0.15mm long and 0.003-0.004 mm thick.

Microscleres – (1) Mucronate spicules with spherical or trilobed heads and shaft end with or without a mucronate, size 0.05-0.07 mm long and 0.005-0.010 mm wide, diameter of head 0.008-0.020 mm. (2) Spherules plenty, size 0.002-0.006 mm diameter.

Distribution : In India : Andamans, Gulf of Mannar, Kodikkarai.

Elsewhere : Vietnam (Dawydoff, 1952); Indonesia (ZMA database).

12. *Cliona viridis* (Schmidt, 1862)
(Fig. 12a- d)

Vioa viridis Schmidt, 1862, p.1.

Cliona viridis, Thomas, 1972, p. 349, pl.2, fig. 1; Thomas, 1985, p.319, pl. VI, fig. 16.

Material examined : P3613/1, 3 ex., Mamallapuram, Dt. Kanchipuram, Shore collection, 04.04.2004, Coll. J.G. Pattanayak; P213/1, one ex, Coll. S.W. Kemp.

Description : Boring into mollucan shells, chambers formed inside the shells irregular and diameter up to 8 mm, but small chambers (up to 3 mm) are normally present. Colour pale yellow. Papillea small, 2-3 mm in diameter; hard and leathery.

Megascleres –Tylostyles. Size, 0.1-0.35 mm long and 0.002-0.012 mm thick.

Microscleres – Spirasters. With 2-5 angulations; spines long, conical and only on convex parts. Size, 0.03-0.05 mm long and 0.001-0.002 mm wide.

Distribution : In India : Gulf of Mannar and Mamallapuram.

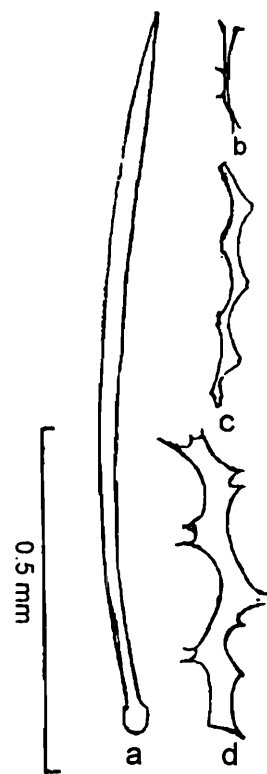


Fig. 12. *Cliona viridis* a. tylostyle b-d. spirasters

Elsewhere : Atlantic Ocean, Mediterranean Sea, Red Sea and Indo-Pacific.

Genus *Cliothesa* Topsent, 1905

Definition : Clionaidae with amphiasters as microscleres.

Type species : *Thoosa hancocki* Topsent, 1888

13. *Cliothesa quadrata* (Hancock, 1849)
(Fig. 13 a & b)

Cliona quadrata Hancock, 1849, p. 344, pl. 5, fig. 6; Thomas, 1985, p. 319, pl. VI, fig. 15; Pattanayak, 2006, p. 33, fig. 18a-b, pl. III E.

Cliona warreni, Carter, 1881, p. 370, pl. 18, fig. 6.

Cliothesa quadrata, Rützler, K.; Stone, S.M. 1986, p. 658.

Material examined : P3615/1, 2 ex., Arkadutarai, Dt. Nagapattinam, Shore collection, 23.03.2004, Coll. J.G. Pattanayak

Description : Boring on molluscan shells, cavities formed inside the shells 1-2 mm diameter and rectangular in shape; colour – dark brown.

Megascleres – Tylostyles only, head

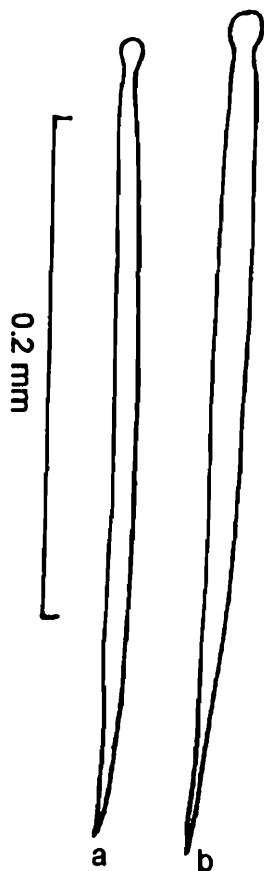


Fig. 13. *Cliothosa quadrata* a,b. tylostyles

spherical, short, large and fusiform, 0.3-0.35 mm long, 0.008-0.012 mm wide.

Microscleres – absent.

Distribution : In India : Andamans, Gulf of Mannar and Arkadutarai.

Elsewhere : Mediterranean Sea, South Atlantic (Hancock, 1869), Indonesia (ZMA database)

Genus *Pione* Gray, 1867

Definition : Clionidae with tylostyles and microspined oxeas and microrhabds.

Type species : *Cliona northumbrica* Hancock, 1849

14. *Pione vastifica* (Hancock, 1849) (Fig. 14 a-d)

Cliona vastifica Hancock, 1849, p.342; Thomas, 1972, p. 345, pl. 1, fig. 3, 3A, 3B; Thomas, 1985, p. 318, pl. VI, fig. 13; Pattanayak, 2006, p. 33, pl. IV A, fig. 19a-d.

Pione vastifica, Hooper and Van Soest, 2002, p. 180, fig. 12.

Material examined : P3614/1, 6 ex., Kodikkarai, Dt. Nagapattinam, Shore collection, 24.03.2004, Coll. J.G. Pattanayak.

Description : Boring on shells, opening on shells very small from 0.5-1.0 mm; colour – grey. Chambers found inside the shell different in shape and pores 0.5-1.0 mm in diameter and 0.5-2.0 mm apart.

Megascleres : (1) Tylostyles straight and sharply pointed head well developed and spherical, size 0.15-0.20 mm long, 0.001-0.003 mm wide. (2) Oxeas spined and sharply pointed, 0.04-0.12 mm long, 0.001-0.003 mm wide.

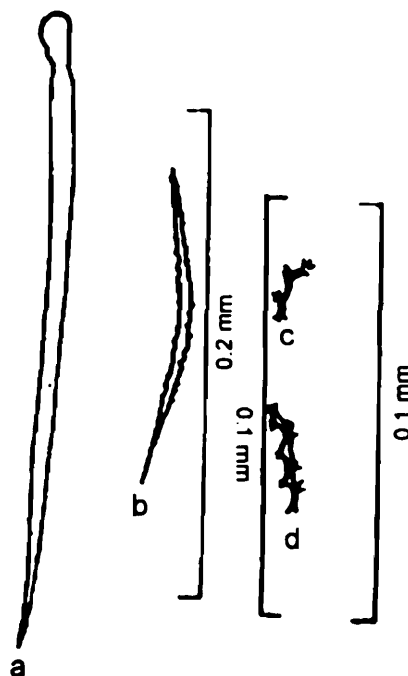


Fig. 14. *Pione vastifica* a. tylostyle b. oxea c, d. spirasters

Microscleres – Spirasters with 3-6 angulations, spines more prominent at the angular region or granulated throughout or even smooth, size 0.007-0.015mm long, 0.001-0.002 mm wide.

Distribution : In India : Andamans, Chilka Lagoon, Gulf of Mannar, Kodikkarai, Minicoy Island, Zuary and Mandovi Estuary.

Elsewhere : Cosmopolitan.

Genus *Sphaciospongia* Marshall, 1892

Definition : Massive Clionidae with complex, incurrent pore sieves, abundant large

tylostyles in the choanosome and rare, minute spirasters and their amphiastrose derivatives in the ectosome.

Type species : *Alcyonium vesparium* Lamarck, 1815.

15. *Spheciospongia inconstans*

(Dendy, 1887)

(Fig. 15 a-h; Plate II C)

Suberites inconstans Dendy, 1887, p. 154.

Spirastrella inconstans Sollas, 1902, p. 216, pl. 14, fig. 3; Levi, 1961b, p. 513; Thomas, 1985, p.305, pl. V, fig. 23; Pattanayak, 2006, p.33, pl.IV C, fig.21a-h.

Spheciospongia inconstans Van Soest, 2009-10-24 (genus transfer)

Material examined : P3616/1, 5 ex., Kanyakumari, off shore collection, 06.09.2003, Coll. Ch. Satyanarayana.

Description : Sponge massive, finger shaped,

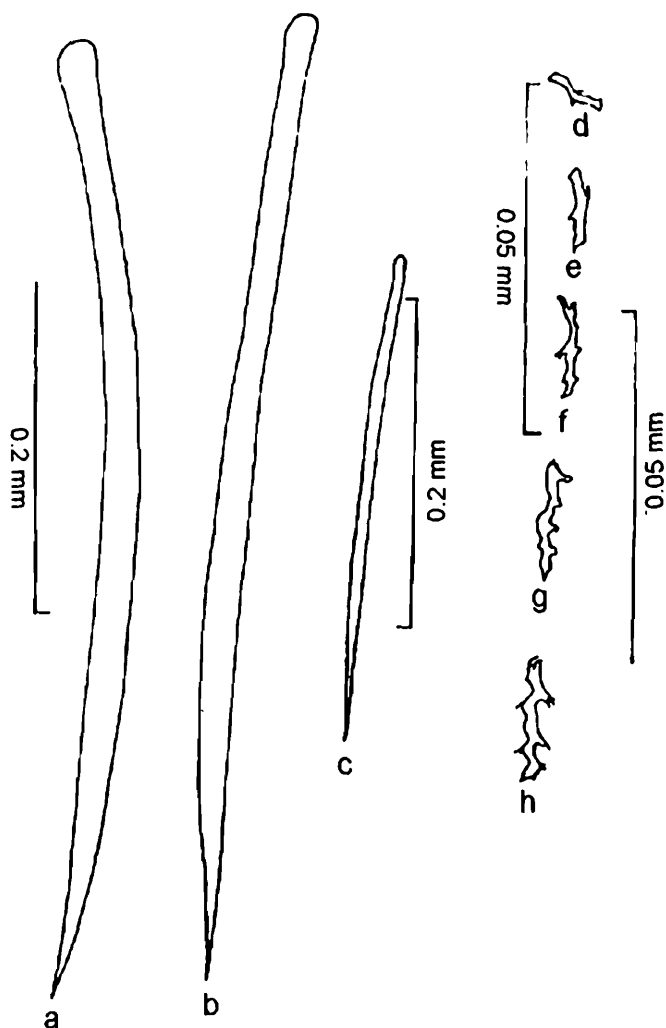


Fig. 15. *Spheciospongia inconstans* a-c. tylostyles d-h. spirasters

surface smooth, size variable small to bigger ones; colour – light brown to grayish white, oscules – terminal in digital form, 5-1.0 mm; pores distributed throughout body in massive form.

Skeleton – Tylostyles running vertically up through the interior ending in dermal brushes; fusion of tylostyles give rise to the compact mass in the interior; spirasters less in number, scattered throughout the body.

Megascleres – Tylostyles 0.15-0.60 mm long, 0.004-0.015 mm wide.

Microscleres – Spirasters few in number, 0.005-0.020 mm long and 0.001-0.002 mm wide.

Distribution : In India : Andamans, Gulf of Mannar, Palk Bay and Kanyakumari.

Elsewhere : Pulau Bidang, NE of Penang, 5°30' N (Sollas, 1902), Zamboanga, Philippines (Levi, 1961b), Indonesia (ZMA database).

Family SUBERITIDAE Schmidt, 1870

Definition : Hadromerida without cortex and without microscleres other than microrhabds; spicules tylostyles or styles, exceptionally oxeas, arranged in brushes or palisade in the peripheral region.

Genus *Suberites* Nardo, 1833

Definition : Suberitidae with ectosomal skeleton consisting of bouquets of smaller tylostyles carried by subradiate bundles of larger tylostyles; choanosomal skeleton confused or alveolar arrangement of larger tylostyles. If present, microscleres are spined centrotyle microstrongyles.

Type species : *Alcyonium domuncula* Olivi, 1792

16. *Suberites carnosus* (Johnston, 1842)

(Fig. 16a, b; Plate II D)

Halichondria carnosus Johnston, 1842 : i-xii, 1-264, pls I-XXV.

Suberites carnosus, Rao, 1941, p. 426; Thomas, 1985, p. 310, pl. V, fig. 35.

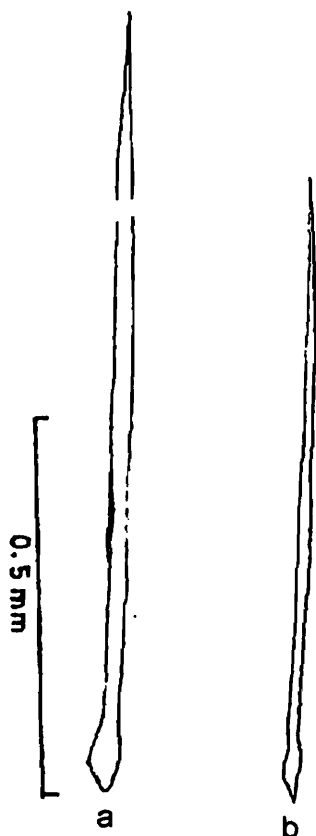


Fig. 16. *Suberites carnosus* a&b tylostyle

Material examined : P3617/1, one ex., Kasimedu fish landing centre, Chennai, off shore collection, 24.09.2003, Coll. Ch. Satyanarayana.

Description : Sponge club shaped, hard and friable in texture, surface rough to touch, Colour- orange, Consistency fleshy; oscules terminal, circular, slit-like and highly contractile, leads into a wide canal running throughout the length of the sponge.

Skeleton – Skeletal framework composed of a very dense mass of thick but loose bundles of tylostyles and fibres running in all directions and lie tangentially towards the surface; smaller spicules present in the dermal parts in brushes.

Megascleres – Tylostyles straight or curved, two size categories, 0.50-0.75 mm long, 0.020-0.025 mm wide and 0.20-0.40 mm long, 0.004-0.008 mm wide.

Microscleres – Absent.

Distribution : In India : Gulf of Mannar, Palk Bay and Chennai.

Elsewhere : Cosmopolitan.

Family TETHYIDAE Gray, 1848

Definition : Hasdromerida usually with stylote megascleres, mainly strongyloxeas, generally in radiate tracts and two categories of euasterose microscleres, micrasters and megasters, sometimes rhabds.

Genus *Tethya* Lamarck, 1814

Definition : Tethyidae with main skeleton formed by strongyloxea bundles radiating from the center of the sponge. Main megascleres are usually strongyloxeas, interstitial (auxiliary) megascleres are often styles. Megasters are spherasters or oxyasterasters. Micrasters are tylasters, strongylasters or oxyasters.

Type species : *Alcyonium aurantium* Pallas, 1766.

17. *Tethya diploderma* Schmidt, 1870 (Fig. 17 a-g; Plate II E)

Tethya diploderma Schmidt, 1870, p. 52, pl. 4, fig. 2; Topsent, 1918, p. 563; Brondsted, 1934, p. 5; Burton, 1937, p. 12; pl. 9; Thomas, 1985, p. 331, pl. VII, fig. 2; Pattanayak, 2006, p. 37, pl. IV E, fig. 23a-g.

Tethya lyncurium var. C Dendy, 1905, p. 114.

Material examined : P3618/1, 5 ex., Kanyakumari, off shore collection, 06.09.2003, Coll. Ch. Satyanarayana; P3599/1, 2 ex, Santapalli, Madras, Coll. T. S. Gardiner

Description : Hemispherical, surface tuberculated, ridges extending over the surface, consistency tough and compressible; colour – pale brown, Oscules – opens at terminal ends, in groups, very minute, 0.5 mm diameter.

Skeleton – Ectosome thin, densely packed, tylasters arranged compactly; choanosome consisting of radiate bundles of strongyloxeas; spherasters and oxyasters present in the flesh.

Megascleres – Strongyloxeas long, straight, base round with other end sharply pointed, 0.5-1.2 mm long, 0.010-0.020 mm wide.

Microscleres – (1) Spherasters with ten or more smooth conical rays, 0.03-0.05mm diameter, (2) Oxyasters with several conical

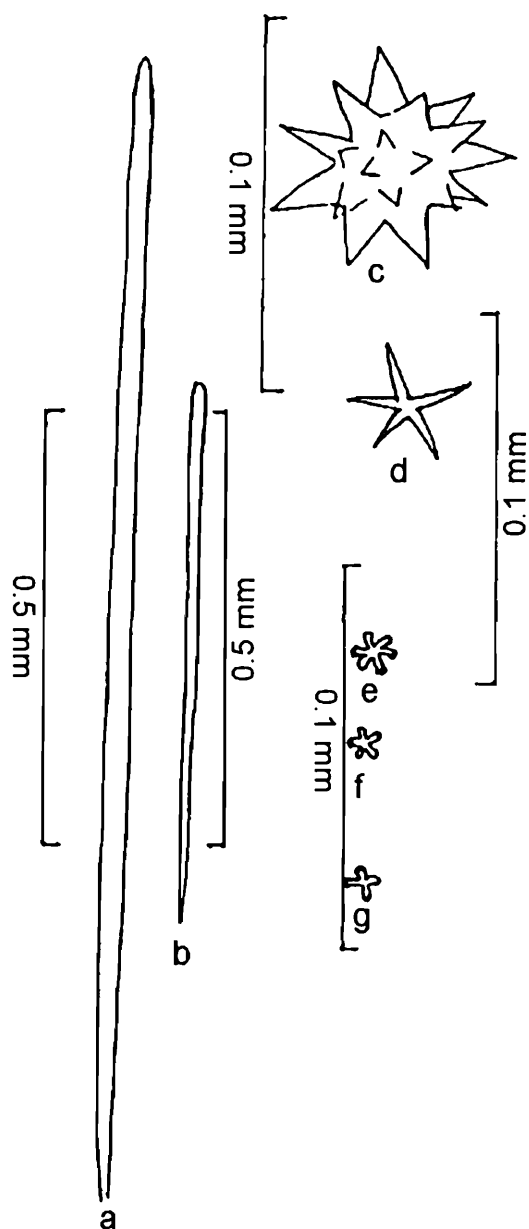


Fig. 17. *Tethya diploderma* a,b. strongyloxeas c. spheraster d. oxyaster e-g. tylasters

rays, 0.020-0.035 mm diameter, (3) Tylasters with several tylote rays, 0.012-0.015 mm diameter.

Distribution : In India : Andaman and Nicobar Islands, Gulf of Mannar, Palk Bay and Kanyakumari.

Elsewhere : Atlantic Ocean (Schmidt, 1870) Red sea (Topsent, 1918), Banda, Indonesia (Brondsted, 1934).

Genus ***Stellitethya*** Sara, 1994

Definition : Tethyidae with megascleres styles or strongyloxeas (fusiform styles), vertically crossing the sponge in parallel bundles. Megasters represented by

oxyspherasters, micrasters usually represented by tylasters.

Type species : *Stellitethya extensa* (Hentschel, 1909)

18. *Stellitethya repens* (Schmidt, 1870)
(Fig. 18 a-e; Plate II F)

Tethya repens Schmidt, 1870, p. 51; Pattanayak, 2006, p. 38, pl. V A, fig. 24a-e.

Tethytimea repens, Lendenfeld, 1896, p. 164; Thomas, 1985, p. 332, pl. VII, fig. 4.

Donatia repens Burton, 1924, p. 1036; Dendy & Burton, 1926, p. 247.

Stellitethya repens Hooper and Van Soest, 2002, p. 258 (subgenus)

Material examined : P3619/1, 8 ex., Ovari, Tirunelveli, shore collection, 09.09.2003, Coll. Ch. Satyanarayana.

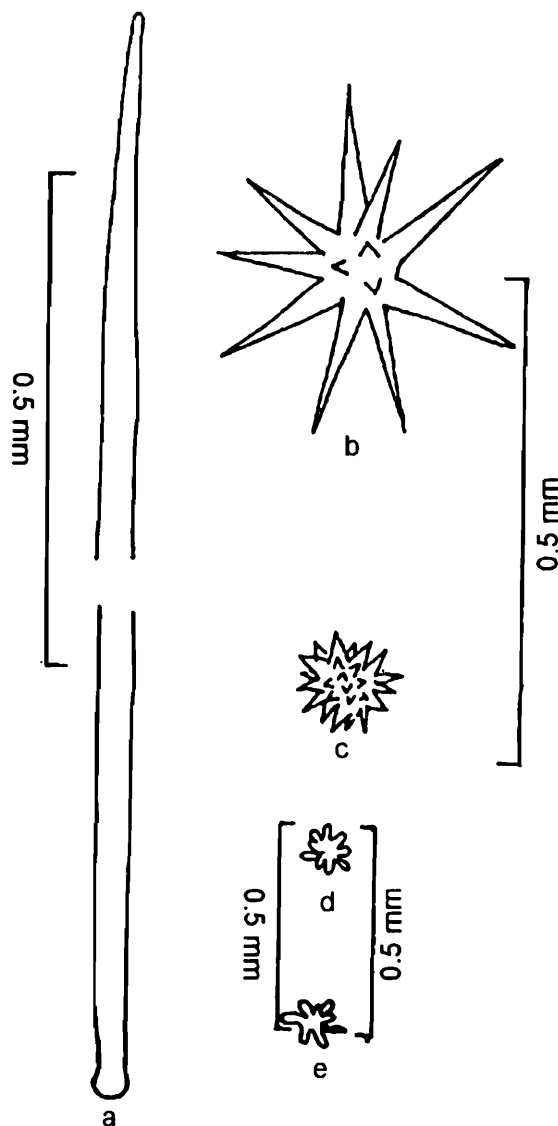


Fig. 18. *Stellitethya repens* a. tylostyle b,c. spherasters d-e. strongylasters

Description : Spherical, surface hispid, consistency hard and incompressible; colour – light gray, Oscules – Slit like, less in number; scattered throughout the body, Cortex – well developed thick and densely packed with spherasters.

Skeleton – radial with bundles of tylostyles terminating at the dermal brushes; smaller brushes of tylostyles present in cortex region.

Megascleres – (1) Tylostyles long and slightly curved, 0.30-2.25 mm long, 0.004-0.020 mm wide.

Microscleres – (1) Spherasters with branched or unbranched rays, 0.07-0.28 mm diameter, (2) Strongylaster small with 6-12 rays 0.008-0.015 mm in diameter.

Distribution : In India : Andamans, Gulf of Mannar, Palk Bay and Ovari.

Elsewhere : Atlantic Ocean (Schmidt, 1870), Mediterranean Sea (Lendenfeld, 1896), Indonesia (ZMA database).

Genus *Xenospongia* Gray, 1858

Definition : Thethidae with discoid body. Megascleres represented by styles in parallel bundles ending in the tubercles, crossed by thin bundles of styles in the lower part of the choanosome at the contact with the sand layer. Megasters oxyasters, heterogeneous in size and shape; micrasters spiny oxyasters, strongylasters, chiasters and tylasters.

Type species : *Xenospongia patelliformis* Gray, 1858

19. *Xenospongia patelliformis* Gray, 1858 (Fig. 19a-i)

Xenospongia patelliformis Gray, J.E. 1858 : 229, pl. 12;
Dendy, 1905, p. 116, pl. 7.

Material examined : P3620/1, 8 ex., Ovari, Tirunelveli, shore collection, 09.09.2003, Coll. Ch. Satyanarayana

Description : Sponge encrusting, upper surface convex with tubercles and conules. Colour, yellow. Consistency, firm and compact. Surface hispid due to the presence of radial

bundles of spicules. Oscules scattered; pores in groups. Cortex well developed and thickness about 1.0 mm.

Skeleton – Main skeleton composed of radial and transverse bands and cortex with a well developed layer of microscleres.

Megascleres – Styles. 1.5-1.75 mm long, 0.008-0.012 mm wide.

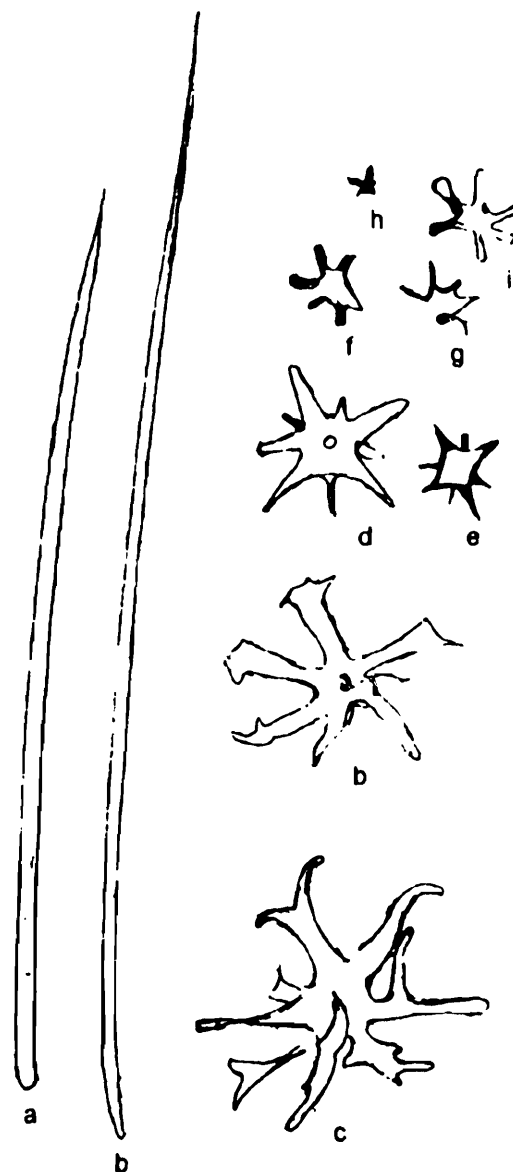


Fig. 19. *Xenospongia patelliformis* a, b. style c. spheraster d-i. strongylasters

Microscleres – Spherasters – Centrum small and with conical rays; diameter up to 0.075 mm. Strongylasters – Rays 4-8, tip of ray crown of spines; diameter 0.005-0.015 mm.

Distribution : In India : Gulf of Mannar and Ovari.

Elsewhere : Indo-Pacific.

Order LITHISTIDA Schmidt, 1870

Definition : 'Lithistid' Demospongiae (polyphyletic) characterized by choanosomal articulated spicules called desmas forming a rigid skeleton in most genera (informal group).

Family THEONELLIDAE Lendenfeld, 1903

Definition : 'Lithistid' Demospongiae with tetraclope choanosomal desmas and phyllo- to discotriaenes as ectosomal spicules.

Genus *Discodermia* du Bocage, 1870

Definition : Theonellidae with exclusively discotriaenes as ectosomal spicules; microscleres acanthoxeas and acanthorhabds.

Type species : *Dactylocalyx polydiscus* Bowerbank, 1869

20. *Discodermia papillata* Carter, 1880
(Fig. 20 a-f; Plate III A)

Discodermia papillata Carter, 1880, p. 146, pl. vii, fig. 48; Sollas, 1888, p. 330; Lendenfeld, 1903, p. 131; Burton and Rao, 1932, p. 305; Thomas, 1985, p. 344, pl. VIII, fig. 4; Pattanayak, 2006, p. 41, pl. V C, fig. 27a-f.

Material examined : P3524/1, 6 ex., Kodikkarai, Dt. Nagapattinam, Shore collection, 24.03.2004, Coll. J.G. Pattanayak.

Description : Sponge massive, irregular, surface smooth; Colour – pale white in spirit. Skeleton – Discotriaenes arranged in the dermal part with their shafts pointing inwards radially; beneath this layer desmas form a compact reticulation with the interlocking of their branches.

Megascleres – (1) Discotriaenes, diameter 0.20-0.25 mm, and shaft 0.10-0.12 mm long, 0.025-0.030 mm wide, (2) Tetracrepid desmas with wart-like tubercles, size 0.25-0.35 mm, arms 0.015-0.025 mm.

Microscleres – (1) Microstrongyles, microspined, 0.01-0.012 mm long, 0.002 mm wide, (2) Microxeas 0.30-0.35 mm long, 0.02 mm wide.

Distribution : In India : Andamans, Gulf of Mannar and Kodikkarai.

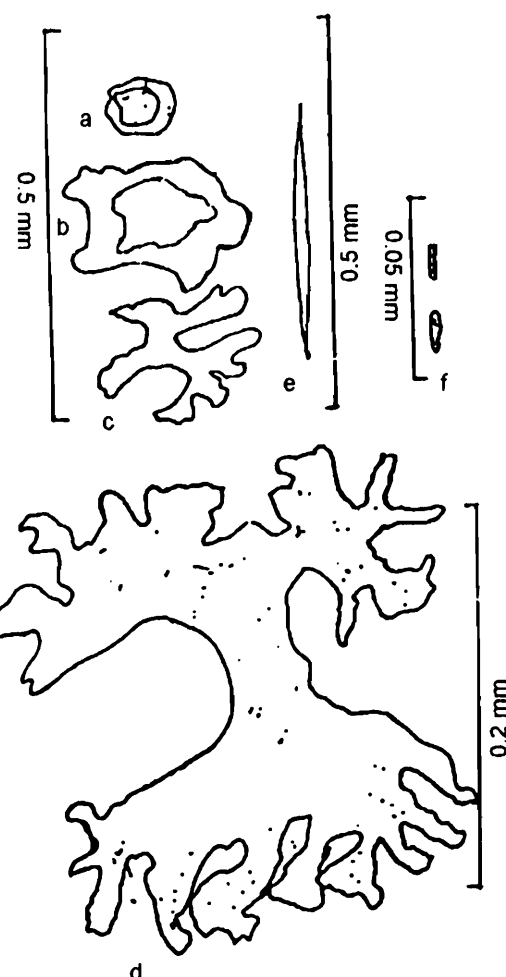


Fig. 20. *Discodermia papillata* a, b. discotriaene c, d tetracrepid desma e. microxea f. microstrongyle

Elsewhere : Off Cape Negrais, Burma (Burton & Rao, 1932).

Genus *Theonella* Gray, 1868

Definition : Theonellidae with phyllotriaenes to discotriaenes among ectosomal spicules; microscleres are acanthorhabds and/or acanthoxeas.

Type species : *Theonella swinhoei* Gray, 1868

21. *Theonella swinhoei* Gray, 1867
(Fig. 21 a-e; Plate III B)

Theonella swinhoei Gray, 1867, p. 556; Carter, 1873, p. 437; Sollas, 1888, p.284, pls. 29 & 30; Lendenfeld, 1903, p. 126; Wilson, 1925, p. 448; Burton and Rao, 1932, p. 307; Thomas 1985, p. 346, pl. VIII, Fig. 10; Pattanayak, 2006, p. 42, pl. V D, fig. 28a-e.

Material examined : P3525/1, 2 ex., Arkadutarai, Dt. Nagapattinam, Shore

collection, 23.03.2004, Coll. J.G. Pattanayak; P3600/1, 1 ex, Krusadai Island, Gulf of Mannar, Coll. B. N. Chopra and H. S. Rao.

Description : Sponge tubular, perpendicular to substratum, raised into irregular tubercles, surface smooth; colour - greyish white in spirit; Oscules – terminal, 8-10mm in diameter.

Skeleton – Phyllotriaenes, desmas and strongyles arranged around the axial canal, microscleres microstrongyles; silica deposited in irregular, granular masses around axial canals.

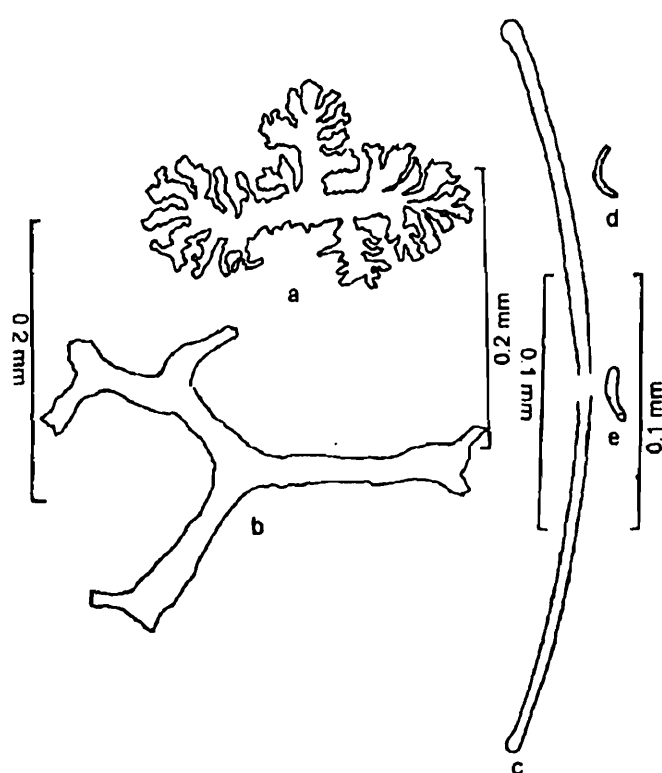


Fig. 21. *Theonella swinhoei* a. phyllotriaene b. desma c. strongyle d,e. microstrongyle

Megascleres – (1) Phyllotriaenes, conical shaft 0.12-0.15 mm long and 0.015-0.020mm wide, diameter of clads 0.2-0.5mm, (2) Desmas, ridged tuberculated, 0.5-0.7mm diameter, (3) Strongyles arranged in bundles, 0.5-0.6mm long, and 0.007-0.008mm wide.

Microscleres – (1) Microstrongyles, spiny, cylindrical, 0.025-0.030 mm long, 0.0025-0.0035 mm wide.

Distribution : In India : Andaman and Nicobar Islands, Krusadai Island and Arkadutarai.

Elsewhere : Red Sea, Indo-Pacific; Philippines (Wilson, 1925); Indonesia (ZMA database).

Family DESMANTHIDAE Topsent, 1893

Definition : 'Lithistid' Demospongiae encrusting, rarely massive in habit; choanosomal skeleton composed of branching desmas supposedly monorepidial or clearly monorepidial; other megascleres are oxeas and/or styles. Microscleres in one genus only, slightly resembling sanidaster.

Genus *Petromica* Topsent, 1898

Definition : Massive desmanthidae with desmas branching in various planes.

Type species : *Petromica grimaldii* Topsent, 1898

22. *Petromica (Petromica) massalis*

Dendy, 1905

(Fig. 22a & b; Plate III C)

Petromica massalis Dendy, 1905, p. 104, pl. 4, fig. 5; Burton, 1928, p. 110; Thomas, 1985, p. 304; Pattanayak, 2006, p. 43, pl. V E, fig. 29a & b.

Petromica (Petromica) massalis List-Armitage and Hooper, 2002, p. 813.

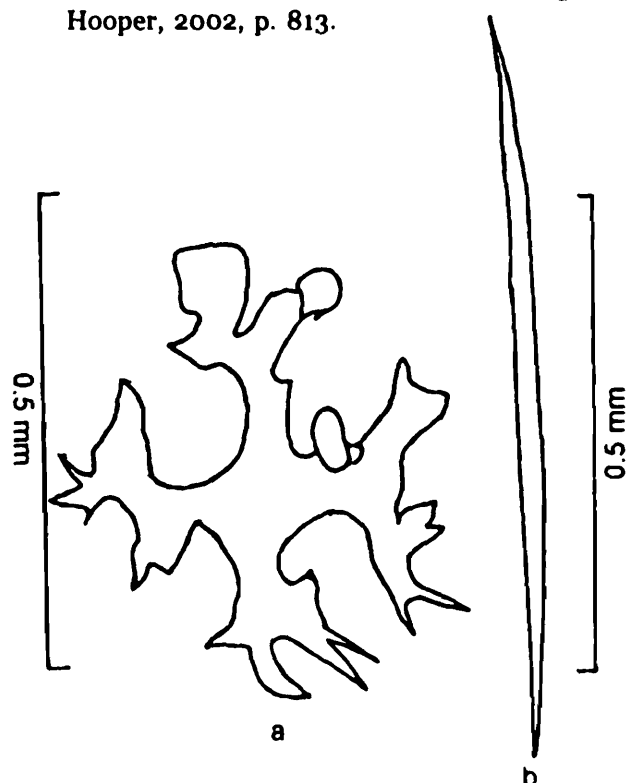


Fig. 22. *Petromica (Petromica) massalis* a. Desma b. oxea

Material examined : P3526/1, 2 ex., Arkadutarai, Dt. Nagapattinam, Shore collection, 23.03.2004, Coll. J.G. Pattanayak.

Description : Massive, hemispherical, broad base, diameter 6mm, surface hispid, uneven with pores bearing dermal membrane; texture hard and incompressible; colour – light gray; Oscules-inconspicuous.

Skeleton – reticulation of desmas and monaxon spicules; monaxon spicules partly arranged in bundles and end in surface supporting the dermal memberane.

Megascleres – (1) Desmas, monocrepid, 0.50-0.75 mm long, 0.04-0.07 mm wide, (2) Oxeas 0.95-1.15 mm long, 0.028-0.035 mm wide.

Microscleres - absent.

Distribution : In India : Andamans, Gulf of Mannar and Arkadutarai.

Elsewhere : Ceylon (Dendy, 1905).

Subclass CERACTINOMORPHA Levi, 1953

Definition : Demospongiae with parenchymella larvae and predominantly viviparous sexual reproduction; generally with both a spicule skeleton and well-developed sponging fibres forming a diversity of skeletal structures (although siliceous spicules are lost altogether in three orders and in several other genera, and sponging fibres are lost or greatly reduced in several genera scattered throughout the subclass). Spicules are monaxonic (either monactinal (styles) or diactinal (oxeas-strongyles), never tetractinal (although modifications to the ends of some monaxonic spicules occur and may appear to be superficially tetractinal); microscleres are diverse (meniscoid (chela), oxeote, toxote, spheres) but never astrose.

Order POECILOSCLERIDA Topsent, 1928

Definition : Demospongiae with skeleton composed of siliceous spicules; main skeleton composed of megascleres (monactinal, diactinal or both) and sponging fibres in various stages

of development; both fibre and mineral skeletons always show regional differentiation such that megascleres are often differentiated into distinct ectosomal and choanosomal components; microscleres include meniscoid forms such as chela (unique to the order), sigmas and sigmancistra-derivatives, and other diverse forms such as toxas, raphides, microxeas and disscate microrhabds; the order is predominantly viviparous with incompletely ciliated parenchymella larvae (one oviparous family (Raspailiidae), and another suspected oviparous family (Rhabderemiidae), is also included).

Suborder MICROCIONINA Hajdu, van Soest & Hooper, 1994

Definition : Poecilosclerida with terminally spined ectosomal monactinal megascleres (occasionally modified to quasidiactinal forms); choanosomal megascleres diverse, consisting of at least two categories localized to distinct regions within the skeleton, or sometimes up to five categories including spicules echinating fibres in many taxa; isochelae of palmate origin, with diverse forms of toxas but lacking sigmas.

Family MICROCIONIDAE Carter, 1875

Definition : Microcionina with terminally spined ectosomal styles, rarely modified to quasidiactinal or diactinal forms; three skeletal regions defined by the presence of different forms of structural styles; (1) choanosomal (axial) skeleton (with spongin fibres enveloping principal styles echinated by acanthose or smooth styles; in two groups this is replaced by a basal or axial renieroid skeleton of smooth or acanthose styles or strongyles, with or without echinating spicules); (2) subectosomal (extra-axial or extra-fibre) skeleton (with individual or tracts of auxiliary styles ascending to the surface); and (3) ectosomal skeleton (with smaller auxiliary styles forming a surface crust tangential, paratangential or perpendicular to the surface). One or more skeletal regions may be lost or modified. Megascleres predominantly smooth styles but may be modified and/or supplemented by quasidiactinal or diactinal

forms, or lost completely and replaced with detritus. Microscleres include palmate isochelae and diverse forms of toxas.

Subfamily MICROCIONINAE Carter, 1875

Definition : Microcionidae lacking a secondary renieroid skeleton, with only a reticulate, pulmo-reticulate, plumose hymedesmioid, microcionid or axially compressed primary skeleton.

Genus *Clathria* Schmidt, 1862

Definition : Microcioninae with auxiliary styles in one or two categories forming various ectosomal structures ranging from membranous paratangential to a dense erect palisade of brushes; choanosomal skeleton well-structured, hymedesmioid to reticulate, with mostly smooth styles enclosed within sponging fibres and fibres echinated by mostly acanthose smaller styles.

Subgenus *Microciona* Bowerbank, 1862

Definition : *Clathria* with persistently encrusting growth form, with hymedesmioid skeletal architecture consisting of a basal layer of spongin, typically with ascending, plumose, non-anastomosing spongin fibre nodes, and megascleres embedded and erect on basal layer.

Type species : *Microciona atrasanguinea* Bowerbank, 1862

23. *Clathria* (*Microciona*) *atrasanguinea* (Bowerbank, 1862) (Fig. 23 a-e; Plate III D)

Microciona atrasanguinea Bowerbank, 1862, p. 824, 1109, 1110, 1135, pl. 30, fig. 1, pl. 74, fig. 2; Burton, 1937, p. 30, pl. 4, fig. 24.

Scopalina atosanguinea Schmidt, 1866a, p. 149, Schmidt, 1866b, p. 15.

Microciona atosanguinea Gray, 1867, p. 535; Carter, 1880, p. 38-41, 151; Burton and Rao, 1932, p. 344-345.

Scopalina lophyropoda Schmidt, 1868, p. 26, 40.

Amphilectus atrasanguineus Vosmaer, 1880, p. 115.

Pluemohalichondria atrasanguinea Hanitsch, 1890, p. 207-208, 210.

Microciona atrasanguineum Cuenot, 1903, p. 4.

Cf. Microciona prolifera Vosmaer, 1935, p. 604, 607.

Clathria (*Microciona*) *atrasanguinea* van Soest, 1993, p. 103; Hooper, 1996, p. 219, Pattanayak, 2006, p. 46, pl. V F, fig. 30a-e

Material examined : P3528/1, one ex., Arkadutarai, Dt. Nagapattinam, Shore collection, 23.03.2004, Coll. J.G. Pattanayak.

Description : Spongebody thin, encrusting with some elevations, colour – pale brown in spirit; Oscules – minute irregularly distributed.

Skeleton – main skeleton arranged vertically on substratum either singly or in plumose columns.

Megascleres – (1) Subtylostyles of main skeleton smooth 0.3-5 mm long, 0.01-0.015

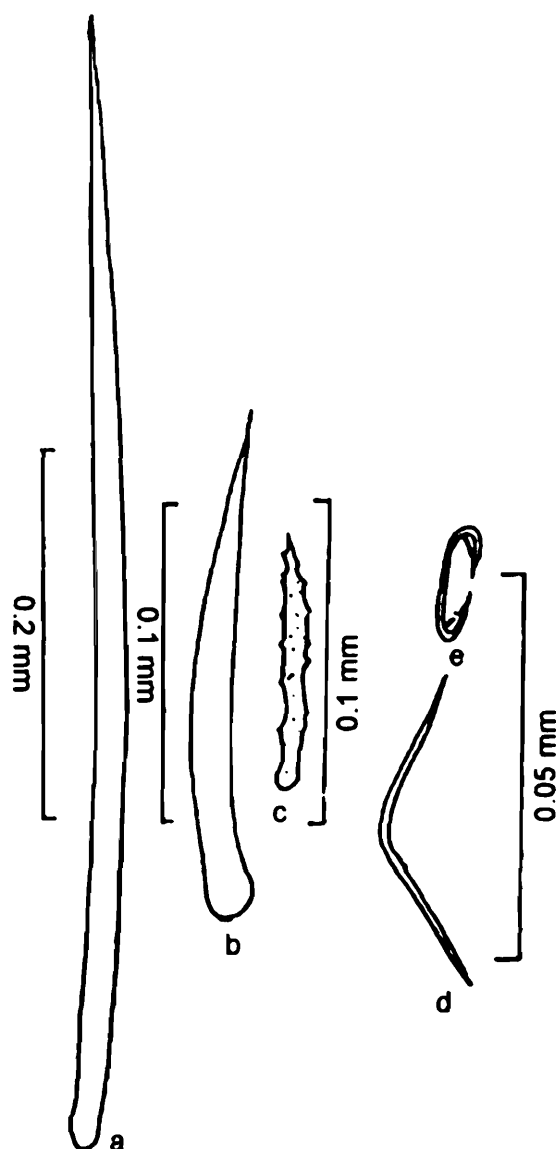


Fig. 23. *Clathria* (*Microciona*) *atrasanguinea* a. subtylostyle of main skeleton b. dermal subtylostyle c. Acanthostyle d. toxa e. Isochela

mm wide, (2) Acanthostyles spined throughout, 0.15-0.18 mm long, 0.006-0.007 mm wide, (3) Dermal subtylostyles smooth, 0.025-0.028 mm long and 0.003-0.004 mm wide.

Microscleres – (1) Toxas, 0.035-0.095 mm long, (2) Isochelas, chord, 0.006-0.007 mm long.

Distribution : In India : Andamans, Gulf of Mannar and Arkadutarai.

Elsewhere : Caribbean, NE Atlantic, Mediterranean sea, Red sea, Arabian Gulf, W. Indian Ocean, Bay of Bengal.

Subgenus **Thalysias** Duchassaing & Michelotti, 1864

Definition : *Clathria* with two categories of auxiliary styles forming a specialized ectosomal skeleton, the smaller usually forming discrete bundles or a continuous palisade perpendicular to the surface; echinating megascleres present.

Type species : *Spongia virgultosa* Lamarck, 1814

24. ***Clathria (Thalysias) vulpina***
(Lamarck, 1814)
(Fig. 24 a-f; Plate III E)

Spongia vulpina Lamarck, 1814, p. 376, 449.

Halichondria fondifera Bowerbank, 1875, pp. 288-289.

Amphilectus frondifera Vosmaer, 1880, p. 115.

Rhaphidophlus vulpina Ridley, 1884, p. 615.

Clathria frondifera Ridley, 1884, pp. 448-449, 612, pl. 42, fig. i, pl. 53, fig. j; Burton, 1937, pp. 27-28, pl. 3, fig. 21; Thomas, 1970, pp. 206-207; text fig. 11; Thomas, 1973b, pp. 33-34, pl. 2, fig. 6, pl. 8, fig. 4. Thomas, 1979b, pp. 26-27, pl. 2, fig. 1.

Clathria reinwardti var. *palmata* Ridley, 1884, p. 447.

Clathria corallitincta Dendy, 1889, p. 85, pl. 4, fig. 8; Dendy, 1916a, p. 128; Dendy, 1921, p. 65.

Not *Rhaphidophlus filifer* var. *spinifera* Lindgren, 1898, pp. 311-312, pl. 17, fig. 7, pl. 19, fig. 18; Thiele, 1903, 958.

Rhaphidophlus seriatus Thiele, 1899, p. 14, pl. 1, fig. 6, pl. 5, fig. 7.

Rhaphidophlus frondifera Thiele, 1903, p. 958, text-fig. 23.

Clathria frondifera var. *dichela* Hentschel, 1912, pp. 360-361.

Not *Clathria nuda* Hentschel, 1912, p. 298, 359, 364-365, pl. 19, fig. 28.

Not *Clathria frondifera* var. *major* Hentschel, 1912, p. 361.

Tenacia frondifera var. *dichela* Hallman, 1920, p. 771.

Clathria frondifera var. *seto-tubulosa* Wilson, 1925, p. 439.

Tenacia frondifera Burton and Rao, 1932, pp. 337-339; Burton, 1934, p. 559; Levi, 1961b, pp. 521-522, Text figs. 12, 13.

Rhaphidophlus vulpinus Topsent, 1932, p. 110, pl. 5, Fig. 3.

cf. *Microciona prolifera* Vosmaer, 1935, p. 609, 629.

Thalysias frondifera de Laubenfels, 1954, pp. 138-139, text Fig. 88.

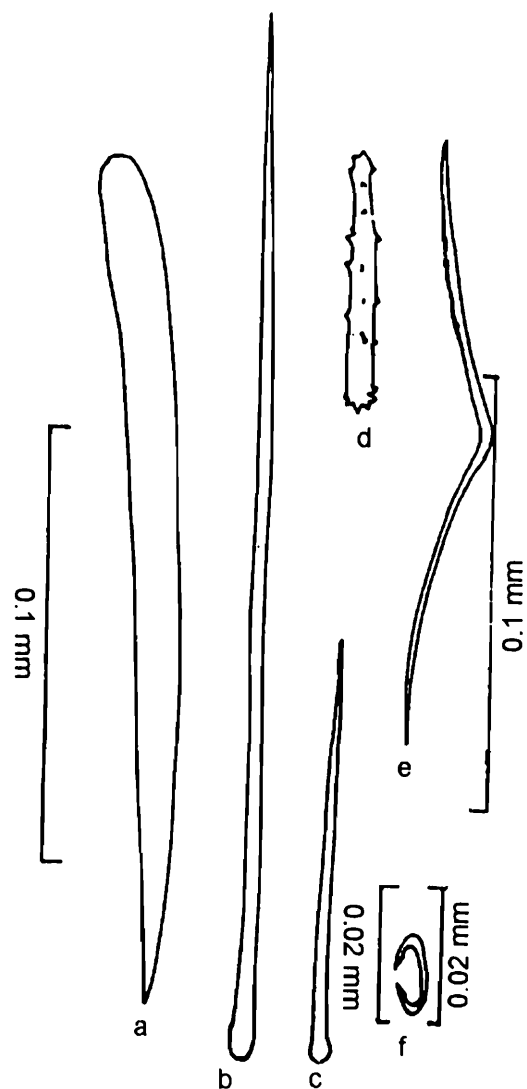


Fig. 24. *Clathria (Thalysias) vulpina* a. style b. interstitial subtylostyle c. dermal subtylostyle d. acanthostyle e. toxa f. isochela

Clathria typical Vacelet & Vasseur, 1971, p. 94.

Clathria dichela Vacelet *et al.*, 1976, p. 71, pl. 3, fig. b, Vacelet & Vasseur, 77, p. 114.

Rhaphidophylus dichela van Soest, 1984, p. 115.

Clathria vulpina Hooper & Levi, 1993, pp. 1246 - 1250, figs. 11-12, table 6; Hooper & Wiedenmayer, 1994, p. 274.

Clathria (Thalysias) vulpina Hooper, 1996, pp. 397, figs. 206-209, tables 41-42, plate 8F; Pattanayak, 2006, p. 47, pl. VI A, fig. 31 a-f.

Material examined : P3529/1, 6 ex., Kodikkarai, Dt. Nagapattinam, Shore collection, 24.03.2004, Coll. J.G. Pattanayak

Description : Spongebody massive and clathrous, uneven, surface - smooth, consistency - hard but brittle, colour - light gray in spirit; oscules - very less in number of irregularly scattered, 0.5-1.0 mm diameter.

Skeleton - composed of irregularly isodictyal network of spongin fibres cored by several lines of smooth styli and echinated by acanthostyles; auxiliary spicules subtylostyles of two sizes, larger occurring interstitially, smaller as dermal skeleton; microscleres chelae and toxons.

Megascleres - (1) Coring styles 0.18-0.3 mm long, 0.01-0.015 mm wide, (2) Interstitial subtylostyles 0.2-0.3 mm long, 0.005-0.008 mm thick, (3) Dermal subtylostyles 0.065-0.2 mm long, 0.003-0.008 mm wide (4) Acanthostyles 0.05-0.07 mm long, 0.005 mm thick.

Microscleres - (1) Chelas Isochelas, 0.013-0.016 mm long, (2) Toxa 0.14-0.16 mm long, 0.003-0.005 mm wide.

Distribution : In India : Andamans, Tuticorin, Kilakarai, Palk Bay, Kodikkarai, Katiawar (West Coast of India).

Elsewhere : Widely distributed throughout Indo-West Pacific, Australian region (Hooper, 1996); Mozambique (Thomas, 1979); Madagascar (Vacelet *et al.*, 1971, 1976, 1977; Hooper, 1996); Amirante Is (Ridley & Dendy, 1887); Seychelles Is (Ridley & Dendy, 1887; Thomas, 1979); Aldabra Is (Levi, 1961); Red Sea (Topsent, 1892; Burton, 1959); Sri Lanka (Dendy, 1889, 1916; Lindgren, 1897); Mergui

Archipelago and Andaman Is (Burton & Rao, 1932); Straits of Malacca, Malaysia and Gaspar Straits (Bowerbank, 1875); Aru Is, Arafura sea, Java sea and Sulewasi, Indonesia (Thiele, 1889; Lindgren, 1898; Hentschel, 1912; Hooper, 1996); Hon Rai I., Vietnam (Hooper, 1996); Negros orientale, Bohol sea, Mindinao and S. Philippines (Wilson, 1925; Levi, 1961; Hooper 1996); Guam, Micronesia (de Laubenfels, 1954); New Caledonia (Hooper and Levi, 1993), Madang, Papua New Guinea (Hooper, 1996).

25. *Clathria (Thalysias) procera*

(Ridley, 1884)

(Fig. 25 a-f; Plate III F)

Clathria procera Ridley, 1884 : 366; Burton, 1937. p. 28 (Synonymy).

Material examined : P3531/1, five ex., Ovari, Tirunelveli, shore collection, 09.09.2003, Coll. Ch. Satyanarayana.

Description : Sponge is a clathrous mass of flattened branches which are divisible into main and connecting branchlets. Branches divide dichotomously. Colour, pale white externally and brick red internally when alive. Texture stiff but description slightly compressible. Surface

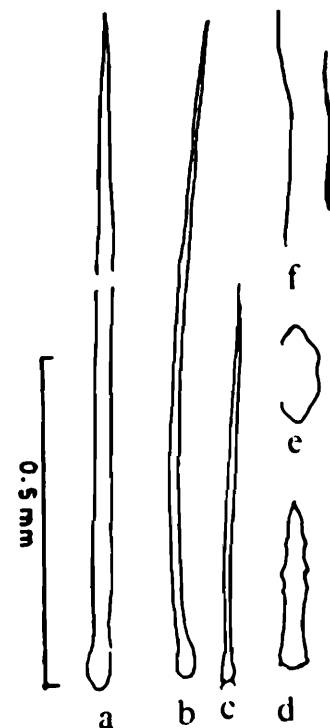


Fig. 25. *Clathria (Thalysias) procera* a. main tylostyle b. interstitial subtylostyle c. dermal subtylostyle d. Acanthostyle e. isochela f. toxa

uneven, oscules scattered, slit-like, maximum diameter up to 2 mm and contractile, ectosome detachable.

Skeleton - irregular reticulation of well developed fibres, 0.1 mm in diameter, cored by subtylostyles and echinated by acanthostyles.

Megascleres (1) Main subtylostyles, 0.2-0.35 mm long, 0.008-0.015 mm wide, basally spined, (2) Acanthostyles, 0.04-0.07 mm long, 0.004-0.009 mm wide, (3) Interstitial subtylostyles, basally spined; 0.18-0.30 mm long, 0.004-0.008 mm wide, (4) Dermal Subtylostyles, shape as in above, 0.15-0.17 mm long, 0.004 mm wide.

Microscleres - (1) Isochelas. Chord up to 0.015 mm. (2) Toxas. Hair-like, 0.04 mm long.

Distribution : In India : Gulf of Mannar, Palk Bay and Ovari.

Elsewhere : Red Sea to Australian region.

Subgenus **Clathria** Schmidt, 1862

Definition : Clathria with only a single category of auxiliary style forming a sparse paratangential ectosomal skeleton; choanosome without marked difference between axial and extra-axial regions.

Type species : *Clathria compressa* Schmidt, 1862

26. *Clathria (Clathria) indica*

(Dendy, 1889)

(Fig. 26a, b; Plate III G)

Clathria indica Dendy, 1889 : 73; Dendy, 1905, p. 171.

Clathria (Clathria) indica Hooper. and Van Soest (Ed.) 2002 : 437 (subgenus)

Material examined : P3527/1, 6 ex., Kodikkarai, Dt. Nagapattinam, Shore collection, 24.03.2004, Coll. J.G. Pattanayak.

Description : Sponge erect and flabellate, branching and anastomosing, cylindrical to flattened, Colour, brick red when alive. Consistency, compressible and with good resiliency. Oscules scattered; surface finely conulose, conules 0.5-1 mm apart and 0.8 mm high on an average.

Skeleton - Coring spicules absent, irregular fibres composing the main skeleton echinated by acanthostyles only.

Megascleres - (1) Styles. Oxeote or even stylote forms, 0.12-0.14 mm long, 0.001-0.004 mm wide. (2) Acanthostyles, 0.05-0.09 mm long, 0.004-0.008 mm wide.

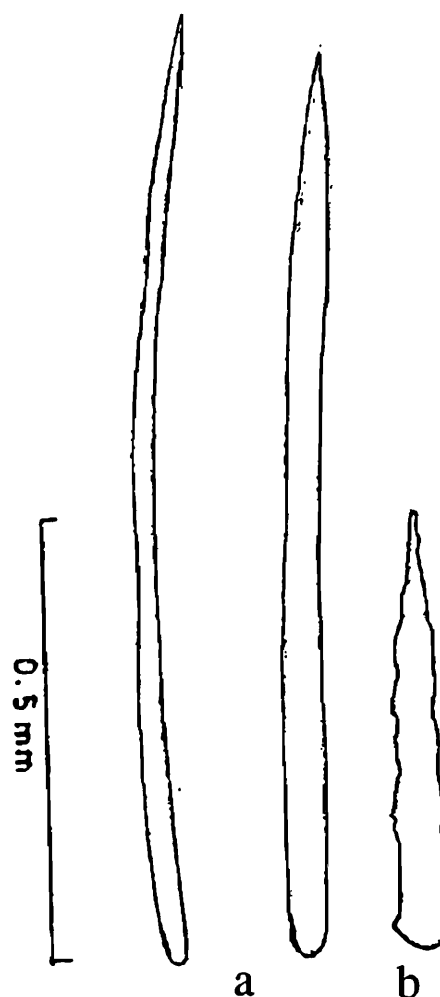


Fig. 26. *Clathria (Clathria) indica* a. style b. acanthostyle

Microscleres - Absent.

Distribution : In India : Gulf of Mannar, Palk Bay and Kodikkarai.

Elsewhere : Widely distributed in the Indian Ocean.

Family RASPAILIIDAE Hentschel, 1923

Definition : Microcionina with a special category of smaller ectosomal styles, oxeas or anisoxeas forming discrete bouquets around the protruding larger styles or oxeas.

Subfamily RASPAILIINIAE Nardo, 1833

Definition : Raspailiidae with echinating megascleres geometry ranging from microcionid-like club-shaped acanthostyles with small granular or erect spines, to club-shaped with strongly recurved or clavulate spines on the basal and distal ends of spicules, to acanthose rhabdostyles.

Genus *Endectyon* Topsent, 1920

Definition : Raspailiidae with clavulate modifications to acanthostyle geometry, and acanthostyles confined to a particular region outside of the skeletal axis.

Subgenus *Endectyon* Topsent, 1920

Definition : Endectyon with recurved (clavulate) hooks on both ends and lacking any basal rhabd on echinating megascleres, and lacking a specil ectosomal skeleton composed of ectosomal styles/anisoxeas grouped around long extra-axial styles.

Type species : *Phakellia tenax* Schmidt, 1870.

27. *Endectyon (Endectyon) thurstoni*
(Dendy, 1887)
(Fig. 27 a-b)

Raspailia thurstony Dendy, 1887, p. 161, Pl. XII, fig. 1.

Endectyon thurstoni Burton, 1937, p. 34, pl. 4, fig. 26 (Synonymy).

Endectyon (Endectyon) thurstoni : Hooper. and Van Soest (Ed.) 2002 : 485.

(subgenus)

Material examined : P3532/1, one ex., Arkadutarai, Dt. Nagapattinam, Shore collection, 23.03.2004, Coll. J.G. Pattanayak.

Description : Sponge erect, stipulate and dichotomously branched. Branches slender, 4-5 mm in diameter and obtusely ointed. Colour, brick red when alive. Texture, tough. Surface hispid and velvety.

Skeleton - Divisible into axial and extra axial parts. Axial part is dense and compact, extra axial fibres arise in an oblique manner from

the axial part interconnected in a sclariform pattern. Spicules are arranged in plumose pattern in these fibres and are echinated by acanthostyles (graphnel spicules).

Megascleres - (1) Styles, 0.28 long, 0.014 mm wide. (2) Acanthostyles. "Graphnel" type, 0.15 long, 0.009 mm wide.

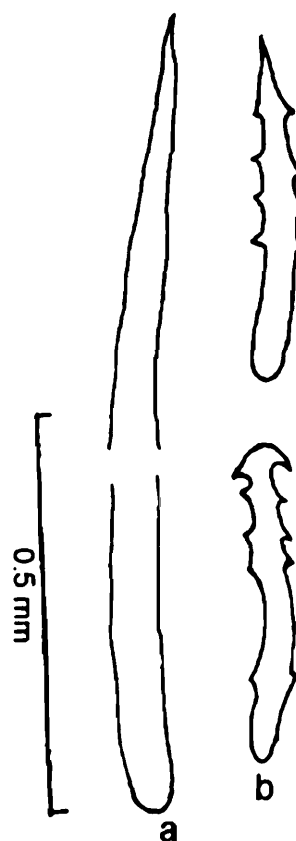


Fig. 27. *Endectyon (Endectyon) thurstoni* a. style
b. graphnel spicule

Distribution : In India : Gulf of Mannar, Palk Bay and Arkadutarai.

Elsewhere : Widely distributed in the Indian Ocean.

Genus *Aulospongos* Norman, 1878

Definition : Raspailiidae with at least two size classes of rhabdostyles of similar geometry, the larger (smooth or partially spined) core spongin fibres, and the smaller (partially spined) echinate fibres although neither are localised to any region of the skeleton; choanosomal skeletal structure is predominantly plumose, with spicules and fibres amalgamated into bulbous tracts (fibre-

bundles), more or less compacted in the axial skeleton, becoming increasingly plumose as they ascend to the periphery, eventually producing a shaggy, compartmentalised or conulose surface; axial and extra-axial skeletons undifferentiated apart from greater amalgamation of fibre-bundles in the axis.

Type species : *Haliphysema tubulatus* Bowerbank, 1873.

28. *Aulospongos tubulatus* (Bowerbank, 1873)
(Fig. 28a, b; Plate IV A)

Haliphysema tubulatus Bowerbank, 1873a : 25.

Aulospongos tubulatus Bowerbank, 1873; Dendy, 1905, p. 176, fig. 3; Burton, 1937, p. 32; Thomas, 1985, p. 269, Pl. III, fig. 10.

Material examined : P3587/1, 2 ex., Arkadutarai, Dt. Nagapattinam, Shore collection, 23.03.2004, Coll. J.G. Pattanayak.

Description : Sponge Massive, Colour – brick-red in live, Consistency hard and incompressible, Oscules scattered 1-3 mm in

diameter, surface conulose, conules flat and blunt.

Skeleton – Stout fibres radiating towards the surface, interconnected with either solitary spicules or irregular bundles of spicules; spicules plumosely arranged; good quantity of sponging present.

Megascleres – (1) Styles or subtylostyles with hocky-stick like base, 0.22-0.50 mm long, 0.012-0.03 mm wide. (2) Acanthostyles basally curved, 0.07-0.15 mm long, 0.004-0.008 mm wide.

Microscleres – Absent.

Distribution : In India : Gulf of Mannar, Palk Bay and Arkadutarai.

Elsewhere : Widely distributed in the Indian Ocean

Subfamily ECHINODICTYINAE Hooper & Van Soest, 2002

Definition : Raspailiidae with regularly reticulate choanosomal skeletal structure, extra-axial skeleton vestigial or virtually absent and all but one species lacks ectosomal specialisation. Echinaaating megascleres are microcionid-like club-shaped acanthostyles.

Genus *Echinodictyum* Ridley, 1881

Definition : Raspailiidae with exclusively reticulate choanosomal skeleton, without any trace of axial compression, cored exclusively by smooth oxeas, and vestigial radial extra-axial and ectosomal skeleton.

Type species : *Spongia mesenterina* Lamarck, 1814

29. *Echinodictyum clathratum* Dendy, 1905
(Fig. 29a-d; Plate IV B)

Echinodictyum clathratum Dendy, 1905, p. 175, fig. 4.
Burton 1937, p. 31, pl. 14, figs. 25.

Material examined : P3533/1, 8 ex., Ovari, Tirunelveli, shore collection, 09.09.2003, Coll. Ch. Satyanarayana; P1147/1, 2ex, Pamban bridge, Gulf of Mannar, Coll. Govt. Museum, Madras.

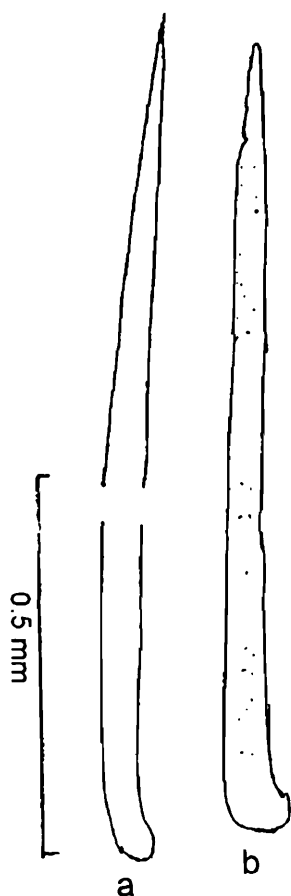


Fig. 28. *Aulospongos tubulatus* a. subtylostyle b. acanthostyla

Description : Sponge stalked; branches form clathrous mass with cavernous interior. Branches, in living condition, covered by an aspiculous membrane. Colour, dark brown when alive. Consistency, tough. Oscules and pores detectable only when fresh and are located on the aspiculous membrane.

Skeleton - irregular network of stout fibres echinated by acanthostyles. Diameter of the fibers up to 0.12 mm projecting from the interior.

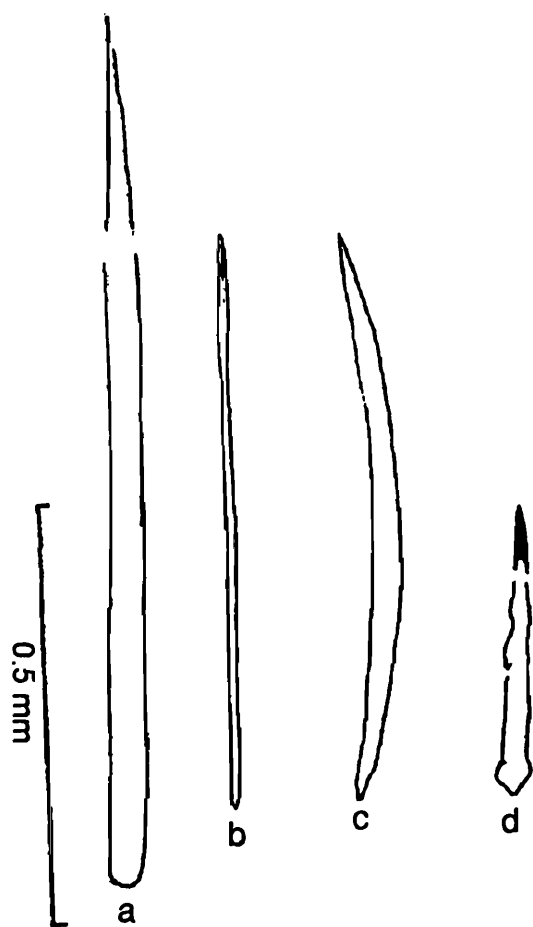


Fig. 29. *Echinodictyum clathratum* a. long style b. hair-like style c. oxea d. acanthostyle

Megascleres : (1) Oxeas, 0.180-0.62 long, 0.0046-0.012 mm wide. (2) Long styles, 1.45 mm maximum. (3) Hair-like styles, Dermal; 0.381 long, 0.002 mm wide. (4) Acanthostyles, 0.11 mm long 0.009 mm wide.

Distribution : In India : Gulf of Mannar and Ovari.

Elsewhere : Widely distributed in the Indian Ocean.

30. *Echinodictyum longistylum* Thomas, 1968
(Fig. 30 a-e; Plate IV C)

Echinodictyum longistylum Thomas, 1968a, p. 246, pl. I, figs. A, B; pl. 2, figs. 1-3.

Material examined : Holotype, P3118/1 (CMFRI Regd. No. T 67/1), 1 ex., Palk Bay, (washed ashore), 20.10.1964, Coll. C.M.F.R.I.

Description : Sponge stalked; with foliaceous branches arising from the stalk. Stalk and branches with long styles arranged vertically and this arrangement gives a characteristic appearance to the specimen. Colour, dark gray, consistency leathery. Oscules and pores not traceable.

Skeleton - composed of spicular tracts running longitudinally and each tract connected to the adjacent ones through vague bundles. Both main and connecting tracts are echinated by acanthostyles. Long styles have their heads buried deep in the main tracts.

Megascleres - (1) Long oxea, 4.5-5.0mm long, 0.028-0.03 mm wide. (2) Small oxea, 0.5-0.6 mm long, 0.005 mm wide. (3) Styles or subtylostyles, 4.5-5.0 mm long, 0.029 mm wide.

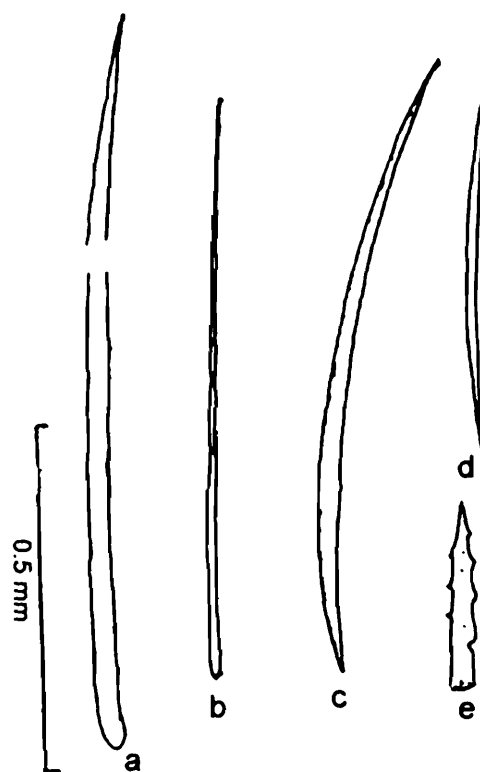


Fig. 30. *Echinodictyum longistylum* a. long style b. hair-like style c. Oxea d. small oxea e. Acanthostyla

(4) Small styles, 0.80-0.90 mm long, 0.004 mm wide. (5) Acanthostyles. 0.05-0.10 mm long, 0.006 mm wide.

Distribution : So far known from type locality.

Remarks : This species is described for the first time from Palk Bay by Thomas (1968). Present description is based on the description of type specimen collected from Palk Bay.

Family RHABDEREMIIDAE Topsent, 1928

Definition : Microcionina of uncertain relationship, with smooth or spined rhabdostyles bearing an extra spiral twist at the rounded extrimity and microscleres include peculiar toxiform (thraustoxeas), sigmoid-like (spirosigmata, thraustosigmata) and rugose microscleres.

Genus *Rhabderemia* Topsent, 1890

Definition : As for family.

Type species : *Microciona pusilla* Carter, 1876

31. *Rhabderemia acanthostyla* Thomas, 1968 (Fig. 31 a-c; Plate IV D)

Rhabderemia acanthostyla Thomas, 1968, p. 247, pl. 2, figs. 4, 5; Thomas, 1985, p. 271, pl. III, fig. 14.

Material examined : Holotype, P3119/1 (CMFRI Regd. No. T 68/1), 1 ex., Gulf of Mannar, 26.02.1967, Coll. C.M.F.R.I.

Description : Sponge encrusting; colour dark brown. Consistency smooth and slimy. Surface conulose. Oscules not visible, pores minute, contractile.

Skeleton - consists of vertical tufts of acanthorhabdostyles or rhabdostyles cemented together by sponging. Solitary spicules, erect on the substratum, may also be present.

Megascleres (1) Rhabddostyles or Acanthorhabdostyles. Rhabdostyles rather slender than the other; Rhabddostyles measure, 0.08-0.25 long, 0.002-0.004 mm wide; (2) Acanthorhabdostyles 0.10-0.3 long, 0.006-0.012 mm wide.

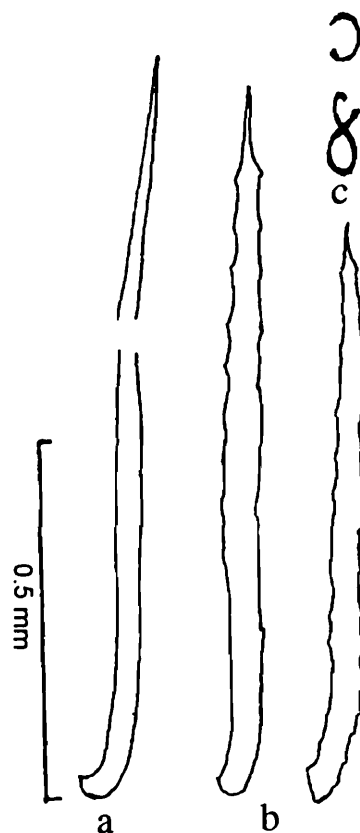


Fig. 31. *Rhabderemia acanthostyla* a. rhabdostyle b. acanthorhabdostyle c. sigma

Microscleres - (1) Sigmas, Twisted; Chord 0.012-0.025 mm.

Distribution : So far known from type locality.

Remarks : This species is described for the first time from Gulf of Mannar by Thomas (1968). Present description is based on the description of type specimen collected from Gulf of Mannar.

32. *Rhabderemia indica* Dendy, 1905 (Fig. 32 a-c)

Rhabderemia indica Dendy, 1905, p. 180, pl. 12, fig. 10. Thomas, 1985, p. 270, Pl. III, fig. 12.

Material examined : P3536/1, 6 ex., Kodikkarai, Dt. Nagapattinam, Shore collection, 24.03.2004, Coll. J.G. Pattanayak; 1151/1, one ex, Nagapattinam, Coll. Govt. Museum, Madras.

Description : Sponge encrusting or finger shaped; colour - dull gray. Consistency hard. Surface microscopically granular. Oscules small, scattered or terminal, large, up to 4 mm in diameter, pores minute, contractile.

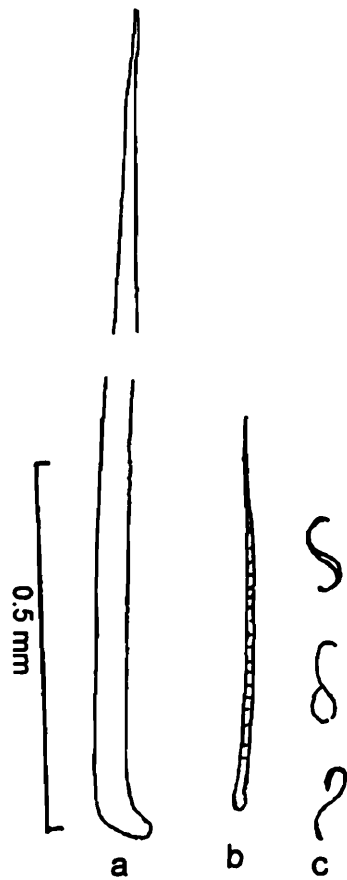


Fig. 32. *Rhabderemia indica* a. rhabdostyle
b. microstyle c. sigmas

Skeleton - consists of rhabdostyles cemented together by spongin. Solitary spicules, erect on the substratum, may also be present.

Megascleres - (1) Rhabdostyles rather slender, 0.22-0.26 long, 0.004-0.012 mm wide

Microscleres - (1) Microstyles Granulated, 0.050-0.075 long, 0.002mm wide. (2) Sigmas, Twisted; Chord 0.008-0.012 mm.

Distribution : In India : Palk Bay and Kodikkarai.

Elsewhere : Indian Ocean and red sea

33. *Rhabderemia prolifera* Annandale, 1915
(Fig. 33 a-c)

Rhabderemia prolifera Annandale, 1915b, p. 464, pl. 34, fig. 3, text fig. 3; Hallman, 1917, p. 399; Thomas, 1979b, p. 26, pl. 1, fig. 19; Thomas, 1985, p. 271, pl. III, fig. 13; Van Soest & Hooper, 1993, p. 319.

Material examined : P3537/1, 4 ex., Ovari, Tirunelveli, shore collection, 09.09.2003, Coll. Ch. Satyanarayana.

Description : Sponge encrusting, consistency friable; colour - pale gray in spirit; Oscules-less in number and pores scattered throughout body.

Skeleton - Skeletal architecture erect hymedesmoid.

Megascleres - Rhabdostyles, 0.10-0.20 mm long, 0.005-0.008 mm wide.

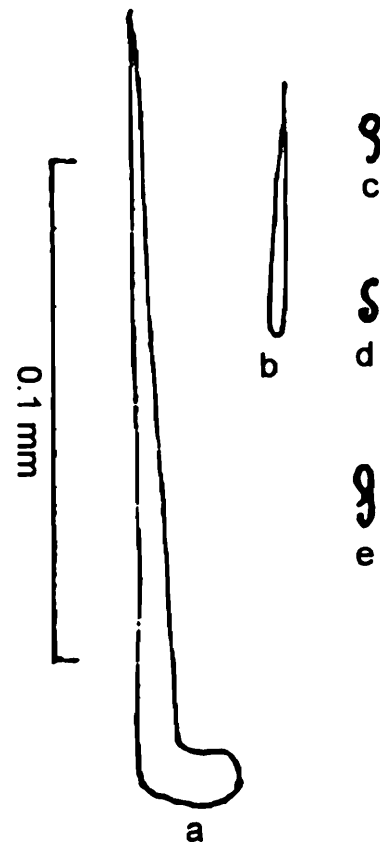


Fig. 33. *Rhabderemia prolifera* a. rhabdostyle
b. microstyle c-e. sigmas

Microscleres - (1) Microstyles entirely smooth, 0.045-0.05 mm long, 0.001 mm wide, (2) Sigmas contorted, chord 0.008-0.012 mm long, (3) Thraustoxea and true toxa absent.

Distribution : In India : Andamans, Gulf of Mannar, Palk Bay and Ovari.

Elsewhere : Mozambique channel (Thomas, 1979 b); Indian ocean (Hallman, 1917)

Suborder MYXILLINA Hajdu, van Soest & Hooper, 1994

Definition : Poecilosclerida with tridentate or polydentate chelae microscleres; palmate chelae absent; dtoxas absent; sigmas usually

present. Differentiated ectosomal and choacosomal megascleres, although either or all may be lost secondarily. Ectosomal megascleres typically diactinal, commonly with anisoterminals. Choanosomal megascleres usually styles, rarely oxeas or strongyles.

Family COELOSPHAERIDAE Dendy, 1922

Definition : Myxillina with reticulate choanosomal skeleton and arcuate isochelae.

Genus **Coelosphaera** Thomson, 1873

Definition : Coelosphaeridae with hollow bodies provided with fistules; megascleres tylotes or strongyles, to which echinating acanthostyles may be added; microscleres arcuate isochelae, sigmas and raphides (may be absent).

Subgenus **Coelosphaera** Thomson, 1873

Definition : *Coelosphaera* without echinating acanthostyles.

Type species : *Coelosphaera tubifex* Thomson, 1873

34. *Coelosphaera (Coelosphaera) encrusta* (Kumar, 1925)
(Fig. 34a-c; Plate IV E)

Histoderma encrusta Kumar, 1925, p. 220, fig. 3.

Coelosphaera encrusta Thomas, 1985, p. 254, Pl. II, fig. 24.

Coelosphaera (Coelosphaera) encrusta Hooper. and Van Soest (Ed.) 2002 : 531 (subgenus)

Material examined : P3621/1, one ex., Ovari, Tirunelveli, shore collection, 09.09.2003, Coll. Ch. Satyanarayana

Description : Sponge encrusting, thin, consistency hard; Colour-red when alive; single oscule on papilla.

Megascleres – Tylotes of two types (1) smaller ones straight or slightly curved, 0.21-0.22 mm long, 0.005-0.006 mm wide; (2) larger ones with angular bent in the centre, 0.28-0.30 mm long and 0.006 mm wide.



Fig. 34. *Coelosphaera (Coelosphaera) encrusta*
a. tylotes b. isochelae c. Sigmas

Microscleres – (1) Contorted sigmas, chord 0.03-0.04 mm long. (2) Palmate isochaelae, chord 0.023-0.025 mm long.

Distribution : In India : Gulf of Mannar and Ovari.

Genus **Lissodendoryx** Topsent, 1892

Definition : Coelosphaeridae with ectosomal tornotes in the form of tylotes or strongyles; choanosomal smooth or spined styles. Occasionally absent or modified to strongyles or oxeas; arcuate chelae.

Subgenus **Lissodendoryx** Topsent, 1892

Definition : Lissodendoryx with a full complement of megascleres including ectosomal tylotornotes and choanosomal styles, which may or may not bear spines; no smaller category of echinating acanthostyles microscleres include arcuate isochaelae and sigmas, which may be absent. Raphides may be present.

Type species : *Tedania leptoderma* Topsent, 1889

35. *Lissodendoryx (Lissodendoryx) balanophilus* Annandale, 1914
(Fig. 35a-d; Plate IV F)

Lissodendoryx balanophilus Annandale, 1914, p. 149;
Thomas, 1985, p. 266, Pl. III, fig. 5.

Lissodendoryx (Lissodendoryx) balanophilus Hooper.
and Van Soest (Ed.) 2002 : 540 (subgenus)

Material examined : P3582/1, 7 ex., Ovari,
Tirunelveli, shore collection, 09.09.2003, Coll.
Ch. Satyanarayana.

Description : Sponge encrusting, consistency compressible with good resiliency; Oscules not visible, pores minute, 0.03-0.04 mm in diameter; Colour – light yellow in live.

Skeleton – Tylotes arranged in illdefined bands in the dermal parts and tylostyles in the interior connected with the similar bands.

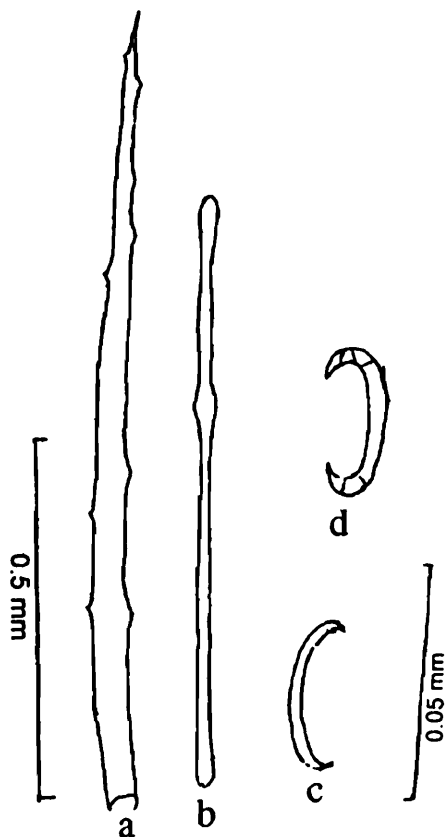


Fig. 35. *Lissodendoryx (Lissodendoryx) balanophilus*
a. tylostyle b. tylote c. Sigma d. isochela

Megascleres – (1) Tylostyles 0.12-0.15 mm long, 0.001-0.007 mm wide; shaft sparsely spined. (2) Tylotes 0.14-0.18 mm long, 0.003-0.004 mm wide.

Microscleres – (1) Sigmas, chord 0.012-

0.035 mm long. (2) Arcuate isochela 0.015-0.025 mm long.

Distribution : In India : Gulf of Mannar, Madras coast and Ovari.

36. *Lissodendoryx (Lissodendoryx) ternatensis* Thiele, 1903
(Fig. 36a-d; Plate IV G)

Lissodendoryx ternatensis Thiele, 1903, p.

Lissodendoryx sinensis, Brøndsted, 1929, p. ; Burton, 1937, p. 26, pl. 3, fig. 7; Thomas, 1985, p. 266, pl. III, fig. 6.

Lissodendoryx (Lissodendoryx) ternatensis Hooper.
and Van Soest (Ed.) 2002 : 542. (subgenus)

Material examined : P3583/1, 2 ex., Ovari,
Tirunelveli, shore collection, 09.09.2003, Coll.
Ch. Satyanarayana

Description : Sponge massive, branching, consistency friable; Colour – green in live; Oscules either terminal on branches or irregularly distributed, diameter 2-3 mm.

Skeleton – Irregularly arranged tylotes form the dermal skeleton. The main skeleton

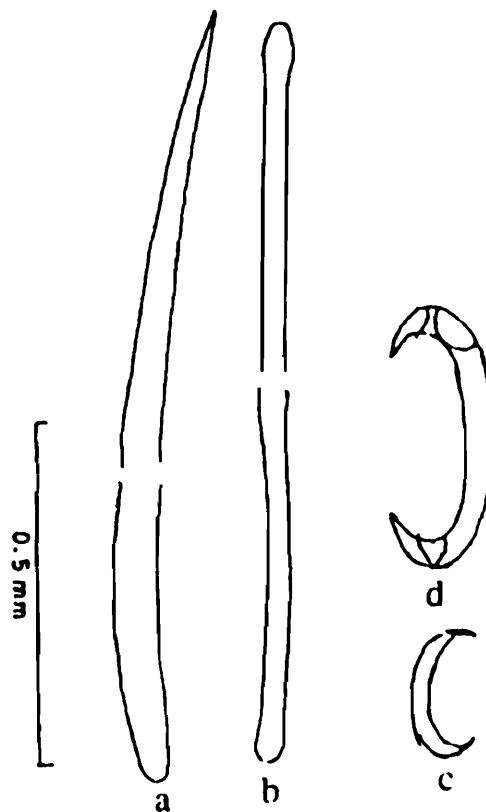


Fig. 36. *Lissodendoryx (Lissodendoryx) ternatensis*
a. style b. tylote c. sigma d. isochela

composed of one or two styles connected together at their nodes by sponging and form isodictyal reticulation with triangular or rectangular meshes.

Megascleres – (1) Styles 0.15-0.25 mm long and 0.003-0.008 mm wide. (2) Tylotes 0.15-0.22 mm long and 0.002-0.006 mm wide.

Microscleres – (1) Sigmas, Chord 0.015-0.045 mm long. (2) Arcuate isochelas, Chord 0.012-0.025 mm long.

Distribution : In India : Gulf of Mannar and Ovari.

Elsewhere : Indo-Pacific.

Subgenus ***Ectyodoryx*** Lundbeck, 1909

Definition : *Lissodendoryx* with echinating acanthostyles.

Type species : *Hastatus foliatus* Fristedt, 1887

37. ***Lissodendoryx (Ectyodoryx) lissostyla*** (Thomas, 1970)
(Fig. 37a-e; Plate V A)

Ectyodoryx lissostyla Thomas, 1970, p. 203, fig. 1-3; Thomas, 1985, p. 260, Pl. II, fig. 36.

Lissodendoryx (Ectyodoryx) lissostyla Hooper and Van Soest (Ed.) 2002, p. 544 (subgenus).

Material examined : Holotype, P3115/1, (CMFRI Regd. No. T 81/1) 1 ex., Gulf of Mannar, March, 1970, Coll. C.M.F.R.I.

Description : Sponge encrusting, thick, consistency hard, surface conulose; Colour- pale yellow; Oscules irregular, scattered, 1.0-2.5 mm in diameter.

Skeleton – Irregularly reticulated, styles and tornotes arranged in irregular bands in deeper parts and polygonal pattern towards the peripheral parts. Echinating spicules are smooth and the spongin is sparsely noted.

Megascleres – (1) Styles 0.375-0.510 mm long, 0.008-0.025 mm wide. (2) Tornote 0.185-0.340 mm long, 0.006-0.008 mm wide. (3) Smooth styles 0.080-0.108 mm long, 0.005-0.007 mm wide, echinate the fibres.

Microscleres – (1) Isochelas tridentate, chord 0.020-0.040 mm long. (2) Sigmas, chord 0.050-0.065 mm long.

Distribution : So far known from type locality.

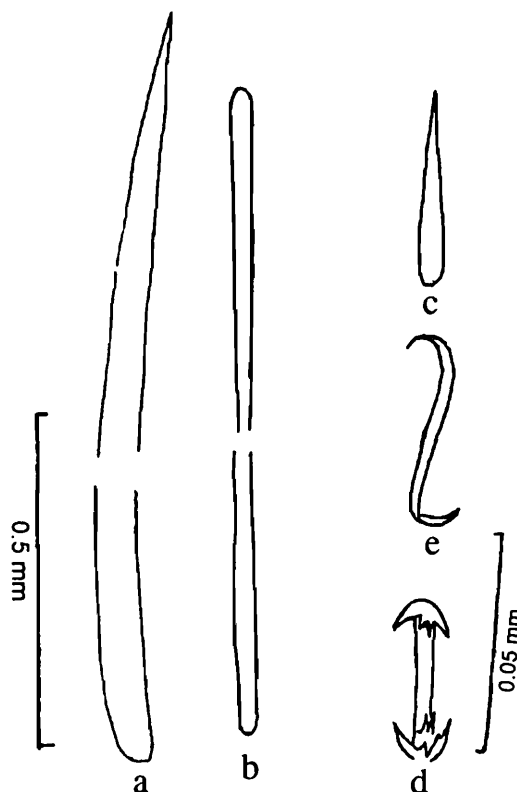


Fig. 37. *Lissodendoryx (Ectyodoryx) lissostyla* a. style b. tornote c. small style d. isochela e. sigma

Remarks : This species is described for the first time from Gulf of Mannar by Thomas (1970) as *Ectyodoryx lissostyla*. Hooper and Van Soest (2002) described the genus *Ecrydoryx* as a subgenus of *Lissodendoryx*. Present description is based on the description of type specimen collected from Gulf of Mannar.

Family HYMEDESMIIDAE Topsent, 1928

Definition : Myxillina with smooth ectosomal tornotes (basically diactinal, but may be anisotornotes or styles), a peripheral choanosomal plumose skeleton of bundles of smooth tornotes, a basal skeleton of acanthostyles, singly or in plumose bundles (may be absent), echinating acanthostyles (may be absent). Additional non-echinating acanthostyles or acanthoxeas may occasionally be present. Microscleres include arcuate chelaas and sigmas, but may be absent.

Genus *Hymedesmia* Bowerbank, 1864

Definition : Hymedesmiidae with hymedesmioid skeleton.

Type species : *Hymedesmia zetlandica* Bowerbank, 1864

38. *Hymedesmia (Hymedesmia) mannarensis* Thomas, 1970
(Fig. 38 a-d, Plate V B)

Hymedesmia mannarensis Thomas, 1970, p. 204. figs. 5, 5a, 5b.

Hymedesmia (Hymedesmia) mannarensis Hooper. and Van Soest (Ed.) 2002, p. 580 (subgenus).

Material examined : Holotype, P3113/1, (CMFRI Regd. No. T 83/1) 1 ex., Gulf of Mannar, March, 1970, Coll. C.M.F.R.I.

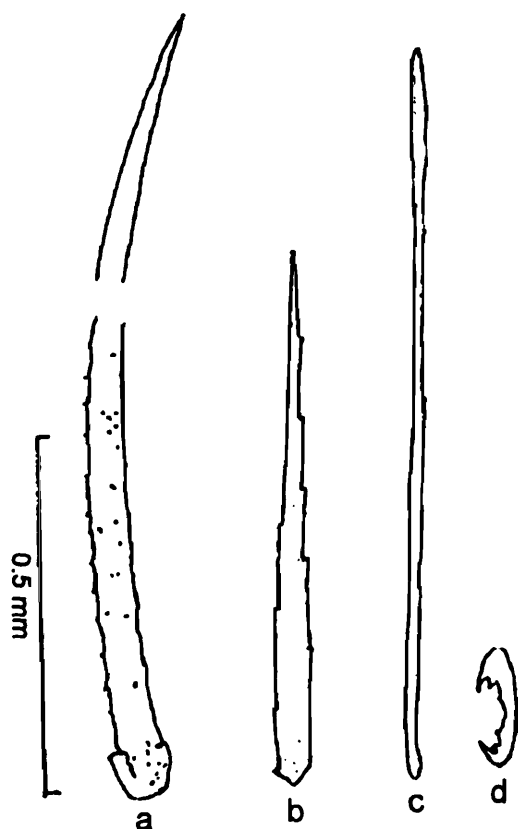


Fig. 38. *Hymedesmia (Hymedesmia) mannarensis*
a. acanthostyle large, b. acanthostyle small,
c. style, d. isochela

Description : Sponge encrusting; colour dark brown in dry condition. Surface hispid and deeply pigmented.

Skeletal arrangement in typical *Hymedesmia* pattern.

Megascleres : (1) Large Acanthostyles, 0.375-0.410 mm long, 0.008-0.015 mm wide, (2) Small Acanthostyles, 0.095-0.170 mm long, 0.004-0.009 mm wide (3) Styles, 0.168-0.21 mm long, 0.003 mm wide.

Microscleres : Isochelas. Arcuate, chord, 0.04-0.05 mm. long.

Distribution : So far known from type locality.

Remarks : This species is described for the first time from Gulf of Mannar by Thomas (1970). Present description is based on the description of type specimen collected from Gulf of Mannar.

39. *Hymedesmia (Hymedesmia) stylophora* Thomas, 1970
(Fig. 39 a-c, Plate V C)

Hymedesmia stylophora Thomas, 1970, p. 204. figs. 5, 5a, 5b.

Hymedesmia (Hymedesmia) stylophora Hooper. and Van Soest (Ed.) 2002 : 580 (subgenus)

Material examined : Holotype, P3114/1, (CMFRI Regd. No. T 82/1) 1ex., Gulf of Mannar, March, 1970, Coll. C.M.F.R.I.

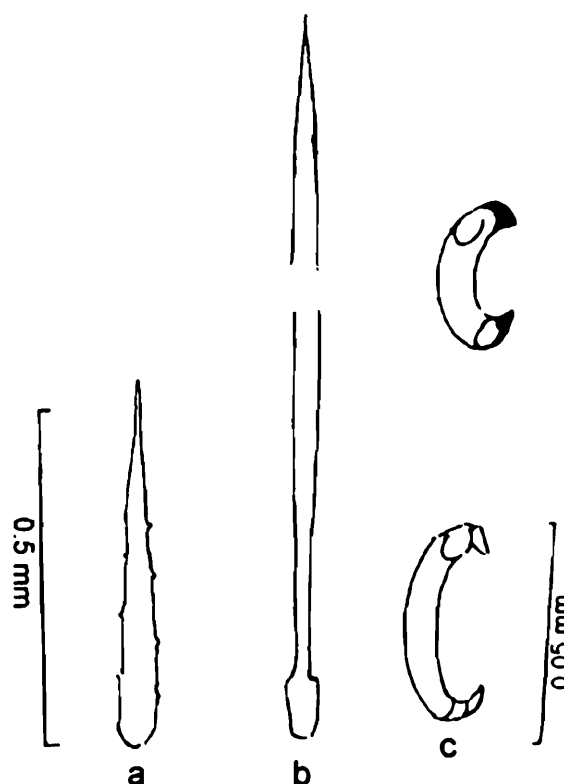


Fig. 39. *Hymedesmia (Hymedesmia) stylophora*
a. acanthostyle b. subtylostyle c. isochela

Description : Sponge encrusting, and uniformly spreading on the substratum. Consistency, paper like; surface smooth and uniform.

Skeletal arrangement in typical *Hymedesmia* pattern; dermal skeleton tangential.

Megascleres : (1) Acanthostyles, 0.080-0.110mm long, 0.005-0.008 mm wide (2) Styles/Subtylostyles, 0.160-0.210 mm long, 0.001-0.003 mm wide.

Microscleres : Isochelas. Tridentate; chord, 0.016-0.025 mm long.

Distribution : So far known from type locality.

Remarks : This species is described for the first time from Gulf of Mannar by Thomas (1970). Present description is based on the description of type specimen collected from Gulf of Mannar.

Family TEDANIIDAE Ridley & Dendy, 1886

Definition : Mixillina with onychaetes, without chaele or sigmas.

Genus *Tedania* Gray, 1867

Definition : Tedaniidae with differentiated ectosomal and choanosomal megascleres.

Subgenus *Tedania* Gray, 1867

Diagnosis : Smooth, relatively small styles, occasionally strongylote styles as structural megascleres and microspined tylotes as ectosomal megascleres.

Type species : *Reniera digitata* Schmidt, 1862.

40. *Tedania (Tedania) anhelans*
(Lieberkuhn, 1859)
(Fig. 40 a-c; Plate V D)

Halichondria anhelans Lieberkuhn, 1859, p. 365.

Reniera nigrescens Schmidt, 1862, p. 74.

Reniera digitata Schmidt, 1862, p. 75, pl. vii, fig. 11.

Reniera ambigua Schmidt, 1864, p. 39, pl. iv, fig. 8.

Tedania digitata Gray, 1867, p. 520.

Tedania ambigua Gray, 1867, p. 520.

Reniera muggiana Schmidt, 1868, p. 28.

Tedania digitata var. *fibrosa* Ridley and Dendy, 1887, p. 51.

Tedania digitata var. *bermudensis* Ridley and Dendy, 1887, p. 51.

Tedania nigrescens Vosmaer, 1887, p. 338; Burton & Rao, 1932, p. 353; Burton, 1937, 27, pl. 3, fig. 22.

Tedania rubicanda Lendenfeld, 1888, p. 190.

Tedania assabensis Keller, 1891, p. 313, pl. xvi, figs. 11 & 12.

Tedania grasilis Lambe, 1895, p. 116, pl. ii, fig. 3.

Tedania brucei Wilson, 1894, p. 320, pls. xix, xx.

Tedania digitata var. *vulcani* Lendenfeld, 1897, p. 112, pl. x, figs. 117-119.

Tedania digitata var. *sansibarensis* Baer, 1906, p. 17, pl. i, fig. 2.

Tedania ignis, Verill 1907, p. 339.

Tedania digitata var. *inermis* Hentschel, 1911, p. 333.

Tedania digitata var. *polytyla* Hentschel, 1911, p. 333.

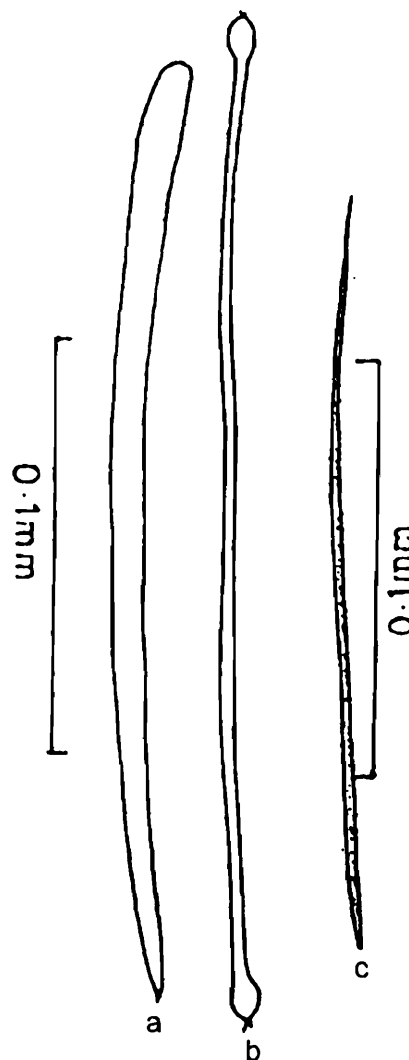


Fig. 40. *Tedania (Tedania) anhelans* a. style b. tornote c. onychaete

Tedania anhelans Levi, 1963, p. 32, fig. 33; Thomas, 1985, p. 262, pl. III, fig. 1; Pattanayak, 2006, p.60, pl. VII B, fig. 40a-c.

Tedania (Tedania) anhelans Hooper and Van soest, 2002, P. 629, fig. 2A-F.

Material examined : P3540/1, 5 ex., Kanyakumari, off shore collection, 06.09.2003, Coll. Ch. Satyanarayana.

Description : Sponges attached on stones, finger like branched, surface smooth, irregular; consistency soft and fragile; colour - pale white in spirit; Oscule - irregularly distributed, 1-3mm in diameter.

Skeleton - Dermal part composed of tornotes arranged irregularly and interior part composed of styles and onychaetes arranged in halichondroid pattern.

Megascleres - (1) Styles slightly curved and sharply pointed; 0.17-0.22 mm long, 0.004-0.008 mm wide, (2) Tornotes straight with oblong and minutely spined head, 0.195-0.215 mm long, 0.002-0.005 mm wide.

Microscleres - Onychaetes with unequal ends, 0.095-0.175 mm long.

Distribution : In India : Andamans, Gulf of Mannar, Palk Bay, Kanyakumari and Mincoy Island.

Elsewhere : Cosmopolitan.

Suborder MYCALINA Hajdu, van Soest & Hooper, 1994

Definition : Poecilosclerida possessing palmate chelae or derivatives thereof (occasionally absent) and smooth megascleres of a single type; tridentate chelae and toxas absent; sigmas or derivatives thereof usually present. Skeleton plumose or plumoreticulate.

Family DESMACELLIDAE Ridley & Dendy, 1886

Definition : Mycalina lacking chelae and diancistra-like microscleres. Microscleres include sigmas, microxeas, commata and raphides.

Genus *Biemna* Gray, 1867

Definition : Desmacellidae with stylote or exceptionally oxeote megascleres arranged in plumoreticulate fashion; ectosomal skeleton consists of the brushed endings of choanosomal tracts; microscleres include sigmas, microxeas, commata and raphides.

Type species : *Desmacidon peachi* Bowerbank, 1866

41. *Biemna tubulata* (Dendy, 1905)
(Fig. 41a-d; Plate V E)

Desmacella tubulata Dendy, 1905, pl. ix, fig. 4.

Biemna tubulata, Burton and Rao, 1932, p. 327, Pl. XVIII, fig. 4.

Material examined : P3581/1, 6 ex., Kodikkarai, Dt. Nagapattinam, Shore collection, 24.03.2004, Coll. J.G. Pattanayak; P3622, one ex, Feb, 1926, Coll. H.S. Rao.

Description : Sponges tubular, colour yellow, consistency friable, surface slightly hispid; Oscules-terminal, diameter 2-5 mm.

Skeleton-Confused reticulation of spicular bands, project out at the surface to form hispid.

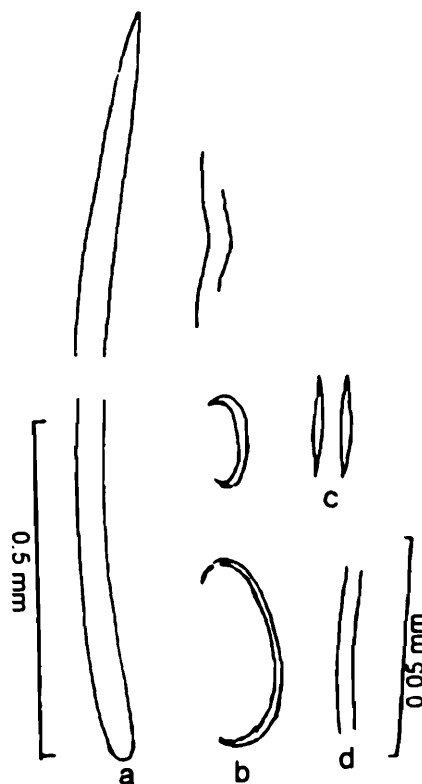


Fig. 41. *Biemna tubulata* a. style b. sigmas c. Toxas d. raphides

Megascleres–Styles 0.175–0.350 mm long, 0.004–0.007 mm wide.

Microscleres–(1) Sigmas, chord 0.012–0.035 mm long. (2) Toxas, 0.015–0.030 mm long. (3) Raphides, 0.025–0.10 mm long. (4) Microxeas, 0.015–0.030 mm long.

Distribution : In India : Gulf of Mannar, Palk Bay and Kodikkarai.

Elsewhere : Atlantic Ocean and Indo-Australian region.

Family MYCALIDAE Lundbeck, 1905

Definition : Mycalina with 'mycalostyles' (styles with slightly constricted neck), occasionally modified to exeas or strongyles, arranged in a plumose, plumoreticulate or confused manner; microscleres include palmate chelae, sigmas (may be serrated), toxas (may be spined), spined microxeas, and raphides, all of which may be absent; no diancistras or derivates, no commata, no spined micro (subtylo-) styles.

Genus *Mycale* Gray, 1867

Definition : Mycalidae with megascleres in a single category of shape. There may be size categories.

Subgenus *Aegogropila* Gray, 1867

Definition : Mycale with surface visibly reticulate to the naked eye; choanosomal skeleton plumose or plumoreticulated made of multispicular tracts of megascleres of one category only; ectosomal skeleton a dense tangential reticulation of megascleres isolated or in tracts, megascleres are subtylostyles (mycalostyles); microscleres are palmate anisochelae in one to four size categories, the larger ones forming rosettes, sigmas, raphides, toxas and eventually micracanthoxeas.

42. *Mycale (Aegogropila) crassissima* (Dendy, 1905)

(Fig. 42 a-f; Plate V F)

Esperella crassissima Dendy, 1905, p. 160, pl. II, fig. 6.

Mycale crassissima Levi, 1961a, p. 134. Thomas, 1985,

p. 282, pl. IV, Fig. 10; Pattanayak, 2006, p. 64, pl. VII E, fig. 42a-f.

Mycale (Aegogropila) crassissima Hooper and Van soest, 2002, p. 674 (subgenus)

Material examined : P3541/1, one ex., Arkadutarai, Dt. Nagapattinam, Shore collection, 23.03.2004, Coll. J.G. Pattanayak.

Description : Cushion-shaped or massive, with finger-shaped branches; consistency hard but compressible, surface reticulated, colour-pale gray in spirit, Oscules - large, irregularly scattered on surface, 3 mm in diameter.

Skeleton - dermal skeleton of loosely scattered tangentially arranged spicules; main skeleton compact, spicules entangled by fibres.

Megascleres (1) Subtylostyles, 0.45–0.52 mm long, 0.015 mm wide.

Microscleres (1) Anisochelae two types, large sized anisochelae 0.050–0.065 mm long

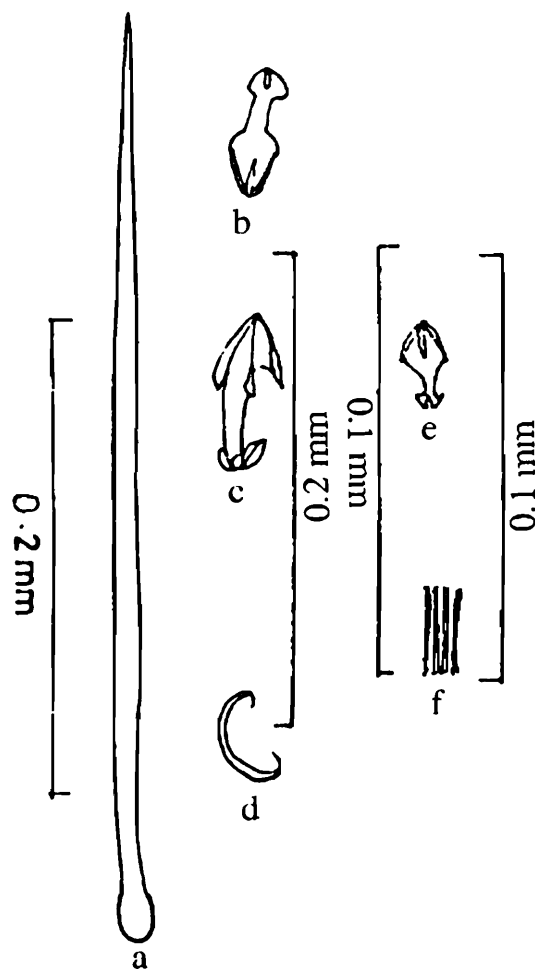


Fig. 42. *Mycale (Aegogropila) crassissima* a. subtylostyle b,c. large anisochelae d. sigma e. small anisochela f. Raphides

and small size anisochelas 0.015-0.019 mm long, (2) Sigmas, chord 0.025-0.035 mm long, (3) Raphides, present in bundles, hair-like 0.020-0.025 mm long.

Distribution : In India : Andamans, Gulf of Mannar and Arkadutarai.

Elsewhere : Vietnam (Levi, 1961a); Indonesia (ZMA database).

Subgenus **Mycale** Gray, 1867

Definition : *Mycale* with a confused tangential ectosomal skeleton (many with pore-grooves, and/or three categories of anisochelae, and/or basally-spurred anisochelae-III, and/or raphides in two categories).

Type species : *Hymeniacidon lingua* Bowbank, 1864

43. *Mycale (Mycale) grandis* Gray, 1867
(Fig. 43 a-g; Plate V G)

Mycale grandis Gray, 1867, p. 492; Burton, 1937, p. 23, pl. 2, fig. 13

Mycale (Mycale) grandis Hooper and Van soest, 2002, p. 672 (subgenus)

Material examined : P3542/1, 6 ex., Kodikkarai, Dt. Nagapattinam, Shore collection, 24.03.2004, Coll. J.G. Pattanayak; P1138/1, one ex, Pamban Bridge, Gulf of Mannar, Govt. Museum.

Description : Sponge encrusting or massive. Colour - orange when alive. Consistency, compressible with good resiliency when fresh, and highly friable when dry. Oscules scattered, sometimes with oscular tubes; diameter, 2-5 mm.

Dermal

Skeleton - composed of tangentially placed subtylostyles and microscleres. Main skeleton of stout primary fibers of 0.13-0.26 mm diameter and connectives are much slender.

Megascleres - (1) Subtylostyles. Size, 0.430-0.560 × 0.006-0.016 mm.

Microscleres - (1) Large anisochelas. Chord, 0.120-0.135 mm. (2) Medium sized anisochelas. Chord, 0.025-0.030 mm. (3) Small anisochelas.

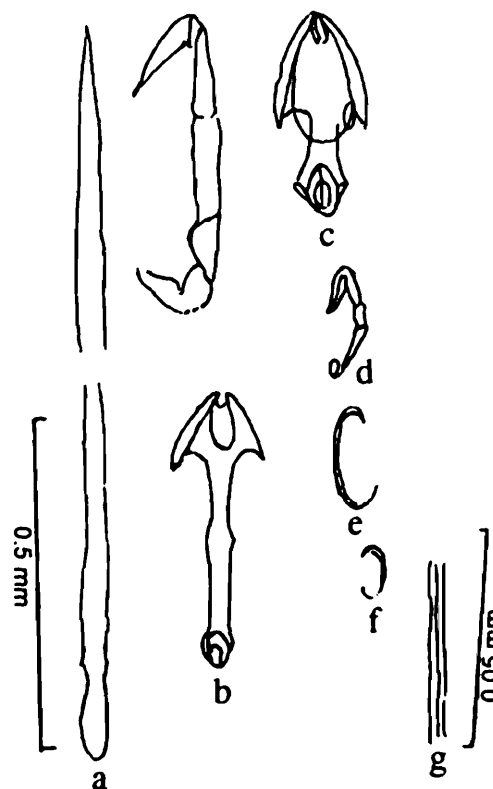


Fig. 43. *Mycale (Mycale) grandis* a. subtylostyle b. large anisochela c. medium anisochela d. small anisochela e. large sigma f. small sigma g. raphides

Chord, 0.014-0.018 mm. (4) Large sigmas. Chord, 0.040-0.056 mm. (5) Small sigmas. 0.012-0.020 mm. (6) Raphides. In bundles; length, 0.035-0.084 mm and hair-like.

Distribution : In India : Gulf of Mannar, Palk Bay and Kodikkarai.

Elsewhere : Red Sea to Australian region.

44. *Mycale (Mycale) indica* (Carter, 1887)
(Fig. 44a-i; Plate VI A)

Esperia indica Carter, 1887, p. 72, VI, Figs. 3-6.

Mycale indica Burton and Rao, 1932, p. 327; Rao, 1941, p. 445; Pattanayak, 2006, p. 64, pl. VII E, fig. 42a-f.

Mycale (Mycale) indica Hooper and Van soest, 2002, p. 672 (subgenus)

Material examined : P3543/1, 5 ex., Kanyakumari, off shore collection, 06.09.2003, Coll. Ch. Satyanarayana

Description : Massive body and finger-like processes on upper surface of body; surface smooth in naked eye but under lens minutely

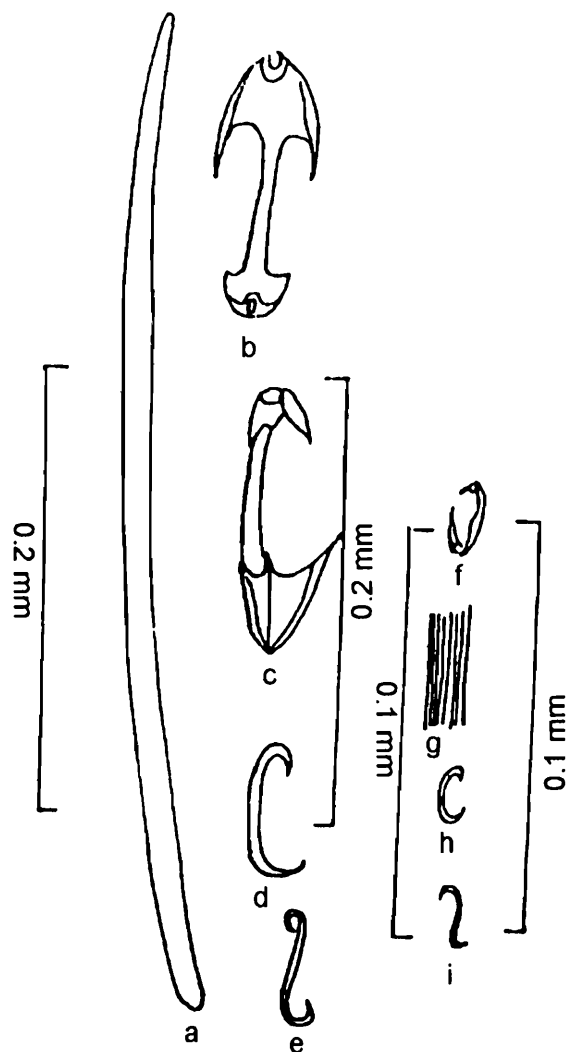


Fig. 44. *Mycale (Mycale) indica* a. style b,c. large anisochalae d,e. large sigmas f. small anisochela g. raphides h,i. small sigmas

roughened by ends of dermal styles, foreign matters embedded in sponge body; colour-pale yellow in spirit; consistency - slightly compressible and fragile, Oscules - not evident, but invagination of sponge surface gives it a cavernous form.

Skeleton primary skeleton consisting of reticulum of spicular fibres, which radiating fan-wise toward dermal spicular layer, seems to support it.

Megascleres - (1) Styles 0.42-0.70mm long, 0.012-0.015mm wide.

Microscleres (1) Large anisochelae 0.105-0.135 mm, (2) Small anisochelae 0.014-0.018 mm, (3) Sigmas small and large 'C' shaped, 0.013-0.080 mm cord and 'S' shaped or contorted sigmas 0.015-0.065mm chord, (4) Raphides 0.020-0.045 mm.

Distribution : In India : Andamans, Gulf of Mannar and Kanyakumari.

Elsewhere : Mergui Archipelago, Burma (Carter, 1887, Burton & Rao, 1932).

45. *Mycale (Mycale) mannarensis*

Thomas, 1968

(Fig. 45 a-d; Plate VI B)

Mycale mannarensis Thomas, 1968c, p. 255, figs. 1-2.

Mycale (Mycale) mannarensis Hooper and Van soest, 2002, p. 672 (subgenus).

Material examined : Holotype, P3122/1, (CMFRI Regd. No. T 69/1) 1ex., Gulf of Mannar, 16.11.1965, Coll. C.M.F.R.I.

Description : Sponge encrusting, fleshy and slimy when fresh. Colour-black when alive. Oscules and pores not traceable.

Skeleton The dermal skeleton is well developed ; meshes triangular, megascleres and raphides form continuous bands at the dermal part. Anisochelas may be seen arranged in rosettes in the dermal part. The main skeleton is poorly developed due to the thinly encrusting nature.

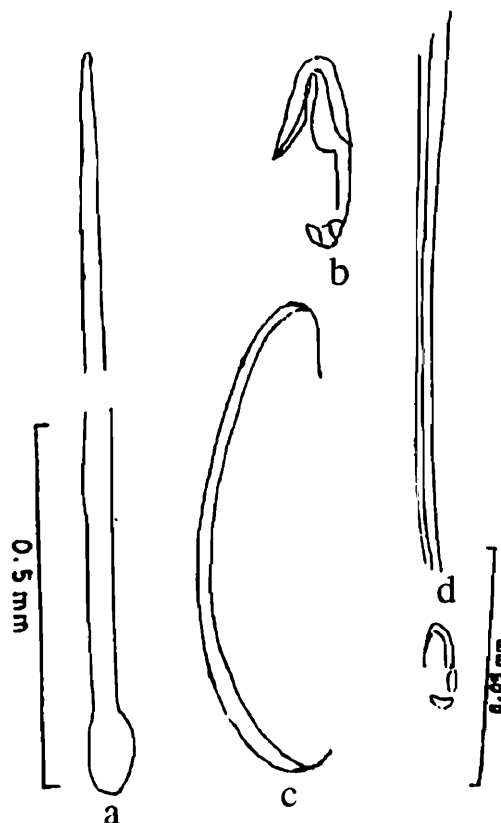


Fig. 45. *Mycale (Mycale) mannarensis* a. subtylostyle b. anisochela c. sigma d. raphides

Megascleres - (1) Tylostyles, 0.294-0.315 long and 0.004-0.008 mm wide.

Microscleres - (1) Anisochelas. Chord, 0.021-0.042 mm long (2) Sigmas. Chord, 0.063-0.084 mm long (3) raphides, 0.376-0.528 mm long and hair-like.

Distribution : Gulf of Mannar

Remarks : This species is described for the first time from Gulf of Mannar by Thomas (1968). Present description is based on the description of type specimen collected from Gulf of Mannar

46. *Mycale (Mycale) monanchorata*

Burton & Rao, 1932

(Fig. 46 a, b; Plate VI C)

Mycale monanchorata, Burton & Rao, 1932, p. 329, fig. 6A-C.

Mycalecarmia monanchorata, Thomas, 1985, p. 284, Pl. IV, fig. 13.

Mycale (Mycale) monanchorata Hooper and Van soest, 2002, p. 672 (subgenus)

Material examined : P3623/1, 5 ex., Kanyakumari, off shore collection, 06.09.2003,

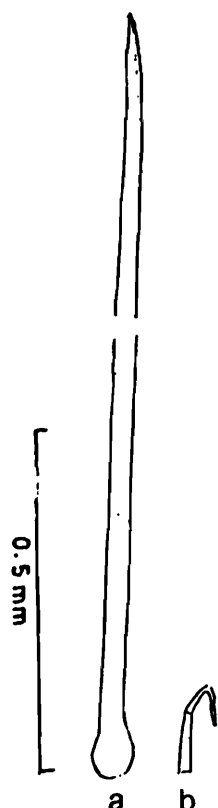


Fig. 46. *Mycale (Mycale) monanchorata* a. subtylostyle b. anisochela

Coll. Ch. Satyanarayana; P1495/1, one ex, Pamban, Gulf of Mannar, Coll. Riks Museum, Stockholm; P1496/1, Kilakarai, Ramnad Dist., Coll. S.W. Kemp.

Description : Sponge encrusting or irregularly massive. Colour-light violet externally and pale yellow internally when alive. Surface conulose, conules 1-2 mm high and correspond to tps of main fibres ending in the surface. Oscules and pores not visible.

Skeleton – consists of perpendicular main fibres running towards the surface in parallel course and are connected by secondaries.

Megascleres – (1) Subtylostyles, 0.22-0.28mm long and 0.002-0.006 mm wide.

Microscleres – (1) Anisochela, Chord, 0.028 mm long.

Distribution : Gulf of Mannar, Palk Bay and Kanyakumari.

Subgenus *Carmia* Gray, 1867

Definition : *Mycale* with plumose or plumoreticulated choanosomal skeleton; ectosomal skeleton absent, or only a few scattered megascleres lying tangentially, as well as dispersed microscleres; megascleres are subtylostyles (mycalostyles) in cone category only; microscleres are palmate anisochaelae in one or more size-category, the larger of which may form rosettes, as well as a variable complement of sigmas, toxas, raphides and micracanthoxeas.

Type species : *Hymedesmia macilenta* Bowerbank, 1866

47. *Mycale (Carmia) mytilorum*

Annandale, 1914

(Fig. 47 a-c; Plate VI D)

Mycale mytilorum Annandale, 1914, p. 149 ; Burton, 1937, p. 24, pl. 2, fig. 15; Thomas, 1985, p. 282, Pl. IV, fig. 8.

Mycale (Carmia) mytilorum Hooper and Van soest, 2002, p. 678 (subgenus).

Material examined : P3624/1, 5 ex., Kanyakumari, off shore collection, 06.09.2003,

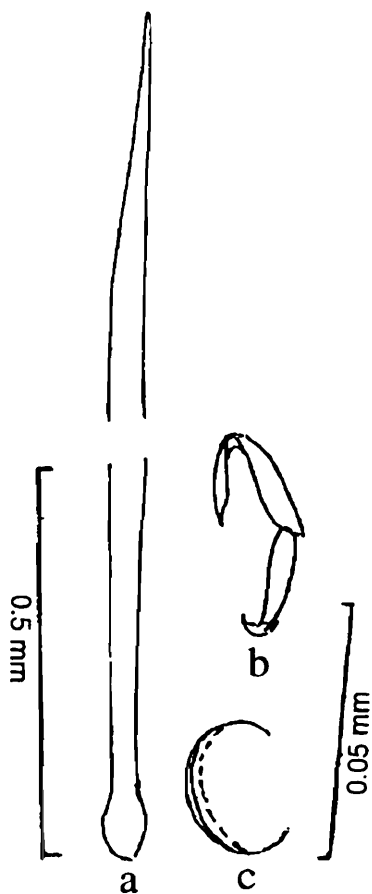


Fig. 47. *Mycale (Carmia) mytilorum* a. subtylostyle
b. anisochela c. Sigma

Coll. Ch. Satyanarayana; ZEV6151/7, Madras Harbour, Coll. N. Annandale.

Description : Sponge encrusting or massive. Colour – brick red when alive Slimy when alive and with good resiliency. Surface even ; Oscules rare, when present on the thickest part, highly contractile. Pores, minute ; oval in outline and highly contractile.

Skeleton – Subtylostyles are scattered in the dermal region along with microscleres and refingent granules. Main Skeleton lac and irregular.

Megascleres – (1) Subtylostyles, 0.198-0.226mm long and 0.003-0.008 mm wide.

Microscleres – (1) Anisochelas. Chord, 0.012-0.021 mm long (3) Sigmas. Chord, 0.033-0.037 mm long.

Distribution : In India : Gulf of Mannar and Kanyakumari.

Elsewhere : Widely distributed in the Indian Ocean.

Subgenus *Paresperella* Dendy, 1905

Definition : *Mycale* with choanosomal skeleton plumose or plumoreticulated, made of multispicular tracts of megascleres; ectosomal skeleton often a tangential reticulation of megascleres; megascleres subtylostyles (mycalostyles) often of one size category only; microscleres are palmate anisochelae of one or more categories, the larger ones may form rosettes, serrated sigmas, and occasionally toxas.

Type species : *Esperia serratohamata* Carter, 1880

48. *Mycale (Paresperella) bidentata* (Dendy, 1905) (Fig. 48a-c)

Paresperella bidentata Dendy, 1905, p. 163, pl. 11, fig. 1; Burton, 1937, p. 26, pl. 2, fig. 17; Thomas, 1985, p. 286, Pl. IV, fig. 18.

Mycale (Paresperella) bidentata Hooper and Van soest, 2002, p. 683 (subgenus).

Material examined : P3578/1, 2 ex, Kodikkarai, Dt. Nagapattinam, Shore collection, 24.03.2004, Coll. J.G. Pattanayak.

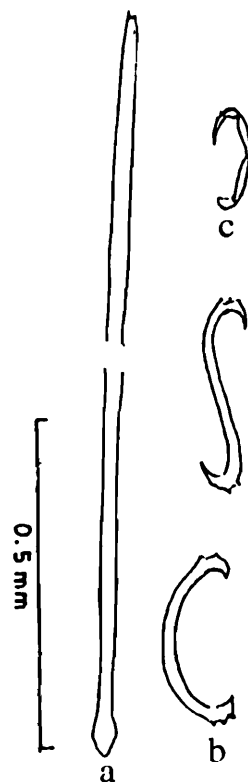


Fig. 48. *Mycale (Paresperella) bidentata*
a. subtylostyle b. sigma c. Anisochela

Description : sponge compacted mass with sand grains, colour – yellow, surface uneven.

Skeleton – Dermal skeleton composed of wide meshed spicular fibres, main skeleton irregular, fibres ending in the surface support the dermal skeleton, sand grains incorporated into the skeleton.

Megascleres – Subtylostyles straight, 2-3 teeth at the tip, 0.25-0.28 mm long, 0.005 mm wide.

Microscleres – (1) Sigmas, chord 0.05 mm long. (2) Anaisochelas in rosettes, chord 0.026-0.028 mm long.

Distribution : In India : Gulf of Mannar and Kodikkarai.

Order HALICHONDRIDA Gray, 1867

Definition : Ceractinomorpha Demospongiae with styles, oxeas strongyles or intermediate spicules, of widely diverging sizes, and not functionally localized; skeleton plumoreticulate, dendritic or confused; microscleres if present microxeas and/or trichodragmas.

Family DICTYONELLIDAE Van Soest, Diaz & Pomponi, 1990

Definition : Halichondrida without ectosomal skeleton, but with dense organic ectosomal layer, giving the sponge a fleshy appearance; choanosomal skeleton is predominantly built of styles, occasionally oxeas or strongyles occur.

Genus *Stylissa* Hallmann, 1914

Definition : Dictyonellidae with a skeleton consisting of styles arranged in a confused plumose reticulation, with many single spicules in confusion. Styles in a single size category.

Type species : *Stylotella flabelliformis* Hentschel, 1912

49. *Stylissa carteri* (Dendy, 1889) (Fig. 49a, b; Plate VI E)

Acanthella carteri Dendy, 1889, p. 93, pl. 4, fig. 6;
Dendy, 1905, p. 193, pl. 8, fig. 6

Axinella carteri, Burton, 1937, p. 35, pl. 6, fig. 37;
Thomas, 1985, p. 290, Pl. IV, fig. 24.

Stylissa carteri Hooper and Van soest, 2002, p. 661
(genus transfer).

Material examined : P3568/1, 2 ex.,
Kanyakumari, off shore collection, 06.09.2003,
Coll. Ch. Satyanarayana

Description : Sponge proliferously lamellar,
surface conulose, colour-brick red in live,
texture tough, Oscules and pores not traceable.



Fig. 49. *Stylissa Carteri* a, b. styles

Skeleton – Axinelloid pattern, skeleton dense and fibres very less in the axial part, spicules arranged plumosely.

Megascleres – (1) Stout styles 0.39-0.65 mm in length and 0.02-0.03 mm wide. (2) Slender styles 0.9-1.5 mm long, 0.007-0.016 mm wide.

Microscleres – Absent.

Distribution : In India : Gulf of Mannar and Kanyakumari.

Elsewhere : Red sea and Indian Ocean.

Family AXINELLIDAE Carter, 1875

Definition : Halichondrida without specialised ectosomal skeleton; with velvety or microhispid surface; with choanosomal skeleton of ascending spiculo-fibres connected irregularly by loose spicules and short tracts, or plumoreticulated with ascending plumose tracts connected by thinner ones or single spicules. Megascleres are connected by thinner ones or single spicules. Megascleres are oxeas, anisoxeas, styles, sinuous strongyles in any combination. Microscleres are raphides, single or in trichodragmata.

Genus *Axinella* Schmidt, 1862

Definition : Axinellidae with choanosomal skeleton differentiated in axial (compressed or vaguely reticulated) and extra-axial (plumoreticulated) region. Megascleres are styles and oxeas. Microscleres, if present, are microraphides and trichodragmata.

Type species : *Axinella polypoides*, Schmidt, 1862

50. *Axinella donnani* (Bowerbank, 1873)
(Fig. 50 a, b)

Isodictya donnani Bowerbank, 1873, p. 28, pl. 6.

Phakelia donnani, Dendy, 1905, p. 190.

Axinella donnani, Burton, 1937, p. 35, pl. 6, fig. 32 ;
Thomas, 1970, p. 207. 4 ; Thomas, 1985, p. 289,
Pl. IV, fig. 23.

Material examined : P3569/1, 3 ex.,
Kanyakumari, off shore collection, 06.09.2003,
Coll. Ch. Satyanarayana.

Description : Sponge lamellar, surface minutely hispid, colour-yellow or orange, texture tough, Oscules – arranged in groups, in a radiating pattern; pores scattered.

Skeleton – Axial condensation quite dense and extra axial fibres arise from the axial part in different angles. Extra axial fibres interconnected by scattered spicules or fibres in a scalariform pattern. Extra axial fibres end in the dermal brushes and plumosely arranged spicules give a characteristic appearance to the surface.

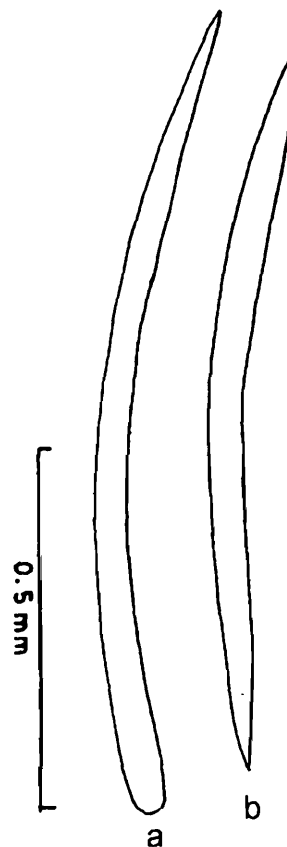


Fig. 50. *Axinella donnani* a. style b. oxea

Megascleres – (1) Styles 0.15-0.45 mm long and 0.004-0.005 mm wide. (2) Oxeas 0.375-0.515 mm long and 0.007-0.008 mm wide.

Microscleres – Absent.

Distribution : In India : Gulf of Mannar, Palk Bay and Kanyakumari.

Elsewhere : Atlantic Ocean and Red sea.

51. *Axinella tenuidigitata* Dendy, 1905
(Fig. 51. a & b; Plate VI F)

Axinella tenuidigitata Dendy, 1905, p. 189, pl. 13, fig. 4; Thomas, 1985, p. 290, pl. IV, fig. 25.

Material examined : P3547/1, 6 ex.,
Kodikkarai, Dt. Nagapattinam, Shore collection,
24.03.2004, Coll. J.G. Pattanayak.

Description : Sponge massive, irregular, erect, branches arising from upper surface of main body, tips of branches conical; surface granular, minutely conulose; texture - tough but compressible, resilient; colour - pale white in spirit; Oscules - small, scattered throughout body, 1 mm diameter.

Skeleton – Choanosomal skeleton

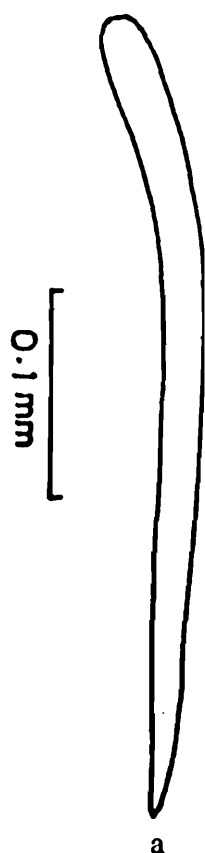


Fig. 51. *Axinella tenuidigitata* a. Style

differentiated into axial and extra axial skeleton, axial compression of spongin fibres cored by styles, extra axial fibres plumose towards surface.

Megascleres - (1) styles slightly curved or straight, sharply pointed, 0.55-0.90 mm long, 0.025-0.033 mm wide.

Microscleres - absent.

Distribution : In India : Andamans, Gulf of Mannar and Kodikkarai.

Family HALICHONDRIIDAE Gray, 1867

Definition : Halichondrida with a confused arrangement of smooth oxeas and/or styles in the choanosome and usually an organised special ectosomal skeleton consisting of tangentially arranged or densely confusedly arranged crust of oxeas and /or styles of sizes similar to or smaller than those of the choanosome.

Genus *Amorphinopsis* Carter, 1887

Definition : Halichondriidae with ectosomal

tangential skeleton of inter-crossing megascleres single or in tracts. Spicules differentiated into larger oxeas and derived forms, smaller oxeas and small styles, concentrated at the surface. Choanosomal skeleton confused with high spicular density and little or no spongin.

Type species : *Amorphinopsis excavans* Carter, 1887

52. *Amorphinopsis foetida* (Dendy, 1889)
(Fig. 52 a-c; Plate VI G)

Hymeniacidon foetida Dendy, 1889, p. 87, pl. 4, fig. 5.

Amorphinopsis megarrhaphea Hallman, 1914, p. 330, pl. 17, fig. 485.

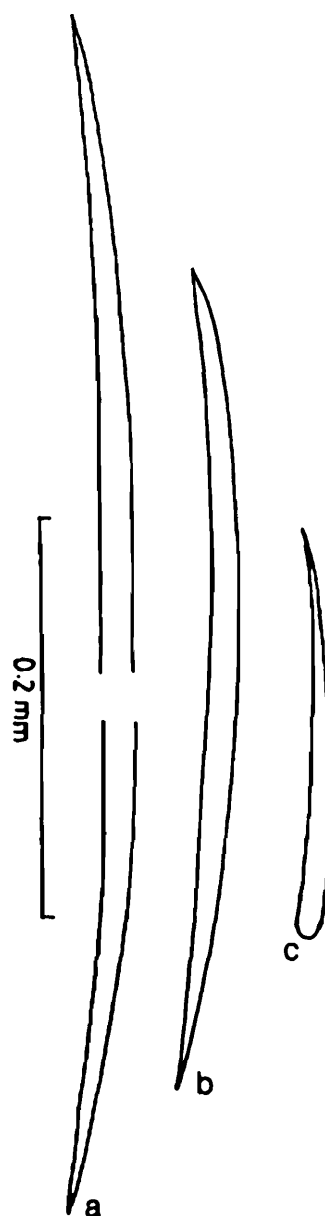


Fig. 52. *Amorphinopsis foetida* a. large oxea b. small oxea c. style

Prostylissa foetida Burton, 1937, p. 37, pl. 7, fig. 45, Rao, 1941, p. 452; Thomas, 1985, p. 324, pl. vi, fig. 27.

Amorphinopsis foetida Pattanayak, 2006, p. 74, pl. VIII D, fig. 48a-c.

Material examined : P3548/1, 4 ex., Kanyakumari, off shore collection, 06.09.2003, Coll. Ch. Satyanarayana

Description : Sponge thick encrusting, with Oscules on tubular projections, surface hispid under lens, texture compact, hard and fragile; colour - light gray when dry, Oscules - scattered on the tubular projections with or without oscular tube, diameter 1-2 mm.

Skeleton - dermal skeleton composed of large oxeas in radial form and associated with styles; meshes polygonal with pores 0.35mm in diameter; main skeleton irregular with oxeas in bands and scanty spongin.

Megascleres - (1) Oxeas slightly curved and sharply pointed, 0.5-0.8 mm long, 0.01-0.03 mm wide, (2) Styles slightly curved and pointed, 0.15-0.25 mm long, 0.008-0.010mm wide.

Microscleres absent

Distribution : In India : Andamans, Gulf of Mannar, Kanyakumari and Minicoy Island.

Elsewhere : Australian region (Hallman, 1914).

Genus *Topsentia* Berg, 1899

Definition : Halichondriidae with an ectosomal skeleton consisting of a crust-like party tangential or paratangential arrangement of spicules grading into the densely confused choanosomal skeleton. Ectosome detachable only in flakes due to lack of subdermal cavities, but choanosome cavernous. Spicules oxeas or modifications, in a large size range, including smaller spicules concerned at the surface.

Type species : *Anisoxya glabra* Topsent, 1898

53. *Topsentia halichondrioides* (Dendy, 1905) (Fig. 53; Plate VII A)

Trachyopsis halichondrioides Dendy, 1905, p. 147; pl. 10, fig. 10; Burton, 1928, p. 118, Thomas, 1985, p. 300, pl. V, fig. 15.

Halichondira aplysinoides Dendy, 1921, p. 39, pl. 3, figs. 3-5, pl.12, fig. 9.

Halichondria rugosa Bergquist, 1961, p. 185, fig. 9a, b.

Spongisorites halichondrioides Pattanayak, 2006, p. 72, pl. VIII E, fig. 49a&b.

Topsentia halichondrioides Erpenbeck and Van Soest, 2002, p. 787

Material examined : P3549/1, 4 ex., Kanyakumari, off shore collection, 06.09.2003, Coll. Ch. Satyanarayana.

Description : Massive form, surface irregular; consistency - soft; colour - light gray in spirit; Oscules - at upper portion of the body, 2-3 mm in diameter.

Skeleton - irregular reticulation of oxeas and fibres, with wisps of spicules directed towards surface and in some places projects out of surface; smaller oxeas present in dermal part, in brushes.

Megascleres - (1) Oxeas, 0.45-0.75 mm long, 0.01-0.03 mm wide.

Microscleres - absent.

Distribution : In India : Andamans, Gulf of Mannar, Palk Bay and Kanyakumari.



Fig. 53. *Topsentia halichondrioides* oxeas

Elsewhere : Malay Archipelago (Burton, 1928), Ceylon (Dendy, 1905, Burton, 1928), Indian Ocean (Dendy, 1921), Chatham Island (Bergquist, 1961).

Order HAPLOSCLERIDA Topsent, 1928

Definition : Demospongiae in which the main skeleton is partially or entirely composed of an isodictyal anisotropic or isotropic, occasionally alviolate reticulation of spongin fibres and or spicules, with uni- to multispicular tracts of diactinal spicules forming triangular, rectangular or polygonal meshes. Megascleres are exclusively oxeote or strongylote, bonded together with collagenous spongin or enclosed within spongin fibres; microscleres, if present, may include sigmas and/or smooth toxas (both frequently centrangulate), microxeas or microstrongyles, and in one group amphidiscs.

Suborder HAPLOSCLERINA Topsent, 1928

Definition : Marine haplosclerida with a anisotropic choanosomal skeleton; spicules smooth oxeas or strongyles of a single category.

Family CALLYSPONGIIDAE de Laubenfels

Definition : Haplosclerida with two dimensional ectosomal skeleton of primary, secondary and sometimes tertiary spongin fibres, fibres are cored by oxeas or strongyles, occasionally uncored or cored with foreign material.

Genus *Callyspongia* Duchassaing & Michelotti, 1864

Definition : Callypsospongiidae with a regular ectosomal tangential reticulation of primary, secondary and sometimes tertiary spiculo-fibres, ectosomal morphology; one single size or three sizes of rounded to irregular, or triangular to rectangular ectosomal mesh. Spongin abundant. Microscleres toxas may be present (e.g., *Callyspongis (Toxochalina) multiformis* Pulitzer-Finali, 1986).

Type species : *Callyspongia fallax* Duchassaing & Michelotti, 1864

54. *Callyspongia cellaria fusca* Rao, 1941 (Fig. 54; VII B)

Callyspongia cellaria var *fusca* Rao, 1941, p. 437, Pl. XII, fig. 8 and 9.

Material examined : P3576/1, 4 ex., Kodikkarai, Dt. Nagapattinam, Shore collection, 24.03.2004, Coll. J.G. Pattanayak.

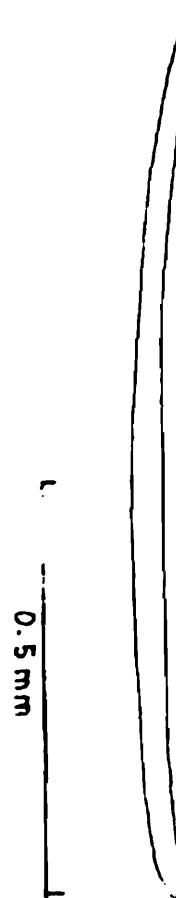


Fig. 54. *Callyspongia cellaria fusca* oxea

Description : Sponge clathrous, attached on mollusk shells, texture less firm and slightly compressible, colour-dark brown, Oscules - numerous 5-8 mm in diameter.

Skeleton - Dermal reticulation of spicular fibres formed of one or more spicules, spicular fibres relatively thin and form a circular or polydgonal reticulation.

Megascleres - Oxeas straight or curved, 0.15-0.25 mm long and 0.013-0.014 mm wide.

Microscleres - absent.

Distribution : In India : Gulf of Mannar and Kodikkarai.

55. *Callyspongia pambanensis* Rao, 1941
(fig. 55; Plate VII C)

Callyspongia pambanensis Rao, 1941, p. 441, pl. XII, fig. 10-12.

Material examined : P3573/1, 2 ex., Kodikkarai, Dt. Nagapattinam, Shore collection, 24.03.2004, Coll. J.G. Pattanayak.

Description : Sponge digitate, branching and anastomosing, texture resilient, furry external surface, colour-light brown; Oscules – numerous, rounded or oval, 3-7 mm in diameter; pores – numerous, less than 1 mm in diameter.

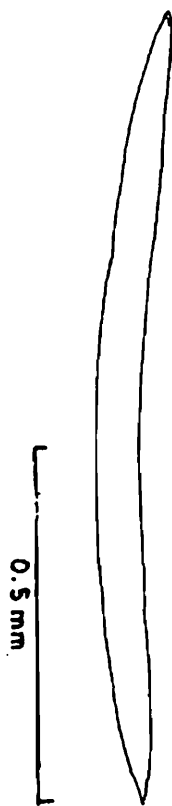


Fig. 55. *Callyspongia pambanensis* oxeas

Skeleton – Main skeleton consists of more or less parallel ascending spicular fibres arching towards the distal end and the periphery of the sponge and connected by short thin transverse fibres. Brush like termini of individual fibres anastomose with similar adjacent termini to form a dermal membrane, with a small bunch of short spicular fibres projecting at the junction of the main and dermal fibres. This projecting fibres give the sponge surface furry appearance.

Megascleres – Oxeas 0.18-0.25 mm long and 0.004-0.020 mm wide.

Microscleres – Absent.

Distribution : In India : Gulf of Mannar and Kodikkarai.

Subgenus *Cladochalina* Schmidt, 1870

Definition : *Callyspongia* with ectosomal network with three sizes of mesh around terminal ends of primary fibres largely spread on the surface. Multispicular primary fibers largely spread on the surface. Multispicular primary fibres well defined, always fasciculated, and ramified to form a choanosomal tertiary network of fine fibres always present. Spongin sheath clearly visible. Conulose surface.

Type species : *Tuba armigera* Duchassaing & Michelotti, 1864

56. *Callyspongia (Cladochalina) fibrosa* Ridley & Dendy, 1886
(Fig. 56; Plate VII D)

Callyspongia fibrosa Ridley & Dendy, 1886, p; Thomas, 1985, p. 248, Pl. II, fig. 14.

Pachychalina spinilamella, Dendy, 1905, p. 149, pl. 7, fig. 4.

Sclerochalina spinilamella, Burton, 1930, p. 669.

Callyspongia (Cladochalina) fibrosa Hooper and Van Soest, 2002, p. 258 (subgenus)

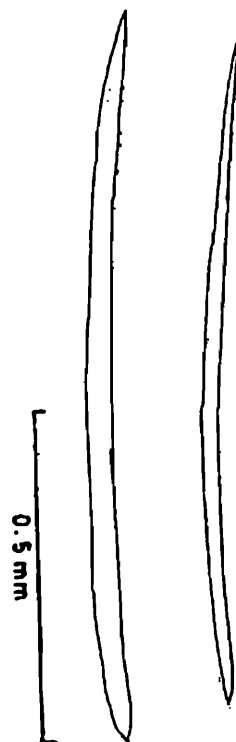


Fig. 56. *Callyspongia (Cladochalina) fibrosa* Oxeas

Material examined : P3574/1, 6 ex., Kodikkarai, Dt. Nagapattinam, Shore collection, 24.03.2004, Coll. J.G. Pattanayak.

Description : Sponge finger shaped or flattened branched, connules on the surface and prominent at growing tips, colour-pale yellow in live; Oscules – irregularly distributed, rounded or elliptical, 4 mm in diameter.

Skeleton – Dermal skeleton reticulate, meshes triangular or subdivided by unispicular or multispicular tertiary fibres; main skeleton formed of primaries and connectives.

Megascleres – Oxeas straight or slightly curved 0.080-0.105 mm long and 0.002-0.004 mm wide.

Microscleres – Absent.

Distribution : In India : Gulf of Mannar, Palk Bay and Kodikkarai.

Elsewhere : Indo-Australian region.

**57. *Callyspongia (Cladochalina) spinosissima* (Dendy, 1887)
(Fig. 57)**

Pachychalina subcylindrica Dendy, 1887, p.524; Dendy, 1905, p. 148, pl. 10, fig. 1, 2.

Callyspongia spinosissima, Burton, 1937, p. 21; Thomas, 1985, p. 248, Pl. II, Fig. 15.

Callyspongia (Cladochalina) spinosissima Hooper and Van soest, 2002. p. 841. (subgenus)

Material examined : P3572/1, 5 ex., Kodikkarai, Dt. Nagapattinam, Shore collection, 24.03.2004, Coll. J.G. Pattanayak; P1144/1, Shingle Island, Gulf of Mannar, Coll. Govt. Museum. Madras.

Description : Sponge erect, irregularly cylindrical branched, colour-yellowish brown; Oscules – scattered, 2-4 mm in diameter; pores – minute 0.05 mm in diameter.

Skeleton – Dermal skeleton reticulate, fibres unispicular only in the tertiary level. Main skeleton composed of primaries of 0.06-0.12 mm in diameter and connectives, meshes rectangular.

Megascleres – Oxeas 0.15-0.20 mm long and 0.005-0.010 mm wide.



Fig. 57. *Callyspongia (Cladochalina) spinosissima* Oxea

Microscleres – Absent.

Distribution : In India : Gulf of Mannar and Kodikkarai.

Elsewhere : Indian Ocean.

**58. *Callyspongia (Cladochalina) diffusa* Ridley, 1884
(Fig. 58; Plate VII E)**

Callyspongia diffusa Ridley, 1884, p. 183; Burton, 1934, p. 541; Burton, 1937, p. 20; Rao, 1941, p. 432, Pl. Xii, fig. 14.

Tubulodigitus communis, Carter, 1881, p. 367.

Siphonochalina communis, Dendy, 1889, p. 81.

Siphonochalina crassifibra, Dendy, 1889, p. 82.

Siphonochalina procumbens, Dendy, 1890, p. 355.

Siphonochalina communis var. *tenuispiculata*, Dendy, 1890, p. 155, pl. vii, fig. 1.

Toxochalina robusta var. *ridleyi*, Dendy, 1905, p. 140, pl. ix, fig. 2.

Siphonochalina crassifibra, Dendy, 1916a, p. 114.

Siphonochalina minor, Dendy, 1916a, p. 115.

Callyspongia diffusa Hooper and Van soest, 2002, p. 841 (subgenus assignment)

Material examined : P3570/1, 5 ex.,

Kanyakumari, off shore collection, 06.09.2003,
Coll. Ch. Satyanarayana

Description : Sponge flabellate, fan-shaped, compressible, resilient, colour-pale brown, Oscules – 2-5 mm diameter, present on funnel shaped processes on upper surface of the sponge.

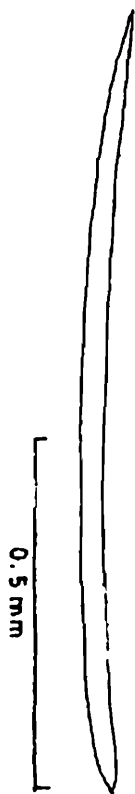


Fig. 58. *Callyspongia (Cladochalina) diffusa* Oxea

Skeleton – Dermal and primary skeleton fibres are well developed with spongin fibres.

Megascleres – Oxeas 0.070-0.075 mm long and 0.004 mm wide.

Microscleres – absent

Distribution : In India : Pamban, Gulf of Mannar and Kanyakumari.

Elsewhere : Trincomalee, Ceylon.

Family CHALINIDAE Gray, 1867

Definition : Haplosclerena with a delicate reticulated choanosomal skeleton of uni-, pauci- or multispicular primary lines, which are regularly connected by unispicular secondary lines. Ectosomal skeleton, if present, a regularly hexagonal, unispicular, tangential reticulation.

Genus *Haliclona* Grant, 1836

Defination : Chalinidae with unispicular secondary lines.

Subgenus *Haliclona* Grant, 1836

Definition : Choanosomal skeleton consisting of a very regular, ladder-like reticulation of uni- to paucispicular primary lines, regularly connected by unispicular secondary lines. Ectosomal skeleton, if present, a unispicular, tangential, isotropic reticulation ; ocassionally with the oxeas 'intercrossing' Oxeas short, rather robust, fusiform or with acerated points. Spongin moderate to abundant. No microscleres.

Type species : *Haliclona oculata* (Pallas, 1766)

59. *Haliclona (Haliclona) oculata*

(Pallas, 1766)

(Fig. 59; a, b; Plate VII F)

Spongia oculata Pallas, 1766

Haliclona oculata Rao, 1941, p. 428.

Haliclona (Haliclona) oculata De Weerd, W.H. 2002, p. 852.

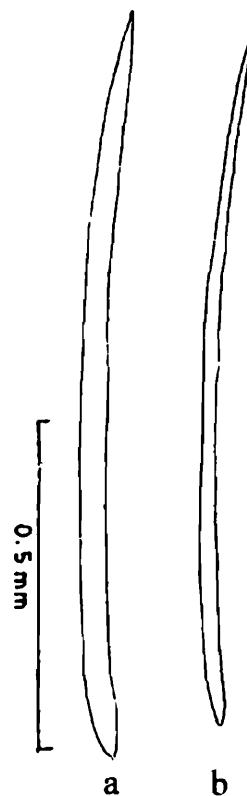


Fig. 59. *Haliclona (Haliclona) oculata* a,b. Oxeas

Material examined : P3565/1, 7 ex., Kodikkarai, Dt. Nagapattinam, Shore collection, 24.03.2004, Coll. J.G. Pattanayak.

Description : Sponge consists of several short tubes arising from a basal mass and arranged side by side. Texture soft and spongy. Surface hispid; oscules - terminal and elevated, diameter, 2-4 mm.

Skeleton – Skeleton consists of an irregular reticulation of multiserially cored fibers, main fibers are distinct from connectives

Megascleres – Oxeas, 0.08-0.12 mm long and 0.004-0.008 mm wide.

Microscleres – Absent.

Distribution : In India : Gulf of Mannar and Kodikkarai.

Elsewhere : Atlantic Ocean, Red Sea, Pacific Ocean, Arctic.

Subgenus ***Soestella*** de Weerdt, 2000

Definition : Chalinidae with a subanisotropic choanosomal skeleton consisting of ill-defined paucispicular primary lines. There is a slight but consistent tendency of spicules to form rounded meshes. Ectosomal skeleton a discontinuous, tangential, rather open reticulation, due to many rounded meshes framed by spicules in lines of 2-5 spicules thick. Spongin always present at nodes of spicules, but never abundant. Oxeas usually slender. Microscleres, if present, sigmas, toxas or raphides.

Type species : *Reniera mamillata* Griessinger, 1971

60. *Haliclona (Soestella) implexa*

(Schmidt, 1868)

(Fig. 60; Plate VII G)

Reniera implexa Schmidt, 1868, p; Dendy, 1905, p. 142.

Haliclona (Soestella) implexa De Weerdt, 2000, p. 60.

Material examined : P3562/1, 6 ex., Kodikkarai, Dt. Nagapattinam, Shore collection, 24.03.2004, Coll. J.G. Pattanayak

Description : Sponge tubular, tubes originate

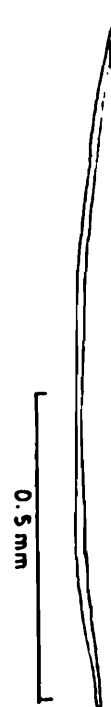


Fig. 60. *Haliclona (Soestella) implexa* Oxea

from basal encrusting portion; Oscules terminal, up to 8 mm. Colour - brownish yellow in spirit.

Skeleton - triangular pattern, each side made of one spicule and cemented by spongin at corners only. Occasionally spicular fibers are also met with.

Megascleres – Oxeas, 0.136 mm long and 0.004 mm wide.

Microscleres – Absent.

Distribution : In India : Gulf of Mannar and Kodikkarai.

Elsewhere : Atlantic Ocean, Mediterranean Red Sea, Pacific Ocean.

Subgenus ***Reniera*** Schmidt, 1862

Defination : Chalinidae with a chaonosomal skeleton consisting of delicate, regular, unispicular, isotropic reticulation. Ectosomal skeleton, if present, also a tangential, unispicular, isotropic, very regular and continuous reticulation. Spongin always present at nodes of spicules, but never abundant. Oxeas frequently blunt-pointed or strongylote. Microscleres, if present, toxas and sigmas. Sponges commaonly soft and fragile.

Type species : *Reniera aquaeductus* Schmidt, 1862

61. *Haliclona (Reniera) madrepora*

(Dendy, 1889)
(Fig. 61; Plate VIII A)

Reniera madrepora Dendy, 1889, p.73

Haliclona madrepora Burton, 1937. 17, pl. 1, fig. 6
(Synonymy).

Material examined : P3563/1, 4 ex.,
Kodikkarai, Dt. Nagapattinam, Shore collection,
24.03.2004, Coll. J.G. Pattanayak.

Description : Sponge composed of a mass of anastomosing cylindrical branches, branches may form branchlets. Both branches and branchlets have cylindrical to flattened outline. Colour - pale yellow or orange in spirit. Texture - soft and capressible. Oscules scattered, pores small, upto 0.05 mm. Surface hispid.

Skeleton : unispicular to multispicular reticulation of oxeas; meshes triangular or rectangular. In the deeper parts the skeleton is dense with much spongin and in other parts spongin only at the corners.

Megascleres – Oxeas, 0.14 – 0.18 mm long and 0.007 – 0.008 mm wide.

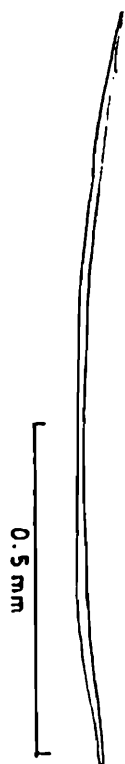


Fig. 61. *Haliclona (Reniera) madrepora* Oxea

Microscleres – Absent.

Distribution : In India : Gulf of Mannar and Kodikkarai.

Elsewhere : Red Sea.

Genus ***Chalinula*** Schmidt, 1868

Defination : Choanosomal skeleton with secondary lines more than one spicule length. No ectosomal skeleton.

Type species : *Chalinula renieroides* Schmidt, 1868

62. *Chalinula camerata* (Ridley, 1884)
(fig. 62; Plate VIII B)

Reniera camerata Ridley, 1884

Haliclona camerata Burton, 1937, p. 17 (Synonymy)

Chalinula camerata Hooper and Van soest, 2002, 853.
(genus transfer)



Fig. 62. *Chalinula camerata* oxea

Material examined : P3564/1, 3 ex.,
Kodikkarai, Dt. Nagapattinam, Shore collection,
24.03.2004, Coll. J.G. Pattanayak.

Description : Sponge lamellar, subcylindrical or subconical; with cavernous interior opening

to the outside through irregular openings. Texture - compressible. Oscules on the inner surface in lamellar specimens.

Skeleton - scalariform pattern, primaries with 4-10 spicules and secondaries with lesser number in cross section. Meshes rectangular to rounded. Primaries project out at the surface giving much hispidity.

Megascleres - Oxeas, 0.16-0.30 mm long 0.005-0.02 mm width.

Microscleres - Absent.

Distribution : In India : Gulf of Mannar and Kodikkarai.

Elsewhere : Red Sea, Australian region.

Family NPHATIDAE Van Soest, 1980

Definition : Haplosclerida with three dimensional ectosomal skeleton of multispicular fibres. Choanosomal skeleton of multispicular fibres, cored by oxeas, often strongylote or stylote. Microscleres if present, sigmas or microxeas.

Genus *Gelliodes* Ridley, 1884

Definition : Niphatidae in which the tangential ectosomal layer of fibres with an irregular mesh is interrupted by protruding ends of choanosomal longitudinal fibres. Choanosomal skeletal network is composed of compact multispicular longitudinal fibres.

Type species : *Gelliodes fibulata* Ridley, 1884.

63. *Gelliodes carnosa* Dendy, 1889
(Fig. 63; Plate VIII C)

Gelliodes carnosa Dendy, 1889, p. 83, pl. iv, fig. 7;
Dendy, 1905, p. 137, pl. vii, fig. 5.

Gelliodes carnosa var. *laxa*, Dendy, 1922, p. 29, pl. ii, fig. 1.

Adocia carnosa, Burton, 1937, p. 19, pl. i, fig. II.

Material examined : P3567/1, 1 ex., Kodikkarai, Dt. Nagapattinam, Shore collection, 24.03.2004, Coll. J.G. Pattanayak.

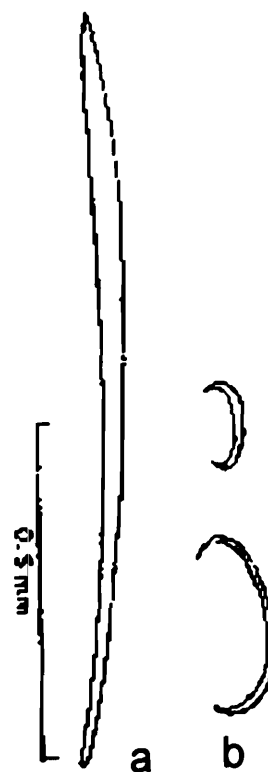


Fig. 63. *Gelliodes carnosa* a. oxea, b. sigmas

Description : Sponge lamellar mass bearing numerous tubular processes each terminating in a vent, surface smooth, even, texture soft and compressible, colour-grey in life; Oscules - at terminal end, 3-5 mm in diameter.

Skeleton - Main skeleton of multispicular ascending fibres with bispicular conjunctives, dermal skeleton unispicular reticulation with a fair amount of sponging.

Megascleres - Oxeas 0.12-0.14 mm long and 0.006-0.008 mm wide.

Microscleres - Sigmas, chord 0.015-0.02 mm long.

Distribution : In India : Gulf of Mannar and Kodikkarai.

Suborder PETROSINA Boury-Esnault & Van Beveren, 1982

Definition : Marine Haplosclerida with an isotropic choanosomal skeleton lacking differentiation in primary and secondary fibres or tracts; spicules smooth oxeas and/or strongyles in a single, or up to five size categories.

Family PHLOEODICTYIDAE Carter, 1882

Definition : Haplosclerida with an ectosomal tangential network of free oxeas or strongyles. Choanosomal network is an isotropic reticulation of free spicules, reinforced or not by an irregular network of fibres or tracts.

Genus *Aka* de Laubenfels, 1936

Definition : Excavation sponges boring calcitic substrata. Spicules only oxeas forming sinuous bands arranged in bundles, producing fistibulose tubes.

Type species : *Aka insidiosa* Johnson, 1899

64. *Aka diagnoxea* Thomas, 1968
(Fig. 64; Plate VIII D)

Aka diagnoxea Thomas, 1968b, p. 250, figs. 1-5;
Thomas, 1972, p. 342, pl. 1, figs. 9 A.

Material examined : Holotype, P3116/1, (CMFRI Regd. No. T 70/1) 1 ex., Gulf of Mannar, 20.06.1965, Coll. C.M.F.R.I.

Description : Sponge boring into corals. Cavities formed inside the coral large, up to 20 mm in diameter and irregular in outline. Fistules projecting out of the substratum.

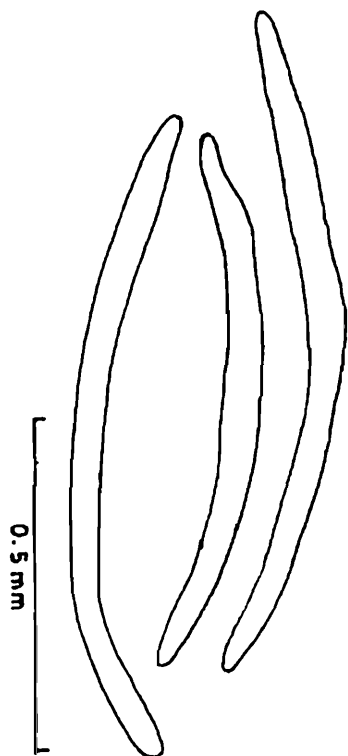


Fig. 64. *Aka diagnoxea* Oxeas

Megascleres – Oxeas, 0.109-0.130 long and 0.007-0.008 mmwide.

Microscleres – Absent.

Distribution : Gulf of Mannar and Kodikkarai.

Remarks : This species is described for the first time from Gulf of Mannar by Thomas (1968). Present description is based on the description of type specimen collected from Gulf of Mannar

65. *Aka minuta* Thomas, 1972
(Fig. 65; Plate VIII E)

Aka minuta Thomas, 1972, p. 343, pl. 2, figs. 4, 4A.

Material examined : Holotype, P3117/1, (CMFRI Regd. No. T 71/1) 1 ex., Gulf of Mannar, 06.09.1969, Coll. C.M.F.R.I.

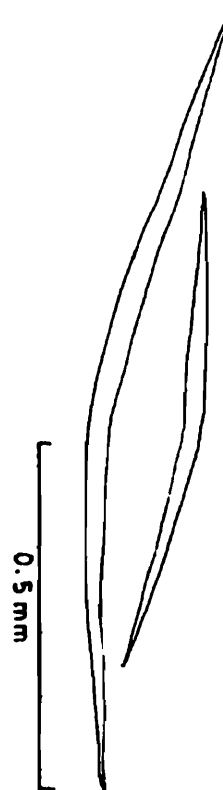


Fig. 65. *Aka minuta* oxea

Description : A common boring sponge of Pocillopora spp. In the Gulf of Mannar. Chambers, formed inside the coral branch, small and irregular. Inter-chamberal connectives pore like. Excurrent and incurrent papillae project out of the substratum through small pores.

Megascleres – Oxeas. With sharp curve at the centre, 0.110-0.130mm long, 0.006-0.008 mm wide.

Microscleres – Absent.

Distribution : Gulf of Mannar and Arkadutarai.

Remarks : This species is described for the first time from Gulf of Mannar by Thomas (1972). Present description is based on the description of type specimen collected from Gulf of Mannar

Family PETROSIIDAE van Soest, 1980

Definition : Haplosclerida with an ectosomal skeleton consisting of an isotropic reticulation of single spicule or spicule tracts and a choanosomal skeleton verging towards an isotropic reticulation of spicule tracts, in which primary and secondary tracts are indistinct.

Genus *Xestospongia* de Laubenfels, 1932

Definition : Petrosiidae with an ectosomal skeleton consisting only of an isotropic reticulation of single spicules or spicule tracts.

Type species : *Haliclona diprosopia* de Laubenfels, 1930

66. *Xestospongia testudinaria*

(Lamarck, 1815)

(Fig. 66 a & b; Plate VIII F)

Alcyonium testudinarium Lamarck, 1815, p. 167,

Reniera crateriformis Carter, 1882b; p. 115, Carter, 1887, p.71.

Reniera testudinaria Ridley, 1884, p. 409.

Petrosia testudinaria Dendy, 1889, p. 77; pl. iii, figs. 1-3; Dendy, 1905, p. 144, fig. 1; Hentschel 1912, p. 403; Topsent 1920, p. 7; Wilson, 1925, p. 399, pl. XL, Fig. 6; Burton, 1937, p. 22, pl. 1, fig. 10; Thomas 1985, p. 246, pl. II, fig. 9; Thomas, 1991, p. 311, fig. 1f; George & George, 1987.

Xestospongia testudinaria Hooper, Kennedy and Van Soest 2000, p. 174; Pattanayak, 2006, p. 79, pl. IX E, fig. 55a & b.

Material examined : P3554/1, 5 ex., Kanyakumari, off shore collection, 06.09.2003, Coll. Ch. Satyanarayana.

Description : Massive, outer surface ridged vertically; surface smooth, texture soft and breaking at little pressure; colour-pale brown, Oscule - at the inner surface, present in groups, 0.5-1mm diameter.

Skeleton - Both dermal and main skeleton well developed, consisting of stout plurispicular reticulation.

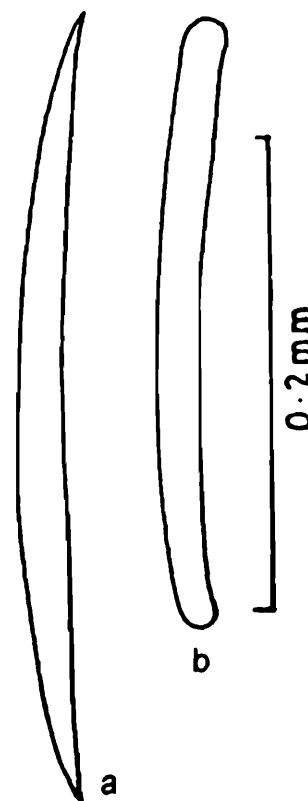


Fig. 66. *Xestospongia testudinaria* a. oxea b. strongyle

Megascleres - (1) Oxeas, stout, slightly curved, 0.15-0.45 mm long, 0.015-0.023 mm wide, (2) Strongyles less in number, 0.17-0.38 mm long, 0.015-0.025 mm wide.

Microscleres - absent.

Distribution : In India : Andamans, Gulf of Mannar, Palk Bay, Tuticorin and Kanyakumari.

Elsewhere : Sattahip region, Thailand (Lamarck, 1814), Bodhgaya Island and Pulau Sipadan, Sabah (George & George, 1987); Indonesia (ZMA database); Singapore (Q.M/RZC collection); Mergui Archipelago (Carter, 1887), Indo-Pacific (Ridley, 1884), Ceylon (Dendy, 1905); Indonesia (Hentschel, 1912); Philippine (Wilson, 1928), Papua and New Guinea (Thomas, 1991).

Order DICTYOCERATIDA Minchin, 1900

Definition Demospongiae (Ceractinomorpha) in which a spongin fibre skeleton, which makes up a significant proportion of the body volume, is universally present and is constructed on an anastomosing plan. The skeleton develops from multiple points of attachment and, except in two genera where primary fibres are absent, is organised as a hierarchy of primary, secondary and sometimes tertiary elements. In one family the reticulate skeleton is supplimented by fine collagenous filaments dispersed throughout the mesohyle. Fibre construction is either homogeneous, lacking pith, with growth laminae tightly adherent and just detectable, or pithed and strongly laminated with pith grading into dark. In the later, consecutive laminae are marked but remain adherent to each other. Pith is structurally and chemically distinct from that seen in fibres of Verongida and Dendroceratida. The choanocyte chambers are either diplodal or eurypylous. Cells of the mesohyl are moderately to weakly diversifies, never showing the range of structural types seen in Dendroceratida or Verongida. Larvae are incubated parenchymellae with complex histology and a posterior ring or cap of long cilia. Sponge texture is characteristically compressible and tough, never heavily collagenous throughout, hard when debris is incorporated or the fibre skeleton is dense, soft when the skeleton is reduced in proportion to soft tissue mass. There is often a marked differential pigmentation, with the exterior dark and the interior ranging from white through cream to pale brown or pale to bright yellow. In terms of biochemistry the group is characterised by very low sterol content and a diverse range of terpenes within the lipid fraction.

Family THORECTIDAE Bergquist, 1978

Definition : Dictyoceratida with laminated skeletal fibres and diplodal choanocyte chambers.

Subfamily PHYLLOSPONGIINAE Bergquist, Sorokin and Karuso, 1999

Definition : Thorectidae consisting of foliose, lamellate or folio-digitate growth forms, with tertiary fibres in the skeleton (except in one genus)

Genus *Carteriospongia* Hyatt, 1877

Definition : Unarmoured phyllospongiinae, but with a sand crust. Regular fibre skeleton of primary, secondary and vermiform tertiary fibres.

Type species : *Spongia papyracea* Esper, 1806.

67. *Carteriospongia foliascens* (Pallas, 1766)
(Fig. 67; Plate VIII G)

Spongia foliascens Pallas, 1766, p. 395.

Phyllospongia foliascens Lendenfeld, 1889, p. 196, pl. 5, fig. 3; Thomas, 1973b, p. 14, pl. 1, fig. 4, pl. 6, fig. 1,2,4; Bergquist, 1965, p. 131, figs. 3a,b;

Thomas 1979a, p. 14, fig. 2c; George and George, 1987; Zeng *et al.*, 1991, p. 421; Pattanayak, 2006, p. 80, pl. IX F, fig. 55a & b.

Carteriospongia foliascens Hooper and Van soest, 2002, p. 1046 (genus transfer).

Material examined : P3557/1, 4 ex., Kanyakumari, off shore collection, 06.09.2003, Coll. Ch. Satyanarayana

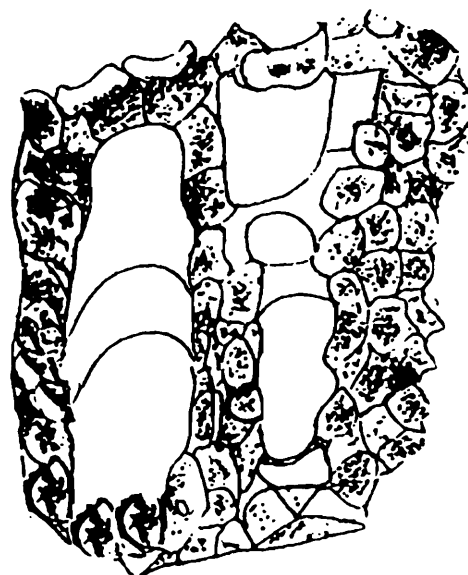


Fig. 67. *Carteriospongia foliascens* skeleton of spongin fibres

Description : Sponge thin foliaceous, stalked funnel-shaped, thickness 2-3 mm, diameter 95-150 mm. Surface corrugated and ornamented by ridges and pits, covered externally by transparent dermal membrane, reinforced by fins and grains, Oscule situated at inner side of the specimens, diameter 0.5-0.9 mm.

Skeleton - Spongin fibres coarser and more definitely cored by foreign material. Siliceous or calcareous spicules absent.

Distribution : In India : Andamans, Minicoy Island and Kanyakumari.

Elsewhere : Russia (Pallas, 1766), Palau Archipelago (Bergquist, 1965), Bodgaya Islands and Pulau Sipadan, Sabah (George and George,

1987), South China Sea, Taiwan (Zeng *et al.* 1991).

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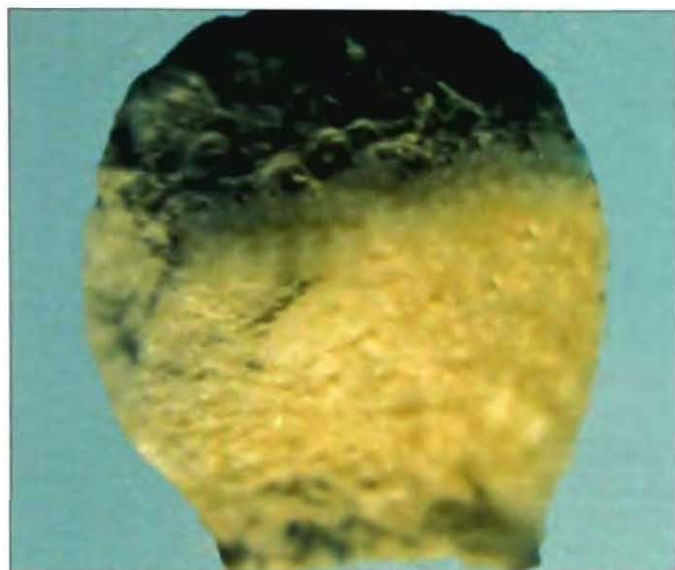
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Plate I



A. Cinachyra arabica



B. Cinachyrella tarentina



C. Paratetilla bucca



D. Ecionemia acervus

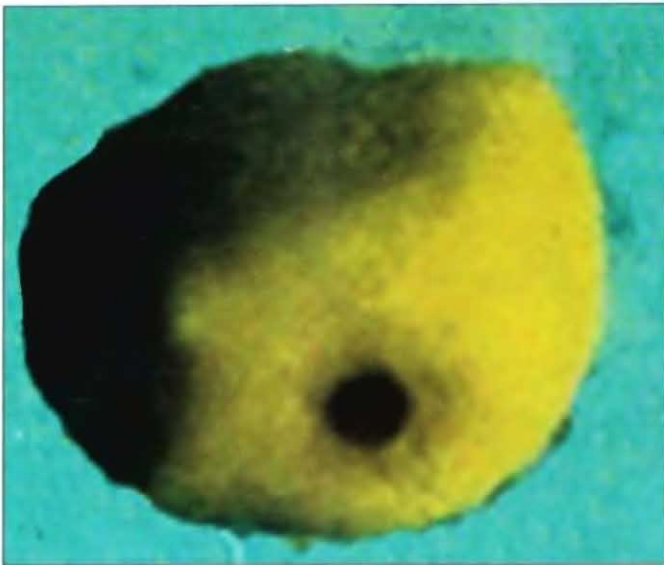


E. Rhabdastrella globostellata



F. Stelletta clavosa

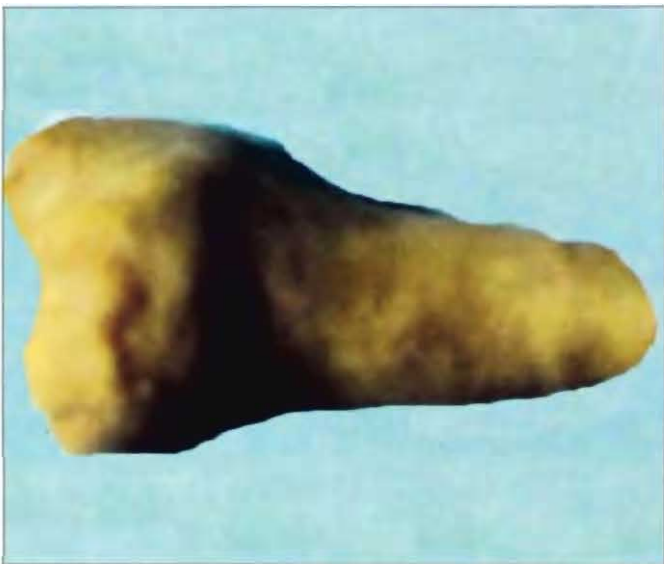
Plate II



A. Stelletta purpurea



B. Geodia inconspicua



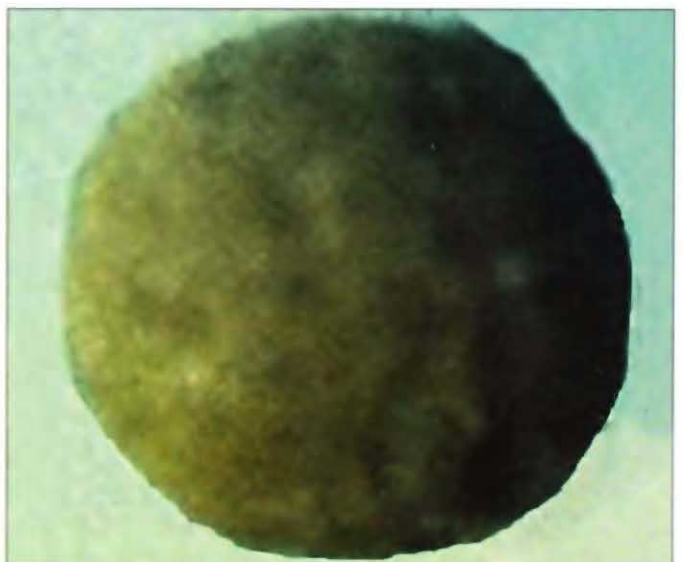
C. Spheciospongia inconstans



D. Suberites carnosus

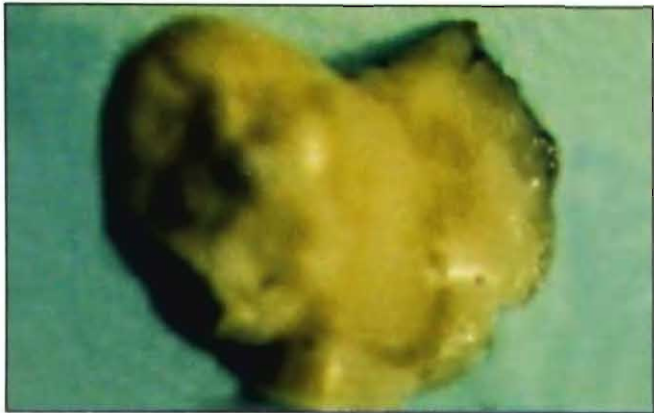


E. Tethya diploderma



F. Stellitethya repens

Plate III



A. *Discodermia papillata*



B. *Theonella swinhoei*



C. *Petromica (Petromica) massalis*



D. *Clathria (Microciona) atrasanguinea*



E. *Clathria (Thalysias) vulpine*

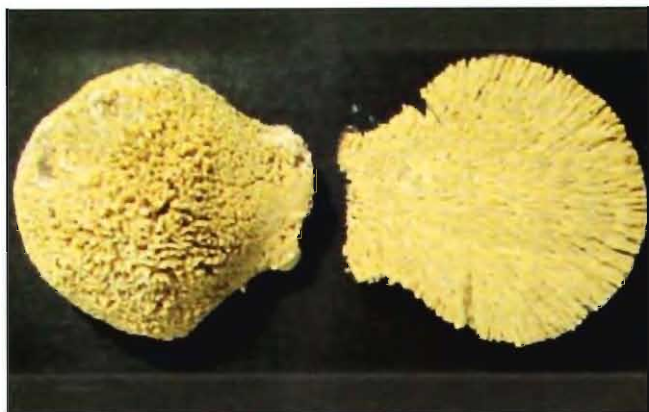


F. *Clathria (Thalysias) procera*



G. *Clathria (Clathria) indica*

Plate IV



A. Aulosponges tubulatus



B. Echinodictyum clathratum



C. Echinodictyum longistylum



D. Rhabderemia acanthostyla



E. Coelosphaera encrusta



F. Lissodendoryx (Lissodendoryx) balanophilus



G. Lissodendoryx (Lissodendoryx) ternatensis

Plate V



A. *Lissodendoryx (Ectyodoryx) lissostyla*



B. *Hymedesmia (Hymedesmia) mannarensis*



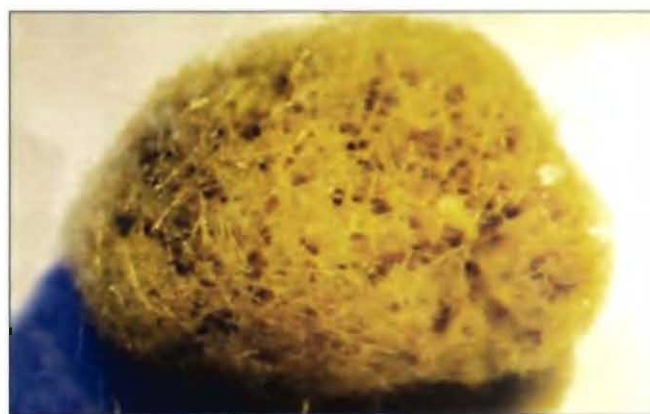
C. *Hymedesmia (Hymedesmia) stylophora*



D. *Tedania (Tedania) anhelans*



E. *Biemna tubulata*



F. *Mycale (Aegogropila) crassissima*



G. *Mycale (Mycale) grandis*

Plate VI



A. Mycale (Mycale) Indica



B. Mycale (Mycale) mannarensis



C. Mycale (Mycale) monanchorata



D. Mycale (Carmia) mytilorum



E. Stylisa carteri



F. Axinella tenuidigitata



G. Amorphinopsis foetida

Plate VII



A. *Topsentia halichondrioidess*



B. *Callyspongia cellaria fusca*



C. *Callyspongia (Callyspongia) pambanensis*



D. *Callyspongia (Cladochalina) fibrosa*



E. *Callyspongia (Cladochalina) diffusa*



F. *Haliclona (Haliclona) oculata*



G. *Haliclona (Soestella) implexa*

Plate VIII



A. Haliclona (Reniera) madrepora



B. Chalinula camerata



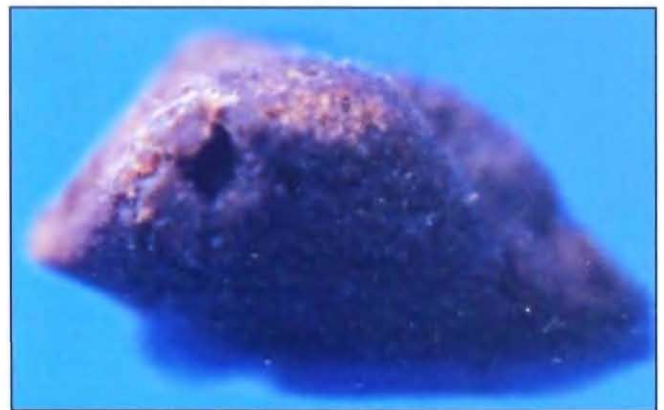
C. Gelliodes carnosa



D. Aka diagnoxea



E. Aka minuta



F. Xestospongia testudinaria



G. Carteriospongia foliascens

NEMATODA : TYLENCHIDA

DEBABRATA SEN and A.K. SANYAL

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INTRODUCTION

The phytophagous nematodes, which belong mostly to the orders Tylenchida, Aphelenchida and some members of the order Dorylaimida, cause significant yield loss to the agricultural crops. Even after many decades of intensive research on nematology, very few people, including the farmers, particularly in our country, are aware of these organisms and losses caused by them, due to their minute body size. Due to this lack of awareness, the phytonematodes affect agricultural productivity and hence they exert great importance in our economy. Dasgupta (1998) provided a detail list of crop losses due to nematodes in India, some of which are being mentioned: 14.9% germination loss and 50.95% of annual yield loss of carrot by *Meloidogyne hapla* in Nilgiri hills have been recorded. 30-60% of yield loss of banana by *Radopholus similis* (Nair *et al.*, 1966; Reddy, 1993), 10-15% loss of paddy due to *Ditylenchus angustus* (Swarup and Dasgupta, 1986), 11-29% loss of Maize and 0.1-9% loss of wheat by *Heterodera zae* and *Anguina tritici* respectively have been estimated. Ahmad (1996) provided information about 600 Indian species under 70 genera belonging to the sub order Tylenchina.

Barber (1901) first reported the tea-eelworm disease in South India. Since then, a lot of works have been done on the nematode pests associated with different agricultural crops of economic importance in Tamil Nadu (Ayyar, 1926; Singh, 1960; Seshadri and Kumaraswami, 1963; Chandy *et al.*, 1963; Sivakumar, 1964;

Kumar *et al.*, 1972; Singh *et al.*, 1979; Siddiqi and Khan, 1983; Sivakumar, 1987). The occurrence of some nematodes in Tamil Nadu have been reported by Janarthanam (1974), Chandrasekaran *et al.* (1975), Jayaraman *et al.* (1976), Sivakumar and Sundaram (1981) Sivakumar and Mohansundaram (1982) and others.

The distribution of nematode pests associated with various commercially important crops like coffee, cotton, betel vine and grape varieties has been studied by Somasekhar (1959), Abu Bucker and Seshadri (1968), Sivakumar and Marimuthu (1984) and Azakiamanavalam *et al.* (1987) respectively. A lot of studies have been done to investigate the nature of association of phytonematodes with sugarcane in Tamil Nadu (Rao *et al.*, 1960; Rao, 1961; Chandy, 1963; Jairam *et al.*, 1964). The occurrence of Criconeematids from the state have extensively been studied and recorded by Muthukrishnan *et al.*, 1975; Chawla and Samathanam, 1980; Sivakumar and Muthukrishnan, 1986 and Muthukrishnan, 1987a and b. In the present communication an attempt has been made to present a compiled list of plant parasitic nematodes belonging to the order Tylenchida so far described and reported from Tamil Nadu. Siddiqi (2000) while reviewing the classification of Tylenchida, transferred many valid species from one genus to other and many of them were also synonymised with other species. Classification proposed by Siddiqi (2000) has been followed here to arrange the genera and species and to indicate their present status.

CHECKLIST

- Order TYLENCHIDA Thorne, 1949
 Suborder TYLENCHINA Thorne, 1949
 Infraorder TYLENCHATA Siddiqi, 2000
 Superfamily TYLENCHOIDEA Örley, 1880
 Family TYLENCHIDAE Örley, 1880
 Subfamily TYLENCHINAE Örley, 1880
 1. Genus **Tylenchus** Bastian, 1865
 2. Genus **Filenchus** Andrassy, 1954
 2.1.1. *Filenchus annulatus* (Siddiqui and Khan, 1983) Siddiqi, 1986
 (= *Lelenchus annulatus* Siddiqui and Khan, 1983)
 2.1.2. *F. tenuis* (Siddiqui and Khan, 1983) Siddiqi, 1986
 (= *Lelenchus tenuis* Siddiqui and Khan, 1983)
 Family ECPHYADOPHORIDAE Skarbilovich, 1959
 Subfamily ECPHYADOPHORINAE Siddiqi, 1986
 3. Genus **Ecphyadophoroides** Corbett, 1964
 Infraorder ANGUINATA Siddiqi, 2000
 Superfamily ANGUINOIDEA Nicoll, 1935 (1926)
 Family ANGUINIDAE Nicoll, 1935 (1926)
 Subfamily ANGUININAE Nicoll, 1935 (1926)
 4. Genus **Ditylenchus** Filipjev, 1936
 5. Genus **Nothanguina** Whitehead, 1959
 6. Genus **Orrina** Brzeski, 1981
 6.1.3. *Orrina Phyllobia* (Thorne, 1934) Brzeski, 1981
 Syn. *Anguillulina phyllobia* Thorne, 1934
 (= *Nothanguina phyllobia* (Thorne, 1934) Thorne, 1961)
 7. Genus **Subanguina** Paramonov, 1967
 7.1.4. *Subanguina radicola* (Greef, 1872) Paramonov, 1967
 (= *Heterodera radicola* Greef, 1872)
 Suborder HOPLOLAIMINA Chizhov & Berezina, 1988
 Superfamily HOPLOLAIMOIDEA Filipjev, 1934
 Family HOPLOLAIMIDAE, Filipjev, 1934
 Subfamily HOPLOLAIMINAE, Filipjev, 1934
 8. Genus **Hoplolaimus** Daday, 1905
 Subgenus **Hoplolaimus** Daday, 1905
 8.1.5. *Hoplolaimus (Hoplolaimus) galeatus* (Cobb, 1913) Thorne 1935
 Syn. (= *Hoplolaimus coronatus* Cobb, 1923)
 Subgenus **Basirolaimus** Shamsi, 1979
 8.2.6. *Hoplolaimus (Basirolaimus) seinhorsti* Luc, 1958
 Syn. (= *Hoplolaimus seinhorsti* Luc, 1958)
 8.3.7. *H. (B.) indicus* Sher, 1963
 Syn. (= *Hoplolaimus indicus* Sher, 1963)
 9. Genus **Scutellonema** Andrassy, 1958
 9.1.8. *Scutellonema brachyurus* (Steiner, 1938) Andrassy, 1954
 Syn. *Rotylenchus brachyurus* Steiner, 1938
 Subfamily ROTYLENCHOIDINAE Whitehead, 1958
 10. Genus **Helicotylenchus** Steiner, 1945
 10.1.9. *Helicotylenchus crenacauda* Sher, 1966
 10.2.10. *Helicotylenchus dihystra* (Cobb, 1893) Sher, 1961
 Syn. *Tylenchus dihystra* Cobb, 1893
 (= *Helicotylenchus nannus* Steiner, 1945)
 10.3.11. *H. multicinctus* (Cobb, 1893) Golden, 1956
 Syn. *Tylenchus multicinctus* Cobb, 1893
 10.4.12. *H. erythrinae* (Zimmermann, 1904) Golden, 1956
 Syn. *Tylenchus erythrinae* Zimmermann, 1904
 10.5.13. *H. girus* Saha, Chawla & Khan, 1974
 Syn. (= *H. incisus* Darekar and Khan, 1979)
 11. Genus **Rotylenchus** Filipjev, 1936
 Subgenus **Rotylenchus** Filipjev, 1936
 11.1.14. *Rotylenchus (Rotylenchus) goodeyi* Loof & Oostenbrink, 1958
 Family ROTYLENCHULIDAE Husain & Khan, 1967
 Subfamily ROTYLENCHULINAE Husain & Khan, 1967

12. Genus **Rotylenchulus** Linford & Oliveira, 1940
- 12.1.15. *Rotylenchulus reniformis* Linford & Oliveira, 1940
- Family PRATYLENCHIDAE Thorne, 1949
- Subfamily PRATYLENCHINAE Thorne, 1949
13. Genus **Pratylenchus** Filipjev, 1936
- 13.1.16. *Pratylenchus brachyurus* (Godfrey, 1929) Filipjev & Schuur Stekh., 1941
- Syn. *Tylenchus brachyurus* Godfrey, 1929
- 13.2.17. *P. coffeae* (Zimmerman, 1898) Filipjev & Schuur Stekh., 1941
- Syn. *Tylenchus coffeae* Zimmerman, 1898
- 13.3.18. *P. delattrei* Luc, 1958
- 13.4.19. *P. neglectus* (Rensch, 1924) Filipjev & Schuur Stekh., 1941
- Syn. *Aphelenchus neglectus* Rensch, 1924
- 13.5.20. *P. pratensis* (de Man, 1880) Filipjev, 1936
- Syn. *Tylenchus pratensis* de Man, 1880
- 13.6.21. *P. Scribneri* Steiner, 1943
- 13.7.22. *P. zae* Graham, 1951
- Subfamily HIRSCHMANNIELLINAE Fotedar & Handoo, 1978
14. Genus **Hirschmanniella** Luc & Goodey, 1964
- 14.1.23. *Hirschmanniella mucronata* (Das, 1960) Khan, Siddiqi, Khan, Husain & Saxena, 1964
- Syn. *Radopholus mucronatus* Das, 1960
- 14.2.24. *H. oryzae* (van Breda de haan, 1902) Luc & Goodey, 1964
- Syn. *Tylenchus oryzae* van Breda de haan, 1902
- Subfamily RADOPHOLINAE Allen & Sher, 1967
- 15.1.25. *Radopholus similis* (Cobb, 1893) Thorne, 1949
- Syn. *Tylenchus similis* Cobb, 1893
- Family MELOIDOGYNIDAE Skarbilovich, 1959
- Subfamily MELOIDOGYNINAE Skarbilovich, 1959
16. Genus **Meloidogyne** Goeldi, 1892
- 16.1.26. *Meloidogyne arenaria* (Neal, 1889) Chitwood, 1949
- Syn. *Anguillula arenaria* Neal, 1889
- 16.2.27. *M. hapla* Chitwood, 1949
- 16.3.28. *M. incognita* (Kofoid & White, 1919) Chitwood, 1949
- Syn. *Oxyuris incognita* Kofoid & White, 1919
- 16.4.29. *M. javanica* (Treub, 1885) Chitwood, 1949
- Heterodera javanica* Treub, 1885
- Family HETERODERIDAE Filipjev & Schuur Stekh., 1941
- Subfamily HETERODERINAE Filipjev & Schuur Stekh., 1941
17. Genus **Heterodera** Schmidt, 1871
- 17.1.30. *Heterodera cajani* Koshy, 1967
18. Genus **Globodera** Skarbilovich, 1959 (Behrens, 1975)
- 18.1.31. *Globodera rostochiensis* (Wollenbower, 1923) Skarbilovich, 1959
- Syn. (= *Heterodera rostochiensis* Wollenbower, 1923)
- Superfamily DOLICHODOROIDEA Chitwood, 1950
- Family TELOTYLENCHIDAE Siddiqi, 1960
- Subfamily TELOTYLENCHINAE Siddiqi, 1960
19. Genus **Quinisulcius** Siddiqi, 1971
- 19.1.32. *Quinisulcius capitatus* (Allen, 1955) Siddiqi, 1971
- Syn. *Tylenchorhynchus capitatus* Allen, 1955
- (= *Tylenchorhynchus acti* Hopper, 1959)
- (= *T. nilgiriensis* Muthukrishnan & Shunmugam, 1967)
- 19.2.33. *Q. acutus* (Allen, 1955) Siddiqi, 1971
- Syn. (= *Tylenchorhynchus acutus* Allen, 1955)
20. Genus **Tylenchorhynchus** Cobb, 1913
- 20.1.34. *Tylenchorhynchus brassicae* Siddiqi, 1961
- 20.2.35. *T. crassicaudatus* Williams, 1960

20.3.36. *T. elegans* Siddiqi, 1961

20.4.37. *T. nudus* Allen, 1955

Suborder CRICONEMATINA Siddiqi, 1980

Superfamily CRICONEMATOIDEA Taylor,
1936

Family CRICONEMATIDAE Taylor, 1936

Subfamily CRICONEMATINAE Taylor, 1936

21. Genus **Criconema** Hofmänner &
menzel, 1914

Subgenus **Criconema** Hofmänner & menzel,
1914

21.1.38. *Criconema (Criconema) lamellatum*
(Raski & Golden, 1966) Raski & Luc, 1985

Syn. *Criconemoides lamellatus* Raski &
Golden, 1966

Subgenus **Nothocrioinemella** Ebsary, 1981

21.2.39. *Criconema (Nothocrioinemella)*
mutabile (Taylor, 1936) Raski & Luc, 1985

Syn. *Criconemoides mutabilis* Taylor, 1936

22. Genus **Crossonema** Mehta & Raski, 1971

22.1.40. *Crossonema civellae* (Steiner, 1949)
Mehta & Raski, 1971

Syn. (= *Criconema civellae* Steiner, 1949)

23. Genus **Lobocriconema** De Grisse &
Loof, 1965

23.1.41. *Lobocriconema brevicaudatum*
(Siddiqi, 1961) De Grisse, 1967

Syn. (= *Criconema brevicaudatum* Siddiqi,
1961)

24. Genus **Neolobocriconema** Mehta &
Raski, 1971

24.1.42. *Neolobocriconema palaniensis*
(Muthukrishnan, 1987) Van den Berg, 1993

Syn. (= *Ogma palaniensis* Muthukrishnan,
1987)

25. Genus **Ogma** Southern, 1914

Subgenus **Ogma** Southern, 1914

25.1.43. *Ogma (Ogma) Decalineatum*
(Chitwood, 1957) Andrassy, 1979

Syn. *Criconema Decalineatum* Chitwood,
1957

(= *Ogma coffeae* (Edward *et. al.*, 1970)
Andrassy, 1979)

Subgenus **Corserinema** Khan, Chawla &
Saha, 1976 (Siddiqi, 1986)

25.2.44. *Ogma (C.) palmatum* (Siddiqi &
Southey, 1962) Siddiqi, 1986

Syn. *Criconema palmatum* Siddiqi &
Southey, 1962

(= *Crossonema (Crossonema) palmatum*
(Siddiqi & Southey, 1962) Mehta & Raski,
1971

Subfamily MACROPOSTHONIINAE
Skarbilovich, 1959

26. Genus **Macroposthonia** de Man, 1880

26.1.45. *Macroposthonia basili* (Jairajpuri,
1964) De Grisse & Loof, 1965

Syn. *Criconemoides basili* Jairajpuri, 1964

(= *Criconemella basili* (Jairajpuri, 1964)
Luc & Raski, 1981)

26.2.46. *M. curvata* (Raski, 1952) De Grisse &
Loof, 1965

Syn. *Criconemoides curvatus* Raski, 1952

(= *Criconemella curvata* (Raski, 1952) Luc
& Raski, 1981)

26.3.47. *M. irregularis* (De Grisse, 1964) De
Grisse & Loof, 1965

Syn. *Criconemoides irregularis* De Grisse,
1964

(= *Criconemella irregularis* (De Grisse,
1964) Luc & Raski, 1981)

26.4.48. *M. onoensis* (Luc, 1959) De Grisse &
Loof, 1965

(= *Criconemella onoensis* (Luc, 1959) Luc
& Raski, 1981)

26.5.49. *M. ornata* (Raski, 1958) De Grisse &
Loof, 1965

(= *Criconemella ornata* (Raski, 1958) Luc
& Raski, 1981)

26.6.50. *M. rustica* (Micoletzky, 1915) De Grisse
& Loof, 1965

Syn. *Criconema rusticum* Micoletzky, 1915

26.7.51. *M. sphaerocephalus* (Taylor, 1936) De
Grisse & Loof, 1965

(= *Criconemella sphaerocephalus* Taylor,
1936)

- 26.8.52. *M. xenoplax* (Raski, 1952) De Grisse & Loof, 1965
 (= *Criconemella xenoplax* Raski, 1952)
27. Genus ***Criconemoides*** Taylor, 1936
 Subgenus ***Criconemella*** De Grisse & Loof, 1965
- 27.1.53. *Criconemoides (Criconemella) goodeyi* de Gurian, 1963
 (= *Criconemella goodeyi* (de Gurian, 1963) De Grisse & Loof, 1965)
- 27.2.54. *C. (C.) purvulus* Siddiqi, 1961
 (= *Criconemella purvula* (Siddiqi, 1961) De Grisse & Loof, 1965)
28. Genus ***Discocriconemella*** De Grisse & Loof, 1965
- 28.1.55. *Discocriconemella limitanea* (Luc, 1959) De Grisse & Loof, 1965
 (= *Discocriconemella barberi* Chawla and Samathanam, 1980)
 (= *Criconema brevicaudatum* Siddiqi, 1961)
- 28.2.56. *D. theobromae* (Chawla and Samathanam, 1980) Raski and Luc, 1987
 Syn. (= *Madinema theobromi* Chawla and Samathanam, 1980)
- Subfamily HEMICRICONEMOIDINAE
 Andrassy, 1979
29. Genus ***Hemicriconemoides*** Chitwood and Birchfield, 1957
- 29.1.57. *Hemicriconemoides brachyurus* (Loos, 1949) Chitwood and Birchfield, 1957
- 29.2.58. *H. cocophillus* (Loos, 1949) Chitwood and Birchfield, 1957
- 29.3.59. *H. gaddi* (Loos, 1949) Chitwood and Birchfield, 1957
- 29.4.60. *H. mangiferae* Siddiqi, 1961
- 29.5.61. *H. mehdii* Suryawanshi, 1971
- Superfamily HEMICYCLIOPHOROIDEA
 Skarbilovich, 1959
- Family HEMICYCLIOPHORIDAE
 Skarbilovich, 1959
- Subfamily HEMICYCLIOPHIRINAE
 Skarbilovich, 1959
30. Genus ***Hemicycliophora*** de Man, 1921
- 30.1.62. *Hemicycliophora labiata* Colbran, 1971
31. Genus ***Aulosphora*** Siddiqi, 1980
- 31.1.63. *Aulosphora penetrans* (Thorne, 1955) Siddiqi, 1980
 (= *Hemicycliophora penetrans* Thorne, 1955)
32. Genus ***Loofia*** Siddiqi, 1980
- Family CALOOSIIDAE Siddiqi, 1980
- Subfamily CALOOSIINAE Siddiqi, 1980
33. Genus ***Caloosia*** Siddiqi and Goodey, 1964
- 33.1.64. *Caloosia exilis* Mathur, Khan, Nand and Prasad, 1969
 (= *Caloosia indica* Chawla and Samathanam, 1980)
- 33.2.65. *C. paralongicaudata* Siddiqi and Goodey, 1964
 Syn. (= *Hemicycliophora longicaudata* apud Siddiqi, 1961)
- Superfamily TYLENCHULOIDEA
 Skarbilovich, 1947
- Family TYLENCHULIDAE Skarbilovich, 1947
- Subfamily TYLENCHULINAE Skarbilovich, 1947
34. Genus ***Tylenchulus*** Cobb, 1913
- 34.1.66. *Tylenchulus semipenetrans* Cobb, 1913
- Family PARATYLENCHIDAE Thorne, 1949
- Subfamily PARATYLENCHINAE Thorne, 1949
35. Genus ***Paratylenchus*** sp. Micoletzky, 1922
- Suborder HEXATYLINA Siddiqi, 1980
- Superfamily SPHAERULARIOIDEA Lubbock, 1861
- Family NEOTYLENCHIDAE Thorne, 1941
- Subfamily NEOTYLENCHINAE Thorne, 1941
36. Genus ***Hexatylus*** sp. Goodey, 1926
 Syn. (= *Neotylenchus* Steiner, 1931)

DISCUSSION

In the present checklist of phytophagous nematodes known from Tamil Nadu, 66 species under 36 genera of the order Tylenchida Thorne, 1949 have been listed. The present systematic status of the species has been provided in the list with its originally described

or reported names within the parenthesis. Only one species, *Paratylenchus macrophallus* (de Man, 1880) Goodey, 1934, reported by Jairam *et al.* (1964) from sugar cane, has been placed under species *inquirendae*. Among the species listed above, the following six species were described from Tamil Nadu as new to science :

1. *Filenchus annulatus* (Siddiqui and Khan, 1983) Siddiqui, 1986
(= *Lelenchus annulatus* Siddiqui and Khan, 1983)
2. *F. tenuis* (Siddiqui and Khan, 1983) Siddiqui, 1986
(= *L. tenuis* Siddiqui and Khan, 1983)
3. *Neolobocriconema palaniensis*
Muthukrishnan, 1987
4. *Caloosia indica* Chawla and Samathanam, 1980
5. *Discocriciconemella barberi* Chawla and Samathanam, 1980
6. *D. theobromae* (Chawla and Samathanam, 1980) Raski & Luc, 1987
(= *Madinema theobromi* Chawla and Samathanam, 1980)

The survey of Abu Bucker and Seshadri (1968) revealed the presence of 8 genera of plant parasitic nematodes (*Rotylenchulus*, *Pratylenchus*, *Rotylenchus*, *Helicotylenchus*, *Hoplolaimus*, *Tylenchorhynchus*, *tylenchus* and

Aphelenchus) in most of the cotton growing areas of Tamil Nadu. Among them *Pratylenchus delattrei* appeared to be very common and *Rotylenchus reniformis* was found to be the most dominant and widely distributed species in the cotton fields of Coimbatore. According to Koshy *et al.* (1978) *Radopholus similis* is widely distributed in Coimbatore, Madurai, Tirunelveli, Salem Dharampuri and North Arcot districts of Tamil Nadu State. Sivakumar and Marimuthu (1984) reported the occurrence of *Meloidogyne incognita* in all the betel vine growing districts of Tamil Nadu and *Helicotylenchus girus* (= *H. incisus*), *Hoplolaimus seinhorsti*, *Hirschmanniella mucronata*, *Tylenchorhynchus brassicae*, *Criconemoides* spp. and *Radopholus similis* were recorded with high population density in the State. Amalraj and Rao (1992) concluded that potato cyst nematodes are prevalent in India, only in the hills of Tamil Nadu.

SUMMARY

A checklist of 66 species under 36 genera of plant parasitic nematodes belonging to the order Tylenchida known from Tamil Nadu State, India, has been prepared with present systematic status of the species. The list includes six species which have been described from the State as new to science.

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NEMATODA : DORYLAIMIDA

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INTRODUCTION

The members of the order Dorylaimida, commonly known as dorylaims, represent a large and very important group of soil and freshwater nematodes. They occur more frequently in soil than any other group of nematodes. They are found in every type of habitat and in all types of soil. Both in appearance and mode of life the dorylaims represent a wide diversity within the nematoda. They dominate in numbers as well as in species over all other nematode orders. Approximately there are 1700 known species of Dorylaimida, grouped in over 200 genera (Jairajpuri and Ahmad, 1992). Out of these, more than 300 species have so far been reported from India. The dorylaimid nematodes are free-living, mostly saprophytic, few are plant-parasitic and some are also predaceous in nature. They represent a considerable part of the nematode biomass. Each species possibly plays a significant role in the ecosystem inhabits. Dorylaims have not so direct bearing on the crops but they have notable indirect effect on agriculture.

The history of dorylaims dates back to 1845, when Dujardin described the first species of this group and named it *Dorylaimys stagnalis*. The era of modern taxonomy of dorylaims began with publication of the monographs by Thorne and Swanger (1936) and Thorne (1939). Thorne's monograph provided a stimulus for further research on dorylaimis and much of what he did in 1939 is still relevant today. Pearse (1942) proposed the order Dorylaimida for the dorylaimid nematodes. Jairajpuri and

Ahmad (1992) published a comprehensive work in summarizing, evaluating and systematizing all the informations on Dorylaimida.

The dorylaimid nematodes are generally colourless, mostly have cylindrical bodies and generally assume a ventrally arcuate posture after fixation. They are mostly microscopic in size but may be found with naked eye. The average size of the body is about 1.0 mm, but may be as small as 0.3-0.4 mm (*Diphtherophora parva* Siddiqi, 1964, *Dorylaimellus iari* Siddiqi, 1983) or as large as 12 mm (*Paralongidorus epimikis* Dalmaso, 1969).

The important diagnostic characters of dorylaims are cuticle smooth, finely or coarsely striated; lip region with labial papillae arranged in two circlets, 6 in the inner and 10 in the outer; feeding apparatus consisting of an anterior cheilostome and a posterior oesophagostome; amphids cyathiform, stirrup-shaped or saccate with pore or slit-like aperture; guiding apparatus with single or double ring; oesophagus in two parts, an anterior slender and a posterior expanded; nerve ring encircles anterior slender part of oesophagus; oesophageal glands unicellular, five in number, rarely three, located together with their nuclei and orifices in basal exdanded part of oesophagus; cardia generally present at oesophago-intestinal junction; genital system monodelphic or didelphic with reflexed ovary (ies); vulva transverse or longitudinal; male with pair of opposed testes, paired spicules, lateral guiding pieces and sometimes a gubernaculum; supplements few to numerous,

rarely absent; tail shape and size highly variable, often dissimilar in sexes.

As because no extensive survey has been conducted to study the dorylaims in Tamil Nadu, only a few species of the order Dorylaimida have so far been recorded from the state. Baqri (1980) reported two new species *Oriverutus arcuatus* and *Chitwoodius seshadrii* from soil around roots of coffee from Kumbabund under Salem district. Khan *et al.* (1980) described a new species *Siddiqia seclipsi* from soil around roots of *Acacia* sp. from Vivekananda Puram under the district Cape Comorin. Chawla and Samathanam (1980) reported two new species: *Siddiqia inagrenia* from soil around roots of sweet orange (*Citrus sinensis*) from Government Orchard at Srivilliputhur, district Ramanathapuram and *Longidoroides longiurus* from soil around roots of Cacao (*Theobroma cacao*) at Government Pepper Nursery, Peccipparai, district Kanya Kumari. Samathanam and Chawla (1982) recorded eight species belonging to four genera viz., *Xiphinema americanum*, *X. elongatum*, *X. insignae*, *X. radiculicola*, *Longidorus siddiqi*, *Longidoroides longiurus*, *Siddiqia citri* and *S. inagreina* from hilly areas of four southern districts (Madurai, Ramanathapuram, Tirunelveli and Kanyakumari), associated with different crop plants. Thangavelu *et al.* (1990) recorded *X. basiri* from Salem district associated with rhizosphere of Mulberry (*Morus indica* L.). Johnson *et al.* (2006) recorded *X. basiri* and *Longidorus elongatus* associated with cut flowers (carnation, gerbera, gladiolus and Asiatic lily) from Nilgiris, Dindigul and Salem districts. Thus total thirteen species of dorylaimid nematodes have so far been reported from Tamil Nadu. The check list of those species is being incorporated hereunder.

CHECK LIST

Phylum NEMATHELMINTHES

Class NEMATODA

Order DORYLAIMIDA

Suborder DORYLAIMINA

I. Superfamily DORYLAIMOIDEA De Man, 1876

Family NORDIIDAE Jairajpuri and Siddiqi, 1964

Subfamily ACTINOLAIMOIDINAE

Jairajpuri and Ahmad, 1992

Genus *Oriverutus* Siddiqi, 1971

Syn. *Mammillonema* Darekar and Khan, 1982

1. *Oriverutus arcuatus* Baqri, 1980

II. Superfamily LONGIDOROIDEA Thorne, 1935

Family LONGIDORIDAE Thorne, 1935

Subfamily LONGIDORINAE Thorne, 1935

Genus *Longidorus* Micoletzky, 1922

Syn. *Brevinema* Stegarescu, 1980

Neolongidorus Khan, 1987

2. *Longidorus elongatus* (De Man, 1876)

Thorne and Swanger, 1936

Syn. *Dorylaimus elongatus* De Man, 1876

3. *L. pisi* Edward *et al.*, 1964

Syn. *Brevinema pisi* (Edward *et al.*, 1964) Stegarescu, 1980

L. siddiqi Aboul-Eid, 1970

Genus *Paralongidorus* Siddiqi *et al.*, 1963

Syn. *Siddiqia* Khan *et al.*, 1978

4. *Paralongidorus citri* (Siddiqi, 1959)

Siddiqi *et al.*, 1963

Syn. *Xiphinema citri* Siddiqi, 1959

Longidorus citri (Siddiqi, 1959) Siddiqi, 1962

Siddiqia citri (Siddiqi, 1959) Khan *et al.*, 1978

5. *P. inagreina* (Chawla and Samathanam, 1980) Luc and Doucet, 1984

Syn. *Siddiqia inagreina* Chawla and Samathanam, 1980

Genus *Longidoroides* Khan *et al.*, 1978

Syn. *Inagreiis* Khan, 1982

6. *Longidoroides longiurus* Chawla and Samathanam, 1980

7. *L. seclipsi* (Khan *et al.*, 1980) Luc and Doucet, 1984

Syn. : *Siddiqia seclipsi* Khan *et al.*, 1980

Family XIPHINEMATIDAE Dalmasso, 1969

Subfamily XIPHINEMATINAE Dalmasso, 1969

Genus *Xiphinema* Cobb, 1913

8. *Xiphinema americanum* Cobb, 1913
Syn. : *X. neoamericanum* Saxena et al., 1973
9. *X. basiri* Siddiqi, 1959
Syn. *X. cobbi* Sharma and Saxena, 1981
X. hayati Javed, 1983
10. *X. elongatum* Sch.-Stekhoven and Teunissen, 1938
Syn. *X. pratensis* Loos, 1949
X. campinense Lordello, 1951
X. nagarjunenesis Khan, 1982
X. uasi Edward and Sharma, 1982
11. *X. insigne* Loos, 1949
Syn. *X. indicum* Siddiqi, 1959
X. lugewai Darekar and Khan, 1982
X. neodimorphicaudatum Khan, 1982
12. *X. radicola* Goodey, 1963
Syn. : *X. australiae* McLeod and Khair, 1973

III. Superfamily TYLENCHOLAIMOIDEA Filipjev, 1934

- Family TYLENCHOLAIMIDAE Filipjev, 1934
Subfamily TYLENCHOLAIMINAE Filipjev, 1934
Genus *Chitwoodius* Furstenberg and Heyns, 1966
Syn. *Chiwoodia* Furstenberg and Heyns, 1966
13. *Chitwoodius seshadrii*, Baqri, 1980

DISCUSSION

Only after 1950s, the study on nematode taxonomy as well as on ecology has been flourished in India. In true sense, little works have so far been done on nematode taxonomy in Tamil Nadu. Only a few species have been reported from different districts of the state. But no consolidated account or any comprehensive work on dorylaimid nematodes are available from the state.

The present work deals with an account of all the soil and plant parasitic nematodes belonging to the order Dorylaimida, recorded so far from Tamil Nadu. Only thirteen species under six genera, four subfamilies and families, three superfamilies and only one suborder have been cited in this paper. It would have to be agreed that the reporting of only thirteen species of dorylaims does not reflect the true picture of species diversity of dorylaimid nematodes in Tamil Nadu. However, more extensive survey and thorough investigation are needed to get the real status of species diversity of dorylaims of the state and it can definitely yield a good number of new genera and species of the order Dorylaimida.

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TREMATODA

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INTRODUCTION

Digenetic trematodes are endoparasites found as adult in the digestive system, respiratory system, urinogenital system, gall bladder, bile-duct, liver, pancreatic duct etc. of vertebrates. Some are known to inhibit the connective tissue of muscle of their hosts. The digestive tract is the most commonly preferred habitat.

Helminths cause deadly diseases in human being. Almost all other animals associated with them such as cattle, goat, mule, elephant, dog, cat, fish, poultry bird etc., also harbour helminth parasites. Burt (1970) opined that there are more number of parasites than free living forms, both in number and variety. Various diseases caused to man and animals of their utility by the helminth parasites, impair their efficiency and utility to a varying degree. In case of animals, meats become spoiled, bones brittle, leather becomes useless, milk yielding and egg laying capacity are lost. Ghosh and Chauhan (1975) opined that damage caused by the helminth are even more than those of bacteria or virus, viral or bacterial diseases are devastating for a sudden period but normally not of regular or frequent occurrence and remain limited to a geographical area. Helminth parasites are found through out the Globe and may be present for the whole life in the animals and impair the efficiency for a much greater period. In India according to Bhalerao (1935) *Fasciola gigantica* Cobbold, 1855 alone causes more damage to cattle than any other bacterial or viral diseases. Buckley (1939, 1964) made

extensive studies and found 41% of three villages in Assam are infected with *Gastrodiscoides hominis* (Lewis and McConnel, 1976), Leiper, 1913. Bhalerao (1944) examined amphistomes collected from various parts of India including Tamil Nadu and opined that immature form of those parasites are invariably fatal to sheep, goat and cattle. Katiyar and Varshney (1963) recorded average mortality of 75.54% in goats and 67.62% due to amphistomiasis alone.

Leaving aside the record of helminth parasites of medical importance, only very few records are available in literature about the parasites of pig, mule, horse, elephant etc., but no consolidated account or any comprehensive work on parasitic helminth are available from Tamil Nadu.

The Digenea are believed to have originated from the turbellarian ancestors and their parasitic life is assumed to have developed from their ancestors to the phylogenetically related invertebrate hosts. The most primitive Digenea, therefore, must have confined their parasitism theoretically to invertebrate hosts until the advent of vertebrates, in the simplest life cycle pattern, i.e. one host-cycle. As a matter of fact this simplest pattern is represented by pathogenesis. As the forerunners of the vertebrates arrived the Trematode parasites found their lodging in the newcomers and further intruded into higher vertebrate groups. From the reasoning the evolutionary steps of the Digenea, though lagging, should conform to those of the host animals.

Stoll (1947) estimated that about 10 million human being are infected with the trematode parasite, *Fasciolopsis buski* (Lankester, 1857) Stiles, 1901 throughout the globe with pathogenic forms in Assam, West Bengal and Tamil Nadu. Buckley (1939) recorded this species from Assam. Sharma (1933) recorded that 3.2% of soldiers and civilians in Shillong are infected with *G. hominis*. Incidentally it may be recorded that the genus *Gastrodiscoides* was established by Leiper (1913) from some specimens from Assam sent to him by Dr. Mackie. This species has been recorded from Assam by Lewis and McConnell (1876), Stephens (1906), Gibs (1890) which shows its wide distribution and high incidence. The parasite is also very common in pigs. Buckley (1939) in order to investigate the life history of *Gastrodiscoides hominis* came all the way from England to Assam. He did not succeed. He did detail study on the epidemiology of the species. He recorded 82 positive cases out of 221 faecal samples examined by him from three villages of Kamrup district, Assam. He recovered as many as 200 species of *G. hominis* from a girl patient. Maplestone (1940), Mukherjee (1945, 1946 and 1948) also tried to find out the exact snail host for *G. hominis* in Assam. Success also showered to them, ultimately Dutta and Srivastava (1966) found out the experimental infection that the planorbid snail *Helicorbis coenosus* (Benson) is the intermediate host of *G. hominis* infecting pigs at Berielly (U.P.)

Another parasite *Artyfechinostomum sufrartyfex* Lane, 1915 to be the infecting beings in various parts of India and neighbouring countries was originally described from

specimens recovered from a girl in Assam. Leiper (1911) described *Echinostoma malayanum* from an Indian patient.

Regarding earlier record of trematode parasites from animals other than man, Gibs (1892) recorded *Paramphistomum cervi* (Zeder, 1790), Fiscoeder, 1901 and *Gastrodiscus aegypticus* (Cobbold, 1877) Railliet, 1892 from horse and cattle in Tamil Nadu. Fiscoeder, (1903) described *Pseudodiscus collinsi* from Assam. Looss (1907) recorded *Gastrodiscoides aegypticus* and *Gastrodiscus secundus* from elephant and mule respectively from Assam. Baylis (1929) and Faust (1929) recorded *Gastrodiscoides hominis* (Lewis et Mc Connell, 1826) Leiper, 1913, Buckley 1939 recorded this parasite not only in human population only but in pigs and opined that over 50% pigs are infected with this parasite in some places of Tamil Nadu. He also recorded *Fasciolopsis buski* (Lankester, 1857) Stiles, 1901 from the tribal population of the same state.

In trematodes important morphological characters of taxonomic importance are (1) relative position and size ratio of suckers (2) the absolute and relative position of ovary and testes (3) the arrangement of testes (4) the position, nature, and distribution of vitelline glands (5) the presence or absence of seminal receptacle (6) the position of the genital pore (7) the presence or absence of cirrus sac and the nature of the cirrus (8) the presence of a seminal vesicle inside or outside the cirrus sac (9) shape and relative length of caeca (10) shape, size and colour of the eggs.

CHECK LIST

Phylum PLATYHELMINTHES

Class TREMATODA

Order DIGENEA

Parasite

Host

1. Family SCHISTORCHIIDAE Yamaguti, 1942

1. *Schistorchis longivesiculurus* Hafeezullah, 1975

Siganus oramin

2. *Schistorchis skrjabini* Parukhin, 1963

Triacanthus brevirostris

3. *Schistorchis caraneus* Luhe, 1906 *Tetrodon hispidus*
2. Family OPECOELIDAE Ozaki, 1925
4. *Enenterum mannatense* Hafeezullah, 1975 *Kyphosus cinerascens*
5. *Jeancadenatia dollfusi* Hafeezullah, 1975 -do-
3. Family HEMIURIDAE Luhe, 1901
6. *Parahemiurus dussumieriae* Hafeezullah, 1965 *Dussumieri acuta*
7. *Parahemiurus gastricus* (Sahay et Srivastava, 1977) *Sardinella sirm*
8. *Parahemiurus engraulisi* Gupta et Johan, 1977 *Trissocles hamiltoni*
9. *Atheria zankiae* Hafeezullah, 1964 *Jonius casutta*
10. *Hysterolecitha sigani* Manter, 1969 *Platax tigre*
11. *Hysterolecithoides frontilatus* Manter, 1969 *Siganus oramin*
12. *Trifoliovarium triacanthi* Bilquees, 1973 *Triacanthus brevirostris*
13. *Lecithocladium glandulum* Chauhan, 1905 *Caranx carangus*
14. *Uterovesiculurus paralichthydis* Yamaguti, 1934 *Platycephalus indicus*
15. *Lecithaster indicum* Srivastava, 1935 Unidentified fish
16. *Neopasthidenia habei* Machida, 1980 *Kyphosus cinerascens*
4. Family ACANTHOCOLPIDAE Luhe, 1909
17. *Skrjarbinopsolus elongatus* Madhvi, 1974 *Polynemus xanthonemus*
18. *Stephanostomoides tenuis* Manter, 1963 *Chirocentrus dorab*
5. Family LECITHODENDRIIDAE (Luhe, 1901) Odhner, 1910
19. *Ganeo tigrinum* Mehra et Negi, 1928 *Rana* sp.
6. Family ACCACOELIIDAE (Odhner, 1911) Looss, 1912
20. *Tetrochetus coryphaenae* Yamaguti, 1934 *Coryphaena hippurus*
7. Family ECHINOSTOMATIDAE Poche, 1926
21. *Artyfechinostomum sufrartyfex* Lane, 1915 *Sus cristata, Sus scrofa, Palm civet*
22. *Acanthoparyphium jeetai* Chakrabarti, 2004 *Calidrus minuta*
23. *Echinochasmus narayani* Mudailar, 1938 *Milvus migrans govinda*
8. Family FASCIOLIDAE Railliet, 1895
24. *Fasciola jacksoni* Cobbold, 1869 *Elephas indicus*
25. *Fasciolopsis buski* (Lankester, 1857) Looss, 1899 Pig, Man
9. Family PARAMPHISTOMIDAE Fiscoeder, 1901
26. *Cotylophoron indicum* Stiles et Goldberger, 1910 *Ovis aries, Capra hircus*
27. *Ceylonocotyle scoliocoelium* (Fiscoeder, 1904) Nasmak, 1937 *Bos taurus, Bos indicus*
28. *Gastrodiscus secundus* (Looss, 1907) *Elephas secundus*
29. *Pseudodiscus collinsi* (Cobbold, 1875) Sonsino, 1895 Equines and *Elephas indicus*
10. Family HETEROPHYIDAE Odhner, 1914
30. *Heterophyes indica* Rao et Ayyar, 1931 Street Dog
11. Family HAPLOPORIDAE Poche, 1925
31. *Lecithobotrys vitellus* Sharma et Gupta, 1970 *Mugil parsia*

12. Family OPISTHOTREMATIDAE Poche, 1926

- 32.
- Paracochleotrema indicum*
- Sharma et Gupta, 1971
- Dugong dugong*

13. Family PRONOCEPHALIDAE Looss, 1899

- 33.
- Pleurogonius mandapamensis*
- Chattopadhyaya, 1972
- Eretmochelys squamosa*

- 34.
- Pleurogonius longiusculus*
- Looss, 1901
- Caretta caretta*
- ,
-
- Chelone mydas*

- 35.
- Pleurogonius ozaki*
- Oguro, 1936
- Chelone mydas*

- 36.
- Pyelosomum solum*
- Chattopadhyaya, 1972
- Eretmochelys imbricata*

14. Family FELLODISTOMIDAE Nicolls, 1909

- 37.
- Faustula mandapamensis*
- Simha, 1974
- Stromateus cinereus*

- 38.
- Tergestia cloanacantha*
- Manter, 1963
- Hemiramphus fare*

DISCUSSION

Out of 38 species recorded so far from Tamil Nadu, six of them are pathogenic to mammals (Ghosh & Chakrabarti, 1999). *Fasiolopsis buski* (Lankester, 1951) Stiles 1901,

Artyfechinostomum sufrartylfex Lane, 1915 and *Gastrodiscoides hominis* Lewis and Mc Connell, 1918 are pathogenic to man; *Fasciola jacksoni* Cobbold, 1869, *Pseudodiscus secundus* Looss, 1907 and *Pseudodiscus collinsi* (Cobbold, 1875) Sonsino, 1895 are pathogenic to elephant.

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POLYCHAETA : ANNELIDS

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INTRODUCTION

Polychaetes are one of the major invertebrate communities in the marine, estuarine and brackish water ecosystems. Very high salinity tolerance is the key characters for their choice of the wide range of saline habitats. Except some families like Alciopidae, Tomopteridae and Syllidae, which occur as planktonic forms in the estuarine and marine water most of the polychaetes are benthic. Benthic polychaetes mostly prefer to different ecological habitats, some occur in sandy or muddy substrata, some are found to the comfortable in the crevices of rocks. The most important works in the taxonomic accounts of the polychaetes pertaining to the Indian waters are those of Fauvel (1932, 1953). However our knowledge of the polychaete fauna from Tamilnadu coast is based on the works of Fauvel (1953), some additional records are also available from Gravely (1927), Ghosh (1953), Balasubrahmanyam (1960a, 1960b, 1964); Ajmal Khan, Vivekanadan and Balasubrahmanyam (1975) and Chandran *et al.* (1984).

The Present paper deals with 51 species of polychaetes belonging to 21 families, recently collected from this state. All the species collected from the marine and estuarine habitats, except one species namely, *Namalycastis indica* (southern, 1921), which was collected from a fresh water pond about 50km distance from sea. The original reference, diagnostic characters, habitats and distribution data are provided for each species.

A LIST OF POLYCHAETE SPECIES

Phylum ANNELIDA

Class POLYCHAETA

I. Family APHRODITIDAE

1. *Aphrodita aculeata* Linnaeus, 1761
2. *Eupanthalis boa* (Johnston, 1839)
3. *Panthalis oerstedii capensis* McIntosh, 1925

II. Family POLYNOIDAE

4. *Gattyana deludens* Fauvel, 1932
5. *Gattyana fauveli* Misra, 1998
6. *Gaudichaudius cimex* (Quatrefages, 1866)
7. *Harmothoe ampulifera* (Grube, 1878)
8. *Harmothoe dictyophora* (Grube, 1878)
9. *Harmothoe imbricata* (Linnaeus, 1767)
10. *Harmothoe sinagawensis* Fauvel, 1932
11. *Hololepidella maculata* Day, 1973
12. *Lepidonotus carinulatus* Grube, 1870
13. *Lepidonotus cristatus* Grube, 1876
14. *Lepidonotus dictyolepis* Haswell, 1883
15. *Lepidonotus tenuisetosus* (Gravier, 1901)

III. Family SIGALIONIDAE

16. *Euthalenessa djiboutiensis* (Gravier, 1902)
17. *Sthenelais boa* (Johnston, 1839)
18. *Sthenelais limicola* (Ehlers, 1864)
19. *Sthenolepis japonica* (McIntosh, 1885)
20. *Pseudoeurythoe* sp.

IV. Family PISIONIDAE

21. *Pisionidens indica* (Aiyar and Alikunhi, 1940)

22. *Pisione* sp.

V. Family CHRYSOPETALIDAE

23. *Paleanotus debilis* (Grube, 1855)
(= *Chrysopetalum ehlersi* Gravier, 1902)

24. *Bhownia goodie* Wester, 1884

VI. Family AMPHINOMIDAE

25. *Amphinomae rostrata* (Pallas, 1766)

26. *Chloea flava* (Pallas, 1766)

27. *Chloea parva* baird, 1870

28. *Amphinomid* sp.

VII. Family PHYLLODOCIDAE

29. *Eteone ornata* Grube, 1877

30. *Eulalia (Pterocirrus) magathaensis*
Kinberg, 1857

31. *Eulalia (Eumadia) sanguinea* Oersted,
1843

32. *Notophyllum splendens* Schramarda, 1861

33. *Phyllodoce castanea* (Marenzellar, 1879)

34. *Phyllodoce dissotyla* Willey, 1905

35. *Phyllodoce madeirensis* Langerhans, 1880

36. *Phyllodoce malmgreni* Gravier, 1900

37. *Phyllodoce tenuissima* Grube, 1878

38. *Pelagobia longicirrata* Greeff, 1879

VIII. Family ALCIOPIDAE

39. *Alciopinna parasitica* Claparedi &
Panceri, 1867

XI. Family ISOPELIDAE

40. *Phalacrophorus pictus* Greeff, 1879

X. Family HESIONIDAE

41. *Hesione intertexta* Grube, 1878

42. *Leocrates claparedii* (Coasta, 1868)

43. *Hesionid* sp.

44. *Gyptis* sp.

XI. Family PILARGIDAE

44. *Ancistrosyllis constricta* Southern, 1921

45. *Ancistrosyllis groenlandica* McIntosh,
1897

46. *Ancistrosyllis rigida* Fauvel, 1919

47. *Ancistrosyllis parva* Day, 1963

48. *Synelemis dineti* Kartzmann, Laubier et
Ramos, 1974

XII. Family SYLLIDAE

49. *Exogone verugera* (Claparedi, 1868)

50. *Odontosyllis gravellyi* Fauvel, 1930

51. *Opisthosyllis brunnea* Langerhans, 1879

52. *Syllis gracilis* Grube, 1840

53. *Syllis (Haplosyllis) spongicola* Grube,
1855

54. *Syllis (Typhosyllis) Variegata* Grube,
1860

55. *Syllis prolifera* Crohn, 1852

56. *Typanosyllis Misakiensis* Izuku, 1906

57. *Typanosyllis zebra* Grube, 1860

58. *Autolytus* sp.

XIII. Family NEREIDIDAE

59. *Ceratonereis costae* (Grube, 1840)

60. *Dendronereis aestuarina* Southern, 1921

61. *Leonates jousseaumei* Garvier, 1901

62. *Leonates decipiens* Fauvel, 1929

63. *Nereis coutierei* Gravier, 1901

64. *Nereis cricognatha* Ehlers, 1904

65. *Nereis indica* Kinberg, 1865

66. *Nereis longilingulis* Monro, 1937

67. *Nereis kaudermi* Fauvel, 1921

68. *Nereis unifaciata* Willyi, 1905

69. *Nereis (Ceratonereis) mirabilis* Kinberg,
1865

70. *Perenereis cultrifera* var. *hellari* Grube,
1878

71. *Perinereis nuntia* var. *brevicirris* (Grube,
1867)

72. *Perinereis nuntia* var. *typica* (Savigny,
1920)

73. *Platynereis dumerilli* Audouin & Milne
Edwards, 1833

74. *Tylonereis bogoyawlenski* Fauvel, 1911

75. *Tylonereis fauveli* Southern, 1921

XIV. Family NEPHTYIDAE

76. *Nephtys polybranchia* Southern, 1921

77. *Nephtys dibranchis* Grube, 1877

78. *Agalophamus lorychaeta* (Fauvel, 1902)
[= *Nephtys lyrochaeta* Fauvel, 1902]

79. *Micronephtys spherocirrata* (Wesenberg-Lund, 1949) [= *Nephtys spherocirrata* Wesenberg-Lund, 1949]

XV. Family GLYCERIDAE

80. *Glycera convoluta* Keferstein, 1862
 81. *Glycera alba* (Muller, 1788)
 82. *Glycera cirrata* Grube, 1869
 83. *Glycera rouxi* Audouin & Milne Edwards, 1833
 84. *Glycera sagittariae* McIntosh, 1885
 85. *Glycera natalensis* Day, 1957
 86. *Glycera tessalata* Grube, 1863
 87. *Hemipodus* sp.

XVI. Family GONIADIDAE

88. *Goniada (Goniodopsis) agnisia* Fauvel, 1930
 89. *Glycinde oligodon* Southern, 1921

XVII. Family ONUPHIDAE

90. *Onuphis eremita* Audouin & Milne Edwards, 1833
 91. *Onuphis variegata* Audouin & Milne Edwards, 1833
 92. *Onnuphis holobranchiata* Marenzeller, 1879
 93. *Diopatra neopolitana* Delle-Chiaje, 1841
 94. *Diopatra cuprea punctifera* Ehlers, 1908
 95. *Diopatra monroi* Day, 1960

XVIII. Family TYPHLOSCOLECIDAE

96. *Travisioponie labifera* Levensen, 1885

XIX. Family TOMOPTERIDAE

97. *Tomopteris helgolandica* Greff, 1879

XX. Family LACYDONIIDAE

98. *Paralacydonia weberi* Horst, 1922

XXII. Family DORVILLIDAE

99. *Dorvillea incertus* (Schmarda, 1861)
 100. *D. neglecta* (Fauvel, 1923)
 101. *Protodorovilla biarticulata* Day, 1963

XXIII. Family EUNICIDAE

102. *Eunice afra* Peters, 1855
 103. *E. antennata* Savigny in Lamarck, 1818

100. *E. fuscafasciata* (Treadwell, 1922) [= *E. (Nacidion) gracilis* (Crossland, 1904)]

101. *E. siciliensis* Grube, 1840
 102. *E. tentaculata* Quatrefages, 1865
 103. *E. tubifex* Crossland, 1904
 104. *E. australis* Quatrefages, 1865
 105. *E. indica* Kingberg, 1865
 106. *Staurocephalus incertus* (Schmarda, 1861)
 107. *Marphysa gravelyi* Southern, 1921
 108. *Marphysa purcellana* Willey, 1904
 109. *M. fallax* Marion & Bobertzky, 1875
 110. *Nauphanta mossambica* (Peters, 1855) [= *M. mossambica* Peters, 1855]
 111. *Nematonereis hebes* Verill, 1900. [= *Nematonereis unicornis* Schmarda, 1861]
 112. *Paramarphysa orientalis* Willey, 1905

XXIV. Family LUMBRINERIDAE

113. *Lumbrinereis latreilli* Aud & Milne Edwards, 1834
 114. *Lumbrinereis impatiens* Claparede, 1868
 115. *Lumbrinereis polydesma* Southern, 1921
 116. *Lumbrinereis pseudobifilaris* Fauvel, 1932
 117. *Lumbrinereis simplex* Southern, 1921
 118. *Lumbrinereis megalhaensis* Kingberg, 1865
 119. *Ninoe* sp.

XXV. Family OENONIDAE

120. *Arabella (Arabella) iricolor* (Motagu, 1804) [= *Arabella iricolor* (Motagu, 1804)]

XXVI. Family ORBINIDAE

121. *Scoloplos marsupialis* Southern, 1921
 122. *S. chevalieri* (Fauvel, 1901)

XXVII. Family SPIONIDAE

123. *Polydora (Carazzia) antennata* Claparede 1870
 124. *Polydora hornelli* Willey, 1905
 125. *Polydora ciliata* (Johnston, 1838)
 126. *Polydora hoplura* Claparede, 1870
 127. *Polydora coeca* Oersted,
 128. *Polydorella prolifera* Augenar, 1914

129. *Pseudopolydora kemp* (Southern, 1921)
 130. *Prionospio pinnata* Ehlers, 1901
 131. *Prionospio polybranchia* Fauvel, 1929
 132. *Prionospio cirrobranchiata* Day, 1961
 133. *Prionospio malmgreni* Claparede, 1870
 134. *Prionospio saldanha* Day, 1961
 135. *Prionospio krusadensis* Fauvel, 1929
 136. *Prionospio* (*Aquilospio*) *sexoculata* Augner, 1918

137. *Scoelepis indica* Fauvel, 1928
 138. *Scoelepis squamata* (Muller, 1806)
 139. *Spio filicornis* (Muller, 1776)
 140. *Malacoceros indicus* Fauvel, 1928
 141. *Laonice cirrata* (Sars, 1851)

XXVIII. Family MAGELONIDAE

142. *Magelona cincta* Ehlers, 1908
 143. *Magelona papillicornis* Muller, 1858

XXIX. Family DISOMIDAE

144. *Disoma orissae* Fauvel, 1932

XXX. Family CHAETOPTERIDAE

145. *Chaetopterus varieopedatus* (Renier, 1804)
 146. *Spiochaetorperus costarum* (Claparede, 1870)

XXXI. Family CIRRATULLIDAE

147. *Chaetozone setosa* Malmgren, 1867
 148. *Aphelochaeta filiformis* (Keferasterein, 1862) [= *Ciratulus filiformis* Keferasterein, 1862]
 149. *Ciratulus chrysoderma* Claparede, 1870

XXXII. Family FLABELLIGERIDAE

150. *Brada villosa* (Rathke, 1843)
 151. *Stylarioides parmatus* Grube, 1878
 152. *S. bengalensis* Fauvel, 1932
 153. *Diplocirrus capensis* Day, 1961
 154. *Diplocirrus* sp.
 155. *Pherusa* sp.

XXXIII. Family SCALIBREGMIDAE

156. *Parasclerocheilus branchiatus* Fauvel, 1928
 157. *Scalibregma inflatum* Rathke, 1843

XXXIV. Family OPHELLIDAE

158. *Armandia leptocirris* Grube, 1867
 159. *Armandia lanceolatus* Willey, 1905
 160. *Ammotrypane avlogaster* Rathke, 1843
 161. *Polyophthalmus pictus* Dujardin, 1839
 162. *Ophelina agulhana* Day, 1961
 163. *Ophelina acuminata* Oersted, 1843

XXXV. Family STARNASPIDAE

164. *Starnaspis scutata* (Ranzeni, 1807)

XXXVI. Family CAPITELLIDAE

165. *Dashybranchus caducus* Grube, 1867
 166. *Heteromastus similes* Southern, 1921
 167. *Heteromastus bifidus* Augner, 1914
 168. *Scyploproctus djiboutieusis* Gravier, 1906
 169. *Puliella armata* Fauvel, 1930
 170. *Notomastus giganteus* Moore, 1906
 171. *Branchiicapitella singularis* Fauvel, 1932

XXXVII. Family MALDANIDAE

172. *Clymene* (*Euclymene*) *iusecta* (Ehlers)
 173. *Axiothella obockensis* (Gravier, 1906)
 174. *A. australis* Augener, 1914
 175. *Maldane sersi* Malnegrens, 1866
 176. *Maldane cristata* Treadwell, 1923
 177. *Euclymene annandalei* Southern, 1921
 178. *Euclymene lombricoides* (Quatrefages, 1865)

XXXVIII. Family OWENIIDAE

179. *Owenia fusiformes* Delle-Chiaje, 1841

XXXIX. Family SABELLARIIDAE

180. *Sabellaria pectinata* Fauvel, 1928
 181. *S. spinulosa alcocki* Gravier, 1906
 182. *S. cementarium* Moore, 1906
 183. *S. intoshi* Fauvel, 1914

XXXX. Family PECTINARIIDAE

184. *Pectinaria crassa* Grube, 1870

XXXXI. Family AMPHARETIDAE

185. *Amphicteis gunneri* (Sars, 1835)
 186. *Schitocomes heltoni* Chaubrlis, 1919

XXXXII. Family TERESELLIDAE

187. *Loimia medusa* (Savigny, 1820)

188. *Lysilla pambanensis* Fauvel, 1928
189. *Nicolea gracilibranchis* (Grube), 1878
190. *P. labiata* Willey, 1905
191. *Polycirrus coccineus* Grube, 1870
192. *Terebella ehrenbergi* Grube, 1870
193. *Pista herpini* Fauvel, 1928
194. *Pista typha* Grube, 1878
195. *Lanis socialis* Willey, 1905

XXXXIII. Family TRICHOBRANCHIDAE

196. *Terebellides stroemi* Sars, 1835

XXXXIV. Family SABELLIDAE

197. *Dasychone cingulata* Grube, 1878
198. *Laonome indica* Southern, 1921
199. *Sabellastrate indica* (Savigny, 1818)
200. *Hypsicomus phaetaenia* (Schmarda, 1861)
201. *Potamilla ehlersi* Gravier, 1906
202. *P. ceylonica* Augner, 1926
203. *Jasmineria* sp.

Family TROCHOCHAETIDAE

204. *Poecilochaetus serpens* Allen, 1904

XXXXV. Family SERPULIDAE

205. *Ficopomatus macrodon* Southern, 1921
206. *Hydroides lunulifera* (Claparedi, 1868)
207. *H. monoceros* Gravier, 1908
208. *Hydroides homoceros*, Pixell, 1913
209. *Hydroides heteroceros* (Grube, 1868)
210. *Hydroides albiceps* (Grube, 1869)
211. *Mercierella enigmatica* Fauvel, 1932
212. *Omphalopomopsis langerhansii*
(Marenzeller, 1884)
213. *Pomatoceros caeruleus* Schmarda, 1861
214. *Pomatoceros triqueter* Linneus, 1767
215. *Pomatoleios crosslandi* Pixell, 1913
216. *Pomatostegus stellatus* (Aligaard, 1789)
217. *P. polytrema* Var. *Indica* Fauvel, 1928
218. *Serpula vermicularis* Linnaeus, 1767
219. *Vermiliopsis acanthophora* Augner, 1914
220. *Salmacine dysteri* (Huxley, 1865)
221. *Spirorbis foraminosus* Bush, 1904

SYSTEMATIC ACCOUNT

Family APHRODITIDAE

Genus *Aphrodita* Linnaeus

1. *Aphrodita aculeata* Linnaeus, 1761

1761. *Aphrodita aculeata* Linnaeus, 38.

1953. *Aphrodita aculeata* Fauvel, p. 24. fig. 6 a-g.

Material : 2 ex. Killakari, 11.11.04, A. Misra & party.

Digonosis : Dorsal setae short, straight and blunt, protuding very little over dorsal felt; lateral setae slender, beautifully iridescent; ventral setae smooth, without lateral hook.

Habitat : Attach to undersurface of rocks.

Distribution : India : Killakari, Cape Comorin, Santapalli, Chennai

Elsewhere : Japan, Indian Ocean, Mediterranean Sea, Atlantic Ocean, North Sea, English Channel.

II Family POLYNOIDAE

Subfamily HARMOTHOINAE

Genus *Gaudichaudius*

2. *Gaudichaudius cimex* (Quatrefages, 1866)

1866. *Iphione cimex* Quatrefages, Historie naturelle douce. Annelides etgephyriens, 2-3 : 270.

1986. *Gaudichaudius cimex* Pettibone, Smithson, contr. zool., 428; 34. figs. 16-17.

1998 *Gaudichaudius cimex* - Misra, State fauna sereuis 3; Fauna of West Bengal, part 10; 136.

Material : 5 ex., Rameswaram, 12.11.2004, A. Misra & Party.

Digonosis : Median antennae long with a large bulbous ceratophores, inserted in the anterior notch of prostomium, elytra covered with horny combed polygonal areas, lateral fringe of papillae present; notopodia redused without any projecting acicular pocess; Neuropodia diagonally truncate. Notosetae numerous, spinous of two type; neurosetae numerous and uniform.

Habitat : External surface of hermit crab shells; dead molluscan shells.

Distribution : India : Rameswaram, kanikinada, Pondichery; Nagapattinam, Lower reaches of Hooghly estuary, Chandipur, Ratnagiri, Kerala, Karnataka.

Elswhere : Burma, Malaca Strait, Indochina, Yellow sea.

3. *Gattyana fauveli* Misra, 1998

1998. *Gattyana fauveli* Misra, *Fauna of West Bengal, State fauna series*, 3(part 10) : 135.

1932. *Harmothoe singawaensis* Fauvel, 1932 : 23 : 1953-48.

Material : 1 ex. T-Nagar, Mandapam, 11.11.04., Coll. A. Misra & Party 2 ex. Nagapattinam beach, 27.03.2004, Pattanayak & Party.

Digonosis : Elytra 15 pairs, without any horny combed polygonal areas, lateral fringes of papillae absent; notosetae all slender capillaries, with sharply pointed tips; Neurosetae numerous and of two kinds.

Habitat : External surface of hermit crab shells; dead molluscan shells.

Distribution : Endemic to India—Manadpam Rameswaram, Nagapattinam, Lower reaches of Hooghly estuary.

4. *Harmothoe ampulifera* (Grube 1878)

1878. *Polynoe ampullafera* Grube *Mem. Acad. imp. sci. st. petersbourg* (7), p. 35, pl. III, Fig. 5.

1911. *Harmothoe ampulifera*, Fauvel, *Archiv. Zool. Exper. Gen paris*, VI, p. 368.

Material : 1 ex. Rameswaram, 12.11.2004, Coll. A. Misra & Party

Digonosis : Elytra 15 pairs, fringed, with small conical papillae and large vesicles in concentric rows, ventral lamellae conspicuous. Notoetae verticillate spinulose; neurosetae bidentate.

Habitat : Crevices of dead coralline stones.

Distribution : India—Kamorta Is (Andamans), Rameswaram, pamban

Elswhere : Phillipine Is, Annam, Persian Gulf, Red Sea.

5. *Harmothoe dictyophora* (Grube, 1878)

1878. *Polynoe dictyophora*, Grube, *Mem. Acad. imp. sci. st. petersbourg* (7), p. 44, pl. XV, Fig. 9.

1905. *Hermothoe dictyophora* Willey, Roy, *Soc. Rep. on pearl oyster fishery, suppl. Rep.*, XXX, p. 251, pl. 1., Fig. 14-16.

Material : 2 Ex. Rameswaram, 12.11. 2004, Coll. A. Misra & Party

Digonosis : Elytra 15 pairs, fringed, divided into polygonal areas with bifurcate tubercles carrying cutaneous spines, with filiform papillae, dorsal setae numerous, spinulose, ventral setae conspicuously bidentate.

Habitat : Attached to crevices of coralline stones.

Distribution : India—Ganjam, coastal Chennai, Kilakarai, Rameswaram.

Elswhere : Australia, Malay Archipelago, Annam, Ceylon, Red Sea, Persian Gulf, Madagascar.

Subfamily LEPIDONOTINAE

6. *Lepidonotus carinulatus* Grube, 1870

1870. *Lepidonotus carinulatus* Grube, p. 26.

1953. *Lepidonotus carinulatus* Fauvel, p. 34, fig. 13. g-i.

Material : 2 ex., Killakarai, 11.11.2004, 1 ex, Pamban, 12.11.2004; 2 ex, Tuticorin Light House area, 16.11.2004, Coll. A. Misra & Party.

Digonosis : Elytra 12 pairs, rounded and fringed, covered with a flat or carinulate tubercles; Noto seatae slender, spinulose, ventral setae stout bidentate.

Habitat : attached to stones and dead shells.

Distribution : India—Tuticorin, pamban, Kilakarai.

Elswhere : Japan, Phillipine island, India Ocean, paersian Gulf, Red sea, Mdagascar.

7. *Lepidonotus cristatus* Grube, 1876

1876. *Lepidonotus cristatus* Grube, p. 27, pl. II, fig. 3.

1953. *Lepidonotus tenuisetosus* Fauvel, p. 35. fig. 13n.

Material : 1 ex. T-Nagar, Mandapam, 11.11.04. Coll. A. Misra & patry.

Digonosis : Elytra 12 pairs, soft, large entirely covering the back; rounded or slightly marginate, withot fringe; Notoetae stout, crenulated; Neuroseate short smooth, few rows of small spines.

Habitat : Attached to crevices and dead coral rocks.

Distribution : India–Andamans, Gulf of Mannar.

Elswhere : Phillipines Island; West Australia; Indian Ocean, Maurius;

8. *Lepidonotus dictyolepis* Haswell, 1883

1883. *Lepidonots dictyolepis* Haswell, p. 287

1953. *Lepidonots tenuisetoss* Fauvel, p. 35.

Material : 2 ex. Killakarai, 11.11.04. Coll. A. Misra & Party.

Digonosis : Elytra oval, 12 pairs, divided into polygonal area, with star like papillae, overlaping, covering whole body and with and with a thick fringe and cylindrical papillae along the margin; dorsal setae slender and spinulose; ventral setae stout, with a short unidentate apex and few spines.

Habitat : This species choose hard substrates like the ridge on the molluscan shells, in the empty shell of Balanus.

Distribution : India–Killakarai, Gulf of Mannar.

Elswhere : South Australia.

9. *Lepidonotus tenuisetosus* (Gravier, 1901)

1901. *Euphione tenuisetosa* Gravier, p. 222, pl. VIII, figs, 123-125.

1953. *Leidonotus tenuisetosus*, Fauvel, p. 36., fig. 14.

Material : 3 ex. Rameswaram, 12.11.2004. Coll. A. Misra & Party.

Digonosis : Elytra 12 pairs, oval, slightly reniform, with a small fringe, covered with a few large and a number of smaller rounded papillae and also very small calicinate papillae

on the outer edge; dorsal setae slender, nearly capillaries and spinulose; verntal setae with a rather long smooth tip and few fringes.

Habitat : This species choose hard substrates like the ridge on the mollucan shells, in the empty shell of Balanus.

Distribution : India–Port canning, Orissa, Madras.

Elswhere : Indian Ocean, Red Sea, Madagascar.

III Family SIGALIONIDAE

10. *Euthalenessa djiboutiensis* (Gravier, 1901)

1901. *Thaloemessa djiboutiensis* Gravier, 231. p. VII. fig. 114-117.

1953. *Euthalenssa djiboutiensis* Fauvel, p. 64, fig. 30.

Material : 4 ex., Killakarai, 11.11.04, Coll. A. Misra & Party.

Digonosis : Elytra reuniform with long digitiform multifid papillae on the outer margin; dorsal cirrus on the third setigeruous segment; branchial process on every foot formthe 4th setigeros segmentl notosetae spinous, simple, neurosetae compound, falcgerous.

Habitat : Colleted from coralline sandy substratum towards low water zone.

Distribution : India–Kilakarai, Madras coast, Orissa.

Elswhere : Australia, Mergui, Persian Gulf, red Sea.

11. *Sthenelais boa* (Johnston, 1839)

1839. *Digalion boa* Johnston, p. 439.

1953. *Sthenelais boa* Fauvel, p. 110. fig. 41 a-1.

Material : 2 ex. Pamban, 12.11.2004. Coll. A. Misra & Party.

Digonosis : Elytra reniformn, overlapping over the back, with numerous minute papillae and a fringe on outer boarder, notosetae simple, capillaries, tapering and spinous; neurosetae compound, falcigerous, sometimes simple.

Habitat : collected from the near shore water buried at a depth of nearly 25-30 cm.

Distribution : India–Pamban, Parangapettai shore, Krusadai Island.

Elsewhere : Ceylon, Mediterranean Sea, Atlantic Ocean.

IV Family AMPHINOMIDAE

12. *Amphinome rostrata* (Pallas, 1766)

1885. *Amphinome rostrata*, McIntosh, p. 21 pl. I a, fig. 96.

1932. *Amphinome rostrata*, Fauvel, p. 81-82, fig. 37.

Material : 5 ex., Tuticorin light house area, 16.11.2004. Coll. A. Misra & Party.

Digonosis : Body square in section, prostomium small, rounded, with two eyes, Caruncle smooth heart shaped. Median tentacle short, inserted on the anterior margin of the caruncle. Lateral tentacle short, subulate. Branchiae bushy, Neurosetae stout.

Habitat : Found crawling on the floating wreck, leafs, wooden pieces floating on the surface sea water.

Distribution : India–Tuticorin, Nankuri harbour, Puri.

Elsewhere : Pacific, Indian and Atlantic oceans, in their warm parts

13. *Chloeia flava* Pallas, 1766

1766. *Aphrodita flava pallas*, 1766. p. 99, pl. 8. fig. 7-11.

1953. *Chloeia flava* Fauvel, p. 96. fig. 46d.

Material : 3 ex. Tuticorin light house area, 16.11.2004. Coll. A. Misra & Party

Digonosis : A row of rounded spots varying in shape from a narrow eclipse to a circle along mid dorsal line. Setae varying from almost pure white to a bright yellow. Tectacles and dorsal cirri more or less violet or deep purple. Caruncle extends posteriorly to commencement of the 4th segment and end with a free tapering extremity.

Habitat : Pelagic form, collected from trawl net catches.

Distribution : India–Tuticorin, Bay of Bengal, Mandapam, Palk Strait.

Elsewhere : Japan, India ocean, Pacific Ocean.

14. *Chloeia parva* Baird, 1870

1870. *Chloeia parva*, Baird, p. 233, pl. IV, fig. 8, a-b.

1953. *Chloeia parva*, Fauvel, p. 96. fig. 46f.

Material : 2 ex. Tuticorin light house area, 16.11.2004. Coll. A. Misra & Party

Digonosis : A mid-dorsal row of dark marks in the form of Roman T. caruncle with crest surmounted by a black wavy line extending up to setiger 6. Branchiae bipinnate and paired lateral branches from setiger 4, extending up to posterior end. Notosetae short and serrated; neurosetae long and smooth.

Habitat : Pelagic form, collected from trawl catches.

Distribution : India–Tuticorin (T.N.) Mouth of Hooghly estuary (W.B.), Chandipur (Orissa), Visakhapatnam (A.P.) Andamans; West coast of India.

Elsewhere : Gulf of Oman; Srilanka; Malay; Mergui; Sumatra; Java; New Guinea.

V Family PHYLLODOCIDAE

15. *Eteone ornata* Grube, 1877

1877. *Eteone (Mysta) ornata* Grube, *Mem. Acad. Sci.*, S Peterb. 25 : 106.

1953. *Eteone (Mysta) ornata* Fauvel, p. 12, fig. 65, a-d.

Material : 4 ex., Nagapattinam beach, 27.03.2004. Coll. Pattanyak & Party.

Digonosis : Body elongated with 3 striking longitudinal rows of violet pigment spots upon a pale yellowish colour towards the middle part of body, becomes gradually smaller and blend into a single streak, disappear completely posterior; proboscis with lateral rows of soft papillae and small spinous tubercles.

Habitat : Sandy beach, crawl on the sandy inter-tidal zone.

Distribution : India–Nagapattinam beach, Mouth of Hooghly estuary (West Bengal).

Elsewhere : Mozambique; Philippines; N. Japan Sea.

16. *Eulalia (Pterocirrus) magalhaensis*
Kinberg 1857

1857. *Eulalia magalhaensis* Kinberg, p. 55, Pl. XXXIII, fig. 1.

1953. *Eulalia (pterocirrus) magalhaensis*, Fauvel, p. 124. fig. 62.

Material : 3 ex. Pichavaram Mangrove area, 30.03.2004. Coll. Pattanayak & Party

Digonosis : Prostomium oval. Two large eyes. Tentacles sub-equal, longer than prostomium. Three tentacular segments distinct. Ventral cirrus of the second tentacular pair flattened and winged. Proboscis covered with small papillae. Dorsal cirri elongated and lanceolate. Ventral cirri short and blunt.

Habitat : Soft mud towards the mid littoral zone.

Distribution : India–Pichhavaram Mangrove, Gulf of Mannar

Elsewhere : South Pacific Ocean, Australia, New Zealand, Philippine Is. Red. sea.

17. *Eulalia (Eumadia) sanguinea*
Oersted, 1843

1843. *Eulalia sanguinea* Oersted. p. 28.

1953. *Eulalia (Eumida) sanguinea* Fauvel, p. 125. fig. 63 F-K.

Material : 6 ex. 30.03.2004. Coll. Pattanyak & Party

Digonosis : Prostomium heart shaped, proboscis smooth, dorsal cirri heart shaped, ventral cirri lanceolate, setae with swollen, spinous shaft and long terminal pieces.

Habitat : Crawling the surface of balanids and oyster shells.

Distribution : India–Peregipettai sea beach, Gulf of Mannar

Elsewhere : Cosmopolitan in temperate and tropical seas.

18. *Phyllodoce madeirensis*
Langerhans, 1880

1880. *Phyllodoce madeirensis* Langerhans, p. 307, pl. XVII, fig. 44.

1953. *Phyllodoce (Anaitides) madeirensis*, p. 120. fig. 59 d-h.

Material : 2 ex. Pichhavaram Mangrove area, 30.03.2004. Coll. Pattanayak & Party

Digonosis : Body long slender; Dorsal cirri large lanceolate and fulcate and ventral cirri large foliaceous; Prostomium heart shaped with and occipital papilla; proboscis with 12 longitudinal rows, 6 on each side, of papillae at the base.

Habitat : Soft mud towards the low water zone at a depth of more than one feet.

Distribution : India–Pichhavaram Mangrove area, Andaman Is. Lakshadweep Sea.

Elsewhere : Cosmopolitan.

19. *Phyllodoce malmgreni* Gravier, 1900

1900. *Phyllodoce malmgreni* Gravier, p. 207. pl. 10. fig. 29-31.

1953. *Phyllodoce malmgreni*, Fauvel, p. 117. fig. 56h.

Material : 3 ex. Pichhavaram Mangrove area, 30.03.2004. Coll. Pattanayak & Party

Digonosis : Tentacular cirri long subulate, dorsal cirri sub-rhomboidal numerous irregular rows of small papillae at the base of proboscis.

Habitat : In burrows of the muddy and sandy intertidal zones of the estuary.

Distribution : India : Pichhavaram, Visakhapattanam,

Elsewhere : Red Sea.

20. *Phyllodoce tenuissima* Grube, 1878

1878. *Phyllodoce tenuissima*, Grube, p. 95.

1953. *Phyllodoce (anaitides) tenuissima* Fauvel, p. 121. fig. 60d.

Material : 3 ex. Pullivasal Is. 13.11.2004. A. Misra & Party.

Digonosis : Very long and slender body, prostomium heart shaped with a very small occipital papilla, proboscis with 12 longitudinal rows of papillae at the base and a dorsal median row of 3 to 4 brown papillae. Dorsal cirri broadly lanceolate, ventral cirri long and slender.

Habitat : Collected from the coralline sandy bed towards the low water zone.

Distribution : India–Pullivasal Is; Nicobar Is; Lakshadweep;

Elsewhere : India, Srilanka, Philipinnes, Australia, New Zealand.

VI Family HESIONIDAE

21. *Hesione intertexta* Grube, 1878

1878. *Hesione intertexta*, Grube, p-102, Pl. VI, fig. 5.

1953. *Hesione intertexta* Fauvel, p. 105.

Material : 3 ex., Poomerichan Is. 13.11.2004. Coll. A. Misra & Party.

Digonosis : Body pale yellow, Dorsal surface with numerous, segmentally broken narrow longitudinal brown stripes.

Habitat : Collected from partly decomposed wooden logs.

Distribution : India–Poomerichan Is, Gulf of Mannar.

Elsewhere : Philippines, Indian ocean, Australia, New Calidonia.

VII Family PILARFIDAE

22. *Ancistrosyllis constricta* (Southern, 1921)

1921. *Ancistrosyllis constricta* Southern, p-573, Pl. XIX, fig. 1a-g.

1953. *Ancistrosyllis constricta* Fauvel, p. 111, fig. 54 a-d.

Material : 3 ex., Poomerichan Is. 13.11.2004. Coll. A. Misra & Party.

Digonosis : Body flat and soft with a distinct neck near fourth segment; papillae at base of the median dorsal cirri; Hooked setae beginning from setiger 30-40.

Habitat : Soft muddy substratum, mixed fine coralline sand towards the sheltered area near low water mark.

Distribution : India–Widely distributed in Indian coast.

Elsewhere : South Africa.

VIII Family NEREIDIDAE

23. *Namalycastis indica* (Southern, 1921)

1921. *Lycastis indica* Southern, Mem, Indian Mus 5; 578, pl 19.

1967. *Namalycastis indica* Day, p. 301. fig. 14.2 p-p-s.

Material : 1 ex., Mutthupetta, Nagapattinam 25.03.2004. A. Misra & Party.

Digonosis : Prostomium wider than long, with a short antero-median groove, palps short and broad, Antennae distinct, tentacular cirri 4 pairs, slender, postero dorsal pairs Longest, reaching setiger 3-5; notosetae hemigomph spiniger, (1-2 some times absent) Neuropodium unilobe conical process; neurosetae of 3 kinds; hemigomph and hetergomph spinigerous and hetergomph falcigerous.

Habitat : Soft and formed clayey soil in the zone between high water line and mid tidal line.

Distribution : India–Widely distributed in Indian coast.

Elsewhere : Indo-west pacific : Mosambique; South Africa, Srilanka, Burma, Celebes, Solomon Is.

24. *Ceratonereis costae* (Grube, 1840)

1840. *Nereis costae* Grube, p. 74.

1953. *Ceratonereis costae*, Fauvel, p. 194. fig. 98 a-f.

Material : 3 ex. Poomerichan Is. 13.11.2004.

Digonosis : Basal ring without paragnaths, Prostomium entire, without cleft, falcigerous setae normal distributed throughout. Dorsal homogomph falcigerous absent.

Habitat : Collected from the intertidal sandy soil towards the low water zone.

Distribution : India–Poomerichan Is; Gulf of Mannar.

Elsewhere : Indian Ocean, Malay archipelago, Philipinnes, China, Australia.

25. *Perinereis cultrifera* var. *hellari* Grube, 1840

1840. *Nereis cultrifera* Grube, Actinien Echinodermen and wurmen Description Adriatischen und mittelmeeeres, p. 74.

1953. *Perinereis cultrifera*, Fauvel, p. 206. fig. 106a-1.

Material : 3 ex. Poomerichan Is. 13.11.2004.
A. Misra & Party

Digonosis : Prostomium sub-pryriform with dark longitudinal bands of pigments between anterior pair of eyes; paragnaths arranged as follows : I = 2 cones in vertical line; II = 10-12 cones in curved rows, III = 12-16 cones in oval patch; IV = 20-25 cones about three oblique rows forming a wedge, V = 3 cones in triangle, VI = a single row at both sides; notosetae homogomph spinigers only, neurosetae homo- and heterogomph spinigers and heterogomph falcigers.

Habitat : Soft mud at low water zone.

Distribution : Poomerichan Is. Hooghly estuary (West Bengal); Gulf of Mannar; Andamans; Maharashtra.

Elsewhere : North east Atlantic, from North Sea to Sengal, Mediterranean and tropical Indo west pacific.

26. *Perinereis muntia* var, typical (Savigny, 1820)

1820. *Lycoris nuntia* savigny, p. 33.

1953. *Perinereis nuntia*, Fauvel, p. 212. fig. 109 a-g.

Material : 3 ex. Poomerichan Is. 13.11.2004.
Coll. A. Misra & Party

Digonosis : Longest tentacular cirri reaching up to setiger 10-12; pharyngeal paragnath arranged as group I = 1-2 cones in a line, group II and IV = cluster of several cones. Group III = rectangular patch, group V = 3 cones in a triangle. Gr. rostrum VI = 6-10 small in curved rows. group VII & VIII = 2-3 irregular rows.

Habitat : Lives in temporary burrows towards the low water zone.

Distribution : India-Poomerichan Is. Tuticorin, Pamban backwaters, Chandipur, Andamans, Coast of Maharashtra, Goa, Okha, Laksadweep.

Elsewhere : Widely recorded in Indian ocean.

27. *Tylonereis bogoyawensis* Fauvel, 1911

1911. *Tylonereis bogoyawensis* Fauvel, p. 373. pl. XIX. Fig. 1-7.

1953. *Tylonereis bogoyawensis* Fauvel, p. 168. fig. 5 e, f.

Material : 3 ex. Pichhavaram Mangrove. 30.03.2004. Coll. Pattanyak & Party

Digonosis : Prostomium broader than long, notched, proboscis with conical soft papillae only, ventral setigerous lob trilobed.

Habitat : Soft mud, in the mid-littoral zone.

Distribution : India-Gulf of mannar, Travancore.

Elsewhere : Persian Gulf

28. *Tylonereis fauveli* Southern, 1921

1921. *Tylonereis fauveli* Southern, p. 582, pl. IX. fig. 3.

1953. *Tylonereis fauvel*, p. 169. fig. 85 c-d.

Material : 2 ex. Pichhavaeram Mangrove area, 30.03.2004. Coll. Pattanyak & Party

Digonosis : Body large, Prostomim broader than long and notched; proboscis with conical soft papillae only, ventral setigerous lobe bilobed.

Habitat : Soft mud, in the mid-littoral zone.

Distribution : India-Pichhavaeram Mangrove area, Chilika lake, Pamban.

Elsewhere : Mergui

IX Family NEPTYIDAE

29. *Nephtys dibranchis* Grube, 1877

1877. *Nephtys dibranchis* Grube, p. 536.

Material : 2 ex., Pichhavaram Mangrove area 30.03.2004. Coll. Pattanyak & Party.

Digonosis : internal cirri long slender and coiled. Ventral legules cirriform, gill like, bifurcate lyriform setae present.

Habitat : Soft sediments, muddy sands in the zone near low tide area.

Distribution : Orissa coast; Visakhapattanam, Madras.

Elsewhere : Newzealand, New Guena, Australia, India ocean, Gulf of Omman, Persian Gulf. South America.

30. ***Nephtys polybranchia*** Southern, 1921

1921. *Nephtys polybranchia* Southern p. 607. pl. XXIV, fig. 11.

1998. *Nephtys polybranchia* Misra, p. 167.

Material : 2 ex. Pichhavaeram Mangrove area, 30.032004, Coll. Pattanyak & Party

Digonosis : Pharynx eversible, divisible into short muscular distal region and inflated proximal region; interramal cirri commencing on setiger 2, extending up to posterior end; setae simple and of three types—barred, spinulose and smooth capillaries.

Habitat : Soft silty sediments, muddy sands in the zone near the low water line.

Distribution : Pichhavaeram Mangrove area, Hooghly estuary; Chilka Lake; Adyar estuary; Cochin backwater; Umbargoan.

Elsewhere : Taleh-sap, Shanghai.

X Family GLYCERIDAE

31. ***Glycera alba*** (Muller, 1788)

1788. *Nereis alba* Muller p-217, Pl. II, fig. 6, 7.

1967. *Glycera alba* Day p. 360, fig. 16. 2. k.

Material : 5 ex., Tuticorin, 16.11.2004. Coll. A. Misra & Party.

Digonosis : Prostomium with 10-12 rings, 2 small eyes, and 4 small tentacles distally; branchiae simple appear as short stumpy lobes above the dorsal edge of setiger 35 to 40; notosetae capillaries, neurosetae composite, homogomph spinigers.

Habitat : Silty mud in the zone between mid tidal level and low tidal level.

Distribution : Tuticorin, Hooghly estuary Gangam coast, Puri, Konarak; Cochin backwater; Ghogha Coast of Maharashtra; Goa.

Elsewhere : North eastern Atlantic from Norway to fraance, Red sea and Tropical Indian Ocean, Japan.

32. ***Glycera rouxi*** Audouin & Milne Edwards, 1833

1833. *Glycera rouxi* Aud. & Milne Edward, *Annls, Sci. nat.*, 29 : 264.

1953. *Glycera rouxi* Fauvel, P. 297. fig. 149 a-d.

Material : 6 ex. Tuticorin 16.11.2004. Coll. A. Misra & Party

Digonosis : Pharyngeal papillae in the form of smooth conical globular processes; branchiae simple slender, retractile and start from the anterior surface of setiger 22-24; pre-setal ligles sub-equal and short, post-setal lobe rounded,

Habitat : Soft silty sediments near or below low water level.

Distribution : Hooghly estuary; Chandipur; Vishakha patnam, Vellar estuary, Gulf of Mannar, Pamban backwater, Andamns; Kerala Coast; Lakshadweep.

Elsewhere : Indo pacific and north Atlantic (S.Africa, Madagascar, Mosambique, Iranian Gulf, Solomon Is., Ferallon Is, Japan, North Atlantic, Mediterranean Sea)

XI Family ONUPHIDAE

33. ***Onuphidae eremita*** Audoin & Milne Edwards, 1833

1833. *Onuphidae eremita* Audoin & Milne Edwards p-226.

1953. *Onuphidae eremita* Fauvel p. 257, fig. 129. a-1.

Material : 5 ex., Tuticorin, 16.11.2004. Coll. A. Misra & Party.

Digonosis : Median occipital antennae shorter than the inner laterals; tentacular cirri inserted dorso-laterally and longer than the peristomial segments; branchiae from the first setiger with simple filaments, with 2 filaments from 22-24 setigers, reaching maximum with 4-5 filaments and then decrease posteriorly; setae include anterior hooded pseudocomposite hooks, posterior winged capillaries, pectinate setae and bidentate acicular setae with guard.

Habitat : Lives in thin tubes encrusted with sand towards the low-water zone.

Distribution : Tuticorin, Digha Coast, Chennai coast; Sri Lanka.

Elsewhere : Madagascar, Mergui Archipelago; Myanmar.

34. *Diopatra neopolitana* Delle-Chiaje, 1841

1841. *Diopatra neopolitana* Delle-Chiaje, p. 97.

1953. *Diopatra neopolitana* Fauvel, p. 252. fig. 126a-h.

Material : 2 ex. Pichhavaram Mangrove, 5x Perangapettai, 30.03.2004. Coll. Pattanyak & Party.

Digonosis : Prostomium with a pair of short, subulate frontal antennae, a pair of oval cushion like palps, and five occipital antennae; tentacular cirri present; branchiae commencing from setiger 4 to 5, extending up to setiger 50-61, branchial filaments arranged in 10-12 whorls; setae include limbate setae, pseudocomposite hooks, pectinate setae and sub-acicular hooks.

Habitat : Lives in tough tubes made of fine sands, projected part decorated with shell fragments, leaves and embedded in stiff mud towards the low water zone.

Distribution : India-Pichhavaram Mangrove area, Hooghly estuary, Matla river, Chandipur, Ratnagiri.

Elsewhere : Atlantic ocean, Mediterranean Sea, Red Sea, Persian Gulf, Gulf of Oman, Arabian Sea, India ocean, Gulf of Siam, China Sea, Pacific ocean.

XII Family EUNICIDAE

35. *Eunice tentaculata* Quatrefages, 1865

1865. *Eunice tentaculata* Quatrefages p.317.

1953. *Eunice tentaculata* Fauvel p. 234, fig. 118. m-p.

Material : 3 ex., Pamban, 12.11.2004. Coll. A. Misra & Party.

Digonosis : Tenacles annulated, Tentacular cirri articulate, Branchiae pectinate begins from 4-6 foot and with maximum 6-20 filaments and continue up to posterior end of the body.

Habitat : Collected from tubes attached to the hard substrate like, stones, rocks, etc.

Distribution : Pamban, Gulf of Mannar, Andaman and Nicobar Is.

Elsewhere : New Zealand, Australia, Malaya seas, India ocean.

36. *Eunice tubifex* Crossland, 1904

1904. *Eunice tubifex* Crossland, p. 303, Pl. XXI, fig. 1-8.

1953. *Eunice indica*, Fauvel, p. 232. fig. 116 a-g.

Material : 3 ex. Perangapettai beach, 30.03.2004.

Digonosis : Branchiae pectinate begin from 20 to 35th foot and with maximum 3-6 filaments; compound setae with sword shaped terminal piece anteriorly, sickle-shaped posteriorly.

Habitat : Collected from membranous tubes attached to the hard substrate like, stone, rocks, etc.

Distribution : India-Perangapettai beach, Gulf of Mannar.

Elsewhere : Tropical Indo-West Pacific.

37. *Eunice indica* Kingberg, 1865

1865. *Eunice indica* Kingberg p. 562.

1953. *Eunice indica* Fauvel, p. 241. fig. 119 g.

Material : 5 ex. Perangapettai beach, 30.03.2004. Coll. Pattanyak & Party

Digonosis : Branchiae pectinate begin from 3rd foot and with maximum of 10-20 filaments; compound setae tridentate with a sharp protruding guard.

Habitat : Collected from tubes buried in soft sandy mud up to depth of more than two feet.

Distribution : India-Perangapettai beach, Nicobar Is, Gulf of Mannar

Elsewhere : Japan, New Caledonia, Gambier Is, Indian Ocean, Persian Gulf, Red Sea.

38. *Marphysa gravelyi* Southern, 1921

1921. *Marphysa gravelyi* Southern, p. 671, pl. XXIV, fig., 13.

1953. *Marphysa gravelyi* Fauvel, p. 246.

Material : 1 ex. Pichhavaram Mangrove area, 30.03.2004. Coll. Pattanyak & Party

Digonosis : Branchiae pectinate begin on 35th to 50th feet with maximum of 8-9 filaments and extend up to posterior end of the body. Neuropodial compound setae with knife-like terminal piece gradually replaced by capillary setae posteriorly.

Habitat : Very long eotm burrows deep into the soft mud towards the low littoral zone.

Distribution : Endemic to India—Vellar estuary, Chilka lake, Adyar, Madras.

XIII Family LUMBRINERIDAE

39. *Lumbrinereis latreilli* Audouin & Milne Edwards 1834

1834. *Lumbriconereis latreilli* Audouin & Milne Edwards, p. 168.

1953. *Lumbriconereis latreilli* Fauvel p. 266, fig. 134. a-r.

Material : 12 ex., Parengapettai, 30.03.2004. Coll- Pattanyak & Party.

Digonosis : Body elongated, narrowed anteriorly. Prostomium blunt conical. Parapodia well developed; setigerous process with a rounded lobe on anteriorly and a elongated conical ligule on posteriorly. In the anterior feet both capillary setae and compound hooks are present while in the succeeding feet only small hooks are present.

Habitat : Prefers sandy mud towards the mouth of the estuary, possibly with higher salinity.

Distribution : India—Parengapettai, Tuticorin.

Elsewhere : Cosmopolitan in temperate and tropical seas.

40. *Lumbrinereis polydesma* Southern 1921

1921. *Lumbrinereis polydesma* Southern, p. 622, pl. XXVI, fig 15.

1953. *Lumbrinereis polydesma* Fauvel, p. 264. fig. 133 a-i.

Material : 7 ex. Rameswaram, 12.11.2004. Coll. A. Misra & Party

Digonosis : Slender body with rounded prostomium. Parapodia with anterior short rounded lobe and a posterior longer conical or cirriform lobe. Capillary seate in all the parapodia; simple hooked seate from 30th foot with 6-10 small spines above the main teeth.

Habitat : Soft muddy soil in the low littoral zone.

Distribution : India—Endemic to India. Rameswaram, Chilka lake.

XIV Family SPIONIDAE

41. *Polydorella prodorella* Augenar, 1914

1914. *Polydorella prodorella* Augenar, p. 16 pl. I, fig. 3.

1953. *Polydorella prodorella* Fauvel p. 322, fig. 169. a-g.

Material : 8 ex., Pamban, 12.11.2004. Coll. A. Misra & Party.

Digonosis : Fourth setigerous segments modified with : i) a row of three 3-6 large asymmetrical setae with denticulate crest and blunt hook ii) an inferior row of 3-6 smaller setae slightly enlarged at the tip; iii) a few ventral, slender capillary setae. Neuropodial hooks appear on 6-7 setigers.

Habitat : Lives in smooth tubes buried in mud.

Distribution : India—Pamban, Gulf of Mannar,

Elsewhere : Australia.

42. *Prionospio polybranchiata* Fauval 1929

1929. *Prionospio polybranchiata* Fauval, p. 184

1953. *Prionospio polybranchiata* Fauvel, p. 324. fig. 170 a-g.

Material : 3 ex. Pamban, 12.11.2004. Coll. A. Misra & Party.

Digonosis : Branchiae numerous, first five pairs filiform, very long and extend up to 8-10 setigers, then foliaceous and elongate, partly attached to the dorsal lamella.

Habitat : lives in burrows in soft mud in the mid-littorla zone.

Distribution : Endemic to India, Pamban, (Gulf of Mannar).

43. *Prionospio krusadensis* Fauvel, 1929

1929. *Prionospio krusadensis* Fauvel, p. 182, fig. 2.

1953. *Prionospio krusadensis* Fauvel, Bull. Soc. zool. France, Paris, 14 : 182.

Material : 8 ex. Dhanuskothi, 12.11.2004. Coll. A. Misra & Party.

Digonosis : Prostomium short rounded, frontal peaks and occipital tentacles absent, eyes present; branchiae 3 pairs, pinnate, on 2nd 3rd and 4th setigerous segments; lamellae large, oval or subtriangular; dorsal hooks from 40-42 segments; without genital pouches.

Habitat : Fine sandy mud, within slimy mucous tube.

Distribution : Endemic to India–Dhanuskothi, Gulf of Mannar, Krudadai Island and Digha Coast.

XV Family CAPITELLIDAE

44. *Heteromastus similes* Southern, 1921

1921. *Heteromastus similes* Southern p. 640, pl. XXIX, fig 3.

1953. *Heteromastus similes* Fauvel p. 366, fig. 191. a-d.

Material : 11 ex., Pichhavaram Mangrove area, 30.03.2004. Coll. Pattanyak & Party.

Digonosis : Prostomium conical pear shaped, thorax with capillary setae and hooks, first 5 setiger segment with capillary setae, next 6 with long hooks, Branchie present.

Habitat : Lives in soft and brittle tubes, embeded in muddy sand substratum.

Distribution : India–Pichhavaram Mangrove Chilka Lake; Vishakhapatnam, Gulf of Mannar.

Elsewhere : Taleh-Sap, Gulf of Siam.

XVI Family MALDANIDAE

45. *Euclymene annadalei* Southern, 1921

1921. *Euclymene annadalei* Southern p. 648, pl. XXVIII, fig. 22, a-g, Pl. XXIX, fig. 22 h-k.

1953. *Clymene (Euclymene) annadalei* Fauvel p. 377, fig. 196. a-b.

1967. *Euclymene annadalei* Day, p. 641, fig. 30.7. a-d.

Material : 7 ex., Pichhavaram Mangrove area, 30.03.2004. Coll. Pattanyak & Party.

Digonosis : Body cylindrical with long segments, 21 setigers; Prostomium bluntly trainglar with numeros ocelli; cephalic rim crenlate posteriorly; a dorsal glandlar streak from setiger 9; notoseate mainly with narrow winged capillaries anteriorly, include feathered forms posteriorly; setiger 1-3 with a single acicular spine with a smooth bent teeth; neroseate with nmerous hooks each with a vertical series of 5-6 teeth above the main fang.

Habitat : Lives in narrow tubes coated with sand grains towards the low littoral zones.

Distribution : Endemic to India–Pichhavaram Mangrove, Andaman & Nicobar island, Chilka Lake.

XVI Family OWENIIDAE

46. *Owenia fusiformis* delle Chiaje, 1844

1844. *Owenia fusiformis* delle Chiaje, p. 31.

1953. *Owenia fusiformis* Fauvel p. 391, fig. 203 a-f.

Material : 3 ex., Dhanuskothi, 12.11.2004. Coll. A. Misra & Party.

Digonosis : Body elongated and cylindrical with few segments; tube cartilaginous strengthened by imbricating shell fragments or sand grains; head with a frilly feeding membrane; thoracic region with 3 short setigers bearing capillary setael first five abdominal setigers longs, abdomen with notopodial capillaries and neurpodial rows of minute long-shaft looks.

Habitat : Lives in tough tubes in muddy sand on midiltoral zone.

Distribution : Hooghly estuary, Orissa Coast, Tuticorin, Lakshadweep; Andamans.

Elsewhere : Cosmpolitan–Atlantic, Indian and Pasific Ocean.

XVIII Family TEREBELLIDAE

47. *Loimia medusa* (Savigny, 1818)

1818. *Terebella medusa* (Savigny), Histoire natralle Description animaxces Sans Vertebres; p. 95.

1953. *Loimia medusa* Fauvel. P. 416, fig. 218 a-f.

Material : 6 ex., Tuticorin light house area, 16.11.2004. Coll. A. Misra & Party.

Digonosis : Tentacular lobe short with several eye-spots; lateral lobe membranous, horizontally placed over segment 2 and 3; branchiae 3 pairs, first often than other two; uncini pectiniform with a single vertical series of 5-6 teeth, in double rows, set back to back on postero thorax; abdominal uncini on squate pinnules.

Habitat : Live in tubes made of sand grains and build in open beaches.

Distribution : Tuticorin light house area, Hooghly estuary, Gulf of Mannar, Vembandad Lake, Ratnagiri, Beyt Island, Lakshdweep Archipelago and Andaman Is.

Elsewhere : Atlantic ocean, Red Sea, Parisan gulf, Indian Ocean, Japan, Pacific Ocean, California.

XIX Family TRICHOBRANCHIDAE

48. *Terebellides stroemi* Sars, 1835

1835. *Terebellides stroemi* Sars, p. 48.

1953. *Terebellides stroemi* Fauvel. P. 436, fig. 231 i-q.

Material : 2 ex., Parangipettai coast, 30.03.2004, Coll. Pattanyak & party.

Digonosis : A single branchial trunk distally divided in to 4 lamellate lobes; notosetae commence on 3rd segments, uncini commence on 6th setigerous segments with unidentate vhooks abdominal uncini travicular.

Habitat : Lives in membranous tubes coated with sandy muds buried sandy habitats in shelter region covered with stones and pebbles.

Distribution : India-Parangipettai coast, Bay of Bengal, Orissa coast, Madras Coast, Laccadweep Sea.

Elsewhere : Cosmopolitan from the Arctic to the sub-Antarctic.

XX Family SABELLIDAE

49. *Laonome indica* Southern, 1921

1921. *Laonome indica* Southern, mem. Indian Mus, 5 : 652. Pl. XXX, fig. 20.

1953. *Laonome indica* Fauvel. P. 446, fig. 235 d-h.

Material : 7 ex., Pichhavaram Mangrove area, 30.03.2004. Coll. Pattanyak & Party.

Digonosis : Branchial lobes symmetrical, semi-circular, thorasic segments 6 with dorsal long capillaries having narrow wings and long tapering tips, and seate with spatulate tips terminating in a long fine point; uncini with a stout rounded base and 4-5 rows of teeth above the main fang.

Habitat : Lives in tubes made of fine silt mixed with mucous.

Distribution : Endemic to India-Pichhavaram Mangrove, Hooghly estuary; Chilka Lake.

XXI Family SERPULIDAE

50. *Ficopomatus macrodon* Southern, 1921

1921. *Ficopomats macrodon* Southern, p. 655, Pl. XXX, fig. 27, a-m.

1953. *Ficopomatus macrodon* Fauvel. P. 473, fig. 248 c-l.

Material : 5 ex., Pichhavaram Mangrove area, 30.03.2004. Coll. Pattanyak & Party.

Digonosis : Operculum soft fig shaped, non spinous, with conical horny capped, branchial filaments, 13-17 in number, with 18-20 pairs of barbules; Peculiar thorasic uncini and tube with a single dorsal ridge.

Habitat : Calcareous tube attach to hard substrate-wood, concrete piles, stones, bricks etc.

Distribution : India-Pichhavaram Mangrove, Cochin backwater, Hooghly estuary, Chilika Lake, Ennur backwaters, Madras coast.

Elsewhere : Sri lanka and Thiland.

51. *Serpula vermicularis* Linnaeus, 1767

1767. *Serpula vermicularis* Linnaeus, 32.

1953. *Serpula vermicularis* Fauvel, p. 454. fig. 239 a-q.

Material : 2 ex. Tuticorin light house area, 16.11.2004. Coll. A. Misra & Party

Digonosis : Operculum funnel shaped with numerous radii symmetrically arranged, collar trilobed, collar setae beayonet shaped, with two large conical, blunt processes at the base. Uncini stout and blunt, with 4-7 teeth.

Habitat : Found attached to under surface of stones and oyster shells.

Distribution : India-Tuticorin, Orissa coast.

Elswhere : Atlantic Ocean, Mediterranean sea, Red Sea, Parsian Gulf, Indian Ocean.

SUMMARY

The present paper deals with 51 species of polychaetes belonging to 34 genera and 21

families collected by the authors during recent survey of Zoological Survey of India from Tamilnad state during 2002 to 2004. Although 193 species are so far known from that area detail description are provided here for only the recent collected species.

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EARTHWORM

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INTRODUCTION

The paper with 20 species belonging to 16 genera and eight families out of which 13 species are recorded for the first time from the state of which 6 species are varying from the recognized species. Aristotle described some terrestrial elongated worms as 'the intestine of earth'. These are the earthworms the megadrile oligochaetes of the phylum Annelida. They are bilaterally symmetrical coelomate invertebrates having external and internal segmentations throughout the body with setae as locomotory organs present on all segments excepting the first and last ones. Their respiration takes place by the gaseous exchanges through the moist skin. They are hermaphrodite and the fertilisation of their ova is external in the cocoons formed by the material secreted from the clitellum.

Earthworms are found in various types of soils where there is sufficient food and moisture. They occur in vegetable gardens, plant nurseries, cultivated fields, orchards, grasslands, forests, etc. They are hermaphrodite and the fertilisation of their ova is external in the cocoons formed by the material secreted from the clitellum.

Earthworms are found in various types of soils where there is sufficient food and moisture. They occur in vegetable gardens, plant nurseries, cultivated fields, orchards, grasslands, forests, etc. They are also found under logs and stones, and even in the axils of leaves of some plants. Some are hydrophilous and occur near water bodies.

Earthworms are popularly known as 'friends of farmers' because of their beneficial effects in increasing the fertility of soil, recycling various kinds of organic wastes, producing vermicompost and providing animal protein as poultry and fish feed. Out of about 6000 global species more than 485 species of earthworms are so far known to occur in India. *Moniligaster perrieri*, the first new species of earthworms of the Indian mainland was described by Perrier in 1872 from Kerala. Subsequently our knowledge on the taxonomy of Indian earthworms was enriched by the contributions of Darwin (1881), Halder (1998, 1999), Julka (1976, 1981, 1988), Julka & Halder (1975), Stephenson (1914, 1923).

The present report is based on the study made during March, 2003 to February, 2004. Collections of earthworms from Tamil Nadu.

SYSTEMATIC ACCOUNT

Phylum ANNELIDA

Class OLIGOCHAETA

A. Order MONILIGASTRIDA

I. Family MONILIGASTRIDAE

1. Genus *Drawida* Michaelsen, 1907

1. *Drawida nepalensis* Michaelsen, 1907

2. *Drawida wilsi* Michaelsen, 1907

3. *Drawida annandalei* Stephenson, 1913

4. *Drawida sulcata* Michaelso, 1907

B. Order HAPLOTAXIDA

II. Family ACANTHODRILIDAE

2. Genus *Pontodrilus* Beddard, 1874

5. *Pontodrilus bermudensis* Beddard, 1891

III. Family LUMBRICIDAE

3. Genus *Eisenia* Malm, 1877

- 6.
- Eisenia fetida*
- (Savigny, 1826)

IV. Family MEGASCOLECIDAE

4. Genus *Amyntas* Kinberg, 1867

- 7.
- Amyntas diffringenes*
- (Baird, 1869)

- *8.
- Amyntas hawayanus*
- (Rosa)

- *9.
- Amyntas alexandri*
- Beddard

- *10.
- Amyntas*
- sp.

5. Genus *Euthraeodrilus*

- 11.
- Euthraeodrilus*
- sp.

6. Genus *Lampito* Kinberg, 1866

- 12.
- Lampito mauritii*
- Kinberg, 1866

7. Genus *Megascolex*

- 13.
- Megascolex*
- sp.

8. Genus *Metaphire* Sims & easton, 1972

- *14.
- Metaphire peguana*
- (Rosa, 1890)

- *15.
- Metaphire posthuma*
- (Vaillant, 1868)

9. Genus *Perionyx* Perrier, 1872

- 16.
- Perionyx annandalei*

- 17.
- Perionyx excavatus*
- Perrier, 1872

- 18.
- Perionyx sansibaricus*

V. Family OCTOCHAETIDAE

10. Genus *Dichogaster* Beddard, 1888

- 19.
- Dichogaster bolau*
- (Michaelsen, 1891)

11. Genus *Octochaetona* Gates, 1962

- 20.
- Octochaetona beatrix*
- (Beddard, 1902)

- *21.
- Octochaetona*
- sp.

- *22.
- Octochaetona*
- sp.

- *23.
- Octochaetona*
- sp.

- 24.
- Octochaetona quadripapilata*
-
- (Stephenson, 1924)

12. Genus *Wahoscolex* (Veereshi)

- *25.
- Wahoscolex*
- sp.

VI. Family ALMIDAE

13. Genus *Glyphidrilus* Horst, 1889

- 26.
- Glyphidrilus annandalei*
- Michaelson

- 27.
- Glyphidrilus tuberosus*
- Stephenson, 1916

VII. Family OCNERODRILIDAE

14. Genus *Nematogenia*

- 28.
- Nematogenia panamaensis*
- (Eisen)

VIII. Family UDRILIDAE

15. Genus *Eudrilus*

- *29.
- Eudrilus eugeniae*

- *30.
- Eudrilus*
- sp.

Species marked with asterix (*) are recorded for the first time from Tamil Nadu.

I. Family MONILIGASTRIDAE

1. Genus *Drawida* Michaelsen, 19001. *Drawida nepalensis* Michaelsen, 1907

1982. *Drawida nepalensis* Michaelsen, Julka, *Rec. zool. Surv. India*, **80** : 147.

Material examined : 13 ex., Reg. No. An 3335/1, Rameswaram temple side garden, Tamil Nadu. 12.1.2004; coll. A. Misra and party.

Diagnostic characters : Length 50-130 mm. diameter 2-5mm. Segments 120-180. Colour yellowish grey. Prostomium prolobous. Setae closely paired. Dorsal pores absent. Clitellum ring shaped on IX-XIV. Male pores on prominent transverse oval papillae, midway between b and c. Female pores in b. Spermathecal pores just ventral from c. Septa 5/6-8/9 very strong. Four gizzards in XIV-XVII. Prostates long, tube like in a U shaped loop.

Distribution : India : Andaman & Nicobar Islands; Arunachal Pradesh; Assam; Bihar; Himachal Pradesh; Meghalaya; Sikkim; Tripura; Uttar Pradesh; West Bengal; Tamil Nadu.

Elsewhere : Pakistan; Nepal; Bangladesh; Myanmar; Indonesia.

2. *Drawida willsi* Michaelsen, 1907

Material examined : 2 ex., Reg. No. An 3337/1, Gandhipuram, Coimbatore, Tamil Nadu. 27.11.2004; coll. A. Misra and party.

Diagnostic characters : Length 55-60 mm. diameter 2.1-2.5 mm. segments 155-160. Male pores on 9/10 segments. Two gizzards are in XIV and XV. Atrium is moderately large, simple, almost unstalked.

Distribution : Madhya Pradesh; Andhra Pradesh; Tamil Nadu.

3. *Drawida annandalei* Stephenson, 1913

Material examined : 2 ex., Reg. No. An 3337/1, Coonor, Tamil Nadu. 28.11.2004; coll. A. Misra and party.

Diagnostic characters : Length 35 mm. diameter 1.5 mm. Male pores on 9/10 segments. Three gizzards are in XII-XV.

Distribution : South India.

4. *Drawida sulcata* Michaelsen, 1907

Material examined : 2 ex., Reg. No. An 3339/1, Coonor, Tamil Nadu. 28.11.2004; coll. A. Misra and party.

Diagnostic characters : Length 67-70 mm. diameter 3-3.5 mm. Segments 150. Male pore on 9/10 segments. Five gizzards are in XIV-XIX. Atrium small, simple, hidden in body-wall.

Distribution : South India.

II. Family ACANTHODRILIDAE

2. Genus *Pontodrilus* Beddard, 1874

5. *Pontodrilus burmudensis* Beddard, 1891

1891. *Pontodrilus burmudensis* Beddard, *Ann. Mag. nat. Hist.*, (ser. 6). 7 : 96.

Material examined : 5 ex.; Reg. No. An 334/1, Mandapam, Tamil Nadu; 10.11.2004; coll. C.K. Mandal and S. Dhani.

Diagnostic characters : Length 70-81 mm. diameter 2.5-3.2 mm. Holonephric nephridia.

Distribution : India : Andaman & Nicobar Island; Andhra Pradesh, Goa; Kerala; Lakshadweep Islands; Maharashtra; Orissa; Tamil Nadu; West Bengal.

Elsewhere : Africa, Madagascar, Sri Lanka, Maldives, Myanmar, Vietnam, Indonesia; Australia, Some Islands in the Pacific Ocean; USA; West Indies, South America.

Remarks : This is a peregrine species inhabiting in mud with organic matter and salt on sea shore and margins of estuaries and brackish water lakes.

III. Family LUMBRICIDAE

3. Genus *Eisenia* Malm, 1877

6. *Eisenia fetida* (Savigny, 1826)

1826. *Enterion fetidum* Savigny, *Mem. Acad. Sci. Inst. F.*, 5 : 182.

Material examined : 10 ex.; reg. No. An 3341/1; Compost pit, Ottacodai, Tuticorin; 16.11.2004; coll. A. Mishra and party.

Diagnostic characters : Length 27-130 mm. Diameter 3-5 mm. Setae lumbricine. Closely paired. segments 155-160. Male pore paired with large glandular papillae on XV segment. Female pore paired on XIV. Gizzard in XVII segment. Clitellum saddle shaped in XXIV-XXXIV segment. Prostates absent dorsal pores present, Colour purple.

Distribution : India : Delhi; Himachal Pradesh; Kerala; Nicobar Islands; Sikkim; West Bengal; Tamil Nadu.

Elsewhere : Europe, Lebanon, Turkey, Afghanistan, Korea, Japan; Australia, New Zealand; North America; West Indies, South America, Some Islands in the Atlantic Ocean.

V. Family MEGASCOLECIDAE

5. Genus *Amyntas* Kinberg, 1867

7. *Amyntas diffrigenes* (Baird, 1869)

1869 *Megascoleus diffrigenes* Baird, *Proc. zool. Soc. Lond.*, : 40.

Material examined : 2 ex.; Reg. No. An 3342/1; Ganesh temple side garden, Madurai District, Tamil Nadu; 8.11.2003; coll. Ch. Satyanarayan and party.

Diagnostic characters : Length 45-170 mm, diameter 3-6 mm, segments 79-121; clitellum XIV-XVI; first dorsal ore usually at 11/12; genital marking small circular or shortly elliptical disk, paired pre-setal, just median to the line of spermathecal pores in some or all or VI-IX; post-setal, just in front of spermathecal pores in some or all V-VIII; spermathecal pores 4 pairs, minute, superficial, each in a small circular to transversely elliptical disk in 5/6-8/9.; female pores mid ventral.

Gizzards large, somewhat conical, narrow in front; intestinal origin usually in XVI; last pair of hearts in XIII.

Distribution : India: Arunachal Pradesh; Assam; Himachal Pradesh, Jammu & Kashmir; Karnataka; Manipur; Meghalaya; Sikkim; Tamil Nadu; Uttar Pradesh; West Bengal.

Elsewhere : Africa, Madagascar & its adjacent Islands; Europe, China, Korea, Japan; Sri Lanka, Nepal, Bhutan, Bangladesh, Indonesia, Philippines; Australia, New Zealand, Some Island in the Pacific Ocean; USA; Central America, West Indies, South America.

8. *Amyntas hawayanus* (Rosa, 1891)

Material examined : 1 ex., Reg. No. An 3344/1; Madurai District, Tamil Nadu; 8.11.2003; coll. C.K. Mondal and S. Dhani.

Distribution : India : West Bengal; Manipur; Meghalaya; Rajasthan; Sikkim; Uttar Pradesh; Tamil Nadu.

Elsewhere : Mauritius; Europe; Egypt; Pakistan; China; Sri Lanka; Bangladesh Myanmar; Thailand, Malay Peninsula; Indonesia; Hongkong; U.S.A.; Some Islands of Pacific Ocean and Atlantic ocean; West Indies; South America.

9. *Amyntas alexandri* Beddard, 1900

Material examined : 2 ex., Reg. No. An 3344/1; Madurai District, Tamil Nadu; 8.11.2003; coll. C.K. Mondal and S. Dhani.

Distribution : India: West Bengal; Andaman and Nicobar Islands; Assam; Madhya Pradesh;

Elsewhere : Myanmar and Thailand.

10. *Amyntas* sp.

Material examined : 1 ex., Reg. No. An 3344/1; Madurai District, Tamil Nadu; 8.11.2003; coll. C.K. Mondal and S. Dhani.

Distribution : India : West Bengal; Maharashtra; Rajasthan; Uttar Pradesh; Tamil Nadu.

Elsewhere : Europe; Pakistan; China;

Myanmar; Thailand; Malay Peninsula; Indonesia; Hongkong; Taiwan; Hawaii; U.S.A.; South America.

6. Genus *Euthraeodrilus*

11. *Euthraeodrilus* sp.

Material examined : 1 ex., Reg. No. An 3345/1; Yearcaud, Tamil Nadu; 30.11.2004; coll. C.K. Mondal and S. Dhani.

Diagnostic characters : Prostomium epibolic. Spermatheca 2 pairs (7 segments), first pair large dumbbell shaped. Female pore single in segment XIV. Male pore 2 in segment XVII. Setae perichaetine. Prostate gland recemose. Gizzard in segment VIII. Ovary 1 pair. Salivary gland 1 pair. 5 pairs of seminal vesicle.

7. Genus *Lampito* Kinberg, 1866

12. *Lampito mauritii* Kinberg, 1866

1866. *Lampito mauritii* kinberg, *fivers K. Vetens. Akad. Forhandl. Stockholm*, **23** : 103.

Material examined : 31 ex., Reg. No. An 3346/1, Rameswaram temple side garden, Tamil Nadu; 12.11.2004; coll. A. Misra and party.

Diagnostic characters : Length 95-155 mm, diameter 3-6 mm, segments 70-121; clitellum Clitellum annular, XIV-XVII or XVIII; spermathecal pores 3 pairs, large, in EG, at 6/7, 7/8, 8/9; male pores in XVIII, at or lateral to B, in paired, circular, slightly raised prothores that extends from A into CE; female pores paired on XIV; genital marking absent.

Distribution : India : Widely distributed India. Andaman & Nicobar Island; Andhra Pradesh; Bihar; Delhi; Gujarat; Karnataka; Kerala; Lakshadweep & Minicoy Island; Madhya Pradesh; Maharashtra; Orissa; Rajasthan; Tamil Nadu; Tripura; Uttar Pradesh; West Bengal.

Elsewhere : Zanzibar, Comoro Island, Madagascar, Seychelles Is., Mauritius; Pakistan, China, Maldives, Sri Lanka, Bangladesh, Myanmar, Thailand, Malay Peninsula, Indonesia, Philippines, Hong Kong; New Caledonia.

8. Genus *Megascolex*13. *Megascolex* sp.

Material examined : 3 ex., Reg. No. An 346/1; Yearcaud, Tamil Nadu; 30.11.2004; Coll. C. K. Mandal and S. Dhani.

Diagnosotic characters : Male pore on XVIII segment. Female pore on XIV segment. Spermatheca on segment 7/8. Clitellar region balloon shaped. Tail nipple shaped.

9. Genus *Metaphire* Sims & Easton, 197214. *Metaphire peguana* (Rosa, 1890)

1890. *Perichaeta peguana* Rosa, *Ann. Mus. Civ. Nat. Genova*, **30** : 113.

Material examined : 2 ex., Reg. No. An 3347/1, Yearcaud, Tamil Nadu; 30.11.2004; coll. a. Misra, C.K. Mandal and S. Dhani.

Distribution : India : Andaman Islands; West Bengal, Tamil Nadu.

Elsewhere : Myanmar, Thailand, Vietnam, Malay Peninsula, Indonesia.

15. *Metaphire posthuma* (Vaillant, 1868)

1868. *Perichaeta posthuma* Vaillant, *Annl. Sci. Nat.*, (ser. 5) **10** : 228.

Material examined : 11 ex., Reg. No. An 3074/1, Yearcaud, Tamil Nadu; 30.11.2004; coll. A. Misra, C.K. Mandal and S. Dhani.

Diagnostic characters : Length 60-140 mm, diameter 3-8 mm, segments 91-124. Light to dark grey in living condition, curled into ball when touched; living in top 15 to 20 cm. of moist and semi-moist clayey loam soil, available in flower beds, grassbeds and soil covered with dry heaps of leaf litter; comes out of the burrow after overnight shower; castings deposited on the surface of the soil in the form of small heaps of loose ovoidal pellets.

Distribution : India : Andamans Island; Bihar; Delhi; Gujara; Haryana; Himachal Pradesh, Jammu & Kashmir; Madhya Pradesh; Maharashtra; Meghalaya; Orissa; Punjab; Rajasthan, Uttar Pradesh; West Bengal; Tamil Nadu.

Elsewhere : Pakistan; Bangladesh, Myanmar, Thailand, Vietnam, Malay Peninsula, Indonesia, Philippines, USA.

10. Genus *Perionyx* Perrier, 187216. *Perionyx annandalei* (Michaelsen, 1907)

Material examined : 2 ex., Reg. No. An 3347/1, Poolachi, Tamil Nadu; 22.11.2004; coll. A. Misra, and party.

Diagnostic characters : Length 160-280 mm, diameter 6-10 mm, segments 170-215. Colour violet blue. Clitellum ring shaped between segment XII-XXIV. Gizzard large in VI segment.

Distribution : India : West Bengal; Meghalaya; Tamil Nadu.

17. *Perionyx excavatus* Perrier, 1872

1872. *Perionyx excavatus* Perrier, *Nouv. Arch. Mus. Hist nat. Paris*, **8** : 126.

Material examined : 60 ex., Reg. No. An 3348/1, Poolachi, Tamil Nadu; 22.11.2004; coll. A. Misra, and party.

Diagnostic characters : Length 35-125 mm, diameter 3-7 mm, segments 79-121; clitellum Clitellum annular, XIII-XVII. Spermathecal pores 2 pairs, near mid-ventral line, in 7/8, 8/9; male pores in small transverse protuberances within a single male field, each protuberance with a slightly irregular transverse groove containing apertures of 4-9 perisetal follicles, on XVIII; female pore single, mid-ventral, on XIV; genital marking absent; nephridiopores inconspicuous, in one rather irregular longitudinal rank on each side near m L.

Distribution : India : Andaman Islands; Arunachal Pradesh; Assam; Bihar (present record); Himachal Pradesh; Maharashtra; Manipur; Meghalaya; Orissa; Sikkim; Tamil Nadu; Tripura; Uttar Pradesh; West Bengal.

Elsewhere : Madagascar and its adjacent Islands; Sri Lanka, Myanmar, Thailand, Vietnam, Malay Peninsula, Indonesia, Philippines, Taiwan; West Indies.

Remarks : This is an endemic species originated from the Himalayas and is widely distributed throughout India.

18. ***Perionyx sansibaricus*** Michaelsen, 1891
1891. *Perionyx sansibaricus* Michaelsen, *Mitt. naturh. Mus. Hamb.*, 9 : 4.

Material examined : 2 ex., Reg. No. an 3347/1, Poolachi, Tamil Nadu; 22.11.2004; coll. A. Misra, and party.

Diagnostic characters : Length 32-65 mm, diameter 2.5-3.5 mm, segments 84-108; clitellum annular, XIII-XVII; male pores usually pre-setal, near mid-ventral line, in a slightly depressed transverse male field; spermathecal pores paired, near mid-ventral line, in 6/7/8/9; genital markings absent.

Gizzards slightly developed in VI; intestine begins in XVI; last pair of hearts in XII; spermathecae paired in VII-IX, each with an ental pear-shaped, shortly stalked, multi-occulate diverticuluml nephridia vesiculate.

Distribution : India : Delhi; Gujara; Kerala; Madhya Pradesh; Maharashtra; Orissa; Tamil Nadu; Uttar Pradesh.

Elsewhere : Zanzibar.

Remarks : It is a peregrine species successfully settled in the northern, central, western and southern part of India.

VI. Family OCTOCHAETIDAE

11. Genus ***Dichogaster***

19. ***Dichogaster bolau***

Material examined : 12 ex., Reg. No. An 3348/1, Poolachi, Tamil Nadu; 22.11.2004; coll. A. Misra, and party.

Diagnostic characters : Length 20-40 mm. diameter 1-3 mm. segments 70-90. Genital markings are absent. Male pore paired in seminal grooves on XVIII. Gizzards in V and VII segment.

Distribution : It is found throughout the world.

13. Genus ***Octochaetona***

20. ***Octochaetona beatrix***

Material examined : 12 ex., Reg. No. An 3348/1, Poolachi, Tamil Nadu; 22.11.2004; coll. A. Misra, and party.

Diagnostic characters : Length 40-134 mm. diameter 2.5 mm. segments 133-197. Clitellum on XIII-XXVIII. Gizzards in V and VIII segment. Genital markings absent. Male genital field slightly depressed between XVII-XIX. Gizzards between septa 4/5 and 8/9.

Distribution : It is found throughout the world.

21. ***Octochaetona*** sp.

Material examined : 12 ex., Reg. No. An 3349/1, Vergaliar shoal, Poolachi, Tamil Nadu; 25.11.2004; coll. A. Misra, and party.

Diagnostic characters : Setal arrangement invisible. Male pore in XVIII segment. Tail paddle like, Head consists of step like structures.

22. ***Octochaetona*** sp.

Material examined : 12 ex., Reg. No. an 3349/1, Upper kodair, Mundanthurai zone, Tamil Nadu; 18.11.2004; coll. A. Misra, and party.

Diagnostic characters : Perichaetine setal arrangement. Single female pore in XIV segment. 1 pair male pore in segment XVIII. Large body. 6 accessory pores in segment XIX-XXIV.

23. ***Octochaetona*** sp.

Material examined : 12 ex., Reg. No. An 3349/1, Upper kodair, Mundanthurai zone. Tamil Nadu; 18.11.2004; coll. A. Misra, and party.

Diagnostic characters : Accessory pores in XIV-XVII and XIX-XXIV segment. Male pore one pair leaf like in XVIII segment. Gizzard in 7/8 segment Prostate gland balloon shaped.

12. Genus *Eutyphoeus*24. *Eutyphoeus quadripapillatus*

Material examined : 12 ex., Reg. No. An 3349/1, Upper kodair, Mundanthurai zone. Tamil Nadu; 18.11.2004; coll. A. Misra, and party.

Diagnostic characters : Length 60-110 mm. diameter 3-4 mm. segments 120-168. Clitellum on XIII-XXVII, genital markings paired on XIII-XIV. Male pore on XVII segment.

13. Genus *Wahoscoles*25. *Wahoscolex* sp.

Material examined : 12 ex., Reg. No. An 3349/1, Upper kodair, Mundanthurai, Tamil Nadu; 18.11.2004; coll. A. Misra, and party.

Diagnostic characters : Lumbricine setal arrangement. Female pore in XIV segment. Male pore in XVII segment. Tail comparatively lean and whitish in colour. Prostate gland tubular. Gizzard in 6/7 segment. Accessory gland 2 pairs. Spermatheca 3 pairs in 7/8/9. Salivary gland 2 pairs.

VII. Family ALMIDAE

14. Genus *Glyphidrilus*26. *Glyphidrilus tuberosus*

Material examined : 12 ex., Reg. No. An 3348/1, Poolachi, Tamil Nadu; 22.11.2004; coll. a. Misra, and Party.

Diagnostic characters : Length 60-118 mm, diameter 2.5-3 mm. Segments 221. Clitellum annular, wings XX-XXIV. Genital markings small, circular to elliptical tubercles, Female pores paired on XIV.

Remarks : Endemic in India.

VIII. Family OCNERODRILIDAE

16. Genus *Nematogenia*27. *Nematogenia panamanensis*

Material examined : 2 ex., Reg. No. an 3347/1, Poolachi, Tamil Nadu; 22.11.2004; coll. A. Misra, and party.

Diagnostic characters : Male pores just behind prostatic pores. Male field within 16-18 segments. Female pores nearer XIV segment. Clitellum shaddle shaped, within segments XII-XXIV. Prostate long, ducts slightly narrower.

IX. Family EUDRILIDAE

17. Genus *Udrilus*28. *Udrilus ugeny*

Material examined : 12 ex., Reg. No. An 3348/1, Poolachi, Tamil Nadu; 22.11.2004; coll. A. Misra, and party.

Diagnostic characters : Length 90-135 mm, diameter 5-8 mm. Colour red to dark violet. Gizzard single in V. Setae lumbricine. Spermathecal pores in or posterior to testis segment. Male pores paired, slightly in front of 17/18 segment. Female pores paired, transverse slits on XIV.

Distribution : India : Uttarakhand; Uttar Pradesh; Madhya Pradesh.

Elsewhere : Myanmar

29. *Udrilus* sp.

Material examined : 12 ex., Reg. No. An 3349/1, Yearcaud, Tamil Nadu; 29.11.2004; coll. A. Misra, and party.

Diagnostic characters : Oval shaped clitellar region. Perichaetine setal arrangement. 4 line shaped accessory pores after clitellar region.

SUMMARY

The paper deals with 29 species of earthworms collected by Dr. A. Misra, Ch. Satyanarayana, C.K. Mandal and S. Dhani, 2002 to 2004.

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BRACHYURAN CRABS (CRUSTACEA : DECAPODA : BRACHYURA)

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INTRODUCTION

The state of Tamil Nadu lying between 11°N latitude and 78°E longitude has a geographical area of 1,30,058 sq. km. It is situated at the extreme of South India which is bounded by Andhra Pradesh and Karnataka on the north and Kerala on the west. On its eastern side lies the Bay of Bengal and the Coromandel coast while on the south it is bordered by the Indian Ocean. The southern boundaries of the state is limited by Palk Strait and Gulf of Mannar which separates India from Sri Lanka. Tamil Nadu has 29 districts of which 13 are coastal. The coast line stretches to about 1000 km. The coastal areas of this state is endowed with a variety of aquatic habitats such as estuaries, backwater, coral reefs and mangroves. Besides, there are sandy beaches and rocky substratum too. All these ecosystems are rich in fauna supporting a wide array of life including crustaceans of which brachyurans form the principal component. In the present investigation, brachyuran crabs comprising of 94 species of marine and estuarine crabs belonging to 58 genera and 17 families present in National Zoological Collection of Zoological Survey of India are studied and communicated along with an updated check-list of crabs hitherto known from Tamil Nadu coast.

HISTORICAL REVIEW

The first report of brachyuran crab from the state of Tamil Nadu dates back to 1781 when Fabricius recorded a single species *Cancer*

fornicata (= *Cryptopodia fornicata*) from Tranquebar. Incidentally, this was also the first brachyuran crab reported from the east coast of India. In 1790, Herbst described two species namely, *Cancer echinatus* (= *Parthenope echinatus*) and *Cancer carnifex* (= *Cardisoma carnifex*) from the same place. Later on, in 1793 Fabricius reported further two species namely, *Cancer porcellanus* (= *Philyra globosa*) and *Cancer cylindrus* (= *Ixa cylindrus*) and another species *Cancer setosus* (= *Pseudograpsus setosus*) in 1798 from the same locality. In 1850, Lucas reported a single species, *Ozius frontalis* (= *Epixanthus frontalis*) again from the same location. Mention may be made that H. Milne Edwards (1834) and A. Milne Edwards (1861) recorded "*Egeria arachnoids*, *herbstii*, *indica*" and *Thalamita sima* respectively from the Coromandel coast which includes part of Tamil Nadu. Subsequently, Heller (1862) described three species *Menaethius brevirostris*, *Gelasimus variegatus* and *Thelphusa wüllerstorfi* (= *Spiralothelphusa wüllerstorfi*) from Madras (= Tamil Nadu). Among these, the first two were marine crabs while the last one - a freshwater species. In 1865, he added 18 species to the list from the same area. This included two new taxa, one marine, *Sesarma aspera* (= *Parasesarma plicatum*) and another freshwater, *Thelphusa corrugata* (= *spiralothelphusa wüllerstorfi*). Thurston (1887) reported 10 species of marine crabs from Rameswaram and its adjoining islands. In the same year, Henderson (1887) described a new species of calappid crab, *Matuta miersii* (=

Ashtoret miersii) from Madras and De Man (1887) also recorded two species, *Sesarma aspera* (= *Parasesarma plicatum*) and *S. eyedouxi* (= *Chiromantes eyedouxi*) also from Madras. In 1892, Thallwitz recorded a single species of sesarmine crab, *Sarmatium punctatum* (= *Neosarmatium punctatum*) from Madras. Later on, Henderson (1893) recorded 116 species including five new taxa from the coast of Tamil Nadu. Thurston in 1895, published an exhaustive list of brachyuran crabs occurring in Gulf of Mannar. This list contained 93 species belonging to 57 genera. In their Natural History Notes from H. M. Indian Marine Survey Steamer "Investigator" Alcock and Anderson (1894a,b) recorded 86 species belonging to 54 genera including 6 new taxa from Madras coast. This contained 50 species from Madras, 35 species from Palk Strait and 3 from Pulicat Lake. This was followed by a number of publications by Alcock (1895, 1896, 1899a,b and 1900) in which 92 species under 56 genera and 14 families were recorded. Kemp (1919a,b) recorded 6 species including two new taxa, namely, *Scopimera pilula* and *S. proxima* from this coast. Gravely (1927, 1941) published a comprehensive account of 56 species and 29 species from Krusadai Island and Madras beach respectively. In 1935, Balss reported three species from Madras coast based on collections deposited in the Madras Museum. This contained a new species, *Medaeus rouxi* (= *Nanopilumnus rouxi*). Premkumar (1964) described a new species of ocypodid crab, *Ocypoda portonovoensis* (= *Ocypode macrocera*) from Vellengirayanpattai, Porto Novo. In 1967, Sankarankutty published a list of 88 species of crabs from Palk Bay and Gulf of Mannar. In this work, one new species and five other species were recorded for the first time from Indian waters which were collected from Palk Bay and Gulf of Mannar. In 1977, Kantha Bai and Rama Rao in their work on common and edible crabs of Madras recorded as many as 39 species belonging to 23 genera. While working on the distribution and zonation of crabs of Pulicat Lake, Joel *et al.* (1986) recorded 26 species belonging to 18 genera. Deb (1989) in her monographic account on the

subfamily Actaeinae (Xanthidae) of India reported 3 species from this coast and described a new species. Subsequently, brachyuran fauna of Parangipettai coast and Gulf of Mannar has been explored by Sethuramalingam and Khan (1991), Jeyabaskaran *et al.* (2000) and Venkatraman *et al.* (2002). Recently, Oswin (1998), Kathiresan (2000) and Ravichandran *et al.* (2001) dealt with the inventory and ecological study of crabs of Muthupet and Pichavaram mangroves. Dev Roy and Nandi (2005) have recently reviewed the reef crabs of Indian coasts and recorded as many as 64 species belonging to 40 genera and 13 families from Tamil Nadu coast.

MATERIAL AND METHODS

The present paper is based on materials which were deposited with the National Zoological Collection (N.Z.C.) of Zoological survey of India collected and deposited by various survey parties over the years. A small recent collection of crabs was, however, made available for study by Dr. J.G. Pattanayak of General Non-Chordata Division. An attempt has been made to provide collection data of each species, such as date of collection, name of collector, sex and number of examples and under distribution, states and the various localities within it have been arranged alphabetically.

The brachyuran taxonomy has undergone a radical change since the time of Alcock. In the present work, the scheme of classification adopted by Bowman and Abele (1982) has been followed for the most part with some modifications in the superfamily Xanthoidea in the light of taxonomic treatment made by Serène (1984) as pointed earlier by Dev Roy and Das (2000). In addition, some expert opinions received from the eminent carcinologists like Holthuis, Guinot and Davies have been incorporated in this work. Each species is provided with diagnosis to facilitate identification. In the diagnosis, telegraphic language has been used mostly. Only important references have been cited in the synonymy. In the present treatment, current revisionary work

on various groups as well as important opinions published by International Commission on Zoological Nomenclature (ICZN) has been consulted. Dichotomous key has been provided to facilitate identification, all keys to the species and higher taxa dealt herein are related to concerned taxa of Tamil Nadu. The family, subfamily, generic and subgeneric descriptions have been made based on Alcock (1895-1900), Banerjee (1960), Barnard (1950), Barnes (1967), Chiong and Ng (1998), Crane (1975), Davie (1994), Galil and Clark (1994), Griffin (1973), Harminto and Ng (1991), Holthuis and Manning (1990), Laurie (1906), McLay (2000), Miers (1886), Sakai (1976), Serène and Soh (1970), Takeda and Miyake (196), Tyndale-Biscoe and George (1962), Wagner (1986) and Wood-Mason (1991). Terminologies adopted in this work are from Dev Roy and Das (2000).

There is no single reference work dealing with a complete list of marine and estuarine brachyuran crabs known from the coast of Tamil Nadu. Most of the informations are scattered, often the same species is recorded under two or three names thereby creating taxonomic confusion. As such an updated check-list of brachyuran crabs (346 species) hitherto recorded from Tamil Nadu coast has been prepared after critical evaluation of various taxa and is presented in Appendix-1 and a separate list of species (134 species) with current and supplanted name in Appendix-2. A list of crabs citing their exact place of occurrence at different maritime areas of the state has been provided in Appendix-3 along with the name of the workers and years of publication. This list also contains four species which are of doubtful occurrence. Besides, another list of crabs (72 species) not reported during last 100 years or so from the state since their description/last record has been given in Appendix-4.

All measurements used in this work are in millimeter. Wherever two or more measurements of a particular crab are given, the first one is always of the male, the second one of female and the third one of ovigerous female. The following abbreviations have been used in the text :

W = Carapace width; F = Front; L = Carapace length; R = Rostrum; P = Propodus length; D = Dactylar length; M = Male; F = female; J = Juvenile.

SYSTEMATIC LIST

(Brachyuran crabs of Tamil Nadu coast present in National Zoological Collections of Zoological Survey of India)

Phylum and Subphylum CRUSTACEA

Pennant, 1777

Class MALACOSTRACA Latreille, 1806

Subclass EUMALACOSTRACA Grobben, 1892

Order DECAPODA Latreille, 1803

Suborder PLEOCYEMATA Burkenroad, 1963

Infraorder BRACHYURA Linnaeus, 1758

Section DROMIACEA De Haan, 1833

Superfamily DROMIOIDEA De Haan, 1833

Family DROMIIDAE De Haan, 1833

1. *Lauridromia dehaani* (Rathbun, 1923)

Section OXYSTOMATA H. Milne Edwards, 1834

Superfamily DORIPPOIDEA MacLeay, 1838

Family DORIPPIDAE MacLeay, 1838

Subfamily DORIPPINAE MacLeay, 1838

2. *Dorippe quadridens* (Fabricius, 1793)

Superfamily LEUCOSIOIDEA Samouelle, 1819

Family CALAPPIDAE De Haan, 1833

Subfamily CALAPPINAE De Haan, 1835

3. *Calappa gallus* (Herbst, 1803)

4. *Calappa hepatica* (Linnaeus, 1758)

5. *Calappa japonica* Ortmann, 1892

6. *Calappa lophos* (Herbst, 1782)

7. *Mursia bicristimana* Alcock and Anderson, 1894

Subfamily MATUTINAE De Haan, 1835

8. *Ashtoret lunaris* (Forskål, 1775)

9. *Matuta victor* (Fabricius, 1781)

Family LEUCOSIIDAE Samouelle, 1819

Subfamily EBALIINAE Stimpson, 1871

10. *Ebalia malefactorix* Kemp, 1915

Subfamily ILLINAE Stimpson, 1871

11. *Arcania erinacea* (Fabricius, 1787)
12. *Arcania quinquespinosa* Alcock and Anderson, 1894

Subfamily LEUCOSIINAE Samouelle, 1819

13. *Philyra globosa* (Fabricius, 1787)
14. *Philyra globulosa* H. Milne Edwards, 1837
15. *Leucosia biannulata* Tyndale-Biscoe and George, 1962
16. *Leucosia haematosticta* Adams and White, 1848
17. *Leucosia obtusifrons* De Haan, 1841
18. *Leucosia phyllochira* Bell, 1855
19. *Leucosia pubescens* Miers, 1877
20. *Leucosia rotundifrons* Chopra, 1933

Section OXYRHYNCHA Latreille, 1803

Superfamily MAJOIDEA Samouelle, 1819

Family MAJIDAE Samouelle, 1819

21. *Doclea ovis* (Fabricius, 1787)
22. *Doclea muricata* (Fabricius, 1787)
23. *Doclea hybrida* (Fabricius, 1798)
24. *Doclea alcocki* Laurie, 1906

Superfamily PARTHENOPOIDEA MacLeay, 1838

Family PARTHENOPIDAE MacLeay, 1838

- Subfamily PARTHENOPINAE MacLeay, 1838
25. *Parthenopinae echinatus* (Herbst, 1796)

Subfamily AETHRINAE Dana, 1851

26. *Cryptopodia patula* Choing and Ng, 1998

Section CANCRIDEA Latreille, 1803

Superfamily CANCROIDEA Latreille, 1803

Family CORYSTIDAE Samouelle, 1819

27. *Jonas* sp.

Section BRACHYRHYNCHA Borradaile, 1907

Superfamily PORTUNOIDEA Rafinesque, 1815

Family PORTUNIDAE Rafinesque, 1815

Subfamily CATOPTRINAE Borradaile, 1903

28. *Carupa tenuipes* Dana, 1851

Subfamily CAPHYRINAE Alcock, 1899

29. *Lissocarcinus polybioides* Adams and White, 1848

Subfamily POLYBIINAE Ortmann, 1893

30. *Parathranites orientalis* Miers, 1886

Subfamily PORTUNINAE Rafinesque, 1815

31. *Scylla serrata* (Forskål)
32. *Portunus gladiator* Fabricius, 1798
33. *Portunus pelagicus* (Linnaeus, 1758)
34. *Portunus pubescens* (Dana, 1852)
35. *Charybdis (Charybdis) callianassa* (Herbst, 1801)
36. *Charybdis (Charybdis) feriatus* (Linnaeus, 1758)
37. *Charybdis (Charybdis) helleri* (A. Milne Edwards, 1867)
38. *Charybdis (Charybdis) lucifer* (Fabricius, 1798)
39. *Charybdis (Charybdis) natator* (Herbst, 1794)
40. *Charybdis (Charybdis) rostrata* (A. Milne Edwards, 1861)
41. *Charybdis (Gonioneptunus) bimaculata* (Miers, 1886)
42. *Thalamita chaptali* (Audouin and Savignyi, 1826)

43. *Thalamita crenata* (Latreille, 1803)

44. *Thalamita prymna* (Herbst, 1803)

Subfamily PODOPHTHALMINAE Miers, 1866

45. *Podophthalmus vigil* (Fabricius, 1798)

Superfamily XANTHOIDEA MacLeay, 1838

Family GONEPLACIDAE MacLeay, 1838

Subfamily CARCINOPLACINAE H. Milne Edwards, 1852

46. *Carcinoplax longipes* (Wood-Mason, 1891)

Family XANTHIDAE MacLeay, 1838

Subfamily CYMOINAE Alcock, 1898

47. *Cymo melanodactylus* De Haan, 1833
48. *Cymo quadrilobatus* Miers, 1884

Subfamily LIOMERINAE Sakai, 1976

49. *Liomera (Bruciana) pediger* (Alcock, 1898)

Subfamily ZOSIMINAE Stimpson, 1907

50. *Atergatis dilatatus* De Haan, 1835
51. *Atergatis integerrimus* (Lamrck, 1801)

52. *Platypodia semigranosa* (Heller, 1861)
Subfamily XANTHINAE MacLeay, 1838
53. *Macromedaeus quinquedentatus* (Krauss, 1843)
54. *Leptodius exaratus* (H. Milne Edwards, 1834)
55. *Leptodius sanguineus* (H. Milne Edwards, 1834)
56. *Demania splendida* Laurie, 1906
57. *Calmania prima* Laurie, 1906
Subfamily ETISINAE Ortmann, 1893
58. *Etisus laevimanus* Randall, 1840
Subfamily CHLORODIINAE Alcock, 1898
59. *Chlorodiella nigra* (Forskål, 1775)
60. *Phymodius unguatus* (H. Milne Edwards, 1834)
Family TRAPEZIIDAE Miers, 1886
Subfamily TRAPEZIINAE Miers, 1886
61. *Trapezia ferruginea* Latreille, 1825
62. *Tetralia glaberrima* (Herbst, 1790)
Family PILUMNIDAE Samouelle, 1819
Subfamily GALENINAE Alcock, 1898
63. *Galene bispinosa* (Herbst, 1783)
Subfamily HALIMEDINAE Alcock, 1898
64. *Halimede ochtodes* (Herbst, 1783)
Subfamily PILUMNINAE Samouelle, 1819
65. *Pilumnus longicornis* Hilgendorf, 1878
66. *Pilumnus minutus* (De Haan, 1835)
67. *Glabropilumnus laevis* (Dana, 1852)
Subfamily RHIZOPINAE Stimpson, 1858
68. *Typhlocarcinus nudus* Stimpson, 1858
69. *Typhlocarcinus villosus* Stimpson, 1858
70. *Benthopanope indica* (De Man, 1888)
71. *Pseudolithochira integra* (Miers, 1884)
Family CARPILIDAE Ortmann, 1893
72. *Carpilius maculatus* (Linnaeus, 1758)
Family ERIPHIIDAE MacLeay, 1838
Subfamily OZIINAE Dana, 1851
73. *Sphaerozius nudus* A. Milne Edwards, 1867
- Subfamily MENIPPINAE Ortmann, 1893
74. *Menippe rumphii* (Fabricius, 1798)
75. *Myomenippe hardwickii* (Gray, 1831)
76. *Globopilumnus actumnoides* (A. Milne Edwards, 1867)
Subfamily ERIPHIINAE MacLeay, 1838
77. *Eriphia scabricula* Dana, 1852
78. *Eriphia sebana* (Shaw and Nodder, 1803)
Superfamily GRAPSIDOIDEA MacLeay, 1838
Family GECARCINIDAE MacLeay, 1838
79. *Cardisoma carnifex* (Herbst, 1794)
Family GRAPSIDAE MacLeay, 1838
Subfamily GRAPSINAE Dana, 1851
80. *Grapsus albolineatus* Lamarck, 1818
81. *Metopograpsus messor* (Forskål, 1775)
Subfamily VARUNINAE H. Milne Edwards, 1853
82. *Varuna litterata* (Fabricius, 1798)
Subfamily SESARMINAE Dana, 1852
83. *Parasesarma plicatum* (Fabricius, 1798)
84. *Neosarmatium meinerti* (De Man, 1888)
85. *Metasesarma obesum* (Dana, 1851)
Superfamily OCYPODOIDEA Rafinesque, 1815
Family OCYPODIDAE Rafinesque, 1815
Subfamily OCYPODINAE Rafinesque, 1815
86. *Ocypode ceratophthalma* (Pallas, 1772)
87. *Ocypode cordimana* Desmarest, 1825
88. *Ocypode macrocera* H. Milne Edwards, 1837
89. *Ocypode platytarsis* H. Milne Edwards, 1852
90. *Uca lactea* (De Haan, 1835)
91. *Uca triangularis* (A. Milne Edwards, 1873)
Subfamily DOTILLINAE Stimpson, 1858
92. *Dotilla intermedia* De Man, 1888
93. *Dotilla myctiroides* H. Milne Edwards, 1852
94. *Scopimera pilula* Kemp, 1919

SYSTEMATIC ACCOUNT

Family DROMIIDAE De Haan, 1833

1833. Dromiacea De Haan, In : Siebold, *Fauna japon. (Crust.)* (1) : ix [corrected to Dromiidae by Ortmann, 1892 : 541, 543. Name No. 356 on Official List, in Opinion 688, *Bull. zool. Nomencl.*, **21**(3) : 16 (1964).
1899. Dromiidae, Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 128.
1993. Dromiidae, McLay, In : A. Crosnier (ed.), *Résultats des Campagnes MUSORSTOM. Vol. 10. Mém. Mus. natn. Hist. nat.*, **156** : 149.
2005. Dromiidae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 368. *Zool. Surv. India*.

Diagnosis : Carapace shape variable, generally subglobular, sometimes flat but commonly ovoid or subcircular, often pentagonal. Lateral borders usually distinct and armed with teeth. Front usually tridentate, middle tooth always on a much lower plane than the others or often absent. Antennal flagella shorter than carapace length. Eye-stalk short, stout. External maxillipeds typically opercular, completely closing the buccal cavity. Chelipeds equal, generally much shorter than the walking legs. An epipod may be present on chelipeds but not on any of the following legs. First two pair of legs generally stout, not much shorter than chelipeds, third pair usually shortest, last two pairs much reduced, prehensile and subdorsal in position. Abdomen of six segments and telson, folded under thorax. Vestiges of uropods usually present on sternal surface of sixth abdominal segment. Genital openings coxal. Sternal grooves of female variable—they may either ending apart or together between bases of chelipeds and second pair of walking legs.

Type genus : *Dromia* Weber, 1795.

Remarks : The family Dromiidae has been revised by McLay (1993) and currently it contains 29 valid genera from the Indo-Pacific and the Atlantic coasts. However, a single genus, namely, *Lauridromia* has been collected from Tamil Nadu coast.

Genus *Lauridromia* McLay, 1993

1993. *Dromia*, Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 136 (in partim).
1903. *Dromidiopsis* Borradaile, *Ann. Mag. nat. Hist.*, ser. 7, **11** : 298 (in partim).
1993. *Lauridromia* McLay, In : A. Crosnier (ed.), *Résultats des Campagnes MUSORSTOM. Vol. 10. Mém. Mus. natn. Hist. nat.*, **156** : 149.
2005. *Lauridromia dehaani*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5** : 369. *Zool. Surv. India*.

Diagnosis : Carapace as broad as or slightly broader than long. Coxae of third maxillipeds closely approximated and inserted under tip of sternum. Cheliped with an epipod, upper border of carpus and propodus armed with 2-4 tubercles. Legs not knobbed or ridged, propodi and dactyli of first two pairs equal in length, inner margin of dactyli typically with 7 or more spines; dactyli of third leg opposed by a single propodal spine, generally two spines on the outer propodal margin; fourth leg shorter than the second, dactyl usually opposed by two propodal spines and with up to three spines on the outer margin but usually a spine on the outer margin of dactyl itself. Uropods well developed, visible externally. Joint between last two abdominal segments wholly or at least partially fused. Sternal grooves of adult females end apart as well developed tubes behind bases of chelipeds.

Type species : *Dromia intermedia* Laurie, 1906, by designation by McLay : 145 (1993).

Remarks : In Tamil Nadu coast, this is represented by a single species, namely, *Lauridromia dehaani*.

1. *Lauridromia dehaani* (Rathbun, 1923)

1899. *Dromia rumphii*, Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 137.
1923. *Dromia dehaani* Rathbun, *Proc. biol. Soc. Wash.*, **36** : 68.
1993. *Lauridromia dehaani* McLay, In : A. Crosnier (ed.), *Résultats des Campagnes MUSORSTOM. Vol. 10. Mém. Mus. natn. Hist. nat.*, **156** : 145, 146.
2005. *Lauridromia dehaani*, Dev Roy and Bhadra,

Zool. Surv. India State Fauna Series 5 : Fauna of Andhra Pradesh : 369, pl. 1, fig. 1.

Material examined : 1(F), Tuticorin, Marine Survey, Reg. No. 1171; 1(M), Madras, Reg. No. 1527; 1M, Near River Bank, Cuddalore, Dist. Cuddalore, 01. 04. 2004, Dr. J.G. Pattanayak, Reg. No. C 5396/2.

Measurement :

W = 52.25 F = 7.0 L = 45.2 R = 3.2
56.4 7.2 49.35 2.95

Diagnosis : Entire body, chelipeds and legs (excepting the finger tips) densely covered with coarse hairs. Carapace broader than long, smooth and markedly convex in both the directions; regions indistinct, only the gastric region feebly indicated. Front tridentate, middle tooth shorter than the laterals placed at a lower plane but prominent. Antero-lateral teeth three, subequal, postero-lateral border strongly converging with a large laterally directed tooth just behind the cervical groove. Chelipeds stout, subequal and massive; all the borders of arm dentate; outer surface of wrist adorned with 2-3 denticles, upper border of palm also bearing same number of denticles; height of palm exceeding its width. Last two pair of legs subequal, their propodi very much reduced than the first and second pairs; dactyli claw-shaped, slightly shorter than their propodi in third and fourth pairs, forming chelae with the opposing single propodal spine in last pair. Both male and female abdomens with a broad convex ridge down the middle line; sixth segment of male abdomen distinctly broader than long. Sternal sulci of female very prominent ending apart behind cheliped bases.

Type locality : Japan (Rathbun, 1923).

Distribution : Indo-West Pacific. India : East coast-Tamil Nadu : Cuddalore (present record), Gulf of Mannar, Parangipettai coast; Andhra Pradesh: Maipadu, Krishnapatnam Port, Visakhapatnam; Orissa : Gopalpur coast. West coast-Kerala : Trivandrum.

Elsewhere : South Africa, Red Sea, Gulf of Aden, Maldives, Pakistan, Hong Kong, China, Japan and Indonesia.

Remarks : There is much confusion regarding the identities of *Dromia dormia* (Linnaeus, 1763) and *D. dehaani* Rathbun, 1923 (= *Lauridromia dehaani* McLay, 1993) both of which are characterized by having a convex carapace, broader than long, with thick tomentum and by the presence of three conspicuous antero-lateral teeth. However, the major differences as pointed out by Rathbun (1923), Lewinsohn (1984) and of late by McLay (1993) are shown in Table-1.

The present collections from Tamil Nadu coast which are deposited in the National Collections of the Zoological Survey of India as *Dromia dormia* belong to *Lauridromia dehaani* as per the diagnostic features given in Table-1.

This crab occurs in both the coasts of India.

Family DORIPPIDAE MacLeay, 1838

- 1838. Dorippina MacLeay, In: Smith, *Illustr. Zool. S. Afr. (Invert.)* : 69 [corrected to Dorippidae by White, 1847 : 53. Name No. 355 on Official List, there attributed to De Haan, 1841, in error (fide Manning and Holthuis, 1981, in *Smithson. Contrib. Zool*, 306 : 281)].
- 1896. Dorippidae, Alcock, *J. Asiat. Soc. Bengal*, 65(2) : 273, 274.
- 1990. Dorippidae, Holthuis and Manning, *Researches on Crustacea, Special No. 3* : 5.
- 2005. Dorippidae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 372. *Zool. Surv. India*.

Diagnosis : Carapace depressed, sub-quadrangular or subcircular, short, leaving the first two or three abdominal segments uncovered, generally visible in dorsal view. Orbits incomplete. Antennules usually too large to fold inside their fossettes. Antennae large. Buccal cavern prolonged to form an efferent branchial canal. First two pair of true legs markedly long and strong, last two pair remarkably short, slender and dorsal in position culminating in hook-like dactyls. Gills less than nine. Male genital openings coxal, female openings sternal or coxal.

Type genus : *Dorippe* Weber, 1795.

Table 1. showing major differences between *Lauridromia dehaani* and *Dromia dormia*

<i>Lauridromia dehaani</i>	<i>Dromia dormia</i>
1. Median rostral tooth shorter than the lateral teeth	1. Median rostral tooth longer than the lateral teeth.
2. Supra-orbital tooth present	2. Supra-orbital tooth absent or indicated just by a little swelling.
3. The three antero-lateral teeth almost of same size	3. The four antero-lateral teeth unequal, first one being much larger.
4. Postero-lateral tooth directed laterally	4. Postero-lateral tooth directed obliquely forward.
5. Dactyli of first two pair of legs about as long as their propodi, upper margin smooth, lower margin armed with 10-14 spinules of about same size lying flat against dactyli	5. Dactyli of first two pair of legs shorter than propodi, upper margin not smooth, lower margin with 4-5 spinules increasing in size distally.
6. Female sternal grooves convergent, running parallel for a short distance until diverging strongly to culminate on large conical tubercles just behind cheliped bases.	6. Female sternal grooves gradually convergent, but diverging slightly near the end, terminating bases of chelipeds, separated by a smooth ridge.
7. The joint between fifth and sixth abdominal segments partially fused in both sexes	7. The joint between fifth and sixth abdominal segments not fused.
8. Dactyli of last leg opposed by a single propodal spine and none on the outer margin.	8. Two unequal propodal spines opposing the dactyl, a small spine present on the outer margin.

Subfamily DORIPPINAE MacLeay, 1838

1838. Dorippina MacLeay, In : Smith, *Illustr. Zool. S. Afr. (Invert.)* : 69.
1896. Dorippinae, Alcock, *J. Asiat. Soc. Bengal*, **65**(2) : 273, 274.
1990. Dorippinae, Holthuis and Manning, *Researches on Crustacea, Special No. 3* : 5.
2005. Dorippinae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 373. *Zool. Surv. India*.

Diagnosis : Third maxillipeds not covering anterior part of buccal cavity, inhalent canals opening in front of chelipeds.

Remarks : The subfamily contains four genera namely, *Dorippe*, *Neodorippe*, *Paradorippe* and *Dorippoides* in Indian waters. Only the first genus has been dealt in this communication.

Genus *Dorippe* Weber, 1795

1763. *Notogastropus* Vosmaer, *Mémoires de mathématique et physique, tirez des registres de l'Académie Royale des Sciences (Paris)*, **4** : 635 [not binomial; name placed on the Official Index of Rejected and Invalid Generic Names in Zoology (Name No. 1668), in opinion 688, *Bull. zool. nomencl.*, **21**(1) : 7 (1964).
1765. *Noto-gastropus* Vosmaer, *Uitgezogte Verhandelingen uit de Nieuwste Werken van de Sociëteiten der Wetenschappen in Europa en van andere Geleerde Mannen*, Amsterdam, **10** : 119 [not binomial].
1795. *Dorippe* Weber, *Nomencl. ent. Syst. Fabr.* : 93.
1894. *Dorripe*, Alcock and Anderson, *J. Asiat. Soc. Bengal*, **63**(2) : 198 [incorrect spelling of *Dorippe* Weber, 1795].

Diagnosis : Carapace as long as broad or slightly broader than long; surface very much

roughened and uneven with deep grooves and sharp tubercles; cervical groove distinct and wide, a short precervical ridge in front of distal part of cervical groove; branchial groove very deep and sharply defined. Protogastric region with tubercle in each half, mesogastric region with two close submedian tubercles, metagastric region low with few short, sharp, parallel, oblique grooves on each side extending posterolaterally; urogastric region with a single tubercle; cardiac region with V- or Y-shaped median ridge; epibranchial region with 1-4 tubercles and a ridge along anterior margin of branchial groove. Front with two triangular submedian teeth, exhalent canal not visible in dorsal view. Inner orbital teeth almost as large as frontal and produced far less forward; outer orbital tooth triangular, slender, pointed and extended little beyond the frontal teeth. Eyes elongate, slender and pointed; cornea ventrolateral. Both chelipeds of females and juvenile males equal; right cheliped stronger in large males. Second and third pair of walking legs long, third pair longest; merus flattened or cylindrical, generally covered with short pubescence of rather stiff hairs, carpus granular on anterior margin and often with few hairs, propodus and dactylus completely naked. Male abdomen with first segment trapezoidal, widening posteriorly; second segment shorter and wider than the first with three teeth or tubercles in transverse row; third somite widest, with transverse row of often three large teeth or tubercles; fourth somite narrower, fifth somite widening posteriorly; sixth segment also narrowing posteriorly; telson triangular with rounded apex. Female abdomen very wide, transverse ridges on second to fifth somites, especially those on third to fifth somites prominent; telson somewhat longer than wide, apex rounded. Sternum finely or roughly granular; in male, all the three sternites exposed, in female only the first two; no median spine on any thoracic sternite of female. First male pleopod short and straight, gradually tapering to single short, slender, blunt corneous apex; basal part of outer margin of pleopod with lobe.

Type species : *Cancer quadridens* Fabricius, 1793, by subsequent selection by Holthuis, 1962: 54, 55; gender : feminine. Name placed on Official List of Generic Names in Zoology, in Opinion 688 by International Commission, 1987 : 83.

Remarks : The genus contains seven species from the Indo-West Pacific region, of which, only one occurs in India.

2. *Dorippe quadridens* (Fabricius, 1793)

1793. *Cancer dorsipes* Linnaeus, *Mus. Lud. Ulr.* : 452.

1793. *Cancer quadridens* Fabricius, *Ent Syst.* II. : 464.

1798. *Dorippe quadridens*, Fabricius, *Ent. Syst. Suppl.* : 361.

1896. *Dorippe dorsipes*, *J. Asiat. Soc. Bengal*, 65(2) : 277.

1967. *Dorippe frascione*, Sankarankutty, *Proc. Symp. Crust., Ernakulum*, 1 : 349.

1976. *Dorippe (Dorippe) frascione*, Sakai, *Crabs of Japan and the Adjacent Seas* : 60, pl. 22, fig. 3.

1990. *Dorippe quadridens*, Holthuis and Manning, *Researches on Crustacea, Special No. 3* : 18, figs. 5-12.

Material examined : 1(M), Fishing Harbour, Nagapattinam, Dist. Nagapattinam, 27. 03. 2004, Dr. J.G. Pattanayak, Reg. No. C 5388/2.

Measurement :

W = 25.1 F = 11.25 L = 25.15

Diagnosis : Carapace almost as long as broad, surface wrinkled and uneven bearing a number of nodular tubercles; regions well outlined by grooves and puckers; protogastric tubercles crater-like, depressed; those on urogastric and branchial lobes smooth and distinct, the two lateral tubercles of the cardiac region well developed; posteriormost tubercle single and the smallest; lateral branchial tubercles sharp and prominent, posterior dorso-branchial tubercles rounded; cardiac ridge Y-shaped. Front less than half of the greatest breadth of carapace, frontal teeth triangular with blunt apices separated from each other by a deep V-shaped incision. Antero-lateral border denticulated between outer orbital tooth and cervical groove. Inner orbital tooth large, curved and serrated

along the lower border; outer orbital tooth long and acute, reaching beyond the front. Chelipeds markedly unequal; in larger chela, palm greatly swollen and much broader than long; outer surface smooth, dactylus much longer about double the upper border of palm; in both the chelipeds, outer surfaces of ischium, arm and wrist studded with spinules and acute granules. Merus of second and third pair of legs flattened, terminal two joints naked; dactylus longer than propodus; merii covered all over with short pubescens. Second and third segment of male abdomen with a transverse row of three tubercles, of which, the median one large and rounded, laterals much smaller, conical in shape; fourth segment with a short tubercle.

Type locality : Tranquebar, Tamil Nadu, India (Fabricius, 1793)

Distribution : Indo-West Pacific. India : East coast–Tamil Nadu : Madras, Nagapattinam (present record), Pudumadam, Tranquebar.

Elsewhere : Tanzania, Mozambique, Red sea, Gulf of Aden, Persian Gulf, Gulf of Oman, Madagascar, Seychelles, Sri Lanka, Malaysia, Singapore, Indonesia, Thailand, Vietnam, Philippines, China, Taiwan and Australia.

Remarks : Carapace and its appendages with the exception of palm and fingers of chelipeds and propodus and dactylus of first and second pair of true legs are thickly covered with short pubescence.

This species is so far recorded only from the east coast.

Family CALAPPIDAE De Haan, 1833

1833. Calappidea De Haan, In : Siebold, *Fauna japon. (Crust.)* (1) : ix, xiii, 67.

(1837), 119, 124 (1841) [corrected to Calappidae by White, 1847 : 44. Name No. 371 on Official List, in Opinion 712, *Bull. zool Nomencl.*, **21**(5) : 341 (1964)].

1896. Calappidae, Alcock, *J. Asiat. Soc. Bengal*, **65**(2) : 136, 137.

1997. Calappidae, Galil, In : A. Crosnier (ed.), *Résultats des Campagnes MUSORSTOM*. Vol. 18. *Mém. Mus. Natn. Hist. nat.*, **176** : 2.

2000. Calappidae, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No.* **185** : 18.

2005. Calappidae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series* **5** : 377. *Zool. Surv. India*.

Diagnosis : Carapace oval or circular in outline. Front almost as broad as orbit. Lateral borders either with a small tooth or a strong spine at the junction of antero-lateral and postero-lateral borders or with a postero-lateral vault-like expansion over the walking legs. Antenna small, antennules folded obliquely. External maxillipeds may or may not close the buccal cavity fully, their palps either concealed in repose or always exposed. Efferent branchial channels together forming a deep channel in the endostome, afferent branchial openings near base of cheliped. Chelipeds massive, greatly enlarged, almost symmetrical in size (assymetrical in the size of fingers); palm enormous, often very prominent. Abdomen consisting of five segments in adult male (third to fifth terga fused together) and of seven separate segments in female and young males respectively. Gills nine on each side. Male genital openings coxal.

Type genus : *Calappa* Weber, 1795

Key to subfamilies of the family CALAPPIDAE

- Merus of external maxilliped not elongate or acute never concealing the flagellum in repose, ambulatory legs gressorial
..... CALAPPINAE

Merus of external maxilliped elongated and pointed at tip, concealing completely the flagellum in repose, ambulatory legs natatorial MATUTINAE

Subfamily CALAPPINAE De Haan, 1833

1833. Calappidea De Haan, In : Siebold, *Fauna japonica (Crust.)* : 67.

2005. Calappinae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5** : 377, 378. *Zool. Surv. India*.

Diagnosis : Same as in key

Key to the genera of the subfamily CALAPPINAE

Carapace with a postero-lateral shield-like expansion or series of broad serrations beneath which ambulatory legs remain hidden in flexion, basal joint of antenna much dilated, no spine at the junction of antero-and posterolateral borders

..... ***Calappa***

Carapace without any trace of a postero-lateral shield-like expansion, basal joint of antenna slender, a strong spine at the junction of antero-and postero-lateral borders.....

Mursia

Genus ***Calappa*** Weber, 1795

1795. *Calappa* Weber, *Nomencl. ent. Syst. Fabr.* : 92

1896. *Calappa*, Alcock, *J. Asiat. Soc. Bengal*, **65**(2) : 139.

1997. *Calappa*, Galil, In : A. Crosnier (ed.), *Résultats des Campagnes MUSORSTOM*, Vol. 18, *Mém. Mus. natn. Hist. nat., Paris*, **176** : 272.

2005. *Calappa*, Dev Roy and Bhadra, *Zool. Surv. India State Fauna Series 5 : Fauna of Andhra Pradesh (Part 5)* : 378.

Diagnosis : Carapace strongly convex, rounded in front, much broadened posteriorly by a pair of clypeiform expansion or wings on each side for concealing the legs. Front small, more or less triangular, projecting slightly or not at all, bilobed. Orbits small, circular; sub-orbital border complete, not notched; inner angle open but filled by stout and expanded basal antenna-joint. No distinct epistome. External maxillipeds leaving between them the exposed anterior prolongation of endopods of first maxillipeds forming the floor of exhalant branchial channels. Chelipeds massive, subequal; merus strongly keeled on its lower margin; palm strongly compressed, upper border forming a high sharply dentate or crenulate crest. Male abdomen made up of five segments, third to fifth somites fused together, that of young male and adult female consisting of seven distinct segments.

Type species : *Cancer granulatus* Linnaeus, 1758, by subsequent designation by Latreille,

1810 : 422; gender: feminine. Name No. 1611 on Official List, in Opinion 712, *Bull. zool. Nomencl.*, **21**(5) : 337 (1964).

Key to species of the genus ***Calappa***

1. Front bifid 2
Front emarginated 3

2. Carapace more or less smooth except a few lumps on anterior half, clypeiform expansions formed of six teeth, posterior border of carapace bounded on either side by an indistinct tooth ***Calappa lophos***

Carapace covered with pustle-like tubercles, clypeiform expansions formed of seven teeth, posterior border of carapace bounded on either side by a prominent tooth

..... ***Calappa japonica***

3. Carapace strongly convex, entire surface covered with large squamiform tubercles, pterygostomian region sparsely hairy
..... ***Calappa gallus***

Carapace evenly convex, surface covered with tubercles and granules in the anterior two-thirds, pterygostomian region densely hairy ***Calappa hepatica***

3. ***Calappa gallus*** (Herbst, 1803)

1803. *Cancer gallus* Herbst, *Versuch. Naturgesch. Krabben Krebse*, **3**(3) : 46, pl. 58, fig. 1.

1898. *Calappa gallus*, Alcock, *J. Asiat. Soc. Bengal*, **65**(2) : 146.

1906. *Calappa gallus* var. *capellonis* Laurie, *Ceylon Pearl Oyster Fisheries, Supplementary Reports*, **5** : 381, pl. 1, fig. 5, pl. 2, fig. 2.

1976. *Calappa gallus*, Sakai, *Crabs of Japan and the Adjacent Seas* : 131, pl. 39, fig. 2.

Material examined: 2(F), Station-3, Marina Beach, Opposite to Presidency College, Chennai, 05.06.1961, V.K. Premkumar, Reg. No. C 5389/2.

Measurement :

W = 41.35 F = 3.5 L = 38.7

Diagnosis : Carapace thick, surface studded with large tubercles on the anterior part

especially in the branchial and gastric regions, posterior part with transverse beaded ridges; antero-lateral margins crenulated; posterior margin finely beaded, without produced into teeth or projections. Clypeiform expansions well-developed with four teeth, third tooth broadest and the largest. Front emarginate, projecting well beyond the orbits. Pterygostomial region glabrous. Chelipeds massive, equal; arm with four prominent lobes distally; outer surface of wrist and palm covered with large bullous tubercles, the latter posteriorly with smaller tubercles; upper border of palm 5-dentate, lower border smooth between two beaded ridges; fingers strongly bent inwards, cutting edges of larger cheliped strongly dentate, both dactylus and propodus armed with large molariform teeth proximally.

Type locality : Philippines, Amboina (Herbst, 1803).

Distribution : Tropical Atlantic and Indo-West Pacific. India : East coast—Tamil Nadu : Madras (= Chennai, present record), Gulf of Mannar. Andamans.

Elsewhere : West Africa between Cape Verde Islands and Senegal to Angola including the offshore islands of Gulf of Guinea and East coast of America from Florida to Brazil, South Africa, Red Sea, Persian Gulf, Sri Lanka and Japan to Sandwich Islands.

Remarks : This species of crab usually occurs in coral reefs at a depth of 3-6 m. in Gulf of Mannar (Jeyabaskaran *et al.*, 2000).

This crab is not yet recorded from the west coast.

4. *Calappa hepatica* (Linnaeus, 1758)

1758. *Cancer hepatica* Linnaeus, *Mus. Lud. Ulr.* : 448 and *Syst. Nat.*, 12th ed., 1(2) : 1048.

1896. *Calappa hepatica*, Alcock, *J. Asiat. Soc. Bengal*, 65(2) : 142.

1976. *Calappa hepatica*, Sakai, *Crabs of Japan and the Adjacent Seas* : 128, pl. 38, figs. 1, 3.

Material examined : 2(F), Station-3, Marina Beach, Opposite to Presidency College,

Chennai, 05.06.1961, V.K. Premkumar, Reg. No. C 5390/2.

Measurement :

$$W = 40.6 \quad F = 3.35 \quad L = 35.3$$

Diagnosis: Carapace broader than long, its length being about 7/8th its width; anterior 2/3rd of its surface covered with low blunt tubercles, posterior 1/3rd with short transverse granules and beaded ridges, antero-lateral margins coarsely dentate. Clypeiform expansions well developed with four teeth, separated from the antero-lateral margin by a distinct sinus, postero-lateral margin with 3-4 indistinct notches from which run beaded ridges; posterior margin beaded and unarmed. Front emarginated, bluntly triangular, not projecting beyond orbits, post-frontal area smooth. Pterygostomial regions densely setose. Chelipeds massive, equal; outer surface of wrist and palm tuberculate, crest of palm crenulate; three rows of transverse tubercles extending from base of wrist-joint—first two running parallel, of which, upper one proceeding towards base of denticle of dactylus and the lower one towards base of molariform tubercle of fixed finger; last one extending up to the tip of fixed finger; dactylus conical and curved, its upper margin crenated, tip chocolate brown in smaller cheliped. Sixth segment of male abdomen squarish.

Type locality : Unknown.

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu: Gulf of Mannar. Islands : Andamans; Lakshadweep : Minicoy; Nicobars.

Elsewhere : East coast of Africa, South Africa, Red Sea, Persian Gulf, Japan and Hawaii to Sandwich Islands.

5. *Calappa japonica* Ortmann, 1892

1892. *Calappa japonica* Ortmann, *Zool. Syst. (Jb.)*, 6(4) : 566, pl. 26, fig. 8.

1894. *Calappa exanthematos* Alcock and Anderson, *J. Asiat. Soc. Bengal*, 63(2) : 177.

1896. *Calappa exanthematos*, *Illustr. Zool. "Investigator" Crust.*, : pl. 15, fig. 1, 1a.

1896. *Calappa exanthematos*, Alcock, *J. Asiat. Soc. Bengal*, 65(2) : 146.

1914. *Calappa japonica*, Parisi, *Atti della Società Italiana de Science Naturali*, **53** : 10, pl. 11 and fig. 1.
1950. *Calappa japonica*, Barnard, *Ann. S. Afr. Mus.*, **38** : 352, figs. 66 n-p.
1976. *Calappa japonica*, Sakai, *Crabs of Japan and the Adjacent Seas* : 133, pl. 40, fig. 2.

Material examined : 1(M), Fishing Harbour, Nagapattinam, Dist. Nagapattinam, 27. 03. 2004, Dr. J.G. Pattanayak, Reg. No. C 5389/2.

Measurement :

W = 72.25 F = 7.6 L = 53.8

Diagnosis : Carapace much broader than long, thick, anterior part of it covered with numerous large, round or oval smooth mamillary tubercles with a red base resembling smallpox pustles and yellow apex. Antero-lateral border smooth bearing some tubercles. Clypeiform expansions ill-developed, consisting of seven tubercles. Posterior border of carapace beaded and bounded on either side by an obtuse teeth. Front narrow, bifid, not projected beyond the orbit. Chelipeds massive; arm bearing four broad blunt teeth, edges finely serrated; outer surface of wrist and palm bearing blunt tubercles similar to those on carapace, upper surface of the later sharply crested with 6-7 denticles, lower border uniformly granular all over; outer surface of dactylus granular, a patch of small hairs on its anterior margin; fingers hooked at tips and crossing each other, their cutting edges strongly dentate; no ridge extended to molariform tubercle of immobile finger, a groove between it and the lower border. Leg joints slender, smooth; dactylus longer than propodus.

Type locality : "Tokaiobai" (= Tokyo Bay), Japan (Ortmann, 1892).

Distribution : Indo-West Pacific. India : East coast-Tamil Nadu: Madras coast, Chennai, Nagapattinam (present record).

Elsewhere : South Africa, Bay of Bengal and Japan.

Remarks : This crab is not yet recorded from the west coast.

6. *Calappa lophos* (Herbst, 1790)

1790. *Calappa lophos* Herbst, *Versuch Naturgesch. Krabben Krebse*, 1(2) : 201, pl. 13, fig. 77.
1896. *Calappa lophos*, Alcock, *J. Asiat. Soc. Bengal*, **65**(2) : 144.
1997. *Calappa lophos*, Galil, In : A. Crosnier (ed.), *Resultats des Campagnes MUSORSTOM*, Vol. 18, *Mem. Mus. natn. Hist. nat.*, Paris, ser., **176** : 302, figs. 16, 17a, 20a, 32, 35c.
2005. *Calappa lophos*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5** : 379, pl. 4, fig. 1. *Zool. Surv. India*.

Material examined : 1(M), 1(F), Station-3, Marina Beach, Opposite to Presidency College, Madras, 05.06.1961, V.K. Premkumar, Reg. No. C 4874/1; 2(F), Station-3, Elliots Beach near Radio Station, Madras, 21.10.1961, P.P., Reg. No. C 4875/1; 1(F), Marina Beach, Opposite to University Building, Madras, 21.09.1961, Reg. No. C 4876/1; 1(F), Triplicane Beach, Madras, 02. 11. 1961, P.P., Reg. No. C 4877/1; 1F, near River Bank, Cuddalore, Dist. Cuddalore, J.G. Pattanayak, Reg. No. C 5388/2.

Measurement :

W = 61.3	F = 5.3	L = 48.0
66.4	3.9	52.7
75.0	5.2	58.95

Diagnosis : Carapace deep, convex, more or less oval in outline, surface smooth, excepting a few blunt tubercles anteriorly and a few scattered fine granules posteriorly; gastric and cardiac regions bounded by deep grooves. Antero-lateral margin crenated, postero-lateral margin bearing four large, marginally beaded lacinated teeth, posterior margin beaded and also with three broad, granular teeth. Front produced a little beyond the orbit and bifid bearing a triangular tubercle on each side, separated by a wide sulcus. Endostomial septum deeply excised anteriorly. Chelipeds massive, subequal; merus with quadrilobate lamina at the far end, the two distal lobes being acuminate; palm compressed, outer surface smooth excepting a few large tubercles beneath the crest, the later consisting of 6-7 large strong teeth, their size increasing distally; on lower

outer border, an uneven granular ridge extending almost parallel to its lower margin from proximal ram-like tooth to base of immobile finger. Merus, carpus and propodus of leg joints broad and smooth; dactylus long, cylindrical, larger than propodus with brownish tips, propodus grooved longitudinally. Male abdomen five - jointed, third to fifth segments fused together.

Type locality : Unknown.

Distribution : Indo-West Pacific. India : East coast-Tamil Nadu: Madras (= Chennai), Gulf of Mannar, Cuddalore (present record); Andhra Pradesh : Chirala, Kakinada, Ongole, Maipadu Visakhapatnam; Orissa : Gopalpur coast; Pondicherry; West Bengal : Hooghly, Sundarbans. West coast-Gujarat: Okha Reef and Pirotan Island; Karnataka : Karwar; Kerala : Travancore coast; Maharashtra : Bombay (= Mumbai), Ratnagiri. Lakshwadweep.

Elsewhere : South Africa, Mozambique, Madagascar, Reunion, Mauritius, Seychelles, Red Sea, Gulf of Oman, Pakistan, Sri Lanka, China, Taiwan, Japan, Singapore, Indonesia, Australia, New Caledonia and Chesterfield Island.

Remarks : This crab occurs extensively in both the coasts of India as well as in Lakshwadweep.

Genus *Mursia* Desmarest, 1823

1823. *Mursia* Desmarest, *Dict. Sci. Nat.*, **28** : 231.
 1896. *Mursia*, Alcock, *J. Asiat Soc. Bengal*, **65**(2) : 149.
 1993. *Mursia*, Galil, In : A. Crosnier (ed.) : Résultats des Campagnes MUSORSTOM, Vol. 10, *Mém. Mus. natn. Hist. nat.*, **156** : 348.

Diagnosis : Carapace transversely oval or subcircular, moderately convex, without lateral wing-like expansions, the evenly arched antero-lateral margin terminating to a large lateral epibranchial spine. Front with a small acuminate tip. Orbits large, oval; lower margin with a deep notch, inner angle open containing the basal antennal joint; antennules obliquely folded. External maxillipeds as in *Calappa*. Chelipeds subequal, wrist beset with 1-3 spines

on lower outer margin, dactylus and fixed finger of larger cheliped knobbed at their bases. Legs large, first two pair as long as the chelipeds. Male abdomen five segmented, 3-5 somites intimately fused, sutures hardly distinguishable, tergum of first somite almost fully concealed in both sexes, that of second somite strongly carinated transversely.

Type species : *Mursia cristiata* H. Milne Edwards, 1837, by subsequent monotypy; gender : feminine.

7. *Mursia bicristimana* Alcock and Anderson, 1894

1894. *Mursia bicristimana* Alcock and Anderson, *J. Asiat. Soc. Bengal*, **63**(2) : 179.
 1896. *Mursia bicristimana*, Alcock and Anderson, *J. Asiat. Soc. Bengal*, **65**(2) : 150.
 1993. *Mursia bicristimana*, Galil, In : A. Crosnier (ed.) : Résultats des Campagnes MUSORSTOM, Vol. 10, *Mém. Mus. natn. Hist. nat.*, **156** : 356, figs. 1f, 3j-k and 5c-d.

Material examined : 1(M), Madras coast, Marine survey, 1893-94, Reg. No. 4542/7.

Measurement :

W = 13.5	F = 2.95	L = 14.5
15.2	2.9	16.1
18.0	3.2	19.5

Diagnosis : Carapace convex, subcircular, longer than broad, surface roughened with close pearl-like granules, besides some large tubercles arranged in seven rows—one centrally and three on each side of it radiating over the branchial regions; gastric and cardiac areas bounded by deep grooves, branchial part inflated. Antero-lateral borders strongly toothed, postero-laterals finely beaded, posterior margins bounded on either side by a denticle. Front trilobed—middle lobe broad. Transverse ridge at lower distal end of arm produced into two spines, of which, outer one much larger, exceeding half the length of lateral epibranchial spine and extending along the palm as a sharp longitudinal crest; upper border of palm 7-crested, outer surface of palm and wrist roughened with granules and tubercles; upper border of dactylus finely

crenated, fingers meeting at tips, their cutting edges armed with broad stout teeth. Leg joints stout, compressed; both the borders of merus, carpus and propodus strongly crenated, their outer surfaces roughened with coarse granules; in first three pair, upper surface of carpus traversed longitudinally by three beaded carina, of which, the middle one produced into a spine. Male abdomen consisting of five segments, third to fifth segments fused intimately; carina of second segment trilobed, sixth segment squarish.

Type locality : Sri Lanka (Alcock and Anderson, 1894).

Distribution : Bay of Bengal. India : East coast-Tamil Nadu : Madras coast (present record). Nicobars.

Elsewhere : Sri Lanka.

Remarks : The species is known so far only from the Bay of Bengal. Therefore, this is the first report of this crab from Indian mainland coasts and that too from Tamil Nadu.

The present specimen was collected from a depth of 33 fathoms (= 60.06 m).

Subfamily MATUTINAE De Haan, 1835

1835. *Matutoidea* De Haan, In : Siebold, *Fauna japon.* (Crust.) (1) : xiii, 119, 126.

2000. *Matutinae*, Dev Roy and Das, *Rec. Zool. Surv. India, Occ. Paper No.* **185** : 19.

Diagnosis : Carapace circular with a stout spine at the junction of antero-lateral and postero-lateral borders. Merus of external maxillipeds elongate with acute tip, concealing the flagellum fully in repose.

Remarks : The subfamily is represented by two genera, both of which can be distinguished by the following key.

Key to genera of the subfamily MATUTINAE

- Mid-palmar ridge granular and parallel to lower margin of fixed finger, dactylar ridge smooth throughout, carpus of last leg bicarinate **Ashtoret**

Mid-palmar ridge smooth and oblique, dactylar ridge strongly milled throughout, carpus of last pair of leg unicarinate

..... **Matuta**

Genus **Ashtoret** Galil and Clark, 1994

1994. *Ashtoret* Galil and Clark, *Zool. Verh., Leiden*, **294** : 4.

2005. *Ashtoret*, Dev Roy and Bhadra, *Zool. Surv. India State Fauna Series*, **5** : *Fauna of Andhra Pradesh (Part 5)* : 381

Diagnosis : Carapace subcircular, strongly convex, bearing tubercles centrally; regions not defined. Front wider than orbit, trilobate, median lobe projecting. Antero-lateral margin arcuate and tuberculate; postero-lateral margin sharply convergent; lateral spines acute. Antenna rudimentary. Orbits obliquely cut, communicating with antennular fossa. Eye-stalk stout and elongate, its lower surface thickly covered with long plumose setae. Pterygostomial region bearing several rows of ellipsoid tubercles serving as stridulatory organ. Third maxilliped elongate, extending almost up to the anterior margin of carapace. Chelipeds subequal; merus short, trigonal, lower margin tuberculate; carpus with inferior angle produced; palm sculptured to its outer surface and about twice its height; upper margin cut into three teeth, diminishing in size distally; mid-palm with a series of tubercles and spines parallel to its lower margin; outer surface of dactylus with a finely milled ridge in male, absent in female. Ambulatory legs with first propodus bearing a triangular teeth on lower margin, penultimate carpus bicarinate, propodus of last pair greatly extended posteriorly. Sternum anteriorly ogival. Male abdomen five segmented, telson 1.5 times as long as wide at base with conspicuously tuberculate carina on third abdominal tergite.

Type species : *Matuta picta* Hess, 1865 : 158; gender : feminine; by designation by Galil and Clark, in *Zool. Verh. Leiden*, **294** : 4 (1994).

Remarks : The genus is represented by two species in Tamil Nadu.

8. *Ashtoret lunaris* (Forskål, 1775)

1775. *Cancer lunaris* Forskål, *Desc. Anim.* : 91 (part).
 1896. *Matuta lunaris*, Alcock, *J. Asiat. Soc. Bengal*, **65**(2) : 158.
 1994. *Ashtoret lunaris*, Galil and Clark, *Zool. Verh., Leiden*, **294** : 5, figs. a-b, pl. 1a-b.
 2005. *Ashtoret lunaris*, Dev Roy and Bhadra, *Zool. Surv. Fauna of Andhra Pradesh, India State Fauna Series*, **5** : 382, pl. 1, fig. 2.

Material examined: 1(F), Station-3, Marina Beach, Opposite to Presidency College, Madras, 05. 06. 1961, V.K. Premkumar, Reg. No. C 4879/1.

Measurement :

$$W = 30.45 \quad F = 7.35 \quad L = 29.8$$

Diagnosis : Carapace covered with minute red dots, all the six tubercles of the dorsal surface prominent. A strong tubercle present on the postero-lateral border little below the lateral epibranchial spine. Front with straight lobes laterally and a slightly emarginated rostrum medially. Mid-palm of chelipeds—a five-lobed ridge, second and fourth lobes enlarged and acute; dactylus convex and smooth.

Type locality : Red Sea (Forskål, 1775)

Distribution: Indo-Pacific. India : East coast Tamil Nadu : Madras (= Chennai); Andhra Pradesh : Kakinada.

Elsewhere : Red Sea, Aden, Malaysia, Singapore, Philippines, Indonesia, New Guinea and Australia.

Genus *Matuta* Weber, 1795

1795. *Matuta* Weber, *Nomencl. ent. Syst. Fabr.* : 92.
 2000. *Matuta*, Dev Roy and Das, *Rec. Zool. Surv. India, Occ. Paper No.* **185** : 19.
 2005. *Matuta*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 383, *Zool. Surv. India*.

Diagnosis : Carapace flattish, subcircular. Front almost as broad as orbit, trilobed, middle one more prominent than others. Postero-lateral borders strongly convergent, generally with a spine at the junction of antero-lateral

and postero-lateral borders. Antenna extremely small, inconspicuous. Antennules folded almost longitudinally. Orbits large, oval. Eye-stalks stout, usually elongate. External maxillipeds elongate, covering the buccal cavity fully; endostomial septum not separated from the efferent canals. Chelipeds massive, equal; stridulatory organ consisting of two elevated obliquely striated areas—proximal one linear, distal one either oval or subcircular on inner surface of upper margin of palm along with a double series of transversely elongated tubercles on the pterygostomial region; palm compressed, outer surface sculptured, upper border cristiform. Legs adapted for swimming and burrowing, propodus and dactylus broadened enormously in first and last pair. Abdomen of adult male consisting of five segments in female and young males; first tergum in both sexes concealed under the carapace completely.

Type species : *Cancer victor* Fabricius 1786, a subjective junior synonym of *Cancer lunaris* Forskål, 1775; by subsequent designation by Latreille, 1810; gender: feminine.

Remarks : The genus is represented by a single species.

9. *Matuta victor* (Fabricius, 1781)

1781. *Cancer victor* Fabricius, *Species Insectorum Exhibentes*, **2** : 502.
 1896. *Matuta victor*, Alcock, *J. Asiat. Soc. Bengal*, **65**(2) : 160.
 1994. *Matuta victor*, Galil and Clark, *Zool. Verh., Leiden*, **294** : 39, figs. 7a-b, pl. 13a-b.
 2005. *Matuta victor*, Dev Roy and Das, *Zool. Surv. India State Fauna Series 5 : Fauna of Andhra Pradesh* (Part 5) : 384, pl. 4, fig. 3.

Material examined : 2(M), 4(F), Madras, 14. 07. 1926, J.J. Asana, Reg. No. 5397/1; 2(M), 2(F), Seashore ca. 2 miles North of Tranquebar, Dist. Tanjore, 03.03.1958, Dr. A.G.K. Menon, Reg. No. 5434/1; 3(M), 2(F), Krusadai Island, Gulf of Mannar, Dr. A.G.K. Menon, Reg. No. C 5435/1; 1(M), Station-3, Marina Beach, Opposite to Presidency College, Madras, 05.06.1961, V.K. Premkumar, Reg. No. C 4879/1; 1(F), Royapuram Beach, Madras, 10.10.1961,

P.P., Reg. No. 5433/1; 1(M), Station-3, Elliots Beach, Madras, near Radio Station, 21.10.1961, P.P., Reg. No. C 4966/1; 7(M), 2(F), Station-3, Triplicane Beach, Madras, 02. 11. 1961, Dr. R.S. Pillai and V.K. Premkumar, Reg. No. 4965/1; 2(M), Station-6, Along the northern shores of Hare Island, about 7 miles South-East of Mandapam Camp, Dist. Ramnad, M.A.S. Menon, Reg. No. C 5436/1; 1(M), Seashore about 3.5 miles from the Biological Station, Porto Novo, 24.01.1957, Reg. No. C 5355/2.

Measurement :

W = 70.95	F = 10.6	L = 44.8
48.15	6.9	28.3

Diagnosis : Carapace sub-circular, little convex, much broader than long, surface finely granular in epibranchial, post-gastric and cardiac regions. Antero-lateral borders with six small tubercles just behind the outer orbital angle followed by three crenular teeth, of which, middle one—the smallest. Postero-lateral borders oblique with a large, granular lateral epibranchial spine on either side; posterior-lateral margins forming a finely beaded, slightly elevated ridge culminating slightly beneath the epibranchial spine. Front bilobed with rounded apices. Chelipeds almost equal and symmetrical; upper margin of palm tridentate, proximal tooth broadest; mid-palm in male consisting of a smooth rounded ridge running to the tip of fixed finger and bearing proximally a granular tubercle, a very conspicuous acute strong spine lying in front of it; this ridge absent in female and instead, five tubercles present, of which, fourth one largest and triungulate; lower proximal angle of palm ended with an acute, prominent spine (often absent in female) or represented by a granular tubercle; in male, a row of tubercles running from proximal angle of lower border of palm ending at base of fixed finger; in female, in addition to these, another row of granules extending from the proximal spine of palm to almost up to the tip of immobile finger running subparallel to its lower margin; dactylus traversed by a strongly milled ridge from base to tip on its outer surface in male but smooth in female.

Type locality : Malabar coast, India (Fabricius, 1781).

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu : Madras, Hare Island (present record), Krusadai Island and Kutikal, Porto Novo (present record), Tranquebar, Tuticorin; Andhra Pradesh: Akkupalli, Kakinada, Maipadu, Nizampatnam, Pukkala Peta, Visakhapatnam; Orissa: Mahanadi Delta; Pondicherry; West Bengal: Gangetic Delta, Sundarbans. West coast - Maharashtra : Ratnagiri; Malabar coast. Andaman Islands : South Andamans.

Elsewhere : Mozambique, Madagascar, Comoros, Tanzania, Somalia, Red Sea, Gulf of Aden, Gulf of Oman, Pakistan, Sri Lanka, Myanmar, Malaysia, Singapore, Thailand, Philippines, Hong Kong, China, Taiwan, Japan, Indonesia, Timor, Australia, Norfolk, New Caledonia, New Hebrides, Ovolan and Fiji.

Remarks : This species occurs extensively in the Indo-Pacific region. It is found in both the coasts of India as well in Andaman Islands.

Family LEUCOSIIDAE Samouelle, 1819

1819. Leucosiadae Samouelle, *Entom. Useful Compend.* : 91 [corrected to Leucosiidae by Miers, 1879 : 671. Name No. 374 on Official List, in Opinion 712, *Bull. zool. Nomencl.*, 21(5) : 341 (1964)].

2005. Leucosiidae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series* 5(Part 5) : 381. *Zool. Surv. India*

Diagnosis : Carapace subcircular, oval or polygonal. Front narrow but much wider than orbit. Eyes very small. Antennules obliquely folded, antennae small often obsolete. Inhalent branchial channels opening at bases of third maxillipeds. Gills less than nine. Chelipeds symmetrical. Abdominal segments seldom separate distinctly, usually third to sixth terga in both sexes intimately fused with or without obliteration of sutures. Male openings sternal.

Type genus : *Leucosia* Weber, 1795.

Key to subfamilies of the family LEUCOSIIDAE

1. Epistome and infra-orbital lobes well-developed EBALIINAE
Epistome reduced, infra-orbital lobes rarely well-developed 2
2. Merus of external maxillipeds exceeds half the length of ischium. Fingers stout, gradually narrowing from base to tip LEUCOSINAE
Merus of external maxillipeds half or less than half the length of ischium. Fingers slender, almost of the same diameter from base to near to its tip ILIINAE

Subfamily EBALIINAE Stimpson, 1871

1871. Ebaliinae Stimpson, *Bull. Mus. Comp. Zool., Harvard*, **2** : 155, 159
1918. Ebaliinae, Ihle, *Siboga-Expeditie Monogr., Leiden*, **39B** : 205.
2005. Ebaliinae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5** (Part 5) : 386, 387. *Zool. Surv. India*.

Diagnosis : Merus of external maxillipeds half or more than half the length of ischium, measured along the inner border. Epistome and infra-orbital lobes well developed. Fingers not much flattened or elongated. No thoracic sinus.

Genus *Ebalia* Leach, 1817

1817. *Ebalia* Leach, *Zool. Miscell.*, **3** : 18 and in 1815-1875, *Malac. Podophth. Brit.*, pl. 25.
1855. *Phlyxia* Bell, *Trans. Linn. Soc. Lond.*, **21** : 303.
1856. *Bellidilia* Kinahan, *J. roy. Dublin Soc.*, **1**(3) : 115, 117, 128.
2005. *Ebalia*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 387. *Zool. Surv. India*.

Diagnosis : Carapace rhomboidal or pentagonal or hexagonal, generally broader than long, regions well defined and tumid, inflated portions nodular or granular, hind margin bilobed or dentiform. Front narrow, subtruncate, usually not much produced. Antennules obliquely or transversely folded.

Antennae minute but distinct. Merus of external maxillipeds triangular, about 3/4th the length of ischium measured along the inner border; exopods not dialated. Chelipeds variable, usually massive. Abdomen with third to fifth segments in male and third to sixth segments in female fused; males usually with a denticle at the base of terminal segment.

Type species : *Ebalia bryerii* Leach, 1817, a subjective junior synonym of *Cancer tumefactus* Montagu, 1808, by subsequent designation by H. Milne Edwards, 1837, in 1836-1844, pl. 24, fig. 3 (as *Ebalia brayerii*); gender : feminine. Name No. 145 on Official List, type species cited there as *Cancer tuberosus* Pennant, 1777, in error (Manning and Holthuis, 1981).

10. *Ebalia malefactrix* Kemp, 1915

1915. *Ebalia malefactrix* Kemp, *Mem. Indian Mus.*, **5** : 209, pl. 12, fig. 1, text-figs. 1a-c.
1990. *Ebalia malefactrix*, Kazmi and Tirmizi, *Crustaceana*, **58**(1) : 22, figs. 3A-H.
1995. *Ebalia malefactrix*, Deb, *Fauna of Chilka Lake, Wetland Ecosystem Series*, **1** : 349. *Zool. Surv. India*

Material examined : 1(M), 2(F), Ennur Backwater near Madras, N. Annandale, 17. 01. 1995, Reg. No. 9136/10.

Measurement :

$$\begin{array}{ccc} W = 4.3 & F = 0.5 & L = 4.3 \\ & 4.7 & 0.5 & 4.6 \end{array}$$

Diagnosis : Carapace almost as broad as long or slightly broader than long, strongly convex in both the directions, subcircular to polygonal in outline. Front almost straight, slightly emarginated at the middle and finely beaded. A large antero-lateral facet present on the side walls of hepatic region on each side of carapace. Three broad ridges on carapace densely covered with close-set tubercles unite forming a "broad-arrow" with the point directed forwards, the arrow extending backwards in the mid-dorsal line terminate on the intestinal region, the lateral ridges running obliquely outwards and backwards on the branchial region end to a sharp prominence in the anterior third of very

long, convergent and beaded postero-lateral margin. Chelipeds longer than carapace in male, shorter in female ; merus cylindrical, covered with vesiculous granules ventrally; outer surface of wrist, palm and fingers finely granulate, inner surface with numerous scattered granules. Leg joints long, smooth; dactylus longer than propodus. Male abdomen consisting of two parts, bearing a blunt tubercle on its penultimate segment. Margin of thoracic sternum festooned with small granules.

Type locality : Chilka Lake, Orissa, India (Kemp. 1915).

Distribution : Indian Ocean. India : East coast –Tamil Nadu: Ennur Backwater; Orissa : Chilka Lake; West Coast–Kerala : Cochin Backwater.

Elsewhere : Pakistan, Malaysia and Singapore.

Remarks : The following points are noted during our present investigation :

1. Ridges of carapace are more strongly pronounced in smaller specimens.
2. The tubercles on ridges are much larger, more densely and closely set in smaller specimens than their larger counterparts.
3. In chelipeds, inner border of merus is crenated from its proximal to distal part, two longitudinal granular line has been seen to run parallel on the outer surface of wrist; upper border of palm with a fine granular line; ventrally wrist, palm and fingers are covered with large, vesiculous granules; upper margin of dactylus and lower margin of fixed finger are finely crenated; fingers broad, leaving a little gap when closed and both the fingers are grooved longitudinally.

The width and length of the single ovigerous female were 5.2 mm respectively.

This crab occurs in both the coasts of India.

Subfamily ILIINAE Stimpson, 1871

1871. Iliinae Stimpson, *Bull. Mus. comp. Zool., Harvard*, 2 : 155.
1896. Iliinae, Alcock, *J. Asiat. Soc. Bengal*, 65(2) : 166.

1918. Iliinae, Ihle, *Siboga-Expedition Monogr., Leiden*, 39B : 205.

2005. Iliinae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5 (Part 5) : 388, Zool. Surv. India.

Diagnosis : Merus of external maxillipeds half or less than half the length of ischium, if measured along the inner border. Epistome reduced, infra-orbital lobe rarely well-developed. Fingers slender, almost of the same diameter from base to tip.

Genus *Arcania* Leach, 1817

1817. *Arcania* and *Iphis* Leach, *Zool. Miscell.*, 3 : 19.

1896. *Arcania*, Alcock, *J. Asiat. Soc. Bengal*, 65(2) : 262.

1976. *Arcania*, Sakai, *Crabs of Japan and the Adjacent Seas* : 90.

Diagnosis : Carapace globular, oval or rhomboidal, lateral and posterior margins armed with definitely situated spines or tubercles; surface usually crisply granular, spiny or tubercular, often smooth; regions rarely defined. Front bilobed, prominent. Epistome very small. Buccal cavern elongate-triangular. Merus of third maxilliped distinctly less than half the length of ischium; exopod narrow, its outer margin almost straight. Inner canthus of orbit prolonged into a spine, eyes small. Antennules folded very obliquely. Antennae small, basal joint lodged in the cleft at inner canthus of orbit. Chelipeds very slender, elongate, about twice the length of carapace; fingers and legs also slender. Abdomen with segments 3-5 in male, 3-6 or 4-6 in female fused.

Type species : *Cancer erinaceus* Fabricius, 1787, by monotypy; gender feminine.

Remarks : The genus *Arcania* consists of seven species from India (Dev Roy and Bhadra, 2005), out of which, only two are represented in the present collection.

Key to species of the genus *Arcania*

Fingers longer than palm, carapace covered with microscopic granules, margins of carapace armed with five spines
.....*A. quinquespinosa*

Fingers shorter than palm, carapace densely spiny, 11 spines on margins of carapace...

.....*A. erinaceus*

11. ***Arcania erinacea*** (Fabricius, 1787)

1787. *Cancer erinaceus* Fabricius, *Mantissa Ins.*, 1 : 325.
 1798. *Leucosia erinaceus*, Fabricius, *Ent. Syst. Suppl.* : 352.
 1896. *Arcania erinaceus*, Alcock, *J. Asiat. Soc. Bengal*, 65(2) : 268.
 1933. *Arcania erinaceus*, Chopra, *Rec. Indian Mus.*, 35(1) : 44

Material examined : 1(M), 1(F), Madras, Reg. No. 1503.

Measurement :

W = 13.5	F = 2.95	L = 14.5
15.2	2.9	16.1
18.0	3.2	19.5

Diagnosis : Carapace globose, longer than broad, surface thickly covered with thorns and spines, marginal eleven spines long and more conspicuous than others, major part of the branchials bearing secondary spinelets, ventral part of the body including external maxillipeds also bearing large vesiculus granules and sharp spinules. Front deeply cut into two short, broad, prominent teeth. Chelipeds and leg joints (except dactyli of third and fourth pair) armed with sharp spines, fingers of chelipeds shorter than palm, first pair of leg proportionately longer.

Type locality : "Oceano Indico" (Fabricius, 1787).

Distribution : Indo-Pacific. India : East coast-Tamil Nadu: Madras, Gulf of Mannar; Orissa : Gopalpur coast; Pondicherry; West Bengal : Sandheads.

Elsewhere : Gulf of Mannar off Sri Lanka, Singapore and Japan.

Remarks : The specimens examined agree very well closely with the description of Alcock (1896). Some minor differences were, however, noted by Chopra (1933) while working with the Sandhead specimens. These are : (i) granulation

on the basal half of palm and some of the distal leg joints were obscure. But during our observation, leg joints (except dactyli) of all walking legs and chelipeds (except palm and fingers) have been found to bear sharp granules. In this regard, our study agrees with the observation of Sakai (1976). Mention may be made that in Balss's (1922) specimens, chelipeds and ambulatory legs were just granulated and spinulated (ii) ischium of female external maxillipeds was thickly fringed with hairs about the middle of its surface while it was absent in males. But this is altogether absent in both male and female specimens studied by us.

In India, this species is so far known only from the east coast.

12. ***Arcania gracilis*** Henderson, 1893

1893. *Arcania septemspinosa* var. *gracilis* Henderson, *Trans. Linn. Soc. Lond. Zool.*, ser. 5 : 404.
 1894. *Arcania quinquespinosa* Alcock and Anderson, *J. Asiat. Soc. Bengal*, 63(2) : 206.
 1896. *Arcania quinquespinosa* Alcock and Anderson, *Illustr. Zool. "Investigator" Crust.*, pl. 24, fig. 6.
 1896. *Arcania quinquespinosa* Alcock, *J. Asiat. Soc. Bengal*, 65(2) : 266.
 1989. *Arcania quinquespinosa*, Chen, In : J. Forest (ed.), *Résultats des Campagnes MUSORSTOM*, vol. 5, *Mém. Mus. natn. Hist. nat.*, (A), 144 : 208, pl. 1, fig. 7.
 2008. *Arcania gracilis*, Dev Roy, *Rec. zool. Surv. India, Occ. Paper*, 289 : 30.

Material examined : 1(F), Madras, Marine Survey, Reg. No. C 3544/9; 1(F), Madras, Marine Survey, Reg. No. C 3545/9.

Measurement :

W = 27.45	F = 2.2	L = 12.45

Diagnosis : Carapace broadly conical in outline, surface marked with a large red spot on the cardiac region. Margins of carapace armed with five spines-lateral two largest followed by the intestinal, rest two on posterior border smallest. Front cut into two sharp teeth. Fingers of chelipeds much longer than palm, almost twice the length of palm. Abdomen consisting of five segments in both sexes.

Type locality : Off Madras coast, India (Alcock and Anderson, 1894).

Distribution : Indo-Pacific. India : East coast-Tamil Nadu : Madra, Gulf of Mannar; Andhra Pradesh: Visakhapatnan; Orissa : Ganjam coast. Lakshadweep.

Elsewhere : Red Sea, Persian Gulf, Maldives, Sri Lanka, Arakan coast, Philippines, Vietnam, South China Sea, East China Sea and Japan.

Remarks : Ovigerous females measured during this investigation ranged from 17.9 to 27.45 mm. across their carapace width.

Subfamily LEUCOSIINAE Samouelle, 1819

1819. Leucosiadae Samouelle, *Entom. Useful Compend.* : 91.

1896. Leucosiinae, Alcock, *J. Asiat. Soc. Bengal*, 65(2) : 165, 168.

2001. Leucosiinae, Dev Roy and Bhadra, *Zool. Surv. India Estuarine Ecosystem Series 4 : Fauna of Godavari Estuary* : 37.

Diagnosis : Merus of external maxillipeds more or much more than half the length of ischium measured along its inner border; fingers stout, gradually narrowing from base to tip. Thoracic sinus present.

Key to species of the subfamily LEUCOSIINAE

- Front narrow, snout-like; buccal cavity elongate, exopodite of maxillipeds narrow and elongate; a thoracic sinus present above the bases of chelipeds *Leucosia*
- Front broad and truncated, not snout-like; buccal cavity broad visible dorsally; exopodite of external maxillipeds broad; no thoracic sinus *Philyra*

Genus *Philyra* Leach, 1817

1817. *Philyra* Leach, *Zool. Miscell.*, 3 : 18, 22.

1896. *Philyra*, Alcock, *J. Asiat. Soc. Bengal*, 65(2) : 237.

2005. *Philyra*, Dev Roy and Bhadra, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series 5(Part 5)* : 396, *Zool. Surv India*.

Diagnosis : Carapace circular, depressed, its margin bounded by a continuous beaded line

originating just behind the front; hepatic and branchial regions fairly defined by grooves or creases. Front quadridentate; edges of pterygostomial ridges and tip of buccal cavity projecting beyond the front. Epistome very small. Buccal cavern transversely oblong. Exopod of third maxilliped broader than merus of endopod. Orbits small, sunken. Antennules transversely folded. Chelipeds symmetrical and more massive than legs. True legs small. Male abdomen consisting of 3 or 4 pieces, that of female of four, fusion lines often quite distinct.

Type species : *Cancer globus* Fabricius, 1775, by subsequent designation by H. Milne Edwards, 1837; gender: feminine. Name No. 1642 on Official List, in Opinion 712, *Bull. zool. Nomencl.*, 21(5) : 338 (1964).

Key to species of the genus *Philyra*

- Margin of carapace bounded by a beaded line of uniform sized granules, sixth segment of male abdomen without any enlarged tooth *P. globosa*
- Some of the granules of carapace margins enlarged to form blunt tubercles, sixth segment of male abdomen with an enlarged tubercle *P. globulosa*

13. *Philyra globosa* (Fabricius, 1787)

1787. *Cancer globosus* Fabricius, *Mantissa Ins.*, 1 : 315.

1896. *Philyra globosa*, Alcock, *J. Asiat. Soc. Bengal*, 65(2) : 243.

2005. *Philyra globosa*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 398, pl. 4, fig. 4. *Zool. Surv India*.

Material examined : 1(M), Akkaraighori Sea Beach near Cuddalore, Dist. Cuddalore, 01. 04. 2004, Dr. J.G. Pattanayak, Reg. No. C 5345/2.

Measurement :

$$W = 18.2 \quad F = 2.45 \quad L = 18.4$$

Diagnosis : Carapace subcircular, depressed, almost smooth to the naked eye; the dorsum defined by a continuous beaded line of uniformly sized granules. Third maxilliped glabrous, exopod widely expanded. Epistome projecting beyond the front. Front broad, linear, pubescent and deflexing downwards. Arm of

chelipeds visibly granular, proximally with close-set flattened pearly granules along the upper, outer and lower borders, rest part of chelipeds finely granulate; palm more than double the length of dactylus and almost twice its height; fingers fluted, crossing each other, white at tips, their inner margins evenly denticulate. Sixth segment of male abdomen devoid of any enlarged tooth.

Type locality : "Littora Malabarica" (Fabricius, 1787)

Distribution : Indian Ocean. India : East coast –Tamil Nadu: Apparaighori, Madras (= Chennai), Parangipettai coast; Andhra Pradesh : Pukkala Peta; Orissa : Gopalpur coast; West Bengal : Sandheads. West coast–Kerala : Travancore; Maharashtra : Bombay (= Mumbai). Andamans.

Elsewhere : South Africa, Persian Gulf, Pakistan, Sri. Lanka and Mergui Archipelago.

Remarks : This crab occurs in both the coasts of India including the Andaman Islands.

14. *Philyra globulosa* H. Milne Edwards, 1837

1837. *Philyra globulosa* H. Milne Edwards, *Hist. Nat. Crust.*, 2 : 132 and In : Cuvier's, *Régne Anim. Crust.* : 2, pl. 24, fig. 4.

1896. *Philyra globulosa*, Alcock, *J. Asiat. Soc. Bengal*, 65(2) : 245.

2005. *Philyra globulosa*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 399, pl. 1, fig. 5. Zool. Surv India.

Material examined : 1(M), Akkaraighori Sea Beach near Cuddalore, Dist. Cuddalore, 01. 04. 2004, Dr. J.G. Pattanayak, Reg. No. C 5346/2.

Measurement :

W = 27.1 F = 6.45 L = 26.75

Diagnosis : Carapace circular, thick; surface covered with vesicular granules; margins bounded by an elegantly beaded line, some of the granules enlarged to form blunt, stout conspicuous tubercles at regular intervals visible even with naked eye. Front furry, slightly emarginate at the middle, broadly bilobed upon denudation of hairs. Third maxillipeds densely

pubescent especially on the apical part; exopod oval, foliaceous. Chelipeds broad, massive and subequal; palm shorter than dactyls; cutting edges strongly dentate, movable finger with an enlarged tooth at its middle, fixed finger also with a large tooth nearer to its base. Sixth segment of male abdomen bearing an enlarged tubercle.

Type locality : Indian Ocean (H. Milne Edwards, 1837).

Distribution : Indian Ocean. India : East coast–Tamil Nadu : Apparighori, Point Calimere; Andhra Pradesh: Kakinada, Machilipatnam, Nizampatnam, Orissa : Gopalpur coast; West Bengal : Sandheads. West coast–Kerala : Travancore coast. Andaman Islands.

Elsewhere : South Africa, Persian Gulf, Pakistan, Gulf of Thailand and Indonesia.

Remarks : Like the preceeding species, this crab also occurs in both the coasts of India including the Andaman Islands.

Genus *Leucosia* Weber, 1795

1795. *Leucosia* Weber, *Nomencl. Ent. Syst. Fabr.* : 92.

1896. *Leucosia*, Alcock, *J. Asiat. Soc. Bengal*, 65(2) : 168, 209.

2005. *Leucosia*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 3. Zool. Surv India.

Diagnosis : Carapace thick, subcircular or subrhomboidal or hexagonal in outline; surface smooth, glazed or polished; hepatic region defined. Front narrowed and upturned (snout-like). Thoracic sinus present. True postero-lateral margins ill-defined posteriorly, epibranchial margin greatly thickened, elegantly milled and continued with a finely-beaded crest forming the hind margin. Epistome very small. Buccal cavern elongate-triangular. Merus of external maxillipeds sharply triangular, about as long as ischium; outer margin of exopod nearly straight. Chelipeds symmetrical, rather stout; palm and fingers moving in a horizontal plane. Legs small. Male abdomen generally consisting of 4 pieces, the two large middle pieces formed of fifth terga often fuse into one;

female abdomen also usually of 4 pieces, the large oval third piece formed of fourth terga sometimes fused with the second piece.

Type species : *Cancer craniolaris* Linnaeus, 1758, by designation by Holthuis, 1959; gender : feminine. Name No. 1631 on Official List, in Opinion 712, *Bull. zool. Nomencl.*, **21**(5) : 338 (1964).

Key to species of the genus *Leucosia*

1. Free edge of front projected beyond epistome, palm not foliaceous 2
 Free edge of front not projected beyond epistome, palm foliaceous
 *L. phyllocheira*
2. True postero-lateral margin of carapace beaded as far as the level of base of last pair of legs 3
 True postero-lateral margin of carapace either beaded only up to the level of base of first pair of true legs or not 5
3. Carapace sharply hexagonal, surface smooth, medium sized crab
 *L. pubescence*
 Carapace bluntly hexagonal, surface distinctly punctate, large crab 4
4. Front much broader than long, anterior edge devoid of lobe *L. rotundata*
 Front slightly broader than long, anterior edge trilobed *L. obtusifrons*
5. Lower edge of thoracic sinus defined by pearly granules *L. biannulata*
 Lower edge of thoracic sinus devoid of such granules *L. haematosticta*

15. *Leucosia biannulata* Tyndale-Biscoe, 1962

1874. *Leucosia neocaledonica* A. Milne Edwards, *Nouv. Archs. Mus. Hist. nat.*, Paris, **10** : 40, pl. 2, fig. 1.
1896. *Leucosia longifrons* var. *neocaledonica*, Alcock, *J. Asiat. Soc. Bengal*, **65**(2) : 218.
1962. *Leucosia biannulata* Tyndale-Biscoe and George, *J. Roy. Soc. West. Australia*, **45**(3) : 92 (in appendix), fig. 9.

Material examined : 1(M), 1(F), Palk Straits, Reg No.

Measurement :

W = 14.25	F = 1.0	L = 18.85
13.6	0.95	18.7

Diagnosis : Carapace pentagonal, longer than broad, surface closely punctate, hepatic region conspicuous. Front curved downwards, unidentate and produced much beyond the level of the eyes. Antero-lateral margins granular. Thoracic sinus distinct. Anterior margin of arm of cheliped bearing 14 unequal granules, granules larger proximally, shorter distally, ventral surface smooth except for a cluster of granules proximally; wrist with 2-3 granules along its inner edge; palm carinated at its lower edge. Upper margin of merus of ambulatory legs with 1 dorsal and 2 ventral longitudinal lines of fine granules, both the edges of propodus carinated.

Type locality : Palk Strait, India (Tyndale-Biscoe and George, 1962).

Distribution : Bay of Bengal. India : East coast—Tamil Nadu : Palk Strait.

Remarks : So far known from its type locality only.

16. *Leucosia haematosticta* Adams and White, 1848

1848. *Leucosia haematosticta* Adams and White, *Zool. 'Samarang', Crust.* : 54.
1896. *Leucosia haematosticta*, Alcock, *J. Asiat. Soc. Bengal*, **65**(2) : 229.
1962. *Leucosia haematosticta*, Tyndale-Biscoe, *J. Roy. Soc. West. Australia*, **45**(3) : 80, pl. 1, fig. 7 and pl. 2, fig. 7.

Material examined : 1(M), 1(F), Madras coast, Marine Survey, Reg. No. 9343/9.

Measurement :

W = 11.7	F = 2.25	L = 12.0
9.2	2.0	9.6

Diagnosis : Carapace smooth, hexagonal, urn-shaped, slightly longer than broad. Antero-lateral margins concave, smooth; postero-lateral margins bearing a dense patch of pubescence

at the base of second pair of legs. Thoracic sinus simple. Epibranchial angle of carapace sharply produced into a broad, blunt tooth. Upper and lower borders of arm of chelipeds encrusted proximally with a patch of whitish velvety tomentum; upper border of palm carinated, lower border with a line of strong granules running from proximal part of palm to almost to the tip of fixed finger; both dactylus and fixed finger also carinated at their outer and inner surfaces. Male abdomen consisting of four pieces, third segment with a short but broad prominent tooth followed by short bristles.

Type locality : Eastern Seas (Adams and White, 1848).

Distribution : Indo-Pacific. India : East coast –Tamil Nadu : Madras coast.

Elsewhere : Gulf of Thailand, Japan, Timor and Australia.

Remarks : Alcock (*op. cit.*) stated dactyli of legs of this crab to be as long as their carpus and propodus combined together. But during our present study, dactyli has been noticed to be much shorter than the combined length of carpus and propodus. Further, a patch of spongy pubescens has been observed to be present from the proximal part of palm to almost up to the middle of the fixed finger at the inner surface.

The reddish spots on carapace, so characteristics of this species in live condition has been found to disappear on long preservation.

So far, this crab is known only from the east coast.

17. *Leucosia obtusifrons* De Haan, 1841

1841. *Leucosia obtusifrons* De Haan, In : Siebold, *Fauna japon. (Crust.)* : 133, pl. 33, fig. 2.

1896. *Leucosia obtusifrons*, Alcock, *J. Asiat. Soc. Bengal*, 65(2) : 216.

1976. *Leucosia obtusifrons*, *Crabs of Japan and the Adjacent Seas*: 119, pl. 34, fig. 5, text-figs. 65d, 67a.

Material examined : 3(M), 2(F), Madras coast, Marine Survey, Reg. No. C 4447/7.

Measurement :

W =	21.55	F =	2.8	L =	21.8
	22.3		2.65		20.6

Diagnosis : Carapace bluntly hexagonal, longer than broad, surface quite smooth, gastric and branchial regions minutely punctate. Antero-lateral margins sinuous and concave, postero-lateral margins arched and crenulate, the crenulations extending up to base of last pair of legs. Front prominent, markedly broader than long and feebly trilobed. Chelipeds massive, equal in both sexes; in adult male, chelipeds less than half of again as long as carapace; inner and outer surfaces of arm studded with pearl-like granules; in addition to these, two divergent longitudinal rows of similar tubercles arising from a number of smaller coalescent tubercles at the base of arm and extending for about half of its length; wrist small, globular, smooth bearing a single row of granules at lower border; palm nearly one and a half times as long as high and smooth, lower border bearing three rows of granules, the granules extending up to the fixed finger; fingers shorter than palm bearing short teeth on their entire cutting edges. Meropodites of leg joints subcylindrical, carpus short and inflated, propodus with a sharp dorsal carinae, dactyli narrowly lanceolate and much larger than propodus. Male abdomen four-jointed, third segment with a strong tooth at its middle, second somite very small in female.

Type locality : Japan (De Haan, 1841).

Distribution : Indo-Pacific. India : East coast –Tamil Nadu : Madras coast.

Elsewhere : Sri Lanka and Japan.

Remarks : So far known from the east coast only.

18. *Leucosia phyllocheira* Bell, 1855

1855. *Leucosia phyllochira* Bell, *Trans. Linn. Soc.*, 21 : 291, pl. 31, fig. 5.

1896. *Leucosia phyllochira*, Alcock, *J. Asiat. Soc. Bengal*, 65(2) : 235.

Material examined : 1(J), Palk Strait, "Investigator", Reg. No. 9077/6.

Measurement :

$$W = 3.35 \quad F = 0.35 \quad L = 4.0$$

Diagnosis : Carapace longer than broad, hexagonal, smooth, polished, thoracic sinus ill defined; Antero and postero-lateral margins smooth. Chelipeds shorter than carapace; arm closely nodular, anterior margin bearing 9-10 tubercles and a cluster of tubercles ventrally; palm distinctly broader than long, foliaceous, edges strongly carinated; fingers slightly curved, meeting at tip, cutting edges quite smooth.

Type locality : Borneo (Bell, 1855).

Distribution : Indian Ocean. India : East coast-Tamil Nadu : Palk Strait.

Elsewhere : Borneo.

Remarks : So far known from Tamil Nadu only.

19. *Leucosia pubescens* Miers, 1877

1877. *Leucosia pubescens* Miers, *Trans. Linn. Soc. Lond. Zool.*, ser. 2, 1 : 238.

1896. *Leucosia pubescens*, Alcock, *J. Asiat. Soc. Bengal*, 65(2) : 233.

1957. *Leucosia pubescens*, Chhapgar, *J. Bombay nat. Hist. Soc.*, 54(2) : 406, pl. 2, figs. g-i.

Material examined : 3(M), 2(F), Palk Straits, Marine Survey, Reg. No. 9072/6.

Measurement :

$$\begin{array}{ccc} W = 15.4 & F = 2.1 & L = 15.85 \\ & 14.25 & 1.85 & 17.85 \end{array}$$

Diagnosis : Carapace sharply hexagonal, polished, about as long as its breadth. Front prominent, truncate-triangular, dorsally convex, tridentate about as long as broad with its sides subparallel. Thoracic sinus shallow. Chelipeds equal; arm trigonal bearing large tubercles on the margins, both outer and inner surfaces smooth; wrist also smooth; cutting edges of fingers strongly dentate, palm and wrist inflated. Merus of first three pair of walking legs rounded with a longitudinal row of small granules on the ventral side but flattened in last pair and bearing tubercles ventrally almost at its middle; carpus inflated, non-carinated,

their propodi carinated. Male abdomen three jointed, penultimate segment markedly long, ultimate segment extremely short.

Type locality : Shark's Bay, West Australia (Miers, 1877).

Distribution : Indo-Pacific. India : East coast-Tamil Nadu : Madras coast, Palk Strait; Andamans. West coast-Maharashtra : Bombay.

Elsewhere : Persian Gulf, Sri Lanka, Myanmar, Thailand, Hong Kong and Australia.

Remarks : Alcock (1896) reported a serrated lobule on the ventral part of merus of last pair of leg but only four tubercles were noticed in the specimens that we have examined; in one of the female specimens, it was even smooth. During the course of study, in some specimens inner side of palm has been found to bear a row of large tubercles proximally at the lower end.

This species is recorded from both east and west coasts of India including the Andaman Islands.

20. *Leucosia rotundifrons* Chopra, 1933

1933. *Leucosia rotundifrons* Chopra, *Rec. Indian Mus.*, 35(1) : 34, text-fig. 1, 2.

Material examined : 1(F), Madras coast, Marine Survey, Reg. No. C 1643/1.

Measurement :

$$W = 23.2 \quad F = 3.65 \quad L = 23.9$$

Diagnosis : Carapace thick, roughly hexagonal; surface smooth but hepatic, gastric, and branchial regions distinctly pitted. Antero-lateral margins not straight and beaded throughout, postero-laterals crenated, posterior margins smooth and rounded. Front prominent, broader than long, concave dorsally with a faint groove on either side. Thoracic sinus shallow. In third maxilliped, exognath of merus covered with small pearl-like granules distally. Chelipeds equal; upper and lower border of arm covered with large pearly tubercles proximally, its outer and inner surfaces also bearing longitudinal row of large tubercles decreasing in size distally and

running for about half of its length; wrist short, globular with smooth outer surface; upper border of palm obscurely keeled, both outer and inner surfaces granular; fingers bearing short teeth on their cutting edges, leaving a narrow gap when closed, tips pointed. Merii of legs subcylindrical, carpi short and inflated, propodi with a dorsal carinae, dactylus broadly lanceolate. Abdomen four segmented in both sexes, second segment very small.

Type locality : Laccadive Sea, 11°14'30" N. and 74°57'15", 68-148 fathoms (= 123.76 – 269.36 m) (Chopra, 1933).

Distribution : Indian Ocean. India : East coast –Tamil Nadu : Madras coast; West Bengal : Sandheads, Mouth of River Hooghly. West coast - Lakshwadweep.

Elsewhere : Persian Gulf.

Remarks : This crab occurs in east coast of India and also in Lakshadweep Islands.

Family MAJIDAE Samouelle, 1819

1819. Maiadae Samouelle, *Entom. Useful compend.* : 88 [corrected to Majidae by Neumann, 1878 : 5].
 1895. Madae, Alcock, *J. Asiat. Soc. Bengal*, **64**(2) : 160.
 1976. Majidae, Sakai, *Crabs of Japan and the Adjacent Seas* : 153.
 2005. Majidae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 401. Zool. Surv. India.

Diagnosis : Oxyrhyncha with chelipeds (especially the mobile) rarely much greater than other legs, fingers bent at an angle on the hand. Second article of antenna well developed, generally fused with epistome and often with front. Palp of external maxillipeds articulated either at summit or at antero-external angle of merus. Orbits generally more or less incomplete. Hooked hairs present almost always. Male genital openings coxal.

Remarks : Only one subfamily has been dealt with in this communication.

Subfamily PISINAE Dana, 1851

1851. Pisinae Dana, *Am. J. Sci. Arts.*, ser. 2, **11** : 428.

1896. Pisinae, Alcock, *J. Asiat. Soc. Bengal*, **64**(2) : 160, 165, 200.

2005. Pisinae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 404. Zool. Surv. India

Diagnosis : Basal antennal joint broad. Orbits partly defined. Post-ocular cupped process always present, hollowed for retention of the short eye-stalks.

Remarks : It is represented by a single genus.

Genus *Doclea* Leach, 1815

1815. *Doclea* Leach, *Zool. Miscell.*, **2** : 41.
 1895. *Doclea*, Alcock, *J. Asiat. Soc. Bengal*, **64**(2) : 225.
 1986. *Doclea*, Wagner, *Bull. Mus. natn. Hist. nat. Paris*, ser. 4, **8** : 895.
 2005. *Doclea*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 404. Zool. Surv. India.

Diagnosis : Carapace globular to subpyriform with lateral and often dorsal spines or tubercles. Rostrum bifid. Eyes small. Antenna very short and inconspicuous, basal joint of antenna produced into a sharp tooth at outer apex, flagella almost rudimentary. Outer angle of buccal frame produced into a spine, pterygostomial ridge absent. Chelipeds longer and stouter in male, shorter and slenderer in female. Legs long, almost 1-4 times as long as carapace and tomentose. Abdomen consisting of seven segments in male and of 4-7 in females.

Type species : *Doclea rissonii* Leach, 1815, by monotypy; gender: feminine.

Remarks : The genus contains four species in Tamil Nadu, all of which can be distinguished by the following key.

Key to species of the genus *Doclea*

1. Pterygostomial canal present *D. ovis*
 Pterygostomial canal absent..... 2
2. Carapace subpyriform, rostrum long, all abdominal segments free in both sexes ...
 *D. alcocki*
 Carapace globular, rostrum short, 4-6

abdominal segments fuse together in both sexes 3

3. Tubercles, not spines on carapace
..... *D. hybrida*

Spines, not tubercles on carapace
..... *D. muricata*

21. *Doclea alcocki* Laurie, 1906

1906. *Doclea alcocki* Laurie, *Ceylon Pearl Oyster Fisheries, Supplementary Reports*, 5 : 381, pl. 2, fig. 2.

1986. *Doclea alcocki* Wagner, *Bull. Mus. natn. Hist. nat., Paris*, sér. 4, 8 : 919, figs. 24-26, pl. 7.

Material examined : 1(F), Akkaraighori Sea Beach near Cuddalore, Dist. Cuddalore, 01.04. 2004, Dr. J.G. Pattanayak, Reg No. C 5402/2.

Measurement :

W = 44.5 F = 7.8 L = 46.5

Diagnosis : Carapace subpyriform, thick bearing eight tubercles, of which, four in the gastric region, fifth in urogastric, sixth in cardiac, seventh and eighth in intestinal region. Rostrum long, straight, distinctly bifid, tips pointed. Antero-lateral border of carapace armed with four tubercles, second tubercle slightly larger than the rest three, fourth tubercle broad and blunt.

Type locality : Sri Lanka (Laurie, 1906).

Distribution : Indian Ocean. India : East coast –Tamil Nadu : Gulf of Mannar.

Elsewhere : Sri Lanka, Thailand.

Remarks : Body and legs except finger and dactyli closely covered with very short velvet.

22. *Doclea hybrida* (Fabricius, 1798)

1798. *Inachus hybridus* Fabricius, *Entom. Syst. Suppl.*, 355.

1895. *Doclea hybrida*, Alcock, *J. Asiat. Soc. Bengal*, 64(2) : 231.

1977. *Doclea hybrida*, Kantha Bai and Rama Rao, *Neswl. zool. Surv. India*, 3(6) : 370.

2005. *Doclea hybrida*, Dev Roy and Bhadra, *Zool. Surv. India State Fauna Series 5 : Fauna of Andhra Pradesh (Part 5)* : 406, pl. 1, fig. 7.

Material examined : 1(M), 1(F), Madras, Reg. No. C 4922/1; 1(M), Apparaighori Sea Beach near Cuddalore, Dist. Cuddalore, 01. 04. 2004, Dr. J.G. Pattanayak, Reg. No. C 5347/2.

Measurement :

W = 35.5 F = 4.8 L = 35.0
43.3 5.55 42.5

Diagnosis: Carapace subglobose, depressed, distinctly longer than broad and bearing tubercles instead of spines on the dorsal surface. Antero-lateral border armed with four spines – first two extremely small, tuberculiform; third and fourth larger, last one about twice the third.

Type locality : India (Fabricius, 1798).

Distribution: Indian Ocean. India : East coast –Tamil Nadu, Madras (= Chennai, Tranquebar, Pamban, Rameswaram; Andhra Pradesh : Kakinada, Maipadu. West coast Maharashtra : Ratnagiri.

Elsewhere : Sri Lanka.

Remarks : This crab resembles *D. muricata* very closely. Dev Roy and Bhadra (2005) have recently clarified the differences between *D. hybrida* and *D. muricata*.

This crab occurs in both the coasts of India.

23. *Doclea muricata* (Fabricius, 1787)

1787. *Caneer muricatus*, Fabricius, *Mantissa Ins.*, 1 : 324.

1895. *Doclea muricata*, Alcock, *J. Asiat. Soc. Bengal*, 64(2) : 230.

1986. *Doclea muricata*, Wagner, *Bull. Mus. Natn. Hist. nat. Paris*, ser. 4, 8 : 911, figs. 16-19, pl. 5.

2005. *Doclea muricata*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5 : (Part 5) : 405. *Zool. Surv. India*.

Material examined : 1(M), Madras, Reg. No. C 4922/1; 1(F), Madras, Reg. No. C 4923/1.

Measurement :

W = 30.45 F = 4.5 L = 29.45
28.2 4.25 27.6

Diagnosis : Carapace as long as broad, subglobular and bearing eight spines on its

median line first four in the mesogastric, fifth and sixth on urogastric and cardiac respectively, seventh and eight in the intestinal region, last one largest. Two spines, one behind the other on the branchial region between median and lateral row of spines. Antero-lateral borders also bearing tubercles; the tubercles of antero-lateral series and those on carapace corresponding in number and position with spines of the preceeding species. Chelipeds slender in both sexes; palm larger than dactylus, its height about half of its length.

Type locality: "India Orientali" (Fabricius, 1787).

Distribution: Indian Ocean. India : East coast –Tamil Nadu : Madras (= Chennai), Palk Strait, Tranquebar; Andhra Pradesh : Pukkala Peta; Pondicherry. West coast–Kerala : Cochin Harbour; Maharashtra : Ratnagiri.

Elsewhere : South Africa, Sri Lanka, Myanmar, Malaysia and Indonesia.

Remarks : This crab occurs in both the coasts of India.

24. *Doclea ovis* (Fabricius, 1787)

1787. *Cancer ovis* Fabricius, *Mantissa Ins.* : 355.
 1893. *Doclea muricata*, Henderson, *Trans. Linn. Soc. Lond. Zool.*, Ser. 2, 5 :
 1896. *Doclea ovis*, Alcock, *J. Asiat. Soc. Bengal*, 64(2) : 227.
 1896. *Doclea canalifera*, Alcock, *J. Asiat. Soc. Bengal*, 64(2) : 228.
 1986. *Doclea ovis*, Wagner, *Bull. Mus. Natn. Hist. nat. Paris*, ser. 4, 8 : 897, figs. 1-4, pls. 1, 2.
 2005. *Doclea ovis*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 405, pl. 1, fig. 5. *Zool. Surv. India*.

Material examined : 1(M), Madras coast, 1893-94, Marine survey of India, Reg. No. 4301/7; 1(M), Madras coast, 1893-94, Marine survey of India, Reg. No. 4302/7; 1(F), Madras coast, 1893-94, Marine survey of India, Reg. No. 4303/7; 2(M), Madras coast, 1893-94, Marine survey of India, Reg. No. 4304/7; 2(M), Fishing Harbour, Nagapattinam, Dist. Nagapattinam, 27. 03. 2004, Dr. J.G. Pattanayak, Reg. No. 5383/3.

Measurement :

W = 53.4	F = 7.2	L = 50.7
38.65	4.3	36.9

Diagnosis : Carapace subcircular, deep; entire surface except the fingers of chelipeds and dactyls of leg covered with a thick coat of velvet-like soft fur; on denudation, surface appearing smooth with the exception of a few tubercles down the middle line and also in branchial part; regional boundaries distinctly and deeply grooved; in its median line, carapace bearing a series of seven tubercles—of these, first four in the mesogastric region, fifth in the urogastric, sixth in the metagastric and seventh in the intestinal region. Rostrum slightly broader than long and deeply bifid at tip. Antero-lateral border armed with four tubercles, first one smallest and almost obsolete, second to fourth dentiform, second and third being almost of same size; posterior border of carapace often with a trace of tubercle. Pterygostomian region grooved longitudinally. Chelipeds long, strongly swollen; both outer and inner surfaces of palm and its upper and lower borders studded with microscopic granules, outer surface of dactylus grooved; both the edges of fingers finely serrated. Leg joints thick, rounded; first ambulatory leg being about the length of carapace and rostrum. Abdomen in both sexes consisting of seven distinct segments, second segment of male bearing a blunt tubercle, in female it is slightly broader.

Type locality : "India Orientali" (Fabricius, 1787).

Distribution : Indo-Pacific. India : East coast –Tamil Nadu : Bay of Bengal, possibly Tranquebar, East India, probably Tranquebar, Madras, Gulf of Mannar, Parangipettai coast; Andhra Pradesh: Kakinada, Machilipatnam, Maipadu, Visakhapatnam; Orissa : Devi River, Gopalpur coast; Pondicherry; West Bengal : Hooghly River. West coast–Kerala : Travancore.

Elsewhere : Madagascar, Mauritius, Bangladesh, Myanmar, Malay Peninsula, Gulf of Thailand, Makassar, Vietnam, Hong Kong and China.

Remarks : A strong blunt tubercle (feebly indicated in females) is present on the branchial region behind the last antero-lateral tooth. The fourth antero-lateral tooth is not reduced to a blunt tubercle as reported by. The distance between second and third antero-lateral teeth is much more than the space between third and fourth teeth.

The width and length of the single ovigerous female were 43.8 and 48.5 mm. respectively.

This crab is present in both the coasts of India.

Family PARTHENOPIDAE MacLeay, 1838

1838. Parthenopina MacLeay, In : Smith, *Illustr. Zool. S. Afr. (Invert.)* [corrected to Parthenopidae by Bell, 1844. Name No. 362 on Official List].

2005. Parthenopidae, Dev Roy and Bhadra, *Zool. Surv. India State Fauna Series 5 : Fauna of Andhra Pradesh (Part 5) : 411.*

Diagnosis : Carapace triangular or pentagonal. Eyes retractile in small, circular, well defined orbits. Antenna small, deeply imbedded in between inner angle of the orbit and antennular fossa, basal segment neither fused with epistome nor with the front. Chelipeds not specially mobile, usually much longer and more massive than the ambulatory legs, fingers bent on palm towards the side of fixed finger.

Type genus : *Parthenope* Weber, 1795. Name No. 362 on Official List of Family-Group Names in Zoology, in opinion 696, *Bull. zool. Nomencl.*, **21**(2) : 94 (1964).

Remarks : The family is represented by two subfamilies namely, Parthenopinae and Aethrinae.

Key to subfamilies of the family PARTHENOPIDAE

- Carapace not laterally expanded.....
.....PARTHENOPINAE
- Carapace expanded to form a vault,
concealing the ambulatory legs
.....AETHRINAE

Subfamily PARTHENOPINAE MacLeay, 1838

1838. Parthenopina MacLeay, In : Smith, *Illustr. Zool. S. Afr. (Invert.)* : 55, 58.

1898. Parthenopiae, Alcock, *J. Asiat. Soc. Bengal*, **64**(2) : 258.

2006. Parthenopinae, Dev Roy and Bhadrs, *Fauna of Andhra Pradesh, State Fauna Series, 5*(Part 5) : 411. *Zool. Surv. India.*

Diagnosis: Carapace subpentagonal, ovate-pentagonal, semi-circular or semi-elliptical in outline but commonly equilaterally triangular, surface extremely uneven being covered with granules or tubercles of various sizes. Gastric and cardiac regions marked off from the branchial regions. Rostrum simple or weakly trilobed. Chelipeds enormous in size. Ambulatory legs slender.

Remarks : The subfamily is represented by a single genus.

Genus *Parthenope* Weber, 1795.

1795. *Parthenope* Weber, *Nomencl. ent. Syst. Fabr.* : 92.

1815. *Lambrus* Leach, *Trans. Linn. Soc. Lond.*, **11** : 308.

1871. *Platylambrus* Stimpson, *Bull. Mus. Comp. Zool., Harvard*, **2** : 129.

1875. *Aulacolambrus* Paulson, *Podophthalmata & Edriophthalmata (Crustacea)* : 9.

1875. *Pseudolambrus* Paulson, *Podophthalmata & Edriophthalmata (Crustacea)* : 9.

1878. *Rhinolambrus* A. Milne Edwards, in 1873-1881, *Bull. de la Société Philomathique de Paris, sér.*, **7**, **2** : 148.

1878. *Parthenolambrus* A. Milne Edwards, in 1873-1881, *Bull. de la Société Philomathique de Paris, sér.*, **7**, **2** : 147.

Diagnosis : Carapace broadly triangular or ovate-pentagonal, surface granular, tubercular or spiny. Front pointed, exceedingly short. Eyes contained in distinct orbits. Antennules transversely folded. Antenna small, basal joint extremely short, not reaching up to the front and wedged in between antennular fossa and the large lobe constituting floor of orbit. Epistome narrow or very large. Buccal frame quadrangular, often narrowed. Chelipeds

monstrous in size, ambulatory legs slender. Male abdomen consisting of five or six segments, that of female of seven joints.

Type species : *Cancer longimanus* Linnaeus, 1758, by subsequent designation by Rathbun, 1904 *Proc. biol. Soc. Wash.*, 17 : 170, 171; gender : feminine. Name No. 1581 on Official List, in Opinion 696, *Bull. zool., Nomencl.*, 21(2) : 94 (1964).

Remarks : The genus is represented by a single species.

25. *Parthenope echinatus* (Herbst, 1790)

1790. *Cancer echinatus* Herbst, *Versuch. Naturgesch. Krabben Krebse*, 1(2) : 255, pl. 19, figs. 108, 109.

1798. *Parthenope giraffa* Fabricius, *Ent Syst. Suppl.* : 353.

1886. *Lambrus echinatus* Miers, *Report H.M.S. "Challenger" Brachyura*, 17 : 93.

1898. *Lambrus (Platylambrus) echinatus*, Alcock, *J. Asiat. Soc. Bengal*, 64(2) : 264.

2000. *Parthenope (Platylambrus) echinatus*, Jeyabaskaran, Khan and Ramaiyan, *Brachyuran Crabs of Gulf of Mannar*: 78, pl. 68.

Material examined: 2(M), 6(F), Fishing Harbour, Nagapattinam, Dist. Nagapattinam, 27.03.2004, Dr. J.G. Pattanayak, Reg. No. C 5394/2.

Measurement :

W = 28.85 F = 2.8 L = 21.7 R = 2.5
34.0 2.75 25.95 2.0

Diagnosis : Carapace distinctly broader than long, triangular in form. Surface covered with mushroom-like and paxilliform tubercles, regions well outlined, gastric and cardiac areas elevated and demilitated on each side from the elevated regions by broad deep grooves. Lateral margins armed with ramose spines decreasing in size from back to front. Rostrum broad, concave at base and narrowed at tip. Chelipeds unequal in male, subequal in female, their upper surfaces covered with ramose spines, lower surface with pearly tubercles; palm trigonal, fingers much shorter than palm, strongly curved inwards and slightly downwards, tips blackish, cutting edges strongly

toothed. Merus, carpus and propodus of leg joints bearing numerous spines. Male abdomen consisting of six segments, that of female of seven separate joints.

Type locality : Tranquebar (Herbst, 1790).

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu: Gulf of Mannar; Coromandel; Orissa; Pondicherry.

Elsewhere : Mauritius, Sri Lanka, Singapore, Korea, Australia and as far as Samoa.

Remarks : Both upper and lower border of merus of first and last pair and anterior border of carpus and propodus of legs are elegantly denticulated in the last pair. Carpus and propodus are also denticulated on the lower border. However, dentition is more pronounced in the last pair.

This crab has so far been recorded from the east coast only. The smallest and largest ovigerous female recorded during this study are 32.9 and 33.1 mm respectively across their carapace width.

Subfamily AETHRINAE Dana, 1851

1851. Oethrinae Dana, *Am. J. Sci. Arts.*, ser. 2, 12 : 127.

1976. Aethrinae, Sakai, *Crabs of Japan and the Adjacent Seas* : 288.

2005. Aethrinae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 413. *Zool. Surv. India*.

Diagnosis : Carapace transversely elliptical, pentagonal or octagonal in outline. Lateral margins cristate, somewhat expanded forming a vault to conceal the ambulatory legs. Antennules folded longitudinally.

Genus *Cryptopodia* H. Milne Edwards, 1834

1834. *Cryptopodia* H. Milne Edwards, *Hist. Nat. Crust.*, 1 : 360.

1895. *Cryptopodia*, Alcock, *J. Asiat. Soc. Bengal*, 64(2) : 281.

1998. *Cryptopodia*, Chiong and Ng, *Raffles Bull. Zool.*, 46(1) : 159.

2005. *Cryptopodia*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 413, *Zool. Surv. India*.

Diagnosis : Carapace pentagonal to almost triangular in outline with large lateral expansions concealing the ambulatory legs fully and prolonged beyond the base of abdomen. Postero-lateral margin convex, crenulated; postero-lateral angles truncated; dorsal and ventral surfaces smooth to rough; branchial, cardiac and gastric regions elevated; deep triangular depression at carapace center bounded by granules, ridges of granules also running from mesobranchial to metabranchial regions. Rostrum almost horizontal, spatuliform and very prominent; post-rostral region depressed. Pterygostomial regions smooth, not ridged. Orbits very small, almost circular with a suture on the upper margin; eyes very small, retractile. Basal antennal joint dilated, not reaching the orbital hiatus. Antennular fossae narrow, somewhat oblique. Epistome well developed. Buccal cavern small. External maxillipeds small, outer surface smooth, pitted or granulated, merus distally truncated with the antero-external angle slightly produced. Merus of chelipeds flat with a wing-like lobe on the posterior margin near to its distal extremity; palm elongated, tricarinated, dentated and dilated distally, fingers short. Ambulatory legs slender, decreasing successively, upper and lower margins of fourth, fifth and sixth joints carinated, dactyls almost straight.

Type species : *Cancer fornicata* Fabricius, 1781, by monotypy; gender : feminine.

Remarks : The genus contains four species from India, of which, three species occur in the east coast (Dev Roy and Bhadra, *op. cit.*). However, in this communication only one species has been dealt.

26. *Cryptopodia patula* Choing and Ng, 1998

1998. *Cryptopodia patula*, Choing and Ng, *Raffles Bull. Zool.*, 46(1) : 174, figs., 11-13.

1895. *Cryptopodia fornicata*, Alcock, *J. Asiat. Soc. Bengal*, 64(2) : 282 (in partim).

Material examined: 1(M), 1(F), Palk Strait, Madras coast, G.H. Booley, Marine Survey, Reg. No. 4448/7.

Measurement :

W = 59.0 F = 26.85 L = 27.25 R = 5.6
60.54 5.7 32.3 7.3

Diagnosis : Carapace much broader than long, its length about half of its greatest breadth, pentagonal, smooth; clypeiform expansions large concealing the legs fully and extending posteriorly beyond base of abdomen; regions distinct, branchial, cardiac and gastric regions not much elevated, appearing flattened when viewed frontally; a deep triangular depression at the center of carapace. Antero-lateral borders denticulated, postero-laterals convex, crenulated; posterior borders almost straight, faintly cut into lobes, their edges finely granular, postero-lateral angles truncated. Rostrum conspicuous, triangular, much longer than broad; margins almost straight, finely crenulated and diverging proximally, tips bluntly pointed; post-rostral area depressed. Latero-ventral carapace concavity shallow. Chelipeds massive, unequal and trigonal; merus flattened, leaf-like distally with a wing-like expansion, both its upper and lower edges denticulated; three teeth on the anterior margin much enlarged and subequal; wrist small, also leaf-like and armed with a denticle at the inner end and an obtuse tooth at the outer end; palm long, tricarinated, its outer and inner edges strongly cristiform and denticulated; anterior margin bearing five prominent teeth; fingers short, stout, smooth, strongly incurved, meeting at tips; dactylus bearing 2-3 spines at its proximal end. Leg joints slender, smooth; first pair longest, last smallest, second and third pair being of same size; both upper and lower edges of merii denticulated, those on the first and second pair being strongly lacinate; lower edges of merii with dense vertical hairs; lower margins of carpus also denticulated; dactyli long, cylindrical, tips brownish. Male abdomen five-jointed, third to fifth segments fused together; abdominal segments roughened near the edges, surface of sixth segment bearing large, bulbous tubercles, last segment triangular, deflexed downwards and bearing 3-5 strong tubercles at its center.

Type locality : Persian Gulf (Chiong and Ng, 1998).

Distribution : Indian Ocean. India : East coast –Tamil Nadu, Madras, Palk Strait (present record).

Elsewhere : Persian Gulf, Oman and Sri Lanka.

Remarks : Choing and Ng (*op. cit.*) stated rostrum of this crab to be broader than long in the descriptive part of the species but this is longer than broad in the present specimens. The two species closely resemble each other from which they can be differentiated by the following points

This species is distributed from north-western to southern India, reaching westwards to Gulf of Oman and Arabia. It overlaps the distribution of *C. fornicata sensu stricto* in India and so far, it is not yet known to invade further eastwards in India. Chiong and Ng (*op. cit.*) remarked that the records of *C. fornicata* by Alcock (1895) from India and Stephensen (1946) from the Persian Gulf almost certainly refer to *C. patula*. Examination of specimens from Andamans, Palk Straits and Pedro shoal present in National Zoological Collection of Zoological Survey of India corroborates this view.

The single ovigerous female that we have examined 60.3 mm long and 40.0 mm wide across its carapace.

Family CORYSTIDAE Samouelle, 1819

1819. Corystidae Samouelle, *Entom. Useful Comp.* : 82 [Name No. 357 on Official List, in Opinion 689, *Bull. zool. Nomencl.*, **21**(1) : 20 (1964)].
1893. Corystidae Ortmann, *Zool. Jb.*, **7**(1) : 26, 28.
1930. Euryalidae Rathbun, *Bull. U. S. natn. Mus.*, **152** : 10.
2005. Corystidae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 415. *Zool. Surv. India*.

Diagnosis : Carapace longitudinally oval, convex from side to side, without distinction of regions. Front cut into two or three teeth. Orbits

incomplete, eyes retractile. Antennal flagellum very long and feathery. Antennules folded longitudinally. Epistome absent. Third maxillipeds subpediform, extending almost up to the antennules. Buccal cavern elongate and square-cut with the anterior angles rounded and slightly convergent. Legs either all gressorial or last pair modified for swimming. Sternum and abdomen narrow, the latter consisting of five segments in male, basal segments visible dorsally in both sexes. Male genital openings coxal.

Type genus : *Corystes* Latroille, [1802-1803].

Remarks : The family is represented by a single genus.

Genus *Jonas* Jacquinot, 1853 in Jacquinot and Lucas, 1853

1853. *Jonas* Jacquinot and Lucas, *Crustacés*, In: Dumont d'Urvill's, *Voy. Pole Sud., "Aristrolabe" et la "Zélée"* **3** : 85.
1976. *Jonas*, Sakai, *Crabs of Japan and the Adjacent Seas* : 304.
2000. *Jonas*, Ng, Chan, and Wang, *National Taiwan Museum Special publication Series No. 10* : 166.
2005. *Jonas*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series 5*(Part 5) : 416, *Zool. Surv. India*.

Diagnosis : Carapace thick, ellipsoid and anteriorly broadened; intestinal region distinctly convex. Lateral margins armed with ten acuminate spines. Outer lateral margins of rostrum slope very gently giving it a more triangular and narrower appearance. Orbits very long, cornea swollen and reniform. Basal antennal segment distinctly longer than broad. Epistome distinctly elongate, as long as or longer than broad. Outer distal angle of buccal cavity with a long prominent spine. Merus of external maxilliped broader than ischium. Dactylus of last ten pair of ambulatory legs compressed and paddle-like. Sixth male abdominal segment normal, telson exposed.

Type species : *Jonas macrophthalmus* Hombron and Jacquinot, 1846, by monotypy; gender : masculine.

Remarks : The genus is represented by a single species in Tamil Nadu, the identification of which could be made only up to the generic level.

27. *Jonas* sp.

Material examined : 1(M), Madras, 12.08. 1958.

Measurement :

W = 12.0; F = 2.1; L = 18.95; R = 2.1

Remarks : This is the first report on the occurrence of this genus from the coast of Tamil Nadu. The genus has been recorded earlier from Andhra Pradesh (Dev Roy and Bhadra, *op. cit.*). A detailed paper dealing with its taxonomy will be published elsewhere.

Family PORTUNIDAE Rafinesque, 1815

1815. Portunidia Rafinesque, *Analyse nature* : 97[Corrected to Portunidae by Samouelle, 1819: 93. Name No. 69 on Official List, in Opinion 394, *Bull. zool. Nomencl.* (1956)].

1899. Portunidae, Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 5.

2000. Portunidae, Dev Roy and Das, *Rec. Zool. Surv. India, Occ. Paper No.* **185** : 25.

Diagnosis : Carapace depressed, slightly convex, hexagonal, subquadrate, elongate ovate or subcircular, usually broader than long, rarely areolated; regions generally not well defined. Front broad, horizontal and cut into 2-6 teeth or lobes. Antero-lateral borders cut into 4-9 teeth. Antennal flagella usually long and slender, antennules obliquely or transversely folded. Epistome of fair length antero-posteriorly or linear and sunken, palate well defined anteriorly. Buccal frame quadrate, usually broader than long, merus of external maxillipeds never remarkably long. Chelipeds massive. Last pair of legs usually modified for swimming with at least the last two joints flattened, broadened and paddle-like. Male genital openings coxal.

Type genus : *Portunus* Weber, 1795.

Remarks : The family Portunidae is now divided into six subfamilies. Out of these, five are represented in Tamil Nadu.

**Key to subfamilies of the family
PORTUNIDAE**

1. Eye-stalks markedly long
..... PODOPHTHALMINAE

Eye-stalks normal 2

2. Carapace broad (transversely elliptical) or Carcinoplax-shape) and convex in both the directions, antennal flagellum in orbital hiatus CATOPTRINAE

Carapace broad, not convex in both directions, antennal flagellum included or excluded in orbital hiatus 3

3. Carapace very broad and of typically Portunidae-shape, antero-lateral teeth 4-9, both chelipeds and legs long
..... PORTUNINAE

Carapace relatively narrow, antero-lateral teeth less than nine, both chelipeds and legs short 4

4. Antero-lateral teeth 4 or 5, antennal flagellum excluded from the orbit, last pair of leg either claw-shaped or lanceolated
..... CAPHYRINAE

Antero-lateral teeth 5, antennal flagellum standing in the orbit, last pair of leg lanceolated POLYBIINAE

Subfamily CATOPTRINAE Borradaile, 1903

1903. Catoptrinae Borradaile, In : J. Stanley (ed.), *The Fauna and Geography of the Maldiva and Laccadive Archipelagoes* : 427, 428.

1899a. Lupinae Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 6,8,22.

1976. Catoptrinae, Sakai, *Crabs of Japan and the Adjacent Seas* : 323.

Diagnosis : Carapace transversely elliptical or Carcinoplax-like in shape. Basal antenna joint long and oblique, flagellum lodged in orbital hiatus. Antero-lateral margins entire or toothed. Dactylus of last pair of legs either lanceolated or gressorial.

Remarks : The subfamily Catoptrinae contains three genera namely, *Carupa* Dana, 1851, *Catoptrus* A. Milne Edwards, 1867 and

Libystes A. Milne Edwards, 1867 in the Indo-Pacific, of which, only the first genus has been recorded from Indian waters.

Genus ***Carupa*** Dana, 1851

1851. *Carupa* Dana, In : Silliman, *Am. J. Sci. Arts*, ser. 2, **12** : 129.
 1899. *Carupa*, Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 25, 26.
 1976. *Carupa*, Sakai, *Crabs of Japan and the Adjacent Seas* : 325.

Diagnosis : Carapace transverse, broad, moderately convex, surface smooth and unbroken. Front slightly produced beyond inner supra-orbital angles, about 1/4th of the greatest breadth of carapace and either bilobed or quadrilobed. Antero-lateral margins moderately oblique and arched, subequal in length to postero-lateral margins and cut into seven irregular lobes (including outer orbital angles). Orbit with little or no dorsal inclination, upper border with two notches, lower border crenulate. Antennules transversely folded. Basal antennal joint as long as broad, slender, flagellum of moderate length and lodged in orbital hiatus. Epistome long, buccal cavern squarish, efferent branchial channels well defined. Chelipeds massive, much more robust than legs; arm with spines; one or both angles of wrist spiniform; palm tumid, massive, almost smooth; fingers stout, strongly dentate. Male abdomen four-jointed, first segment almost concealed under carapace, second to fifth terga fused.

Type species : *Carupa tenuipes* Dana, 1852, by subsequent designation by monotypy; gender : feminine.

Remarks : The genus is represented by a single species from India.

28. ***Carupa tenuipes*** Dana, 1851

1851. *Carupa tenuipes* Dana, In: Silliman, *Am. J. Sci. Arts*, sér. 2, **12** : 129.
 1894. *Carupa tenuipes*, Alcock and Anderson, *J. Asiat. Soc. Bengal*, **63**(2) : 201.
 1899. *Carupa laeviuscula*, Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 26.

1976. *Carupa tenuipes*, Sakai, *Crabs of Japan and the Adjacent Seas*: 325, pl. 110, fig. 3.

Material examined : 1(M), Madras coast, A.R. Anderson, 1893-94, Reg. No. 4486/7.

Measurement :

W = 14.2 F = 4.5 L = 7.55

Diagnosis : Carapace transversely oval, smooth (but frosted with minute granules if observed under the binocular) and glabrous. Front cut into four shallow lobes, middle two narrowest, slightly projecting, truncate and notched at the middle. Anterolateral margin seven toothed, of which, sixth tooth the largest and most acute, fifth the smallest. Chelipeds unequal; Anterior border of arm provided with three claw-shaped teeth distally, of which, the middle one strongest and broadest; wrist with a strong tooth at its inner corner and 1-2 spinules at the outer corner; outer surface of wrist roughened with granules; palm smooth, unarmed, crest of its upper inner border very obtuse; fingers stout, crossing each other, their cutting edges strongly dentate; outer surface of dactylus and immovable finger grooved with a longitudinal channel running from finger-joints to almost up to their tips. Leg joints slender, smooth, gradually decreasing in size from first to last, last two joints of last pair flattened for swimming. Abdomen consisting of four pieces in male, first segment narrow, almost concealed under the caapace, second to fifth fused, last segment longer than broad.

Type locality : Paumotu Archipelago? (= Tuamotu archipelago) (Dana, 1851).

Distribution : Indo-West Pacific. India : East coast-Tamil Nadu : Madras (= Chennai). Andaman Islands.

Elsewhere : Madagascar, Mauritius, Seychelles, Red Sea, Japan, Australia, Samoa and Tuamotu Archipelago.

Remarks : This species occurs exclusively in east coast of India and in Andaman Islands.

The present status of this species of crab from Indian waters is not known as no fresh material of this species has been collected after 1894 by Alcock.

Subfamily CAPHYRINAE Miers, 1886

1886. Caphyrinae Miers, *Report H.M.S. "Challenger", Brachyura*, 17 : 170.
1899. Caphyrinae, Alcock, *J. Asiat. Soc. Bengal*, 68(2) : 6, 8, 18.
1976. Caphyrinae, Sakai, *Crabs of Japan and the Adjacent Seas* :

Diagnosis : Carapace not very broad. Antero-lateral margins arcuated and armed with 4-5 teeth. Basal joint of antenna with its antero-external angle lobulate, flagellum excluded from orbit. Legs short, last pair claw-shaped or lanceolated.

Remarks : The subfamily Caphyrinae is represented by four genera in the Indo-Pacific. Among these, only the genus *Lissocarcinus* Adams and White has so far been reported from Indian waters.

Genus *Lissocarcinus* Adams and White, 1848

1848. *Lissocarcinus* Adams and White, 'Samarang', *Crust.* : 45.
1899. *Lissocarcinus*, Alcock, *J. Asiat. Soc. Bengal*, 68(2) : 18.
1976. *Lissocarcinus*, Sakai, *Crabs of Japan and the Adjacent Seas* : 327.

Diagnosis : Carapace either not at all or very little broader than long, depressed, smooth or with a single ridge running obliquely inwards from the last tooth of each antero-lateral border. Front prominent, laminar, projected somewhat beyond the orbits and either subentire or distinctly notched at mid-line, its width varying from half to one-third the greatest width of carapace. Antero-lateral borders slightly oblique, moderately arched and cut into five lobes or teeth (including outer orbital angles). Basal joint of antenna short, its outer angle produced as a lobule, flagellum excluded from the orbit. Two fissures on upper border of orbit either prominent or almost indistinguishable. Antennules folded either transversely or slightly obliquely. Epistome short, almost overlapped by the external maxillipeds. Buccal frame squarish, broader than long, efferent branchial channels well defined. Chelipeds short, subequal, slightly longer than legs; arms short, without any

prominent spine; inner angle of wrist dentiform, palm short, not costated; fingers stout, shorter than palm. Ambulatory legs very short, propodus and dactylus of last pair typically foliaceous for swimming paddles, carpus and merus not dilated. Male abdomen five jointed with 3rd-5th segments coalescent.

Type species : *Lissocarcinus polybioides* Adams and White, 1849, by monotypy; gender : masculine.

Remarks : In all, eight species belonging to this genus are recorded from the Indo-West Pacific, out of which, only four are reported from Indian waters. However, the genus is represented by a single species in the coast of Tamil Nadu.

29. *Lissocarcinus polybioides* Adams and White, 1848

1848. *Lissocarcinus polybioides* Adams and White, 'Samarang', *Crust.* : 46, pl. 11, fig. 5.
1899. *Lissocarcinus polybioides*, Alcock, *J. Asiat. Soc. Bengal*, 68(2) : 19.
1976. *Lissocarcinus polybioides*, Sakai, *Crabs of Japan and the Adjacent Seas* : 327, pl. 111, fig. 5.

Material examined : 1(M), Madras, Reg. No. 3342/3.

Measurement :

$$W = 8.6 \quad F = 3.2 \quad L = 8.3$$

Diagnosis : Carapace slightly broader than long, depressed, posterior part truncated and constricted. Surface of carapace and chelipeds roughened with very granules. Front broadly triangular, medially produced and notched deeply. Antero-lateral border cut into five broad teeth, of which, first one broadest and last one smallest; a low transverse ridge running obliquely inwards from the last tooth on either side of the antero-lateral borders. Pre-orbital tooth distinct. Chelipeds subequal and moderately strong; inner corner of wrist armed with a strong tooth, 2-3 denticles also present on its outer surface; fingers broad, stout, slightly shorter than palm and meeting at tips, their cutting edges toothed strongly. Merus of last pair of leg twice as long as broad, posterior

border of both merus and propodus smooth and unarmed. Penultimate segment of male abdomen longer than broad, curved slightly and then with gradually convergent sides.

Type locality : Eastern Seas (Adams and White, 1848)

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu : Madras (= Chennai); Orissa : Ganjam coast. West coast—Kerala : Malabar. Andaman Islands; Lakshwadweep.

Elsewhere : East coast of Africa, Madagascar, Seychelles, Sri Lanka, Malay Archipelago, Philippines and Australia.

Remarks : This species of crab occurs in both the coasts of India as well in Bay Islands and Lakshwadweep.

The status of this species from Indian waters is not known since no fresh specimen referable to this crab has been collected after Alcock (1899).

Subfamily POLYBIINAE Ortmann, 1893

1893. Polybiidae Ortmann, *Zool. Jb. (Syst.)*, 7(1) : 68 [corrected to Polybiinae by Stephenson, 1972].

1899. Portuninae Alcock, *J. Asiat. Soc. Bengal*, 68(2) : 6, 15.

1960. Macropipinae Stephenson and Campbell, *Aust. J. mar. Freshwat. Res.*, 11(1) : 76, 88.

Diagnosis : Carapace not very broad. Antero-lateral teeth five. Basal antennal joint in orbital hiatus lying almost in longitudinal axis of carapace, flagellum lodged into the orbit. Legs stout and long, last pair lanceolated.

Remarks : The subfamily Polybiinae Ortmann is represented by four genera namely, *Benthochascon* Alcock and Anderson, 1899, *Macropipus* Prestandrea, 1833, *Ovalipes* Rathbun, 1898 and *Parathranites* Miers, 1886 in the Indo-West Pacific. Among these, only the first and last genera have been reported from India. However, it is represented by the single genus, *Parathranites* in Tamil Nadu.

Genus *Parathranites* Miers, 1886

1886. *Lupocyclus* (*Parathranites*) Miers, *Report H. M. S. 'Challenger' Brachyura*, 17 : 186.

1899. *Parathranites*, Alcock, *J. Asiat. Soc. Bengal*, 68(2) : 16.

1939. *Parathranites*, Sakai, *Crabs of Japan and the Adjacent Seas* : 376.

Diagnosis : Carapace hexagonal, convex, moderately transverse; regions well outlined with some definitely placed tubercles, transverse ridges absent. Front quadridentate, projected beyond the inner supra-orbital angles and less than a fourth the greatest breadth of carapace. Antero-lateral margins oblique, not much curved and cut into five teeth (including outer orbital angles). Orbits with 2 fissures in the upper margin; lower margin concave, inner angle tooth-like and prominent. Antennules transversely folded. Basal joint of antenna longer than broad, slender, flagellum long and lodged in orbital hiatus. Epistome short from front to back and encroached upon by the external maxillipeds. Buccal cavern square-cut. Chelipeds moderately massive, shorter than any of the first three pair of ambulatory legs; arm, wrist and palm with spines; palm prismatic, fingers stout and strongly dentate. Legs long, slender; in the last pair, merus and carpus shortened but not broadened, propodus and dactylus foliaceous and typically paddle-like. Male abdomen five-segmented, 3rd–5th terga fused.

Type species : *Lupocyclus* (*Parathranites*) *orientalis* Miers, 1886 by monotypy; gender : masculine.

Remarks : The genus *Parathranites* is represented by three species in the Indo-West Pacific region, of which, only one species as under occurs in India.

30. *Parathranites orientalis* Miers, 1886

1886. *Lupocyclus* (*Parathranites*) *orientalis* Miers, *Report H.M.S. 'Challenger' Brachyura*, 17 : 186, pl. 17, figs. 1a-c.

1894. *Lupocyclus orientalis*, Alcock and Anderson, *J. Asiat. Soc. Bengal*, 63(2) : 201.

1899. *Parathranites orientalis*, Alcock, *J. Asiat. Soc. Bengal*, 68(2) : 17.

1976. *Parathranites orientalis*, Sakai, *Crabs of Japan and the Adjacent Seas* : 332, pl. 113, fig. 3.

Material examined : 1(M), Madras coast, Marine Survey, 1893-94, Reg. No. 4487/7.

Measurement :

$$W = 13.85 \quad F = 3.6 \quad L = 11.15$$

Diagnosis : Carapace hexagonal, markedly convex at the middle, its dorsal and ventral surfaces and chelipeds covered with granules resembling very minute pearls, regions well demarcated, mesobranchial and cardiac areas elevated; the seven tubercles on dorsal surface arranged as follows: one tubercle each on either side of protogastric, one at middle of mesogastric, one on either inner branchial area in a transverse series with the metagastric and two close side by side at middle of cardiac region, those on the cardiac being most prominent. Front cut into four triangular-shaped teeth, middle pair much broader and stouter than the outer pair. Antero-lateral borders composed of five teeth, first tooth (outer orbital angle) triangular-shaped and very conspicuous; last tooth directed outwards at right angles to others, second to fourth very broad and sharply acuminate anteriorly; posterior border almost straight, forming dentiform angles with the postero-lateral borders. Inner angle of lower orbital border bilobed, inner lobe very conspicuous, tooth-like and produced beyond the level of tips of frontal teeth. Chelipeds subequal, arm with a spine at the middle of its anterior border and a spinule near the distal end of the posterior border; inner corner of wrist armed with a very long spine, about as long as the upper border of palm, outer surface with two spinules besides a spine; palm bicarinate, armed with three sharp spines - one at wrist-joint, other two just behind the finger the finger-joint, of which, the one on the inner border much larger than the outer border; fingers slender and crossing each other. First three pair of ambulatory legs long, thin and slender; last pair very much shortened, its merus slender and unarmed; third pair shorter than the preceding two; dactyli long, cylindrical. Male abdomen consisting of five segments, second and third segments carinated strongly, penultimate segment of male abdomen almost as long as broad with its sides almost parallel.

Type locality : Kii [Kei] and Admiralty Islands (Miers, 1886).

Distribution : Indo-West Pacific. India: East coast-Tamil Nadu : Madras coast; Coromandel coast. Andaman Islands. West coast-Malabar.

Elsewhere : Seychelles, Madagascar, Admiralty Island, Japan, Kei Islands, Solomon Bank and Australia.

Remarks : This crab occurs in both the coasts of India including the Andaman islands. This species was reported by Alcock and Anderson from Madras coast in 1894; thereafter, no further collection or recent record of its occurrence in the state is available in the published literature.

Subfamily PORTUNINAE Rafinesque, 1815

1815. Portunidia Rafinesque, *Analyse Nature* : 97.
 1896. Lupinae Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 6, 8, 10, 12.
 2000. Portuninae, Dev Roy and Das, *Rec. zool Surv. India, Occ. Paper No.*, **185** : 25.

Diagnosis : Carapace distinctly broad and of typical Portinid-shape. Front broad. Antero-lateral teeth from 4-9. Orbits of normal size.

Key to genera of the subfamily PORTUNINAE

1. Carapace oval, antero-lateral borders cut into nine teeth 2
 - Carapace hexagonal, antero-lateral borders never cut into nine teeth 3
2. Carapace smooth, without distinction of regions, propodus of chelipeds smooth and inflated **Scylla**
 - Carapace not smooth, regions well defined, propodus of chelipeds prismatic and costate **Portunus**
3. Antero-lateral border of carapace cut into six teeth **Charybdis**
 - Antero-lateral border of carapace cut into five teeth **Thalamita**

Genus **Scylla** De Haan, 1833

1833. *Scylla* De Haan, *Fauna japon. (Crust.)* : 11.
 1899. *Scylla*, Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 27.

1998. *Scylla*, Keenan, Davie and Mann, *Raffles Bull. Zool.*, **46**(1) : 228.

2005. *Scylla*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 419, *Zool. Surv. India*.

Diagnosis: Carapace broad, transverse, moderately convex with an almost even surface. Front cut into four teeth. Antero-lateral borders cut into nine subequal teeth (including the outer orbital tooth), postero-lateral borders shorter than the antero-laterals. Basal joint of antenna short and broad, its antero-external angle produced to form a lobule lying in the orbit, flagellum lodged in orbital hiatus. Antennules transversely folded. Epistome not produced, buccal cavity squarish. Chelipeds massive, wrist and palm smooth, without ridges, palm inflated. Legs stout, in last pair merus and carpus shortened and broadened, propodus and dactylus typically foliaceous for swimming. Male abdomen broadly triangular, five segmented, third to fifth terga fused, first tergum much concealed beneath the carapace.

Type species : *Cancer serratus* Forskål, 1775, by selection by Rathbun, 1922 : 28; gender: feminine. Name No. 833 on Official List, in Opinion 73, *Bull. zool. Nomencl.* (1956).

Remarks : The genus contains four species, of which, three species occur in India (Keenan *et al.*, *op. cit.*), all the species have been recorded from the state. However, only one species has been dealt with in this communication.

31. *Scylla serrata* (Forskål, 1775)

1775. *Cancer serratus* Forskål, *Desc. Anim.* : 90.

1899. *Scylla serrata*, Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 27.

1998. *Scylla serrata*, Keenan, Davie and Mann, *Raffles Bull. Zool.*, **46**(1) : 228, figs. 7A, 8A, 9A, 10.

2005. *Scylla serrata*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 420, *Zool. Surv. India*.

Material examined : 1(M), Madras, Reg. No. C 3929/3.

Measurement :

W = 59.15 F = 19.5 L = 42.1

Diagnosis : Frontal lobes high, bluntly pointed with concave margins. Antero-lateral teeth narrow, outer margin slightly concave. Chelipeds and legs marked with polygonal markings.

Type locality : Jiddah, Red Sea (Forskål, 1775).

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu : Madras (= Chennai), Palk Bay, Pulicat Lake; Andhra Pradesh : East Godavari, Krishna, Bellore, Visakhapatnam, West Godavari; Orissa : Chilka Lake, Gopalpur coast; West Bengal : Sundarbans. West coast—Goa : Zuari estuary; Gujarat : Gulf of Kachchh; Karnataka: Karwar, Kumta, Mangalore; Kerala : Travancore; Maharashtra : Bombay (= Mumbai), Kolak. Andaman Islands : North, Middle and South Andamans; Nicobars : Car Nicobar, Great Nicobar.

Elsewhere : South Africa, Red Sea, Mauritius, Indonesia, Philippines, Taiwan, Japan, Timor, Australia, Samoa, Solomon Island, Fiji and New Caledonia.

Remarks : This is an edible species of high commercial value.

Genus *Portunus* Weber, 1795

1795. *Portunus* Weber, *Nomencl. Ent. Syst.* : 93.

1833. *Neptunus* De Haan, In : Siebold, *Fauna japon, (Crust.)* : 7.

2000. *Portunus*, Dev Roy and Das, *Rec. Zool. Surv India, Occ. Paper No.* **185** : 30.

Diagnosis : Carapace transversely broad, depressed or slightly convex. Front broad and cut into 3-6 teeth. Antero-lateral borders cut into nine regular teeth, last tooth often enlarged. Basal antennal joint short, its antero-external angle produced to form a lobule or spine extending into the orbit, flagellum lodged in the orbital hiatus. Antennules transversely folded. Orbit with two fissures or sutures on the upper border; lower border also with a suture or fissure near the outer angle, inner angle tooth-like and usually very distinct. Epistome short or linear, often prolonged at the middle forming a spine beneath the inter-

antennular septum. Buccal cavity squarish. Chelipeds long, massive, palm prismatic with longitudinal ridges, fingers strongly dentate, almost as long as palm. Legs compressed, in last pair merus and carpus broadened and shortened, propodus and dactylus typically foliaceous and paddle-like for swimming. Male abdomen five-jointed, third to fifth segments fused.

Type species : *Cancer pelagicus* Linnaeus, 1758, by designation by Rathbun, 1926; in opinion 394, International commission on Zoological Nomenclature, 1965; gender : masculine; name no. 986 on Official List.

Remarks : The present collection from Tamil Nadu includes three species, *Portunus gladiator*, *P. pelagicus* and *P. pubescens*, all the species can be distinguished by the following key.

Key to species of the genus *Portunus*

1. Antero-external angle of merus of third maxilliped rounded 2
Antero-external angle of merus of third maxilliped produced in a lateral direction, no spot on dactylus of last pair of leg
..... *P. gladiator*
2. Posterior border of arm of chelipeds armed with a spine at its distal border. Carapace covered with miliary granules and devoid of hairs *P. pelagicus*
- No spine on posterior border of arm of chelipeds. Carapace covered with soft hairs *P. pubescens*

32. *Portunus gladiator* Fabricius, 1798

1798. *Portunus gladiator* Fabricius, *Ent. Syst. Suppl.* : 368.
1899. *Neptunus (Amphitrite) gladiator*, Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 35.
1976. *Portunus (Monomia) gladiator*, Sakai, *Crabs of Japan and the Adjacent Seas* : 341.
2005. *Portunus gladiator*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 425, *Zool. Surv. India*.

Material examined : 1(F), Fishing Harbour, Nagapattinam, Dist. Nagapattinam, 27. 03. 2004, Dr. J.G. Pattanayak, Reg. No. C 5393/2.

Measurement :

$$W = 32.5 \quad F = 5.1 \quad L = 21.65$$

Diagnosis : Carapace flattish, surface marked by two low sub-regional elevations; regions distinct and marked with symmetrically disposed fine granules. Front cut into four acute teeth—middle two much smaller and less conspicuous than the laterals, dentiform process of epistome visible between them. Antero-external angle of merus of third maxilliped strongly produced laterally. Median lobe of the supra-orbital margin strongly produced at its outer angle. Four spines on anterior and two on posterior border of arm of cheliped. Dactylus of last pair of legs without any spot.

Type locality : “Oceano Asiatico” (Fabricius, 1798).

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu : Gulf of Mannar, Madras (= Chennai), Nagapattinam (present record), Parangipettai coast; Andhra Pradesh : Visakhapatnam; Pondicherry; West Bengal : Sundarbans. West coast—Kerala : Travancore coast.

Elsewhere : East coast of Africa, South Africa, Madagascar, Mauritius, Persian Gulf, Sri Lanka, Gulf of Martaban, Mergui Archipelago, Peninsular Malaysia, Singapore, Gulf of Thailand, Philippines, Japan, New Guinea and Australia.

33. *Portunus pelagicus* (Linnaeus, 1758)

1758. *Cancer pelagicus* Linnaeus, *Syst. Nat.*, 10th ed., 1 : 626.
1899. *Neptunus pelagicus*, Alcock, *J. Asiat. Soc. Bengal*, **68** (2) : 34
2000. *Portunus pelagicus*, Dev Roy and Das, *Rec. Zool. Surv. India, Occ. Paper No.* **185** : 31, pl. 1, fig. 1, pl. 9, figs. 3, 4.

Material examined : 1(F), Kundukal Point, R.B.S. Sewell, Reg. No. C 635/2; 1(M), Station—527, Rameswaram Island, ‘Investigator’, 1912-13, Reg. No. C 645/2; 1(M), Tranquebar shore,

Dist. Tanjore, 03. 08. 1958, Dr. A.G.K. Menon, Reg. No. C 5092/2; 3(M), 1(F), Kundukal Point, Rameswaram, 02. 1926, R.B.S. Sewell, Reg. No. C 635/2; 2(M), 1(F), Station-12, Ennur Estuary, 08. 03. 1986, Dr. M.S. Mani, Reg. No. C 5092/2.

Measurement :

W = 111.55 F = 13.85 L = 63.3

Diagnosis : Carapace about twice as broad as long, little convex, surface covered with miliary granules, a transverse granular line across the gastric region and one on each side of the branchial region from the large lateral spine. Frontal teeth four, middle pair extremely small, almost obsolete. Antero-lateral borders very long, arched, cutting into nine acute teeth (including the outer orbital angle). Upper orbital border cut into three lobes by two fissures, middle lobe very prominent and dentiform. Chelipeds massive, unequal; arm bearing three large acute spines on the anterior border and a sharp on the posterior border; wrist costate, its inner and outer corners adorned with two large, sharp spines; palm costate bearing three spines - one at base and two distally side by side just behind the finger-joints; fingers long, pointed and crossing each other; their inner edges strongly dentate, dactylus of large chela bearing a strong molariform tooth at its proximal end. Leg joints smooth, compressed; in fifth pair, merus and carpus shortened and broadened, propodus and dactylus become foliaceous and paddle-like for swimming, upper margin of carpus of second to fourth pair armed with a subterminal spine at the distal end. Male abdomen five-jointed, third to fifth segments fused, sixth somite longer than broad, seventh nearly half of the sixth; female abdomen seven-segmented.

Type locality : Unknown.

Distribution: Indo-West Pacific. India : East coast-Tamil Nadu: Madras (= Chennai), Pulicat Lake; Palk Bay, Gulf of Mannar; Andhra Pradesh : East Godavari District, West Godavari District; Orissa : Chilka Lake, Mahanadi estuary; Pondicherry; West Bengal : Sundarbans, Digha coast. West coast-Gujarat :

Hanumandandi, Adatra reef, Okha, Gulf of Kachchh; Maharashtra : Mumbai (Bombay); Karnataka: Karwar Sirur; Kerala : Travancore; Malabar. Andaman Islands : North Andaman, South Andaman.

Elsewhere : East and South coasts of Africa, Red Sea, Persian Gulf, Pakistan, Sri Lanka, Mergui Archipelago, Singapore, Philippines, Hong Kong, Japan, Australia, New Caledonia, New Zealand and Tahiti.

Remarks : This is an extremely distributed species, recorded from both the coasts of India as well as from Bay Islands. It is also a common edible crab frequently seen in the markets for sale.

34. *Portunus pubescens* (Dana, 1852)

1852. *Lupa pubescens* Dana, *U.S. Explor. Exped.*, **13**(1) : 274, pl. 16, figs. 9a-c.
 1861. *Achelous pubescens* A. Milne Edwards, *Archs. Mus. natn. Hist. nat. Paris*, sér. 1, **10** : 342.
 1906. *Portunus pubescens*, Rathbun, *Bull. U.S. Fish. Comm.*, **23** : 870, pl. 14, fig. 1.
 1934. *Neptunus pubescens*, Sakai, *Sci. Rep. Tokyo Bunrika Daig. B*, **1**(25) : 303.
 1939. *Neptunus (Neptunus) pubescens*, Sakai, *Studies on Crabs of Japan*. 4. *Brachygnatha, Brachyrrhyncha* : 388, pl. 80, fig. 1.
 1967. *Portunus pubescens*, Sankarankutty, *Proc. Symp. Crustacea*, Part 1 : 357, text-fig.6 and pl. 2, fig. 2.
 1985. *Portunus pubescens*, Deb and Bhadra, *Bull. zool. Surv. India*, **7**(2-3) : 203, pl. 2, fig. 1.

Material examined : 1(M), Mandapam Camp, Tamil Nadu, 22. 01. 1974, Dr. P.K. Talwar, Reg. No. 3658/2.

Measurement :

W = 35.5 F = 5.45 L = 19.5

Diagnosis : Carapace broadly oval, moderately convex medially, surface covered with numerous soft hairs concealing the granular ridges, mesogastric and epibranchial ridges recognizable. Front quadridentate; outer pair broader; inner pair slenderer, slightly longer than the outer ones and more prominent; frontal tips rounded. Antero-lateral borders cut into nine acuminate teeth, first tooth broadest,

next seven teeth of almost of same size and spine-tipped; last one largest and directed laterally. Antero-external angle of merus of outer maxillipeds not produced laterally. Upper orbital border with two distinct clefts. Chelipeds long, slender and equal; anterior border of arm bearing three spines, distal-most spine broadest, proximal one smallest; posterior border unarmed; outer surface of wrist with four distinct carinae culminating in spines, inner corner armed with a long spine; outer surface of palm costate, its upper border bearing two spines side by side just behind the finger joint; fingers slender, curved, shorter than palm and meeting at tips, their cutting edges armed with large teeth. Edges of merus, carpus, propodus and dactylus of legs fringed with hairs. Male abdomen five-jointed, sixth segment longer than broad and convergent.

Type locality : Unknown.

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu : Palk Bay, Gulf of Mannar; West Bengal : Sagar Island.

Elsewhere : Japan, Australia, Sandwich and Hawaiian Islands.

Remarks : This is not a common species and so far, it is recorded only from the east coast.

Genus *Charybdis* De Haan, 1833

1833. *Charybdis* and *Oceanus* De Haan, In : Siebold, *Fauna japon. (Crust.)* : 9, 10.
1861. *Goniosoma* A. Milne Edwards, *Archs. Mus. natn. Hist. nat. Paris, sér. 1*, 10 : 367.
1899. *Charybdis*, Alcock, *J. Asiat. Soc. Bengal*, 68(2) : 47.
2000. *Charybdis*, Dev Roy and Das, *Rec. Zool. Surv. India, Occ. Paper No. 185* : 35.

Diagnosis : Carapace hexagonal, moderately broad, depressed or slightly convex with more or less distinct transverse granular ridges in the anterior half. Front cut into six lobes or teeth (excluding the supraorbital angles). Antero-lateral teeth varying from 5-7 but commonly six. Basal antennal joint short, broad ; its outer angle lobule-like, filling the orbital hiatus, meeting the front and excluding flagellum from

the hiatus. Antennules transversely folded. Orbitals as in *Portunus*. Epistome considerably long, buccal cavity as in *Portunus*. Chelipeds, legs and male abdomen as in *Portunus*.

Type species : *Cancer sexdentatus* Herbst, 1783, a subjective junior synonym of *cancer feriatus* Linnaeus 1758, by subsequent designation by Glaessner, 1929 : 113; gender : feminine; name no. 1616 on Official List.

Remarks : The genus *Charybdis* is divided into five subgenera. However, the present collection contains representatives belonging to two subgenera namely, *Charybdis* and *Gonioneptunus* both of which can be distinguished by the following key.

Key to subgenera of the genus *Charybdis*

- Antennal flagellum excluded from the orbital hiatus, four median teeth of front not much dissimilar from the outermost pair ***Charybdis***
- Antennal flagellum resting on upper part of orbital hiatus, four median frontal teeth larger and broader than the outermost pair ***Gonioneptunus***

Subgenus *Charybdis* De Haan, 1833

1833. *Charybdis* De Haan, In : Siebold, *Fauna japon. (Crust.)* : 9, 10.
1899. *Goniosoma*, Alcock, *J. Asiat. Soc. Bengal*, 68(2) : 48, 49.
2000. *Charybdis*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No. 185* : 36.

Diagnosis : Four median teeth of the front nearly of same size. Antero-lateral teeth usually six, often seven. Posterior border of arm of cheliped without any spine.

Key to species of the subgenus *Charybdis*

1. With a transverse granular ridge on the cardiac region 4
No transverse granular ridge behind the cardiac region 2
2. First antero-lateral tooth truncated and notched, sides of sixth abdominal segment

curved with gradually convergent sides, a brown cross mark on carapace

..... *Charybdis (Charybdis) feriatus*

First antero-lateral tooth acute, sides of sixth abdominal segment parallel and divergent at the distal third, no cross mark on carapace 3

3. A sharply dentiform lobule at the outer end of lower border of orbit, carapace with two circular whitish spots on either part of branchial region especially in live or freshly preserved specimens

..... *Charybdis (Charybdis) lucifera*

Lobule at outer end of lower border of orbit not dentiform, branchial region of carapace without such circular spots

..... *Charybdis (Charybdis) helleri*

4. Posterior half of branchial region with transverse granular ridges

..... *Charybdis (Charybdis) natator*

Posterior half of branchial region without transverse granular ridges 5

5. Middle two frontal teeth markedly prominent

..... *Charybdis (Charybdis) rostrata*

Middle two frontal teeth less prominent ..

..... *Charybdis (Charybdis) callianassa*

35. *Charybdis (Charybdis) callianassa* (Herbst, 1801)

1801. *Cancer callianassa* Herbst, *Versuch. Naturgesch. Krabben Krebse*, 3(2) : 45, pl. 54, fig. 7.

1899. *Charybdis (Goniosoma) callianassa*, Alcock, *J. Asiat. Soc. Bengal*, 68(2) : 57.

1961. *Charybdis (Charybdis) callianassa*, Stephenson, *Aust. J. mar. Freshwat. Res.*, 12(1) : 116.

Material examined : 1(F), Station-3, Madras, Reg. No. C 684/2.

Measurement :

W = 28.1 F = 6.25 L = 18.6

Diagnosis : Carapace pubescent and convex especially in the posterior half; besides the usual transverse ridges, an additional pair also

present across the cardiac region and two granular patches on the branchial part. Front six-dentate, median pair most prominent with rounded apices; submedians low, broad with a strongly directed outward slope; apex of third pair also rounded but much smaller than the medians. Antero-lateral teeth six, their free edges finely serrated; first tooth notched anteriorly, inner angle acute; last tooth spiniform and longer than any of the preceding ones. Chelipeds unequal; inner border of arm beset with 2-3 spines and often with 2-3 stout tubercles in between the spines; inner corner of wrist armed with a strong spine, outer surface with 3 spinules; palm with 3 spines on the upper surface; fingers longer than palm, pointed and crossing each other, their cutting edges strongly dentate. Posterior border of last leg smooth. Sixth segment of male abdomen broader than long with the anterior angles rounded off; second and third segment in both sexes and fourth segment in female transversely carinated.

Type locality : "Die vaterland ift Ost indien" (Herbst, 1801).

Distribution : Indo-West Pacific. India : East coast-Tamil Nadu : Madras (= Chennai), Parangipettai coast; Andhra Pradesh : Chirala, Kakinada, Machilipatnam, Nizampatnam, Pukkala Peta, Sekhinetipalli; Orissa : Gopalpur coast; West Bengal : South 24 Parganas, Sandheads. West coast-Gujarat : Pirotan Island; Maharashtra : Udvada, Bombay (= Mumbai).

Elsewhere : South Africa, Pakistan, Gulf of Thailand, Malay Archipelago, Singapore, Indonesia, Hong Kong, Philippines, China, Japan and Australia.

Remarks : This species was earlier identified and registered as *Charybdis rostrata*. But on re-examination it is found that the crab actually belongs to *Charybdis callianassa*.

This crab occurs in both the coasts of India.

36. *Charybdis (Charybdis) feriatus* (Linnaeus, 1758)

1758. *Cancer feriatus* Linnaeus, *Syst. Nat.*, 10th ed., I : 627.

1899. *Charybdis (Goniosoma) crucifera*, Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 51.
1935. *Charybdis (Goniosoma) cruciatus*, Chopra, *Rec. Indian Mus.*, **37**(4) : 482.
2001. *Charybdis (Charybdis) feriata*, Dev Roy and Bhadra, *Zool. Surv. India Estuarine Ecosystem Series 4 : Fauna of Godavari Estuary* : 43.
2005. *Charybdis (Charybdis) feriatus*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 432, pl. 2, fig. 4, *Zool. Surv. India*.

Material examined: 1(M), Station-3, Triplicane Beach, Madras, 20. 06. 1961, Dr. R.S. Pillai and V.K. Premkumar, Reg. No. C 4939/1; 1(M), Santapalli, Madras, October, 1909, 'Golden Crown', Reg. No. C 6872/10.

Measurement :

$$W = 76.4 \quad F = 16.25 \quad L = 51.15$$

Diagnosis : Carapace smooth, convex and glabrous. Transverse ridge lacking behind the level of last antero-lateral spine. Front cut into six blunt teeth. Antero-lateral teeth five (excluding the outer orbital angle) - first tooth truncated and notched, second to fourth very broad with anteriorly acuminate lobes, last one spine-like. Major diameter of orbit nearly half of the width of front. Chelipeds stout, little unequal; inner border of arm adorned with three elongated spines, distal one largest; upper border granular; outer surface of wrist bearing three spinules, inner corner with a large strong spine; outer surfaces of both wrist and palm costate; upper border of palm with four spines—one just behind the finger-joint on the inner border, two side by side slightly behind the preceeding one and last one near apex of the wrist-joint; cutting edges of fingers strongly dentate. In the last pair of leg, length of merus about $2/5^{\text{th}}$ of its breadth. Sixth segment of male abdomen much broader than long with gently curved sides.

Type locality : Unknown.

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu: Madras (= Chennai), Parangipettai coast, Palk Bay, Gulf of Mannar; Andhra Pradesh : Kakinada; Orissa : Gopalpur coast, Mahanadi estuary, Baleshwar (present

record), Puri (present record); Pondicherry; West Bengal: Sundarbans, Digha coast, Sandheads. West coast—Bombay (= Mumbai); Gujarat : Gulf of Kachchh; Kerala: Travancore coast. Andaman Islands.

Elsewhere : South Africa, Madagascar, Pakistan, Bangladesh, Malay Peninsula, Singapore, Hong Kong, Taiwan, Japan and Australia.

Remarks : The specimens examined agree well with the description of Alcock (1899a). However, in one of the specimens third antero-lateral tooth has been found to be bifid. The cross marking on carapace, so characteristic of this species in live form has, however, disappeared due to long preservation.

37. *Charybdis (Charybdis) helleri*
(A. Milne Edwards, 1867)

1867. *Goniosoma helleri* A. Milne Edwards, *Annl. Soc. Ent. Fr.*, sér. 4, **7** : 282.
1899. *Charybdis (Goniosoma) merguensis*, Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 55.
2000. *Charybdis (Charybdis) helleri*, Dev Roy and Das, *Rec. Zool. Surv. India, Occ. Paper No. 185* : 36, pl. 2, fig. 1 and pl. 9, figs. 7,8.

Material examined : 1(M), Station-14, Madras, Reg. No. C 715/2.

Measurement :

$$W = 26.5 \quad F = 7.65 \quad L = 16.25$$

Diagnosis : Carapace broad, convex and pubescent bearing the usual transverse ridges. Front deeply cut into six teeth, apices of middle two teeth rounded. Antero-lateral teeth six, first five pointed anteriorly, sixth tooth directed antero-laterally. The lobule at the outer end of lower border of orbit obtuse, not dentiform. Chelipeds stout, unequal; arm with three spines on the anterior border, proximal spine shortest, almost inconspicuous, distal two very strong and much larger; wrist armed with a large pointed spine at its inner angle, outer surface also bearing three spinules; palm bearing five spines on the dorsal surface, larger two along the inner border and smaller two on the outer border, fifth spine near articulation of the wrist-

joint. In the last pair of legs, posterior border of carpus bearing an acute spine; dactylus serrated at the lower margin. Sixth segment of male abdomen as long as broad with the sides parallel at basal two-thirds and then convergent distally.

Type locality : Indian Archipelago and New Caledonia (A. Milne Edwards, 1867).

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu: Madras (= Chennai) (present record), Parangipettai coast, Palk Bay, Gulf of Mannar; Orissa: Gopalpur coast; West Bengal: Sundarbans, Sandheads. West coast—Kerala : Cochin Backwater. Andaman Islands : Rangat, Middle Andaman.

Elsewhere : Sri Lanka, Myanmar, Thailand and Indonesia.

Remarks : This crab has been recorded from both the coasts of India including the Andaman Islands and is reported to occur among the live corals up to 6.0 m depth in Gulf of Mannar (Jeyabaskaran *et al.*, 2000). This crab is distributed from Mediterranean to Hawaii (Stephenson *et al.*, 1957).

38. *Charybdis (Charybdis) lucifera* (Fabricius, 1798)

1798. *Portunus lucifer* Fabricius, *Ent. Syst. Suppl.* : 364.
1894. *Goniosoma luciferum*, Alcock and Anderson, *J. Asiat Soc. Bengal*, **63**(2) : 201.
1899. *Charybdis (Goniosoma) quadrimaculata*, Alcock, *J. Asiat Soc. Bengal*, **68**(2) : 54.
1939. *Charybdis lucifer*, Sakai, *Studies on the Crabs of Japan* : 401, 402.
2005. *Charybdis lucifera*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 434, *Zool. Surv. India*.

Material examined : 1(M), Station-13, Madras, Reg. No. C 717/2.

Measurement :

W = 21.95 F = 6.4 L = 14.3

Diagnosis : Carapace very broad, depressed, bearing the usual transverse ridges; two large white spots present on either part of branchial

region especially in live specimens; regions distinct, branchial area tumid. Front cut into six teeth, apex of middle pair rounded, second pair sloping outwards. Antero-lateral teeth six, claw-shaped; first tooth acute and the smallest; sixth tooth spiniform, directed antero-laterally and much prominent than the others. Lobule at the outer end of lower border of orbit sharply dentiform. Chelipeds subequal, inner border of arm with three spines, distal two being much larger than the proximal; palm with five spines—first pair smaller just proximal to finger-joints, next pair larger slightly behind the former; fingers white, pointed and crossing each other, their cutting edges strongly toothed.

Type locality : “Oceano Indico” (Fabricius, 1798).

Distribution : Indo-Pacific. India : Tamil Nadu—Madras (= Chennai), Parangipettai coast; Andhra Pradesh : Puluguvari Palem, Visakhapatnam; West coast—Kerala : Cochin Harbour, Vembanad Lake; Malabar coast; Maharashtra : Bombay (= Mumbai), Deogad coast (Ratnagiri District).

Elsewhere : Sri Lanka, Java, Thailand, Japan and Australia.

39. *Charybdis (Charybdis) natator* (Herbst, 1794)

1794. *Cancer natator* Herbst, *Versuch. Naturgesch. Krabben Krebse*, **2**(5) : 156, pl. 40, fig. 1.
1899. *Charybdis (Goniosoma) natator*, Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 61.
1976. *Charybdis (Charybdis) natator*, Sakai, *Crabs of Japan and the Adjacent Seas* : 360.
2005. *Charybdis (Charybdis) natator*, Dev Roy and Bhadra, *Zool. Surv. India. Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 434.

Material examined : 1(M), Madras, Reg. No. 2728/10; 3M, 1F, Station-3, Elliots Beach, Madras, Reg. No. C4940/1.

Measurement :

W = 50.75 F = 11.9 L = 31.5
56.65 15.3 37.05

Diagnosis : Front six dentate, frontal teeth subequal and bluntly rounded. First antero-

lateral tooth truncated, last one not much enlarged. Chelipeds covered with transverse squamiform tubercles, more prominent on palm. Sixth male abdominal segment broad and its sides parallel in three-fourth of its extent.

Type locality : Unknown.

Distribution : Indo-West Pacific. India : East coast—Madras (= Chennai), Parangipettai coast, Palk Bay, Gulf of Mannar; Andhra Pradesh : Kakinada, Machilipatnam, Visakhapatnam; Pondicherry. West coast—Gujarat : Okha; Kerala : Trivandrum.

Elsewhere : South Africa, Madagascar, Red Sea, Sri Lanka, Malay Archipelago, Singapore, Philippines, Hong Kong, Southern coast of China, Taiwan, Japan and Australia.

40. *Charybdis (Charybdis) rostrata*

A. Milne Edwards, 1861

1861. *Goniosoma rostratum* A. Milne Edwards, *Archs. Hist. nat. Paris*, sér. 1, 10 : 379, 385, pl. 35, fig. 2.
1899. *Charybdis (Goniosoma) rostrata*, Alcock, *J. Asiat. Soc. Bengal*, 68(2) : 59.
2001. *Charybdis (Charybdis) rostrata*, Dev Roy and Bhadra, *Zool. Surv. India Estuarine Ecosystem Series 4 : Fauna of Godavari Estuary* : 44.

Material examined : 9(M), 3(F), Gulf of Mannar, Marine Survey, Reg. No. 2727/10; 5(M), 5(F), Mouth of Arasalem River, Karaikal, 10. 02. 1958, Dr. A.G.K. Menon, Reg. No. C 685/2; 1(F), Station-13, Madras, Reg. No. C 684/2.

Measurement :

W = 28.65	F = 7.55	L = 20.6
27.45	6.9	19.5
27.05	7.35	19.25

Diagnosis : Carapace much broader than long, little convex, pubescent; regions distinct; a fine transverse granular ridge running inwards from the level of last antero-lateral spine interrupted medially by the cervical groove; in addition, two granular ridges also present, of which, first one small, broken and widely apart, second one uninterrupted; another ridge present across the cardiac region. Front six-dentate, middle two much prominent with

rounded apices, projecting far beyond the others; next pair broad, sloping inwards; last pair small, narrow and nearly straight. Antero-lateral teeth six, first tooth acute, sixth tooth spiniform and much larger than any of the preceding ones. Chelipeds unequal even in the same sex; inner border of arm with two spines, distal one much smaller; inner corner of wrist adorned with a large strong spine besides three less conspicuous spinules also present on the outer surface; palm tumid six-costate, upper surface armed with two spines, fingers pointed, crossing each other, their cutting edges strongly dentate, dactylus armed with a strong molariform tooth proximally. Height of merus of last pair of leg about half of its length. Sixth segment of male abdomen broader than long with curved and gently converging lateral margins.

Type locality : "Bouches du Ganges" (= Mouth of the River Ganges) (A. Milne Edwards, 1861).

Distribution : Indian Ocean. India : East coast—Tamil Nadu : Madras (= Chennai, present record), Gulf of Mannar; Andhra Pradesh : Machilipatnam, Narsapur; Orissa : Chilka Lake; West Bengal : Kolkata (Calcutta), Sundarbans, Sandheads. Andaman Islands.

Elsewhere : Sri Lanka, Myanmar, Thailand and Indonesia.

Remarks : So far, this species is known from the Indian Ocean. It is recorded from east coast of India and Andaman Islands.

The smallest and largest ovigerous female measured during this investigation were 19.3 and 27.05 mm. across their carapace width.

Subgenus *Gonioneptunus* Ortmann, 1894

1894. *Gonioneptunus* Ortmann, *Zool. Jb. (Syst.)*, 7(1) : 79.
1899. *Gonioneptunus*, Alcock, *J. Asiat. Soc. Bengal*, 68(2) : 11, 48, 49, 67.
1976. *Gonioneptunus*, Sakai, *Crabs of Japan and the Adjacent Seas* : 363.

Diagnosis : Posterior border of dorsum of carapace straight forming either an angular

junction or a curve with the postero-lateral borders. Lobule at outer angle of basal antennal joint not meeting the front, flagellum lodged in orbital hiatus. Four median frontal teeth longer and broader than the outermost pair. Postero-lateral border of arm of cheliped with or without a spine distally.

41. *Charybdis (Gonioneptunus) bimaculata* (Miers, 1886)

1886. *Charybdis variegatum* var. *bimaculatum* Miers, Report H.M.S. "Challenger", *Brachyura*, **17** : 191, pl. 15, fig. 3.
1899. *Charybdis (Gonioneptunus) bimaculata*, Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 69.
1976. *Charybdis (Gonioneptunus) bimaculata*, Sakai, *Crabs of Japan and the adjacent Seas* : 364, pl. 128, fig. 1.

Material examined : 1(M), Palk Straits, Marine Survey, Dr. Giles, Reg. No. 9085/6.

Measurements :

W = 10.6 F = 5.0 L = 7.55

Diagnosis : Carapace flattish, covered with short dense hairs and bearing the usual transverse lines; regions distinct. Front cut into eight teeth, outer pair small, having a tendency to unite with the supraorbital tooth. Antero-lateral teeth six, first tooth very broad, truncated; second smallest, last tooth spiniform and projecting sideways. Merus of last leg about as long as broad, propodus smooth on the posterior border. Sixth male abdomen much broader than long, truncate-triangular in outline.

Type locality : Kobe, Inland Sea of Japan (Miers, 1886).

Distribution : Indo-West Pacific. India : East coast-Tamil Nadu : Madras (= Chennai), Palk Strait; Orissa; West coast-Maharashtra : Bombay (= Mumbai).

Elsewhere : East coast of Africa, Maldives, Pakistan, Japan and Australia.

Remarks : This crab occurs in both the coasts of India. However, it is not a common species.

Genus *Thalamita* Latreille, 1829

1829. *Thalamita* Latreille, In : Cuvier's, *Regne Anim. Crust.*, (ed.2), **4** : 33 (foot note)
1899. *Thalamita*, Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 11, 72.
2000. *Thalamita*, Dev Roy and Das, *Rec. Zool. Surv. India, Occ. Paper No.* **185** : 39.

Diagnosis : Carapace roughly hexagonal, broad, depressed or slightly convex, usually marked with prominent transverse ridges. Front cut into 2-6 rounded or subquadrate teeth or lobes. Antero-lateral borders cut into five teeth, fourth tooth often rudimentary or absent. Basal antenna-joint broad, apical lobe long, lying in contact for its entire length with the inner orbital tooth, antenna excluded from the orbit. Epistome long, buccal cavity as in *Charybdis*. Chelipeds, legs and male abdomen as in *Portunus* and *Charybdis*.

Type species : *Cancer admete* Herbst, 1803; by monotypy; gender : feminine. Name No. 195 on Official List, in Opinion 73, *Bull. zool. Nomencl* (1958).

Key to species of the genus *Thalamita*

1. Front cut into six lobes 2
Front cut into two lobes *T. chaptali*
2. Antero-lateral border of carapace cut into five subequal teeth, crest of basal antennal segment with some granules ... *T. crenata*
Antero-lateral border of carapace cut into five teeth, of which, fourth tooth rudimentary, crest of basal antennal segment with few spines *T. prymna*

42. *Thalamita chaptali* (Audouin, 1826)

1826. *Thalamita chaptali* Audouin, In : J.-C. Savignyi, *Description de l'Égypte, Histoire naturelle*, **1**(2) : 83, pl. 4, fig. 1 [fig. in Savignyi, 1809: pl. 4, fig. 1 (*fide* Stephenson, 1957)].
1899. *Thalamita chaptali*, Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 80.
2005. *Thalamita chaptali*, Dev Roy and Bhadra, *Zool. Surv. India State Fauna Series* **5** : *Fauna of Andhra Pradesh* (Part 5) : 442.

Material examined : 2(F), Station-10, Madras (= Chennai), Reg. No. C 782/2; 1(M), 1(F), Station-685, Krusadai Island, 20. 12. 1923, B.C. Chopra and H.S. Rao, Reg. No. C 780/2; 2(M), 1(F), Station-666, 06. 02. 1924, Marine Survey, Reg. No. C 783/2.

Measurement :

W = 23.0 F = 3.75 L = 15.5

Diagnosis : Carapace convex from front to back, granular, transverse ridges very distinct. Front extremely broad, forming a shallow arch and notched at the middle, free margins finely granular. Antero-lateral teeth five—first three teeth square cut, fourth acuminate and the smallest, last tooth acute. Chelipeds unequal, granular; anterior border of arm adorned with 2-3 obtuse teeth, distal most tooth being very much enlarged and stout, posterior border unarmed; inner border of wrist armed with a large, strong acute spine, the usual spinules on the outer angle obsolescent. Palm bicarinate with five spines, anterior most two just behind the finger joints obsolete, fingers broad, crossing each other, their cutting edges strongly toothed. Posterior border of propodus of last leg bearing 5-8 spinules. Sixth segment of male abdomen distinctly broader than long, its sides being little divergent in two-thirds of its extent.

Type locality : Unknown.

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu: Madras (= Chennai), Pichavaram, Gulf of Mannar; Andaman Islands.

Elsewhere : Red Sea, Madagascar, Mauritius, Gulf of Thailand, Australia, New Caledonia, Solomon Island and Tahiti.

Remarks : This species is so far recorded from east coast of India and Andaman Islands only. The single ovigerous female available with the present collection is 13.45 mm. across its carapace width.

43. *Thalamita crenata* (Latreille, 1829)

1829. *Portunus crenatus* Latreille, *Collection du Museum* : 33.

1899. *Thalamita crenata*, Alcock, *J. Asiat. Soc. Bengal*, 68(2) : 76.

2000. *Thalamita crenata*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No. 185* : 40, pl. 2, fig. 3, pl. 10, figs. 1, 2.

Material examined : 2(M), 1(F), Station-3a, Palk Bay, Mandapam Camp, 10. 05. 1955, Dr. H.C. Roy, Reg. No. C 728/2; 1(M), Pamban Beach, Dist. Ramnad, February 1925, B. Chopra and H.S. Rao, Reg. No. C 735/2.

Measurement :

W = 54.55 F = 21.0 L = 36.7
57.55 21.75 37.3

Diagnosis : Carapace slightly convex, smooth, roughly hexagonal in outline, surface crossed by faint transverse granular ridges. Frontal teeth six, almost of equal size, broad and rounded especially the laterals. Antero-lateral teeth five, claw-shaped, diminishing in size from front to back, first three teeth larger than the rest. Crest of basal antennal joint traversed by a granular ridge. Chelipeds stout, unequal and almost smooth; anterior border of arm with 3 stout spines followed by some tubercle; inner border of wrist armed with a strong spine, outer surface bearing 3 spinules; palm with four spines in two rows on the upper surface and one at the apex of wrist-joint; fingers stout, smooth and grooved, tips pointed and crossing each other, their apposed margins strongly dentate, dactylus with a strong molariform tooth at its proximal end. Leg joints slender, smooth and unequal except the last pair. Sixth segment of male abdomen broader than long with gently curved sides.

Type locality : Unknown.

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu: Pulicat Lake, Parangipettai coast, Palk Bay (present record), Gulf of Mannar; Andhra Pradesh : Visakhapatnam; Orissa : Chilka Lake, Gopalpur coast; Pondicherry. West coast—Maharashtra: Bombay (= Mumbai). Andaman and Nicobar Islands : North Andaman, Middle Andaman, South Andaman; Nicobars.

Elsewhere : East coast of Africa, Red Sea, Pakistan, Sri Lanka, Mergui Archipelago, Singapore, Indonesia, Philippines, Japan, Australia, New Zealand, Samoa, Hawaii and Society Islands.

Remarks : This species occurs in both the Indian coasts as well as Bay Islands.

The present specimens were collected from coral reefs. The specimens bearing Registration No. C 735/2 were obtained from dead coral. This crab has also been reported from Pichamvaram mangroves (Kathiresan, *op. cit.*; Ravichandran *et al.*, *op. cit.*).

44. *Thalamita prymna* (Herbst, 1803)

1803. *Cancer prymna* Herbst, *Versuch. Naturgesch. Krabben Krebse*, 3(3) : 41, pl. 57, fig. 2.

1899. *Thalamita prymna*, Alcock, *J. Asiat. Soc. Bengal*, 68(2) : 78.

2000. *Thalamita prymna*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No. 185* : 42, pl. 2, fig. 4 and pl. 10, figs. 3, 4.

Material examined : 1(M), 1(F), Krusadai Island, March 1950, A.G.K. Menon, Reg. No. C 740/2; 1(F), Krusadai Island, S.L. Hora and A.G. K. Menon, March 1950, Reg. No. C 2445/2; 7 (M), 5(F), Krusadai Island, March 1950, S.L. Hora and A.G.K. Menon, Reg. No. C 5090/1; 3 (M), 1(F), Palk Straits, Madras coast, Marine Survey, Reg. No. C 4506/7.

Measurement :

W = 50.6	F = 21.4	L = 32.7
41.95	21.3	27.15
38.8	21.2	32.7

Diagnosis : Carapace hexagonal, glabrous or hairy, slightly convex medially, surface crossed by transverse granular ridges. Front broad, horizontal, six-dentate, middle four teeth square cut, lateral two rounded. Antero-lateral borders cut into five claw-shaped spines, of which, first three spines stout and larger than the rest, fourth one rudimentary. Crest of basal antennal-joint traversed by 2-3 spines followed by some tubercles. Chelipeds stout, unequal; inner border of arm adorned with 3-4 stout spines followed by a spinule near articulation of wrist-joint; wrist with four spines—three on outer surface and the one at inner corner very sharp; palm armed with five spines—one basal, two on the upper inner border and the remaining two on upper outer border; outer surface of palm with two granular ridges—one at the middle,

other slightly beneath the preceeding one running from wrist-joint to almost up to the tip of of immobile finger; fingers long, sharp, grooved and smooth, tips pointed and crossing each other, their cutting edges strongly dentate, dactylus with a strong molariform tooth at its proximal end; upper surface of arm, wrist and palm granular. Leg joints as in *T. crenata*. Sixth male abdominal segment almost as long as broad.

Type locality : Unknown.

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu : Madras (= Chennai), Palk Bay, Gulf of Mannar; Orissa: Gopalpur coast. West coast—Gujarat : Okha. Andaman and Nicobar Islands: North Andaman, Middle Andaman, South Andaman; Nicobars.

Elsewhere : South Africa, Red Sea, Pakistan, Mergui Archipelago, Malay Peninsula, Indonesia, Japan, Australia, New Caledonia, Tonga, Samoa and Marshall Islands.

Remarks : This species occurs in both the coasts of India as well as from Andaman and Nicobar Islands. It is reported to occur abundantly in coral reefs densely covered with sea weeds at depths varying from 0.5-1.0 m. in Gulf of Mannar (Jeyabaskaran *et al.*, 2000). Mention may be made that as early in 1893, Henderson also reported this crab to be common between tide marks at Rameswaram.

Subfamily PODOPHTHALMINAE Dana, 1851

1851. Podophthalmidae Dana, *Am. J. Sci. Art.*, ser. 2, 12 : 130.

1907. Podophthalminae, Borradaile, *Ann. Mag. nat. Hist.*, ser. 7, 19 : 483.

2005. Podophthalminae, Dev Roy and Bhadra, *State Fauna of Andhra Pradesh, Fauna Series*, 5(Part 5) : 442, Zool. Surv. India.

Diagnosis : Front extremely narrow, T-shaped. Antero-lateral teeth few. Orbits very long, occupying the entire anterior border of carapace.

Genus *Podophthalmus* Lamarck, 1801

1801. *Podophthalmus* Lamarck, *Syst. Anim. Sans. Vert. (Crust.)* : 152.

1899. *Podophthalmus*, Alcock, *J. Asiat. Soc. Bengal*, **68**(2) : 92.

2001. *Podophthalmus*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series* **5** : 443, Zool. Surv. India.

Diagnosis : Carapace extremely broad. Antero-lateral borders transverse in the greater part of their extent turning obliquely backwards and culminating in a large spine. Epibranchial spine rudimentary, standing slightly behind the large outer orbital angle. Front extremely narrow. Antennules stout, lodged in fossa beneath the front. Antenna lodged in orbital hiatus, its basal joint short, flagellum long and slender. Orbits very long, transversely grooved. Chelipeds long, massive. Legs adapted for swimming.

Type species : *Podophthalmus spinosus* Lamarck, 1801, by monotypy; gender : masculine.

45. *Podophthalmus vigil* (Fabricius, 1798)

1798. *Portunus vigil* Fabricius, *Ent. Syst. Suppl.* : 368.

1976. *Podophthalmus vigil*, Sakai, *Crabs of Japan and the Adjacent Seas*: 383, pl. 135, fig. 2.

2005. *Podophthalmus vigil*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 443, pl. 2, fig. 7. Zool. Surv. India.

Material examined : 1(M), Lautapalu, Madras, October, 1909, J.T. Jenkins, Reg. No. C 7061/10.

Measurement :

$$W = 82.2 \quad F = 1.4 \quad L = 36.35$$

Diagnosis : Carapace extremely broad anteriorly, more than twice its length, oblong-quadrate; surface granular along the supraorbital margin, epibranchial crests and mesobranchial areas; regions fairly defined. Antero-lateral margins angularly bent, epibranchial spine extremely small, almost rudimentary lying slightly behind the large outer orbital angles. Orbits markedly long and grooved transversely, eye-stalks remarkably long, eyes terminal. Front extremely narrow, T-shaped. Antero-external angle of merus of outer maxillipeds forming a lobule. Epistome

linear, projected. Chelipeds slightly unequal; both outer and inner borders of arm with 2 and 3 enlarged spines respectively, posterior border with a denticle near the wrist-joint; inner corner of wrist armed with a strong tooth; palm 5-costate, four on the outer and one on the inner surface; upper border with 3 spines—one just behind the finger-joint, one in front of apex of wrist-joint and another ventrally in parallel with the first spine at the base of movable finger; Fingers very much shortened, their cutting edges strongly dentate. Posterior border of merus of last pair of legs with the usual subterminal spine, upper border of second to fourth pair granular.

Type locality : "Oceano Indico" (Fabricius, 1798).

Distribution: Indo-West Pacific. India : East coast—Tamil Nadu : Madras (= Chennai), Ennore and Pulicat estuaries, Sinnur and Porto Novo, Parangipettai coast, Gulf of Mannar; Andhra Pradesh : Kottapatnam. Krishnapatnam Port, Narsapur, Visakhapatnam; Orissa : Gopalpur coast; West coast—Kerala : Cochin.

Elsewhere : Red Sea, Madagascar, Malay Peninsula, Singapore, Philippines, Taiwan, Japan, Australia, Hawaii, Samoa and Tahiti.

Remarks : This species of crab is very common in Tamil Nadu. It is recorded from both the coasts of India.

Family GONEPLACIDAE MacLeay, 1838

1838. Gonoplacidae MacLeay, [corrected to Goneplacidae by Stebbing, 1902 : 15].

1858. Rhizopidae Stimpson, *Proc. Acad. Nat. Sci. Philad.* : 95.

1900. Prionoplacinae Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 286, 292.

1900. Pseudorhombilinae Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 286, 292, 297.

2005. Goneplacidae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 363, 444, Zool. Surv. India.

Diagnosis : Carapace subquadrilateral. Orbits complete, often elongate. First antenna obliquely or transversely folded. Fifth joint of

third maxilliped articulated at or near antero-internal angle of fourth joint, exognath of normal size. Male genital openings sternal or coxal.

Type genus : *Goneplax* Leach, 1814.

Remarks : The family Goneplacidae is divided into four subfamilies as discussed earlier by Dev Roy and Bhadra (*op. cit.*). Only the subfamily Carcinoplacinae is represented in the present collection.

Subfamily CARCINOPLACINAE H. Milne
Edwards, 1852

1852. Carcinoplacinae H. Milne Edwards, *Annls. Sci. nat. (Zool.)*, ser. 3, **18** : 164.
2005. Carcinoplacinae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 444, Zool. Surv. India.

Diagnosis : Carapace xanthoid, regions indistinct. Front square-cut, generally of good breadth. Antennules transversely folded, antennal flagella of moderate length. Epistome well defined, buccal cavern squarish, merus of third maxilliped subquadrate. Eyes well pigmented, eye-stalks normally movable. Base of third male abdominal segment covering whole sternum between the last pair of leg. Male openings sternal.

Genus *Carcinoplax* H. Milne Edwards, 1852

1852. *Cancer* (*Curtonotus*) De Haan, *Fauna japon. (Crust.)* : 20 [name pre-occupied, a subgenus erected without the inclusion of a nominal species; an invalid junior homonym of *Curtonotus* Stephens, 1827 (Coleoptera)].
1852. *Carcinoplax* H. Milne Edwards, *Annls. Sci. nat. (Zool.)*, ser. 3, **18** : 164 [substitute name for *Curtonotus* de Haan, 1833].
2005. *Carcinoplax*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 445, Zool. Surv. India.

Diagnosis : Carapace deep, subquadrilateral, broader than long, regions indistinct. Lateral borders toothed and well arched. Front straight, square-cut, weakly notched or with longitudinal groove at midline. Basal antennal joint short, flagellum not excluded from the orbit,

antennules transversely folded. Eye-stalks short, stout. Chelipeds subequal, longer in male than female. Legs slender, unarmed; propodus and dactylus of last pair compressed and decidedly broadened. Abdomen with seven distinct segments in both sexes, second and third segments occupying entire width of sternum between fifth coxae. Genital openings very large in mature female. Penultimate sternal plate forming a protective covering to the external duct in male.

Type species : *Cancer* (*Curtonotus*) *longimanus* De Haan, 1833, by subsequent designation by Glaessner, 1929 : 111; gender : feminine.

Remarks : The genus is represented by four species from Indian coasts (Dev Roy and Bhadra, *op. cit.*). Among these, only one species occurs in Tamil Nadu. Mention may be made that Alcock and Anderson (1894b) recorded the genus from Madras coast.

46. *Carcinoplax longipes* (Wood-Mason,
1891)

1891. *Nectopanope longipes* Wood-Mason, *Ann. Mag. nat. Hist.*, ser. **6**, **7** : 262.
1900. *Carcinoplax longipes*, Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 303.
1800. *Carcinoplax longipes*, In : J. Forest (ed.), *Mem. Mus. natn. Hist. nat.*, (A), **144** : 303, fig. 26, pl. 10, figs. A-C.
2005. *Carcinoplax longipes*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 447, pl. 4, fig. 6, Zool. Surv. India.
Material examined : 1(F), Fishing Harbour, Nagapattinam, Dist. Nagapattinam, 27.03. 2004, Dr. J.G. Pattanayak, Reg. No. 5381/2.

Measurement :

$$W = 28.2 \quad F = 7.3 \quad L = 23.85$$

Diagnosis : Carapace square-cut, depressed; regions not defined; surface smooth. Antero-lateral margins cut into two teeth behind the outer orbital angle—first tooth broad and blunt; second one sharp and conspicuous. Front prominent, slightly emarginated at the middle, free edges grooved longitudinally. Chelipeds

subequal, smooth; inner border of arm with two tubercles, distal one spiniform; palm compressed, upper border of palm much shorter than dactylus, fingers pointed and crossing each other, their cutting edges strongly dentate. Legs thin, carpus and propodus with sparse hairs, dactylus well plumed, terminal joints of last pair compressed.

Type locality : Andaman Sea, station-56, off West coast of Andaman between North and South Sentinel Islands, 240-220 fathoms (= 436.8-400.4 m) (Wood-Mason, 1891).

Distribution : Indo-Pacific. India : East coast -Tamil Nadu: Nagapattinam (present record); Andhra Pradesh : Chirala, Visakhapatnam. West coast-Kerala : Travancore. Andaman Islands and Great Nicobar.

Elsewhere : China and Japan.

Remarks : Red squarish and circular spots as reported earlier by Dev Roy and Bhadra (*op. cit.*) from specimens of Andhra coast is however, lacking in the present specimens. This is the first report of the occurrence of this species from Tamil Nadu.

Family XANTHIDAE MacLeay, 1838

1838. Xanthidae MacLeay, *Entom. Useful Compend.* : 59. [Name No. 73 on Official List; therein dated from Dana, 1851, in error].

2005. Xanthidae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 448, Zool. Surv. India.

Diagnosis : Carapace transversely oval, hexagonal or subquadrate, often subcircular, usually broader than long. Front broad or broadish but never rostrum-like or acute. Antero-lateral borders commonly arched with lobes, teeth or spines. Antennules transversely or obliquely folded, antennary flagella short and slender. Anterior margin of buccal cavity very distinct, not covered by the external maxillipeds. Chelipeds symmetrical or asymmetrical. Leg joints adapted for walking. Male abdomen five-jointed.

Type genus : *Xantho* Leach, 1914.

Key to subfamilies of the family XANTHIDAE

1. Carapace subcircular or oval, without distinct delineation between antero- and postero-lateral parts 2
Carapace xanthoid-shaped, antero-lateral margins markedly separated from the postero-laterals 3
2. Carapace not much broader than long, flat dorsally without distinction of regions, chelipeds remarkably unequal, symbiotic with live hexacoralline corals CYMOINAE
Carapace much broader than long, dorsally convex, regions well demarcated or hardly indicated, chelipeds subequal or slightly unequal LIOMERINAE
3. Basal segment of antenna completely embraces the ventral prolongation of fronto-orbital margin, front with or without a marginal crest ZOSIMINAE
Basal segment of antenna may or may not embrace the ventral prolongation of fronto-orbital margin, front without a marginal crest 4
4. Antero-lateral teeth 4-8 with acute or sub-acute apices, dorsal regions more or less delineated but always indicated, modified dactylo-propodal articulation of ambulatory legs hardly marked ETISINAE
Antero-lateral teeth 2-4, often with acute apices eroded with age, dorsal regions often well delineated, sometimes poorly indicated, modification of dactylo-propodal articulation of ambulatory legs always well defined CHLORODIINAE

Subfamily CYMOINAE Alcock, 1898

1898. Cymoida Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 78, 172.
1913. Cymoidae, Klunzinger, *Nova. Acta Leop. Carol.*, 99(2) : 254.
1976. Cymoinae, Takeda, *Researches on Crustacea, Tokyo*, 7 : 76.

Diagnosis : Carapace subcircular, flat; front nearly half of the greatest breadth of carapace; chelipeds markedly unequal.

Remarks : The subfamily is represented by a single genus.

Genus **Cymo** De Haan, 1833

1833. *Cymo* De Haan, In : Siebold, *Fauna japon. (Crust.)* : 22.

1898. *Cymo*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 172.

1984. *Cymo*, Serène, *Faune Tropicale*, 24 : 31.

Diagnosis : Carapace subcircular or oval, almost as long as broad, depressed, more or less granular and without distinction of regions. Lateral borders convex, weakly dentate, without clear delineation between antero- and postero-lateral parts. Chelipeds markedly unequal in both sexes; dactylus of larger cheliped short, thick and beak-like, shorter than the width of palm, hollowed at tip and in contact throughout their lengths; smaller cheliped with two fingers identical in shape, almost conical, slandering towards their extremity and in contact throughout their lengths; dactylus as long as width of palm. Leg joints short, broad and fringed with a thick shaggy fur. Male abdomen 5-jointed, 3rd to 5th somites being coalesced.

Type species : *Pilumnus andreossyi* Audouin, 1826, by monotypy; gender : masculine.

Key to species of the genus Cymo

- Palm and wrist studded with granules and warts, edges of frontal lobes surmounted by granular tubercles giving it a four-lobed appearance *C. quadrilobatus*
- Palm and wrist studded with sharp granules only, edges of frontal lobes denticulate ...
..... *C. melanodactylus*

47. Cymo melanodactylus De Haan, 1833

1833. *Cymo melanodactylus* De Haan, In : Siebold, *Fauna japon. (Crust.)* : 22.

1898. *Cymo melanodactylus*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 174.

1984. *Cymo melanodactylus*, Serène, *Faune Tropicale*, 24 : 34, fig. 8 and pl. 2B.

Material examined : 2(M), 1(F), Pamban, Dist. Ramnad, 22.02.1913, S.W. Kemp, Reg. No. C 5953/1; 1(M), 2(F), Krusadai Island, 16. 09. 1925, Reg. No. C 5954/1.

Measurement :

W = 14.6	F = 5.0	L = 14.35
15.0	5.95	13.85
9.4	3.45	8.6

Diagnosis : Carapace subcircular, flat. Front broad, bilobed, their free edges almost regularly denticulate. Lateral margins showing faint indication of lobules. Chelipeds markedly dissimilar in both sexes; outer surface of wrist and palm granular, those on the palm being arranged linearly (in both chelipeds); fingers broad, blunt, stout and meeting at tips.

Type locality : "Insula Java" (De Haan, 1833)

Distribution : Indo-west Pacific. India : East coast-Tamil Nadu: Pamban, Krusadai Island.

Elsewhere : Red Sea, Sri Lanka, Mergui Archipelago, Japan, Java, Tahiti and Paumotu.

Remarks : This species was reported by De Haan as *Cymo meladactylus*. De Haan (*op. cit.*) just mentioned about the species and its place of occurrence in Java Sea without furnishing its description or photograph or illustration.

In spirit preserved specimens, carapace, chelipeds and leg joints of this crab exhibits cream colouration while fingers of chelipeds are very dark, more or less chocolate black.

Due to the close resemblance of *C. melanodactylus* with *C. andreossyi*, some of the earlier workers like Laurie (1915), Borradaile (1917) and Tweedie (1950) considered it as a form or variety of the latter. But currently these two are regarded as two distinct species (Guinot, 1958; Forest and Guinot, 1961; Serène, 1984; Patton, 1966).

48. Cymo quadrilobatus Miers, 1884

1884. *Cancer andreossyi* var. *quadrilobatus* Miers, *Zool. H. M. S. "Alert"* : 533.

1898. *Cymo quadrilobatus*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 175.

1984. *Cymo quadrilobatus*, Serène, *Faune Tropicale*, 24 : 34, fig. 9, pl. 2, figs. E, F.

Material examined : 1(M), Palk Strait, Marine Survey, Reg. No. 4514/7.

Measurement :

W = 7.0	F = 4.1	L = 7.6
17.1	9.6	16.3

Diagnosis : Carapace subcircular, flat, slightly broader than long, regions distinct, branchio-hepatic regions distinctly areolated, areolae consisting of elevated clusters of pearl-like granules. Lateral borders divided into three granular lobes anteriorly. Front broad, about half of its greatest breadth, deeply cut at the middle into two lobes, edges of each lobe concave, their angles in the form of granular tubercles giving a four-lobed appearance; post-frontal lobes granular. Chelipeds markedly unequal; upper surface of arm covered with pearl-like granules; outer surface of wrist and both the surfaces of palm also studded with pearly granules, some of the granules on wrist in lines of upper border of palm coalesce to form large wart-like tubercles; fingers broad, stout and hollowed in larger cheliped, thin and pointed in smaller cheliped. Legs densely covered with fur and silky hairs; merus, carpus, propodus and dactylus granulated dorsally.

Type locality : Red Sea (Miers, 1884).

Distribution : Indo-Pacific. India: East coast—Tamil Nadu : Palk straits. Andaman islands : Little Andamans. Lakshadweep : Minicoy.

Elsewhere : Red Sea, Seychelles, Chagos Archipelago, Reunion, Mauritius, Maldives, Funafuti and Vietnam.

Remarks : This species is not yet recorded from the west coast.

Subfamily LIOMERINAE Sakai, 1976

1976. *Liomeroida* Sakai, *Crabs of Japan and the Adjacent Seas* : 385, 390.
1984. *Liomerinae*, Serène, *Faune Tropicale*, **24** : 11, 16, 19, 45.

Diagnosis : Carapace broad, transversely oval, dorsally convex or transversely flat, regions well outlined; antero-lateral margins divided into four broad, rounded lobes. Ambulatory legs

somewhat depressed. Male abdomen five-jointed, 3rd to 5th segments fused together.

Remarks : The subfamily is represented by two genera, *Liomera* Dana, 1851 and *Neoliomera* Odhner, 1925. Only the first genus is recorded from Indian waters.

Genus *Liomera* Dana, 1851

1851. *Liomera* Dana, *Am. J. Sci. Arts.*, ser. 2, **12** : 124.
1851. *Carpilodes* Dana, *Am. J. Sci. Arts.*, ser. 2, **12** : 126.
1898. *Liomera*, Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 87.
1898. *Carpilodes*, Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 72, 81.
1984. *Liomera*, Serène, *Faune Tropicale*, **24** : 45.

Diagnosis : Carapace very broad, barrel-like, convex, regional boundaries well demarcated and especially anteriorly subdivided into lobular areoles. Antero-lateral borders usually divided into four broad shallow rounded lobes, postero-lateral margins straight or strongly convergent. Front nearly 1/3rd the greatest breadth of carapace, deflexed, grooved medially and slightly notched. Basal antennal joint partly filling gap between front and inner infra-orbital angle. Orbits small, entire with three suture lines on its outer angle, eyes on short thick stalks. Anterior margin of merus of external maxillipeds transverse. Chelipeds equal or subequal in both sexes; fingers pointed but distinctly grooved near tips. Male abdomen five-jointed, 3rd to 5th segments fused.

Type species : *Liomera lata* Dana, 1852, by monotypy; gender : feminine.

Remarks : The genus *Liomera* is splitted into three subgenera namely, *Acites* Lanchester, 1901, *Bruciana* Serène, 1977 and *Liomera* Dana, 1851, all of which are recorded from Indian waters. The present collection, however, includes a single species belonging to the subgenus *Bruciana*.

Subgenus *Bruciana* Serène, 1977

1977. *Bruciana* Serène, *Revue Zool. Afr.*, **91**(3) : 749.
1984. *Bruciana* Serène, *Faune Tropicale*, **24** : 56.

Remarks : Serène (*op. cit.*) established the subgenus based upon the species *Carpilodes* (= *Liomera*) *pediger* Alcock, 1898. Later on, another species, *Neolimera acutidens* Sakai, 1969 from Japan was assigned to this subgenus (Serène, 1984).

49. *Liomera (Bruciana) pediger*
(Alcock, 1898)

1898. *Carpilodes pediger* Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 83.

1899. *Carpilodes pediger*, Alcock and Anderson, *Illustr. Zool. "Investigator" Crust.* : pl. 36, fig. 4.

1984. *Liomera (Bruciana) pediger*, Serène, *Faune Tropicale*, **24** : 56, fig. 16, pls. 4D, E and 9C.

Material examined : 1(M), Madras, Reg. No. 9226/6.

Measurement :

$$W = 9.55 \quad F = 4.2 \quad L = 6.0$$

Diagnosis : Carapace about 2/3rd as long as broad, areoles well developed, separated by deep grooves, 2 M completely divided, 1L- 4L distinctly separated. Antero-lateral margins 4-lobate; lobes broad, shallow and bluntly pointed at tip; postero-lateral margins strongly convergent. Front broad, deflexed, notched at middle but not distinctly bilobed. Chelipeds subequal, granular; wrist bearing a strong tooth on its inner upper border; palm with three longitudinal granulated lines on its upper margin; fingers broad and stout meeting at tips, outer surfaces grooved, their cutting edges strongly toothed, dactylus armed with a strong molariform tooth proximally.

Type locality : Andamans, Sri Lanka (Alcock, 1898).

Distribution : Indian Ocean. India : East coast-Tamil Nadu : Madras (= Chennai, present record). Andaman Islands.

Elsewhere : Seychelles, Mahe, Sri Lanka and Sulu Sea.

Remarks : This crab is a new record to Tamil Nadu. This is also the first report of the occurrence of this species from the coast of Indian mainland. It is recorded from Indian waters after a lapse of 108 years since its description.

Subfamily ZOSIMINAE Alcock, 1898

1898. *Zosimoida* Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 77.

1907. *Zosiminae*, Stimpson, *Smithson. Misc. Collns.*, **49** : 57.

1984. *Zosiminae*, Serène, *Faune Tropicale*, **24** : 16.

2000. *Zosiminae*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No.* **185** : 49.

Diagnosis : Carapace broad, transversely oval. Front weakly bilobed, with or without a marginal crest. Antero-lateral borders sharp, crest-like, thin and entire (often fissured only) or divided into four large teeth. Chelipeds subequal and similar, anterior border of palm more or less carinated. Upper border of leg-joints especially that of merus, carpus and propodus sharply cristate.

Key to the genus of the subfamily
ZOSIMINAE

- Carapace smooth with the regions either not at all or very poorly indicated .***Atergatis***
- Carapace granular with the regions and sub-regions well delimited ***Platypodia***

Genus *Atergatis* De Haan, 1833

1833. *Atergatis* De Haan, In : Siebold, *Fauna japon. (Crust.)* : 4, 17.

1898. *Atergatis*, Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 94.

2000. *Atergatis*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No.* **185** : 50.

Diagnosis : Carapace very broad, convex; surface smooth or pitted; regional boundaries absent or very faintly indicated; lower surface of carapace wings hollowed to contain the wrists and palm in flexion. Front narrow, deflexed, its free edge shaped like a Cupid's bow. Antero-lateral margins curved with keel-like edge, postero-laterals strongly convergent and straight. Basal antenna-joint short, meeting the front at their antero-external angle, flagellum shorter than major diameter of the orbit. Antennules transversely folded. Eye-stalks thick, short; eyes small. Anterior margin of external maxillipeds nearly transverse.

Chelipeds subequal. Legs with upper margins of merus, carpus and propodus and lower margin of merus and propodus sharply carinate. Male abdomen five-jointed, 3rd-5th segments fused together.

Type species : *Cancer integerrimus* Lamarck, 1818, by subsequent designation by International Commission on Zoological Nomenclature, 1956, in Opinion 73; gender : masculine. Name No. 124 on Official List.

Key to species of the genus *Atergatis*

- Carapace marked with large compact punctations irregularly and rather distantly but obliterated on the posterior part, surface of third maxillipeds almost devoid of hair, no comb-like tufts of hair on the legs *A. integerrimus*
- Surface of carapace wholly and regularly stippled except for the median part, surface of third maxillipeds covered with long, compact setae, comb-like tufts of thick hair present on the under surfaces of some of leg joints *A. dilatatus*

50. *Atergatis dilatatus* (De Haan, 1835)

1835. *Atergatis dilatatus* De Haan, *Fauna japon. (Crust.)* : 46, pl. 14, fig. 2.
1898. *Atergatis dilatatus*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 96.
1927. *Atergatis dilatatus*, Gravely, *Bull. Madras Govt. Mus.*, (N. S.), 1(1) : 144.

Material examined : 1(M), Pamban, Dist. Ramnad, S.W. Kemp, Reg. No. C 5189/1; 1 (M), Madras, Ganjam coast, 8-16 March, "Golden Crown", Reg. No. 6509/10.

Measurement :

W = 22.45 F = 6.4 L = 13.9

Diagnosis : Carapace transversely oval, entire dorsal surface (except the gastric region), chelipeds and legs extensively and closely covered with minute pits, regions indistinct. Front broad, cleft at the middle by a shallow notch, bilobate. Merus of external maxillipeds densely covered with thick, long bristles.

Chelipeds smooth, outer surface of palm granular. Surface of sternum also finely granular.

Type locality : Japan (De Haan, 1835).

Distribution : Bay of Bengal. India : East coast-Tamil Nadu: Gulf of Mannar. Andaman Islands : Aberdeen Bay.

Elsewhere : Sri Lanka.

Remarks : Original description of the species by De Haan is too short, just in two lines. Chopra and Das (1937) reported lower border of ischium and merus of walking legs to have remarkable comb-like tufts of long and stiff bristles; in contrast, only scanty hairs have been observed in the specimens during our present investigation. This may be due to the smallness of crabs. So far, the crab is known from Bay of Bengal only.

51. *Atergatis integerrimus* (Lamarck, 1801)

1801. *Cancer integerrimus* Lamarck, *Hist. Nat. Anim. Sans. Vert.* (1st. ed.), 5 : 272.
1898. *Atergatis integerrimus*, Alcock, *J. Asiat. Soc. Bengal*, 67(1) : 95.
1927. *Atergatis integerrimus*, Gravely, *Bull. Madras Govt. Mus.* (N. S.), 1(1) : 144, pl. 25, fig. 45.
2000. *Atergatis integerrimus*, Dev Roy and Das, *Rec. Zool. Surv. India, Occ. Paper No. 185* : 52, pl. 2, fig. 8 and pl. 11, figs. 3, 4.

Material examined : 4 (M), South of Krusadai Island, 04. 09. 1925, S.L. Hora, Reg. No. C 1464/2.

Measurement :

W = 49.2 F = 8.25 L = 30.35

Diagnosis : Carapace broader than long and convex in both the directions; regional boundaries indistinct. Anterior 1/3 rd surface of carapace irregularly and distantly pitted especially near the front and antero-lateral margins. Front moderately broad, edges smooth and cristate forming a semi-circle with the antero-lateral border. Antero-lateral margins crested, the crest-like edges turning in at the lateral epibranchial angle forming a strong ridge. External maxilliped devoid of hair.

Chelipeds smooth, outer surface of palm roughened due to the presence of minute granules, upper border of arm and palm and both the edges of leg joints crested.

Type locality : Unknown.

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu : Pamban, Tuticorin, Manoli Island and Kilakarai, Gulf of Mannar. West coast—Gujarat : Okha; Maharashtra : Mumbai (= Bombay); Karnataka : Karwar. Andaman Islands : Chidyatapu.

Elsewhere : East coast of Africa, Mauritius, Mergui Archipelago, Sri Lanka, Singapore, Hong Kong, Philippines and Japan.

Remarks : Scanty growth of hairs on the lower border of ischium and merus of walking legs as observed by Chopra and Das (1937) in Myanmar specimens have been observed in the present materials also.

Genus *Platypodia* Bell, 1835

1835. *Platypodia* Bell, *Trans. Zool. Soc. Lond.*, **1** : 336.
 1862. *Lophactaea* H. Milne Edwards, *Anns. Sci., nat. (Zool.)*, sér. 4, **18** : 43.
 1865. *Lophactaea* A. Milne Edwards, *Nouv. Arch. Mus. Hist. nat. Paris*, **1** : 245.
 1942. *Paraplatypodia* Ward, *Bull. Maurit Inst.*, **2**(2) : 42.

Diagnosis : Carapace moderately broad, convex; surface granular, regions well defined. Front slightly deflexed, grooved and slightly sinuous at the middle. Antero-lateral borders crest-like, thin, sharp and divided into blunt lobes by narrow fissure, postero-lateral margins rather concave. Basal antenna-joint short, meeting the front only at its antero-external angle, flagellum short, lodged in the orbital hiatus. Antennules transversely folded. Orbits large, thick, short, more or less circular with three prominent suture lines near the outer angle; eye-stalks thick, short. Anterior border of merus of external maxillipeds slightly curved. Chelipeds equal in both sexes, fingers pointed, not hollowed at tips. Upper margin of leg joints sharp and cristiform. Male abdomen five jointed, 3rd to 5th segments fused.

Type species : *Xantho granulosa* Rüppell, 1830, by subsequent designation by Rathbun, 1930; gender : feminine.

52. *Platypodia semigranosa* (Heller, 1861)

1861. *Atergatis semigranosa* Heller, *Abhandl. Zool.-bot. Ges. Wien*, **11** : 6.
 1898. *Lophactaea semigranosa*, Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 101.
 1976. *Platypodia semigranosa*, Sakai, *Crabs of Japan and the Adjacent Seas* : 405, pl. 144, fig. 3.

Material examined : 1(M), Pamban, Dist. Ramnad, 22.02.1913, S.W. Kemp, Reg. No. 5703/1; 1(M), 1(F), Pamban, Dist. Ramnad, 24.02.1913, S.W. Kemp, Reg. No. 5710/1.

Measurement :

$$W = 15.5 \quad F = 4.5 \quad L = 10.5$$

Diagnosis : Carapace broad, transversely oval, regions well outlined by deep grooves, surface covered with pearl-like granules except mesogastric, post-cardiac region, supra-orbital border and outer surface of walking legs. Crest of antero-lateral borders cut into four broad segments by shallow notches. Front with a shallow incision at the middle, free edges granular and bow-shaped. Chelipeds subequal, upper border of arm and palm strongly crested, that of the latter adorned with 4-5 tubercles; outer surface of wrist and palm tuberculated, tubercles being larger on palm; fingers broad, hoof-like, chocolate brown, leaving no gap when closed. Walking legs strongly crested with a few sparse bristles on most of the joints. Male abdomen five-jointed, 3rd to 5th segments being fused, female abdomen consisting of seven distinct segments.

Type locality : Red Sea (Heller, 1861).

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu: Pamban. Andaman Islands.

Elsewhere : Red Sea, Mergui Archipelago, Sri Lanka, Amboina, Japan, Australia and as far as Hawaii.

Remarks : This species is so far recorded from east coast of India and Andaman Islands only.

Subfamily XANTHINAE MacLeay, 1838

1898. Xanthidae MacLeay, In : Smith, *Illustr. Zool. S. Afr. (Invert.)* : 59.
1851. Xanthinae, Dana, *Am. J. Sci. Arts*, ser. 2, **12** : 124.
1898. Xanthoida (in part), Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 77, 112.
1984. Xanthini, Serène, *Faune Tropicale*, **24** : 172.
2005. Xanthinae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 449, 451, *Zool. Surv. India*.

Diagnosis : Carapace transversely oval or hexagonal, generally broader than long. Front almost linear and cut into two lobes, without a marginal crest and fissured at the middle. Antero-lateral teeth usually four, often more.

Remarks : The subfamily contains 14 genera from the Indian Ocean, viz. *Macromedaeus*, *Leptodius*, *Dermania*, *Calmania*, *Xanthias*, *Paraxanthias*, *Lachnopodus*, *Neoxanthops*, *Calmania*, *Neoxanthias*, *Paraxanthodes*, *Nanocassiope*, *Epixanthops*, *Lioxanthodes* and *Metaxanthops*. Out of these, only the first 9 genera are known to occur in Indian waters. However, it is represented by three genera namely, *Macromedaeus*, *Leptodius* and *Dermania* in the present collection.

Key to genera of the subfamily
XANTHINAE

1. Carapace oval, chelipeds unequal, finger tips hollowed 2
Carapace pentagonal, chelipeds subequal or feebly unequal, fingers not hollowed at tips **Dermania**
2. Upper border of palm with prominences **Calmania**
Upper border of palm without prominences 3
3. Antennular fossa broad, third maxillipeds elongated with merus obviously as long as broad, first male pleopod with a group of numerous long curved subdistal spines and a bifurcated apex without mushroom-shaped tubercles **Macromedaeus**

Antennular fossa narrow and elongated, third maxillipeds squat, merus broad and projected at antero-external angle, first male pleopod with few short subdistal spines and an elongated apical lobe, bordered by mushroom-shaped tubercles **Leptodius**

Genus *Macromedaeus* Ward, 1942

1942. *Macromedaeus* Ward, *Bull. Maurit. Inst.*, **2**(2) : 92.
1984. *Macromedaeus*, Serène, *Faune Tropicale*, **24** : 175.

Diagnosis : Basal segment of antenna short and squat, antennular fossae broad. Outer maxillipeds elongated, merus as long as broad. Excavated extremities of fingers of chelipeds rounded. In male, first pleopod bearing a group of numerous long, curved subdistal spines with a bifurcated apex.

Type species : *Macromedaeus punctatus* Ward, 1942, by original designation; gender : masculine.

Remarks : The genus contains four species namely, *M. bidentatus* (A. Milne Edwards, 1867), *M. crassimanus* (A. Milne Edwards, 1867), *M. nudipes* (A. Milne Edwards, 1867) and *M. quinquedentatus* (Krauss, 1843) from Tamil Nadu. However, only one species has been dealt with in this communication.

53. *Macromedaeus quinquedentatus*
(Krauss, 1843)

1843. *Xantho 5-dentatus* Krauss, *Die Sudafrikanischen Crustaceen* : 30, pl. 1, figs 3a-d.
1898. *Xantho (Leptodius) euglyptus* Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 121.
1899. *Leptodius euglyptus*, Alcock and Anderson, *Illustr. Zool. "Investigator" Crust.* : 36, fig. 1.
1950. *Xantho (Leptodius) quinquedentatus*, Barnard, *Ann. S. Afr. Mus.*, **38** : 225, 41b, 42f, g.
1957. *Leptodius euglyptus quadrispinosus*, Chhapgar, *J. Bombay nat. Hist. Soc.*, **54**(2) : 31.
1984. *Macromedaeus quinquedentatus*, Serène, *Faune Tropicale*, **24** : 179, fig. 104, pl. 25 D-E.
2000. *Leptodius euglyptus*, Jeyabaskaran, Khan and

Ramaiyan, *Brachyuran Crabs of Gulf of Mannar* : 61, pl. 51b.

Material examined : 1(M), Pamban, Ramnad District, 24. 02. 1913, S. W. Kemp, Reg. No. C 5767/1; 1(M), 1(F), South of Krusadai Island, 04. 09. 1925, S.L. Hora, Reg No. C 5765/1.

Measurement :

W = 26.6	F = 3.7	L = 15.7
14.0	2.7	9.6

Diagnosis : Carapace broad, regions and areolations distinct in anterior two-thirds, smooth and flat in posterior one-third. Front projected beyond the orbit, cut at the middle by a deep V-shaped incision and separated from the outer orbital angle by a notch. Antero-lateral margins cut into five teeth (including outer orbital angle), first tooth rather blunt and inconspicuous, rest dentiform, fifth tooth smaller than the fourth. Anterior margin of merus of third maxillipeds notched almost medially. Chelipeds unequal, upper margin of arm setose, outer surface of wrist and palm strongly wrinkled, upper border of palm nodular; fingers broad, stout, chocolate brown in colour, their cutting margins strongly toothed, tips hollowed. Leg joints broad, stout; upper border of carpus, propodus and dactylus carinated, their outer surfaces granular, last segment conical, upper border of merus and lower border of propodus densely setose. Third to fifth segments of male segments fused together, sixth segment almost as long as broad.

Type locality : Natal Bay (Krauss, 1843)

Distribution : Indian Ocean. India. East coast-Tamil Nadu : Pamban, Krusadai Island (present record). West coast-Gujarat : Okha (present record). Andamans : North Andaman : Sound Island (present record); South Andamans : Aberdeen Bay, Port Blair (present record); Nicobars : Car Nicobar : Malacca (present record).

Elsewhere : South Africa, Mauritius, Sri Lanka, Malaysia, Australia and as far as Hawaii.

Remarks : Rugosities on wrist and palm of chelipeds have been found to be more marked in juvenile specimens. Denticles in between

antero-lateral teeth are also less pronounced in juvenile specimens. The present specimens differ from Barnard (*op. cit*) in respect of the following points :

- i. pterygostomian region of the present specimens are smooth and glabrous, not granulose and setose as reported.
- ii. first to third abdominal segments are not granular, these are rather smooth.

These crabs were reported to be associated mostly with the branching corals in Gulf of Mannar at 0.5–1.0 m., depth (Jeyabaskaran *et al.*, 2000).

Genus *Leptodius* A. Milne Edwards, 1863

1863. *Leptodius* A. Milne Edwards, *Annls. Sci. nat. (zool.)*, sér. 4, **20** : 284.

1898. *Xantho (Leptodius)* Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 117.

2000. *Leptodius*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No. 185* : 55.

Diagnosis : Carapace broad, suboval, moderately convex in anterior half, flat in posterior half, regions distinct and well lobulated in anterior two-thirds, but not in the posterior one third. Front slightly deflexed, sublaminar, notched in the middle line, separated from supra-orbital margin by a notch or groove. Antero-lateral borders curved, usually cut into four teeth or lobes, often more; postero-lateral borders as long as the chord of antero-laterals and convergent moderately. Basal antennal joint short; flagellum almost as long as orbit, meeting the front at inner angle and lodged in the orbital hiatus. Antennules transversely folded. Orbits suboval, their margins with two suture lines above and one just beneath the outer angle, lower edge with a prominent tooth at inner angle. Anterior border of merus of external maxillipeds almost transverse and usually with a small tooth near antero-lateral angle. Chelipeds unequal in both sexes, fingers pointed. Legs thick, subcylindrical, their upper margins often sharp. Male abdomen five-jointed, 3rd–5th segments fused.

Type species : *Chlorodius exaratus* H. Milne Edwards, 1834, by monotypy; gender : masculine. Name No. 874 on Official List.

Key to species of the genus *Leptodius*

- Antero-lateral border of carapace with four teeth (excluding the outer orbital angle) ..
..... *Leptodius exaratus*
- Antero-lateral border of carapace with five teeth (excluding the outer orbital angle) ..
..... *Leptodius sanguineus*

54. *Leptodius exaratus* (H. Milne Edwards, 1834)

1834. *Chlorodius exaratus* H. Milne Edwards, *Hist. Nat. Crust.*, Paris, 1 : 402.
1877. *Chlorodius (Leptodius) exaratus*, Kossmann, *Reise roth. Meer. Crust.* : 32, pl. 2, figs. 1-6.
1893. *Xantho exaratus* Ortmann, *Zool. Jb. (Syst.)*, 7(2) : 445.
1893. *Leptodius exaratus*, Henderson, *Trans. Linn. Soc. Lond. Zool.*, ser. 2, 5 : 362.
1898. *Xantho (Leptodius) exaratus*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 118.
2000. *Leptodius exaratus*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No. 185* : 56, pl. 3, fig. 2 and pl. 11, figs. 7, 8.

Material examined : 4(M), 4(F), Palk Strait, Marine Survey, Reg. No. 4398/7; 1(M), Krusadai Island, March, 1950, S.L. Hora and A.G.K. Menon, Reg. No. C 5830/1; 2(M), 1(F), Pamban, Dist. Ramnad, 24. 02. 1913, S.W. Kemp, Reg. No. C 5395/2; 3(M), Rameswaram, 03. 03. 1925, B. Chopra and H.S. Rao, Reg. No. C 5834/1; 1(F), Krusadai Island, Porites Bay, S.L. Hora, 16. 09. 1925, Reg. No. C 5827/1; 1(M), 1(F), Krusadai Island, Gulf of Mannar, March, 1950, S.L. Hora and A.G.K. Menon, Reg. No. C 2443/2.

Measurement :

W = 29.55	F = 7.6	L = 19.3
17.85	4.65	12.5

Diagnosis : Carapace smooth, transversely oval, moderately convex in anterior two-thirds, nearly flat in posterior one-third; regional and

subregional lobules well outlined by deep grooves. Front narrow, bilaminar; lobes square-cut, their free edges slightly concave, granular and inconspicuous. Antero-lateral borders cut into four acuminate teeth (excluding the outer orbital angle) -first tooth small, second tooth broad, low and acuminate, last two teeth sharply acuminate anteriorly. Upper border of orbit with two fissures, lower border with a prominent tooth at its inner angle; eye-stalk thick, short. Chelipeds massive, dissimilar; outer surface of arm smooth, that of wrist somewhat dimpled and wrinkled, its inner corner bearing a blunt conical tooth; palm smooth, its upper surface roughened with reticulating wrinkles; fingers dark brown, broad and stout with hollowed tips. Leg joints compressed, smooth and sparsely hairy along the anterior and posterior edges, dactylus granular and hairy along the edges as far as claw. Male abdomen narrow, five-segmented, third to fifth somites coalesced together; sixth segment longer than broad and divergent posteriorly; female abdomen consisting of seven free segments.

Type locality : Indian Ocean (H. Milne Edwards, 1834).

Distribution : Indo-West Pacific. India : East coast-Tamil Nadu : Palk Bay, Gulf of Mannar. West coast-Gujarat : Gulf of Kachchh; Maharashtra : Bombay (= Mumbai). Andaman Islands : North and South Andamans.

Elsewhere : East coast of Africa, Red Sea, Persian Gulf, Sri Lanka, Arakan coast, Mergui Archipelago, Malay Peninsula, Indonesia, Philippines, Japan, Polynesia, Australia and as far as Hawaii.

Remarks : The smallest and largest ovigerous female measured during this measurement were 17.85 and 21.7 mm respectively across their carapace width. Specimens bearing Reg. No. C 5395/2 were collected from backwater.

55. *Leptodius sanguineus* (H. Milne Edwards, 1834)

1834. *Chlorodius sanguineus*, *Hist. Nat. Crust.*, Paris, 1 : 402.

1861. *Chlorodius edwardsi* Heller, *Stizungsber. Math. Nat. Cl. K. Akad. Wiss. Wien.*, **43**(1) : 336.
1868. *Leptodius sanguineus* A. Milne Edwards, *Nouv. Archs. Mus. Hist. nat., Paris*, **4** : 71.
1893. *Xantho exaratus* var. *sanguineus* Ortmann, *Zool. Jb. (Syst.)*, **7**(2) : 447.
1898. *Xantho (Leptodius) sanguineus*, Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 119.
2000. *Leptodius sanguineus*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No. 185* : 57, pl. 3, fig. 3 and pl. 11, figs. 9, 10.

Material examined : 2(M), Palk Strait, Marine Survey, Reg. No. 4399/7.

Measurement :

$$W = 37.7 \quad F = 7.15 \quad L = 24.4$$

Diagnosis : Carapace broadly oval, little convex antero-posteriorly, regional and subregional lobules conspicuous and well demarcated. Antero-lateral border of carapace longer than postero-lateral and cut into five teeth (excluding the outer orbital angle) – first tooth small, second tooth broad, third and fourth very acute and distinct, fifth one rudimentary, another denticle in between and slightly below the outer orbital angle and first antero-lateral tooth. Chelipeds massive, unequal; outer surface of wrist and upper border of palm roughened with reticulating wrinkles; inner corner of wrist bearing a blunt conical tooth; fingers broad, dark brown, hollowed at tips; cutting edges of dactylus armed with three and that of fixed finger with two denticles. Front, orbits, legs and abdomen as in *L. exaratus*.

Type locality : Mauritius (H. Milne Edwards, 1834).

Distribution : Indo-West Pacific. India : East coast–Tamil Nadu : Palk Straits (present record). West coast–Maharashtra : Bombay (= Mumbai). Andaman and Nicobar Islands. Lakshadweep : Minicoy.

Elsewhere : West coast of South America, East Africa, South Africa, Red Sea, Persian Gulf, Pakistan, Mauritius, Sri Lanka, Arakan coast, Malay Peninsula, South China Sea, Japan, Australia, Polynesia and as far as Hawaii.

Genus *Demanian* Laurie, 1906

1906. *Demanian* Laurie, *Ceylon Pearl Oyster Fisheries, Supplementary Reports*, **5** : 396.
1815. *Xantho* Leach, *Trans. Linn. Soc. Lond.*, **11** : 320.
1861. *Lophoxanthus* A. Milne Edwards, *Miss. Sci. Mex. Crust.* : 256.

Diagnosis : Carapace pentagonal, moderately convex from front to back and flattened from side to side; regions well areolated and subdivided into many lobules; surface smooth. Antero-lateral borders blunt, cut into four lobes by shallow grooves; postero-lateral borders straight and strongly convergent. Front distinctly bilobed. Orbits large with three prominent sutures near its outer angle, eyes on short thick stalks. Antennules folded in a transverse oblique direction. Basal joint of antenna broad, flagellum very much shortened and lodged in the orbital hiatus. No ridges delimiting efferent branchial channels on the endostome. Merus of external maxillipeds pointed anteriorly. Chelipeds equal in both sexes, fingers not hollowed at tips. Legs with the upper border of merus, carpus and propodus and lower margin of propodus carinated. Abdomen consisting of 7 separate segments in both sexes.

Type species : *Demanian splendida* Laurie, 1906, by monotypy; gender : feminine.

56. *Demanian splendida* Laurie, 1906

1906. *Demanian splendida* Laurie, *Ceylon Pearl Oyster Fisheries, Supplementary Reports*, **5** : 397, pl. 1, fig. 8 and pl. 2, fig. 1.
1989. *Demanian splendida*, Davie, *Mem. Qd. Mus.*, **27**(2): 123, figs. 1, 2 and 3 a-c.
2005. *Demanian splendida*, Dev Roy and Bhadra, *Zool. Surv. India State Fauna Series 5 : Fauna of Andhra Pradesh (Part 5)* : 452, pl. 2, fig. 8).

Material examined : 1(M), Madras coast, January 1986, P. Krishnamurthy, Reg. No. C 3707/2.

Measurement :

$$W = 41.7 \quad F = 11.95 \quad L = 36.7$$

Diagnosis : Carapace smooth, roughly pentagonal in outline, convex from front to back

and also from side to side, regions well outlined and broken into lobules by deep grooves especially at the posterior half; protogastric, mesogastric and cardiac areas very distinct. Front projected considerably beyond the orbitals, deeply notched, forming two conspicuous bluntly pointed lobes; outer angle of larger lobe produced as distinct blunt forwardly directed tooth. Antero-lateral borders rounded, cut into four lobes by shallow grooves; postero-laterals straight and strongly convergent. Outer surface of third maxilliped smooth. Chelipeds symmetrical; outer surfaces of wrist and palm and upper and lower surfaces of arm polished with transverse squamiform sculpture resembling reminiscent of brain convolutions, their inner surfaces smooth; inner border of arm adorned with 3-4 blunt teeth, inner corner of wrist produced into a short, blunt tooth followed by a denticle just beneath it at the inner surface; upper border of palm armed with 4-5 blunt tubercles; fingers stout, meeting throughout their lengths, their tips pointed and whitish, cutting edges toothed throughout. Leg joints compressed, foliaceous, upper border of merus, carpus and propodus carinated; ventral border of merus with two ridges, anterior ridge more prominent running the entire length of the segment especially in fourth leg; dactyls more or less flattened antero-posteriorly bearing a longitudinal groove both at outer and inner surfaces, upper and lower borders fringed with dense hairs. Male abdomen consisting of seven distinct segments, sixth segment almost twice the length of any of its preceeding five, last segment also smaller than the sixth.

Type locality : Trincomalee, Sri Lanka (Laurie, 1906).

Distribution : Indo-West Pacific. India : East Coast-Tamil Nadu : Gulf of Mannar, Madras coast (present record); Andhra Pradesh : Visakhapatnam.

Elsewhere : Madagascar, Sri Lanka, East and West Australia.

Remarks : This species is so far recorded from east coast of India only.

Genus *Calmania* Laurie, 1906

1906. *Calmania* Laurie, In: W. A. Herdman (ed.), *Ceylon Pearl Oyster Fisheries, Supplementary Reports*, 5 : 406.

1976. *Calmania*, Sakai, *Crabs of Japan and the Adjacent Seas* : 439.

Diagnosis : Carapace subcircular, almost equal in length and breadth, convex from front to back, less so from side to side; only the cardiac region well defined, delimited anteriorly and antero-laterally by a groove. Antero-lateral borders feebly cut into four lobes. Fronto-orbital breadth about two-thirds the greatest breadth of carapace. Front about one-third its greatest breadth of carapace, rounded anteriorly and bilobed very distinctly, lobes not separated by notch or groove from the orbital border. One of the supra-orbital groove present, the other just indicated. Eye-stalk thick, short. Antennules folded longitudinally; basal joint of antenna broad, antennal flagellum slender, naked and much shortened, about one-fourth the length of carapace. No ridges delimiting efferent branchial channel in anterior portion buccal cavity. Merus of external maxillipeds broader than long, ischium slightly longer than broad, outer angle of merus rounded. Chelipeds massive, equal, not long; fingers markedly large, gaping proximally, their tips pointed; upper border of palm with two prominences, distal one much enlarged. Legs almost of same length as chelipeds and fringed with silky hair.

Type species : *Calmania prima* Laurie, 1906, by monotypy; gender : feminine.

Remarks : Systematic position of the genus *Calmania* is still uncertain. While erecting it as a new genus, Laurie (1906) placed the same under the family Xanthidae for the following reasons : 1. anterior epistomial margin of the buccal cavity is well defined, not overlapped by the external maxillipeds and 2. antennal flagellum which is slender. Laurie (*op. cit.*) kept the genus tentatively under the subfamily Chlorodiinae. Later on, Balss shifted it under Parthenopidae near the genus *Gonatonotus*. Flipse opposed the view of Balss but Gordon followed Balss. Sakai (1939) dealt the genus under the subfamily Pilmuninae in Xanthidae.

near to *Ralumia* Balss. Subsequently, in 1976, he transferred it under Xanthoida (= Xanthinae) following Serène (1969). In the present work too, the genus has been treated under the subfamily Xanthinae following Sakai (*op. cit.*).

The genus contains five species from the Indo-Pacific, *Calmania prima* Laurie, 1906 and *C. simodaensis* Sakai, 1939; *C. dalhi* (Balss, 1933); *C. sculptimana* (Tesch, 1918); *C. balssi* Serène and Umali, 1972 is presently synonymised with *Ralumia balssi* Sakai, 1935. Only the first species has been recorded from Indian waters (present record).

57. *Calmania prima* Laurie, 1906

1906. *Calmania prima* Laurie, In : W. A. Herdman (ed.), *Ceylon Pearl Oyster Fisheries, Supplementary Reports*, 5 : 407, pl. 1, fig. 12a-c.
1939. *Calmania prima*, Sakai, *Studies on Crabs of Japan and the Adjacent Seas* : 439, pl. 157, fig. 2 and text-fig. 232a.
1976. *Calmania prima*, Sakai, *Crabs of Japan and the Adjacent Seas* : 439, pl. 157, fig. 2 and text-fig. 232a.

Material examined : 1(F), Station 59, Gulf of Mannar, 11. 11.1889, "Investigator", Reg. No. 2155/7.

Measurement :

W = 7.1 F = 2.55 L = 7.1

Diagnosis : Carapace subcircular, equal in length and breadth, much broadened anteriorly, surface smooth but minutely punctuated, gastric region well indicated and much elevated. Front bilobed, lobes extended much beyond the eyes. Antero-lateral borders weakly cut into four broad lobes by three notches (including the outer orbital angle), postero-lateral borders parallel, narrowed and convergent. Chelipeds massive, equal; upper border of palm with a large prominence, inner surface smooth, outer surface sculptured; fingers broad, stout, their cutting margins strongly toothed, fixed finger flattened at its tip. Legs almost of equal length, slightly flattened laterally, surface smooth, glazed, their borders fringed with silky hairs.

Type locality : Sri Lanka (Laurie, 1806).

Distribution : Indo-Pacific. India : East coast– Tamil Nadu : Gulf of Mannar (present record).

Elsewhere : Sri Lanka, Japan.

Remarks : This present specimen was collected from a depth of 32 fathoms (= 58.24 m).

This crab is a new record to Tamil Nadu vis-a-vis India,

Subfamily ETISINAE Ortmann, 1893

1893. Etisinae Ortmann, *Zool. Jb. (Syst.)*, 7(2) : 429, 470.
1984. Etisinae, Serène, *Faune Tropicale*, 24 : 217.
2005. Etisinae, Dev Roy and Bhadra, *Zool. Surv. India State Fauna Series 5 : Fauna of Andhra Pradesh (Part 5)* : 455.

Diagnosis : Carapace smooth or finely granular, regions more or less delineated and projecting, but always indicated, antero-lateral teeth 4-8 with acute or subacute apices. Front straight, usually projecting, bilobed or quadrilobed, often almost straight with a markedly median fissure and a large lateral sinus separating it from the supra-orbital angles. Basal antennal segment with an external antero-lateral lobe occupying the orbital hiatus; antennal flagellum excluded from the orbit.

Genus *Etisus* H. Milne Edwards, 1834

1834. *Etisus* H. Milne Edwards, *Hist. Nat. Crust.*, 1 : 410.
- 1852a. *Etisodes* Dana, *Proc. Acad. Nat. Sci. Philad.*, 6 : 77 and 1852b. *U. S. Expl. Exped. Crust.*, 13(1) : 184.
1984. *Etisus*, Serène, *Faune Tropicale*, 24 : 218.
2005. *Etisus*, *Zool. Surv. India State Fauna Series 5 : Fauna of Andhra Pradesh (Part 5)* : 455.

Diagnosis : Carapace broad thick, regions well marked. Front narrow, laminar, separated from supraorbital border by a deep notch and splitted by a suture at the middle. Antero-lateral borders cut into 4-8 lobes or spiniform projections. Orbital margin with three sutures,

lower border of orbit with a very prominent tooth at the inner corner. Basal joint of antennae reaching up to the front, its outer angle produced, flagellum excluded from the orbit either by the produced lobe of basal joint or by the meeting of upper and lower inner orbital margins. Outer border of merus of third maxillipeds oblique. Chelipeds massive, slightly unequal in male; fingers stout, strongly curved, meeting at tips. Male abdomen with 3-5 segments fused.

Type species : *Cancer dentatus* Herbst, 1785, by subsequent designation by Glaessner, 1929; gender : masculine.

Remarks : The genus *Etisus* is represented by 20 species from the Indo-Pacific (Dev Roy and Bhadra, 2005) waters. The present collection, however, includes only one species.

58. *Etisus laevimanus* Randall, 1839

1839. *Etisus laevimanus* Randall, *Journ. Acad. Nat. Sci. Philad.* : 115.

1898. *Etisus laevimanus*, Alcock, *J. Asiat Soc. Bengal*, 67(2) : 131.

1927. *Etisus laevimanus*, Gravely, *Bull. Madras Govt. Mus.*, (N. S.), 1(1) : 146, pl. 23, fig. 31.

1957. *Etisus laevimanus*, Chhapgar, *J. Bombay nat. Hist. Soc.*, 54(2) : 431, pl. 9, figs. j-l.

Material examined : 4(M), 1(F), Palk Strait, 1893-94, Marine Survey, Reg. No. 4396/7; 3(M), 1(F), Krusadai Island near Pamban, B. Chopra and H. S. Rao, Reg. No. 291/2; 1(F), South of Krusadai Island, 04. 09. 1925, S. L. Hora, Reg. No. C 5675/1.

Measurement :

W = 65.2 F = 15.0 L = 40.8

Diagnosis : Carapace broad, smooth, regions well outlined and distinctly lobulated. Front grooved at the middle, free edges bow-shaped. Antero-lateral border cut into four broad lobes, last two lobes dentiform with sharp points turned forward. Tooth at inner angle of lower border of orbit reaching up to cave of orbit beyond the tip of the process of basal antenal joint. Chelipeds smooth, massive, subequal; wrist with a blunt tooth; fingers broad, hoof-

like, chocolate brown in colour, leaving a long gap when closed; their tips whitish. Leg joints spineless but fringed with hairs. Male abdomen five jointed, 3rd to 5th segments being fused, Sixth segment longer than broad; female abdomen consisting of seven distinct segments.

Type locality : Hawaii (Randall, 1839).

Distribution : India : East coast-Tamil Nadu : Rameswaram, Tuticorin, Krusadai Island, Kilakarai; Andaman Islands : Aberdeen Bay, West coast-Gujarat : Okha; Maharashtra : Bombay (= Mumbai); Lakshadweep.

Elsewhere : East coast of Africa, Seychelles, Réunion, Mauritius, Red Sea, Persian Gulf, Karachi, Singapore, Japan, Celebes and as far as Hawaii.

Remarks : Cutting edges of fingers of larger chelipeds are armed with a denticle. In smaller cheliped, cutting margins of both the fingers bear three denticles in both sexes. These, however, disappear upon ageing.

In both sexes, both the edges of leg joints bear long hairs. Upper border of merus, carpus, propodus and dactylus bear vesiculous granules. These are developed maximum in dactylus and then in propodus, the last segment also bears a brownish terminal claw.

Carapace width and length of the single ovigerous female measured 47.65 and 31.6 mm respectively.

This species occurs in both the coasts of India, Andaman Islands and Lakshadweep.

Subfamily CHLORODIINAE Alcock, 1898

1898. Chlorodiinae Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 78, 156.

1984. Chlorodiinae, Serène, *Faune Tropicale*, 24 : 11, 17, 232.

2000. Chlorodiinae, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No.* 185 : 59.

Diagnosis : Carapace transversely oval, hexagonal, circular or subcircular; smooth or granular; regions well demarcated or poorly indicated. Front broad and hardly projecting, its breadth less than 1/3rd the greatest breadth

of carapace, frontal margin with two large submedian lobes and two small lateral lobules separated from the supra-orbital angle by a weak concavity. Basal antennal segment generally without outer antero-lateral lobule, flagellum excluded from the orbit. Antero-lateral teeth 2-4, usually feeble often with acute apices eroded with age.

Remarks : This subfamily contains five genera from the Indian ocean, of which, three genera namely, *Pilodius*, *Phymodius* and *Chlorodiella* occurs in India. Only the last two genera are represented in the present collection.

Key to genera of the subfamily CHLORODIINAE

- Regions and areolae of carapace well sculptured ***Phymodius***
- Regions and areolae of carapace few and faint or absent altogether ... ***Chlorodiella***

Genus *Chlorodiella* Rathbun, 1897

1897. *Chlorodiella* Rathbun, *Proc. biol. Soc. Wash.*, 11 : 157.
1898. *Chlorodius*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 159.
1984. *Chlorodiella*, Serene, *Faune Tropicale*, 24 : 254.

Diagnosis : Carapace depressed, flat, hexagonal regions either not at all or faintly indicated. Fronto-orbital border exceeding 3/4th of its greatest breadth; front broad, nearly straight, obscurely emarginated at the middle, its lateral angles separated from supra-orbital margin by a groove. Antero-lateral borders shorter than postero-laterals and cut into four teeth or lobes. Orbits with two suture lines above, eye-stalk thick, short. Basal antennal joint large, extending into gap between front and sub-orbital tooth, flagellum subequal to orbit and lodged in crevice-like orbital hiatus. Anterior border of merus of outer maxillipeds nearly transverse. Chelipeds unequal, long; half or more of arm projecting beyond the edge of carapace, fingers large, broadened and spooned apically. Legs not keeled. Male abdomen five-jointed with 3rd to 5th segments fused.

Type species : *Cancer niger* Forskål, 1775.

Remarks : The genus *Chlorodiella* consists of nine species from the Indo-Pacific region, viz. *C. barbata* (Borradaile, 1900), *C. bidentata* (Nobili, 1901), *C. corallicola* Miyake and Takeda, 1968, *C. cytherea* (Dana, 1852), *C. laevisissima* (Dana, 1852), *C. miliaris* (A. Milne Edwards, 1873), *C. nigra* (Forskål, 1775), *C. oshimai* (Miyake and Takeda, 1967) and *C. xishaensis* Chen and Lan, 1978. Out of these, only two species namely, *C. laevisissima* and *C. nigra* occurs in India. Only the last species has been recorded from coastal mainland, the other being so far known from Andaman and Nicobar Islands.

59. *Chlorodiella nigra* (Forskål, 1775)

1775. *Cancer niger* Forskål, *Desc. Anim.* : 89.
1893. *Chlorodius niger*, Henderson, *Trans. Linn. Soc. Lond. Zool.*, ser. 2, 5 : 361.
1927. *Chlorodius niger*, Gravely, *Bull. Madras Govt. Mus. (N. S.)*, 1(1) : 145, pl. 23, fig. 3b.
1962. *Chlorodiella niger*, Sankarankutty, *J. mar. biol. Ass. India*, 4(1) : 134, figs. 30, 31.
1976. *Chlorodiella nigra*, Sakai, *Crabs of Japan and the Adjacent Seas* : 465, pl. 166, fig. 1.
1984. *Chlorodiella nigra*, Serène, *Faune Tropicale*, 24 : 258, fig. 168, pl. 36B.

Material examined : 2M, 3F, Rameswaram, B. Chopra and H.S. Rao, 03. 11. 1925, Reg. No. C 866/2; 11M, 4F, Near Pamban, Ramnad Dist., B. Chopra and H.S. Rao, February, 1925, Reg. No. C 5929/1; 3M, 3F, Porites Bay, Krusadai Island, 16. 09. 1925, Reg. No. C 5926/1; 2(M), Sandy Point, Krusadai Island, 02. 09. 1925, S.L. Hora, Reg. No. 5927/1; 1(M), 3(F), Krusadai Island, 02. 09. 1925, S. L. Hora, Reg. No. 5928/1.

Measurement :

W = 20.0	F = 7.5	L = 13.5
13.85	5.4	9.1

Diagnosis : Carapace flat, hexagonal, gastric region faintly subdivided into 3-5 areoles, surface smooth except for 1 or 2 low broad transverse wrinkles near antero-lateral borders. Front broad, about 1/3rd the greatest breadth

of carapace and cut into two lobes by a weak notch. Antero-lateral border with four lobes, first lobe small, very near to outer orbital tooth, third lobe largest. Chelipeds unequal, smooth to the naked eye; inner corner of wrist strongly produced; fingers stout, spooned at tip, chocolate black in colour, their cutting edges strongly dentate in larger chela, feebly so in smaller chela. Meropodites of legs armed with a subterminal spine on their anterior margins, legs hairy setose with fine bristles on the dorsal aspect of last three joints, dactylus spinulose on inner margin.

Type locality : Djeddah, Red Sea (Forskål, 1775).

Distribution: Indo-West Pacific. India : East coast–Tamil Nadu : Krusadai Island, Rameswaram, Pamban. Andaman Islands : South Andamans; Nicobars; Lakshadweep.

Elsewhere : East coast of Africa, Madagascar, Seychelles, Red Sea, Sri Lanka, Mergui Archipelago, Mekran coast, Japan, Australia and as far as Hawaii.

Remarks : The specimens examined agree well with the description of Alcock (1898) except the following variations :

i. Last two lobes of antero-lateral borders do not end in procurved spine-like points. In this aspect, it agrees with Sankarankutty (1962) who also expressed similar view from his studies from specimens of Andaman Islands.

ii. Tubercle, spine or crenulation on edges of arm are also not observed in the present specimens.

All specimens bearing Registration No. 5928/1 were collected from dead coral. This species has been reported as the most abundant reef crab in Gulf of Mannar occurring mostly in branching corals of the genera *Acropora*, *Montipora* and *Echinopora* (Jeyabaskaran *et al.*, 2000). It prefers dead corals than the live ones. This crab is not yet recorded from the west coast. The largest and smallest ovigerous female recorded during this study were 12.25 and 10.95 mm respectively across the carapace width.

Genus *Phymodius* A. Milne Edwards, 1863

1863. *Chlorodius (Phymodius)* A. Milne Edwards, *Annls. Sci. nat. (Zool.)*, sér. 4, **20** : 283.

1873. *Phymodius*, A. Milne Edwards, *Nouv. Archs. Mus. Hist. nat. Paris*, **9** : 217.

1898. *Phymodius*, Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 161.

1950. *Phymodius*, Barnard, *Ann. S. Afr. Mus.*, **38** : 215.

1984. *Phymodius*, Serène, *Faune Tropicale*, **24** : 245.

Diagnosis : Carapace moderately flat, transversely oval or hexagonal but never very broad; regions well defined and divided into numerous convex areoles, surface smooth or finely granulose. Fronto-orbital border about half the greatest breadth of carapace. Front distinctly bilobed, lateral angles of each of which forming a distinct lobule. Orbital margin with two grooves above and one at the outer angle; eyes on short, thick stalks. Basal antennal joint large extending into gap between front and suborbital angle. Antero-lateral border almost equal in length to postero-lateral border and cut into four lobes or teeth. Anterior margin of merus of external maxillipeds transverse. Chelipeds stout, unequal, about half the arm and projecting beyond edge of carapace; fingers large, strongly curved, broadened and deeply hollowed at tip. Legs with upper edges of merus, carpus and propodus sharply spinose. Male abdomen five-jointed.

Type species : *Phymodius unguatus*, H. Milne Edwards, 1834, by subsequent designation by Rathbun (1930).

Remarks : This genus can at once be separated from its allied genus *Chlorodius* by the extensive and distinct areolation of carapace, narrower front and by the spiny armature on dorsal border of legs.

The genus contains six valid taxa namely *P. drachi* Guinot, 1964, *P. granulatus* (Targioni Tozzetti, 1877), *P. granulosus* (De Man, 1888), *P. monticulosus* (Dana, 1852), *P. nitidus* (Dana, 1852) and *P. unguatus* (H. Milne Edwards, 1834). Only the last three species have been recorded from Indian coasts, Bay islands and Lakshadweep. However, our present collection contains only the last named species.

60. ***Phymodius ungulatus*** (H. Milne Edwards, 1834)

1834. *Chlorodius ungulatus* H. Milne Edwards, *Hist. Nat. Crust.*, 1 : 400, pl. 16, figs. 6–8.
1893. *Phymodius ungulatus*, Henderson, *Trans. Linn. Soc. Lond. Zool.*, ser. 2, 5 : 362.
1898. *Phymodius ungulatus*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 162.
1950. *Phymodius ungulatus*, Barnard, *Ann. S. Afr. Mus.*, 38: 216, fig. 40 i, j.
1976. *Phymodius ungulatus*, Sakai, *Crabs of Japan and the Adjacent Seas* : 463, pl. 165, fig. 3.
1984. *Phymodius ungulatus*, Serène, *Faune Tropicale*, 24 : 251, pl. 35 E and figs. 158, 161.

Material examined : 1M, Palk Strait, Marine Survey, Reg. No. 4515/7.

Measurement :

$$W = 11.65 \quad F = 4.35 \quad L = 8.3$$

Diagnosis : Carapace hexagonal, depressed; surface smooth, granular under binocular; regional and sub-regional boundaries well demarcated by deep furrows, areolae 2M longitudinally divided, 2F oval, and widely separated and 2P extending almost to median line. Front distinctly bilobed, outer lobe prominent and deeply separated from the markedly convex median lobe. Antero-lateral teeth four, their apices sharply conical. Chelipeds unequal, granular; anterior margin of arm sharply serrated with numerous tubercles, distal 2-3 claw-like; upper surface of wrist and upper as well as inner and outer surfaces of palm studded with well-spaced pustule-like tubercles, those on the outer surface being arranged in longitudinal series; inner corner of wrist strongly pronounced with bifid tip, upper tooth much larger; fingers broad, stout and hoofed at tip; dactylus moderately curved, its upper margin bearing five tubercles proximally, cutting edges of dactylus with 2 and immobile finger with 3 denticles at their proximal end. Leg joints covered with fine granules and scattered hairs, upper border of merus with 5-6 sharp spines, carpus and propodus also bearing 1-2 and 3-4 spinules respectively. Sixth segment of male abdomen

distinctly longer than broad, seventh somite slightly longer than broad.

Type locality : Australasia (H. Milne Edwards, 1834).

Distribution : Indo-West Pacific. India : East coast–Tamil Nadu : Palk Strait (present record), Gulf of Mannar. Andaman Islands : South Andamans; Nicobar Islands : Car Nicobar; Lakshadweep.

Elsewhere : East coast of Africa, Red Sea, Maldives, Mauritius, Sri Lanka, Japan, Polynesia, Australia, Carolines, Ternate, Capricorn Group and Hawaii.

Remarks : This crab is mostly associated with live corals of the genera *Acropora* and *Montipora* and also among dead corals of *Pocillopora damicornis* (Jeyabaskaran *et al.*, 2000).

Family TRAPEZIIDAE Miers, 1886

1886. Trapeziinae Miers, *Report H. M. S. "Challenger" Brachyura*, 17 : 163.
1893. Trapeziidae Ortmann, *Zool. Jb. (Syst.)*, 7(2) : 481.
1898. Trapezioida Alcock, *J. Asiat. Soc. Bengal*, 68(2) : 177.
1984. Trapeziidae, Serène, *Faune Tropicale*, 24 : 265

Diagnosis : Carapace sub-quadrilateral, pentagonal or transversely oval in outline, usually dorsoventrally flattened, bare with smooth or finely granulate surface; regions undefined. Antero-lateral borders parallel, postero-lateral margins convergent backwards from the lateral epibranchial spine. Front almost straight, broad, projected beyond orbits and divided into lobes four lobes or teeth, often finely denticulate or sometimes with only two lobes. Antennae small, slender, excluded from the orbits, basal joint not reaching the front. Merus of third maxillipeds shorter than ischium but not much broader than long. Endopod of second maxillipeds composed of four distinct segments (merus, carpus, propodus and dactylus). Eye-stalks short, not concealed by shallow orbits. Chelipeds slightly unequal, palm either smooth or very finely granular. Male abdomen five-jointed.

Type genus : *Trapezia* Latreille, 1825.

Remarks : Alcock (*op. cit.*) treated Trapezioida as an alliance under the subfamily Eriphiinae. Serène (*op. cit.*) divided Trapeziidae into two subfamilies Trapeziinae Miers, 1886 and Domeciinae Ortmann, 1893. But presently, Domeciinae is elevated to the rank of a family, the family Trapeziidae as such now consists of a single subfamily only.

Subfamily TRAPEZIINAE Miers, 1886

1886. Trapeziinae Miers, *Report H.M.S. "Challenger", Brachyura*, 17 : 163
 1898. Trapeziinae, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 177.
 1984. Trapeziinae, Serène, *Faune Tropicale*, 24 : 17, 265.

Diagnosis : Carapace depressed, nearly quadrilateral, smooth with dorsal regions undefined, postero-lateral angles truncated. Antero-lateral borders straight, forming a right angle with the front and either entire or with one lateral epibranchial tooth. Front broad, horizontal, lobed or denticulate, projecting over antennules and bases of antennae. Merus of third maxillipeds shorter than ischium but not much broader than long. Second maxilliped with its endopod made up of four distinct segments (merus, carpus, propodus and dactylus).

Remarks : Members belonging to this subfamily are usually symbiotic to live corals. The two genera *Trapezia* and *Tetralia* are inhabitants of hermatypic corals especially of *Pocillopora* and *Acropora*. Other three genera of the family namely, *Sphenomerides*, *Calacocarcinus* and *Quadrella* are known to live symbiotically with Gorgonidae, Nephtheidae and Antipatharinae, rarely with ahermatypic hexacoralline corals.

Key to genera of the subfamily TRAPEZIINAE

- Chelipeds not much unequal; arm long, depressed, 2/3rd visible beyond carapace; front lobed or dentate ***Trapezia***

- Chelipeds markedly unequal; arm short, 1/2 visible beyond carapace; front almost straight and finely denticulate ... ***Tetralia***

Genus *Trapezia* Latreille, 1825

1825. *Trapezia* Latreille, *Encycl. Meth.*, 10 : 695 and *Fam. Nat.* : 269.
 1898. *Trapezia*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 217.
 1894. *Trapezia*, Serène, *Faune Tropicale*, 24 : 267.

Diagnosis : Carapace sub-quadrilateral, pentagonal or transversely oval in outline, not much convex; surface bare, smooth, without distinction of regions or finely granular with the regions feebly indicated. Front broad, straight, four-lobed (with inner orbital angle appearing six-lobed), often finely denticulated or sometimes with only two lobes. Antero-lateral borders subparallel, postero-lateral borders convergent. Basal antennal joint short and slender, not reaching the front, antenna excluded from the orbit, flagellum almost as long as orbit. Endopod of second maxilliped composed of four distinct segments (merus, carpus, propodus and dactylus); merus of third maxilliped shorter than ischium, but not much broader than long. Chelipeds subequal, long and strong, arm with its anterior margin cristate and serrate, fingers with sharp cutting edges and pointed tips. Male abdomen five-jointed, 3rd-5th segments fused.

Type species : *Trapezia dentifrons* Latreille, 1825, subsequent designation by Desmarest, 1858; gender : feminine.

61. *Trapezia ferruginea* Latreille, 1825

1825. *Trapezia ferruginea* Latreille, *Encycl. Meth.*, 10 : 695.
 1898. *Trapezia ferruginea*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 220.
 1976. *Trapezia ferruginea*, Sakai, *Crabs of Japan and the Adjacent Seas*: 507, pl. 182, fig. 2.
 1984. *Trapezia ferruginea*, Serène, *Faune Tropicale*, 24 : 273, fig. 180, pl. 38C.

Material examined : 2(M), 9(F), Palk Strait, Dr. A.R. Anderson, Reg. No. 2079/10.

Measurement :

$$\begin{array}{ccc} W = 8.45 & F = 3.35 & L = 7.1 \\ 16.5 & 5.9 & 13.5 \end{array}$$

Diagnosis : Carapace flat, pentagonal in outline; surface smooth, polished, without trace of regions. Front broad, 4-lobed but not very prominent, suborbital tooth not so sharp. Antero-lateral margins subparallel, an acute procurved tooth at the junction with the postero-lateral borders in male but blunt and almost inconspicuous in female (visible under binocular). Chelipeds subequal in both sexes; anterior margin of arm foliaceous and cut into 5-6 teeth; outer surface of wrist and palm smooth and polished; fingers broad, crossing each other and pointed at tips, their cutting edges very feebly toothed especially the immobile finger, dactylus almost equal in length to the upper border of palm and bearing rather dense golden silky bristles.

Type locality : Unknown.

Distribution : Indo-West Pacific. India: East coast-Tamil Nadu : Palk Strait (present record), Gulf of Mannar. Andaman islands : South Andamans; Nicobars Islands : Nancowry Harbour; Lakshadweep : Minicoy.

Elsewhere : Red Sea, Seychelles, Madagascar, Reunion islands, Comores, Sri Lanka, Japan, Sulu Sea, Paumotu, Tahiti, Hawaii, Easter Island, Ellice Island and Society islands.

Remarks : Teeth on the anterior margin of arm of chelipeds are long and sharp in male but broad and blunt in female. In one specimen (female), spine of the lateral border of carapace is acute while in a male specimen of the same population spine has been noted to be blunt and almost obsolete.

This species has been recorded as obligate symbiont in the corals namely, *Acropora* and *Pocillopora damicornis* in Gulf of Mannar (Jeyabaskaran *et al*, 2000).

The smallest and largest egg-bearing female noted during this study are 7.6 and 16.5 mm respectively across the carapace width.

Genus *Tetralia* Dana, 1851

1851. *Tetralia* Dana, *Am. J. Sci. Arts.*, ser. 2, **12** : 128.
 1898. *Tetralia*, Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 223.
 1950. *Tetralia*, Barnard, *Ann. S. Afr. Mus.*, **38** : 279.
 1984. *Tetralia*, Serène, *Faune Tropicale*, **24** : 279.

Diagnosis : Carapace similar to *Trapezia* in form differing from it in the following points : Front straight or slightly convex, finely denticulate and hardly separated from supra-orbital angles with margins evenly convex. Antero-lateral borders without any spine or notch. Basal joint of antenna produced in a narrow process between supra- and infra-orbital angles, flagellum excluded from the orbit. Chelipeds markedly unequal. Legs stout, merus short and broad, almost foliaceous. Male abdomen with seven separate segments.

Type species : *Cancer glaberrimus* Herbst, 1790, by monotypy; gender feminine.

62. *Tetralia glaberrima* (Herbst, 1790)

1790. *Cancer glaberrimus* Herbst, *Versuch. Naturgesch. Krabben Krebse*, **1**(2) : 262, pl. 20, fig. 115.
 1898. *Tetralia glaberrima*, Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 223.
 1950. *Tetralia glaberrima*, Barnard, *Ann. S. Afr. Mus.*, **38** : 280, fig. 52c, d.
 1976. *Tetralia glaberrima*, Sakai, *Crabs of Japan and the Adjacent Seas* : 511, pl. 183, figs. 1, 2, 4.
 1984. *Tetralia glaberrima*, Serène, *Faune Tropicale*, **24** : 281.

Material examined : 1(M), Pamban, Ramnad District, Feb. 1925, B. Chopra and H.S. Rao, Reg. No. C 5392/2.

Measurement :

$$W = 10.7 \quad F = 4.85 \quad L = 10.9$$

Diagnosis : Carapace almost as long as broad, flat, smooth with short pubescence near frontal and lateral margins. Front nearly straight and evenly and finely denticulate. Lateral borders curved very little anteriorly and convergent posteriorly. Chelipeds markedly unequal; anterior border of arm expanded and

finely denticulate distally, more so in larger than in smaller cheliped, a furred roundish pit at base on upper outer surface of palm of larger chela; fingers much shorter than palm, dactylus strongly curved, hook-like, immobile finger with a truncate tip. Legs short, stout culminating in a curious little blunt claw, merus broad and flat, both the edges of propodus and dactylus and only the upper margin of carpus sparsely hairy.

Type locality : Unknown.

Distribution : Indo-West Pacific. India. East coast–Tamil Nadu : Tuticorin, Pamban (present record), Krusadai Island. Andaman Islands : Neill Island. Lakshadweep : Minicoy.

Elsewhere : South Africa, East coast of Africa, Madagascar, Red Sea, Seychelles, Sri Lanka, Mergui Archipelago, Mekran coast, Hong Kong, Japan, Palau, Java, New Caledonia, Tahiti, Paumotu Archipelago.

Family PILUMNIDAE Samouelle, 1819

1819. Pilumnidae Samouelle, *Entom. Useful Compend.* : 86.
 1978. Pilumnidae, Guinot, *Bull. Biol. Fr. Belg. (N.S.)*, **112**(3) : 274.
 1984. Pilumnidae, Serène, *Faune Tropicale*, **24** : 11.

Diagnosis : Carapace thin or thick, inflated or not, surface sharply or plainly granular. Antero-lateral borders generally shorter than the postero-laterals and armed with spines or teeth. Front bilobed, outer angle of each forming an independent tooth or spine-like lobule, separated from the supraorbital angle by a notch or groove. Basal joint of antenna may or may not be in contact with front. Abdomen elongated, narrow, covering most of sternite 4 and with a locking mechanism. Genital openings coxal or coxo-sternal.

Key to subfamilies of the family PILUMNIDAE

1. Carapace pentagonal, no endostomial crests 2
- Carapace xanthoid, narrow, dorsally concave with a narrow posterior margin, endostomial crest present 3

2. Male abdomen with an elongated telson, its length exceeding twice the greatest length of other abdominal segments, Chelipeds bearing large bullous tubercles, antero-lateral borders bearing four rounded lobes HALIMEDINAE
- Male abdomen normal, chelipeds bearing vesiculous granules, antero-lateral borders with short and slender spines GALENINAE
3. Carapace granular or spinose with setae on most of its surface and near antero-lateral margins, regions well defined and areolated PILUMNINAE
- Carapace smooth or feebly granular on small part of its surface and with more or less small tufts of setae in certain areas only, regions either not at all or only feebly indicated and unareolated RHIZOPINAE

Subfamily GALENINAE Alcock, 1898

1898. Galenoida Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 77 [corrected to Galeninae by Alcock, 1898: 136].
 2005. Galeninae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series 5* : (Part 5) : 458, Zool. Surv. India.

Diagnosis : Carapace broad, pentagonal, approaching the quadrilateral. Antero-lateral border hardly longer than the postero-lateral. Basal antennal joint not meeting the front. Male abdomen consisting of seven distinct segments.

Genus *Galene* De Haan, 1833

1833. *Galene* De Haan, *Fauna japon. (Crust.)* : 19
 1898. *Galene*, Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 136.
 1976. *Galene*, Sakai, *Crabs of Japan and the Adjacent Seas* : 441.
 2005. *Galene*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series, 5*(Part 5) : 459, Zool. Surv. India.

Diagnosis : Carapace roughly quadrilateral, strongly convex from front to back, less so from side to side, surface granular in parts or almost smooth. Front bilobed or quadridentate and deflexed obliquely. Antero-lateral borders

moderately curved and indistinctly four lobed, last 2 or 3 lobes spine-like. Orbital margin with three distinct grooves in the vicinity of its outer angle. Eye-stalk thick, of moderate length. Antennules transversely folded. Basal joint of antenna broad, extremely short, not reaching up to the front, flagellum lodged in the orbital hiatus. Anterior margin of third maxilliped slightly oblique. No ridges defining efferent branchial canals on the endostome. Chelipeds unequal, massive in both the sexes, fingers pointed. Legs long, stout. Male abdomen consisting of seven distinct segments.

Type species : *Cancer bispinosa* (Herbst, 1783).

63. *Galene bispinosa* (Herbst, 1790)

1790. *Cancer bispinosus* Herbst, *Versuch Naturgesch. Krabben Krebse*, 1(2) : 144, pl. 6, fig. 45.
 1898. *Galene bispinosa*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 136.
 1998. *Galene bispinosa*, Deb, *Fauna of West Bengal, State Fauna Series*, 3(Part 10) : 371, Zool. Surv. India.
 2005. *Galene bispinosa*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series* 5(Part 5) : 459, pl. 2, fig. 9, Zool. Surv. India.

Material examined : 1(M), Station 4, Royapuram shore, Madras, 06. 10. 1960, Dr. A. Daniel, Reg. No. 1178/2.

Measurement :

W = 60.05 F = 10.5 L = 44.25

Diagnosis : Carapace broader than long, almost pentagonal in shape, strongly convex from front to back, less so from side to side; surface smooth for the most part, rough near the borders especially the postero-lateral borders; regions indistinct, only the cardiac and intestinal areas recognizable marked by strong grooves in large specimens. Front bilobed both inner and outer angles of each lobe equally prominent giving the appearance of 4-dentate. Antero-lateral margins quadrilobate first two obsolete, last two marked by spine-like teeth; posterior margin about half the greatest breadth of carapace. Chelipeds massive, unequal; upper border of arm with two strong teeth at its distal end; inner corner of wrist adorned with two

obtuse teeth, outer corner with a long stout teeth, lower outer part covered with enlarged granules; upper border of palm shorter than dactylus, outer surface studded with tubercles proximally; fingers pointed, crossing each other, their opposed margins bearing strong, molariform teeth. Legs long, stout; upper border of merii scabrous and spinulate, those of carpus, propodus and dactylus and lower border of propodus and dactylus plumose. Male abdomen consisting of seven distinct segments, sixth segment rectangular and slightly broader than long.

Type locality : Unknown.

Distribution : Indo-Pacific. India : East coast— Tamil Nadu : Parangipettai coast, Gulf of Mannar; Andhra Pradesh : Visakhapatnam; Orissa : Gopalpur Coast; West Bengal : Matla River, Gangetic Delta, Sandheads. West coast— Maharashtra : Bombay (= Mumbai).

Elsewhere : Tenasserim, Singapore, Hong Kong, South China, Taiwan, Japan and Australia.

Remarks : This species occurs at both the coasts of India.

The present specimen was collected from a rocky area.

Subfamily HALIMEDINAE Alcock, 1898

1898. Halimedinae Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 1
 1984. Halimedinae, Serène, *Faune Tropicale*, 24 : 11, 17.

Diagnosis : Carapace pentagonal. Front prominent, almost straight or bilobed. Male abdomen with an elongated telson, its length being more than twice the greatest length of any other abdominal segments. No endostomial crest.

Genus *Halimede* De Haan, 1835

1835. *Halimede* De Haan, In : Siebold, *Fauna japon. (Crust.)* : 35.
 1898. *Halimede*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 135.
 1976. *Halimede*, Sakai, *Crabs of Japan and the Adjacent Seas* : 386.

Diagnosis : Carapace pentagonal. Front prominent, almost straight or bilobed. Endostomial crest absent. Telson of male abdomen very much elongated.

Type species : *Cancer (Halimede) fragifer* De Haan, 1835, by monotypy; gender feminine.

64. *Halimede ochtodes* (Herbst, 1790)

1790. *Cancer ochtodes* Herbst, *Versuch. Naturgesch. Krabben Krebse*, 1(2) : 158, pl. 8, fig. 54.

1898. *Polycræmnus ochtodes*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 135.

Material examined: 2(M), Off Tondi, Madras Presidency, 17. 03. 1914, J. Hornell, Reg. No. 8906/10; 1(M), Madras, 23.12.1976, Reg. No. 6108/3; 1(MO, Madras coast, Marine Survey, Reg. No. 4417/7.

Measurement :

W = 34.8 F = 6.5 L = 26.7

Diagnosis : Carapace roughly hexagonal, strongly convex from front to back, less so from side to side, surface smooth and little lumpy, regions not much distinct. Frontal lobes two, their tips rounded with finely granular margins, each lobe separated from the other by a narrow, deep groove. Antero-lateral margin deeply cut into four rounded lobes, last two biggest; postero-laterals almost smooth. Chelipeds stout and equal; outer surface of arm bearing pearly tubercles and its upper border also with tubercles; inner corner of wrist beset with two similar tubercles, one below the other; outer surface of wrist covered with pustulose tubercles; upper border of palm and basal half of dactylus also with a row of similar tubercles, outer surface also bearing pustulose tubercles proximally; fingers broad and stout leaving no gap when closed, their tips crossing each other. Leg joints smooth, dactylus and lower border of propodus furred at its distal end. Male abdomen with seven distinct joints, sixth segment distinctly broader than long, last segment abruptly long and acute.

Type locality : Unknown.

Distribution : Indo-Pacific. India : East

coast—Tamil Nadu : Madras coast, Parangipettai coast, Gulf of Mannar; Orissa : Gopalpur coast.

Elsewhere : Red Sea, Malay Peninsula, Gulf of Thailand and Japan.

Remarks : So far, this species is known from the east coast only. The present specimen bearing was collected from a depth of 5⁷/₈ fathoms (= 10.69 m. approx.).

Subfamily PILUMNINAE Samouelle, 1819

1819. *Pilumnidae* Samouelle, *Entom. Useful Compend.* : 86.

1898. *Pilumninae*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 176, 190.

1984. *Pilumninae*, Serène, *Faune Tropicale*, 24 : 11, 15.

2005. *Pilumninae*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5 : 461, Zool. Surv. India.

Diagnosis : Carapace granular or spinose, usually covered with dense tomentum on most of its surfaces and near antero-lateral margins. Regions more or less distinct. Antero-lateral borders cut into three prominent teeth behind the outer orbital angle. Chelipeds dissimilar, strongly granular or even spinose and at least partly covered with setae.

Key to genera of the subfamily PILUMNINAE

- Carapace rough, granular and tomentose. Outer lobule of front dentiform or spiniform, well-separated from the inner supra-orbital angle by a notch ***Pilumnus***
- Carapace smooth and glabrous. Outer lobule of front not well marked ***Glabropilumnus***

Genus *Pilumnus* Leach, 1815

1815. *Pilumnus* Leach, *Trans. Linn. Soc. Lond.*, 11 : 321.

1898. *Pilumnus*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 190.

1987. *Pilumnus*, Deb, *Bull. zool Surv. India*, 8(1-3) : 301.

2000. *Pilumnus*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No.* 185 : 62.

Diagnosis : Carapace transversely oval or subquadriangular, anteriorly declivous, flattened posteriorly and not much broader than long; regions well marked and areolated. Front bilobed, outer angle of each of which forming a tooth or spine-like lobule, separated from the supra-orbital angle by a groove or notch. Antero-lateral borders shorter than the postero-laterals and cut into spiny teeth. Basal antennal joint may or may not reach the front; flagellum long, exceeding the major diameter of orbit. Antennules transversely folded. Orbits with one or two gaps or notches on the upper border; lower border also with a gap or fissure, inner angle of lower orbital border generally sharp and distinct; eye-stalks moderately long, slender. Endostomial ridges plain, not very high. Antero-lateral border of merus of external maxillipeds almost transverse and without any notch. Chelipeds stout, subequal; fingers rough and short, tips pointed. Legs stout. Male abdomen consisting of seven distinct segments, Carapace, chelipeds and legs thickly covered with shaggy coat of hairs.

Type species : *Cancer hirtellus*, 1761, by monotypy; gender : masculine. Name No. 384 on Official List.

Key to species of the genus *Pilumnus*

- Free margins of front strongly denticulated, strong crenulation in between antero-lateral teeth *P. longicornis*
- Free margins of front not denticulated, no crenulation in between antero-lateral teeth *P. minutus*

65. *Pilumnus longicornis* Hilgendorf, 1878

1878. *Pilumnus longicornis* Hilgendorf, Sitz. phys. math. Kl., Monatsber. K. Preuss. Akad. Wiss. Berlin, 1878: 794, pl. 1, figs. 8, 9.
1898. *Pilumnus longicornis*, Alcock, J. Asiat. Soc. Bengal, 67(2) : 193.
1898. *Pilumnus andersoni*, Alcock, J. Asiat. Soc. Bengal, 67(2): 194.
1957. *Pilumnus longicornis*, Chhapgar, J. Bombay nat. Hist. Soc., 54(2) : 435, pl. 10, figs. m-o.
1968. *Pilumnus longicornis*, Takeda and Miyake, O.

H.M.U., Occ. Pap. Zool. Lab. Fac. Agric. Kyushu Univ., 1(1) : 53, figs. d-f.

1976. *Pilumnus longicornis*, Sakai, Crabs of Japan and the Adjacent Seas: 484, 486, pl. 175, fig. 1.

Material examined : 1(M), Palk Strait, Marine Survey, Reg. no. 1511/7.

Measurement :

W = 20.9 F = 6.5 L = 15.1

Diagnosis : Carapace roughly hexagonal, glabrous, convex, anteriorly declivous posteriorly flat, unareolated, anterior 1/3rd of its surface covered with vesiculous granules, only the gastric and cardiac regions well demarcated. Front deeply cut at the middle into two broad lobes, their edges strongly denticulated. Antero-lateral margins cut into three procurved spiniform teeth, of which, first one smallest, rest two subequal, their bases being strongly granular. Upper orbital margin finely denticulate, lower orbital margin strongly toothed. Chelipeds unequal; both the margins of arm and outer surface of wrist sharply granular; inner angle of wrist produced into a stout spine, below this two more teeth present, lowermost one being the smallest; upper and outer surfaces of palm of larger chela smooth excepting a few tubercles proximally on the upper border; in smaller chela, outer surface bearing sharp, erect tubercles arranged in longitudinal series; cutting edges of fingers strongly dentate, upper border of dactylus granular bearing three denticles. Merus of leg joints armed with 4-5 spines on the upper border; upper border of propodus and dactylus bearing short, silky golden pubescens and longer hairs. Sixth segment of male abdomen longer than broad.

Type locality : Inhambane, S.E. Africa (Hilgendorf, 1878).

Distribution : Indo-West Pacific. India : East coast–Tamil Nadu : Palk Strait (present record). West coast–Gujarat : Okha; Maharashtra : Bombay (= Mumbai); Andaman and Nicobar Islands : Port Blair, Nicobars.

Elsewhere : East coast of Africa, Persian Gulf, Madagascar, Mauritius, Chagos

Archipelago, Pakistan, Mergui Archipelago, Mekran, Singapore, Gulf of Thailand, Japan, Indonesia, Celebes, Torres strait, Australia, New Zealand and as far as Hawaii.

Remarks : This is the first report of the occurrence of this crab from the east coast of mainland India.

66. *Pilumnus minutus* (De Haan, 1835)

1835. *Cancer (Pilumnus) minutus* De Haan, In : Siebold, *Fauna japon. (Crust.)* : 50, pl. 3, fig. 2.
 1873. *Pilumnus minutus*, A. Milne Edwards, *Nouv. Arch. Mus. Hist. nat., Paris*, 9 : 250.
 1907. *Pilumnus hirsutus*, Stimpson, *Smithson. Misc. Coll.*, 49 : 69, pl. 9, fig. 1.
 1898. *Pilumnus hirsutus*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 197.
 1962. *Pilumnus hirsutus*, Sankarankutty, *J. mar. biol. Ass. India*, 4(1) : 144.
 1968. *Pilumnus minutus*, Takeda and Miyake, *O.H.M.U.*, 1(1) : 40, figs. 9 d-e.
 1976. *Pilumnus minutus*, Sakai, *Crabs of Japan and the Adjacent Seas* : 487, pl. 174, fig. 2 and text-fig. 260.

Material examined : 4(M), 3(F), Madras Harbour, S.W. Kemp, 04. 05. 1915, Reg. No. C 2025/2.

Measurement :

W = 12.55	F = 4.0	L = 9.7
17.5	4.4	12.7

Diagnosis : Carapace and its appendages covered with short, silky golden pubescens and longer hairs, the latter being more numerous on anterior half of carapace, chelipeds and legs. Carapace hexagonal, about 3/4th as long as broad; strongly convex from front to back, less so from side to side; regions hardly distinguishable. Antero-lateral margins cut into three procurved spiniform teeth (excluding the orbital angle), of which, last one smallest, first two subequal. Front broad, about a third the greatest breadth of carapace, bilobed, their edges very finely and evenly denticulate, separated from the orbital border by a shallow notch. Chelipeds unequal in both sexes; both the margins of arm and outer surface of wrist

studded with large rounded granules; wrist with a strong spine at its inner angle; upper and outer surfaces of palm (excepting lower portion of larger chela) bearing rows of strong, raised granules, the granules becoming spiniform towards upper border; fingers smooth, stout and glabrous, their outer surfaces grooved with longitudinal channels, cutting edges strongly dentate; smaller chela more densely clothed, its wrist and palm armed with numerous sharp spinules interspersed with long setae. Meropodites of legs with 2-3 spines on their upper borders. Sixth segment of male abdomen broader than long.

Type locality : Japan (De Haan, 1835).

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu : Palk Straits (present record). West coast—Kerala : Trivandrum. Andaman Islands : Port Blair.

Elsewhere : Red Sea, Maldives, Providence Islands, Amirante Island, Mergui Archipelago, Malacca strait, Singapore, Gulf of Thailand, Amboina, Philippines, Taiwan, Japan and Australia.

Remarks : This is the first report of this crab from the east coast of mainland India. With the present collection, this species is now recorded both from the coasts of India including the Andaman Islands.

Genus *Glabropilumnus* Balss, 1932

1932. *Glabropilumnus* Balss, *Zeitschr. Wiss. Zool.*, 142 : 516.
 1969. *Glabropilumnus*, Takeda and Miyake, *OHMU, Occ. Pap. Zool. Lab. Fac. Agr. Kyushu Univ.*, 2 : 130.

Diagnosis : Carapace smooth, rather convex in both directions; dorsally glabrous or hairy only in frontal region, Front bilobed, lobes truncated bearing no lateral lobule and separated from supra-orbital angle by a small incision. Antero-lateral border with three denticles, teeth usually low and subtruncated. Chelipeds very unequal, larger palm smooth and naked. Male abdomen seven-jointed. First male pleopod somewhat *Pilumnus*-type.

Remarks : The genus contains nine species from Indo-Pacific waters viz. *G. dispar* (Dana, 1852), *G. edmensis* (De Man, 1888), *G. gordonae* Balss, 1935, *G. kasijani* Serène, 1969, *G. laevimanus* (Dana, 1852), *G. laevis* (Dana, 1852), *G. latimanus* Gordn, 1934, *G. seminudus* (Miers, 1884) and *G. sodialis* (Alcock, 1898).

It is represented by a single species in India. Deb (1987) dealt the genus under Pilmuninae, family Xanthidae.

67. *Glabropilumnus laevis* (Dana, 1852)

1852. *Pilumnus laevis* Dana, *U. S. Explor. Exped.*, **13**(1) : 238.

1888. *Pilumnus laevis*, De Man, *J. Linn. Soc. Zool.*, **22** : 66, pl. 4, figs. 1, 2.

1898. *Pilumnus ? laevis*, Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 199.

1932. *Glabropilumnus laevis*, Balss, *Zeitschr. Wiss. Zool.*, **142** : 516.

1969. *Glabropilumnus laevis*, Takeda and Miyake, *OHMU, Occ. Pap. Zool. Lab. Fac. Agr. Kyushu Univ.*, **2** : 134, figs. 14a-d.

Material examined : 2(F), Krusadai Island, Gulf of Mannar, September, 1925, F.H. Gravely, Reg. No. 1801/1.

Measurement :

W = 5.2 F = 2.2 L = 4.6

Diagnosis : Carapace slightly broader than long, subcircular, strongly convex from front to back, less so from side to side, surface smooth (excepting subhepatic region), polished and unareolated; regions ill defined. Front slightly produced, bilobed, lobes truncated and separated from the supra-orbital angle by a narrow incision. Antero-lateral border cut into three teeth (excluding outer orbital angle) – first tooth low, truncated, least prominent, continuous with the outer orbital angle; second tooth gently rounded but more prominent than the former, third one broad and subacute, fourth tooth acute. Postero-lateral border moderately convergent and considerably longer than antero-laterals. Chelipeds stout, unequal; wrist covered with microscopic granules, its inner corner produced into a stout tooth, a supplementary one below the main tooth, the

latter being often low and ridge-like; palm smooth and glossy; fingers broad, stout and strongly curved, tips not hollowed, cutting edge of immobile finger strongly dentate bearing a conspicuous molariform tooth proximally. Leg joints smooth, unarmed and sparsely hairy along the borders.

Type locality : Mangsi Island, Straits of Balabac (Dana, 1852)

Distribution : Indo-Pacific. India : East coast - Tamil Nadu : Krusadai Island.

Elsewhere : Mergui Archipelago, Java, Japan and Strait of Balabac.

Remarks : The specimens examined agree well with the description of Takeda and Miyake (1969) although some variations have been observed These are :

- i. No hair behind the front
- ii. No tuft of hair on proto and gastric regions
- iii. In the shape of first antero-lateral spine which is broad and truncated.

This species is a new record to India vis-à-vis Tamil Nadu.

Subfamily RHIZOPINAE Stimpson, 1858

1858. Rhizopidae Stimpson, *Proc. Acad. nat. Sci., Philad.* : 95.

1898. Rhizopinae, Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 287, 293, 317, 318.

1976. Rhizopinae, Sakai, *Crabs of Japan and the Adjacent Seas* : 522, 541.

2005. Rhizopinae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series 5*(Part 5) : 464, *Zool. Surv. India*.

Diagnosis : Antero-lateral corners of carapace cut away and rounded off. Front either square-cut and broad or narrow, almost distinctly bilobed and deflexed. Antennules transversely folded, very often crumpled and folded obliquely or sometimes not at all folded in their fossae; antennal flagellum generally short. Eye-stalks often fixed, cornea small or obsolete, infraorbital border running downwards toward the epistome. Buccal cavern squarish, often diminished in breadth

anteriorly. External maxillipeds completely close the buccal cavern or with a gap left between them. Epistome either well-defined and prominent or ill defined and sunken. Male abdomen not covering the entire space between the last pair of legs.

Key to genera of the subfamily RHIZOPINAE

1. Eyes well formed 2
Eyes obsolete ***Typhlocarcinus***
2. Regions of carapace well-defined, antero-lateral borders deeply cut into 4-5 strong teeth, front much narrowed
..... ***Benthopanope***
Regions of carapace indistinct, antero-lateral borders cut into 4 broad lobes by faint notches, carapace broad
..... ***Pseudolitochira***

Genus ***Benthopanope*** Davie, 1989

1989. *Heteropanope*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 207.
1989. *Benthopanope* Davie, *Mem. Qd. Mus.*, 27(2) : 143.
2005. *Benthopanope*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 465, *Zool. Surv. India*.

Diagnosis : Carapace convex along the mid-line, flat from side to side across the branchial regions. Regional strongly defined by granular dorsal crests. Frontal margin protruding with prominent median lobes, almost sinuous laterally with distinct lateral lobules. Antero-lateral margins cut into 4-5 teeth, first lobe often develop a secondary tooth distinct from the exorbital angle. Orbits more or less kidney-shaped, infraorbital margin with a large triangular tooth at the inner end visible in dorsal view. Eye-stalk thick, short. Basal antennal joint broad, subrectangular; flagellum extremely long, extending much beyond the orbitals. Merus of third maxilliped much shorter than ischium. Chelipeds unequal, massive. Legs of moderate length and unarmed; second pair longest, dactyli about the same length as propodi or slightly longer than propodi and

culminating in an acute chitinous tip. Male abdomen consisting of seven separate segments. Sternal plastron with the fused segments 3-4 relatively short and broad, sternite 8 visible distinctly laterally beside the male abdomen.

Type species : *Benthopanope estuaries* Davie, 1989; gender : feminine; by designation by Davie, 1989, *Mem. Qd. Mus.*, 27(2) : 143.

68. ***Benthopanope indica*** (De Man, 1888)

1888. *Heteropanope indica* De Man, *J. Linn. Soc. London*, 22 : 53, pl. 3, figs. 1,2.
1898. *Heteropanope indica*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 208.
1989. *Benthopanope indica*, Davie, *Mem. Qd. Mus.*, 27(2) : 144.
1998. *Heteropanope indica*, Deb, *Fauna of West Bengal, State Fauna Series*, 3(Part 10) : 374, *Zool. Surv. India*.
1995. *Benthopanope indica*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 465, *Zool. Surv. India*.

Material examined : 1(M), Madras, Station 16, Ennur, 10.05.1918, Reg. No. C 954/2; 1(F), Ennur Backwater, Madras, 19.01.1925, Dr. N. Annandale, Reg. No. C 9162/10; 1(M), Cuddalore, Dist. Cuddalore, 11.01.1957, Reg. No. C 953/2.

Measurement :

W = 18.4	F = 5.35	L = 14.3
13.7	3.4	9.6

Diagnosis : Carapace small, hexagonal, broader than long, slightly convex; surface finely granular bearing a few sparsely distributed short hairs especially near the margins; regions poorly indicated; two short transverse elevated granular ridges present on each side of the epigastric lobe; another two transverse ridges also run on each side of the protogastric lobe, of which, outer ridge about half of its inner ridge; below that, another pair of slightly oblique elevated granular line extend near the third and fourth antero-lateral teeth. Front broad and bilobed, outer angle dentiform and well separated from the supraorbital edges, frontal edges crenated. Antero-lateral borders

deeply cut into four prominent teeth (including the outer orbital angle)—first tooth broad, low, squarish; second tooth also broad but much narrower than the first, high and acuminate; third and fourth triangular but rather acute and directed obliquely forward, third being the most prominent; fourth tooth smallest; outer margin of all teeth crenated. Chelipeds markedly unequal in both sexes but more so in male; in larger cheliped, upper border of arm marked with a strong, broad and curved tooth at its distal end, outer surface finely granular near the upper part but otherwise smooth; inner corner of wrist adorned with a short but strong tooth, outer surface granular; outer surface of palm pitted and covered with microscopic granules on the upper part, rest smooth; fingers stout, chocolate brown in colour, meeting at tips, their cutting edges armed with 3-4 large teeth; in smaller cheliped, upper margin of palm crenated, outer surface roughened with larger granules, fingers ridged longitudinally. Leg joints hairy, dactylus almost as long as the propodus, culminating in small horny tips; upper and lower border of leg joints and their outer surfaces granulated. Male abdomen consisting of seven distinct segments, penultimate segment sub-quadrate, slightly broader than long.

Type locality : Mergui Archipelago (De Man, 1888).

Distribution : Indo-Pacific. India : East coast—Tamil Nadu : Ennur Backwater, Cuddalore (present record); Andhra Pradesh : Sekhinetiipalli; Orissa : Chilka lake; West Bengal : Salt Lake. West coast—Karnataka : Murudeswar. Andaman Islands : Port Blair.

Elsewhere : Pakistan, Sri Lanka, Myanmar and Japan.

Remarks : This species occurs in both the coasts of India including Andaman Islands.

Genus *Typhlocarcinus* Stimpson, 1858

1858. *Typhlocarcinus* Stimpson, *Proc. Acad. nat. Sci. Philad.* : 41.
1898. *Typhlocarcinus*, Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 321.

1964. *Typhlocarcinus*, Serène, *Vidensk. Medd. fra Dansk naturh. Foren*, **126** : 203.
1976. *Typhlocarcinus*, Sakai, *Crabs of Japan and the Adjacent Seas* : 543.
2005. *Typhlocarcinus*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series 5*(Part 5) : 466, *Zool. Surv. India*.

Diagnosis : Carapace deep, subquadrilateral with the anterior angles rounded off, regions indistinct. Front bilobed. Antero-lateral borders well arched, sometimes emarginated; postero-lateral borders parallel. Orbits small and in usual position, eye-stalk immovable, eyes obsolete or nearly so. Basal joint of antenna short, flagellum lodged in orbital hiatus. Antennules transversely folded. Epistome prominent, external maxillipeds closed by buccal cavern completely or almost fully. Chelipeds unequal or subequal; palm short, deep and compressed. Legs slender, unrmmed; third pair longest, dactyli styliform. Abdomen consisting of seven distinct segments in both sexes.

Type species : *Typhlocarcinus nudus* or *Typhlocarcinus villosus* Stimpson, 1858; gender : masculine.

Remarks : The genus *Typhlocarcinus* contains six valid taxa from the Indo-Pacific region namely, *T. nudus* Stimpson, 1858, *T. villosus* Stimpson, 1858, *T. rubidus* Alcock, 1900, *T. dentatus* Stephensen, 1945, *T. thorsoni*, Serène, 1964 and *T. craterifer* Rathbun, 1914. Out of these, first three species occurs in Indian waters. *Xenophthalmodes moebii* Richters, 1880 synonymised with *T. rubidus* by Serène (1964) is presently considered as a distinct species by Ng (1987).

Key to species of the genus *Typhlocarcinus*

- Buccal cavern diminishing in size from back to front, antero-external angle of merus of external maxillipeds obsolete and rounded off *T. nudus*
- Buccal cavern squarish, antero-external angle of merus sharp *T. villosus*

69. *Typhlocarcinus nudus* Stimpson, 1858

1858. *Typhlocarcinus nudus* Stimpson, *Proc. Acad. nat. Sci. Philad.* : 96.

1900. *Typhlocarcinus nudus*, Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 322.

Material examined : 3(M), Madras coast, Reg. No. 479-481/10.

Measurement :

W = 7.75 F = 4.0 L = 5.1

Diagnosis : Carapace deepish, subquadrilateral with the anterior angles rounded off, much broader than long, surface finely granulated (if observed under the lens) especially near epibranchial and post-frontal areas, regions indistinct. Antero-lateral borders with faint notches towards its posterior part, postero-lateral borders parallel. Front broad, grooved at the middle, bilobed, free edges finely granular. Buccal cavity increasing in size from back to front, antero-external angle of merus of maxillipeds obsolete and rounded off, exognath very narrow. Chelipeds subequal, almost smooth; outer and inner surface of arm granular, lower border of arm produced into a strong, blunt tooth; outer surface of wrist smooth, inner edges granular; upper border of palm smooth, crest-like, lower border distinctly ridged from wrist-joint to almost to the tip of fixed finger, fingers long, pointed and crossing each other at tips, their cutting edges adorned with 2-3 strong teeth. Abdomen seven-jointed, terminal segment longer than broad.

Type locality : Hong Kong (Stimpson, 1858).

Distribution : Indo-Pacif. India East coast—Tamil Nadu : Madras coast; West Bengal : Sandheads. Andamans.

Elsewhere : Pakistan, Mekran coast, Singapore, Gulf of Thailand, Hong Kong and Japan.

70. *Typhlocarcinus villosus* Stimpson, 1858

1858. *Typhlocarcinus villosus* Stimpson, *Proc. Acad. nat. Sci. Philad.* : 96.

1900. *Typhlocarcinus villosus*, Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 322.

1964. *Typhlocarcinus villosus*, Serène, *Vidensk. Medd. fra Dansk naturh. Foren*, **126** : 209, fig. 4 and pl. 17C.

Material examined : 3(M), Palk Strait, Reg. No. 4523/7.

Measurement :

W = 8.85 F = 4.1 L = 6.4

Diagnosis : Carapace deep, squarish, regions hardly distinguishable, branchial part tumid. Lateral borders cut into three granular teeth, of which, first two antero-lateral and last two postero-lateral. Front broad, notched at the middle, free edges coarsely granular. Buccal cavity squarish, antero-external angle of merus of external maxillipeds distinct but not produced. Chelipeds unequal; outer surface of arm, wrist and palm coarsely granular, inner corner of wrist produced into a blunt spine, both the edges of arm granulated, crest of upper border of palm coarsely granular, fingers compressed, ridged longitudinally and crossing each other leaving no gap when closed; in smaller cheliped, two rows of coarse granules run parallel from proximal part of palm to almost to the tip of dactylus. Lower border of palm also granular but smooth (near the fixed finger) distally. Leg joints smooth, dactylus almost as long as the propodus.

Type locality : Hong Kong (Stimpson, 1858).

Distribution : Indo-Pacific. India : Tamil Nadu : Palk Strait.

Elsewhere : Bay of Bengal, Gulf of Thailand, Hong Kong, Japan, Timor and Sumba.

Remarks : This species is reported for the first time from Indian waters. The report of the occurrence of the species in Gulf of Iran by Stephensen (1945) and in Red Sea by Monod (1938) are, however, doubtful.

Genus *Pseudolitochira* Ward, 1942

1942. *Litochira* Kinahan, *J. Roy. Soc. Dublin*, **1** : 121.

1895. *Heteropilumnus* De Man, *Zool. Jb. (Syst.)*, **8**(4) : 527.

1901. *Litichira*, Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 313.

1942. *Pseudolithochira* Ward, *Bull. Maurit. Inst.*, **2**(2) : 52.
1976. *Heteropilumnus*, Sakai, *Crabs of Japan and the Adjacent Seas* : 492.
1987. *Pseudolithochira*, Ng, *Indo-Malayan Zoology*, **4** : 97.

Diagnosis : Carapace broader than long, flattish, regions indistinct. Antero-lateral borders either entire or with minute teeth. Front less than half the width of carapace and abruptly declivous. Antennae lodged in orbital hiatus. Chelipeds equal in size.

Type species : *Carcinoplax integer* Miers, 1884, by monotypy; gender feminine.

Remarks : The genus contains two species namely, *Pseudolithochira integra* (Miers, 1884) and *P. decharmoyi* (Bouvier, 1915). Only the first one occurs in Indian waters (present record).

71. *Pseudolithochira integra* (Miers, 1884)

1884. *Carcinoplax integra* Miers, *Zool. H.M.S. "Alert"* : 543, pl. 48, fig. c.
1898. *Lithochira integra*, Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 314.
1976. *Heteropilumnus integra*, Sakai, *Crabs of Japan and the Adjacent Seas* : 493, text-figs. 264a.
1987. *Pseudolithochira integra*, Ng, *Indo-Malayan Zoology*, **4** : 79 (list only)

Material examined : 1(F), Madras coast, Marine Survey, 1893-94, Reg. No. 4525/7.

Measurement :

W = 6.8 F = 4.0 L = 4.7

Diagnosis : Carapace subquadrilateral, deepish, without distinction of regions, surface covered with fine granules. Antero-lateral borders curved and faintly cut into two lobules besides the outer orbital angle. Front broad, much deflexed, not well separated from the supra-orbital angles and divided into two lobes by a small median incision, free margins of these lobes somewhat arched. Eyes on short, thick stalks. Chelipeds massive, subequal, less than twice the length of carapace and much shorter than legs; outer surface of arm, wrist and palm finely granular; inner corner of wrist

dentiform; fingers broad, pointed, slightly sulcated longitudinally and crossing each other, tips naked. Leg joints unarmed; merus, carpus and propodus compressed; dactylus slender, shorter than propodus and in last pair little curved upward towards their corneous claw.

Type locality : Seychelles (Miers, 1884).

Distribution : Indo-West Pacific. India : East coast-Tamil Nadu.

Elsewhere : Red Sea, Mauritius, Seychelles, Mergui Archipelago and Bonin Island.

Remarks : The species is a new record to India vis-à-vis Tamil Nadu.

Family CARPILIDAE Ortmann, 1893

1893. Carpilidae Ortmann, *Zool. Jb. (Syst.)*, **7**(2) : 429.
1984. Carpilidae, Serène, *Faune Tropicale*, **24** : 17, 302.
2000. Carpilidae, Dev Roy and Bhadra, *Rec. zool. Surv. India, Occ. Paper No. 185* : 15, 64.

Diagnosis : Carapace broad, transversely oval and strongly convex. Front moderately broad. Antero-lateral borders strongly curved, thick, entire with a prominent epibranchial tubercle. Basal joint of antenna long, flat; antennary flagellum exceedingly small, less than half the diameter of orbit. Antennules obliquely folded, nearly transversely. Anterior border of merus of external maxillipeds very oblique. Chelipeds stout, unequal and smooth. Legs thin, smooth, subcylindrical. Male abdomen comprising of six segments.

Type genus : *Carpilius* Desmarest, 1823

Genus *Carpilius* Desmarest, 1823

1823. *Carpilius* Desmarest, *Dict. Sci. Nat.*, **28** : 228.
1898. *Carpilius*, Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 78.
2000. *Carpilius*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No. 185* : 64.

Diagnosis : Carapace broadly oval, convex in both directions, smooth excepting some rough pittings inside the frontal and antero-lateral borders and without indication of regions. Front moderately broad, deflexed, 3-lobed, middle lobe conspicuous and bilobulate.

Antero-lateral borders strongly curved, thick and entire with a small but prominent tubercle at the junction of antero- and postero-lateral borders. Basal antennal joint long, flat, reaching the cleft between front and infra-orbital plate; flagellum exceedingly small, less than half the diameter of orbit and lodged in the cleft. Antennules folded obliquely transversely. Orbits circular, margins entire; upper edge thickened forming a distinct blunt tooth at its junction with the antero-lateral margin. Chelipeds massive, unequal and smooth; fingers bluntly pointed, larger cheliped with one or two molariform teeth, smaller cheliped with a blunt cutting edge. Leg joints smooth, subcylindrical. Male abdomen six-jointed, third and fourth fused with obliteration of sutures, fifth segment immovably adherent to the fourth.

Type species : *Cancer maculatus* Linnaeus 1758, by subsequent designation by International Commission on Zoological Nomenclature, 1956; gender: masculine. Name No. 777 on Official List.

Remarks : This genus is represented by two species from Indian coasts both of which have been recorded from Tamil Nadu. However, our present collection contains a single species only.

72. *Carpilius maculatus* (Linnaeus, 1758)

1758. *Cancer maculatus* Linnaeus, *Syst. Nat.*, 12th ed., 1042.

1898. *Carpilius maculatus*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 79.

2000. *Carpilius maculatus*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No. 185* : 66, pl. 3, fig. 7 and pl. 12, figs. 5, 6.

Material examined : 1(M), Palk Straits, Marine Survey, Reg. No. 4388/7.

Measurement :

W = 91.0 F = 27.3 L = 67.5

Diagnosis : Carapace very thick, convex from front to back, surface smooth except some rough pittings near lateral margins and the front; regions not defined. Front broad, obliquely deflexed; middle lobe prominent and decidedly bilobulate, separated from the laterals by a deep

notch; free margins smooth and thick Antero-lateral borders strongly curved, thick and entire with a blunt prominent tooth at its proximal extremity; postero-lateral borders straight and strongly convergent. Chelipeds massive, unequal and smooth; dactylus much shorter than palm and strongly curved in larger cheliped; cutting edges of both the fingers of larger cheliped armed with a large molariform tooth at their proximal ends; in smaller cheliped, fingers crossing each other and their cutting margins bearing indistinct teeth. Leg joints smooth, subcylindrical, glabrous; dactylus claw-shaped and grooved, tips chocolate brown even in long preserved specimen. Male abdomen six-jointed, third and fourth segments fused, fifth somite immovably articulated to the fourth, sixth segment much broader than long.

Type locality : Asia (Linnaeus, 1758).

Distribution : Indo-West Pacific. India : East coast-Tamil Nadu : Palk Strait, Gulf of Mannar. Islands : Andamans; Lakshadweep; Nicobars.

Elsewhere : East coast of Africa, Red sea, Madagascar, Maldives, Japan, Australia and Hawaii.

Remarks : The eleven large dark spots of carapace characteristic of this species has completely disappeared due to long preservation. This is in contrast to Alcock's (1898) observation who remarked that those spots never fade away even in very old museum specimens.

This crab is not yet recorded from the west coast. In the eastern coast, it is, however, not known to occur elsewhere except Tamil Nadu.

The present specimen was, however, collected from reef.

Family ERIPHIIDAE Macleay, 1838

1838. Eriphidae MacLeay, In : Smith, *Illustr. Zool. S. Afr. (Invert.)* : 59, 60 [corrected to Eriphiidae by Stimpson, 1870 in *Bull. Mus. comp. Zool. Harvard*, 2 : 141].

2005. Eriphiidae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 469, Zool. Surv. India.

Diagnosis : Carapace xanthoid-shaped, narrow and convex dorsally. Antero-lateral margins spinose. Front very broad, half or more the greatest breadth of carapace. Basal antennal-joint not reaching the front. Chelipeds unequal and weakly dissimilar, smaller cheliped without noticeably elongated fingers.

Type genus : *Eriphia* Latreille, 1817.

Remarks : The family Eriphiidae is currently divided into three subfamilies as discussed earlier by Dev Roy and Bhadra (2005)—all are represented in Tamil Nadu.

Key to subfamilies of the family ERIPHIIDAE

1. Carapace thick, smaller chelipeds without noticeably elongated fingers 2
Carapace dorsally flattened, smaller chelipeds with noticeably elongated fingers OZIINAE
2. Antero-lateral margins entire bearing spinules or tubercles ERIPHIINAE
Antero-lateral margins cut into lobes, teeth, spines or spinules MENIPPINAE

Subfamily OZIINAE Dana, 1851

Diagnosis : Carapace xanthoid-shaped, very broad, dorsally flattened, less so medially; antero-lateral margins lobate or dentate. Chelipeds unequal and very dissimilar, smaller cheliped with noticeably elongated fingers.

Remarks : Inadvertently the author of this subfamily was cited as Alcock (1898) by Das and Dev Roy (2000) which should be Dana, 1851.

Genus *Sphaerozius* Stimpson, 1858

1958. *Sphaerozius*, *Proc. Acad. nat. Sci., Philad.*, **10** : 35.
1886. *Sphaerozius*, Miers, *Report H.M.S. "Challenger" Brachyura*, **17** : 144.
1950. *Sphaerozius*, Barnard, *Ann. S. Afr. Mus.*, **38** : 253.

Diagnosis : Carapace transversely oval, convex; except gastric, other regions

inconspicuous. Front bilobed, each lobe separated from the inner supra-orbital tooth by a weak notch. Antero-lateral borders longer than the postero-lateral and cut into four teeth. Basal joint of antenna 2 not reaching the front. Chelipeds stout, unequal; fingers tips pointed. Male abdomen consisting of 7 distinct segments.

Type species : *Sphaerozius nitidus* Stimpson, 1858, by subsequent designation by the International Commission on Zoological Nomenclature, in Opinion 85, in Smithsonian Miscellaneous Collections, **73**(3) : 17 (1925); gender : masculine. Name No. 372 on Official List.

Remarks : Deb (1987) dealt this genus under the family Xanthidae.

73. *Sphaerozius nudus* (A. Milne Edwards, 1867)

1867. *Actumnus nudus* A. Milne Edwards, *Annls. Soc. Ent. Fr., sér.*, **4**, **7** : 265
1888. *Actumnus nudus*, De Man, *J. Linn. Soc. Zool.*, **22** : 49, pl. 2, figs. 4,5.
1898. *Actumnus nudus*, Alcock, *J. Asiat. Soc. Bengal*, **67**(2) : 207.

Material examined : 2(F), Madras coast, 1972, Dr. Sundar Raj, Reg. No. C 1721/2; 1(F), Station-14, Madras, Reg. No. C 1708/2.

Measurement :

W = 15.5	F = 3.9	L = 11.85
14.65	4.3	10.4

Diagnosis : Carapace subcircular, convex, regions almost indistinct, epigastric, mesogastric, hepatic and branchial regions obscurely outlined by shallow cervical suture; front, epigastric lobes, gastric regions and the antero-lateral areas studded with pearly granules, of which, 9-12 are arranged in an arcuate line with the convexity directed forward separating antero-lateral region from the postero-lateral. Front strongly deflexed, cleft at the middle by a small, median triangular incision into two rounded oblique lobes, their free margins crenulated. Antero-lateral border longer than the postero-lateral and cut into four,

broad, tooth-shaped lobes (excluding the outer orbital angle) - third lobe broadest, last lobe carinated, carinae granular. Chelipeds markedly unequal; outer surface of arm smooth, that of wrist and palm studded with pearl-like granules, inner surface of palm smooth; fingers broad, spoon-shaped with pointed crossing tips, fixed finger with a molariform tooth at its middle. Outer surface of leg joints smooth, upper border of carpus and propodus granular.

Type locality : Pondicherry (A. Milne Edwards, 1867).

Distribution : Indian Ocean. India : East coast-Tamil Nadu: Madras (present record); Pondicherry. West coast-Karnataka : Mysore coast.

Elsewhere : Mergui, Sumatra (present record)

Remarks : This species was described by A. Milne Edwards from materials obtained from Pondicherry in 1867. This is the first record of the occurrence of this crab from Tamil Nadu.

Subfamily MENIPPINAE Ortmann, 1893

1893. Menippinae Ortmann, *Zool. Jahrb. Syst.*, 7(2) : 431.
 1898. Menippinae, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 176.
 1976. Menippinae, Sakai, *Crabs of Japan and the Adjacent Seas* : 468.

Diagnosis : Carapace Xanthoid shaped or transversely oval. Antero-lateral margins usually with lobes, teeth, spine or spinules. Abdomen with seven segments.

Genus *Menippe* De Haan, 1833

1833. *Menippe* De Haan, In : Siebold, *Fauna japon, (Crust.)*, (1) : 21.
 1898. *Menippe*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 177.
 2005. *Menippe*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 470, *Zool. Surv. India*.

Diagnosis : Carapace thick, broad, transversely oval; except the gastric, other

regions ill defined. Antero-lateral margin strongly curved and cut into four teeth. Front narrow, horizontal and cut into two conspicuous lobes, outer angle of each of which forming a distinct tooth. Orbits circular, with three well marked grooves near the outer angle. Eye-stalks short, thick. Basal antennal joint not reaching up to front, flagellum long and lodged in orbital hiatus. Antennules folded almost transversely. Anterior margin of merus of third maxillipeds slightly sinuous but not excised. Endostomial crests low, faint. Chelipeds robust, slightly unequal in both sexes; fingers stout, pointed, not hollowed. Male abdomen of separate segments

Type species : *Cancer rumphii* Fabricius, 1798, by subsequent designation by Glaessner, 1929 : 253; gender : masculine.

74. *Menippe rumphii* (Fabricius, 1798)

1798. *Cancer rumphii*, Fabricius, *Ent. Syst. Suppl.* : 336.
 1898. *Menippe rumphii*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 178.
 1998. *Menippe rumphii*, Deb, *Fauna of West Bengal, State Fauna Series*, 3(Part 10) : 373, *Zool. Surv. India*.
 2005. *Menippe rumphii*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5): 470, pl. 3, fig. 1, *Zool. Surv. India*.

Material examined : 1(F), South of Krusadai Island, 04.09.1925, S.L. Hora, Reg. No. C 5619/1; 1(F), Station-114, Madras, Reg. No. C 5615/1; 1(M), Madras, Reg. No. C 5622/1.

Measurement :

$$W = 35.85 \quad F = 7.55 \quad L = 25.8$$

Diagnosis : Carapace broad, slightly convex longitudinally, rather declivous towards the front and the antero-lateral margins, surface pitted; only the gastric region distinct and subdivided into three lobes by shallow grooves; a faintly marked arcuate granular line running almost parallel with the curve of the antero-lateral border traverse the branchial regions. Front bilobed, each lobe consisting of two rounded lobes, of which, inner one about twice

as broad as the outer one. Antero-lateral borders almost as long as the postero-laterals and cut into four lobes (excluding the outer orbital angle) of which, posterior two teeth dentiform and slightly prominent, anterior two broad but hardly prominent and indistinct especially the first lobe, each lobe separated from one another by rather small, shallow notches, postero-lateral margins oblique and straight. Chelipeds massive, unequal; inner corner of wrist little prominent, blunt, and rounded; fingers stout but shorter than palm. Both the borders of carpus, propodus and dactylus of leg joints hairy but those of the last two segments being denser. Sixth segment of male abdomen broader than long. Carapace, chelipeds and legs reddish, fingers chocolate black in colour.

Type locality : Indian Ocean (Fabricius, 1798).

Distribution : Indian Ocean. India : East coast –Tamil Nadu: Tranquebar, Madras coast, Pamban, Tuticorin; Nicobar Islands. West coast–Karnataka; Lakshadweep.

Elsewhere : Persian Gulf, Pakistan, Myanmar, Sri Lanka, Malay Archipelago and Sumatra.

Remarks : In juvenile specimens, there is a distinct broad lobe at the middle of the fixed finger which is eroded or becomes inconspicuous in adult specimens.

This is a very common crab of Indian coasts and has been recorded both in the Bay of Bengal and Arabian Sea.

Genus *Myomenippe* Hilgendorf, 1879

1879. *Myomenippe* Hilgendorf, *MB. AK. Berl.* : 795.
1898. *Myomenippe*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 179.
1984. *Myomenippe*, Serène, *Faune Tropicale*, 24 : 307.
2005. *Myomenippe*, Dev Roy and Bhadra, *Zool. Surv. India State Fauna Series 5 : Fauna of Andhra Pradesh (Part 5)* : 471.

Diagnosis : Resembles the preceeding genus very closely, differing from it by the following points :

<i>Menippe</i>	<i>Myomenippe</i>
1. Carapace and chelipeds smooth.	1. Carapace and chelipeds roughened with granules.
2. Regions of carapace faintly indicated.	2. Regions of carapace very prominent.
3. Hepatic regions with four distinct tubercles.	3. Tubercles of hepatic regions indistinct.
4. Antero-lateral lobes less prominent, their margins smooth; only the first two lobes broad, last two dentiform.	4. Antero-lateral lobes more prominent, their margins granular; first three lobes broad, last one dentiform.
5. Front bilobed each of which consisting of two teeth, notch between the frontal lobes narrow, inner lobe narrow.	5. Front bilobed, each of which consisting of three teeth, notch between the frontal lobes broad, inner lobe square-cut.
6. Antenna in the orbital hiatus.	6. Antenna excluded from the orbital hiatus
7. Wrist lacking any granular line.	7. A line of granules run from distal part of wrist to its proximal part at the inner angle.

75. *Myomenippe hardwickii* (Gray, 1831)

1831. *Myomenippe hardwickii* Gray, *Zool. Miscell.*, London : 39-41 (not seen).

1899. *Menippe (Myomenippe) granulosa*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 179.

1957. *Myomenippe hardwickii*, Chhapgar, *J. Bombay nat. Hist. Soc.*, 54(2) : 432, pl. 10, figs. a-c.

1998. *Menippe hardwickii*, Deb, *Fauna of West Bengal, State Fauna Series*, 3 (Part 10) : 373, *Zool. Surv. India*.

2005. *Myomenippe hardwickii*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 472, pl. 3, fig. 2, *Zool. Surv. India*.

Material examined : 1(M), 1(F), Pamban bridge, 01. 10. 1925, S.L. Hora, Reg. No. C 5941/1; 1(F), Madras Harbour, 04. 05. 1918, S. W. Kemp, Reg. No. C 5939/1.

Measurement :

W = 7.15	F = 2.75	L = 5.35
12.9	3.95	9.8

Diagnosis : Carapace broad, rather convex; regions distinct, separated from one another by deep grooves, elevated areas of epibranchials covered with large vesiculous granules, postero-lateral border also granular. Front broad, cut into two lobes, each lobe consisting of three teeth, median two broadest, squarish and most prominent; second lobe tuberculiform, third one bigger than the second; a small rounded granular tubercle present just behind the second lobe. Antero-lateral teeth four, first three broad with granular margins, separated from one another by deep incisions, fourth tooth directed obliquely outwards and forwards. Chelipeds unequal, upper border of both the chelipeds and outer surface of smaller cheliped covered with large vesiculous granules, inner surface apparently smooth but finely granular under the lens; outer surface of wrist roughened with large vesiculous granules, a line of granules run from distal part of wrist to its proximal part at the inner angle, the granules diminishing in size from front to back, inner corner of wrist produced into a blunt spine; outer surface of merus also granulate; fingers shorter than the upper border of palm and meeting at tips, their apposed margins strongly dentate, fixed finger

with a molariform tooth. Both the borders of leg joints fringed with fine, stiff, long hairs. Carapace, chelipeds and legs brick red in colour.

Type locality : Unknown

Distribution : Indian Ocean. India : East coast—Tamil Nadu : Madras (= Chennai), Gulf of Mannar; Andhra Pradesh : Kakinada, Nizampatnam, Visakhapatnam; West Bengal : Sundarbans, Sandheads. West coast—Gujarat : Port Okha; Maharashtra : Bombay (= Mumbai).

Elsewhere : East coast of Africa, Bangladesh, Myanmar, Singapore and Indonesia.

Remarks : The width and length of the single ovigerous were 5.85 and 5.05 mm respectively.

Subfamily ERIPHIINAE MacLeay, 1838

1838. Eriphiinae MacLeay, In : Smith, *Illustr. Zool. S. Africa (Invert.)* : 59, 60

1898. Eriphiinae, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 177.

2000. Eriphiinae, Dev Roy and Das, *Rec. Zool. Surv. India, Occ. Paper No.*, 185 : 76.

Diagnosis : Carapace of Xanthoid-shape, narrow and dorsally convex. Antero-lateral borders spinose. Chelipeds unequal and slightly dissimilar, smaller chelipeds without any noticeably elongated finger.

Key to genera of the subfamily ERIPHIINAE

- Antenna excluded from the orbit, supra- and infra-orbital angles in contact with each other, no orbital hiatus **Eriphia**
- Antenna reaching in to the orbit, supra- and infra-orbital angles in contact with each other, orbital hiatus present **Globopilumnus**

Genus *Eriphia* Latreille, 1817

1817. *Eriphia* Latreille, *Nouv. Dict. Hist. nat.* (ed.2), 10 : 404 and also *Eriphis* : 405 [an incorrect spelling for *Eriphia* q.v.].

1898. *Eriphia*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 213.

2000. *Eriphia*, Dev Roy and Das, *Rec. Zool. Surv. India, Occ. Paper No.*, 185 : 76.

Diagnosis : Carapace thick, deep, subquadrilateral, slightly convex or nearly flat and broader than long; only the gastric region well demarcated. Front broad, strongly deflexed, almost straight and cut into two broad lobes. Antero-lateral margins slightly curved, spinate, much shorter than the postero-laterals, meeting the latter at a very open and imperceptible angle. Basal antennal-joint extremely small, short and broad; flagellum long, exceeding the major diameter of orbit. Antennules folded transversely. Orbits deep, oval. Endostomial ridges strong; anterior margin of merus of external maxillipeds not notched. Chelipeds massive, unequal; fingers strong, tips pointed, not hollowed. Legs strong. Male abdomen consisting of seven distinct segments.

Remarks : *Cancer spinifrons* Herbst, 1785, a subjective junior synonym of *Cancer verrucosus* Forskål, 1775, by selection by H. Milne Edwards, 1842, in 1836-1844; gender : feminine. Name No. 1621 on Official List.

Key to species of the genus *Eriphia*

- Carapace thick, dorsally covered with hairs; edge of frontal lobes entire *E. scabricula*
- Carapace flattish, dorsally without hairs; edge of frontal lobes beaded with wart-like tubercles *E. sebana*

76. *Eriphia scabricula* Dana, 1852

1852. *Eriphia scabricula* Dana, *Proc. Acad. nat. Sci. Philad.*, 82 and *U. S. Explor. Exped. Crust.*, 13(1) : 247, pl. 14, figs. 5a-b.
1898. *Eriphia scabricula*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 216.
1950. *Eriphia scabricula*, Barnard, *Ann. S. Afr. Mus.*, 38 : 275.
1976. *Eriphia scabricula*, Sakai, *Crabs of Japan and the Adjacent Seas* : 478, pl. 172, fig. 2.
1984. *Eriphia scabricula*, Serène, *Faune Tropicale*, 24 : 311, pl. 47A, figs. 232, 233.

Material examined : 1(F), Palk Strait, Marine Survey, Reg. No. 4435/7.

Measurement :

$$W = 15.45 \quad F = 7.9 \quad L = 10.5$$

Diagnosis : Carapace depressed, surface covered with numerous hairs and small close vesiculous granules anteriorly and laterally, ordinarily not visible to the naked eye; gastric region well demarcated, cardiac and intestinal areas also recognizable. Front broad, entire, about half the greatest breadth of carapace; free edge of frontal lobes linear and very finely or microscopically beaded. Outer orbital angle with a sharp tooth. Antero-lateral margins bearing 4-5 sharp, stout denticles; teeth decreasing in size from front to back. Chelipeds unequal; both upper and lower surfaces of wrist and palm covered with numerous hairs bearing dense vesiculous granules and sharp pearl-like tubercles; inner corner of wrist produced into a short, stout tooth; Fingers strongly dentate, meeting at tips; in larger cheliped, dactylus bearing a molariform tooth proximally; in smaller cheliped, upper margin of movable finger crenated. Leg joints smooth; except dactyli, their upper margins fringed with long hairs.

Type locality : Fiji Islands, Society Islands and Sulu Sea (Dana, 1852).

Distribution : Indo-West Pacific. India : East coast-Tamil Nadu : Palk Strait (present record). Islands : Andamans; Lakshadweep.

Elsewhere : East coast of Africa, Red Sea, Comoros Island, Glorieuses Island, Madagascar, Seychelles, Mauritius, Sri Lanka, Japan, Sulu Sea, New Caledonia and Polynesia, Tahiti.

Remarks : This species of crab is a new record to mainland India.

77. *Eriphia sebana* (Shaw and Nodder, 1803)

1803. *Cancer sebana* Shaw and Nodder, *Nat. Misc.*, 15 : 591 (not seen).
1898. *Eriphia sebana*, Alcock, *J. Asiat. Soc. Bengal*, 67(2) : 214.
1927. *Eriphia sebana*, Gravely, *Bull. Madras Govt. Mus. (N. S.)*, 1(1) : 145, pl. 24, fig. 40.
2000. *Eriphia sebana*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No.*, 185 : 76, pl. 4, fig. 4, pl. 13, figs. 7, 8.

Material examined : 2(F), Krusadai Island, 02. 05. 1955, Dr. H.C. Ray, Reg. No. C 5574/1; 1(M), 1(F), About 5 miles from Krusadai Island, 07. 05. 1955, Dr. H.C. Ray, Reg. No. C 5560/1.

Measurement :

W = 49.45	F = 22.35	L = 36.6
52.3	24.4	40.3

Diagnosis : Carapace thick, broader than long, moderately convex in both the directions, surface roughened with small, pearl-like granules and tubercles towards the anterior half and by minute granules at the posterior half. Front broad, bilobed, margins not entire but bluntly spinate. Antero-lateral borders bearing 5-6 blunt teeth decreasing in size from front to back. Chelipeds massive, markedly unequal and of smooth appearance to the naked eye but covered with minute granules if examined under the lens. Leg joints stout, compressed, smooth, more or less bearing stiff hairs, meral joints dentate above. Abdomen of both male and female sexes consist of seven separate segments.

Type locality : Unknown.

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu : Rameswaram, Tuticorin, Krusadai Island, Pamban, Pullivasal Island. West coast—Karnataka : Mysore coast. Andaman Islands : South Point, Neill Island, Carlew Island; Lakshdweep : Minicoy; Nicobars.

Elsewhere : East coast of Africa, Red Sea, Mauritius, Sri Lanka, Myanmar, Philippines, Japan, Palao Islands, Australia, Fiji, Samoa and Hawaiian Islands.

Remarks : This is a widely distributed species of the Indo-Pacific, occurring in both the coasts of India including Andaman and Nicobar Islands and Lakshadweep. Two specimens bearing registration nos. C 5574/1 were collected from holes of coral slabs at Galaxea reef, Krusadai Island.

Genus *Globopilumnus* Balss, 1933

1933. *Globopilumnus* Balss, *Capita zool.*, 4(3) : 6.

1976. *Globopilumnus*, Sakai, *Crabs of Japan and the Adjacent Seas* : 469.

1987. *Globopilumnus*, Deb, *Bull. zool. Surv. India*, 8(1-3) : 300, 302.

Diagnosis : Carapace slightly broader than long, subcircular, moderately convex, surface finely granular and hairy, regions feebly marked. Front bilobed, outer angle of frontal lobes not marked and inseperated. Antero-lateral border of carapace armed with 3–7 small teeth; postero-lateral angle between antero-lateral and postero-lateral borders indistinct, postero-lateral borders not markedly concave. Anterior boundary of buccal cavern rounded. Efferent branchial channels not fully defined near the boundary of buccal frame. Second pair of male pleopod very long and whip-shaped distally.

Type species : *Pilumnus globosus* Dana, 1852, by original designation; gender : masculine.

Remarks : The genus has been revised by Si-Liang *et al.* (1998) and currently it consists of ten species namely, *Globopilumnus africanus* (A. Milne Edwards, 1867), *G. actumnoides* (A. Milne Edwards, 1873), *G. calmani* Balss, 1933, *G. elegans* (De Man, 1888), *G. fragaria* Si-Liang, Ai-Yun and Ng, 1998, *G. globosus* (Dana, 1852), *G. laciniatus* (Sakai, 1980), *G. kiiensis* Takeda and Nagai, 1983, *G. stridulans* (A. Milne Edwards, 1867) and *G. xantuni* (Stimpson, 1858). Out of these, *G. globosus* and *G. actumnoides* occurs in India. The former is recorded from Lakshadweep and the latter from Tamil Nadu (present record).

**78. *Globopilumnus actumnoides*
(A. Milne Edwards, 1873)**

1873. *Pilumnus actumnoides* A. Milne Edwards, *Nouv. Archs. Mus. Hist. nat. Paris*, 9 : 247, pl. 10, fig. 3.

1933. *Globopilumnus actumnoides* Balss, *Capita Zool.*, 4(3) : 8, pl. 1, fig. 5, pl. 7, fig. 34.

1939. *Globopilumnus actumnoides*, Sakai, *Studies on the Crabs of Japan* : 515, text-fig. 46.

Materiaial examined : 1(F), Pamban, Gulf of Mannar, F.H. Gravely, Sept. 1925, Reg. No. 1800/1.

Measurement :

$$W = 9.5 \quad F = 3.4 \quad L = 7.5$$

Diagnosis : Carapace subcircular, strongly convex in both the directions, surface covered with fine granules and short pubescent, hairs not thick, except gastric other regions not recognizable. Front broad, about 1/3rd the greatest breadth of carapace, slightly deflexed downwards and cut into two lobes by a small narrow V-shaped incision, their free edges finely granular. Antero-lateral margins with nine denticles (including outer orbital angle), teeth small but stout and conical, anterior five teeth smaller than the posterior four; postero-lateral borders strongly convergent. Chelipeds unequal and stout, wholly hirsute; in larger chela, outer surface of arm, wrist and palm studded with granules, those on the palm being pustle-like disposed more or less in longitudinal series, upper border with five low blunt but prominent tubercles, lower border crenulated, fingers broad and stout, meeting at tips, cutting edge of immobile finger with two strong teeth; in smaller chela, wrist and palm studded with sharper and longer spinules. Leg joints stout, broad bearing long hairs; merus, carpus and propodus finely granulose dorsally and wholly hirsute. Female abdomen consisting of seven free segments, edges of each segment fringed with hairs.

Type locality : New Caledonia (A. Milne Edwards, 1873).

Distribution : Indo-Pacific. India : East coast – Tamil Nadu : Pamban (present record).

Elsewhere : Japan, New Guinea, Australia (Capricorn group of Islands), New Caledonia, Gilbert Islands and Samoa.

Remarks : During the course of present study, several strong conical tubercles have been noticed on the branchial area near the last antero-lateral tooth.

This specimen was earlier identified as *Globopilumnus globosus*.

The species is a new record to India vis-à-vis Tamil Nadu.

Family GECARCINIDAE Macleay, 1838

1838. Gecarcinidae MacLeay, In : Smith, *Illustr. Zool. S. Afr. (Invert.) Crust.* : 63.
 1880. Cardisomaceen Nauck, *Z. wiss. Zool. (Leipzig)*, **34** : 63.
 2000. Gecarcinidae, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No. 185* : 78.

Diagnosis : Carapace thick, transversely oval. Front broad, strongly deflexed, its width being much less than the greatest breadth of carapace. Antero-lateral margins strongly arcuate anteriorly. Inter-antennular septum very broad, inter-antennular fossae narrow. Orbits large. Palp of external maxillipeds articulated either at the antero-external or at the middle of the anterior margin of merus; exognath slender, indistinct and without any flagellum. Chelipeds massive. Legs strong, dactylus long, usually thorny. Male genital openings sternal.

Type genus : *Gecarcinus* Leach, 1814.

Genus *Cardisoma* Latreille, 1828

1828. *Cardisoma* Latreille, *Encyc. méth. Hist. nat. Crust.* **10** : 685.
 1869. *Cardiosoma* Smith, *Trans. Conn. Aca. Arts. Sci.*, **2** : 16, 36.
 1867. *Discoplax* A. Milne Edwards, *Annls. Soc. Ent. Fr.*, sér. 4, **7** : 284.
 1862. *Perigrapsus* Heller, *Verh. Zool. -bot. Ges. Wien*, **12** : 522.
 2000. *Cardisoma*, Dev Roy and Das, *Rec. zool. Surv. India Occ. Paper No. 185* : 79.

Diagnosis : Carapace thick, transversely oval, convex from front to back. Fronto-orbital width much more than half of the greatest breadth of carapace; front nearly straight, deflexed. Lateral borders tumid and strongly curved due to vault-like expansion of gill chambers, pterygostomial regions thickly coated with short hairs. Basal antenna-joint broad and in contact with the front, antenna lodged in the orbital hiatus, flagellum very short. Antennules folded below the front obliquely, inter-antennular septum very broad. Orbits deep, its outer angle defined by a denticle, inner angle also with a well-developed tooth. Epistome short, prominent and well demarcated; buccal cavity squarish,

longer than wide. Chelipeds massive, equal or considerably unequal. Legs stout, dactyli spinose. Abdomen consisting of 7 distinct segments in both sexes, its base covered by the entire breadth of sternum between last pair of legs in male.

Type species : *Cardisoma guanhumi* Latreille, 1828 by subsequent designation by H. Milne Edwards, in 1838, in 1836-1844, pl. 20; gender : neuter.

Remarks : The genus contains 4 species, *Cardisoma carnifex* (Herbst, 1794), *C. armatum* Herklots, 1851, *C. crassum* Smith, 1870 and *C. guanhumi* Latreille, 1828. Out of these, only the first species occurs in India. *C. hirtipes* is known from Andaman and Nicobar Islands is presently transferred to the genus *Discoplax* A. Milne Edwards, 1867. *C. carnifex* is so far recorded both from Bay Islands and as well as from mainland India.

79. *Cardisoma carnifex* (Herbst, 1794)

1794. *Cancer carnifex* Herbst, *Versuch. Naturgesch. Krabben Krebse*, 1(2) : 163, pl. 41, figs. 1,2.
 1828. *Cardisoma carnifex* Latreille, *Encyc. méth. Hist. nat. Crust.*, 10 : 685.
 1852. *Cardisoma obesum* Dana, *U. S. Explor. Exped., Philad.*, 13(1) : 375; 1855; pl. 24, fig. 1.
 1865. *Perigrapsus excelus* Heller, *Reise "Novara" Crust.*, 2(3) : 50, fig. 1/ 35
 1902. *Cardiosoma carnifex*, Alcock, *J. Asiat. Soc. Bengal*, 69(2) : 445.
 2000. *Cardiosoma carnifex*, Dev Roy and Das, *Rec. zool. Surv. India Occ. Paper No. 185* : 79, pl. 7, fig. 8 and pl. 21, figs. 1, 2.

Material examined : 1(M), Madras, Reg. No. C 4362/7; 1(F), Madras, Reg. No. 6424/3.

Measurement :

W = 47.5 F = 12.85 L = 38.55

Diagnosis : Carapace distinctly broader than long, thick, transversely oval and strongly convex from front to back; surface smooth. Front broad, about 1/4th the greatest breadth of carapace and almost as wide as orbit; post-frontal lobes pronounced. Lateral borders strongly convergent with a fine ridge anteriorly

and marked by oblique lines posteriorly; a denticle just behind the exorbital angle. Chelipeds stout and markedly dissimilar; outer surface smooth except edges of arm and palm; inner corner of wrist armed with a small tooth; palm short, higher than long; fingers stout with a few low teeth on the cutting margins; fingers crenated, a wide gap between them when closed. Female abdomen consisting of 7 distinct segments, fifth segment larger than the sixth.

Type locality : Tranquebar (Herbst, 1794).

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu : Madras, Pulicat, Tuticorin Parangipettai coast; Coromandel coast. Pondicherry. Andaman Islands; Nicobars.

Elsewhere : South Africa, East coast of Africa, Madagascar, Chagos Archipelago, Seychelles, Mauritius, Sri Lanka, Thailand, Taiwan, Japan, Indonesia, Tahiti, Fiji and Samoa.

Remarks : Crenellation of fingers is marked in smaller cheliped.

Family GRAPSIDAE MacLeay, 1838

1838. Grapsidae MacLeay, In: Smith, *Illustr. Zool. S. Afr.(invert.)* : 63, 65.
 1851. Plagusiinae Dana, *Amer. J. Sci. Art., ser. 2*, 12 : 288 [corrected to Plagusiinae by Miers, 1878 : 147].
 1852b. Sesarminae Dana, *U.S. Explor. Exped., Crust.*, 13(1) : 333, 353.
 1853. Varynacea H. Milne Edwards, *Annls. Sci. nat. (Zool.)*, sér. 3, 20 : 175 [corrected to Varuninae by Alcock, 1900 : 288, 400]. Name No. 377 on Official List.
 1853. Cyclograpsacea H. Milne Edwards, *Annls. Sci. nat. (Zool.)*, sér. 3, 20 : 191.

Diagnosis : Carapace thick or depressed, quadrilateral with lateral margins either straight or slightly convex. Front very broad. Orbits at or very close to the antero-lateral angles. Buccal cavern square-cut; a gap often wide and rhomboidal in shape left between the external maxillipeds. Chelipeds massive. Legs strong. Male genital openings sternal.

Type genus : *Grapsus* Lamarck, 1801.

Key to subfamilies of the family GRAPSIDAE

1. No oblique hairy ridge on the exposed surface of third maxilliped 2

An oblique hairy ridge on the exposed surface of third maxilliped SESARMINAE

2. A wide gap left between third maxillipeds, exopod narrow. Infra-orbital margin extending uninterruptedly to buccal cavity. Male abdomen occupying all space between bases of last ambulatory legs GRAPSINAE

A moderate gap left between third maxillipeds, exopod broad. Infra-orbital margin incomplete, supplemented by a sub-orbital crest. Male abdomen hardly occupying all the space between bases of last ambulatory legs VARUNINAE

Subfamily GRAPSINAE MacLeay, 1838

1838. Grapsidae MacLeay, In : Smith : *Illustr. Zool. S. Afr. (Invert.)* : 63, 65.
1900. Grapsinae, Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 288, 295, 390.
2005. Grapsinae, Dev Roy and Bhadra, *Zool. Surv. India State Fauna Series 5 : Fauna of Andhra Pradesh (Part 5)* : 473.

Diagnosis : Carapace flat. External maxillipeds not traversed by any oblique hairy crest, exognath very slender and exposed throughout. Male abdomen filling entire space between the last pair of ambulatory legs.

Key to genera of the subfamily GRAPSINAE

- Carapace subcircular, merus of external maxillipeds longer than broad ... **Grapsus**
- Carapace quadrate, merus of external maxillipeds broader than long **Metopograpsus**

Genus **Grapsus** Lamarck, 1801

1801. *Grapsus* Lamarck, *Syst. Anim. Sans. Vert., (Crust.)* : 150.
1900. *Grapsus*, Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 390.

2000. *Grapsus*, Dev Roy and Das, *Rec. zool Surv. India, Occ. Paper No. 185* : 82.

2005. *Grapsus*, Dev Roy and Bhadra, *Zool. Surv. India State Fauna Series, 5 : Fauna of Andhra Pradesh (Part 5)* : 475.

Diagnosis : Carapace flat, slightly broader than long, regions faintly indicated, branchial grooves distinct, branchial regions with regularly parallel oblique ridges; gastric region marked by a transverse squamiform sculpture. Front broad, strongly deflexed. Lateral borders arched and armed with a tooth just behind the outer orbital angle. Basal antennal joint short and broad, flagellum exceedingly short. Antennules transversely folded, inter-antennular septum very broad. Orbits deep, divided into two fossae. Epistome well defined and of good length from front to back. Buccal cavern squarely-cut, external maxillipeds leaving between them a large rhomboidal gap exposing the mandibles. Chelipeds subequal in both sexes, finger tips broad and hollowed. Legs broad and compressed, especially the fourth joints, dactyls thorny. Abdomen of seven segments in both sexes, its base almost as broad as sternum between the last pair of legs in male.

Type species : *Cancer grapsus* Linnaeus, 1758, by tautonymy; gender : masculine.

80. **Grapsus albolineatus** Lamarck, 1818

1818. *Cancer strigosus* Herbst, *Versuch. Naturgesch. Krabben Krebse*, 1(2) : 144, pl. 6, fig. 45.
1818. *Grapsus albolineatus* Lamarck, *Hist. Nat. Anim. Sans. Vert.*, **5** : 249.
1900. *Grapsus strigosus*, Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 393.
1960. *Grapsus albolineatus*, Banerjee, *Temminckia*, **10** : 147, figs. 1c, 2 o, p and 3a-f.
2005. *Grapsus alboneatus*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series, 5(Part 5)* : 475, *Zool. Surv. India*.

Material examined : 1(F), Tuticorin, 17. 04. 1955, Dr. H.S. Roy, Reg. No. C 5999/1.

Measurement :

W = 39.2	F = 14.75	L = 33.0
39.45	14.6	34.05

Diagnosis : Carapace subcircular, depressed, distinctly broader than long; regions well defined, branchial grooves not well-cut, branchial regions marked with obliquely transverse ridges, gastric area not smooth but traversed by short transverse ridges, cardiac and intestinal areas smooth. Lateral margins strongly arched and cut into a small blunt tooth behind the outer orbital angle. Front deep, vertically deflexd with a straight crenulated edge, its surface tuberculated. Sub-orbital tooth acute and keeled. Chelipeds stout and equal in both sexes; inner corner of wrist armed with a straight tooth; outer surface of palm rugose bearing two ridges-the one extending from proximal part of palm to the tip of fixed finger being more prominent, some oblique ridges also present below this; fingers stout, meeting at tips. Leg joints broad and compressed, especially the merus; propodus and dactylus with thorns and bristles, tip of latter spiny. Fifth segment of male abdomen longest, sixth segment far shorter than its preceeding segment.

Type locality : Unknown.

Distribution : Indo-West Pacific. India : East coast-Tamil Nadu: Madras (= Chennai), Palk Bay, Gulf of Mannar; Andhra Pradesh; Orissa. West coast-Gujarat; Maharashtra; Kerala. Islands : Andamans; Nicobars; Lakshadweep.

Elsewhere : East coast of Africa, Red Sea, Baluchistan, Sind coast, Sri Lanka, Arakan and Tenasserim coasts, Mergui Archipelago, Singapore, Philippines, Hong Kong, Japan, Sumatra, Java, Banda Sea, Makassar, Amboina, Aru Island, Polynesian Islands, Australia, Samoa and as far as Hawaii.

Remarks : The single ovigerous female measure 39.45 and 34.05 mm. across its carapace width and length respectively.

Genus *Metopograpsus* H. Milne Edwards, 1853

1853. *Metopograpsus*, H. Milne Edwards, *Annl. Sci. nat. (Zool.)*, sér., 3, **20** : 164.
1960. *Metopograpsus*, Banerjee, *Temminckia*, **10** : 172.
2000. *Metopograpsus*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No. 185* : 84.

Diagnosis : Carapace flattish, quadrangular, slightly broader than long; regions indistinct, branchial grooves conspicuous, lateral parts of branchial region with fine oblique ridges. Front very broad, more than half of the greatest breadth of carapace, deflexed with a rugose surface, free margin crenulated, post-frontal lobes four. Lateral borders with or without tooth. Antenna excluded from orbit by the inner supra-orbital tooth. Antennules transversely folded in the fossa. Orbits of moderate size; eye-stalk thick, short. Epistome well defined, not very deeply excavated, rather short and broad. Buccal cavern squarish with the antero-lateral corners rounded off, a large rhomboidal gap in between the external maxillipeds. Chelipeds subequal or unequal; fingers short and stout, tips broad, hollowed and spoon-shaped. Legs broad, compressed especially the merus, edges of terminal three joints bearing bristles, dactylus thorny. Abdomen consisting of 7 separate segments in both sexes and its base as broad as sternum between the fifth pair of legs in male.

Type species : *Cancer messor* Forskål, 1775, by subsequent designation by Davie, 2002; gender : masculine.

81. *Metopograpsus latifrons* (White, 1847)

1847. *Grapsus latifrons* White, In : J.B. Juke, *Voyage H. M.S. "Fly"* **2** : 337, pl. 2, fig. 2.
1853. *Metopograpsus maculatus* H. Milne Edwards, *Annl. Sci. nat. (Zool.)*, sér. 3, **20** : 165.
1900. *Metopograpsus maculatus*, *J. Asiat. Soc. Bengal*, **69**(2) : 398.
1960. *Metopograpsus latifrons*, Banerjee, *Temminckia*, **10** : 177, figs. 4j, 5d, 6a.
1995. *Metopograpsus maculatus*, Ghosh, *Zool. Surv. India Estuarine Ecosystem Series, Part 2 : Hugli Matla Estuary* : 238.

Material examined: 1(M), 1(F), Pamban Backwarer, 18. 09. 1935, S.L. Hora, Reg. No. C 461/2.

Measurement :

W = 31.35	F = 17.75	L = 28.95
32.35	18.65	25.3

Diagnosis : Carapace quadrate, depressed

much broader than long; surface smooth, fine oblique striations traverse the lateral parts of epibranchial region. Front broad with beaded edges, post frontal lobes with fine transverse lines of small tubercles. Sub-orbital tooth acute and keeled. Chelipeds unequal, upper surface of arm and wrist wrinkled, their inner borders spinate; upper and lower borders of palm granular; dactylus not much longer than the upper border of palm; fingers blunt, their cutting edges armed with few big teeth. In the last three pair of legs, greatest breadth of merus about half of its length. Sixth segment of male abdomen much shorter than the fifth.

Type locality : Unknown.

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu: Parangipettai coast; West Bengal : South 24 Parganas; Orissa; Andhra Pradesh; West coast—Kerala : Travancore; Maharashtra : Kolak, Umarsadi. Andaman and Nicobar Islands.

Elsewhere : Mergui Arhipelago, Sri Lanka, Malaysia, Singapore, Java, Borneo, Amboina, Makassar, Timor, New Guinea and Australia.

Remarks : Tweedie (1936, 1949) pointed out that *Metopograpsus maculatus* H. Milne Edwards and *M. pictus* A. Milne Edwards are synonyms of *M. latifrons* (White, 1847) which is being followed by subsequent authors (Banerjee, *op. cit.*). The same system has been adopted in the present work too.

Subfamily VARUNINAE H. Milne Edwards, 1853

1853. Varunacea H. Milne Edwards, *Annls. Sci. nat. (Zool.)*, sér. 3, **20** : 175.

1900. Varuninae, Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 288, 296, 400.

2005. Varuninae, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 479, Zool. Surv India.

Diagnosis : Carapace depressed. Front slightly or moderately deflexed, often sublaminar. Antennal flagella of good length. Exognath of third maxilliped generally broad. Male abdomen rarely occupy all space between the last pair of ambulatory legs.

Remarks : The subfamily is represented by 10 genera in the Indo-Pacific, of which, three occurs in India (Dev Roy and Bhadra, 2005). The present collection, however, contains a single genus.

Genus *Varuna* H. Milne Edwards, 1830

1830. *Varuna* H. Milne Edwards, *Dict. Hist. Nat.*, **16** : 511.

2005. *Varuna*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 479, Zool. Surv India.

Diagnosis : Carapace almost as broad as long, flattened with thin sharp edges, regions fairly distinct, especially the gastro-cardiac and cardio-branchial grooves. Front broad, more than a third the greatest breadth of carapace, straight, sublaminar and slightly deflexed. Antero-lateral borders curved and cut into three teeth including the outer orbital angle. Orbit small, lower border broken and incomplete. Antennules obliquely folded, interantennular septum broad. Antenna of fair length and lodged in the orbital hiatus. Epistome well defined. Buccal cavern square-cut. Chelipeds equal and massive in adult male. Legs natatorial, terminal three joints of last pair compressed, dilated and fringed with hairs. Abdomen of seven distinct segments in both sexes, entire space between bases of fifth legs not covered in male.

Type species : *Cancer litteratus* Fabricius, 1798, by monotypy; gender: feminine. Name No. 926 on Official List, in Opinion 85, *Bull. zool. Nomencl.* (1956).

82. *Varuna litterata* (Fabricius, 1798)

1798. *Cancer litterata* Fabricius, *Ent. Syst. Suppl.* : 342.

1900. *Varuna litterata*, Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 401.

2005. *Varuna litterata*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 480, pl. 3, fig. 4, Zool. Surv India.

Material examined : 30(M), 17(F), 5(J), Madras, Reg. No. C 4941-44/1.

Measurement :

W = 24.7 F = 10.45 L = 23.0
 22.5 9.0 21.85

Diagnosis : Carapace depressed, smooth with a H-shaped groove at its middle, surface pitted and frosted. Antero-lateral borders arched and cut into three spines (including the outer orbital angle), margins finely beaded. Front broad, straight and slightly deflexed, its edges finely crenated. Inner border of arm denticulate; inner corner of wrist with a large sharp spine; inner surface of palm granular, outer surface with some fine reticulate markings running parallel with the lower border; upper border of palm shorter than dactylus; fingers strongly dentate, meeting at tips; a fine raised line on outer surface of fixed finger.

Type locality : "India Orientali" (Fabricius, 1798).

Distribution : Indo-West Pacific. India : East coast-Tamil Nadu : Madras (= Chennai), Palk Bay, Gulf of Mannar; Andhra Pradesh : Sekhinipalli, Kakinada, Machilipatnam, Visakhapatnam : Orissa : Chilka Lake, Cuttack, Puri; West Bengal : Sundarbans. West coast-Kerala : Trivandrum; Maharashtra: Bombay (= Mumbai).

Elsewhere : East Africa, Bangladesh, Myanmar, Singapore, Philippines, Hong Kong, Japan, New Guinea, Fiji, Australia and New Zealand.

Subfamily SESARMINAE Dana, 1852

1852. Sesarminae Dana, *U.S. Explor. Exped.*, **13**(1) : 333.
 1900. Sesarminae, Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 289, 296, 409.
 2000. Sesarminae, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No.* **185** : 87.

Diagnosis : Carapace thick or flat. External maxillipeds traversed by an oblique hairy crest across ischium and merus, their exognath slender and partly or completely hidden. Male abdomen may or may not fill all space between the last pair of ambulatory legs.

Remarks : The taxonomy and nomenclature within members of the genus *Sesarma* is still in an unsettled state as discussed earlier by Dev Roy and Das (2000) and Dev Roy and Bhadra (2005). In the recent past, several attempts have been made by different specialists to meet this problem and sort out the relationships among them but none proved to be fully satisfactory. De Man (1887, 1895) recognized four subgenera which were subsequently changed by Rathbun (1897, 1909). These were retained in a detailed review of the group by Tesch (1917). Later on, Crosnier (1965) also adopted the system in his work on the Grapsidae of Madagascar. In 1970, Serène and Soh, in their review on Indo-Pacific sesarmine crabs elevated the subgenera to generic status. They erected as many as 10 new genera and argued that *Sesarma* Say, 1817 *sensu stricto* is not represented in the Indo-Pacific region but is restricted to the Atlantic. However, taxonomic problems of the group could not be resolved even then.

**Key to genera of the subfamily
SESARMINAE**

- Lateral border of carapace entire, upper border of palm with pectinated crests ***Parasesarma***
- Lateral border of carapace toothed behind outer orbital tooth, upper border of palm lacking pectinated crests ***Neosarmatium***

Genus *Parasesarma* De Man, 1895

1895. *Parasesarma* De Man, *Zool. Jb. (Syst.)*, **9**(1) : 181.
 1976. *Parasesarma*, Sakai, *Crabs of Japan and the Adjacent Seas* : 655.
 2001. *Parasesarma*, Dev Roy and Bhadra, *Zool. Surv. India, Fauna of Godavari Estuary, Estuarine Ecosystem Series*, **4** : 46.

Diagnosis : Resembling the genus *Sesarma sensu stricto* very closely differing from it in the lateral border of carapace which is entire and in being not toothed behind the outer orbital angle.

Type species : *Cancer quadratus* Fabricius,

1798, by selection by Rathbun, 1918 : 284; gender : neuter.

83. *Parasesarma plicatum* (Fabricius, 1798)

1798. *Cancer quadratus* Fabricius, *Entom. Syst. Suppl.* : 341.
 1900. *Sesarma quadrata*, Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 413.
 1957. *Sesarma (Sesarma) quadrata*, Chhapgar, *J. Bombay nat Hist. Soc.*, **54**(3); 520, pl. 16, figs. a-c.
 2001. *Sesarma (Parasesarma) plicatum*, Dev Roy and Das, *Zool. Surv. India, Fauna of Godavari Estuary, Estuarine Ecosystem Series 4* : 46.
 2005. *Parasesarma plicatum*, Dev Roy and Bhadra, *Zool. Surv India, Fauna of Andhra Pradesh, State Fauna Series, 5*(Part 5) : 483.

Material examined : Station-4, Cooum River, Madras, 16.04.1961, Reg. No. C 5815/2; Cooum river near bridge, Madras, 02.08.1961, Maligi, Reg. No. C 5816/2; Adyar, Marmalong bridge, 15.06.1961, P.P., Reg. No. 4(M), 5(F), Madras, A. Subramaniam, Reg. No. C 3213/2.

Measurement :

W = 18.35 F = 10.6 L = 15.5

Diagnosis : Carapace thick, convex from front to back in male, flattish in female, its length about 4/5th the greatest breadth of carapace at the antero-lateral angle. Front broad, more than half of the greatest breadth of carapace, deflexed downwards; free edge slightly sinuous at the middle; post-frontal lobes four, middle pair broader than the outer ones and more prominent. Lateral borders almost parallel, slightly convergent posteriorly and devoid of any tooth behind the outer orbital angle. Chelipeds differ in sexes, more massive in male, less so in female; outer surface of arm, wrist and palm granular; inner border of arm bearing a large spine at its distal end; upper border of male palm with two oblique pectinated crests but tuberculate and less developed in female; upper border of male dactylus elegantly milled with 10-20 blunt, coarse transverse lamellae, milling incomplete and much less prominent in female.

Type locality : "India Orientali" (Fabricius, 1798).

Distribution : Indo-West Pacific. India : East coast-Tamil Nadu: Madras (=Chennai), Parangipettai coast, Gulf of Mannar; Andhra Pradesh : Kodur, Muthukur, Nizampatnam, West Godavari District; Orissa : Chilka Lake, Mahanadi estuary; Pondicherry; West Bengal : Barrackpore, Matlah river, Uttarbhang. West coast-Gujarat : Okha, Gulf of Kachchh; Maharashtra : Umarsadi, Kolak; Karnataka : Karwar; Kerala : Travancore. Andaman Islands : South and Middle Andamans.

Elsewhere : East coast of Africa, Madagascar, Pakistan, Sri Lanka, Myanmar, Malay Archipelago, China, Korea and Japan.

Remarks : During the present study, 4-5 pectinated crests on palm have been observed in larger specimens, of which, 2-3 are very prominent; in smaller specimens, however, only two ridges are present. In smaller females, this ridge is absent but in larger specimens indications of faint lines may be observed.

The author of this species was cited as Latreille (1803) in their earlier publications by Dev Roy and Das (2000) and Dev Roy and Bhadra (2005) which should be Fabricius (1798) as the latter has priority.

The smallest and largest ovigerous females of this crab noted during this study are 15.5 and 17.2 mm respectively across the carapace width.

Genus *Neosarmatium* Seréne and Soh, 1970

1873. *Metagrapsus*, A. Milne Edwards, *Nouv. Archs. Hist. nat., Paris*, **9** : 308.
 1970. *Neosarmatium* Seréne and Soh, *Treubia*, **27**(4) : 391, 397.
 1994. *Neosarmatium*, Davie, *Mem. Qd. Mus.*, **35**(1) : 35, 36.
 1996. *Neosarmatium*, Ng, Liu and Wang, *J. Taiwan. Mus.*, **49**(2) : 146.

Diagnosis : Carapace subquadrate, high (deeply vaulted). Lateral margins with 2 or less epibranchial teeth behind the exorbital teeth. Upper surface of palm lacking any pectinated crests defined anteriorly by a swollen longitudinal ridge, outer surface with a low longitudinal median ridge, dactyl often with

spines or blunt teeth dorsally. Legs of median length, flattened and broad.

Type species : *Sesarma smithi* H. Milne Edwards, 1853, by original designation; gender: neuter.

Remarks : The genus *Neosarmatium* was diagnosed by Seréne and Soh (1970) to include a number of Indo-West Pacific species previously included under the genera *Sesarma* (*Sesarma*) or *Sarmatium* Dana. The genus has been revised and redefined by Davie (1994) and presently it contains 12 valid taxa, all of which are from the Indo-West Pacific. It is represented by four species in India, of which, three species namely, *N. smithi* (H. Milne Edwards, 1853), *N. leave* (A. Milne Edwards, 1869) and *N. malabaricum* (Henderson, 1893) occur exclusively in the west coast, while one species, *N. meinerti* (De Man, 1887) occurs in the east coast.

Members belonging to this genus are a group of terrestrial crabs, commonly inhabitants near the sea. They are primarily herbivores and appear to be responsible for the consumption of a large per centage of annual leaf fall of mangrove forests.

The genus is represented by a single species in Tamil Nadu.

84. *Neosarmatium meinerti* (De Man, 1887)

1887. *Sesarma meinerti* De Man, *Zool. Jb. (Syst.)*, 2(3 & 4) : 648, 668.

1900. *Sesarma meinerti*, Alcock, *J. Asiat. Soc. Bengal*, 69(2) : 417.

1950. *Sesarma* (*Sesarma*) *meinerti*, Barnard, *Ann. S. Afr. Mus.*, 38 : 12, figs. 25e-f.

1970. *Neosarmatium meinerti*, Seréne and Soh, *Treubia*, 27(4) : 398, 406.

Material examined: 1(M), Madras, Reg. No. 3719/10.

Measurement :

W = 33.1 F = 18.1 L = 26.7

Diagnosis : Carapace deep, convex from front to back, distinctly broader than long and glabrous; mesogastric, cardiac and intestinal

regions very prominent along with the usual oblique striations on the branchial part. Front more than half of the greatest breadth of carapace, its free edge markedly sinuous at the middle, post frontal lobes four, middle two much broader than the outer pair. Lateral margins slightly converging posteriorly and armed with a large tooth behind the outer orbital angle, hind margin shorter than the width of the front. Chelipeds massive, unequal; outer surface of arm and wrist rugulose, that of palm distinctly pitted; inner surface of palm with an oblique granular crest, upper outer surface devoid of any pectinated ridge; upper border of palm and dactylus with a row of inconspicuous serrations; fingers broad, immobile finger notched at tip, cutting edges adorned with blunt teeth. Meropodites of leg joints foliaceous, their outer surface scabrous and roughened with granules; dorsal and ventral surface of carpus, propodus and dactylus densely coated with hairs and bristles. Length of sixth male abdominal segment slightly shorter than its width.

Distribution : Indian Ocean. India : East coast –Tamil Nadu : Madras. Andaman islands.

Elsewhere : East coast of Africa, Madagascar and Seychelles.

Remarks : Alcock (1900) and Barnard (1950) reported the entire dorsal surface of this crab to be densely covered with tufts of hairs but the present specimen is devoid of such hairs. Trace of a second epibranchial tooth as reported Barnard, 1950 by has been noticed in the present specimen also. The number of denticles on the upper border of dactylus has been found to vary from 10-14.

Genus *Metasesarma* H. Milne Edwards, 1853

1853. *Metasesarma* H. Milne Edwards, *Annl. Sci. nat. (Zool.)*, sér. 3, 18 : 188.

1900. *Metasesarma*, Alcock, *J. Asiat. Soc. Bengal*, 69(2) : 427.

2000. *Metasesarma*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No.* 185 : 107.

2005. *Metasesarma*, Dev Roy and Bhadra, *Zool. Surv. India, Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 491.

Diagnosis : Carapace broader than long, thick, regions indistinct. Front broad, vertically deflexed, overhanging the epistome; post-frontal lobes inconspicuous. Lateral borders slightly curved and convergent posteriorly. Orbits deep, oval. Antennae extremely small and excluded from the orbit. Antennules transverse. Merus of external maxillipeds broader than long. Reticulation markings of pterygostomian and its adjacent regions finer, closer and more confused than those in *Sesarma*. Chelipeds subequal; finger tips subacute and hollowed. Legs not much broad and compressed. Abdomen seven-jointed in both sexes.

Type species : *Metasesarma rousseauxii* H. Milne Edwards, 1853, by monotypy; gender : feminine. Name No. 884 on Official List.

Remarks : The genus *Metasesarma* consists of two unequivocally recognized species – *M. aubryi* (A. Milne Edwards, 1869) and *M. rousseauxii* H. Milne Edwards, 1853. A third species *M. granularis* Heller, 1862 described from Tahiti is synonymised with *M. rousseauxii* or treated as a subspecies. But this needs confirmation from further research works to prove its validity (Ng and Davie, 1995).

85. *Metasesarma obesum* (Dana, 1851)

1851. *Sesarma obsum* Dana, *Proc. Acad. nat. Sci. Philad.*, 5(10) : 250.
1901. *Metasesarma rousseauxii*, Alcock, *J. Asiat. Soc. Bengal*, 69(2) : 427.
2000. *Metasesarma rousseauxii*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No. 185* : 107, pl. 7 fig. 6 and pl. 20, figs. 9, 10.
2005. *Metasesarma rousseauxii*, Dev Roy and Bhadra, *Zool. Surv. India, Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 492.

Material examined : 1(F), Bank of Uppana River, Akkaraighori, Dist. Cuddalore, 01.04. 2004, Dr. J.G. Pattanayak, Reg. No. C 5389/1.

Measurement :

$$W = 17.5 \quad F = 10.25 \quad L = 14.8$$

Diagnosis : Carapace deep, squarish, slightly convex from front to back, surface smooth to the naked eye but covered with microscopic

granules especially near the frontal areas, epibranchial part rugulose; regions quite distinct, gastric region separated from the cardiac by a short semilunar groove. Front broad, vertical, deep, spatulate, about half of the greatest breadth of carapace, free edge convex, smooth and very little sinuous; post-frontal lobes four, middle pair more prominent, outer ones hardly recognizable. Lateral borders entire, curved and convergent posteriorly, no tooth behind the outer orbital angle. Chelipeds stout, equal; Inner corner of wrist produced into a blunt tooth, outer surface of palm smooth; upper border of palm and base of dactylus bearing a few blunt serrulations, dactylus about twice the length of upper border of palm; cutting edges of both the fingers armed with 3-4 big teeth, finger tips subacute, hollowed and with a narrow gap when apposed. Leg joints slender, smooth without any spine; meropodites narrow, their upper and lower borders crest-like, outer surfaces finely granular; dactylus almost as long as propodus and their edges fringed with dark spine-like bristles, third pair of legs longest.

Type locality : Zanzibar, Tanzania (H. Milne Edwards, 1853).

Distribution : Indo West Pacific. India : East coast–Tamil Nadu: Akkaraighori (present record), Madras (= Chennai); Andhra Pradesh : Visakhapatnam; West Bengal: Sundarbans. Andaman Islands : South Andamans; Nicobars; Lakshadweep : Minicoy.

Elsewhere : East coast of Africa, Madagascar, Maldives, Sri Lanka, Mergui Archipelago, Philippines, Australia and Samoa.

Family OCYPODIDAE Rafinesque, 1815

1815. Ocypodia Rafinesque, *Analyse Nature* : 96 [corrected to Ocypodidae by MacLeay, 1838 : 63, 64, name no. 375 Official list, in opinion 712, *Bull. zool. Nomencl.*, 21(5) : 341 (1964)].
2005. Ocypodidae, Dev Roy and Bhadra, *Zool. Surv. India, Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 498.

Diagnosis : Carapace deep or flat, subquadrangular, subcubical or subglobose, usually broader than long, regions indistinct.

Front narrow, deflexed, usually a mere lobe between the eye-stalks. Orbits occupying almost the entire border of carapace; eye-stalks slender, often much enlarged. Palp of external maxillipeds coarse, articulated at or near the antero-external angle of merus; exopod usually slender, often coalesced; buccal cavern large, covered by external maxillipeds completely. Chelipeds markedly unequal either in both sexes or in males only. Legs strong, fourth pair much shorter and less massive than the first three pair, an orifice or recess thickly fringed with hairs along the edges between the bases of second and third pair. Male abdomen narrow. Male genital openings sternal.

Type genus : *Ocypode* Weber, 1795.

Subfamily OCYPODINAE Rafinesque, 1815

1815. *Ocypodia* Rafinesque, *Analyse Nature* : 96.
 1902. *Ocypodinae*, Alcock, *J. Asiat. Soc. Bengal*, 69(2) : 290, 294, 343.
 2005. *Ocypodinae*, Dev Roy and Bhadra, *Zool. Surv. India, Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 499.

Diagnosis : Carapace deep, subquadrilateral, regions indistinct. Front narrow, deflexed, usually a mere lobe between the eye-stalks. Lateral borders with or without any tooth behind the outer orbital angle. Antennules folded obliquely or nearly vertically, flagellum short, inter-antennular septum broad. Buccal cavity enclosed by the external maxillipeds entirely. An orifice or recess between bases of second and third pair of legs. Chelipeds unequal, often remarkably in males.

Key to the genera of the subfamily OCYPODINAE

- Antennular flagella rudimentary completely concealed under the front; antennae small, almost rudimentary; eyes very large, occupying the major part of ventral surface of eye-stalks; chelipeds unequal, ambulatories large ***Ocypode***
- Antennular flagella small, not concealed under the front, antennae long; eyes small,

terminal on long slender eye-stalks; one of the male chelipeds enormously enlarged, the other being very small; ambulatories short ***Uca***

Genus *Ocypode* Weber, 1795

1795. *Ocypode* Weber, *Nomencl. Ent. Syst. Fabr.* : 92.
 1801. *Ocypoda* Lamarck, *System. Anim.* : 49.
 1900. *Ocypoda*, Alcock, *J. Asiat. Soc. Bengal*, 69(2) : 342, 343.
 2000. *Ocypode*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No. 185* : 114.

Diagnosis : Carapace deep, subquadrilateral, slightly broader than long, regions ill defined. Front narrow, deflexed. Lateral borders with or without any tooth behind the outer angle. Basal antennal joint short, flagellum rudimentary. Antennules extremely small, almost hidden beneath the front. Orbits large and divided into two fossae; eye-stalks often prolonged in a horn or style. Epistome short. Buccal cavern as broad as long in its widest part, but narrowed anteriorly; external maxillipeds more or less narrow and elongated. Chelipeds unequal in both sexes; palm of larger chela short, high and usually with a stridulating ridge of granules or striae for scrapping against a corresponding ridge on the ischium. Legs strong, fourth pair much shorter and less massive than the other pair, dactylus flute-like; a cavity thickly fringed with hairs connecting the branchial chamber between bases of second and third pair. Abdomen seven-segmented in both sexes.

Type species : *Cancer ceratophthalmus* Pallas, 1772; by selection by Holthuis, 1962; gender: feminine. Name No. 1637 on Official list.

Key to species of the genus *Ocypode*

1. A stridulating ridge present on the inner surface of palm, eye-stalks prolonged beyond the eye as horn or style 2
- No stridulating ridge on inner surface of palm, eye-stalks not prolonged beyond the eye in the form of horn or style *O. cordimana*

2. Fingers of both the chelipeds normally pointed 3
 - Fingers of smaller chelipeds expanded at tip, stridulating ridge comprising exclusively of striae *O. macrocera*
3. Stridulating ridge narrow, consisting of small tubercles only, brushes of hair absent on propodus of legs *O. platytarsis*
 - Stridulating ridge consisting of tubercles gradually passing into striae, anterior surface of propodus of first two pair of legs fringed with dense hairs *O. ceratophthalma*

86. *Ocypode ceratophthalma* (Pallas, 1772)

1772. *Cancer ceratophthalmus* Pallas, *Specilega Zool.*, 9 : 83, pl. 5, fig. 7.
1900. *Ocypoda ceratophthalma*, Alcock, *J. Asiat. Soc. Bengal*, 69(2) : 342, 343.
2005. *Ocypode ceratophthalma*, Dev Roy and Bhadra, *Zool. Surv. India, Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 500.

Material examined : 1(M), 1(F), Tranquebar shore, Dist. Tanjore, 03. 08. 1958, Dr. A.G.K. Menon, Reg. No. C 1953/2.

Measurement :

W = 36.85	F = 2.45	L = 26.75
23.25	2.3	17.9

Diagnosis : Carapace thick, squarish, surface covered with fine granules, regions indistinct. Antero-lateral angles acute and directed outwards, anterior one-third of the lateral borders nearly straight and parallel; margins finely beaded except the posterior border. Orbits large, upper orbital margin wavy and finely crenulated; lower margin also crenated with an indistinct notch at its middle, no gap at the outer margin; eye-stalks prolonged beyond the carapace as a blunt narrow horn. Chelipeds markedly unequal and scabrous, rugulose or with squamiform arrangement; inner corner of wrist armed with a strong spine. Palm compressed, high; outer surface coarsely granular; a stridulating organ present on the inner surface very close to the base of fixed finger and consisting of a few rounded granules on the

upper part followed by several rather widely spaced striae and then more very close-set striae at the lower half; upper border of dactyl, outer surface of both dactyl and fixed finger granular, lower border of fixed finger also granular; fingers pointed at tips, their cutting edges adorned with large teeth. Leg joints long, stout; merus of first three pair of walking legs broadened, fourth pair shortest with a much narrower merus; propodus of first two pair densely hairy on the anterior edges of adults, hairs absent in juveniles; dactylus stout, fluted, fringed with hairs on the antero-lateral margin. Sixth segment of male abdomen larger than broad.

Type locality : Unknown.

Distribution : Indo-West Pacific. India : East coast–Tamil Nadu : Pulicat lake, Tanjore (present record), Gulf of Mannar; Andhra Pradesh : Narsapur. Waltair; Orissa : Chilka Lake; West Bengal : Sagar island. West coast–Maharashtra : Bombay (= Mumbai), Kolak, Umarsadi; Karnataka : Karwar, Sirur (Bhatkal). Andaman Islands : North Andamans, Middle Andamans, South Andaman; Lakshadweep: Kavarathy, Amenidive; Nicobars.

Elsewhere : East coast of Africa, Madagascar, Mauritius, Maldives Sri Lanka, Malay Peninsula, Singapore, Indonesia, China, Japan, Australia, Sandwich Island, Tahiti and Hawaii.

Remarks : This species of crab occurs in both the coasts of India including Andaman and Nicobar Islands and Lakshadweep.

87. *Ocypode macrocera* H. Milne Edwards, 1837

1837. *Ocypode macrocera* H. Milne Edwards, *Hist. Nat. Crust.*, 2 : 49.
1900. *Ocypoda macrocera*, Alcock, *J. Asiat. Soc. Bengal*, 69(2) : 347.
1964. *Ocypoda portonovoensis* Prem Kumar, *Proc. zool. Soc., Calcutta*, 17 : 153, pl. 4.
2005. *Ocypode macrocera*, Dev Roy and Bhadra, *Zool. Surv. India, Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 502, pl. 4, fig. 8.

Material examined : 2(M), 2(F), Seashore about 3.5 miles from the Biological Station, Porto Novo, 24.01.1957, Reg. No.

Measurement :

W = 17.6	F = 2.2	L = 13.95
32.8	3.95	27.35

Diagnosis : Carapace squarish, slightly convex, surface studded with uniformly close granules. Orbits little oblique. Granules of external maxillipeds minute and less prominent. Stridulatory ridge consisting of striations only bearing much less hair. Fingers broad, spatulate and lamellar right up to the tips; upper border of palm and dactylus and lower border of fixed finger crenated. Anterior surface of propodus of first two pair of legs conspicuously fringed with brushes of hair. Sixth segment of male abdomen almost equal to its width.

Type locality : Pondicherry, India (H. Milne Edwards, 1837).

Distribution : Indian Ocean. India : East coast –Tamil Nadu : Porto Novo, Palk Bay, Gulf of Mannar; Andhra Pradesh : Kakinada, Kottapatnam, Krishnapattam, Machilipatnam, Maipadu, Midhirevu, Pukkala Peta, Visakhapatnam; Orissa : Bhitarkonica, Lake Chilka, Gopalpur coast, Mahanadi estuary; Pondicherry; West Bengal : Bakkhali, Sagar, Sundarbans.

Elsewhere : Myanmar and Gulf of Thailand.

88. *Ocypode platytarsis* H. Milne Edwards, 1852

1852. *Ocypode platytarsis* H. Milne Edwards, *Annl. Sci. nat. Zool.*, sér.3, **18** : 141.
1900. *Ocypoda platytarsis*, Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 348.
1995. *Ocypode platytarsis*, Deb, *Fauna of Chilka Lake, Wetland Ecosystem Series*, **1** : 356. *Zool. Surv. India*
2005. *Ocypode platytarsis*, Dev Roy and Bhadra, *Zool. Surv. India, Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 504, pl. 4, fig. 9.

Material examined : 1(M), 1(F), Palk Straits, Reg. No. 4347-58/7.

Measurement :

W = 48.6	F = 4.25	L = 36.8
41.75	4.15	31.6

Diagnosis : Carapace deep, quadrilateral, convex, distinctly broader than long, surface covered with granules, those nearer the lateral borders being larger in size; regions indistinct, only the cardiac area faintly indicated. Surface of ischium of outer maxillipeds almost smooth. Stridulatory ridge of inner surface of palm consisting of granules only, hairs absent. Dactyli of legs broadened and compressed dorsoventrally, propodus devoid of brushes of hairs.

Type locality : Pondicherry, India (H. Milne Edwards, 1852).

Distribution : Indian Ocean. India: East coast –Tamil Nadu : Pulicat Lake; Parangipettai coast, Gulf of Mannar; Andhra Pradesh : Akkupalli, Kakinada, Kodur, Kottapatnam, Krishnapuram, Lawson's Bay, Maipadu, Midhirevu, Muthukur; Orissa : Chilka Lake, Gopalpur coast. West coast–Kerala : Travancore, Mahe. Nicobars.

Elsewhere : Sri Lanka.

89. *Ocypode cordimana* Desmarest, 1825

1825. *Ocypoda cordimana* Desmarest, *Consid. Gener. Crust.* : 121 (not seen).
1900. *Ocypoda cordimana*, Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 349.
1957. *Ocypoda cordimana*, Chhapgar, *J. Bombay nat. Hist. Soc.*, **54** : 507, pl. 13, figs. d-f.
2005. *Ocypoda cordimana*, Dev Roy and Bhadra, *Zool. Surv. India, Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part 5) : 501.

Material examined : 18 (M), 7(F), Madras, W. P. Blanford, 6443/3.

Measurement :

W = 24.4	F = 4.7	L = 20.5
22.3	2.8	17.15

Diagnosis : Carapace thick, quadrilateral, convex from front to back, regional boundaries indistinct. Antero-lateral angles acute and projected rather inwards. Orbits deep, lower border with a notch at the middle; eye-stalks very slender, eyes without any terminal styles. Chelipeds stout, markedly unequal; lower border of arm and palm and inner margin of

wrist serrated, upper border of palm also serrated, its outer and inner surfaces finely granular, stridulatory ridge absent, fingers broad and compressed, their cutting edges strongly dentate. Propodus and dactylus of first two pair of legs fringed with hairs. Sixth segment of male abdomen distinctly broader than long.

Type locality : Unknown.

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu : Madras coast, Mandapam, Krusadai Island, Kundugal Point, Palk Strait, Pulicat Lake; Andhra Pradesh : Bimlipatnam, Chirala, Lawson's Bay, Kakinada, Kodur, West Godavari, Visakhapatnam; Orissa : Chandipur, Gopalpur coast. West coast—Kerala : Travancore; Maharashtra, Umarsadi. Islands : Andamans; Lakshadweep: Minicoy, Kavaratti Islands; Nicobar Islands.

Elsewhere : East coast of Africa, Red Sea, Mauritius, Pakistan, Sri Lanka, Myanmar, Malaysia, Singapore, Japan, Australia and as far as Hawaii.

Remarks : This species occurs in both the coasts of India.

Genus *Uca* Leach, 1814

1814. *Uca* Leach, In : D. Brewster's, *The Edinburgh Encyclopedia*, 7(2) : 430.

1817. *Gelasimus* Latreille, *Nouv. Dict. Nat.*, 12 : 517.

2000. *Uca*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No.*, 185 : 117.

Diagnosis : Carapace deep, subquadrilateral or subhexagonal, broader than long, surface usually smooth, seldom setose or tuberculate, regions indistinct excepting the H-form depression. Front deflexed, moderate to very narrow, spatulate or broadly arcuate. Antero-lateral angles generally pointed. Antero-lateral margins absent or moderately parallel, converging or diverging. Antennae with well developed flagella. Antennules very small, folded obliquely. Orbits deep, slightly sinuous and oblique, suborbital border cut into numerous truncated lobules; eyes small, articulated at or near antero-external angle of

merus; exopod slender, often concealed; buccal cavity completely closed by the maxillipeds. Chelipeds remarkably unequal in male, small and equal in female. Legs strong, meropodites of second and third pair foliaceous, dactyli very sharp. Abdomen consisting of seven distinct segments in both sexes, often two or more segments fuse together.

Type species : *Cancer vocans major* Herbst, 1782, by monotypy; gender : feminine. Name No. 1648 on Official List.

90. *Uca lactea* (De Haan, 1835)

1835. *Ocypode (Gelasimus) lacteus* de Haan, In : Siebold's, *Fauna japon. (Crust.)* : 54, pl. 15, fig. 5.

1900. *Gelasimus annulipes*, Alcock, *J. Asiat. Soc. Bengal*, 69(2) : 353.

1900. *Gelasimus lacteus*, Alcock, *J. Asiat. Soc. Bengal*, 69(2) : 355.

1975. *Uca (Celuca) lactea*, Crane, *Fiddler Crabs of the World* : 292, pls. 39, 40, 45A, 47c-d, 50A, figs. 17-20.

1995. *Uca (Celuca) lactea annulipes*, Bairagi, *Zool. Surv. India, Estuarine Ecosystem Series, Part 2* : Hugli Matla Estuary : 273.

2005. *Uca lactea*, Dev Roy and Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 508, pl. 4, fig. 10. *Zool. Surv. India*.

Material examined : 2(F), Station-2, Cooum River near Iron Bridge, 25. 07. 1961, P.P., Reg. No. C 4959-60/1; Station 2, Adayar Beach, 16.03.1961, Dr. R.S. Pillai and V.K. Premkumar, Reg. No. C4959-63/1.

Measurement :

W = 17.7 F = 3.15 L = 10.9

Diagnosis : Carapace subquadrilateral, much broader than long; antero-lateral angles sharp, claw-shaped and produced diagonally outwards; regions indistinct, only the protogastric and cardiac regions faintly outlined. Front broad, about the greatest breadth of carapace. Antero-lateral borders nearly straight and converging; dorso-lateral margins defined by fine, raised convergent lines extending beyond level of the second pair of walking leg. Upper border of orbit sinuous and smooth; lower border finely crenated at inner half, the crenellations

increasing in size near antero-external angle. Chelipeds markedly unequal in male, equal in female; outer surface of chelipeds smooth, inner surface with an oblique tuberculate ridge; upper border of palm about half the length of dactylus; dactylus hook-like, compressed; pollex slightly curved upwards, truncated at tips due to the presence of an enlarged tooth. Merus of last pair of leg markedly slender. Male abdomen consisting of seven distinct segments.

Type locality : Japan (De Hanns, 1835).

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu : Pulicat Lake, Madras, Parangipettai coast, Pichavaram, Gulf of Mannar; Andhra Pradesh : Guntur, Kakinada, Nellore, Vizianagaram; Orissa : Mahanadi estuary, Gopalpur Beach, Chilka Lake; Pondichery : Yanam; West Bengal : Bakkhali Beach, Sagar Island, Golabari Khal near Bakkhali, Haldia, Medinipur. West coast : Gujarat : Okha; Maharashtra : Bombay, Kolak, Umarsadi; Karnataka : Karwar. Andaman and Nicobar Islands : North Andaman, Middle Andaman, South Andaman, Little Andaman, Nicobars.

Elsewhere : South Africa, East Africa, Madagascar, Mauritius, Red Sea, Persian Gulf, Pakistan, Mergui Archipelago, Malay Peninsula, Singapore, Thailand, Indonesia, Philippines, China, Japan, Ryukyu Island, New Guinea, Australia, New Caledonia and as far as Samoa.

91. *Uca triangularis* (A. Milne Edwards, 1873)

1873. *Gelasimus triangularis* A. Milne Edwards, *Nouv. Archs. Mus. Hist. nat. Paris*, (N. S.) : 9 : 275.

1975. *Uca (Celuca) triangularis bengali* Crane, *Fiddler Crabs of the World* : 290, 610, pl. 38 K-L, fig. 24 J, 32 N-O, 68 C.

1998. *Uca triangularis bengali*, Deb, *Zool. Surv. India, Fauna of West Bengal, State Fauna Series 3* (Part 10) : 398.

2005. *Uca triangularis*, Dev Roy and Bhadra, *Zool. Surv. India, Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 509, pl. 3, fig. 8.

Material examined : 3 (M), Station 3, Adyar River near E. bridge, 25. 01. 1961, I. M. and P. P., Reg. No. C 4964/1; 2(M), Parangipettai

Beach, 2 km. from Chidambaram, Dist. Cuddalore, Dr. J.G. Pattanayak, Reg. No. C 5348/2.

Measurement :

W = 18.55 F = 3.4 L = 10.45

Diagnosis : Carapace distinctly hexagonal, strongly convex, regions not defined; surface covered with microscopic granules. Antero-lateral angles strongly acute; antero-lateral margins absent; dorso-lateral margin strongly convergent posteriorly and marked by a fine raised line extending up to the level of third walking leg; postero-lateral striae absent. Front broad, nearly 1/5th the greatest breadth of carapace, pterygostomian region well-covered with setae. Sub-orbital crenellations low and continuous at inner half and partly separated at the outer end. Chelipeds markedly unequal in male; in major cheliped, all the margins of arm and wrist serrated; dactylus longer than palm; upper border of palm with a double row of tubercles extending almost up to the middle of dactylus; outer surface of palm and fingers studded with vesiculous granules and scattered minute pits; inner surface of palm with moderately high oblique ridge and large tubercles, those of fingers smooth; both dactylus and pollex moderately slender; in minor cheliped, dactylus and pollex relatively longer and slenderer with a few weak serrations in gape; merus flattened bearing granules near ventral margin, curving abruptly distally.

Type locality : New Caledonia (A. Milne Edwards, 1873).

Distribution : Indian Ocean. India : Tamil Nadu : Adyar River : Andhra Pradesh : Kakinada, Nizampatnam, Puluguvari Palem, Sekhinetipalli; Pondicherry; West Bengal.

Elsewhere : Myanmar, Malaysia and Australia.

Subfamily DOTILLINAE Stimpson, 1858

1858. Dotillidae Stimpson, *Proc. Acad. nat. Sci., Philad* : 44

2005. Dotillinae, Dev Roy and Bhadra, *Zool. Surv. India, Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 510.

Diagnosis : Carapace very deep, subglobose or quadrilateral in outline. Front narrow, deflexed, often a mere lobe. Lateral borders with or without tooth. Antennular flagellum rudimentary, almost vertically folded and concealed under the front, internnular septum broad. Orbits shallow. Buccal cavern large, often enormous, completely closed by the external maxillipeds. Chelipeds equal or subequal in both sexes. Legs slender; tympanum present on merus of legs, often on chelipeds and some of the sternal segments; no hairy recess between bases of second and third pair of legs.

Remarks : This subfamily has long been referred to as Scopimerinae. Manning and Holthuis (1981) first pointed out that Dotillinae Stimpson, 1858 is a senior name and has thus priority over Scopimerinae Alcock, 1900. Dotilline crab fauna of India are quite rich. They are represented by 4 genera (namely, *Dotilla*, *Dotillopsis*, *Scopimera* and *Ilyoplax*) and 13 species in the coasts of India. Out of these, four species two each in the genera *Dotilla* and *Scopimera* are recorded from Tamil Nadu.

Key to genera of the subfamily DOTILLINAE

- Lateral walls of carapace with deep convolute structure, merus of external maxillipeds larger than ischium, fourth segment of abdomen overlapping fifth with a dense brush of hair at its distal end in both sexes, male abdomen not constricted, no brush of hair between bases of walking legs ***Dotilla***
- Lateral walls of carapace generally without conspicuous structures, merus of external maxillipeds shorter than ischium, fourth abdominal segment neither overlapping fifth nor with a brush of hair at its distal end, fourth or fifth segment of male abdomen constricted in part or all its extent giving it a wasp-like appearance, a conspicuous brush of hair between bases of first and second pair of walking legs... ***Scopimera***

Genus ***Dotilla*** Stimpson, 1858

1858. *Dotilla* Stimpson, *Proc. Acad. nat. Sci., Philad.* : 98.

2000. *Dotilla*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No. 185* : 128.

2005. *Dotilla*, Dev Roy and Bhadra, *Zool. Surv. India, Fauna of Andhra Pradesh, State Fauna Series, 5(Part 5)* : 511.

Diagnosis : Carapace deep, subcubical or subglobose, as broad as or broader than long, dorsal and lateral surfaces curiously sculptured resembling brain-convolutions. Front, a narrow deflexed lobe. Lateral borders with or without tooth. Antenna with short flagellum. Antennular flagellum rudimentary, almost vertically folded and hidden beneath the front. Orbits shallow; eye-stalks long and slender, eyes terminal. Buccal cavern enormous, suboval or subcircular; external maxillipeds very large, fully covering the buccal cavity as a strong hemispherical bulge. Chelipeds equal in both sexes; fingers slender, acute, slightly deflexed and not bearing any prominent tooth. Legs moderate, not much variable in length; upper surface of merii of leg joints and chelipeds provided with a characteristic oval membranous space or "tympanum", similar space often present on some of the segments of sternum. Abdomen of seven segments in both sexes, distal end of fourth segment thickly fringed with setae, fifth segment not constricted in male.

Type species : *Cancer sulcatus* Forskål, by monotypy; gender : masculine.

Key to species of the genus *Dotilla*

- Chelipeds not much longer than carapace and legs, no tympana on sternum *D. intermedia*
- Chelipeds 1-4 times the length of carapace and much longer than the legs, tympanum on each segment of sternum *D. myctiroides*

92. *Dotilla intermedia* De Man, 1888

1888. *Dotilla intermedia* De Man, *J. Linn. Soc. Zool.*, **22** : 135, pl. 9, figs. 4-6.

1900. *Dotilla clepsydrodactylus* Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 365.

2005. *Dotilla intermedia*, Dev Roy and Bhadra, *Zool. Surv. India, Fauna of Andhra Pradesh, State Fauna Series, 5(Part 5)* : 512.

Material examined : 1 (M), 17 (J), Ennur Backwater near Madras, 19.01.1915, N. Annandale, Reg. No. C 9194/10.

Measurement :

$$W = 4.65 \quad F = 0.95 \quad L = 3.55$$

Diagnosis : Carapace broader than long, thick and sculptured exhibiting a five-rayed star grooves anteriorly; only the frontal groove continued up to the gastric region. Areolated region of carapace and its side walls finely granular. Gastric region bearing five small tubercles—one on the mesogastric, two on the urogastric and one on each side of the branchial region. Merus of external maxillipeds not longitudinally sulcate, inner half of the joint quite smooth. Chelipeds subequal, palm tumid; both outer and inner surfaces of arm, wrist and palm granular; fingers slender, long, about twice as long as palm, gradually tapering into an acute point; outer surface of both fingers grooved longitudinally, their apposed margins armed with broad, finely serrated dentary lobes. In the last pair of legs, dactylus about as long as its propodus, in others dactylus longer than propodus; merus of each leg provided with a 'tympanum', in last pair tympanum almost half as long as the joint; propodus distinctly grooved on the outer surface. Anterior margin of fourth abdominal segment emarginated at the middle and also piliferous; penultimate joint more than twice as broad as long, shorter than the terminal segment, its base slightly broader than long.

Type locality : Sullivan Island, Mergui (De Man, 1888).

Distribution : Bay of Bengal. India : East coast—Tamil Nadu : Ennur, Parangipettai coast; Andhra Pradesh: Baruva, Vadarevu; Orissa : Balassore, Chandipore Chilka Lake, Mahanadi Delta; West Bengal : Sagar Island.

Elsewhere : Mergui Archipelago, Tavoy.

93. *Dotilla myctiroides* (H. Milne Edwards, 1852)

1852. *Doto myctiroides* H. Milne Edwards, *Annl. Sci. nat. (Zool.)*, sér. 3, 18 : 152, pl. 4, fig. 24.

1900. *Dotilla myctiroides*, Alcock, *J. Asiat. Soc. Bengal*, 69(2) : 368.

2000. *Dotilla myctiroides*, Dev Roy and Das, *Rec. zool. Surv. India, Occ. Paper No. 185* : 128, pl. 5, fig. 2 and pl. 15, figs. 7, 8.

2005. *Dotilla myctiroides*, Dev Roy and Bhadra, *Zool. Surv. India, Fauna of Andhra Pradesh, State Fauna Series 5(Part 5)* : 514.

Material examined: 2 (M), 5 (F), Pamban, Dist. Ramnad, 21. 02. 1913, S.W. Kemp, Reg. No. C 8935/10; 8 (M), 15 (F), Krusadai Island, 09. 09. 1925, Reg. No. C 2515/2; 18 (M), 4(F), Tuticorin, 02. 1918, J. Hornell, Reg. No. C 9806/10; 1 (F), Ennur Backwater near Madras, 10, 1913, N. Annandale, Reg. No. 8934/10.

Measurement :

$$\begin{array}{ccc} W = 9.2 & F = 1.1 & L = 8.9 \\ 7.55 & 0.95 & 7.3 \end{array}$$

Diagnosis : Carapace almost as long as broad, subcubical; surface smooth except anteriorly and posteriorly, side walls and pterygostomian regions finely granular; regions indistinct, branchial area areolated. Front extremely narrow, deflexed and grooved. Merus of external maxillipeds about twice as big as ischium, outer surface studded with vesiculous granules; a faint groove running parallel anteriorly with its outer border. Lateral borders diverging strongly backwards, side walls sculptured with the usual convoluted grooves. Chelipeds long, slender and unarmed, stouter than legs and about 4 times the length of carapace; its inner and outer surfaces frosted, if observed under the lens; upper border of palm and dactylus finely crenated; fingers much longer than palm, slender and pointed, their cutting edges finely serrated. Leg joints long, granular; meropodites dilated strongly, outer surface of each of which with a large tympanum; dactylus long, slender, about twice the length of propodus in the last pair. Abdomen consisting of seven segments in both sexes, sixth segment of male abdomen longer than broad. Tympanum present on either side of the last four thoracic sterni.

Type locality : Mahe, Seychelles (H. Milne Edwards, 1852).

Distribution : Indo-West Pacific. India : East coast—Tamil Nadu : Madras, Ennur,

Rameswaram, Tuticorin, Kutikal Point, Pamban, Krusadai Island; Andhra Pradesh : Bimlipatam; Orissa : Chilka Lake; Pondicherry: Mahe. West coast-Goa : Panaji, Mormugao; Karnataka : Karwar; Kerala : Travancore; Maharashtra : Bombay. Andaman Islands : North and South Andamans.

Elsewhere : Seychelles, Sri Lanka, Tenasserim coast, Mergui Archipelago, Malay Peninsula, Singapore, Indonesia and Philippines.

Remarks : This species is frequently found in places where the water is brackish. Specimens bearing Registration No. C 8934/10 and 8935/10 were collected from the backwaters of Pamban and Ennore. The former was obtained from a depth of 4-5 ft. by Dr. Annandale while specimens belonging to the latter were collected by digging.

The single ovigerous female was 6.9 and 7.0 mm across its carapace width and length respectively.

Genus *Scopimera* De Haan, 1833

1833. *Scopimera* De Haan, In : Siebold, *Fauna japon. (Crust.)* : 5, 24.

1900. *Scopimera*, Alcock, *J. Asiat. Soc. Bengal*, **69**(2) : 369.

1919. *Scopimera*, Kemp, *Rec. Indian Mus.*, **16**(5) : 309, 310.

Diagnosis : Carapace much broader than long, deep, without any brain convolution on the sidewalls. External maxilliped unsculptured, its merus shorter than its ischium. A hairy-ridged pouch often present between the bases of first and second pair of ambulatory legs. Male abdomen wasp-like due to prolongation and narrowness of fifth segment, female abdomen consisting of seven distinct segments.

Type species : *Ôcypode (Scopimera) globosa* De Haan, 1835 by subsequent designation by monotypy; gender : feminine.

Remarks : The genus *Scopimera* is represented by four species in Indian coasts, namely, *S. globosa*, *S. investigatoris*, *S. pilula* and *S. proxi*. Among these, species are endemic.

Only the last two species has been recorded from Tamil Nadu. However, only one species has been dealt with in this communication.

94. *Scopimera pilula* Kemp, 1919

1919. *Scopimera pilula* Kemp, *Rec. Indian Mus.*, **16**(5) : 314, pl. 12, fig. 1, text-figs. 3, 4.

Material examined : 1(M), Station-1, Adayar River, Elphinston Bridge, Adayar, 25.10.1961, I.M. and P.P., Reg. No. C 4958/1.

Measurement :

W = 7.35 F = 1.2 L = 6.2

Diagnosis : Carapace thick, broader than long, widest posteriorly; branchial regions areolated, a shallow depression on either side of the gastric region; surface smooth except anteriorly and laterally where there are fine granules and tubercles. Side walls and pterygostomian also finely granular. A granular elevation present near the outer orbital angle and a protuberance near the base of fourth pair of legs. Lateral borders visible for a short distance behind the outer orbital angle, beneath it, side walls grooved longitudinally and further down absent altogether. Orbits broad, upper border sinuous, sloping backwardly and ridged strongly, lower border with a finely beaded ridge. External maxillipeds unsculptured, bulging strongly, ischium longer than merus, its breadth being slightly greater than its length. Chelipeds unequal, frosted under the lens; margins of arm and wrist crested; palm compressed, dactylus about two-thirds its length; fingers broad with acute tip, their outer surface grooved longitudinally, cutting edges of dactylus of larger chela with a molariform tooth almost at its middle. Male abdomen seven-segmented, fourth and fifth segments slightly longer than their basal breadth and constricted proximally, sixth segment nearly two-thirds as broad as long, last segment almost twice as broad as long. Meropodite of legs much dilated each bearing a large tympana on both upper and lower surfaces; dactylus long, slender, flute-like just slightly larger in the first three pair, about double the length of propodus in last pair, except dactyli all leg segments finely granular and bearing long, scattered bristles.

Type locality : Pamban, Tamil Nadu, India (Kemp, 1919).

Distribution : Bay of Bengal. India : East coast-Tamil Nadu : Adayar (present record), Pamban Backwaters, Tuticorin.

Elsewhere : Paway (Pawe) Island, Mergui Archipelago.

Remarks : The species is so far known from Tamil Nadu only.

SUMMARY

94 species of marine and estuarine brachyuran crabs belonging to 58 genera and 17 families have been recorded from Tamil Nadu coast. Taxonomic account of each species has been dealt with along with their distribution. Brief notes on habitat ecology and breeding biology of some selected species has also been presented. Four species namely, *Calmania prima*, *Globopilumnus actumnoides*, *Pseudolitocheira integra* and *Typhlocarcinus*

villosus constitutes new records from India. Seven species namely, *Liomera (Bruciana) pediger*, *Carcinoplax longipes*, *Sphaerozius nudus*, *Pilumnus longicornis*, *P. minutus*, *Eriphia scabricula*, *Glabropilumnus laevis* are recorded for the first time from Tamil Nadu. An updated check-list of the all the species hitherto known from this coast is presented along with a list of synonymised species. Distribution of all the species occurring in different parts of the state has been provided. A list of crabs described/recorded but not reported after 1900's is also presented.

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Appendix-1. Check-list of Brachyuran Crabs of Tamil Nadu Coast

Sl. No.	Name of the species	Sl. No.	Name of the species
	Family DROMIIDAE De Haan, 1833	23.	<i>Calappa pustulosa</i> Alcock, 1896
1.	<i>Dromidiopsis abrolhensis</i> Montgomery, 1931	24.	<i>Calappa terraerequiae</i> Ward, 1936
2.	<i>Dromidiopsis cranioides</i> (De Man, 1888)	25.	<i>Mursia bicristimana</i> Alcock and Anderson, 1894
3.	<i>Dromidiopsis dromia</i> (Linnaeus, 1758)		Subfamily MATUTINAE De Haan, 1835
4.	<i>Lauridromia dehaani</i> Rathbun, 1923	26.	<i>Ashtoret lunaris</i> (Forskål, 1775)
5.	<i>Cryptodromia conchifera</i> Alcock and Anderson	27.	<i>Ashtoret miersii</i> (Henderson, 1887)
6.	<i>Cryptodromia hilgendorfi</i> De Man, 1888	28.	<i>Matuta planipes</i> Fabricius, 1798
7.	<i>Cryptodromiopsis</i> sp.	29.	<i>Matuta victor</i> (Fabricius, 1781)
8.	<i>Dromidia unidentata</i> (Rüppell, 1830)		Family LEUCOSIIDAE Samouelle, 1819
			Subfamily EBALIINAE Stimpson, 1871
9.	<i>Pseudodromia integrifrons</i> Henderson, 1893	30.	<i>Ebalia diadumena</i> Alcock, 1896
10.	<i>Conchoecetes artificiosus</i> (Fabricius, 1798)	31.	<i>Ebalia malefactrix</i> Kemp, 1915
	Section Archaeobrachyura Guinot, 1977	32.	<i>Alox rugosum</i> (Stimpson, 1858)
	Superfamily RANINOIDEA De Haan, 1839		Subfamily ILLINAE Stimpson, 1871
	Family RANINIDAE De Haan, 1839	33.	<i>Arcania erinacea</i> (Fabricius, 1787)
11.	<i>Ranina ranina</i> (Linnaeus, 1758)	34.	<i>Arcania heptacantha</i> (De Haan, 1841)
	Section Oxystomata H. Milne Edwards, 1834	35.	<i>Arcania novemspinosa</i> (Lichtenstein, 1816)
	Superfamily Dorippoidea MacLeay, 1838	36.	<i>Arcania gracilis</i> Henderson, 1893
	Family DORIPPIDAE MacLeay, 1838	37.	<i>Arcania septemspinosa</i> (Fabricius, 1793)
	Subfamily DORIPPINAE MacLeay, 1838	38.	<i>Arcania undecimspinosa</i> De Haan, 1841
12.	<i>Dorippe quadridens</i> (Fabricius, 1793)	39.	<i>Ixa cylindrus</i> (Fabricius, 1777)
13.	<i>Dorippoides facchino</i> (Herbst, 1785)	40.	<i>Ixa edwardsi</i> Lucas, 1858
14.	<i>Neodorippe callida</i> (Fabricius, 1798)	41.	<i>Ixoides cornutus</i> MacGilchrist, 1905
15.	<i>Paradorippe granulata</i> (De Haan, 1841)	42.	<i>Parilia alcocki</i> Wood-Mason, 1891
16.	<i>Paradorippe polita</i> (Alcock & Anderson, 1894)	43.	<i>Iphiculus spongiosus</i> Adams and White, 1848
	Superfamily LEUCOSIOIDEA Samouelle, 1819		Subfamily LEUCOSIINAE Samouelle, 1819
	Family CALAPPIDAE De Haan, 1833	44.	<i>Philyra adamsii</i> Bell, 1855
	Subfamily CALAPPINAE De Haan, 1841	45.	<i>Philyra corallicola</i> Alcock, 1896
17.	<i>Calappa bicornis</i> Miers, 1884	46.	<i>Philyra globosa</i> (Fabricius, 1787)
18.	<i>Calappa gallus</i> (Herbst, 1803)	47.	<i>Philyra globulosa</i> H. Milne Edwards, 1837
19.	<i>Calappa hepatica</i> (Linnaeus, 1758)	48.	<i>Philyra scabriuscula</i> (Fabricius, 1798)
20.	<i>Calappa japonica</i> Ortmann, 1892	49.	<i>Philyra syndactyla</i> Ortmann, 1892
21.	<i>Calappa lophos</i> (Herbst, 1782)	50.	<i>Philyra verrucosa</i> Henderson, 1893
22.	<i>Calappa philargius</i> (Linnaeus, 1758)	51.	<i>Pseudophilyra melita</i> De Man, 1888

Appendix-1. Contd.

Sl. No.	Name of the species	Sl. No.	Name of the species
52.	<i>Pseudophilyra woodmasoni</i> Alcock, 1896	82.	<i>Naxioides robillardi</i> Miers, 1882
53.	<i>Coleusia biannulata</i> (Tyndal-Biscoe & George, 1962)	83.	<i>Phalangipus filliformis</i> Rathbun, 1916
54.	<i>Euclosia obtusifrons</i> (De Haan, 1841)	84.	<i>Phalangipus hystrix</i> (Miers, 1886)
55.	<i>Euclosia rotundifrons</i> (Chopra, 1933)	85.	<i>Phalangipus indicus</i> (Leach, 1815)
56.	<i>Leucosia anatum</i> (Herbst, 1783)	86.	<i>Phalangipus longipes</i> (Linnaeus, 1758)
57.	<i>Leucosia lcraniolaris</i> (Linnaeus, 1758)	87.	<i>Tylocarcinus styx</i> (Herbst, 1803)
58.	<i>Leucosia longifrons</i> De Haan, 1841	88.	<i>Doclea alcocki</i> Laurie, 1906
59.	<i>Leucosia phyllochira</i> White, 1847	89.	<i>Doclea hybrida</i> (Fabricius, 1798)
60.	<i>Seulocia pubescens</i> (Miers, 1877)	90.	<i>Doclea muricata</i> (Fabricius, 1787)
61.	<i>Seulocia rhomboidalis</i> (De Haan, 1841)	91.	<i>Doclea ovis</i> (Fabricius, 1787)
62.	<i>Urnalana haematosticta</i> (Adams and White, 1848)	92.	<i>Doclea rissonii</i> Leach, 1815
63.	<i>Onychomorpha lamelligera</i> Stimpson, 1858	93.	<i>Chlorilibinia andamanica</i> Alcock, 1895
64.	<i>Myra affinis</i> Bell, 1855	Subfamily EPIALTINAE MacLeay, 1838	
65.	<i>Myra elegans</i> Bell, 1865	94.	<i>Acanthonyx consobrinus</i> A. Milne Edwards, 1862
66.	<i>Myra fugax</i> (Fabricius, 1798)	95.	<i>Acanthonyx macleayi</i> (Krauss, 1843)
67.	<i>Myra kessleri</i> Paul'son, 1875	96.	<i>Huenia proteus</i> De Haan, 1839
68.	<i>Nursia abbreviata</i> Bell, 1855	97.	<i>Menaethius brevirostris</i> Heller, 1862
69.	<i>Nursia plicata</i> (Herbst, 1803)	98.	<i>Menaethius monoceros</i> (Latreille, 1825)
70.	<i>Nursilia dentata</i> Bell, 1855	99.	<i>Trigonothir simplex</i> (Dana, 1852)
Superfamily MAJOIDEA Samouelle, 1819		Subfamily MITHRACINAE Balss, 1929	
Family MAJIDAE Samouelle, 1819		100.	<i>Micippa philyra</i> (Herbst, 1803)
Subfamily INACHINAE MacLeay, 1838		101.	<i>Micippa thalia</i> (Herbst, 1803)
71.	<i>Achaeus lacertosus</i> Stimpson, 1857	Subfamily OPTHALMINAE Balss, 1929	
72.	<i>Inachoides dolichorhynchus</i> Alcock & Anderson, 1894	102.	<i>Ophthalmias cervicornis</i> (Herbst, 1803)
73.	<i>Paratymolus hastatus</i> Alcock, 1895	Subfamily MAJINAE Samouelle, 1819	
74.	<i>Litosus sexspinosus</i> (Miers, 1884)	103.	<i>Schizophrys aspera</i> (H. Milne Edwards, 1834)
75.	<i>Camposcia retusa</i> Latreille, 1829	104.	<i>Cyclax suborbicularis</i> (Stimpson, 1858)
Subfamily PISINAE Dana, 1851		105.	<i>Chlorinoides aculeatus</i> (H. Milne Edwards, 1834)
76.	<i>Hyastenus aries</i> (Latreille, 1825)	106.	<i>Chlorinoides longispinus</i> (De Haan, 1839)
77.	<i>Hyastenus gracilirostris</i> Miers, 1879	Superfamily HYMENOSOMATIDAE	
78.	<i>Hyastenus hilgendorfi</i> De Man, 1888	MacLeay, 1838	
79.	<i>Hyastenus oryx</i> A. Milne Edwards, 1872	107.	<i>Elamene cristatipes</i> Gravely, 1927
80.	<i>Hyastenus pleione</i> (Herbst, 1803)	108.	<i>Elamene sindensis</i> Alcock, 1900
81.	<i>Naxioides hirta</i> A. Milne Edwards, 1865		

Appendix-1. Contd.

Sl. No.	Name of the species	Sl. No.	Name of the species
	Superfamily PARTHENOPOIDEA MacLeay, 1838		Family PORTUNIDAE Rafinesque, 1815
	Family PARTHENOPIDAE MacLeay, 1838		Subfamily CAPHYRINAE Alcock, 1899
	Subfamily DALDORFIINAE Ng & Rodriguez, 1986	129.	<i>Lissocarcinus laevis</i> Miers, 1886
109.	<i>Daldorfia horrida</i> (Linnaeus, 1758)	130.	<i>Lissocarcinus polybioides</i> Adams and White, 1848
110.	<i>Daldorfia spinosissima</i> (A. Milne Edwards, 1862)		Subfamily CATOPTRINAE Borradaile, 1903
	Subfamily PARTHENOPINAE MacLeay, 1838	131.	<i>Carupa tenuipes</i> Dana, 1851
111.	<i>Aulacolambrus hoplonotus</i> (Adams & White, 1849)		Subfamily POLYBIINAE Ortmann, 1893
112.	<i>Cryptopodia angulata</i> H. Milne Edwards & Lucas, 1841	132.	<i>Parathranites orientalis</i> (Miers, 1886)
113.	<i>Cryptopodia fornicata</i> Fabricius, 1781	133.	<i>Lupocyclus philippinensis</i> , Semper, 1880
114.	<i>Cryptopodia laevimana</i> Miers, 1879	134.	<i>Lupocyclus rotundatus</i> Adams and White, 1848
115.	<i>Cryptopodia patula</i> Choing & Ng, 1998		Subfamily PORTUNINAE Rafinesque, 1815
116.	<i>Enoplolambrus carenatus</i> (H. Milne Edwards, 1834)	135.	<i>Scylla serrata</i> (Forskål, 1775)
117.	<i>Enoplolambrus echinatus</i> (Herbst, 1790)	136.	<i>Scylla tranquebarica</i> (Fabricius, 1798)
118.	<i>Enoplolambrus prensor</i> (Herbst, 1796)	137.	<i>Scylla olivacea</i> (Herbst, 1796)
119.	<i>Parthenope longimanus</i> (Linnaeus, 1764)	138.	<i>Portunus argentatus</i> (White, 1847)
120.	<i>Rhinolambrus contraries</i> (Herbst, 1804)	139.	<i>Portunus gladiator</i> Fabricius, 1798
121.	<i>Rhinolambrus longispinus</i> (Miers, 1879)	140.	<i>Portunus gracilimanus</i> (Stimpson, 1858)
122.	<i>Rhinolambrus pelagicus</i> (Rüppell, 1830)	141.	<i>Portunus hastatoides</i> (Fabricius, 1798)
123.	<i>Rhinolambrus turriger</i> (White, 1847)	142.	<i>Portunus pelagicus</i> (Linnaeus, 1758)
	Subfamily AETHRINAE Dana, 1851	143.	<i>Portunus petreus</i> (Alcock, 1899)
124.	<i>Aethra scruposa</i> (Linnaeus, 1764)	144.	<i>Portunus pubescens</i> (Dana, 1852)
	Family EUMEDONIDAE Dana, 1854	145.	<i>Portunus pulchricristatus</i> (Gordon, 1931)
125.	<i>Zebrida adamsii</i> White, 1847	146.	<i>Portunus samoensis</i> (Ward, 1939)
126.	<i>Harrovia albolineata</i> Adams and White, 1848	147.	<i>Portunus sanguinolentus</i> (Herbst, 1803)
127.	<i>Rhabdonotus pictus</i> A. Milne Edwards, 1867	148.	<i>Portunus tuberculatus</i> (A. Milne Edwards, 1861)
	Superfamily CANCROIDEA Latreille, 1803	149.	<i>Charybdis (Charybdis) affinis</i> Dana, 1852
	Family CORYSTIDAE Samouelle, 1819	150.	<i>Charybdis (Charybdis) amboinensis</i> Leene, 1938
128.	<i>Jonas</i> sp.	151.	<i>Charybdis (Charybdis) anisodon</i> (De Haan, 1850)
	Section BRACHYRHYNCHA Borradaile, 1907	152.	<i>Charybdis (Charybdis) annulata</i> (Fabricius, 1798)
	Superfamily PORTUNOIDEA Rafinesque, 1815	153.	<i>Charybdis (Charybdis) beauforti</i> Leene & Buitendijk, 1949
		154.	<i>Charybdis (Charybdis) callianassa</i> (Herbst, 1789)

Appendix-1. *Contd.*

Sl. No.	Name of the species	Sl. No.	Name of the species
155.	<i>Charybdis (Charybdis) feriatus</i> (Linnaeus, 1758)	179.	<i>Thalamita prymna</i> (Herbst, 1803)
156.	<i>Charybdis (Charybdis) granulata</i> De Haan, 1835	180.	<i>Thalamita spinifera</i> Borradaile, 1903
157.	<i>Charybdis (Charybdis) helleri</i> (A. Milne Edwards, 1867)	181.	<i>Thalamita wood-masoni</i> Alcock, 1899
158.	<i>Charybdis (Charybdis) lucifera</i> (Fabricius, 1798)	Subfamily PODOPHTHALMINAE Dana, 1851	
159.	<i>Charybdis (Charybdis) miles</i> (De Haan, 1835)	182.	<i>Podophthalmus vigil</i> (Fabricius, 1798)
160.	<i>Charybdis (Charybdis) natator</i> (Herbst, 1794)	Superfamily XANTHOIDEA MacLeay, 1838	
161.	<i>Charybdis (Charybdis) orientalis</i> Dana, 1852	Family EURYPLACIDAE Stimpson, 1817	
162.	<i>Charybdis (Charybdis) riversandersoni</i> Alcock, 1899	183.	<i>Eucrate alcocki</i> Seréne, 1971
163.	<i>Charybdis (Charybdis) rostrata</i> (A. Milne Edwards, 1861)	184.	<i>Eucrate crenata</i> De Haan, 1835
164.	<i>Charybdis (Charybdis) variegata</i> (Fabricius, 1798)	185.	<i>Eucrate dentata</i> Alcock, 1900
165.	<i>Charybdis (Goniohellenus) edwardsi</i> Leene and Buitendijk, 1952	186.	<i>Eucrate sexdentata</i> Haswell, 1882
166.	<i>Charybdis (Goniohellenus) hoplites</i> (Wood-Mason, 1877)	187.	<i>Heteroplax nitida</i> Miers, 1879
167.	<i>Charybdis (Goniohellenus) truncata</i> (Fabricius, 1798)	Family GONEPLACIDAE MacLeay, 1838	
168.	<i>Charybdis (Goniohellenus) vadorum</i> Alcock, 1899	Subfamily GONEPLACINAE MacLeay, 1838	
169.	<i>Charybdis (Gonioneptunus) bimaculata</i> (Miers, 1886)	188.	<i>Carcinoplax longimanus</i> (De Haan, 1835)
170.	<i>Charybdis (Goniosupradens) acutifrons</i> (De Man, 1877)	189.	<i>Carcinoplax longipes</i> (Wood-Mason, 1891)
171.	<i>Thalamita admete</i> (Herbst, 1803)	190.	<i>Carcinoplax</i> sp.
172.	<i>Thalamita chaptali</i> (Audouin, 1826)	Family XANTHIDAE MacLeay, 1838	
173.	<i>Thalamita crenata</i> (Latreille, 1829)	Subfamily CYMOINAE Alcock, 1898	
174.	<i>Thalamita danae</i> Stimpson, 1858	191.	<i>Cymo andreossyi</i> (Audouin, 1826)
175.	<i>Thalamita integra</i> Dana, 1852	192.	<i>Cymo melanodactylus</i> De Haan, 1833
176.	<i>Thalamita sexlobata</i> Miers, 1886	193.	<i>Cymo quadrilobatus</i> Miers, 1884
177.	<i>Thalamita sima</i> H. Milne Edwards, 1834	Subfamily LIOMERINAE Sakai, 1976	
178.	<i>Thalamita parvidens</i> (Rathbun, 1907)	194.	<i>Liomera (Bruciana) pediger</i> (Alcock, 1898)
		195.	<i>Liomera (Liomera) margaritata</i> (A. Milne Edwards, 1873)
		Subfamily EUXANTHINAE Alcock, 1898	
		196.	<i>Hypocolpus granulatus</i> (De Haan, 1837)
		197.	<i>Euxanthus exsculptus</i> (Herbst, 1790)
		Subfamily ACTAEINAE Alcock, 1898	
		198.	<i>Actaea jacquelinae</i> Guinot, 1976
		199.	<i>Actaea savignyi</i> (H. Milne Edwards, 1834)
		200.	<i>Actaeodes tomentosus</i> (H. Milne Edwards, 1834)
		201.	<i>Epiactaea margaritifera</i> (Odhner, 1925)

Appendix-1. Contd.

Sl. No.	Name of the species	Sl. No.	Name of the species
202.	<i>Paractaea neospeciosa</i> Deb, 1989	230.	<i>Xanthias punctatus</i> (H. Milne Edwards, 1834)
203.	<i>Paraactaea rufopunctata rufopunctata</i> (H. Milne Edwards, 1834)	231.	<i>Neoxanthias impressus</i> (Lamarck, 1818)
204.	<i>Gaillardiellus rueppelli</i> (Krauss, 1843)	232.	<i>Paraxanthias notatus</i> Dana, 1852
205.	<i>Pseudoliomera speciosa</i> (Dana, 1852)	233.	<i>Neoxanthops lineatus</i> (A. Milne Edwards, 1867)
206.	<i>Pseudoliomera variolosa</i> (Borradaile, 1902)	234.	<i>Calmania prima</i> Laurie, 1906
Subfamily ZOSIMINAE Stimpson, 1907		Subfamily ETISINAE Ortmann, 1893	
207.	<i>Atergatis dilatatus</i> De Haan, 1835	235.	<i>Etisus electra</i> (Herbst, 1801)
208.	<i>Atergatis floridus</i> Linnaeus, 1767	236.	<i>Etisus laevimanus</i> Randall, 1839
209.	<i>Atergatis frontalis</i> De Haan, 1833	Subfamily CHLORODIINAE Alcock, 1898	
210.	<i>Atergatis integerrimus</i> (Lamarck, 1801)	237.	<i>Pilodius areolatus</i> (H. Milne Edwards, 1834)
211.	<i>Atergatis laevigatus</i> A. Milne Edwards, 1865	238.	<i>Chlorodiella laevisissima</i> (Dana, 1852)
212.	<i>Atergatis roseus</i> (Rüppell, 1830)	239.	<i>Chlorodiella nigra</i> (Forskål, 1775)
213.	<i>Atergatis subdentatus</i> De Haan, 1835	240.	<i>Phymodius granulosus</i> (De Man, 1888)
214.	<i>Zozymodes cavipes</i> (Dana, 1852)	241.	<i>Phymodius monticulosus</i> (Dana, 1852)
215.	<i>Platypodia cristata</i> (A. Milne Edwards, 1865)	242.	<i>Phymodius nitidus</i> (Dana, 1852)
216.	<i>Platypodia granulosa</i> (Rüppell, 1830)	243.	<i>Phymodius unguatus</i> (H. Milne Edwards, 1834)
217.	<i>Platypodia semigranosa</i> (Heller, 1861)	Subfamily ZALASINAE Serène, 1968	
218.	<i>Zozymus aeneus</i> (Linnaeus, 1758)	244.	<i>Zalasius indica</i> Sankarankutty, 1967
219.	<i>Lophozozymus dodone</i> (Herbst, 1801)	Subfamily KRAUSSINAE Ng, 1993	
Subfamily XANTHINAE MacLeay, 1838		245.	<i>Kraussia nitida</i> Stimpson, 1858
220.	<i>Macromedaeus bidentatus</i> (A. Milne Edwards, 1867)	INCERTAE SEDIS	
221.	<i>Macromedaeus crassimanus</i> (A. Milne Edwards, 1867)	246.	<i>Liagore erythematica</i> Guinot, 1971
222.	<i>Macromedaeus quinquedentatus</i> (Krauss, 1843)	Family TRAPEZIIDAE Miers, 1886	
223.	<i>Leptodius exaraus</i> (H. Milne Edwards, 1834)	Subfamily TRAPEZIINAE Miers, 1886	
224.	<i>Leptodius gracilis</i> (Dana, 1852)	247.	<i>Trapezia areolata</i> Dana, 1852
225.	<i>Leptodius sanguineus</i> (H. Milne Edwards, 1834)	248.	<i>Trapezia cymodoce</i> (Herbst, 1801)
226.	<i>Demania baccalipes</i> (Alcock, 1898)	249.	<i>Trapezia digitalis</i> Latreille, 1825
227.	<i>Demania scaberrima</i> (Walker, 1887)	250.	<i>Trapezia ferruginea</i> Latreille, 1825
228.	<i>Demania splendida</i> Laurie, 1906	251.	<i>Trapezia flavopunctata</i> Eydoux & Souleyet, 1842
229.	<i>Xanthias lamarckii</i> (H. Milne Edwards, 1834)	252.	<i>Trapezia rufopunctata</i> (Herbst, 1799)
		253.	<i>Tetralia clavimana</i> Heller, 1861
		254.	<i>Tetralia glaberrima</i> (Herbst, 1790)
		255.	<i>Quadrella coronata</i> Dana, 1852

Appendix-1. Contd.

Sl. No.	Name of the species	Sl. No.	Name of the species
	Family PILUMNIDAE Samouelle, 1819		Subfamily MENIPPINAE Ortmann, 1894
	Subfamily PILUMNINAE Samouelle, 1819	282.	<i>Menippe rumphii</i> (Fabricius, 1798)
256.	<i>Actumnus setifer</i> (De Haan, 1835)	283.	<i>Myomenippe hardwickii</i> (Gray, 1831)
257.	<i>Actumnus squamosus</i> (De Haan, 1835)	284.	<i>Sphaerozius nudus</i> A. Milne Edwards, 1867
258.	<i>Actumnus verrucosus</i> Henderson, 1893		Subfamily OZIINAE Dana, 1851
259.	<i>Benthopanope indica</i> (De Man, 1888)	285.	<i>Epixanthus frontalis</i> (H. Milne Edwards, 1834)
260.	<i>Eurycarcinus natalensis</i> (Krauss, 1843)	286.	<i>Ozius rugulosus</i> Stimpson, 1858
261.	<i>Glabropilumnus laevis</i> (Dana, 1852)	287.	<i>Globopilumnus actumnoides</i> (A. Milne Edwards, 1873)
262.	<i>Heteropilumnus angustifrons</i> (Alcock, 1900)		Superfamily GRAPSIDOIDEA MacLeay, 1838
263.	<i>Nanopilumnus rouxi</i> (Balss, 1935)		Family GECARCINIDAE MacLeay, 1838
264.	<i>Pilumnus cursor</i> A. Milne Edwards, 1873	288.	<i>Cardisoma carnifex</i> (Herbst, 1794)
265.	<i>Pilumnus labyrinthicus</i> Miers, 1884		Family GRAPSIDAE MacLeay, 1838
266.	<i>Pilumnus longicornis</i> Hilgendorf, 1878		Subfamily GRAPSINAE MacLeay, 1838
267.	<i>Pilumnus minutus</i> De Haan, 1835	289.	<i>Grapsus albolineatus</i> Lamarck, 1818
268.	<i>Pilumnus scabriuscula</i> Adams and White, 1848	290.	<i>Grapsus tenuicrustatus</i> (Herbst, 1783)
269.	<i>Pilumnus tomentosus</i> Latreille, 1825	291.	<i>Metopograpsus frontalis</i> Miers, 1880
270.	<i>Pilumnus vespertilio</i> (Fabricius, 1793)	292.	<i>Metopograpsus latifrons</i> (White, 1874)
	Subfamily RHIZOPINAE Stimpson, 1858	293.	<i>Metopograpsus messor</i> Forskål, 1775
271.	<i>Pseudolitocheira integra</i> (Miers, 1884)	294.	<i>Metopograpsus thukuhar</i> (Owen, 1839)
272.	<i>Typhlocarcinus nudus</i> Stimpson, 1858	295.	<i>Pachygrapsus porpinquus</i> De Man, 1908
273.	<i>Typhlocarcinus villosus</i> Stimpson, 1858		Subfamily VARUNINAE H. Milne Edwards, 1853
274.	<i>Notonyx</i> sp.	296.	<i>Cyclograpsus eydouxii</i> H. Milne Edwards, 1853
	Subfamily GALENINAE Alcock, 1898	297.	<i>Cyclograpsus punctatus</i> Milne Edwards, 1837
275.	<i>Galene bispinosa</i> (Herbst, 1783)	298.	<i>Metaplex distincta</i> H. Milne Edwards, 1853
	Subfamily HALIMEDINAE Alcock, 1898	299.	<i>Metaplex elegans</i> De Man, 1888
276.	<i>Halimede ochtodes</i> (Herbst, 1783)	300.	<i>Pseudograpsus intermedius</i> Chhapgar, 1955
	Family PANOPEIDAE Ortmann, 1893	301.	<i>Pseudograpsus setosus</i> (Fabricius, 1798)
	INCERTA SEDIS	302.	<i>Ptychognathus altimanus</i> (Rathbun, 1914)
277.	<i>Panopeus laevis</i> Dana, 1852	303.	<i>Varuna litterata</i> (Fabricius, 1798)
	Family CARPILIDAE Ortmann, 1893		
278.	<i>Carpilius convexus</i> (Forskål, 1775)		
279.	<i>Carpilius maculatus</i> (Linnaeus, 1758)		
	Family ERIPHIIDAE MacLeay, 1838		
	Subfamily ERIPHINAE MacLeay, 1838		
280.	<i>Eriphia scabricula</i> Dana, 1852		
281.	<i>Eriphia sebana</i> Shaw and Nodder, 1803		

Appendix-1. Contd.

Sl. No.	Name of the species	Sl. No.	Name of the species
Subfamily SESARMINAE Dana, 1852		Family OCYPODIDAE Rafinesque, 1815	
304.	<i>Perisesarma bidens</i> (De Haan, 1835)	Subfamily OCYPODINAE Rafinesque, 1815	
305.	<i>Perisesarma fasciatus</i> (Lanchester, 1900)	327.	<i>Ocypode ceratophthalma</i> (Pallas, 1772)
306.	<i>Parasesarma pictum</i> (De Haan, 1835)	328.	<i>Ocypode cordimana</i> Desmarest, 1825
307.	<i>Parasesarma plicatum</i> (Fabricius, 1798)	329.	<i>Ocypode macrocera</i> H. Milne Edwards, 1837
308.	<i>Nanosesarma andersoni</i> (De Man, 1888)	330.	<i>Ocypode platytarsis</i> H. Milne Edwards, 1852
309.	<i>Nanosesarma batavicum</i> (Moreira, 1903)	331.	<i>Uca dussumieri</i> (H. Milne Edwards, 1852)
310.	<i>Nanosesarma minutum</i> (De Man, 1887)	332.	<i>Uca tetragonon</i> Herbst, 1790
311.	<i>Episesarma mederi</i> (H. Milne Edwards, 1853)	333.	<i>Uca vocans</i> (Linnaeus, 1758)
312.	<i>Muradium tetragonum</i> (Fabricius, 1798)	334.	<i>Uca lactea</i> (De Haan, 1835)
313.	<i>Selatium brockii</i> (De Man, 1888)	335.	<i>Uca triangularis</i> (A. Milne Edwards, 1873)
314.	<i>Pseudosesarma edwardsi</i> (De Man, 1888)	Subfamily MACROPHTHALMINAE Dana, 1851	
315.	<i>Neosarmatium meinerti</i> (De Man, 1887)	336.	<i>Macrophthalmus</i> (<i>Macrophthalmus</i>) <i>convexus</i> Stimpson, 1858
316.	<i>Neosarmatium punctatum</i> (A. Milne Edwards, 1873)	337.	<i>Macrophthalmus</i> (<i>Macrophthalmus</i>) <i>telescopicus</i> (Owen, 1839)
317.	<i>Metasesarma obsum</i> (Dana, 1851)	338.	<i>Macrophthalmus</i> (<i>Mareotis</i>) <i>depressus</i> Rüppell, 1830
Subfamily PLAGUSINAE Dana, 1851		339.	<i>Macrophthalmus</i> (<i>Mopsocarcinus</i>) <i>erato</i> De Man, 1888
318.	<i>Plagusia dentipes</i> De Haan, 1835	Subfamily DOTILLINAE Stimpson, 1858	
319.	<i>Plagusia depressa tuberculata</i> Lamarck, 1818	340.	<i>Dotilla intermedia</i> De Man, 1888
320.	<i>Percnon planissimum</i> (Herbst, 1804)	341.	<i>Dotilla myctiroides</i> (H. Milne Edwards, 1852)
Superfamily PINNOTHEROIDEA De Haan, 1833		342.	<i>Scopimera pilula</i> Kemp, 1919
Family PINNOTHERIDAE De Haan, 1833		343.	<i>Scopimera proxima</i> Kemp, 1919
Subfamily PINNOTHERINAE De Haan, 1833		Subfamily CAMPTANDRIINAE Stimpson, 1858	
321.	<i>Pinnotheres decanensis</i> Chopra, 1931	344.	<i>Camptandrium sexdentatum</i> Stimpson, 1858
322.	<i>Pinnotheres ridgewayi</i> Southwell, 1911	345.	<i>Baruna socialis</i> Stebbing, 1904
323.	<i>Pinnotheres sinensis</i> (Shen, 1933)	Family PALICIDAE Alcock, 1900	
324.	<i>Pinnotheres</i> sp.	346.	<i>Cymopolia serripes</i> (Alcock and Anderson, 1894)
Subfamily XENOPHTHALMINAE Alcock, 1900			
325.	<i>Xenophthalmus pinnotheroides</i> White, 1846		
Subfamily ASTHENOGNATHINAE Stimpson, 1858			
326.	<i>Chasmocarcinops gelasimoides</i> Alcock, 1900		

Appendix-2. List of synonymised species of crabs recorded from Tamil Nadu

Sl. No.	Supplanted name	References	Current name
	Family DROMIIDAE		
1.	<i>Dromia dromia</i> (Linnaeus)	Sankarankutty, 1967; Kantha Bai and Rama Rao, 1977	<i>Dromidiopsis dromia</i> (Linnaeus, 1758)
2.	<i>Dromia dehaani</i> Rathbun	Sethuramalingam and Khan, 1991; Jeyabaskaran <i>et al.</i> , 2000; Venkataraman <i>et al.</i> , 2000	<i>Lauridromia dehaani</i> (Rathbun, 1923)
	Family DORIPPIDAE MacLeay, 1838		
	Subfamily DORIPPINAE MacLeay, 1838		
3.	<i>Dorippe dorsipes</i> (Linnaeus)	Henderson, 1893; Gravely, 1927; Alcock, 1896	<i>Dorippe quadridens</i> (Fabricius, 1793)
	<i>Dorippe frascione</i> (Herbst)	Sankarankutty, 1967	
	<i>Dorippe (Dorippe) frascione</i> (Herbst)	Jeyabaskaran <i>et al.</i> , 2000	
4.	<i>Dorippe facchino</i> (Herbst)	Henderson, 1893; Thurston, 1895; Alcock, 1896; Gravely, 1941; Kantha Bai and Rama Rao, 1977	<i>Dorippoides facchino</i> (Herbst, 1785)
	<i>Dorippe (Dorippoides) facchino</i> Fabricius	Sethuramalingam and Khan, 1991	
	<i>Dorippe sima</i> Edwards	Alcock and Anderson, 1894	
5.	<i>Dorippe astuta</i> Fabricius	Henderson, 1893; Alcock, 1896; Gravely, 1941	<i>Neodorippe callida</i> (Fabricius, 1798)
6.	<i>Dorippe granulata</i> De Haan	Alcock, 1896; Sankarankutty, 1967	<i>Paradorippe granulata</i> (De Haan, 1841)
7.	<i>Dorippe polita</i> Alcock and Anderson	Alcock and Anderson, 1894; Sankarankutty, 1967	<i>Paradorippe polita</i> (Alcock and Anderson, 1894)
	Family CALAPPIDAE De Haan, 1833		
	Subfamily CALAPPINAE De Haan, 1833		

Appendix-2. Contd.

Sl. No.	Supplanted name	References	Current name
8.	<i>Calappa gallus capellonis</i> Laurie	Jeyabaskaran <i>et al.</i> , 2000	<i>Calappa gallus</i> (Herbst, 1803)
9.	<i>Calappa tuberculata</i> Fabricius (1758)	Thurston, 1887	<i>Calappa hepatica</i> (Linnaeus, 1758)
10.	<i>Calappa euxanthematos</i> Alcock and Anderson	Alcock and Anderson, 1894	<i>Calappa japonica</i> Ortman, 1892
	Subfamily MATUTINAE De Haan, 1835		
11.	<i>Matuta miersi</i> Henderson <i>Matuta miersii</i> Henderson	Henderson, 1887 Henderson, 1893; Thurston, 1895	<i>Ashtoret miersi</i> (Henderson, 1887)
12.	<i>Matuta lunaris</i> (Forskål)	Henderson, 1893; Alcock, 1896; Kantha Bai and Rama Rao, 1977; Jeyabaskaran <i>et al.</i> , 2000; Venkataraman <i>et al.</i> , 2002	<i>Ashtoret lunaris</i> (Forskål, 1775)
13.	<i>Matuta victrix</i> Fabricius	Thurston, 1887; Henderson, 1893; Alcock and Anderson, 1894	<i>Matuta victor</i> (Fabricius, 1781)
	Family LEUCOSIIDAE Samouelle, 1819		
	Subfamily ILLINAE Stimpson, 1871		
14.	<i>Arcania novemspinosa</i> Adams and White, var. <i>aspera</i> Miers	Alcock and Anderson, 1894	<i>Arcania novemspinosa</i> (Adams and White, 1848)
15.	<i>Cancer cylindrus</i> Fabricius	Fabricius, 1793	<i>Ixa cylindrus</i> (Fabricius, 1793)
	Subfamily LEUCOSIINAE Samouelle, 1819		
16.	<i>Philyra adamsii</i> Bell	Thurston, 1895; Sankarankutty, 1967	<i>Philyra adamsia</i> Bell, 1855
17.	<i>Philyra polita</i> Henderson	Henderson, 1893	<i>Philyra globosa</i> (Fabricius, 1798)
18.	<i>Leucosia longifrons</i> var. <i>neocaledonica</i> A. Milne Edwards	Alcock, 1896	<i>Leucosia biannulata</i> Tyndale-Biscoe and George, 1962
19.	<i>Myra australis</i>	Alcock and Anderson, 1894	<i>Myra affinis</i> Bell, 1855
20.	<i>Myra darnleyensis</i> Haswell	Alcock and Anderson, 1894; Alcock, 1896	<i>Myra kessleri</i> Paulson, 1875

Appendix-2. *Contd.*

Sl. No.	Supplanted name	References	Current name
	Family MAJIDAE Samouelle, 1819		
	Subfamily INACHINAE MacLeay, 1838		
21.	<i>Inachoides dolichorhynchus</i> Alcock and Anderson, 1894	Alcock 1895; Krishnamoorthy	<i>Chorinochus dolichorhynchus</i> (Alcock and Anderson, 1894)
22.	<i>Paratymolus sexspinosus</i> Miers	Henderson, 1893; Thurston 1895.	<i>Litosus sexspinsus</i> (Miers, 1884)
	Subfamily PISINAE Dana, 1851		
23.	<i>Halimus aries</i> (Latreille)	Sankarankutty, 1967	<i>Hyastenu aries</i> (Latreille, 1825)
24.	<i>Hyastenus oryx</i> A. Milne Edwards	Jeyabaskaran <i>et al.</i> , 2000	<i>Hyastenus sebae</i> White, 1847
25.	<i>Halimus pleione</i> (Herbst)	Sankarankutty, 1967	<i>Hyastenus pleione</i> (Herbst, 1803)
26.	<i>Naxia hirta</i> (A. Milne Edwards)	Thurston, 1895	<i>Naxioides hirta</i> A. Milne Edwards, 1865)
27.	<i>Naxiaides mammillata</i> Ortmann, 1893	Krishnamoorthy	<i>Naxioides robillardi</i> (Miers, 1882)
28.	<i>Egeria arachnoids, herbstii, indica</i>	H. Milne Edwards	<i>Phalangipus indicus</i> (Leach, 1815)
	<i>Egeria arachnoids</i> (Rumphius)	Henderson, 1893 (in part)	
29.	<i>Egeria indica</i> Leach	Alcock and Anderson, 1894	<i>Phalangipus longipes</i> (Linnaeus, 1758)
	<i>Egeria arachnoids</i> (Rumphius)	Henderson, 1893 (in part)	
30.	<i>Cancer ovis</i> Fabricius	Fabricius, 1787	<i>Doclea ovis</i> (Fabricius, 1787)
	<i>Doclea canalifera</i> Stimpson	Jeyabaskaran <i>et al.</i> , 2000; Krishnamoorthy, 2007	
31.	<i>Doclea gracilipes</i> Stimpson	Kantha Bai and Rama Rao, 1977; Sethuramalingam and Khan, 1991; Venkararaman <i>et al.</i> , 2002.	<i>Doclea rissonii</i> Leach, 1815
	Subfamily EPIALTINAE MacLeay, 1839		
32.	<i>Simocarcinus simplex</i> (Dana)	Thurston, 1895	<i>Trigonothir simplex</i> (Dana, 1852)

Appendix-2. Contd.

Sl. No.	Supplanted name	References	Current name
	Subfamily OPTHALMINAE		
33.	<i>Stenocinops cervicornis</i> (Herbst)	Thurston, 1895	<i>Opthalmias cervicornis</i> (Herbst, 1803)
	Subfamily MAJINAE Samouelle, 1819		
34.	<i>Paramithrax (Chlorinoides) longispinus</i> (De Haan)	Alcock, 1895	<i>Chlorinoides longispinus</i> (De Haan, 1839)
35.	<i>Schizophrys spiniger</i> (Adams and White)	Alcock and Anderson, 1894b	<i>Schizophrys aspera</i> (H. Milne Edwards, 1834)
	Family PARTHENOPIDAE MacLeay, 1838		
	Subfamily PARTHENOPINAE MacLeay, 1838		
36.	<i>Lambrus carinatus</i> Edwards <i>Parthenope carinatus</i>	Alcock and Anderson, 1894; Dev Roy, 2007	<i>Enoplolambrus carinatus</i> Herbst, 1796)
37.	<i>Lambrus contrarius</i> (Herbst) <i>Parthenope (Rhinolambrus) contrarius</i> (Herbst)	Thurston, 1895 Jeyabaskaran <i>et al.</i> , 2000	<i>Rhinolambrus contrarius</i> (Herbst, 1796)
38.	<i>Lambrus holdsworthi</i> Miers	Henderson, 1893; Thurston, 1895	<i>Enoplolambrus carinatus</i> (H. Milne Edwards, 1834)
39.	<i>Lambrus longimanus</i> Leach	Alcock and Anderson, 1894; Alcock, 1895	<i>Parthenope longimanus</i> (Linnaeus, 1758)
40.	<i>Lambrus longispinus</i> Miers	Thurston, 1895	<i>Rhinolambrus longispinus</i> (Miers, 1879)
41.	<i>Lambrus affinis</i> A. Milne Edwards	Thurston, 1895	<i>Rhinolambrus pelagicus</i> (Rüppell, 1830)
42.	<i>Parthenope (Parthenope) prensor</i> (Herbst) <i>Parthenope (Platylambrus) prensor</i> (Herbst)	Sethuramalngam and Khan, 1991 Jeyabaskaran <i>et al.</i> , 2000	<i>Enoplolambrus prensor</i> (Herbst, 1796)
43.	<i>Lambrus turriger</i> Adams and White <i>Lambrus (Rhinolambrus) turriger</i> (Adams and White)	Alcock and Anderson, 1894 Alcock, 1895	<i>Rhinolambrus turriger</i> (White, 1847)
44.	<i>Parthenope spinosissima</i> A. Milne Edwards	Alcock, 1893	<i>Daldorfia spinosissima</i> (A. Milne Edwards, 1862)
	Subfamily AETHRINAE Dana, 1851		
45.	<i>Cryptopodia spatulifrons</i> var. <i>laevimana</i>	Alcock and Anderson, 1894	<i>Cryptopodia laevimana</i> Miers, 1879

Appendix-2. *Contd.*

Sl. No.	Supplanted name	References	Current name
	Family PORTUNIDAE Rafinesque, 1815		
	Subfamily CATOPTRINAE Borradaile, 1903		
46.	<i>Carupa laeviuscula</i> , Heller	Alcock and Anderson, 1894b; Alcock, 1899a	<i>Carupa tenuipes</i> Dana, 1851
	Subfamily POLYBIINAE Ortmann, 1893		
47.	<i>Lupocyclus orientalis</i> Miers	Alcock and Anderson, 1894b	<i>Parathranites orientalis</i> Miers, 1886
48.	<i>Lupocyclus strigosus</i> Alcock	Alcock, 1899a	<i>Lupocyclus philippiensis</i> Semper, 1880
	Subfamily PORTUNINAE Rafinesque, 1815		
49.	<i>Neptunus gladiator</i> (Fabricius)	Henderson, 1893; Thurston, 1895; Gravely, 1941	<i>Portunus gladiator</i> Fabricius, 1798
	<i>Neptunus (Amphitrite) gladiator</i> (Fabricius)	Alcock, 1899a	
50.	<i>Acheolus whitei</i> A. Milne Edwards	Henderson, 1893	<i>Portunus gracilimanus</i> (Stimpson, 1858)
51.	<i>Neptunus hastatoides</i> (Fabricius)	Henderson, 1893; Alcock and Anderson, 1894	<i>Portunus hastatoides</i> (Fabricius, 1798)
	<i>Neptunus (Hellenus) hastatoides</i> (Fabricius)	Alcock 1899a; Sankarankutty, 1967	
52.	<i>Neptunus armatus</i> A. Milne Edwards	Henderson, 1893; Thurston, 1895	<i>Portunus pelagicus</i> (Linnaeus, 1758)
	<i>Neptunus pelagicus</i> (Linnaeus)	Heller, 1865; Henderson, 1893; Thurston, 1895; Gravely, 1941	
53.	<i>Neptunus (Hellenus) spinipes</i> Miers	Alcock, 1899	<i>Portunus pulchricristatus</i> (Gordon, 1931)
54.	<i>Neptunus sanguinolentus</i> (Herbst)	Heller, 1865; Henderson, 1893; Alcock and Anderson, 1894; Thurston, 1895; Gravely, 1941	<i>Portunus sanguinolentus</i> (Herbst, 1790)

Appendix-2. Contd.

Sl. No.	Supplanted name	References	Current name
55.	<i>Neptunus tuberculosus</i>	Alcock and Anderson, 1894	<i>Portunus tuberculosus</i> A. Milne Edwards, 1861)
56.	<i>Goniosoma annulatum</i> (Fabricius)	Henderson, 1893; Thurston, 1895	
57.	<i>Goniosoma affine</i> (Dana)	Henderson, 1893	<i>Charybdis (Charybdis) affinis</i> Dana, 1852
58.	<i>Charybdis variegatum</i> var. <i>callianassa</i> (Herbst)	Alcock and Anderson, 1894	<i>Charybdis (Charybdis) callianassa</i> (Herbst, 1801)
59.	<i>Goniosoma cruciferum</i> (Fabricius)	Henderson, 1893; Thurston, 1895	<i>Charybdis (Charybdis) feriatus</i> (Linnaeus, 1758)
	<i>Charybdis cruciata</i> (Herbst)	Kantha Bai and Rama Rao, 1977	
60.	<i>Goniosoma hellerii</i> A. Milne Edwards	Henderson, 1893; Thurston, 1895	<i>Charybdis (Charybdis) helleri</i> (A. Milne Edwards, 1867)
61.	<i>Goniosoma luciferum</i> Fabricius	Alcock and Anderson, 1894	<i>Charybdis (Charybdis) lucifera</i> (Fabricius, 1798)
62.	<i>Goniosoma natator</i> (Herbst)	Henderson, 1893; Thurston, 1895.	<i>Charybdis (Charybdis) natator</i> (Herbst, 1794)
63.	<i>Goniosoma orientale</i> (Dana)	Henderson, 1893; Thurston, 1895	<i>Charybdis (Charybdis) orientalis</i> Dana, 1852
64.	<i>Goniosoma variegatum</i> (Fabricius)	Henderson, 1893	<i>Charybdis (Charybdis) variegata</i> (Fabricius, 1798)
	<i>Goniosoma variegatum</i> var. <i>callianassa</i> Herbst	Alcock and Anderson, 1894	
65.	<i>Goniosoma ornatum</i> A. Milne Edwards	Henderson, 1893	<i>Charybdis (Goniohellenus) truncata</i> (Fabricius, 1798)
	<i>Goniosoma truncatum</i> Fabricius	Alcock and Anderson, 1894	
66.	<i>Charybdis (Goniohellenus) hoplites</i> var. <i>vadorum</i> Alcock	Sethuramalingam and Khan, 1991	<i>Charybdis (Goniohellenus) vadorum</i> Alcock, 1899
67.	<i>Thalamita admeta</i> var. <i>edwardsi</i> Borradaile	Gravely, 1927	<i>Thalamita admete</i> (Herbst, 1803)
	<i>Thalamita admeta</i> (Herbst)	Gravely, 1941	
	<i>Thalamita savignyi</i> , A. Milne Edwards	Henderson, 1893; Thurston, 1895	
	Superfamily XANTHOIDEA MacLeay, 1838		
	Family GONEPLACIDAE MacLeay, 1838		
	Subfamily CARCINOPLACINAE H. Milne Edwards, 1852		

Appendix-2. *Contd.*

Sl. No.	Supplanted name	References	Current name
68.	<i>Eucrate crenata</i> var. <i>dentata</i>	Alcock, 1900; Sankarankutty, 1967	<i>Eucrate dentata</i> Alcock, 1900
69.	<i>Litocheira angustifrons</i> Alcock	Sethuramalingam and Khan, 1991	<i>Heteropilumnus angustifrons</i> (Alcock, 1900)
	Family XANTHIDAE MacLeay, 1838		
	Subfamily LIOMERINAE		
70.	<i>Carpilodes pediger</i> Alcock	Alcock, 1898	<i>Liomera (Bruciana) pediger</i> (Alcock, 1898)
71.	<i>Carpilodes margaritatus</i> , A. Milne Edwards	Henderson, 1893; Thurston, 1895; Gravely, 1927	<i>Liomera (Liomera)</i> <i>margaritata</i> (A. Milne Edwards, 1873)
	Subfamily EUXANTHINAE		
72.	<i>Hypocoelous rugosus</i> Henderson	Henderson, 1893; Thurston, 1895	<i>Hypocolpus granulata</i> (De Haan, 1837)
73.	<i>Euxanthus melissa</i> (Herbst)	Henderson, 1893; Thurston, 1895	<i>Euxanthus exsculptus</i> (Herbst, 1790)
	Subfamily ACTAEINAE Alcock, 1898		
74.	<i>Actaea calculosa</i> (Milne Edwards)	Henderson, 1893; Thurston, 1895	<i>Actaea jacquelineae</i> Guinot, 1976
75.	<i>Actaea granulata</i> ((Audouin)	Henderson, 1893; Thurston, 1895; Sankarankutty, 1967	<i>Actaea savignyi</i> (H. Milne Edwards, 1834)
76.	<i>Actaea nodulosa</i> (White)	Henderson, 1893; Thurston, 1895	<i>Epiactaea margaritifera</i> (Odhner, 1925)
77.	<i>Actaea ruppelli</i> (Krauss)	Henderson, 1893; Thurston, 1895	<i>Gaillardiiellus rueppelli</i> (Krauss, 1843)
78.	<i>Actaea rufopunctata</i> (Milne Edwards)	Henderson, 1893; Thurston, 1895	<i>Paractaea rufopunctata</i> <i>rufopunctata</i> (H. Milne Edwards, 1834)
79.	<i>Actaea speciosa</i> (Dana)	Gravely, 1927	<i>Pseudoliomera speciosa</i> (Dana, 1852)
80.	<i>Actaea variolosa</i> Borradaile	Deb, 1989	<i>Pseudoliomera variolosa</i> (Borradaile, 1902)
	Subfamily ZOSIMINAE Stimpson, 1907		
81.	<i>Lophactaea cristata</i> A. Milne Edwards	Alcock, 1898; Gravely, 1927	<i>Platypodia cristata</i> (A. Milne Edwards, 1865)
82.	<i>Lophactaea granulosa</i> (Rüppell)	Henderson, 1893; Thurston, 1895	<i>Platypodia granulose</i> (Rüppell, 1830)

Appendix-2. Contd.

Sl. No.	Supplanted name	References	Current name
83.	<i>Lophactaea semigranosa</i> (Heller)	Henderson, 1893; Thurston, 1895	<i>Platypodia semigranosa</i> (Heller, 1861)
84.	<i>Zosymus aeneus</i> (Linnaeus)	Jeyabaskaran et al., 2000	<i>Zozymus aeneus</i> (Linnaeus, 1758)
85.	<i>Leptodius cavipes</i> Dana	Alcock and Anderson, 1894	<i>Zozymodes cavipes</i> (Dana, 1852)
	Subfamily XANTHINAE		
86.	<i>Leptodius crassimanus</i> (H. Milne Edwards)	Sankarankutty, 1967	<i>Macromedaeus crassimanus</i> (A. Milne Edwards, 1867)
87.	<i>Leptodius euglyptus</i> Alcock	Alcock, 1898	<i>Macromedaeus quinquedentatus</i> (Krauss, 1843)
	<i>Xantho (Leptodius) euglyptus</i> Alcock	Gravely, 1927	
88.	<i>Xantho (Leptodius) exaratus</i> Milne Edwards	Gravely, 1927	<i>Leptodius exaratus</i> (H. Milne Edwards, 1834)
89.	<i>Xantho granoso-manus</i> (Dana)	Heller, 1865	<i>Xanthias lamarckii</i> (H. Milne Edwards, 1834)
	<i>Xanthodes lamarckii</i> (Edwards)	Alcock, 1898	
90.	<i>Liomera punctata</i> Milne Edwards	Henderson, 1893; Thurston, 1895	<i>Xanthias punctatus</i> (H. Milne Edwards, 1834)
91.	<i>Xanthodes notatus</i> Dana	Alcock, 1898	<i>Paraxanthias notatus</i> (Dana, 1852)
92.	<i>Xantho (S. str.) impressa</i>	Gravely, 1927	<i>Neoxanthias lineatus</i> (A. Milne Edwards, 1867)
	Subfamily ETISINAE Ortmann, 1893		
93.	<i>Etisodes electra</i> Herbst	Henderson, 1893; Thurston, 1895	<i>Etisus electra</i> (Herbst, 1801)
	<i>Etisus (Etisodes) electra</i> (Herbst)	Sankarankutty, 1967	
	Subfamily CHLORODIINAE		
94.	<i>Chlorodopsis areolatus</i>	Alcock and Anderson, 1894	<i>Pilodius areolatus</i> (H. Milne Edwards, 1834)
95.	<i>Chlorodius laevissimus</i> Dana	Alcock and Anderson, 1894	<i>Chlorodiella laevissima</i> (Dana, 1852)
96.	<i>Chlorodius niger</i> (Forskål)	Heller, 1865; Henderson, 1893; Thurston, 1895	<i>Chlorodiella nigra</i> (Forskål, 1775)
	Family PILUMNIDAE Samouelle, 1819		
	Subfamily PILUMNINAE Samouelle, 1819		
97.	<i>Pilumnus andersoni</i> De Man	Alcock and Anderson, 1894	<i>Pilumnus longicornis</i> Hilgendorf, 1878

Appendix-2. *Contd.*

Sl. No.	Supplanted name	References	Current name
	Subfamily ACTUMNINAE Dana, 1851		
98.	<i>Pilumnus dehaani</i> Miers	Alcock, 1898	<i>Actumnus squamosus</i> (De Haan, 1835)
	Subfamily RHIZOPINAE Stimpson, 1858		
99.	<i>Heteropanope indica</i> De Man	Sethuramalingam and Khan, 1991; Kathiresan, 2000	<i>Benthopanope indica</i> (De Man, 1888)
100.	<i>Litocheira integra</i> (Miers)	Sethuramalingam and Khan, 1991	<i>Pseudolitocheira integra</i> (Miers, 1884)
	Subfamily HALIMEDINAE Alcock, 1898		
101.	<i>Halimede thurstoni</i> Henderson	Henderson, 1893	<i>Halimede tyche</i> (Herbst, 1801)
102.	<i>Polycremnus ochtodes</i> (Herbst)	Alcock and Anderson, 1894; Alcock, 1898	<i>Halimede ochtodes</i> (Herbst, 1783)
	Family PANOPEIDAE Ortmann, 1893		
	INCERTAE SEDIS		
103.	<i>Heteropanope laevis</i> (Dana)	Sankarankutty, 1967	<i>Panopeus laevis</i> Dana, 1852
	Family ERIPHIIDAE MacLeay, 1838		
	Subfamily OZIINAE Dana, 1851		
104.	<i>Ozius frontalis</i>	Lucas, 1850	<i>Epixanthus frontalis</i> (H. Milne Edwards, 1834)
105.	<i>Actumnus nudus</i> A. Milne Edwards	Alcock, 1898; Balss, 1935; Gravely, 1941	<i>Sphaerozius nudus</i> (A. Milne Edwards, 1867)
	Subfamily ERIPHIINAE MacLeay, 1838		
106.	<i>Eriphia laevimana</i> , Latreille	Henderson, 1893; Thurston, 1895	<i>Eriphia sebana</i> Shaw and Nodder, 1803
	INCERTAE SEDIS		
107.	<i>Liagore rubromaculata</i> De Haan	Jeyabaskaran <i>et al.</i> , 2000	<i>Liagore erythematica</i> Guinot, 1971
	<i>Liagore rubromaculatus</i> (De Haan)	Sethuramalingam and Khan, 1991	

Appendix-2. Contd.

Sl. No.	Supplanted name	References	Current name
	Superfamily GRAPSIDOIDEA MacLeay, 1838		
	Subfamily GRAPSINAE Macleay, 1838		
108.	<i>Grapsus strigosus</i> (Herbst)	Henderson, 1893; Thurston, 1895; Gravel, 1927, 1941; Kantha Bai and Rama Rao, 1977; Sethuramalingam and Khan, 1991; Ravichandran <i>et al.</i> , 2001	<i>Grapsus albolineatus</i> Lamarck, 1818
109.	<i>Grapsus maculatus</i> (Catesby) <i>Metopograpsus maculatus</i> Milne Edwards	Henderson, 1893 Sethuramalingam and Khan, 1991; Kathiresan, 2000; Ravichandran <i>et al.</i> , 2002	<i>Metopograpsus latifrons</i> (White, 1847)
	Subfamily VARUNINAE H. Milne Edwards, 1853		
110.	<i>Cancer setosus</i> Fabricius	Fabricius, 1781	<i>Pseudograpsus setosus</i> (Fabricius, 1781)
	Subfamily SESARMINAE Dana, 1852		
111.	<i>Sesarma bidens</i>	Kathiresan, 2000; Ravichandran <i>et al.</i> , 2001	<i>Perisesarma bidens</i> (De Haan, 1835)
112.	<i>Sesarma eydouxi</i> H. Milne Edwards	Heller, 1865; De Man, 1887	<i>Sesarma rectum</i> (Randall 1840)
113.	<i>Sesarma fascinata</i>	Oswin, 1998	<i>Perisesarma fasciatum</i> Lanchester, 1900
114.	<i>Sesarma aspera</i> <i>Sesarma quadrata</i> (Fabricius)	Heller, 1865; De Man, 1887 Henderson, 1893; Alcock and Anderson, 1894; Thurston, 1895; Gravelly, 1927; Sankarankutty, 1967 Kantha Bai and Rama Rao, 1977	<i>Parasesarma plicatum</i> (De Haan, 1835)

Appendix-2. *Contd.*

Sl. No.	Supplanted name	References	Current name
	<i>Sesarma plicata</i> Latreille	Sankarankutty, 1967	
	<i>Sesarma plicatum</i>	Kathiresan, 2000; Ravichandran <i>et al.</i> , 2001	
115.	<i>Sesarma pictum</i>	Kathiresan, 2000	<i>Parasesarma pictum</i> (De Haan, 1835)
116.	<i>Sesarma andersoni</i>	Ravichandran <i>et al.</i> , 2001; Kathiresan, 2000	<i>Nanosesarma andersoni</i> (De Man, 1888)
	<i>Nanosesarma (Beanium) andersoni</i> (De Man)	Sethuramalingam and Khan, 1991	
117.	<i>Sesarma minutum</i>	Kathiresan	<i>Nanosesarma minutum</i> (De Man, 1887)
118.	<i>Neoepisesarma mederi</i>	Ravichandran <i>et al.</i> , 2001	<i>Episesarma mederi</i> (H. Milne Edwards, 1853)
	<i>Neoepisesarma (Neospisesarma) mederi</i> (H. Milne Edwards)	Sethuramalingam and Khan, 1991; Kathiresan, 2000	
119.	<i>Sesarma tetragona</i> (Fabricius)	Henderson, 1893; Alcock and Anderson, 1894	<i>Episesarma tetragonum</i> (Fabricius, 1798)
	<i>Neoepisesarma tetragonum</i>	Kathiresan, 2000; Ravichandran <i>et al.</i> , 2001	
	<i>Neoepisesarma (Muradium) tetragonum</i> (Fabricius)	Sethuramalingam and Khan, 1991; Kathiresan, 2000	
120.	<i>Sesarma edwardsi</i>	Kathiresan, 2000	<i>Pseudosesarma edwardsi</i> (De Man, 1888)
121.	<i>Sesarma brockii</i>	Kathiresan, 2000	<i>Selatium brockii</i> (De Man, 1888)
	<i>Neoepisesarma (Selatium) brockii</i> (De Man)	Sethuramalingam and Khan, 1991	
	Superfamily OCYPODOIDEA Rafinesque, 1815		
	Family OCYPODIDAE Rafinesque, 1815		
	Subfamily OCYPODINAE Rafinesque, 1815		

Appendix-2. Contd.

Sl. No.	Supplanted name	References	Current name
122.	<i>Ocypoda ceratophthalma</i> (Pallas)	Henderson, 1893; Alcock and Anderson, 1894; Thurston, 1895; Gravely, 1927; Kantha Bai and Rama Rao, 1977	<i>Ocypode ceratophthalma</i> (Pallas, 1772)
123.	<i>Ocypoda cordimana</i> Latreille	Alcock and Anderson, 1894; Thurston, 1895; Gravely, 1927, 1941; Kantha Bai and Rama Rao, 1977	<i>Ocypode cordimana</i> Desmarest, 1825
124.	<i>Ocypoda macrocera</i> Milne Edwards	Miers, 1882; Henderson, 1893; Alcock and Anderson, 1894; Thurston, 1895; Gravely, 1927, 1941; Kantha Bai and Rama Rao, 1977	<i>Ocypode macrocera</i> H. Milne Edwards, 1837
	<i>Ocypoda portonovoensis</i> Prem Kumar	Prem Kumar, 1964	
125.	<i>Ocypoda platytarsis</i> Milne Edwards	Henderson, 1893; Thurston, 1895; Gravely, 1927, 1941; Kantha Bai and Rama Rao, 1977	<i>Ocypode platytarsis</i> H. Milne Edwards, 1852
126.	<i>Gelasimus tetragonon</i>	Heller, 1865	<i>Uca tetragonon</i> (Herbst, 1790)
127.	<i>Gelasimus marionis</i> var. <i>nitidus</i>	Gravely, 1927; Sankarankutty, 1967	<i>Uca vocans</i> (Linnaeus, 1758)
	<i>Gelasimus marionis</i> var. <i>typica</i>	Gravely, 1927	
128.	<i>Gelasimus annulipes</i> Latreille	Heller, 1865; Henderson, 1893; Alcock and Anderson, 1894; Thurston, 1895; Gravely, 1927, 1941	<i>Uca lactea</i> (De Haan, 1835)
	<i>Uca annulipes</i> (H. M. Edwards)	Sankarankutty, 1967	
	<i>Uca lactea annulipes</i>	Ravichandran et al., 2001	
	<i>Uca (Celuca) lactea annulipes</i> Crane	Sethuramalingam and Khan, 1991; Kathiresan, 2000	

Appendix-2. *Contd.*

Sl. No.	Supplanted name	References	Current name
129.	<i>Gelasimus triangularis</i> A. Milne Edwards	Henderson, 1893; Gravely, 1927	<i>Uca triangularis</i> (A. Milne Edwards, 1873)
	<i>Uca triangularis bengali</i>	Ravichandran <i>et al.</i> , 2001	
	<i>Uca (Celuca) triangularis bengali</i> Milne Edwards)	Sethuramalingam and Khan, 1991	
130.	<i>Gelasimus variegatus</i> Heller, 1862	Heller, 1862	<i>Uca inversa</i> (Hoffmann, 1874)
	Subfamily DOTILLINAE Stimpson, 1858		
131.	<i>Dotilla clepsydrodactylus</i> Alcock	Sethuramalingam and Khan, 1991	<i>Dotilla intermedia</i> De Man, 1888
152.	<i>Scopimera myctiroides</i> (Milne Edwards)	Henderson, 1893; Thurston, 1895	<i>Dotilla myctiroides</i> (H. Milne Edwards, 1852)
	Subfamily CAMPTANDRIINAE Stimpson, 1858		
133.	<i>Leipocten sordidulum</i> Kemp	Kemp, 1919; Balss, 1935	<i>Baruna socialis</i> Stebbing, 1904

Appendix-3. Distribution of crabs in the state of Tamil Nadu

Sl. No.	Name of the Species	Distribution
A. Valid species		
Family DROMIIDAE		
1.	<i>Dromidiopsis abrolhensis</i>	Parangipettai coast (Sethuramalingam and Khan, 1991).
2.	<i>Dromidiopsis cranioides</i>	Tuticorin (Sankarankutty, 1967).
3.	<i>Dromidiopsis dromia</i>	Rameswaram Island, Gulf of Mannar (Sankarankutty, 1967); Chennai (Kantha Bai and Rama Rao, 1977).
4.	<i>Lauridromia dehaani</i>	Cuddalore (Dev Roy and Bhadra, present paper); Parangipettai coast (Sethuramalingam and Khan, 1991); Tuticorin (Dev Roy and Bhadra, present paper); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; Venkataraman <i>et al.</i> , 2002).
5.	<i>Cryptodromia conchifera</i>	Madras coast (Alcock and Anderson, 1894b).
6.	<i>Cryptodromia hilgendorfi</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
7.	<i>Cryptodromiopsis sp.</i>	Krusadai island, Gulf of Mannar (Gravely, 1927).
8.	<i>Dromidia unidentata</i>	Tuticorin (Henderson, 1893; Thurston, 1895); Vedalai, Palk Bay (Sankarankutty, 1967).
9.	<i>Pseudodromia integrifrons</i>	Mandapam, Gulf of Mannar (Sankarankutty, 1967); Tuticorin (Henderson, 1893; Thurston, 1895).
10.	<i>Conchoecetes artificiosus</i>	Chennai (Henderson, 1893; Krishnamoorthy, 2007)
Section ARCHAEOBRACHYURA		
Superfamily RANINOIDEA		
Family RANINIDAE		
11.	<i>Ranina ranina</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
Section OXYSTOMATA		
Superfamily DORIPPOIDEA		
Family DORIPPIDAE		
12.	<i>Dorripe quadridens</i>	Madras coast (Alcock and Anderson, 1894b); Chennai (Gravely, 1927, 1941; Krishnamoorthy, 2007); Nagapattinam (Dev Roy and Bhadra, present paper); Pamban, Gulf of Mannar (Thurston, 1895); Tuticorin, Gulf of Mannar (Thurston, 1895; Dev Roy and Bhadra, present paper); Krusadai Island, Gulf of Mannar (Gravely, 1927); Pudumadam, Palk Bay (Sankarankutty, 1967); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).

Appendix-3. *Contd.*

Sl. No.	Name of the Species	Distribution
13.	<i>Dorippoides facchino</i>	Chennai (Gravely, 1941; Kantha Bai and Rama Rao, 1977); Parangipettai coast (Sethuramalingam and Khan, 1991); Palk Straits (Alcock and Anderson, 1894); Pamban, Gulf of Mannar (Thurston, 1895); Tuticorin, Gulf of Mannar (Thurston, 1895).
14.	<i>Neodorippe callida</i>	Chennai (Gravely, 1941).
15.	<i>Paradorippe granulata</i>	Chennai (Krishnamoorthy, 2007); Pudumadam, Palk Bay (Sankarankutty, 1967); Gulf of Mannar, (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
16.	<i>Paradorippe polita</i>	Madras coast (Alcock and Anderson, 1894b); Pudumadam, Palk Bay (Sankarankutty, 1967).
	Superfamily LEUCOSIOIDEA	
	Family CALAPPIDAE	
	Subfamily CALAPPINAE	
17.	<i>Calappa bicornis</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
18.	<i>Calappa gallus</i>	Chennai (Dev Roy and Bhadra, present paper; Krishnamoorthy, 2007); Pamban (Thurston, 1895); Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
19.	<i>Calappa hepatica</i>	Chennai (Dev Roy and Bhadra, present paper); Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893), Krusadai Island (Gravely, 1927), Hare Island, Gulf of Mannar (Sankarankutty, 1967).
20.	<i>Calappa japonica</i>	Chennai (Krishnamoorthy, 2007); Nagapattinam (Dev Roy and Bhadra, present paper).
21.	<i>Calappa lophos</i>	Madras coast (Alcock and Anderson, 1894b); Chennai (Heller, 1865; Henderson, 1893; Gravely, 1941; Kantha Bai and Rama Rao, 1977; Galil, 1977; Dev Roy and Bhadra, present paper; Krishnamoorthy, 2007); Parangipettai coast (Sethuramalingam and Khan, 1991); Cuddalore (Dev Roy and Bhadra, present paper); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; Venkataraman <i>et al.</i> , 2002).
22.	<i>Calappa philargius</i>	Chennai coast (Krishnamoorthy, 2007); Palk Bay (Sankarankutty, 1967); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; Venkataraman <i>et al.</i> , 2002).

Appendix-3. Contd.

Sl. No.	Name of the Species	Distribution
23.	<i>Calappa pustulosa</i>	Chennai coast (Krishnamoorthy, 2007).
24.	<i>Calappa terraerequii</i>	Chennai coast (Krishnamoorthy, 2007).
25.	<i>Mursia bicristimana</i>	Madras coast (Alcock and Anderson, 1894a, b)
	Subfamily MATUTINAE	
26.	<i>Ashtoret lunaris</i>	Chennai (Henderson, 1893; Kantha Bai and Rama Rao, 1977; Dev Roy and Bhadra, present paper; Krishnamoorthy, 2007); Parangipettai coast (Sethuramalingam and Khan, 1991); Hare Island (Sankarankutty, 1967); Mandapam, Palk Bay (Sankarankutty, 1967); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; Venkataraman <i>et al.</i> , 2002).
27.	<i>Ashtoret miersii</i>	Chennai (Henderson, 1887, 1893; Kantha Bai and Rama Rao, 1977; Krishnamoorthy, 2007); Tuticorin (Henderson, 1893; Thurston, 1895); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
28.	<i>Matuta planipes</i>	Chennai (Henderson, 1887; Kantha Bai and Rama Rao, 1977; Galil and Clark, 1994; Krishnamoorthy, 2007); Parangipettai coast (Sethuramalingam and Khan, 1991); Mandapam, Palk Bay (Sankarankutty, 1967); Gulf of Mannar (Venkataraman <i>et al.</i> , 2002).
29.	<i>Matuta victor</i>	Madras coast (Alcock and Anderson, 1894); Chennai (Henderson, 1887, 1893; Alcock and Anderson, 1894b; Alcock, 1896; Gravely, 1941; Galil and Clark, 1994; Dev Roy and Bhadra, present paper); Porto Novo (Dev Roy and Bhadra, present paper); Tranquebar (Fabricius, 1793; Dev Roy and Bhadra, present paper); Tuticorin (Henderson, 1893; Thurston, 1895); Rameswaram (Thurston, 1887); Krusadai Island (Gravely, 1927; Dev Roy and Bhadra, present paper); Kutikal Point (Gravely, 1927); Hare Island, Palk Bay (Dev Roy and Bhadra, present paper).
	Family LEUCOSIIDAE	
	Subfamily EBALIINAE	
30.	<i>Ebalia diadumena</i>	Palk Straits (Alcock, 1896).
31.	<i>Ebalia malefactor</i>	Ennur Backwater near Madras (Kemp, 1915).
32.	<i>Oreophorus (Oreophorus) rugosus</i>	Parangipettai coast (Sethuramalingam and Khan, 1991).
	Subfamily ILLINAE	
33.	<i>Arcania erinaceus</i>	Chennai (Krishnamoorthy, 2007); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).

Appendix-3. *Contd.*

Sl. No.	Name of the Species	Distribution
34.	<i>Arcania heptacantha</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
35.	<i>Arcania novemspinosa</i>	Madras coast (Alcock and Anderson, 1894b).
36.	<i>Arcania quinquespinosa</i>	Madras coast (Alcock and Anderson, 1894b); Parangipettai coast (Sethuramalingam and Khan, 1991); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
37.	<i>Arcania septemspinosa</i>	Madras coast (Alcock, 1896); Chennai (Henderson, 1893; Alcock, 1896); Venkataraman <i>et al.</i> , 2002.
38.	<i>Arcania undecimspinosa</i>	Chennai (Krishnamoorthy, 2007); Madras side of Palk straits (Alcock, 1896).
39.	<i>Ixa cylindrus</i>	Madras coast (Alcock and Anderson, 1894b); Chennai (Krishnamoorthy, 2007); Parangipettai coast (Sethuramalingam and Khan, 1991); Madras coast in the neighbourhood of Palk Straits (Alcock, 1896); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
40.	<i>Ixa edwardsi</i>	Chennai (Krishnamoorthy, 2007).
41.	<i>Ixoides cornutus</i>	Chennai (Krishnamoorthy, 2007).
42.	<i>Parilia alcocki</i>	Chennai (Krishnamoorthy, 2007).
43.	<i>Iphiculus spongiosus</i> Subfamily LEUCOSIINAE	Madras coast (Alcock and Anderson, 1894b)
44.	<i>Philyra adamsia</i>	Pudumadam, Palk Bay (Sankarankutty, 1967); Pamban (Thurston, 1895), Rameswaram (Henderson, 1893),
45.	<i>Philyra corallicola</i>	Parangipettai coast (Sethuramalingam and Khan, 1991).
46.	<i>Philyra globosa</i>	Chennai (Henderson, 1893; Alcock, 1896; Gravely, 1941; Kantha Bai and Rama Rao, 1977; Krishnamoorthy, 2007); Akkaraighori Sea Beach near Cuddalore (Dev Roy and Bhadra, present paper); Parangipettai coast (Sethuramalingam and Khan, 1991); Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893); Gulf of Mannar (Venkataraman <i>et al.</i> , 2002; exact locality not indicated).
47.	<i>Philyra globulosa</i>	Chennai (Kantha Bai and Rama Rao, 1977; Krishnamoorthy, 2007); Akkaraighori Sea Beach near Cuddalore (Dev Roy and Bhadra, present paper); Point Calimere (Alcock, 1896).
48.	<i>Philyra scabriuscula</i>	Madras coast (Alcock, 1896; Kantha Bai and Rama Rao, 1977); Chennai (Henderson, 1893; Gravely, 1941; Krishnamoorthy, 2007); Parangipettai coast (Sethuramalingam and Khan, 1991); Mandapam,

Appendix-3. Contd.

Sl. No.	Name of the Species	Distribution
		Palk Bay (Sankarankutty, 1967); Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893), Kutikal Point (Gravelly, 1927).
49.	<i>Philyra syndactyla</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
50.	<i>Philyra verrucosa</i>	Chennai (Henderson, 1893; Alcock, 1896; Krishnamoorthy, 2007); Pudumadam, Palk Bay (Sankarankutty, 1967).
51.	<i>Pseudophilyra melita</i>	Madras coast (Alcock and Anderson, 1894b).
52.	<i>Pseudophilyra wood-masoni</i>	Cape Comorin (Alcock, 1896)
53.	<i>Coleusia biannulata</i>	Palk Straits (Alcock, 1896; Tyndale-Biscoe and George, 1962).
54.	<i>Euclosia obtusifrons</i>	Madras coast (Alcock and Anderson, 18894b; Alcock, 1896; Kantha Bai and Rama Rao, 1977); Parangipettai coast (Sethuramalingam and Khan, 1991); Madras side of Palk Straits (Alcock, 1896).
55.	<i>Euclosia rotundifrons</i>	Madras coast (Chopra, 1933).
56.	<i>Leucosia anatum</i>	Chennai (Krishnamoorthy, 2007); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
57.	<i>Leucosia craniolaris</i>	Chennai (Henderson, 1893; Krishnamoorthy, 2007); Pamban (Thurston, 1895), Rameswaram (Henderson, 1893); Gulf of Mannar, Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
58.	<i>Leucosia longifrons</i>	Chennai (Krishnamoorthy, 2007).
59.	<i>Leucosia phyllochera</i>	Palk Straits (Alcock, 1896).
60.	<i>Seulocia pubescens</i>	Madras coast (Alcock and Anderson, 1894b; Alcock, 1896; Kantha Bai and Rama Rao, 1977); Chennai (Krishnamoorthy, 2007); Parangipettai coast (Sethuramalingam and Khan, 1991); Palk Straits (Alcock, 1896); Gulf of Mannar (Venkataraman <i>et al.</i> , 2002).
61.	<i>Seulocia rhomboidalis</i>	Madras coast (Alcock and Anderson, 1894); Chennai (Krishnamoorthy, 2007).
62.	<i>Urnalana haematosticta</i>	Madras coast (Alcock and Anderson, 1894b).
63.	<i>Onychomorpha lamelligera</i>	Palk Straits (Alcock, 1896).
64.	<i>Myra affinis</i>	Madras coast (Alcock and Anderson, 1894); Chennai (Krishnamoorthy, 2007).
65.	<i>Myra elegans</i>	Madras coast (Alcock and Anderson, 1894b)
66.	<i>Myra fugax</i>	Madras coast (Alcock and Anderson, 1894b; Kantha Bai and Rama Rao, 1977); Chennai (Krishnamoorthy, 2007); Pamban, (Thurston,

Appendix-3. *Contd.*

Sl. No.	Name of the Species	Distribution
		1895), Rameswaram (Henderson, 1893) Gulf of Mannar; Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
67.	<i>Myra kessleri</i>	Madras coast (Alcock and Anderson, 1894b); Palk Straits (Alcock, 1896).
68.	<i>Nursia abbreviata</i>	Pamban, Gulf of Mannar (Thurston, 1895)
69.	<i>Nursia plicata</i>	Madras coast (Alcock and Anderson, 1894b); Tinnevely coast, Palk Straits (Alcock, 1896); Pamban, Gulf of Mannar (Thurston, 1895); Rameswaram (Henderson, 1893).
70.	<i>Nursilia dentata</i>	Madras coast (Alcock and Anderson, 1894b); Madras coast around Palk Straits (Alcock, 1896).
	Section OXYRHYNCHA	
	Superfamily MAJOIDEA	
	Family MAJIDAE	
	Subfamily INACHINAE	
71.	<i>Achaeus lacertus</i>	Palk Straits (Alcock, 1895); Pudumadam, Palk Bay (Sankarankutty, 1967).
72.	<i>Inachoides dolichorhynchus</i>	Madras coast (Alcock and Anderson, 1894b; Alcock, 1895); Chennai (Krishnamoorthy, 2007).
73.	<i>Paratymolus hastatus</i>	Athankarai, Palk Bay (Sankarankutty, 1967).
74.	<i>Litosus sexspinosus</i>	Tuticorin (Henderson, 1893; Thurston, 1895).
75.	<i>Camposcia retusa</i>	Palk Bay and Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
	Subfamily PISINAE	
76.	<i>Hyastenus aries</i>	Madras coast (Alcock and Anderson, 1894b); Chennai (Krishnamoorthy, 2007); Kilakarai, Gulf of Mannar (Sankarankutty, 1967).
77.	<i>Hyastenus gracilirostris</i>	Madras coast (Alcock and Anderson, 1894b; Alcock, 1895).
78.	<i>Hyastenus hilgendorfi</i>	Pamban, (Thurston, 1895), Tuticorin, (Henderson, 1893; Thurston, 1895) and Rameswaram (Henderson, 1893), Gulf of Mannar.
79.	<i>Hyastenus oryx</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
80.	<i>Hyastenus pleione</i>	Gulf of Mammar (Gravely, 1927; Jeyabaskaran <i>et al.</i> , 2000; precise locality not indicated); Kilakarai (Sankarankutty, 1967).
81.	<i>Naxioides hirta</i>	Tuticorin, Gulf of Mannar (Henderson, 1893; Thurston, 1895); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).

Appendix-3. Contd.

Sl. No.	Name of the Species	Distribution
82.	<i>Naxioides robillardi</i>	Chennai coast (Krishnamoorthy, 2007).
83.	<i>Phalangipus filliformis</i>	Chennai coast (Krishnamoorthy, 2007).
84.	<i>Phalangipus hystrix</i>	Chennai coast (Krishnamoorthy, 2007); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
85.	<i>Phalangipus indicus</i>	Madras coast (Alcock and Anderson, 1894b); Chennai (Henderson, 1893, in part; Griffin, 1973).
86.	<i>Phalangipus longipes</i>	Chennai (Henderson, 1893, in part; Griffin, 1973).
87.	<i>Tylocarcinus styx</i>	Pamban, (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893), Krusadai Island, Gulf of Mannar (Gravely, 1927); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
88.	<i>Doclea alcocki</i>	Akkaraighori near Cuddalore (Dev Roy and Bhadra, present paper); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
89.	<i>Doclea hybrida</i>	Chennai (Henderson, 1893; Gravely, 1941; Kantha Bai and Rama Rao, 1977; Dev Roy and Bhadra, present paper; Krishnamoorthy, 2007); Akkaraighori Sea Beach near Cuddalore (Dev Roy and Bhadra, present paper); Pamban (Thurston, 1895).
90.	<i>Doclea muricata</i>	Chennai (Gravely, 1941; Kantha Bai and Rama Rao, 1977; Krishnamoorthy, 2007); Palk Straits (Alcock and Anderson, 1894b); Pamban, Gulf of Mannar (Henderson, 1893); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
91.	<i>Doclea ovis</i>	Madras coast (Alcock, and Anderson, 1894b; Dev Roy and Bhadra, present paper); Chennai (Kantha Bai and Rama Rao, 1977; Krishnamoorthy, 2007; Chopra, 1935); East India, probably Tranquebar (Fabricius, 1787, 1793, 1798); Nagappattinam (Dev Roy and Bhadra, present paper); Bay of Bengal, probably Tranquebar (Wagner, 1986); Parangipettai coast (Sethuramalingam and Khan, 1991); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
92.	<i>Doclea rissonii</i>	Chennai (Kantha Bai and Rama Rao, 1977); Parangipettai coast (Sethuramalingam and Khan, 1991); Gulf of Mannar (Venkataraman <i>et al.</i> , 2002; exact locality not indicated).
93.	<i>Chlorilibinia andamanica</i> Subfamily EPIALTINAE	Chennai coast (Krishnamoorthy, 2007).
94.	<i>Acanthonyx consobrinus</i>	Chennai (Heller, 1865).

Appendix-3. *Contd.*

Sl. No.	Name of the Species	Distribution
95.	<i>Acanthonyx macleayi</i>	Vedalai, Palk Bay (Sankarankutty, 1967)
96.	<i>Huenia proteus</i>	Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895) and Rameswaram (Henderson, 1893).
97.	<i>Menaethius brevirostris</i>	Madras (Heller, 1862).
98.	<i>Menaethius monoceros</i>	Vedalai, Palk Bay (Sankarankutty, 1967); Pamban (Thurston, 1895); Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893), Krusadai Island and Kutikal (Gravely, 1927).
99.	<i>Trigonothir simplex</i>	Tuticorin, Gulf of Mannar (Henderson, 1893; Thurston, 1895).
Subfamily MITHRACINAE		
100.	<i>Micippa philyra</i>	Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893), Krusadai Island (Gravely, 1927), Hare Island, Palk Bay (Sankarankutty, 1967).
101.	<i>Micippa thalia</i>	Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893) and Hare Island (Sankarankutty, 1967).
Subfamily OPTHALMINAE		
102.	<i>Opthalmias cervicornis</i>	Tuticorin, Gulf of Mannar (Henderson, 1893; Thurston, 1895); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
Subfamily MAJINAE		
103.	<i>Schizophrys aspera</i>	Madras coast (Alcock and Anderson, 1894b); Chennai (Henderson, 1893), Pamban, (Thurston, 1895; Sankarankutty, 1967); Tuticorin (Henderson, 1893; Thurston, 1895); Rameswaram (Henderson, 1893), Krusadai Island and Kutikal (Gravely, 1927); and Manoli Island (Sankarankutty, 1967); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
104.	<i>Cyclax suborbicularis</i>	Madras coast (Alcock, 1895); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
105.	<i>Chlorinoides aculeatus</i>	Madras coast (Alcock and Anderson, 1894b).
106.	<i>Chlorinoides longispinus</i>	Madras coast (Alcock, 1895).
Superfamily HYMENOSOMATOIDEA		
Family HYMENOSOMATIDAE		
107.	<i>Elamene cristatipes</i>	Krusadai Island, Gulf of Mannar (Gravely, 1927); Madras Harbour (Sankarankutty, 1967).
108.	<i>Elamene sindensis</i>	Mandapam, Gulf of Mannar (Sankarankutty, 1967).

Appendix-3. Contd.

Sl. No.	Name of the Species	Distribution
Superfamily PARTHENOPOIDEA		
Family PARTHENOPIDAE		
Subfamily DALDORFIINAE		
109.	<i>Daldorfia horrida</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
110.	<i>Daldorfia spinosissima</i>	Coral bank, north of Chennai (Alcock, 1893).
Subfamily PARTHENOPINAE		
111.	<i>Aulacolambrus hoplonotus</i>	Hare Island (Sankarankutty, 1967).
112.	<i>Cryptopodia angulata</i>	Chennai coast (Krishnamoorthy, 2007).
113.	<i>Cryptopodia fornicata</i>	Chennai coast (Krishnamoorthy, 2007); Tranquebar (Fabricius, 1781); Palk Straits (Alcock and Anderson, 1894b; Alcock, 1895).
114.	<i>Cryptopodia laevimana</i>	Palk Straits (Alcock and Anderson, 1894).
115.	<i>Cryptopodia patula</i>	Palk Straits (Choing and Ng, 1998; Dev Roy and Bhadra, present paper).
116.	<i>Parthenope carenatus</i>	Madras coast (Alcock and Anderson, 1894b).
117.	<i>Enoplolambrus echinatus</i>	Chennai (Krishnamoorthy, 2007); Nagapattinam (Dev Roy and Bhadra, present paper); Palk Straits (Alcock and Anderson, 1894b); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
118.	<i>Enoplolambrus pransor</i>	Parangipettai coast (Sethuramalingam and Khan, 1991); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
119.	<i>Parthenope longimanus</i>	Madras coast (Alcock, 1895); Chennai (Henderson, 1893; Kantha Bai and Rama Rao, 1977; Krishnamoorthy, 2007).
120.	<i>Rhinoplambrus contrarius</i>	Tuticorin, Gulf of Mannar (Henderson, 1893; Thurston, 1895); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
121.	<i>Rhinolambrus longispinus</i>	Madras coast (Alcock and Anderson, 1894b); Tuticorin (Henderson, 1893; Thurston, 1895), Gulf of Mannar.
122.	<i>Rhinolambrus pelagicus</i>	Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895) and Rameswaram (Henderson, 1893).
123.	<i>Rhinolambrus turriger</i>	Madras coast (Alcock and Anderson, 1894b; Alcock, 1895).
Subfamily AETHRINAE		
124.	<i>Aethra scruposa</i>	Rameswaram, Gulf of Mannar (Sankarankutty, 1967); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
Family EUMEDONIDAE		
125.	<i>Zebrida adamsii</i>	Tuticorin (Henderson, 1893; Thurston, 1895), Gulf of Mannar.

Appendix-3. *Contd.*

Sl. No.	Name of the Species	Distribution
126.	<i>Harrovia albolineata</i>	Vedalai, Palk Bay (Sankarankutty, 1967).
127.	<i>Rhabdonotus pictus</i> Superfamily CANCROIDEA Family CORYSTIDAE	Tuticorin (Sankarankutty, 1967).
128.	<i>Jonas</i> sp. Section BRACHYRHYNCHA Superfamily PORTUNOIDEA Family PORTUNIDAE Subfamily CAPHYRINAE	Chennai (Dev Roy and Bhadra, present paper).
129.	<i>Lissocarcinus laevis</i>	Tuticorin, Gulf of Mannar (Henderson, 1893; Thurston, 1895).
130.	<i>Lissocarcinus polybioides</i> Subfamily CATOPTRINAE	Chennai (Alcock, 1899a).
131.	<i>Carupa tenuipes</i> Subfamily POLYBIINAE	Madras coast (Alcock and Anderson, 1894b; Alcock, 1899a).
132.	<i>Parathranites orientalis</i>	Madras coast (Alcock and Anderson, 1894b).
133.	<i>Lupocyclus rotundatus</i>	Madras coast (Alcock and Anderson, 1894b).
134.	<i>Lupocyclus philippinensis</i> Subfamily PORTUNINAE	Madras coast (Alcock, 1899a).
135.	<i>Scylla serrata</i>	Chennai (Heller, 1865; Henderson, 1893; Gravely, 1941; Kantha Bai and Rama Rao, 1977); Pulicat Lake (Joel and Raj, 1980); Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Kathiresan, 2000; Ravichandran <i>et al.</i> , 2001); Muthupet, Palk Bay (Oswin, 1998); Mandapam, Palk Bay (Sankarankutty, 1967); around Krusadai Island, Gulf of Mannar (Gravely, 1927); Pulicat Lake (Joel and Raj, 1980).
136.	<i>Scylla tranquebarica</i>	Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Kathiresan, 2000).
137.	<i>Scylla olivacea</i>	Pulicat Lake (Joel and Raj, 1980).
138.	<i>Portunus argentatus</i>	Parangipettai coast (Sethuramalingam and Khan, 1991).
139.	<i>Portunus gladiator</i>	Chennai (Alcock, 1899; Henderson, 1893; Gravely, 1941; Kantha Bai and Rama Rao, 1977; Parangipettai coast (Sethuramalingam and Khan, 1991); Nagapattinam (Dev Roy and Bhadra, present paper); Pamban (Thurston, 1895), Rameswaram (Henderson, 1893); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).

Appendix-3. Contd.

Sl. No.	Name of the Species	Distribution
140.	<i>Portunus gracilimanus</i>	Madras coast (Alcock, 1899); Parangipettai coast (Sethuramalingam and Khan, 1991); Palk straits (Alcock and Anderson, 1894); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
141.	<i>Portunus hastatoides</i>	Madras coast (Alcock and Anderson, 1894b); Chennai (Henderson, 1893; Alcock and Anderson, 1894b; Alcock, 1899a; Kantha Bai and Rama Rao, 1977); Parangipettai coast (Sethuramalingam and Khan, 1991); Athankarai, Palk Bay (Sankarankutty, 1967); Panaikulam (Sankarankutty, 1967); Palk Straits (Alcock and Anderson, 1894b); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
142.	<i>Portunus pelagicus</i>	Chennai (Heller, 1865; Henderson, 1893; Gravely, 1941; Kantha Bai and Rama Rao, 1977); Ennore (Dev Roy and Bhadra, present paper); Parangipettai coast (Sethuramalingam and Khan, 1991); Tranquebar (Dev Roy and Bhadra, present paper); Vedalai and Devipatnam, Palk Bay (Sankarankutty, 1967); Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Dev Roy and Bhadra, present paper); Krusadai Island Gravely, 1927), Pamban, Gulf of Mannar (Sankarankutty, 1967); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact area not indicated).
143.	<i>Portunus petreus</i>	Tuticorin, Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
144.	<i>Portunus pubescens</i>	Vedalai, Palk Bay (Sankarankutty, 1967); Mandapam camp (Dev Roy and Bhadra, present paper); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
145.	<i>Portunus pulchricristatus</i>	Madras coast (Alcock, 1899); Madras (Stephenson, 1972); Parangipettai coast (Sethuramalingam and Khan, 1991).
146.	<i>Portunus samoensis</i>	Hare Island, Gulf of Mannar (Sankarankutty, 1967); Gulf of Mannar (Stephenson, 1972; exact locality not indicated).
147.	<i>Portunus sanguinolentus</i>	Madras coast (Alcock and Anderson, 1894b); Chennai (Heller, 1865; Henderson, 1893; Gravely, 1941; Kantha Bai and Rama Rao, 1977); Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Ravichandran <i>et al.</i> , 2001); Vedalai, Palk Bay (Sankarankutty, 1967); Rameswaram (Henderson, 1893), around Krusadai

Appendix-3. *Contd.*

Sl. No.	Name of the Species	Distribution
		Island (Gravely, 1927); Dhanushkodi (Sankarankutty, 1967); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
148.	<i>Portunus tuberculosus</i>	Palk straits (Alcock and Anderson, 1894).
149.	<i>Charybdis (Charybdis) affinis</i>	Chennai (Henderson, 1893); Parangipettai coast (Sethuramalingam and Khan, 1991).
150.	<i>Charybdis (Charybdis) amboinensis</i>	Parangipettai coast (Sethuramalingam and Khan, 1991).
151.	<i>Charybdis (Charybdis) anisodon</i>	Vedalai, Palk Bay (Sankarankutty, 1967).
152.	<i>Charybdis (Charybdis) annulata</i>	Chennai (Henderson, 1893; Gravely, 1927; Kantha Bai and Rama Rao, 1977); Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893), Krusadai Island (Gravely, 1927; Sankarankutty, 1967), Gulf of Mannar; Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
153.	<i>Charybdis (Charybdis) beauforti</i>	Chennai (Henderson, 1893).
154.	<i>Charybdis (Charybdis) callianassa</i>	Madras coast (Alcock, 1899a); Chennai (Gravely, 1941); Parangipettai coast (Sethuramalingam and Khan, 1991); Palk Straits (Alcock and Anderson, 1894b).
155.	<i>Charybdis (Charybdis) feriatius</i>	Chennai (Henderson, 1893; Kantha Bai and Rama Rao, 1977; Dev Roy and Bhadra, present paper); Parangipettai coast (Sethuramalingam and Khan, 1991); Vedalai and Pudumadam, Palk Bay (Sankarankutty, 1967); Tuticorin (Henderson, 1893; Thurston, 1895), Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
156.	<i>Charybdis (Charybdis) granulata</i>	Parangipettai coast (Sethuramalingam and Khan, 1991).
157.	<i>Charybdis (Charybdis) helleri</i>	Chennai (Dev Roy and Bhadra, present paper); Parangipettai coast (Sethuramalingam and Khan, 1991); Mandapam, Palk Bay (Sankarankutty, 1967); Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893), Krusadai Island (Sankarankutty, 1967), Gulf of Mannar; Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
158.	<i>Charybdis (Charybdis) lucifera</i>	Madras coast (Alcock and Anderson, 1894b); Chennai (Henderson, 1893; Parangipettai coast

Appendix-3. Contd.

Sl. No.	Name of the Species	Distribution
		(Sethuramalingam and Khan, 1991); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
159.	<i>Charybdis (Charybdis) miles</i>	Parangipettai coast (Sethuramalingam and Khan, 1991).
160.	<i>Charybdis (Charybdis) natator</i>	Madras coast (Alcock, 1899a); Chennai (Henderson, 1893; Gravely, 1941; Kantha Bai and Rama Rao, 1977; Dev Roy and Bhadra, present paper); Parangipettai coast (Sethuramalingam and Khan, 1991); Vedalai and Mandapam, Palk Bay (Sankarankutty, 1967); Palk Bay (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated); Pamban (Thurston, 1895), Rameswaram (Henderson, 1893); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
161.	<i>Charybdis (Charybdis) orientalis</i>	Chennai (Kantha Bai and Rama Rao, 1977); Tuticorin (Henderson, 1893; Thurston, 1895).
162.	<i>Charybdis (Charybdis) riverandersoni</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
163.	<i>Charybdis (Charybdis) rostrata</i>	Karaikal (Dev Roy and Bhadra, present paper); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; Dev Roy and Bhadra, present paper).
164.	<i>Charybdis (Charybdis) variegata</i>	Madras coast (Alcock, 1899a); Chennai (Henderson, 1893); Parangipettai coast (Sethuramalingam and Khan, 1991).
165.	<i>Charybdis (Goniohellenus) edwardsi</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
166.	<i>Charybdis (Goniohellenus) hoplites</i>	Parangipettai coast (Sethuramalingam and Khan, 1991).
167.	<i>Charybdis (Goniohellenus) truncata</i>	Chennai (Henderson, 1893; Kantha Bai and Rama Rao, 1977); Palk Straits (Alcock and Anderson, 1894).
168.	<i>Charybdis (Goniohellenus) vadorum</i>	Parangipettai coast (Sethuramalingam and Khan, 1991).
169.	<i>Charybdis (Gonioneptunus) bimaculata</i>	Chennai (Henderson, 1893); Palk straits (Alcock, 1899a).
170.	<i>Charybdis (Goniosupradens) acutifrons</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000)
171.	<i>Thalamita admete</i>	Chennai (Alcock and Anderson, 1894b; Gravely, 1927; 1941); Palk Straits (Alcock and Anderson, 1894; Alcock, 1899); Pamban (Thurston, 1895), Rameswaram (Henderson, 1893), Krusadai Island (Gravely, 1927); Gulf of Mannar; Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).

Appendix-3. *Contd.*

Sl. No.	Name of the Species	Distribution
172.	<i>Thalamita chaptali</i>	Chennai (Dev Roy and Bhadra, present paper); Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Ravichandran <i>et al.</i> , 2001); Krusadai Island, Gulf of Mannar Dev Roy and Bhadra, present paper).
173.	<i>Thalamita crenata</i>	Chennai (Gravely, 1941; Kantha Bai and Rama Rao, 1977; Pichavaram (Ravichandran <i>et al.</i> , 2001); Mandapam, Palk Bay (Sankarankutty, 1967; Dev Roy and Bhadra, present paper); Shingle Island (Sankarankutty, 1967); Krusadai Island (Gravely, 1927) and Pamban (Dev Roy and Bhadra, present paper); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
174.	<i>Thalamita danae</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
175.	<i>Thalamita integra</i>	Vedalai and Mandapam, Palk Bay (Sankarankutty, 1967); Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893), Gulf of Mannar (Thurston, 1895); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated)).
176.	<i>Thalamita parvidens</i>	Vedalai, Palk Bay (Sankarankutty, 1967); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
177.	<i>Thalamita prymna</i>	Madras coast (Alcock, 1899a); Chennai (Henderson, 1893; Kantha Bai and Rama Rao, 1977); Mandapam, Palk Bay (Sankarankutty, 1967); Palk Straits (Alcock and Anderson, 1894; Dev Roy and Bhadra, present paper); Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895; Sankarankutty, 1967), Rameswaram (Henderson, 1893), Krusadai Island (Gravely, 1927; Dev Roy and Bhadra, present paper), Manoli Island (Sankarankutty, 1967), Gulf of Mannar; Gulf of Mannar, Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
178.	<i>Thalamita sexlobata</i>	Tuticorin (Henderson, 1893; Thurston, 1895).
179.	<i>Thalamita sima</i>	Tuticorin (Henderson, 1893; Thurston, 1895), Gulf of Mannar.
180.	<i>Thalamita spinifera</i>	Vedalai, Palk Bay (Sankarankutty, 1967).
181.	<i>Thalamita wood-masoni</i>	Krusadai Island (Gravely, 1927).
Subfamily PODOPHTHALMINAE		
182.	<i>Podophthalmus vigil</i>	Chennai (Kantha Bai, Rama Rao, 1977; Dev Roy and Bhadra, present paper); Ennore and Pulicat

Appendix-3. Contd.

Sl. No.	Name of the Species	Distribution
		estuaries (Raman and Murugesan, 1978); Sinnur (Premkumar, 1962); Porto Novo (Premkumar, 1962; Srinivasagam and Natarajan, 1976); Parangipettai coast (Sethuramalingam and Khan, 1991).
	Superfamily XANTHOIDEA	
	Family EURYPLACIDAE	
183.	<i>Eucrate alcocki</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
184.	<i>Eucrate crenata</i>	Chennai (Alcock, 1900; Krishnamoorthy, 2007); Gulf of Mannar (Venkataraman <i>et al.</i> , 2002).
185.	<i>Eucrate dentata</i>	Palk Straits (Alcock, 1900); Vaighai estuary (Sankarankutty, 1967).
186.	<i>Eucrate sexdentata</i>	Chennai coast (Krishnamoorthy, 2007).
187.	<i>Heteroplax nitida</i>	Chennai (Henderson, 1893).
	Family GONEPLACIDAE	
	Subfamily GONEPLACINAE	
188.	<i>Carcinoplax longimanus</i>	Chennai coast (Krishnamoorthy, 2007).
189.	<i>Carcinoplax longipes</i>	Nagapattinam (Dev Roy and Bhadra, present paper).
190.	<i>Carcinoplax</i> sp.	Madras coast (Alcock and Anderson, 1894b).
	Family XANTHIDAE	
	Subfamily CYMOINAE	
191.	<i>Cymo andreossyi</i>	Pamban (Thurston, 1895; Dev Roy and Bhadra, present paper), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893), Manoli (Sankarankutty, 1967) and Krusadai Islands (Dev Roy and Bhadra, present paper), Gulf of Mannar (Gravely, 1927; Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
192.	<i>Cymo melanodactylus</i>	Manoli Island (Sankarankutty, 1967), Pamban and Krusadai Island (Dev Roy and Bhadra, present paper) and Mandapam inn Gulf of Mannar (Sankarankutty, 1967); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
193.	<i>Cymo quadrilobatus</i>	Palk Straits (Alcock and Anderson, 1894b; Alcock, 1898).
	Subfamily LIOMERINAE	
194.	<i>Liomera (Bruciana) pediger</i>	Chennai (Dev Roy and Bhadra, present paper).
195.	<i>Liomera (Liomera) margaritata</i>	Pamban (Thurston, 1895), Rameswaram

Appendix-3. *Contd.*

Sl. No.	Name of the Species	Distribution
		(Henderson, 1893) and Tuticorin (Henderson, 1893; Thurston, 1895), Gulf of Mannar (Gravely 1927; exact locality not indicated).
	Subfamily EUXANTHINAE	
196.	<i>Hypocolpus granulatus</i>	Tuticorin (Henderson, 1893; Thurston, 1895).
197.	<i>Euxanthus exsculptus</i>	Tuticorin (Henderson, 1893; Thurston, 1895).
	Subfamily ACTAEINAE	
198.	<i>Actaea jacquelinae</i>	Tuticorin (Henderson, 1893; Thurston, 1895).
199.	<i>Actaea savignyi</i>	Chennai (Deb, 1989; Krishnamoorthy, 2007); Palk Straits (Alcock and Anderson, 1894); Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895) and Rameswaram (Henderson, 1893); Palk Straits (Alcock and Anderson, 1894b); Pudumadam, Palk Bay (Sankarankutty, 1967).
200.	<i>Actaeodes tomentosa</i>	Palk Straits (Alcock and Anderson, 1894b).
201.	<i>Epiactaea margaritifera</i>	Tuticorin (Henderson, 1893; Thurston, 1895).
202.	<i>Paractaea neospeciosa</i>	Palk Strait and Gulf of Mannar (Deb, 1989).
203.	<i>Paractaea rufopunctata rufopunctata</i>	Tuticorin (Henderson, 1893; Thurston, 1895).
204.	<i>Gaillardiiellus rueppelli</i>	Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893) and Mandapam (Sankarankutty, 1967), Gulf of Mannar.
205.	<i>Pseudoliomera speciosa</i>	Gulf of Mannar (Gravely, 1927; Jeyabaskaran <i>et al.</i> , 2000).
206.	<i>Pseudoliomera variolosa</i>	Madras Harbour (Deb, 1989).
	Subfamily ZOSIMINAE	
207.	<i>Atergatis dilatatus</i>	Chennai (Dev Roy and Bhadra, present paper) Krusadai Island (Gravely, 1927), Pamban (Dev Roy and Bhadra, present paper), Gulf of Mannar. Gulf of Mannar (Gravely, 1927; exact locality not indicated)
208.	<i>Atergatis floridius</i>	Chennai (Kantha Bai and Rama Rao, 1977); Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895) and Rameswaram (Henderson, 1893), Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
209.	<i>Atergatis frontalis</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
210.	<i>Atergatis integerrimus</i>	Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893), Kilakarai (Sankarankutty, 1967), Manoli

Appendix-3. Contd.

Sl. No.	Name of the Species	Distribution
		Island (Sankarankutty, 1967), Krusadai Island (Dev Roy and Bhadra, present paper), Gulf of Mannar; Gulf of Mannar (Gravely, 1927; Venkataraman <i>et al.</i> , 2002; exact locality not indicated).
211.	<i>Atergatis laevigatus</i>	Tuticorin (Henderson, 1893; Thurston, 1895).
212.	<i>Atergatis roseus</i>	Krusadai Island and its adjacent islands (Jeyabaskaran <i>et al.</i> , 2000), Gulf of Mannar (Gravely, 1927; exact locality not indicated).
213.	<i>Atergatis subdentatus</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
214.	<i>Zozymodes cavipes</i>	Palk Straits (Alcock and Anderson, 1894b).
215.	<i>Platypodia cristata</i>	Madras coast (Alcock, 1898); Gulf of Mannar (Gravely, 1927; Jeyabaskaran <i>et al.</i> , 2000).
216.	<i>Platypodia granulosa</i>	Pamban (Thurston, 1895), Tuticorin (Thurston, 1895; Henderson 1893) and Rameswaram (Henderson 1893).
217.	<i>Platypodia semigranosa</i>	Pamban (Thurston, 1895; Dev Roy and Bhadra, present paper), Rameswaram (Henderson 1893).
218.	<i>Zosymus aeneus</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
219.	<i>Lophozozymous dodone</i>	Pamban (Thurston, 1895), Rameswaram (Henderson, 1893), Tuticorin (Henderson, 1893; Thurston, 1895), Gulf of Mannar.
	Subfamily XANTHINAE	
220.	<i>Macromedaeus bidentatus</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
221.	<i>Macromedaeus crassimanus</i>	Shingle Island (Sankarankutty, 1967); Parangipettai coast (Sethuramalingam and Khan, 1991).
222.	<i>Macromedaeus quinquedentatus</i>	Pamban and Krusadai Island (Dev Roy and Bhadra, present paper), Gulf of Mannar (Gravely, 1927; Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
223.	<i>Leptodius exaratus</i>	Palk Straits (Alcock and Anderson, 1894b); Mandapam, Palk Bay (Sankarankutty, 1967); Rameswaram (Henderson, 1893; Dev Roy and Bhadra, present paper), Pamban (Thurston, 1895; Dev Roy and Bhadra, present paper), Tuticorin (Henderson, 1893; Thurston, 1895), Shingle (Sankarankutty, 1967), Krusadai (Sankarankutty, 1967; Dev Roy and Bhadra, present paper) and

Appendix-3. *Contd.*

Sl. No.	Name of the Species	Distribution
		Pulli Islands (Sankarankutty, 1967), Gulf of Mannar (Gravely, 1927; Jeyabaskaran <i>et al.</i> , 2000; Venkataraman <i>et al.</i> , 2002; exact locality not indicated).
224.	<i>Leptodius gracilis</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
225.	<i>Leptodius sanguineus</i>	Palk Strait (Alcock and Anderson, 1894).
226.	<i>Demania baccalipes</i>	Parangipettai coast (Sethuramalingam and Khan, 1991). Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
227.	<i>Demania scaberrima</i>	Chennai coast (Krishnamoorthy, 2007).
228.	<i>Demania splendida</i>	Madras coast (Dev Roy and Bhadra, present paper); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
229.	<i>Xanthias lamarckii</i>	Madras coast (Heller, 1865; Alcock and Anderson, 1894b); Shingle Island, Gulf of Mannar (Sankarankutty, 1967).
230.	<i>Xanthias punctatus</i>	Palk Straits (Alcock and Anderson, 1894b); Tuticorin (Henderson, 1893; Thurston, 1895), Gulf of Mannar.
231.	<i>Neoxanthias impressus</i>	Gulf of Mannar (Gravely, 1927).
232.	<i>Paraxanthias notatus</i>	Palk Straits (Alcock and Anderson, 1894; Alcock, 1898).
233.	<i>Neoxanthops lineatus</i>	Tuticorin (Henderson, 1893; Thurston, 1895).
234.	<i>Calmania prima</i>	Gulf of Mannar (Dev Roy and Bhadra, present paper).
	Subfamily ETISINAE	
235.	<i>Etisus electra</i>	Palk Straits (Alcock and Anderson, 1894b); Tuticorin, Rameswaram (Henderson, 1893) and Hare island (Sankarankutty, 1967); Gulf of Mannar (Gravely, 1927; exact locality not indicated).
236.	<i>Etisus laevimanus</i>	Palk Straits (Alcock and Anderson, 1894b; Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893), Pamban (Thurston, 1895; Gravely, 1927), Krusadai Island (Dev Roy and Bhadra, present paper), Kilakarai (Sankarankutty, 1967), Gulf of Mannar (Gravely, 1927; Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
	Subfamily CHLORODIINAE	
237.	<i>Pilodius areolatus</i>	Palk Straits (Alcock and Anderson, 1894b; Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).

Appendix-3. Contd.

Sl. No.	Name of the Species	Distribution
238.	<i>Chlorodiella laevis</i>	Palk Straits (Alcock and Anderson, 1894b).
239.	<i>Chlorodiella nigra</i>	Chennai (Heller, 1865); Pamban (Thurston, 1895; Gravely, 1927; Dev Roy and Bhadra, present paper), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893; Dev Roy and Bhadra, present paper), Krusadai island (Dev Roy and Bhadra, present paper), Manoli Island (Sankarankutty, 1967), Gulf of Mannar (Gravely, 1927; Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
240.	<i>Phymodius granulatus</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
241.	<i>Phymodius monticulosus</i>	Tuticorin (Henderson, 1893; Thurston, 1895), Pamban (Gravely, 1927), Rameswaram (Henderson, 1893), Pulli Island (Sankarankutty, 1967), Gulf of Mannar; Gulf of Mannar (Gravely, 1927; Jeyabaskaran <i>et al.</i> 2000).
242.	<i>Phymodius nitidus</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000)
243.	<i>Phymodius unguatus</i>	Madras coast (Alcock and Anderson, 1894b; Palk Straits (Dev Roy and Bhadra, present paper), Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
	Subfamily ZALASIINAE	
244.	<i>Zalasia indica</i>	Devipatnam, Palk Bay (Sankarankutty, 1967).
	Subfamily KRAUSIINAE	
245.	<i>Kraussia nitida</i>	Chennai (Henderson, 1893); Tuticorin (Henderson, 1893; Thurston, 1895)
INCERTAE SEDIS		
246.	<i>Liagore erythematica</i>	Parangipettai coast (Sethuramalingam and Khan, 1991); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
	Family TRAPEZIIDAE	
	Subfamily TRAPEZIINAE	
247.	<i>Trapezia areolata</i>	Rameswaram, Gulf of Mannar (Sankarankutty, 1967); Gulf of Mannar (Gravely, 1927; exact locality not indicated).
248.	<i>Trapezia cymodoce</i>	Palk Straits (Alcock and Anderson, 1894b; Alcock, 1898); Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895), Gulf of Mannar (Gravely, 1927; Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
249.	<i>Trapezia digitalis</i>	Palk Straits (Alcock and Anderson, 1894b; Alcock, 1898).

Appendix-3. *Contd.*

Sl. No.	Name of the Species	Distribution
250.	<i>Trapezia ferruginea</i>	Palk Straits (Dev Roy and Bhadra, present paper).
251.	<i>Trapezia flavopunctata</i>	Rameswaram, Gulf of Mannar (Sankarankutty, 1967); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
252.	<i>Trapezia rufopunctata</i>	Tuticorin (Henderson, 1893; Thurston, 1895).
253.	<i>Tetralia clavimana</i>	Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
254.	<i>Tetralia glaberrima</i>	Pamban (Thurston, 1895; Dev Roy and Bhadra, present paper), Tuticorin (Henderson, 1893; Thurston, 1895), Mandapam (Sankarankutty, 1967), Rameswaram (Henderson, 1893; Sankarankutty, 1967).
255.	<i>Quadrella coronata</i> Family PILUMNIDAE Subfamily PILUMNINAE	Coral bank North of Madras (Alcock, 1898).
256.	<i>Actumnus setifer</i>	Palk Straits (Alcock and Anderson, 1894b).
257.	<i>Actumnus squamosus</i>	Palk Straits (Alcock, 1898).
258.	<i>Actumnus verrucosus</i>	Tuticorin (Henderson, 1893; Thurston, 1895).
259.	<i>Benthopanpope indica</i>	Ennore (Dev Roy and Bhadra, present paper); Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Kathiresan, 2000); Cuddalore (Dev Roy and Bhadra, present paper).
260.	<i>Eurycarcinus natalensis</i>	Pamban, Gulf of Mannar (Sankarankutty, 1967).
261.	<i>Glabropilumnus laevis</i>	Krusadai Island (Dev Roy and Bhadra, present paper).
262.	<i>Heteropilumnus angustifrons</i>	Parangipettai coast (Sethuramalingam and Khan, 1991).
263.	<i>Nanopilumnus rouxi</i>	Madras coast (Balss, 1935).
264.	<i>Pilumnus cursor</i>	Palk Straits (Alcock and Anderson, 1894b).
265.	<i>Pilumnus labyrinthicus</i>	Pamban (Thurston, 1895), Rameswaram (Henderson, 1893).
266.	<i>Pilumnus longicornis</i>	Palk Straits (Alcock and Anderson, 1894b; Dev Roy and Bhadra, present paper); Gulf of Mannar (Venkataraman <i>et al.</i> , 2002; exact locality not indicated).
267.	<i>Pilumnus minutus</i>	Madras Harbour (Dev Roy and Bhadra, present paper), Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000).
268.	<i>Pilumnus scabriuscula</i>	Chennai coast (Krishnamoorthy, 2007).
269.	<i>Pilumnus tomentosus</i>	Tuticorin, Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).

Appendix-3. Contd.

Sl. No.	Name of the Species	Distribution
270.	<i>Pilumnus vespertilio</i>	Palk Straits (Alcock and Anderson, 1894b); Mandapam, Palk Bay (Sankarankutty, 1967); Rameswaram (Henderson, 1893), Tuticorin (Henderson, 1893; Thurston, 1895); Gulf of Mannar (Gravely, 1927; Jeyabaskaran <i>et al.</i> , 2000).
Subfamily RHIZOPINAE		
271.	<i>Pseudolitocheira integra</i>	Madras coast (Dev Roy and Bhadra, present paper) Parangipettai coast (Sethuramalingam and Khan, 1991).
272.	<i>Typhlocarcinus nudus</i>	Madras coast (Alcock, 1900); Palk Straits (Alcock and Anderson, 1894b).
273.	<i>Typhlocarcinus villosus</i>	Palk Straits (Alcock and Anderson, 1894b).
274.	<i>Notonyx</i> sp.	Madras coast (Alcock and Anderson, 1894b).
Subfamily GALENINAE		
275.	<i>Galene bispinosa</i>	Chennai (Dev Roy and Bhadra, present paper; Krishnamoorthy, 2007); Parangipettai coast (Sethuramalingam and Khan, 1991); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; Venkataraman <i>et al.</i> , 2002).
Subfamily HALIMEDINAE		
276.	<i>Halimede ochtodes</i>	Madras coast (Alcock and Anderson, 1894b; Alcock, 1898); Chennai (Henderson, 1893; Dev Roy and Bhadra, present paper; Krishnamoorthy, 2007); Parangipettai coast (Sethuramalingam and Khan, 1991); Tondi (Dev Roy and Bhadra, present paper); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
Family PANOPEIDAE		
INCERTA SEDIS		
277.	<i>Panopeus laevis</i>	Pudumadam, Palk Bay (Sankarankutty, 1967).
Family CARPILIDAE		
278.	<i>Carpilius convexus</i>	Manoli Island, Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).
279.	<i>Carpilius maculatus</i>	Palk Straits (Alcock and Anderson, 1894b; Alcock, 1898; Sankarankutty, 1967); Kilakarai (Sankarankutty, 1967); Gulf of Mannar (Jeyabaskaran <i>et al.</i> , 2000; exact locality not indicated).

Appendix-3. *Contd.*

Sl. No.	Name of the Species	Distribution
Family ERIPHIIDAE		
Subfamily ERIPHIINAE		
280.	<i>Eriphia scabricula</i>	Palk Straits (Alcock and Anderson, 1894b).
281.	<i>Eriphia sebana</i>	Rameswaram (Henderson, 1893), Tuticorin (Henderson, 1893; Thurston, 1895), Pamban (Thurston, 1895), Krusadai Island (Dev Roy and Bhadra, present paper) and Pullivasal Island (Sankarankutty, 1967), Gulf of Mannar; Gulf of Mannar (Gravely, 1927).
Subfamily MENIPPINAE		
282.	<i>Menippe rumphii</i>	Chennai (Henderson, 1893; Dev Roy and Bhadra, present paper); Mandapam, Palk Bay (Sankarankutty, 1967); Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893), Krusadai Island (Dev Roy and Bhadra, present paper); Gulf of Mannar (Gravely, 1927; Jeyabaskaran <i>et al.</i> , 2000).
283.	<i>Myomenippe hardwickii</i>	Madras Harbour (Dev Roy and Bhadra, present paper); Pamban (Dev Roy and Bhadra, present paper).
284.	<i>Sphaerozius nudus</i>	Madras coast (Dev Roy and Bhadra, present paper); Chennai (Gravely, 1927; Dev Roy and Bhadra, present paper); Gulf of Mannar (Gravely, 1927; Balss, 1935).
Subfamily OZIINAE		
285.	<i>Epixanthus frontalis</i>	Parangipettai coast (Sethuramalingam and Khan, 1991); Coromandel coast (Lucas, 1850).
286.	<i>Ozius rugulosus</i>	Chennai (Kantha Bai and Rama Rao, 1977; Krishnamoorthy in press); Gulf of Mannar (Gravely, 1927; Venkataraman <i>et al.</i> , 2002).
287.	<i>Globopilumnus actumnoides</i>	Pamban, Gulf of Mannar (Dev Roy and Bhadra, present paper).
Superfamily GRAPSIDOIDEA		
Family GECARCINIDAE		
288.	<i>Cardisoma carnifex</i>	Madras coast (Alcock and Anderson, 1894b); Pulicat (Alcock and Anderson, 1894; Thurston, 1895); Chennai (Henderson, 1893; Dev Roy and Bhadra, present paper); Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Ravichandran <i>et al.</i> , 2001); Tranquebar (Herbst, 1794); Tuticorin (Henderson, 1893; Thurston, 1895).

Appendix-3. *Contd.*

Sl. No.	Name of the Species	Distribution
Family GRAPSIDAE		
Subfamily GRAPSINAE		
289.	<i>Grapsus albolineatus</i>	Chennai (Henderson, 1893; Kantha Bai and Rama Rao, 1977; Gravely, 1941); Parangipettai coast (Sethuramalingam and Khan, 1991); Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895; Dev Roy and Bhadra, present paper), Rameswaram (Henderson, 1893); Mandapam (Sankarankutty, 1967), Appa Island (Jeyabaskaran <i>et al.</i> , 2000), Gulf of Mannar (Gravely, 1927; Venkataraman <i>et al.</i> , 2002; exact locality not indicated).
290.	<i>Grapsus tenuicrustatus</i>	Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Ravichandran <i>et al.</i> , 2001); Tuticorin (Thurston, 1895).
291.	<i>Metopograpsus frontalis</i>	Mandapam, Palk Bay (Sankarankutty, 1967); Pamban, Gulf of Mannar (Sankarankutty, 1967).
292.	<i>Metopograpsus latifrons</i>	Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Kathiresan, 2000; Ravichandran <i>et al.</i> , 2001); Tuticorin (Thurston, 1895); Pamban (Dev Roy and Bhadra, present paper).
293.	<i>Metopograpsus messor</i>	Chennai (Heller, 1865; Henderson, 1893; Kantha Bai and Rama Rao, 1977); Parangipettai coast (Sethuramalingam and Khan, 1991); Palk Straits (Alcock and Anderson, 1894b); Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893), Krusadai Island (Gravely, 1927), Kutikal (Gravely, 1927); Gulf of Mannar (Venkataraman <i>et al.</i> , 2002; exact locality not indicated).
294.	<i>Metopograpsus thukuhar</i>	Kundugal Point, Gulf of Mannar (Sankarankutty, 1967)
295.	<i>Pachygrapsus porpinquus</i>	Ennur near Madras (Kemp, 1915).
Subfamily VARUNINAE		
296.	<i>Cyclograpsus eydouxi</i>	Chennai (Heller, 1865; De Man, 1887)
297.	<i>Cyclograpsus punctatus</i>	Chennai (Heller, 1865).
298.	<i>Metaplex distincta</i>	Chennai (Alcock, 1900; Kantha Bai and Rama Rao, 1977); Ennore (Henderson, 1893); Pichavaram (Kathiresan, 2000; Ravichandran <i>et al.</i> , 2001); Bank of Uppana River, Akkaraighori (Dev Roy and Bhadra, present paper) Athankarai, Palk Bay (Sankarankutty, 1967).

Appendix-3. *Contd.*

Sl. No.	Name of the Species	Distribution
299.	<i>Metaplex elegans</i>	Pichavaram (Kathiresan, 2000; Ravichandran <i>et al.</i> , 2001).
300.	<i>Pseudograpsus intermedius</i>	Parangipettai coast (Sethuramalingam and Khan, 1991).
301.	<i>Pseudograpsus setosus</i>	Tranquebar (Fabricius, 1781, 1798).
302.	<i>Ptychognathus altimanus</i>	Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Kathiresan, 2000).
303.	<i>Varuna litterata</i>	Madras coast (Heller, 1865; Alcock and Anderson, 1894b; Kantha Bai and Rama Rao, 1977); Chennai (Gravely, 1941; Dev Roy and Bhadra, present paper); Ennore (Henderson, 1893); Palk Straits (Gravely, 1927).
Subfamily SESARMINAE		
304.	<i>Perisesarma bidens</i>	Pichavaram (Kathiresan, 2000); Ravichandran <i>et al.</i> , 2001).
305.	<i>Cyclograpsus fasciatum</i>	Muthupet, Palk Bay (Oswin, 1998).
306.	<i>Parasesarma pictum</i>	Pichavaram (Kathiresan, 2000).
307.	<i>Parasesarma plicatum</i>	Madras coast (Alcock and Anderson, 1894b); Chennai (Heller, 1865; Henderson, 1893; Kantha Bai and Rama Rao, 1977; Dev Roy and Bhadra, present paper); Ennore (Henderson, 1893); Parangipettai coast; (Sethuramalingam and Khan, 1991); Pichavaram (Kathiresan, 2000; Ravichandran <i>et al.</i> 2001); Tuticorin (Thurston, 1895), Pullivasal Island (Sankarankutty, 1967), Kutikal (Gravely, 1927), Krusadai Island (Gravely, 1927).
308.	<i>Nanosesarma andersoni</i>	Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Kathiresan, 2000; Ravichandran <i>et al.</i> , 2001).
309.	<i>Nanosesarma batavicum</i>	Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Kathiresan, 2000).
310.	<i>Nanosesarma minutum</i>	Parangipettai coast (Sethuramalingam and Khan, 1991).
311.	<i>Episesarma mederi</i>	Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Kathiresan, 2000; Ravichandran <i>et al.</i> , 2001).
312.	<i>Muradium tetragonum</i>	Pulicat (Alcock and Anderson, 1894b); Chennai (Henderson, 1893; Alcock, 1900); Ennore (Henderson, 1893); Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Kathiresan, 2000; Ravichandran <i>et al.</i> , 2001).

Appendix-3. Contd.

Sl. No.	Name of the Species	Distribution
313.	<i>Selatium brockii</i>	Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Kathiresan, 2000; Ravichandran <i>et al.</i> , 2001).
314.	<i>Pseudosesarma edwardsi</i>	Pichavaram (Kathiresan, 2000).
315.	<i>Neosarmatium meinerti</i>	Chennai (Alcock, 1900).
316.	<i>Neosarmatium punctatum</i>	Chennai (Thallwitz, 1892).
317.	<i>Metasesarma obesum</i>	Chennai (Alcock, 1900); Ennore (Henderson, 1893); Akkaraighori (Dev Roy and Bhadra, present paper).
Subfamily PLAGUSINAE		
318.	<i>Plagusia dentipes</i>	Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Ravichandran <i>et al.</i> , 2001).
319.	<i>Plagusia depressa tuberculata</i>	Madras coast (Alcock and Anderson, 1894b); Parangipettai coast (Sethuramalingam and Khan, 1991); Palk Straits (Alcock and Anderson, 1894); Mandapam, Gulf of Mannar (Sankarankutty, 1967); Gulf of Mannar (Gravely, 1927; Jeyabaskaran <i>et al.</i> , 2000).
320.	<i>Percnon planissimum</i>	Madras coast (Alcock and Anderson, 1894b); Chennai (Henderson, 1893); Rameswaram (Henderson, 1893), Shingle Island (Sankarankutty, 1967), Krusadai and Manauli Islands (Jeyabaskaran <i>et al.</i> , 2000); Gulf of Mannar (Gravely, 1927).
Superfamily PINNOTHEROIDEA		
Family PINNOTHERIDAE		
Subfamily PINNOTHERINAE		
321.	<i>Pinnotheres decanensis</i>	Madras Presidency (Chopra, 1931); Mandapam, Gulf of Mannar (Sankarankutty, 1967).
322.	<i>Pinnotheres ridgewayi</i>	Mandapam in Palk Bay and Gulf of Mannar (Sankarankutty, 1967); Kutikal (Gravely, 1927), Kundugal Point and Pamban (Silas and Algarswamy, 1967), Gulf of Mannar (Sankarankutty, 1967; exact locality not indicated).
323.	<i>Pinnotheres sinensis</i>	Parangipettai coast (Sethuramalingam and Khan, 1991).
324.	<i>Pinnotheres</i> sp.	Cape Comorin and beyond as far as Tinnevely coast, Gulf of Mannar (Jones, 1950).
Subfamily XENOPHTHALMINAE		
325.	<i>Xenopthalmus pinnotheroides</i>	Pamban (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893), Devipatnam (Sankarankutty, 1967)

Appendix-3. *Contd.*

Sl. No.	Name of the Species	Distribution
	Subfamily ASTHENOGNATHINAE	
326.	<i>Chasmocarcinops gelasimoides</i>	Chennai (Alcock, 1900).
	Superfamily OCYPOIDOIDEA	
	Family OCYPODIDAE	
	Subfamily OCYPODINAE	
327.	<i>Ocypode ceratophthalma</i>	Madras coast (Alcock and Anderson, 1894b); Chennai (Henderson, 1893; Kantha Bai and Rama Rao, 1977); Tranquebar (Dev Roy and Bhadra, present paper); Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893), Krusadai Island (Gravely, 1927), Mandapam and Kundugal Point (Sankarankutty, 1967), Gulf of Mannar (Venkataraman <i>et al.</i> , 2002; exact locality not indicated).
328.	<i>Ocypode cordimana</i>	Madras coast (Alcock and Anderson, 1894b; Alcock, 1900); Chennai (Henderson, 1893; Thurston, 1887; Gravely, 1941; Kantha Bai and Rama Rao, 1977); Tuticorin (Henderson, 1893; Thurston, 1895), Krusadai Island (Gravely, 1927), Mandapam and Kundugal Point (Sankarankutty, 1967).
329.	<i>Ocypode macrocera</i>	Madras coast (Alcock and Anderson, 1894b); Chennai (Henderson, 1893; Gravely, 1941; Kantha Bai and Rama Rao, 1977); Parangipettai coast (Sethuramalingam and Khan, 1991); Porto Novo (Dev Roy and Bhadra, present paper); Pichavaram (Ravichandran <i>et al.</i> , 2001); Pamban (Thurston, 1895), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893), Krusadai Island (Gravely, 1927), Mandapam and Kundugal Point (Sankarankutty, 1967).
330.	<i>Ocypode platytarsis</i>	Chennai (Thurston, 1887; Kantha Bai and Rama Rao, 1977; Parangipettai coast (Sethuramalingam and Khan, 1991); Palk Straits (Dev Roy and Bhadra), Pamban (Thurston, 1895) and Rameswaram (Henderson, 1893; Thurston, 1895; Sankarankutty, 1967), Krusadai Island (Gravely, 1927).
331.	<i>Uca dussumieri</i>	Parangipettai coast (Sethuramalingam and Khan, 1991); Muthupet (Oswin, 1998).
332.	<i>Uca tetragonon</i>	Chennai (Heller, 1865).

Appendix-3. Contd.

Sl. No.	Name of the Species	Distribution
333.	<i>Uca vocans</i>	Kutikal (Gravely, 1927), Pamban and Krusadai Island (Gravely, 1927), Manoli Island (Sankarankutty, 1967).
334.	<i>Uca lactea</i>	Madras coast (Alcock and Anderson, 1894b); Chennai (Heller, 1865; Henderson, 1893; Gravely, 1941; Kantha Bai and Rama Rao, 1977; Dev Roy and Bhadra, present paper); Pulicat (Alcock and Anderson, 1894); Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Kathiresan, 2000; Ravichandran <i>et al.</i> , 2001); Pamban (Thurston, 1895; Gravely, 1927), Tuticorin (Henderson, 1893; Thurston, 1895), Rameswaram (Henderson, 1893), Krusadai Island and Kutikal (Gravely, 1927), Kundugal Point (Sankarankutty, 1967), Vaighai estuary (Sankarankutty, 1967), Gulf of Mannar; Gulf of Mannar (Venkataraman <i>et al.</i> , 2002).
335.	<i>Uca triangularis</i>	Chennai (Henderson, 1893; Gravely, 1941; Kantha Bai and Rama Rao, 1977); Ennore (Henderson, 1893); Adyar river (Dev Roy and Bhadra, present paper); Parangipettai coast (Dev Roy and Bhadra, present paper; Sethuramalingam and Khan, 1991); Pichavaram (Ravichandran <i>et al.</i> , 2001).
Subfamily MACROPHTHALMINAE		
336.	<i>Macrophthalmus (Macrophthalmus) convexus</i>	Pamban (Kemp, 1919), Krusadai Island and Kutikal (Gravely, 1927), Manoli Island (Sankarankutty, 1967).
337.	<i>Macrophthalmus (Macrophthalmus) telescopicus</i>	Pamban (Kemp, 1919), Krusadai Island and Kutikal (Gravely, 1927), Gulf of Mannar.
338.	<i>Macrophthalmus (Mareotis) depressus</i>	Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Kathiresan, 2000; Ravichandran <i>et al.</i> , 2001); Pamban (Thurston, 1895; Kemp, 1919; Gravely, 1927), Rameswaram (Henderson, 1893), Manoli Island and Kundugal Point (Sankarankutty, 1967), Krusadai Island (Gravely, 1927), Palk Bay lagoon (Sankarankutty, 1967).
339.	<i>Macrophthalmus (Mareotis) erato</i>	Parangipettai coast (Sethuramalingam and Khan, 1991); Pichavaram (Kathiresan, 2000; Ravichandran <i>et al.</i> , 2001).
Subfamily DOTILLINAE		
340.	<i>Dotilla intermedia</i>	Chennai (Gravely, 1941); Ennur backwater (Kemp, 1915, 1919; Dev Roy and Bhadra, present paper); Parangipettai coast (Sethuramalingam and Khan, 1991).

Appendix-3. *Contd.*

Sl. No.	Name of the Species	Distribution
341.	<i>Dotilla myctiroides</i>	Ennore (Henderson, 1893; Kemp, 1915, 1919); Chennai (Gravely, 1941); Parangipettai coast (Sethuramalingam and Khan, 1991); Vedalai, Palk Bay (Sankarankutty, 1967); Tuticorin (Henderson, 1893; Thurston, 1895), Pamban (Kemp, 1919; Gravely, 1927), Rameswaram (Henderson, 1893), Kutikal (Gravely, 1927), Krusadai Island (Gravely, 1927; Dev Roy and Bhadra, present paper), Kundugal Point (Sankarankutty, 1967), Gulf of Mannar (Venkataraman <i>et al.</i> , 2002; exact locality not indicated).
342.	<i>Scopimera pilula</i>	Adayar (Dev Roy and Bhadra, present paper); Pamban and Kutikal (Gravely, 1927), Kundugal Point (Sankarankutty, 1967).
343.	<i>Scopimera proxima</i>	Ennur (Kemp, 1919); Silvathurai Lagoon near Tuticorin (Kemp, 1919), Krusadai Island (Gravely, 1927), Mandapam Sankarankutty, 1967).
	Subfamily CAMPTANDRIINAE	
344.	<i>Camptandrium sexdentatum</i>	Ennur (Kemp, 1915).
345.	<i>Baruna socialis</i>	Ennur (Kemp, 1915); Balss 1935
	Family PALICIDAE	
346.	<i>Cymopolia serripes</i>	Madras coast (Alcock and Anderson, 1894b).
B. Doubtful species		
	Family PORTUNIDAE	
1.	<i>Portunus puber</i>	Muthupet (Oswin, 1998).
	Family XANTHIDAE	
2.	<i>Lophactaea fissa</i>	Tuticorin, Gulf of Mannar (Henderson, 1893).
	Family PILUMNIDAE	
3.	<i>Halimede thurstoni</i>	Tuticorin, Gulf of Mannar (Henderson, 1893).
	Family OCYPODIDAE	
4.	<i>Gelasimus variegatus</i>	Chennai (Heller, 1862).

Table 4. List of brachyuran crab species of Tamil Nadu coast not recorded during early/after 1900's in taxonomic literature

Sl. No.	Name of the species	Occurrence	Author and year of description/last record
	Family DROMIIDAE De Haan, 1833		
1.	<i>Cryptodromia conchifera</i> Alcock and Anderson	Madras coast (1894)	Alcock and Anderson (1894b)
2.	<i>Cryptodromiopsis</i> sp.	Krusadai Island	Gravelly (1927)
	Family LEUCOSIIDAE Samouelle, 1819		
	Subfamily EBALIINAE Stimpson, 1871		
3.	<i>Ebalia diadumena</i> Alcock, 1896	Palk Strait	Alcock (1896)
	Subfamily ILLINAE Stimpson, 1871		
	Subfamily LEUCOSIINAE Samouelle, 1819		
4.	<i>Philyra polita</i> Henderson [= <i>P. globosa</i> (Fabricius, 1787)]	Madras	Henderson (1893)
5.	<i>Pseudophilyra melita</i> De Man, 1888	Madras coast	Alcock and Anderson, 1894b
6.	<i>Pseudophilyra wood-masoni</i> Alcock, 1896	Cape Comorin	Alcock, 1896
7.	<i>Leucosia obtusifrons</i> De Haan, 1841	Madras coast	Alcock and Anderson, 1894
8.	<i>Leucosia haematochira</i> Adams and White, 1848	Madras coast	Alcock and Anderson, 1894
9.	<i>Leucosia phyllochira</i> Bell, 1855	Madras side of Palk Straits	Alcock (1896)
10.	<i>Onychomorpha lamelligera</i> Stimpson, 1858		Alcock, 1896
11.	<i>Myra elegans</i> Bell, 1855	Madras coast	Alcock and Anderson (1894)
12.	<i>Myra darnleyensis</i> (= <i>Myra kessleri</i> Paulson, 1875)	Madras coast	Alcock and Anderson (1894)
13.	<i>Nursia abbreviata</i> Bell, 1855	Pamban	Alcock (1896)
14.	<i>Nursia plicata</i> (Herbst, 1803)	Madras coast	Alcock (1896)
15.	<i>Nursilia dentata</i> Bell, 1855	Madras coast	Alcock (1896)
	Family MAJIDAE Samouelle, 1819		
	Subfamily INACHINAE MacLeay, 1838		
16.	<i>Paratymolus sexspinosus</i> [= <i>Litosus sexspinosus</i> (Miers, 1884)]	Tuticorin	Thurston (1895)
	Subfamily PISINAE Dana, 1851		
17.	<i>Hyastenus gracilirostris</i> Miers, 1879	Madras coast	Alcock (1895)
18.	<i>Hyastenus hilgendorfi</i> De Man, 1888	Pamban, Tuticorin Rameswaram	Thurston (1895) Henderson (1893)
	Subfamily EPIALTINAE MacLeay, 1838		
19.	<i>Acanthonyx consobrinus</i> A. Milne Edwards, 1862	Madras	Heller (1865)

Table 4. *Contd.*

Sl. No.	Name of the species	Occurrence	Author and year of description/last record
20.	<i>Huenia proteus</i> De Haan, 1839	Pamban, Tuticorin	Thurston (1895)
21.	<i>Menaethius brevirostris</i> Heller, 1862	Madras	Heller (1862)
22.	<i>Simocarcinus simplex</i> [= <i>Trigonothir simplex</i> (Dana, 1852)]	Tuticorin	Thurston (1895)
	Subfamily MAJINAE Samouelle, 1819		
23.	<i>Chlorinoides aculeatus</i> (H. Milne Edwards, 1834)	Madras coast	Alcock and Anderson (1894)
24.	<i>Paramithrax (Chlorinoides) longispinus</i> [= <i>Chlorinoides longispinus</i> (De Haan, 1839)]	Madras coast	Alcock (1895)
	Family PARTHENOPIDAE MacLeay, 1838		
	Subfamily PARTHENOPINAE MacLeay, 1838		
25.	<i>Lambrus affinis</i> [= <i>Parthenope pelagicus</i> (Rüppell, 1830)]	Pamban, Tuticorin	Thurston (1895)
26.	<i>Lambrus carinatus</i> [= <i>Parthenope carinatus</i> (H. Milne Edwards, 1834)]	Madras coast	Alcock and Anderson (1894)
27.	<i>Lambrus holdsworthi</i> [= <i>Parthenope holdsworthi</i> (Miers, 1879)]	Tuticorin	Thurston (1895)
28.	<i>Lambrus longispinus</i> [= <i>Parthenope longispinus</i> (Miers, 1879)]	Madras coast	Alcock and Anderson (1894), Thurston (1895)
29.	<i>Lambrus (Rhinolambrus) turriger</i> [= <i>Parthenope turriger</i> (Adams and White, 1848)]	Madras coast	Alcock (1895)
	Subfamily AETHRINAE Dana, 1851		
30.	<i>Cryptopodia spatulifrons</i> var. <i>laevimana</i> (= <i>Cryptopodia laevimana</i> Miers, 1879)	Palk Straits	Alcock and Anderson (1894)
	Family EUMEDONIDAE Dana, 1854		
31.	<i>Zebrida adamsii</i> White, 1847	Tuticorin	Thurston (1895)
	Family PORTUNIDAE Rafinesque, 1815		
	Subfamily CAPHYRINAE Alcock, 1899		
32.	<i>Lissocarcinus laevis</i> Miers, 1886	Tuticorin	Thurston (1895)
	Subfamily CATOPTRINAE Borradaile, 1907		
33.	<i>Carupa laeviuscula</i> [= <i>Carupa tenuipes</i> (Dana, 1851)]	Madras coast	Alcock and Anderson (1894)
	Subfamily POLYBIINAE Ortmann, 1893		
34.	<i>Lupocyclus orientalis</i> [= <i>Parathranites orientalis</i> (Miers, 1886)]	Madras coast	Alcock and Anderson, (1894)

Table 4. Contd.

Sl. No.	Name of the species	Occurrence	Author and year of description/last record
35.	<i>Lupocyclus strigosus</i> (= <i>Parathranites philippinensis</i> , Semper, 1880)	Madras coast	Alcock (1899)
36.	<i>Lupocyclus rotundatus</i> Adams and White, 1848	Madras coast	Alcock and Anderson, (1894)
	Subfamily PORTUNINAE Rafinesque, 1815		
37.	<i>Neptunus tuberculosus</i> [= <i>Portunus tuberculosus</i> (A. Milne Edwards, 1861)]	Palk Straits and Madras coast	Alcock and Anderson, (1894)
38.	<i>Charybdis</i> (<i>Gonioneptunus</i>) <i>bimaculata</i> (Miers, 1886)	Madras Palk Straits	Alcock (1898)
39.	<i>Thalamita sexlobata</i> Miers, 1886	Tuticorin	Thurston (1895)
40.	<i>Thalamita sima</i> H. Milne Edwards, 1834	Tuticorin	Thurston (1895)
	Family GONEPLACIDAE MacLeay, 1838		
41.	<i>Notonyx</i> sp.	Madras coast	Alcock and Anderson (1894)
	Family XANTHIDAE MacLeay, 1838		
	Subfamily EUXANTHINAE Alcock, 1898		
42.	<i>Hypocolpus granulatus</i> (De Haan, 1837)	Tuticorin	Thurston (1895)
43.	<i>Euxanthus melissa</i> (Herbst, 1803)	Tuticorin	Thurston (1895)
	Subfamily ACTAEINAE Alcock, 1898		
44.	<i>Actaea tomentosa</i> [= <i>Actaeodes tomentosa</i> (H. Milne Edwards, 1834)]	Palk Straits	Alcock (1898)
45.	<i>Actaea calculosa</i> (= <i>Actaea jacquelineae</i> Guinot, 1976)	Tuticorin	Thurston (1895)
46.	<i>Actaea nodulosa</i> [= <i>Epiactaea nodulosa</i> (White, 1847)]	Tuticorin	Thurston (1895)
47.	<i>Actaea rufopunctata</i> [= <i>Paractaea rufopunctata rufopunctata</i> (H. Milne Edwards, 1834)]	Tuticorin	Thurston (1895)
	Subfamily ZOSIMINAE Stimpson, 1858		
48.	<i>Atergatis laevigatus</i> A. Milne Edwards, 1865	Tuticorin	Thurston (1895)
49.	<i>Lophactaea granulosa</i> (Rüppell, 1830)		Thurston (1895)
	Subfamily XANTHINAE MacLeay, 1838		
50.	<i>Leptodius cavipes</i> [= <i>Zozymodes cavipes</i> (Dana, 1852)]	Palk Straits	Alcock and Anderson (1894)
51.	<i>Liomera punctata</i> [= <i>Xanthias punctatus</i> (H. Milne Edwards, 1834)]	Tuticorin	Henderson (1893), Thurston (1895)
52.	<i>Xanthias notatus</i> [= <i>Paraxanthias notatus</i> (Dana, 1852)]	Palk straits	Alcock and Anderson (1894), Alcock (1898)

Table 4. *Contd.*

Sl. No.	Name of the species	Occurrence	Author and year of description/last record
53.	<i>Cycloxanthias lineatus</i> [= <i>Neoxanthops lineatus</i> (A. Milne Edwards, 1867)]	Tuticorin	Thurston (1895)
54.	<i>Lophozozymous dodone</i> (Herbst, 1803)	Tuticorin, Rameswaram Pamban, Tuticorin	Thurston (1895)
	Subfamily KRAUSSINAE Ng, 1991		
55.	<i>Kraussia nitida</i> Stimpson, 1858	Tuticorin	Thurston (1895)
	Family TRAPEZIIDAE Miers, 1886		
	Subfamily TRAPEZIINAE Miers, 1886		
56.	<i>Trapezia digitalis</i> Latreille, 1825	Madras coast	Alcock (1898)
57.	<i>Trapezia rufopunctata</i> (Herbst, 1799)	Tuticorin	Thurston (1895)
58.	<i>Quadrella coronata</i> Dana, 1852	Coral bank north of Madras	Alcock (1893, 1898)
	Family PILUMNIDAE Samouelle, 1819		
	Subfamily PILUMNINAE Samouelle, 1819		
59.	<i>Pilumnus cursor</i> A. Milne Edwards, 1873	Palk Straits	Alcock and Anderson (1894)
60.	<i>Pilumnus labyrinthicus</i> Miers, 1884	Rameswaram Pamban	Thurston (1895)
	Subfamily ACTUMNINAE Dana, 1851		
61.	<i>Actumnus setifer</i> (De Haan, 1835) (1894)	Palk Straits	Alcock and Anderson
62.	<i>Pilumnus dehaani</i> Miers [= <i>Actumnus squamosus</i> (De Haan, 1835)]	Palk Straits	Alcock (1898)
63.	<i>Actumnus verrucosus</i> Henderson, 189	Tuticorin	Thurston (1895)
	Subfamily RHIZOPINAE Stimpson, 1858		
64.	<i>Typhlocarcinus nudus</i> Stimpson, 1858	Palk Straits Madras coast	Alcock (1900)
	Family ERIPHIIDAE MacLeay, 1838		
	Subfamily OZIINAE Dana, 1851		
65.	<i>Ozius frontalis</i> [= <i>Epixanthus frontalis</i> (H. Milne Edwards, 1834)]	Tranquebar	Lucas (1850)
	Family GRAPSIDAE MacLeay, 1838		
	Subfamily VARUNINAE H. Milne Edwards, 1853		
66.	<i>Cancer setosus</i> [= <i>Pseudograpsus setosus</i> (Fabricius, 1798)]	Tranquebar	Fabricius (1798)

Table 4. Contd.

Sl. No.	Name of the species	Occurrence	Author and year of description/last record
	Subfamily SESARMINAE Dana, 1852		
67.	<i>Sesarma meinerti</i> De Man [= <i>Neosarmatium meinerti</i> (De Man, 1887)]	Madras	Alcock (1900)
68.	<i>Sarmatium punctatum</i> [= <i>Neosarmatium punctatum</i> (A. Milne Edwards, 1873)]	Madras	Thallwitz (1892)
69.	<i>Cyclograpsus punctatus</i>	Madras	Heller (1865)
	Family PINNOTHERIDAE De Haan, 1833		
	Subfamily ASTHENOGNATHINAE Stimpson, 1858		
70.	<i>Chasmocarcinops gelasimoides</i> Alcock, 1900	Madras	Alcock (1900)
	Family OCYPODIDAE Rafinesque, 1815		
	Subfamily OCYPODINAE Rafinesque, 1815		
71.	<i>Gelasimus variegatus</i> Heller, 1862	Madras	Heller (1862)
	Family PALICIDAE Alcock, 1900		
72.	<i>Cymopolia serripes</i> (Alcock and Anderson) [= <i>Palicus serripes</i> (Alcock and Anderson, 1894)]	Madras coast	Alcock (1900)

Post Script

After the submission of the manuscript in 2006, the subfamilies namely, Calappinae, Matutinae, Aethrinae, Oziinae, Eriphiinae, Menippinae, Sesarinae, Varuninae, Xenophthalminae, Camptandriinae, Dotillinae and Macrophthalminae have been elevated to the level of the family. The taxonomic view points mentioned hereunder are adopted as per classification of Ng *et al.* (2008) mostly.

- Six species of the family LEUCOSIIDAE are currently under different generic taxa as follows :
 - Leucosia biannulata* Tyndal-Biscoe & George, 1962—*Coleusia biannulata* (Tyndal-Biscoe & George, 1962).
 - Leucosia haematosticta* Adams & White, 1848—*Urnalana haematosticta* (Adams & White, 1848).
 - Leucosia obtusifrons* De Haan, 1841—*Euclosia obtusifrons* (De Haan, 1841).
 - Leucosia rotundifrons* Chopra, 1933—*Euclosia rotundifrons* (Chopra, 1933).
 - Leucosia pubescens* Miers, 1877—*Seulocia pubescens* (Miers, 1877)
 - Leucosia rhomboidalis* Chopra, 1933—*Seulocia rhomboidalis* (Chopra, 1933).
- Leucosia longifrons* De Haan, 1841 is presently synonymised with *Leucosia anatum* (Herbst, 1783).
- The species *Aethra scruposa* (Linnaeus, 1764) is currently placed under the family AETHRIDAE Dana, 1851.

4. The genera *Arcania* Leach, 1817 (Subfamily ILINAE Stimpson, 1871) and *Philyra* Leach, 1817 (Subfamily LEUCOSINAE Samouelle, 1819) are presently placed under the subfamily EBALIINAE Stimpson, 1871 (Family LEUCOSIIDAE Samouelle, 1819).
5. *Ebalia malefactrix* Kemp, 1915 is transferred to the genus *Philyra* and its current name is *Philyra malefactrix* (Kemp, 1915).
6. The species *Parthenope echinatus* is presently placed under the genus *Enoplolambrus* and its current name is *Enoplolambrus echinatus* (Herbst, 1796).
7. The genus *Doclea* Leach, 1815 is currently treated under the family EPIALTIDAE MacLeay, 1838 instead of MAJIDAE Samouelle, 1819.
8. The genera *Carupa* Dana, 1851, *Lissocarcinus* Adams and White, 1848 and *Lupocyclus* Adams and White, 1849 are placed under the subfamilies CARUPINAE Paul'son, 1875 and CAPHYRINAE Paul'son, 1875 and PORTUNINAE Rafinesque, 1815 respectively.
9. The genera *Charybdis* De Hann and *Thalamita* Latreille, 1829 are currently treated under the subfamily THALAMITINAE Paul'son, 1875 instead of PORTUNINAE Rafinesque, 1815.
10. The genus *Calmania* Laurie, 1906 is presently treated under CALMANIINAE Števcic 1991 (Family PILUMNIDAE Samouelle, 1819) instead of XANTHINAE MacLeay, 1838 (Family XANTHIDAE MacLeay, 1838).
11. The genera *Actumnus Benthopanope* and *Heteropilumnus* are now included in the subfamily PILUMNINAE.
12. The family ERIPHIIDAE MacLeay, 1838, MENIPPIDAE Ortmann, 1894 and OZIIDAE Dana, 1851 are presently contained in the superfamily ERIPHOIDEA MacLeay, 1838. The former contains the genus *Eriphia*. Three genera each are included in the families MENIPPIDAE (*Menippe*, *Myomenippe* and *Sphaerozius*) and OZIIDAE (*Epixanthus Ozius* and *Globopilumnus*).
13. The genus *Tetralia* Dana, 1851 is now treated under the family TETRALIDAE Castro, Ng and Ahyong, 2004 following Castro *et al.* (2004).
14. The subfamily ASTHENOGNATHINAE Stimpson, 1858 is at present transferred from the family PINNOTHERIDAE De Haan, 1833 to VARUNIDAE H. Milne Edwards, 1853.
15. The genus *Uca* Leach, 1814 is presently treated under the subfamily UCINAE Dana, 1851.

ARACHNIDA : SPIDER

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INTRODUCTION

Spider is the most common and primitive arthropods around us belong to the class arachnida under the order araneae. They occur almost everywhere, on or near water, inside or on the ground; from the seashore to the tops of the high mountains and dry hot deserts to snow land. Spiders are distributed all over the world and in almost all possible habitats like forest floor, agricultural fields, deserted buildings and habitations. Their other favorite habitats are tree trunks and under stones and logs. Our most familiar spider is dingy house spider.

It is age old belief that spiders are dangerous and their bites are seriously venomous. It is also true that spiders possess venom and their bite injects poison to kill insects and also cause injury to man. This may be true in case of large spiders the tarantula and black widow spiders. Otherwise the spiders are perhaps one of the best friends of man, because they help as biological control agent by feeding on harmful insects. They are recognized as the dominant terrestrial community (Gertsch, 1949). Many of them are of special attention to mankind because of their unique weaving capability to construct orb-webs with silk threads produced by themselves from the silk glands placed in the abdomen.

The spider fauna of Tamil Nadu is not yet extensively studied. First recorded spider in

the state was known from Nilgiri district of the State. Later the workers like Simon, Gravely, Pocock, Tikader, Gajbe and few others recorded spiders from different districts of Tamil Nadu.

CHECK LIST

Class ARACHNIDA

Order ARANEAE

Family I. AGELENIDAE

1. *Agelena* sp.

Family II. ARANEIDAE

2. *Arachnura* sp.
3. *Araneus* sp.
4. *Argiope aemula* (Walckenaer)
5. *Argiope pulchella* Thorell
6. *Cyclosa* sp.
7. *Cyrtophora* sp.
8. *Cyrtarachne* sp.
9. *Eriovixia laglaisei* (Simon)
10. *Gasteracantha geminata* (Fabricius)
11. *Gasteracantha hasselti* C.L. Koch
12. *Neoscona rumpfi* (Thorell)
13. *Neoscona* sp.

Family III. CLUBIONIDAE

14. *Coenoptychus pulcher* (Simon)
15. *Clubiona drassodes* Cambridge
16. *Clubiona hugiscium* Barrion & Litslinger
17. *Clubiona shillongensis* Tikader

18. *Clubiona* sp.
19. *Eutichurus chingliputensis* Majumder & Tikader
20. *Sphingius kambakamensis* (Grav.)
Family IV. CTENIDAE
21. *Acantheis indicus* (Grav.)
22. *Ctenus* sp.
Family V. CTENIZIDAE
23. *Indiops constructor* (Pocock)
Family VI. ERESIDAE
24. *Stegodyphus sarasinorum* Karsch
Family VII. EUSPARASSIDAE
25. *Heteropoda sikkimensis* (Simon)
26. *Cedignatha* sp.
27. *Palystes flavidus* (Simon)
28. *Olios milleti* (Pocock)
29. *Olios obesulus* (Pocock)
30. *Heteropoda kandiana* (Pocock)
Family VIII. GNAPHOSIDAE
31. *Callilepis rukminae* (Tikader & Gajbe)
32. *Eilica tikaderi* (Platnik)
Family IX. HARSILIDAE
33. *Hersilia savignyi* Lucas
34. *Hersilia* sp.
Family X. LINYPHIIDAE
35. *Linyphia urbasaе* Takader
Family XI. LYCOSIDAE
36. *Hippasa* sp.
37. *Hippasa pantherina* (Pocock)
38. *Lycosa bistrata* (Gravely)
39. *Pardosa pseudoannulata* (Bosenberg & Strand)
Family XII. PISAURIDAE
40. *Dolomedes fimbriatus* (Clerk)
Family XIII. MITURGIDAE
41. *Chiracanthium melanostoma* (Thorell)
42. *Chiracanthium* sp.
Family XIV. OXYOPIDAE
43. *Oxyopes birmanicus* Thorell
44. *Oxyopes javanus* Thorell
45. *Oxyopes lineatipus* (Koch)
46. *Oxyopes* sp.
47. *Peucetia viridana* Stoliczka
Family XV. PHOLCIDAE
48. *Crossopriza lyoni* Blackwall
49. *Smeringopus pallidus* Blackwall
Family XVI. SALTICIDAE
50. *Hasarius adansoni* (Audouin)
51. *Menemerus bivittatus* (Dufour)
52. *Myrmarachne plataleoides* (Cambridge)
53. *Phintella vittata* (C.L. Koch)
54. *Plexippus paykulli* (Savigny & Audouin)
55. *Plexippus petersi* (Karsch)
Family XVII. SICARIIDAE
56. *Loxosceles* sp.
Family XVIII. SPARASSIDAE
57. *Heteropoda venatoria* Linnaeus
58. *Olios milleti* Pocock
59. *Stegodyphus sarasinorum* Karsch
Family XIX. TETRAGATHIDAE
60. *Herennia multipuncta* (Doleschall)
61. *Leucauge decorata* (Blackwall)
62. *Opadometa fastigata* (Simon)
63. *Nephila kuhlii* (Doleschall)
64. *Nephila pilipes* (Fabricius)
65. *Tetragathidae* sp.
Family XX. THERAPHOSIDAE
66. *Annandaliella pactinifera* (Gravely)
67. *Annandaliella* sp.
68. *Portia fimbriata* (Doleschall)
Family XXI. THERIDIIDAE
69. *Achaeearanea mundula* C. L. Koch
70. *Chrysso* sp.
Family XXII. THOMISIDAE
71. *Thomisus beautifularis* Basu
Family XXIII. ULOBORIDAE
72. *Zosis genoiculata* (Olivier)

DISCUSSION

Of the total of about 37,000 species of spider under 108 families known from the world, India contains 59 families, 240 genera and 1442 species. The checklist deals with 72

species of spider representing 23 families and 56 genera. The families like Araneidae, Clubionidae, Eresidae, Salticidae and Tetragnathidae are represented by 12, 7, 7, 6 and 6 species respectively.

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ARACHNIDA : ACARINA (MITES) PLANT AND SOIL INHABITING MITES

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INTRODUCTION

Mites belong to the largest and most important and impressive group of tiny animals, the arthropods. Within the Arthropod, mites are the most diverse assemblage under Chelicerata.

Mites are ubiquitous in every possible habitat like aquatic, terrestrial, arboreal and parasitic. They are strong integrators and important indicators of disturbances in all the ecosystems and constitute a major component of biological diversity.

The highest population density and species richness of free living mites occur in the organic strata of soils and they actively take part in decomposition of organic matter. Many of the soil inhabiting mites are predatory in habit, which are sometimes used as biological control agents. Plant inhabiting mites are also very important both as plant feeding pest and predator of other micro invertebrates including mites.

The present paper contains the information available on the plant and soil inhabiting mites known from Tamil Nadu, India. A total of 349 species under 112 genera and 19 families of mites so far described and recorded from plant and soil in Tamil Nadu. So far there is no record of plant and soil inhabiting astigmatid mite from Tamil Nadu.

CHECK LIST

PLANT MITES

Order PROSTIGMATA

Family TETRANYCHIDAE

1. *Aponychus corpuzae* Rimando, 1966
 2. *Aponychus kodaikanalensis* Gupta, 1984
 3. *Bryobia praetiosa* Koch, 1836
 4. *Eotetranychus hypogaeae* Karuppuchamy and Mohansundaram, 1988
 5. *Eotetranychus limonae* Karuppuchamy and Mohansundaram, 1988
 6. *Eutetranychus orientalis* (Klein, 1936)
 7. *Eutetranychus annecke* Meyer, 1974
 8. *Hellenychus umfoloziensis* Meyer, 1974
 9. *Oligonychus indicus* (Hirst, 1923)
 10. *Oligonychus oryzae* (Hirst, 1926)
 11. *Oligonychus ponmanaiensis* Karuppuchamy and Mohansundaram, 1987
 12. *Panonychus citri* (McGregor, 1916)
 13. *Schizotetranychus spiculus* (Baker and Pritchard, 1960)
 14. *Tetranychus urticae* Koch, 1836
 15. *Tetranychus ludeni* Zacher, 1913
- Family TENUIPALPIDAE
16. *Brevipalpus cucurbitae* Mohansundaram, 1982

17. *Brevipalpus euphorbiae*
Mohansundaram, 1982
18. *Breripalpus phoenicis* Geij., 1939
19. *Dolichotetranychus elatariae*
Mohansundaram, 1983
20. *Dolichotetranychus repenae*
Mohansundaram, 1983
21. *Dolichotetranychus tenellae*
Mohansundaram, 1983
22. *Raoiella macfarlanei* Pritchard & Baker,
1958
23. *Raoiella pandanae* Mohansundaram,
1989
24. *Tenuilichus bassiae* Mohansundaram,
1988
25. *Tenuilichus malvae* Mohansundaram,
1988
26. *Tenuilichus striatus* Mohansundaram,
1988
27. *Tenuipalpus acuminatae*
Mohansundaram, 1983
28. *Tenuipalpus coimbatorensis*
Mohansundaram, 1981
29. *Tenuipalpus gharii* Mohansundaram, 1981
30. *Tenuipalpus laminasetae*
Mohansundaram, 1981
31. *Tenuipalpus malligai* Mohansundaram,
1981
32. *Tenuipalpus mallotae* Mohansundaram,
1983
33. *Tenuipalpus tectonae* Mohansundaram,
1981
34. *Tenuipalpus trifoliatae* Mohansundaram,
1983
35. *Tenuipalpus vriddagiriensis*
Mohansundaram, 1983
- Family ERIOPHYIDAE
36. *Abacarus anacardiae* Mohansundaram,
1982
37. *Abacarus asiaticae* Mohansundaram,
1980
38. *Abacarus faliavagrans*
Mohansundaram, 1986
39. *Abacarus gossypii* Mohansundaram, 1982
40. *Acalitus epiphytivrans*
Mohansunderram, 1983
41. *Acalitus meliosmae* Mohansundaram,
1981
42. *Acalitus reticulatae* Mohansundaram,
1981
43. *Acalitus schefflerae* Mohansundaram,
1981
44. *Acaphylla theae* (Watt, 1898)
45. *Acaphylla steinwedeni* Keifer,
Mohansundaram, 1982
46. *Acaphyllisa parindiae* Keifer, 1976
47. *Acarhynchus bamboovagrans*
Mohansundaram, 1989
48. *Aceria achyranthi* Mohanasundaram,
1990
49. *Aceria agallochae* Mohansundaram, 1983
50. *Aceria alangiae* Mohansundaram, 1986
51. *Aceria allophylae* Umapathy and
Mohansundaran, 1998
52. *Aceria antidotalae* (Mohansundaran,
1981)
53. *Aceria apodytae* Umapathy and
Mohansundaran, 1998
54. *Aceria articulate* Umapathy and
Mohansundaran, 1998
55. *Aceria attakattiensis* Umapathy and
Mohansundaran, 1998
56. *Aceria bambusae* Channabasavanna, 1966
57. *Aceria banyani* Mohansunderram, 1983
58. *Aceria bengalensis* Soliman and Abou
Awod, 1977
59. *Aceria boraginae* Mohansundaram, 1982
60. *Aceria cajani* Channabasavana, 1966
61. *Aceria cernus* (Massce, 1927)
62. *Aceria cerochorae* Mohansundaram, 1990
63. *Aceria cheriani* Masee, 1933
64. *Aceria clerodendronis* Farkas, 1960
65. *Aceria commelinae* (Mohansundaran,
1980)
66. *Aceria crotalariae* Channabasavanna,
1966
67. *Aceria dactylonae* Mohansundaram, 1983

68. *Aceria dalbergiae* Channabasavanna, 1966
69. *Aceria delhiensis* (Mohansundaram, 1982)
70. *Aceria dichrostachya* (Tucker, 1926)
71. *Aceria dichotomae* Mohansundaram, 1982
72. *Aceria donacis* Mohansundaram, 1983
73. *Aceria eragrostae* Mohansundaram, 1983
74. *Aceria erythrinae* Channabasavanna, 1966
75. *Aceria gastrotrichus* (Nalepa, 1918)
76. *Aceria granati* (Canestrini & Masalongo, 1894)
77. *Aceria guerreronis* Keifer, 1964
78. *Aceria holopteliae* Channabasavanna, 1966
79. *Aceria infectoriae* Channabasavanna, 1966
80. *Aceria jasmini* Channabasavanna, 1966
81. *Aceria justiciae* Channabasavanna, 1966
82. *Aceria lencophlocae* Mohansundaram, 1983
83. *Aceria litsea* Keifer, 1972
84. *Aceria lycopersici* wolffenstein, 1879
85. *Aceria mallotica* (Mohansundaram, 1980)
86. *Aceria mangiferae* Sayed, 1946
87. *Aceria medicaginis* (Keifer, 1941)
88. *Aceria mori* Keifer, 1939
89. *Aceria nerii* Channabasavanna, 1966
90. *Aceria poae* Mohansundaram, 1994
91. *Aceria polygale*. Mohansundaram, 1982
92. *Aceria pongamiae* Channabasavanna, 1966
93. *Aceria pustulatus* Mohansundaram, 1983
94. *Aceria puttardurii* Channabasavanna, 1966
95. *Aceria ruelliae* Channabasavanna, 1966
96. *Aceria sacchari* Wang, 1964
97. *Aceria sapindi* Channabasavanna, 1966
98. *Aceria setaceus* Mohansundaram, 1983
99. *Aceria sorghii* Channabasavanna, 1966
100. *Aceria trichocnemum* (Nelepa, 1929)
101. *Aceria tulipae* Keifer, 1938
102. *Aceria viddhagiriensis* (Mohansundaram, 1981)
103. *Aceria vitifoliae* Mohansundaram, 1990
104. *Acerimina terminaliae* Keifer, 1974
105. *Aculops acanthae* Mohansundaram, 1982
106. *Aculops betonicae* Mohansundaram, 1980
107. *Aculops boerhaaviae* Mohansundaram, 1982
108. *Aculops extensae* Mohansundaram, 1980
109. *Aculops leguminae* Mohansundaram, 1982
110. *Aculops pittosporae* Mohansundaram, 1982
111. *Aculops privae* Mohanasundaram, 1980
112. *Aculops webpenetrans* Mohanasundaram, 1985
113. *Aculus atturensis* Mahansundaram, 1980
114. *Aculus cassiae* Mondal and Chakraborti, 1981
115. *Aculus ficivagrans* Mohansundaram, 1984
116. *Aculus kolengii* Mohansundaram, 1981
117. *Aculus leptadeniae* Mohansundaram, 1994
118. *Aculus menoni* Channabasavanna, 1966
119. *Aculus montanae* Mahansundaram, 1984
120. *Aculus ocimumae* Mohansundaram, 1991
121. *Aculus pterygospermae* Mahansundaram, 1984
122. *Aculus sarcococcae* Mahansundaram, 1984
123. *Aculus yelagiriensis* Mahansundaram, 1980
124. *Anchiphytus giganticus* Mohansundaram, 1981
125. *Anthocoptes adhatodae* Channabasavanna, 1966
126. *Anthocoptes ayyanari* Mohansundaram, 1981
127. *Anthocoptes bamboovagrans* Mohansundaram, 1991

128. *Anthocoptes pavoniae* Mohansundaram, 1981
129. *Anthocoptes rutacevagrans* Mohansunderram, 1983
130. *Anthocoptes tectonae* Mohansundaram, 1981
131. *Anthocoptes vitexae* Mohansundaram, 1981
132. *Anthocoptes walayarensis* Mohansundaram, 1981
133. *Anothopoda deviarensis* Mohansundaram, 1981
134. *Anothopoda fici* Mohanasundaram, 1982
135. *Anothopoda wightianae* Mohansundaram, 1981
136. *Artaeris vadalurensis* Mohansunderram, 1983
137. *Asetadiptacus carmonae* Umapathy and Mohansundaram, 2002
138. *Calacarus capsica* Chakraborti and Mondal, 1980
139. *Calacrus carinatus* (Green, 1890)
140. *Calacrus channabasavannae* Lakkundi, 1974
141. *Calacarus citrifolii* Keifer, Mohansundaram, 1982
142. *Calacarus jasmini* Chakrabarti and Mondal, 1979
143. *Calacarus malvae* Mohansundaram, 1983
144. *Calacarus malvavagrans* Mohansundaram, 1986
145. *Calacarus millingtoniae* Mohansundaram, 1982
146. *Calacarus palmae* Mohansundaram, 1994
147. *Calacarus quisqualis* Chakrabarti and Mondal, 1980
148. *Calepitrimerus asperrimae* Mohansundaram, 1982
149. *Calepitrimerus azadirachtae* Channabasavanna, 1966
150. *Catarhinus munnarensis* Mohansundaram, 1991
151. *Cisaberoptes kenyae* Keifer, 1966
152. *Cheiracus sulcatus* Mohansundaram, 1981
153. *Colopodacus bengalensis* Mohansundaram, 1981
154. *Colopodacus eugeniae* Mohansundaram, 1981
155. *Colopodacus gynalaxtae* Mohansundaram, 1981
156. *Colopodacus kallari* Mohansundaram, 1986
157. *Colopodacus walayarensis* Mohansundaram, 1981
158. *Disella granulacoxae* Mohansundaram, 1986
159. *Disella vagrans* Mohansundaram, 1986
160. *Ditrymacus integrifoliae* Mohansundaram, 1982
161. *Ditrymacus keiferi* Mohansundaram, 1982
162. *Ectomerus chebulae* Mohansundaram, 1980
163. *Epitrimerus azimae* Mohansundaram, 1982
164. *Epitrimerus morindne* Mohansunderram, 1983
165. *Epitrimerus parasakthi* Mohansundaram, 1983
166. *Eriophyes acaciae* Mohanasundaram, 1981
167. *Eriophyes alangii* Nalepa, 1929
168. *Eriophyes antidotalae* Mohansundaram, 1980
169. *Eriophyes canthii* Channabasavanna, 1966
170. *Eriophyes cernuus* Masee, 1933
171. *Eriophyes cheriani* Masee, 1933
172. *Eriophyes cymbopogonis* Mohansundaram, 1978
173. *Eriophyes cyperi* Channabasavanna, 1966
174. *Eriophyes ensifoliae* Mohansundaram, 1989
175. *Eriophyes euphorbiae* Mohansundaram, 1983
176. *Eriophyes ficivorus* Channabasavannay, 1966
177. *Eriophyes mallotica* Mahansundaram, 1980

188. *Eriophyes morindae* (Mohansundaram)
1981
189. *Eriophyes plectroniae* Mohansundaram,
1983
180. *Eriophyes rotundae* Mohansundaram,
1983
181. *Eriophyes terminaliae* Chamabasavanna,
1966
182. *Eriophyes vriddhagiriensis*
Mohansundaram, 1980
183. *Floracarus engenifoliae* Mohansundaram,
1981
184. *Floracarus pallachiensis*
Mohansundaram, 1980
185. *Floracarus salvifoliae* Mohansundaram,
1981
186. *Floracarus siruvaniensis*
Mohansundaram, 1981
187. *Floracarus sivakumarii* Mohansundaram,
1981
188. *Hemiscolosenus rares* Moahansundaram,
1986
189. *Keiferophyes avicenniae*
Mohansundaram, 1983
190. *Knorella bambusae* (Kuang & Feng, 1989)
[Synonymy = *Knorella fuzhoui* New
Name, 1993]
191. *Levonga attakattiensis* Umapathy and
Mohansundaran, 2002
192. *Mackiella borasis* Mohansundaram, 1981
193. *Metaculus foveolatae* Mohansundaram,
1983
194. *Metaculus mangiferae* (Alliah, 1955)
195. *Metaculus sapindiphagus*
Mohansundaram, 1982
196. *Monotrimacus quadrangulari*
Mohansundaram, 1982
197. *Neocalacarus mangiferae*
Channabasavanna, 1966
198. *Neocecidophyes mallotivagrans*
Moahansundaram, 1980
199. *Neocolopodacus muruganii*
Moahansundaram, 1986
200. *Neocosella ichnocarpae* Mohansundaram,
1981
201. *Neodialox palmyrae* Mohansundaram,
1983
202. *Neodicrothrix piprae* Mohansundaram,
1989
203. *Neomesalox bauhiniae* Mohansundaram,
1983
204. *Neomesalox kallarensis* Mohansundaram,
1983
205. *Neophantacarus mallotus*
Mohansundaram, 1980
206. *Neophytoptus ocimae* Mohansundaram,
1981
207. *Neorhynacus rajendrani*
Mohansundaram, 1981
208. *Neotegonotus fastigatus* (Nalepa, 1890)
(Keifer, 1966)
209. *Nothopoda kallarensis* Mohansundaram,
1981
210. *Notostrix attenuate* (Keifer, 1963)
211. *Notostrix flabelliferae* Mohansundaram,
1982
212. *Nyboderus globosus* Mohansundaram,
1981
213. *Paracaphylla streblae* Mohansundaram,
1983
214. *Paraphytoptus alangiae*
Mohansundaram, 1984
215. *Paraphytoptus champacae*
Mohansundaram, 1984
216. *Paraphytoptus cristatae*
Mohansundaram, 1984
217. *Paraphytoptus chrysanthemi* Keifer, 1940
218. *Paraphytoptus crotalariphagus*
Mohansundaram, 1984
219. *Paraphytoptus elaeocarpae*
Mohansundaram, 1984
220. *Paraphytoptus erinevagrans*
Mohansundaram, 1984
221. *Paraphytoptus jujubae* Mohansundaram,
1989
222. *Paratetra elephantae* Mohansundaram,
1981
223. *Paratetra integrifoliavagrans*
Mohansundaram, 1983

224. *Phyllocoptes acaciae* Mohansundaram, 1983
225. *Phyllocoptes aliyamagarensis* Mohansundaram, 1981
226. *Phyllocoptes asperaevagrans* Mohansundaram, 1981
227. *Phyllocoptes ficivagrans* Mohanasundaram, 1982
228. *Phyllocoptes immigrans* Keifer, 1940
229. *Phyllocoptes indicae* Mohansundaram, 1981
230. *Phyllocoptes simplicifoliae* Mohansundaram, 1981
231. *Phyllocoptruta odayarae* Mohanasundaram, 1980
232. *Phyllocoptruta odinae* Mohansundaram, 1983
233. *Phyllocoptruta oleivorus* (Ashmead, 1879) (Keifer, 1938)
234. *Phytoptus alangii* (Nalepa, 1929)
235. *Phytoptus eletariae* Moahnsundaram, 1981
236. *Phytoptus glycosmisae* Mohansudaram, 1981
237. *Phytoptus lantanae* Mohansundaram, 1981
238. *Phytoptus laurae* Mohansundaram, 1981
239. *Phytoptus morindae* Mohansundaram, 1981
240. *Phytoptus rosae* Mohansundaram, 1981
241. *Phytoptus rubifoliae* (Channabasavanna, 1966)
242. *Phytoptus subbaraoi* Mohansundaram, 1981
243. *Procalacarus aliyarensis* Mohansundaram, 1983
244. *Proneotegonotus antiquorae* Mohansundaram, 1983
245. *Rhombacus morrisi* Mohansundaram, 1991
246. *Tegolophus coimbatorensis* Mohansundaram, 1983
247. *Tegolophus gmelinae* Mohansundaram, 1983
248. *Tegolophus securinegavagrans* Mohansundaram, 1985
249. *Tegonotus convolvuli* Channabasavanna, 1966)
250. *Tegonotus cardiavagrans* [= present assignment : *Scheutchenkella cardiavagrans* (Mohansundaram, 1982) New Combination
251. *Tegonotus convolvuli* Mohansundaram, 1991
252. *Tegonotus parviflorae* Mohansundaram, 1981
253. *Tetra coimbatorensis* Mohansundaram, 1994
254. *Tetra tephrosiae* Mohansundaram, 1983
255. *Vasates caisiae* Mohansundaram, 1982
256. *Vasates dhodabettaensis* Mohansundaram, 1983
- Family RHYNCAPHYTOPTIDAE
257. *Diptilomiopus alagaralaiensis* Mohansundaram, 1986
258. *Diptilomiopus alangii* Mohansundaram, 1982
259. *Diptilomiopus artocarpae* Mohansundaram, 1981
260. *Diptilomiopus camerae* Mohansundaram, 1981
261. *Diptilomiopus cocculae* Mohansundaram, 1981
262. *Diptilomiopus cumunis* Chakraborti, Ghosh and Das, 1992
263. *Diptilomiopus guajavae* Mohansundaram, 1985
264. *Diptilomiopus integrifoliae* Mohansundaram, 1981
265. *Diptilomiopus jevremovici* Keifer, 1960
266. *Diptilomiopus knorri* Keifer, 1974
267. *Diptilomiopus maduraiensis* Moahansundaram, 1986
268. *Diptilomiopus thangaveli* Mohansunderram, 1983
269. *Hyborhinus kallarensis* Moahansundaram, 1986

Family TARSONEMIDAE

270. *Ogmotarsonemus oryzae*
Mohansundaram, 1996
271. *Parasteneotarsonemus panici*
Mohansudaram, 1986
272. *Steneotarsonemus aristidae*
Mohansudaram, 1986
273. *Steneotarsonemus furcatus* de Leon, 2006

Family CUNAXIDAE

274. *Cunaxa eupatoria* Chinniah and
Mohansundaram, 2001

Order MESOSTIGMATA

Family AMEROSEIIDAE

275. *Neocypholaelaps pradhani* Gupta, 1969

Family PHYTOSEIIDAE

276. *Amblyseius (Amblyseius) deleoni* Muma
& Denmark, 1970
277. *Amblyseius (Amblyseius) largoensis*
(Muma, 1955)
278. *Amblyseius (Amblyseius) rhabdus*
Denmark, 1965
279. *Amblyseius (Amblyseius)*
muraleedharani Gupta, 1985
280. *Amblyseius (Euseius) alstoniae* Gupta,
1975
281. *Amblyseius (Euseius) bambusae* Ghai and
Menon, 1967
282. *Amblyseius (Euseius) coccineae* Gupta,
1975
283. *Amblyseius (Euseius) coccosocius* Ghai
and Menon, 1967
284. *Amblyseius (Euseius) kodaikanalensis*
(Gupta, 1978)
285. *Amblyseius (Euseius) neococcineae*
Gupta, 1978
286. *Amblyseius (Euseius) ovalis* (Evans, 1953)
287. *Amblyseius (Euseius) sacchari* Ghai and
Menon, 1967
288. *Amblyseius (Neoseiulus) fraterculus*
Berlese, 1917
289. *Amblyseius (Neoseiulus) longispinosus*
(Evans, 1952)
290. *Amblyseius (Paraphytoseius) carmarae*
Chinniah and Mohansundaram, 2001

291. *Amblyseius (Paraphytoseius)*
multidentatus (Swirski and Shechter,
1961)
292. *Amblyseius (Typhlodromalus)*
chikmagalurensis Gupta, 1985
293. *Amblyseius (Typhlodromalus)*
chitradurgae Gupta, 1985
294. *Amblyseius (Typhlodromalus)*
kalimpongensis Gupta, 1970
295. *Amblyseius (Typhlodromalus)*
neocrotalariae (Gupta, 1978)
296. *Indoseiulus ricini* (Ghai and Menon, 1969)
297. *Paraphytoseius (Paraphytoseius)*
bhadrakaliensis (Gupta, 1970)
298. *Phytoseius (Dubininellus) roseus* Gupta,
1969
299. *Phytoseius (Pennaseius) kapuri* Gupta,
1969
300. *Phytoseius (Pennaseius) punicae*
Chinniah and Mohansundaram, 2001
301. *Phytoseius (Phytoseius) strobilanthae*
Chinniah and Mohansundaram, 2001
302. *Terminalichus psidi* Mohansundaram,
1983
303. *Typhlodromus (Amblydromella) eharai*
Gupta, 1980
304. *Typhlodromus (Amblydromella) homalii*
Gupta, 1970
305. *Typhlodromus (Amblydromella)*
kodaikanalensis Gupta, 1978
306. *Typhlodromus (Clavidromus)*
neotransvaalensis Gupta, 1978
307. *Typhlodromus (Orientiseius)*
channabasavannai Gupta, 1978
308. *Typhlodromus (Orientiseius) rickeri*
Chant, 1960
309. *Typhlodromus (Typhlodromus)*
communis Gupta, 1980

SOIL MITES

Order MESOSTIGMATA

Family ASCIDAE

310. *Asca pseudospicata* Bhattacharyya, 1965
- Family DERMANISSIDAE
311. *Hypoaspis vacua* (Michael, 1891)

312. *Hypoaspis minor* Costa, 1968
Family EVIPHIDAE
313. *Eviphis cultratellus* (Berlese, 1910)
314. *Eviphis indicus* Bhattacharyya, 1971
Family MACROCHELIDAE
315. *Glypholaspis americana* (Berlese, 1888)
316. *Glypholaspis asperrima* (Berlese, 1905)
317. *Glypholaspis fimicola* (Berlese, 1882)
318. *Glypholaspis orientalis* Iavorschi, 1980
319. *Holostaspella bifoliata* (Tragardh, 1952)
320. *Macrocheles decanensis* Roy, 1988
321. *Macrocheles glaber* (Miiller, 1860)
322. *Macrocheles hastatus* (Linnaeus, 1767)
323. *Macrocheles himalayensis* Roy, 1988
324. *Macrocheles kamengensis* Roy, 1988
325. *Macrocheles kraepelini* (Berlese, 1905)
326. *Macrocheles limue* Samsnak, 1962
327. *Macrocheles merdarius* (Berlese, 1889)
328. *Macrocheles palniensis* Roy, 1991
329. *Macrocheles penicilliger* (Berlese, 1904)
330. *Macrocheles peniculatus* Berlese, 1918
331. *Macrocheles peregrinus* Krantz, 1981
332. *Macrocheles perglaber* Filipponi and Pegazzano, 1962
333. *Macrocheles scutatus* (Berlese, 1904)
334. *Macrocheles vicinus* Leitner, 1946
Family PACHYLAELAPTIDAE
335. *Pachylaelaps dorsalis* Bhattacharyya, 1970
336. *Pachylaelaps femoralis* Bhattacharyya, 1970
337. *Pachylaelaps evansi* Costa, 1967
338. *Pachylaelaps orientalis* Petrova, 1967
Family PARHOLASPIDAE
339. *Gamasholaspis browringi* (Bregetova & Koroleva)
340. *Gamasholaspis incisus* Petrova and Tascavea
341. *Krantzholaspis* sp.
Family UROPODIDAE
342. *Uropoda discus* Hirschmann and Zirngiebl-Nicol, 1969
Family VEIGAIIDAE
343. *Veigaia uncata* Farrier, 1957
Order CRYPTOSTIGMATA
Family AUSTRACHIPTERIIDAE
344. *Lamellebates (Lamellebates) molecula molecula* (Berlese, 1916)
Family SCHELOBATIDAE
345. *Scheloribates (Scheloribates) madrasensis* Anantharaman, 1951
Family GALUMNIDAE
346. *Galumna (Galumna) nilgiria* Ewing, 1910
347. *Galumna (Galumna) tessellate* Ewing, 1910
348. *Galumna (Galumna)* sp.
349. *Vaghia blascoi* Trave, 1981

DISCUSSION

The checklist deals with 349 species of plants and soil inhabiting mite representing three orders viz., prostigmata, mesostigmata and cryptostigmata, 19 families and 102 genera. The plant mite comprises of two orders, 8 families, 97 genera and 309 species. Similarly soil inhabiting mite includes two orders, 11 families, 15 genera and 40 species (Table 1). The genus *Aceria* is represented in Tamil Nadu by highest number of species (56). The other dominant genera are *Amblyseius* (20), *Eriophes* (17), *Macrocheles* (16), *Diptilomiopus* (12) and *Aculus* (11). Other genera known in the state are represented by species having number from one to ten. The present report shows that extensive studies on plant mites of the state have been done, but the soil mite fauna is still meagerly known and the studies on these mites are urgently needed.

Table 1. Number of Plant and soil Mite Taxa known from Tamil Nadu

ORDER	PLANT MITES			SOIL MITES		
	Family	No. of Genus	No. of Species	Family	No. of Genus	No. of Species
PROSTIGMATA	Tetranychidae	09	15	Nil	Nil	Nil
	Tenuipalpidae	05	20			
	Eriophyidae	60	221			
	Rhyncaphyoptidae	12	13			
	Tarsonemidae	03	04			
	Cunaxidae	01	01			
MESOSTIGMATA	Amerosiidae	01	01	Ascidae	01	01
	Phytoseiidae	06	34	Dermanissidae	01	01
				Eviphidae	01	02
				Macrochelidae	03	21
				Pachylaelaptidae	01	04
				Parholaspidae	02	03
				Uropodidae	01	01
				Veigaiidae	01	01
CRYPTOSTIGMATA	Nil	Nil	Nil	Austrachipteriidae	01	01
				Scheloribatidae	01	01
				Galumnidae	02	04

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ARACHNIDA : ACARINA (TICKS)

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INTRODUCTION

The ticks are small group of organisms under the subclass Acarina and the order Metastigmata or Ixodoidea. They are found to occur throughout the world, but more frequently encountered in tropical and subtropical realms.

The ticks show typical morphological characters of acari with a major difference in their greater size (2000 to over 30,000 μm). Besides, there are certain characters which are present and distinct throughout the ontogeny of ticks. A hypostome armed with retrose teeth helps to anchor the tick to its host. A complex sensory setal field, Haller's organ, is located on the dorsal side of tarsus-I in all postembryonic stages, providing sites for contact or olfactory chaemoreception. Other distinguishing features include, a pair of stigmata situated posterior to coxa IV or dorsal to coxa III-IV, palp with only three or four segments, chelicera 2 segmented, digits of chelicerae working in horizontal plane with their dentate faces directed externally.

The member of the order metastigmata is grouped into three families viz., Argasidae or soft tick, Ixodidae or hard tick and Nuttalliellidae (known only from Africa).

The argasid ticks are non-scutate with leathery integument and capitulum inferior in the nymphs and adults, light sexual dimorphism, spiracles small and anterior to coxa IV and pads, porose areas and festoon absent. The Ixodid ticks are scutate with terminal capitulum, distinct sexual dimorphism,

spiracles posterior to coxa IV and pads, porose areas and festoons present.

The ticks live as ectoparasite of vertebrates and feed obligatorily on the blood of mammals, birds and reptiles. Some of them are significant pests of man and animals. They are responsible for causing paralysis and anemia and serve as reservoirs and vectors for many infective viruses, rickettsias, bacteria, sporozoons and spirochaetes. The well known Kysanur Forest Disease of man and monkeys in Karnataka state, India is caused by the vector parasite tick. Many arboviruses have also been isolated from ticks in India. They are oviparous and their life cycle passes through egg, larva, nymph and adult stages.

The metastigmata is a small group in comparison to other acarine orders, comprising a little more than 800 species from all over the world.

The Indian tick was first described by Linnaeus in 1758. It is known that 21 species of Argasid ticks under three genera and 86 species of Ixodid ticks under nine genera occur in India. The first record of tick from Tamil Nadu was made by Nuttall and Warburton (1915).

CHECK LIST

Class ARACHNIDA

Subclass ACARINA

Order METASTIGMATA

Family ARGASIDAE

1. *Argas (Persicargas) robertsi* (Oken, 1818)

Family IXODIDAE

2. *Amblyomma integrum* Karsh, 1879
3. *Amblyomma mudaliari* Rao, Hiregaudar and Alwar, 1964
4. *Aponormma gervasi* (Lucas, 1847)
5. *Aponormma leave* Neumann, 1899
6. *Aponormma pattoni* Neumann, 1899
7. *Boophilus microplus* (Canestrini, 1897)
8. *Boophilus (Uroboophilus) indicus* Mining, 1936
9. *Haemaphysalis bispinosa* Neumann, 1897
10. *Haemaphysalis flava* Neumann, 1897
11. *Haemaphysalis (Haemaphysalis) indoflava* Dhanda and Bhat, 1968
12. *Haemaphysalis intermedia* Warburton and Nuttall, 1909
13. *Haemaphysalis leachi* (Andouin, 1827)
14. *Haemaphysalis (Kaiseriana) spinigera* Neumann, 1897
15. *Haemaphysalis (Kaiseriana) turturis* Nuttall and Warburton, 1915
16. *Hyalomma aegyptium isaaci* Sharif, 1928
17. *Hyalomma excavatum* Koch,
18. *Hyalomma (Hyalomma) var. brevipunctata hussaini* Sharif, 1928
19. *Hyalomma (Hyalomina) brevipunctata* Sharif, 1928
20. *Hyalomma (Hyalomma) hussaini* Sharif, 1928
21. *Rhipicephalus haemaphysaloides* (Supino, 1897)
21. *Rhipicephalus sanguineus* (Latreille, 1806)
22. *Rhipicephalus turanicus* Powerantzev, 1940
23. *Rhipicephalus annulatis* Neumann, 1897
24. *Rhipicephalus bursa* Canestrini and Fanzago, 1878
25. *Rhipicephalus simus* Koch, 1844

DISCUSSION

The checklist includes 24 species under five genera of ixodid tick and only one species belonging to the genera *Argas* under Argasidae from the State. Out of six genera of both soft and hard ticks, *Haemaphysalis* contains maximum number (7) of species. The other two dominant genera are *Rhipicephalus* (6) and *Hyalomma* (5). The present report shows that studies on tick in Tamil Nadu are not yet extensively done, it needs proper attention.

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MARINE AND ESTUARINE FISH

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Tamil Nadu is the southern most state of the Indian Peninsula, located mainly on the east coast of our country on the bank of the Bay of Bengal. It has a coastal line of 1000 km. Out of that 940 km are spread over in the eastern side and the rest 60 km lies on the western coast of our country. This state is bordered by Andhra Pradesh in the north, Karnataka and Kerala in the west, the Bay of Bengal in the east and in the south of this state is the Indian Ocean which is extended up to the surrounding of the Antarctic continent on its eastern part. This state has 10 coastal districts, out of which Ramanathapuram has the longest coastal line of 271 km. Among the coastal districts, Ramanathapuram has the highest annual fish landing centers contributing about 23.40% of the total fish landings of the state. Among the four segments of Tamil Nadu's coastal line, the Palk Bay and the Coromandel coast stands first and second position in the fish landings with 37.21% and 27.67% respectively in the total fish landings of the state. The state has an exclusive economic zone (EEZ) up to 200 nautical miles from the shore, which is 0.19 lakh sq km.

Fishing season of this state is more or less uniform as a whole, though September is the most productive month of the year and July stands second next to September in the contribution of the fish landings of the state. Mechanised boats comprise 20% of the total number of crafts in the state, contributing 57.17 % of the total marine fish landings of the state. The traditional crafts comprise of 80 % of the total number of the crafts in this state, contributing almost 40% of the total fish catch of this state.

The 1000 km. long coastline of this state has been surveyed covering almost all the major fish landing centers. The present study is the consolidated work of our exploration for the marine and estuarine fish resources of all the 10 coastal districts in addition to the fishes already known to occur in the state through published literature. Altogether 789 species under 147 families and 25 orders has been included in this present work from this state. A brief description of all the families, along with the systematic key to the families, genera and species has been furnished in this study. Remarks or systematic notes of some species are also included in this work. Common English name of the species has been incorporated against each species in the text, where the English name is known. The literature consulted during this study has been included in the bibliography section of this work.

SYSTEMATIC LIST OF MARINE AND ESTUARINE FISHES

Class I CHONDRICHTHYES

Order 1 ORECTOLOBIFORMES

Family 1 HEMISCYLLIDAE

1. *Chiloscyllium griseum* Muller & Henle
2. *C. indicum* (Gmelin)
3. *C. plagiosum* (Bennett)
4. *C. punctatum* Muller and Henle

Family 2 STEGOSTOMATIDAE

5. *Stegostoma fasciatum* (Hermann)

Family 3 GINGLYMOSTOMATIDAE

6. *Nebrius ferrugineus* (Lesson)

- Family 4 RHINCODONTIDAE
 7. *Rhincodon typus* Smith
 Order 2 LAMNIFORMES
 Family 5 ODONTASPIDIDAE
 8. *Carcharias tricuspidatus* Day
 Family 6 ALOPIIDAE
 9. *Alopias vulpinus* (Bonnaterre)
 Family 7 LAMNIDAE
 10. *Isurus oxyrinchus* Rafinesque
 Order 3 CARCHARHINIFORMES
 Family 8 SCYLORHINIDAE
 11. *Atelomycterus marmoratus* (Bennett)
 Family 9 TRIAKIDAE
 12. *Mustelus mosis* Hemprich and Ehrenberg
 Family 10 PROSCYLLIDAE
 13. *Eridacnis radcliffei* Smith
 Family 11 HEMIGALEIDAE
 14. *Chaenogaleus macrostoma* (Bleeker)
 15. *Hemigaleus microstoma* Bleeker
 16. *Hemipristis elongata* (Klunzinger)
 Family 12 CARCHARHINIDAE
 17. *Carcharhinus dussumieri* (Valenciennes)
 18. *C. hemiodon* (Valenciennes)
 19. *C. limbatus* (Valenciennes)
 20. *C. macroti* (Muller and Henle)
 21. *C. melanopterus* (Quoy and Gaimard)
 22. *C. sorrah* (Valenciennes)
 23. *Galeocerdo cuvier* (Peron and Le Sueur)
 24. *Lamiopsis temmincki* (Muller and Henle)
 25. *Loxodon macrorhinus* (Muller and Henle)
 26. *Negaprion acutidens* (Ruppell)
 27. *Rhizoprionodon acutus* (Ruppell)
 28. *R. oligolinx* Springer
 29. *Scoliodon laticaudus* Muller and Henle
 Family 13 SPHYRNIDAE
 30. *Eusphyra blochii* (Cuvier)
 31. *Sphyrna lewini* (Cuvier, Griffith and Smith)
 32. *S. zygaera* (Linnaeus)
 Order 4 PRISTIFORMES
 Family 14 PRISTIDAE
 33. *Anoxypristis cuspidata* (Latham)
 34. *Pristis microdon* Latham
 35. *P. zijsron* Bleeker
 Order 5 TORPEDINIFORMES
 Family 15 TORPEDINIDAE
 36. *Torpedo panthera* Olfers
 Family 16 NARCINIDAE
 37. *Narcine brunnea* Annandale
 38. *N. indica* Henle
 39. *N. timlei* (Bloch and Schneider)
 Family 17 NARKIDAE
 40. *Narke dipterygia* (Bloch & Schneider)
 Order 6 RAJIFORMES
 Family 18 RHINOBATIDAE
 41. *Rhinobatos granulatus* Cuvier
 42. *R. obtusus* Muller and Henle
 43. *R. thouniana* (Shaw)
 44. *R. variegatus* Nair and Mohan
 Family 19 RHYNCHOBATIDAE
 45. *Rhina ancylostoma* Schneider
 46. *Rhynchobatus djiddensis* (Forsskal)
 Order 7 MYLIOBATIFORMES
 Family 20 MYLIOBATIDAE
 47. *Aetobatus narinari* (Euphrasen)
 48. *Aetomylaeus maculatus* (Gray)
 49. *Aetomylaeus nichofii* (Schneider)
 Family 21 RHINOPTERIDAE
 50. *Rhinoptera adpersa* Kuller and Henle
 51. *R. javanica* Muller and Henle
 Family 22 MOBULIDAE
 52. *Manta birostris* (Dandoff)
 53. *Mobula eregoodootenkee* German
 Family 23 DASYATIDAE
 54. *Dasyatis bleekeri* (Blyth)
 55. *D. kuhlii* (Muller and Henle)
 56. *D. zugei* (Muller and Henle)
 57. *Himantura fava* (Annandale)
 58. *H. imbricata* (Schneider)
 59. *H. marginatus* (Blyth)
 60. *H. uarnak* (Forsskal)
 61. *H. walga* (Muller and Henle)
 62. *Pastinachus sephen* (Forsskal)

63. *Urogymnus asperrimus* (Bloch and Schneider)

Family 24 GYMNURIDAE

64. *Gymnura japonica* (Schlegel)
65. *G. micrura* (Bloch & Schneider)
66. *G. poecilura* (Shaw)

Class II OSTEICHTHYES

Order 8 ELOPIFORMES

Family 25 ELOPIDAE

67. *Elops machnata* (Forsskal)

Family 26 MEGALOPIDAE

68. *Megalops cyprinoides* (Broussonet)

Family 27 ALBULIDAE

69. *Albula vulpes* (Linnaeus)

Order 9 ANGUILLIFORMES

Family 28 ANGUILLIDAE

70. *Anguilla bengalensis bengalensis* (Gray and Hardwicke)

71. *A. bicolor bicolor* McClelland

Family 29 MORINGUIDAE

72. *Moringua raitaborua* (Hamilton)

Family 30 MURAENIDAE

73. *Echidna nebulosa* (Ahl)
74. *E. zebra* (Shaw and Nodder)
75. *Gymnothorax punctata* (Bloch & Schneider)
76. *G. reticularis* Bloch
77. *Lycodontis favagineus* (Bloch & Schneider)

78. *L. undulatus* (Lacepede)

79. *Siderea picta* (Ahl)

80. *S. thyrsoidea* (Richardson)

81. *Strophidon sathete* (Hamilton)

Family 31 OPHICHTHIDAE

82. *Bascanichthys deraniyagalai* Menon

83. *Lamnostoma orientalis* (McClelland)

84. *Ophichthus apicalis* Bennett

85. *O. cephalozona* (Bleeker)

86. *O. microcephalus* Day

87. *Pisodonophis boro* (Hamilton)

88. *P. cancrivorus* (Richardson)

Family 32 CONGRIDAE

89. *Ariosoma anago* (Temminck & Schlegel)

90. *A. gnanadossi* Talwar and Mukherji

91. *Uroconger lepturus* (Richardson)

Family 33 MURAENESOCIDAE

92. *Congresox talabon* (Cuvier)

93. *C. talabonoides* (Bleeker)

94. *Muraenesox bagio* (Hamilton)

95. *M. cinereus* (Forsskal)

Order 10 CLUPEIFORMES

Family 34 CLUPEIDAE

96. *Amblygaster clupeoides* Bleeker

97. *A. sirm* (Walbaum)

98. *Anodontosoma chacunda* (Hamilton)

99. *Dussumieria acuta* Valenciennes

100. *D. elopsoides* Bleeker

101. *Ehirava fluviatilis* Deraniyagala

102. *Escualosa thoracata* (Valenciennes)

103. *Hilsa kelee* (Cuvier)

104. *Nematalosa galathea* Nelson & Rothman

105. *N. nasus* (Bloch)

106. *Sardinella albella* (Valenciennes)

107. *S. brachysoma* (Steindachner)

108. *S. dayi* Regan

109. *S. fimbriata* (Valenciennes)

110. *S. gibbosa* (Bleeker)

111. *S. longiceps* Valenciennes

112. *S. melanura* (Cuvier)

113. *S. sindensis* (Day)

114. *Tenua losa ilisha* (Hamilton)

115. *T. toli* (Valenciennes)

Family 35 PRISTIGASTERIDAE

116. *Ilisha elongata* (Bennett)

117. *I. filigera* (Valenciennes)

118. *I. kampeni* (Weber and de Beaufort)

119. *I. megaloptera* (Swainson)

120. *I. melanostoma* (Schneider)

121. *I. obfuscata* Wongratana

122. *I. sirishai* Seshagiri Rao

123. *I. striatula* Wongratana

124. *Opisthopterus tardoore* (Cuvier)

125. *Pellona dayi* Wongratana
 126. *P. ditchella* Valenciennes
 127. *Raconda russeliana* Gray

Family 36 ENGRAULIDIDAE

128. *Coilia dussumieri* Valenciennes
 129. *C. neglecta* Whitehead
 130. *C. reynaldi* Valenciennes
 131. *Encrasicholina heteroloba* (Ruppell)
 132. *Setipinna taty* (Valenciennes)
 133. *S. tenuifilis* (Valenciennes)
 134. *Stolephorus andhraensis* Babu Rao
 135. *S. baganensis* Hardenberg
 136. *S. commersonii* Lacepede
 137. *S. indicus* (van Hasselt)
 138. *S. insularis* Hardenberg
 139. *S. waitei* Jordon and Seale
 140. *Thryssa dayi* Wongratana
 141. *T. dussumieri* (Valenciennes)
 142. *T. hamiltoni* (Gray)
 143. *T. malabarica* (Bloch)
 144. *T. mystax* (Schneider)
 145. *T. polybranchialis* Wongratana
 146. *T. purava* (Hamilton)
 147. *T. setirostris* (Broussonet)
 148. *T. vitrirostris* (Gilchrist and Thomson)

Family 37 CHIROCENTRIDAE

149. *Chirocentrus dorab* (Forsskal)
 150. *C. nudus* Swainson

Order 11 GONORYNCHIFORMES

Family 38 CHANIDAE

151. *Chanos chanos* (Forsskal)

Order 12 SILURIFORMES

Family 39 ARIIDAE

152. *Arius arius* (Hamilton)
 153. *A. caelatus* Valenciennes
 154. *A. crossocheilus* Bleeker
 155. *A. dussumieri* (Valenciennes)
 156. *A. jella* Day
 157. *A. maculatus* (Thunberg)
 158. *A. platystomus* Day

159. *A. sagor* (Hamilton)
 160. *A. sona* (Hamilton)
 161. *A. subrostratus* (Valenciennes)
 162. *A. tenuispinis* Day
 163. *A. thalassinus* (Ruppell)
 164. *Batrachocephalus mino* (Hamilton)
 165. *Osteogeneisus militaris* (Linnaeus)

Family 40 PLOTOSIDAE

166. *Plotosus canius* Hamilton
 167. *P. limbatus* Valenciennes
 168. *P. lineatus* (Thunberg)

Order 13 AULOPIFORMES

Family 41 SYNODIDAE

169. *Saurida gracilis* (Quoy & Gaimard)
 170. *S. micropectoralis* Shindo and Yamda
 171. *S. pseudotumbil* Dutt & Sagar
 172. *S. tumbil* (Bloch)
 173. *S. undosquamis* (Richardson)
 174. *Synodus indicus* (Day)
 175. *S. variegatus* (Lacepede)
 176. *Trachinocephalus myops* (Schneider)

Family 42 HARPADONTIDAE

177. *Harpadon nehereus* (Hamilton)

Order 14 GADIFORMES

Family 43 BREGMACEROTIDAE

178. *Bregmaceros maclellandi* Thompson

Order 15 OPHIDIFORMES

Family 44 OPHIDIIDAE

179. *Brotula multibarata* (Temminck and Schlegel)

Family 45 CARAPIDAE

180. *Carapus homei* (Richardson)

Family 46 BATHYTIDAE

181. *Hepthocara simum* Alcock

Order 16 BATRACHOIDIFORMES

Family 47 BATRACHOIDIDAE

182. *Austrobatrachus dussumieri*
 (Valenciennes)

Order 17 LOPHIIFORMES

Family 48 LOPHIIDAE

183. *Lophiodes mutilus* (Alcock)

Family 49 ANTENNARIIDAE

184. *Antennarius hispidus* (Bloch & Schneider)

185. *A. nummifer* (Cuvier)

Family 50 OGCOCEPHALIDAE

186. *Haliutaea stellata* (Vahl)

Order 18 BELONIFORMES

Family 51 EXOCOETIDAE

187. *Cheilopogon cyanopterus* (Valenciennes)

188. *C. furcatus* (Mitchill)

189. *C. nigricans* (Bennett)

190. *C. spilopterus* (Valenciennes)

191. *Cypselurus oligolepis* (Bleeker)

192. *C. poecilopterus* (Valenciennes)

193. *Exocoetus monocirrhus* Richardson

194. *E. volitans* Linnaeus

195. *Hirundichthys coromandelensis* (Hornell)

196. *H. oxycephalus* (Bleeker)

197. *Parexocoetus mento* (Valenciennes)

198. *Prognichthys brevipinnis* (Valenciennes)

Family 52 HEMIRAMPHIDAE

199. *Euleptorhamphus viridis* (van Hasselt)

200. *Hemiramphus far* (Forsskal)

201. *H. lutkei* (Valenciennes)

202. *Hyporhamphus dussumieri*
(Valenciennes)

203. *H. limbatus* (Valenciennes)

204. *H. quoyi* (Valenciennes)

205. *H. xanthopterus* (Valenciennes)

206. *Rhynchorhamphus georgii* (Valenciennes)

207. *R. malabaricus* Collette

Family 53 BELONIDAE

208. *Ablennes hians* (Valenciennes)

209. *Strongylura leiura* (Bleeker)

210. *S. strogylura* (van Hasselt)

211. *Tylosurus acus melanotus* (Bleeker)

212. *T. crocodilus crocodilus* (Peron and Le
Sueur)

Order 19 ATHERINIFORMES

Family 54 ATHERINIDAE

213. *Atherinomorus deodimalis*
(Valenciennes)

214. *A. lacunosus* (Forster)

Order 20 BERYCIFORMES

Family 55 HOLOCENTRIDAE

215. *Myripristis botche* Cuvier

216. *M. murdjan* (Forsskal)

217. *Sargocentron rubrum* Forsskal

Order 21 SYNGNATHIFORMES

Family 56 PEGASIDAE

218. *Eurypegasmus draconis* (Linnaeus)

219. *Pegasus volitans* Linnaeus

Family 57 FISTULARIIDAE

220. *Fistularia petimba* Lacepede

Family 58 CENTRISCIDAE

221. *Centriscus scutatus* Linnaeus

Family 59 SYNGNATHIDAE

222. *Hippichthys cyanospilos* (Bleeker)

223. *Hippocampus kuda* Bleeker

224. *Microphis brachyurus* (Bleeker)

225. *M. cuncalus* (Hamilton)

226. *Syngnathoides biaculeatus* (Bloch)

227. *Trachyrhamphus longirostris* Kaup

228. *T. serratus* (Schlegel)

Order 22 SCORPAENIFORMES

Family 60 DACTYLOPTERIDAE

229. *Dactyloptena macracanthus* (Bleeker)

230. *D. orientalis* (Cuvier)

Family 61 SCORPAENIDAE

231. *Apistus carinatus* (Bloch & Schneider)

232. *Choridactylus multibarbus* Richardson

233. *Dendrochirus brachypterus* (Cuvier)

234. *D. zebra* (Quoy & Gaimard)

235. *Minous monodactylus* (Bloch & Schneider)

236. *Pterois miles* (Bennett)

237. *P. mombasse* (Smith)

238. *P. russelli* Bennett

239. *P. volitans* (Linnaeus)

240. *Scorpaenopsis cirrhosa* (Thunberg)

241. *S. gibbosa* (Bloch & Schneider)

242. *S. venosa* (Cuvier)

243. *Sebastapistes strongia* (Cuvier)

244. *Trachicephalus uranoscopus* (Bloch & Schneider)

Family 62 TETRAROGIDAE

245. *Tetraroge niger* (Cuvier)
246. *Vespacula dracaena* (Cuvier)
Family 63 APLOACTINIDAE
247. *Cocotropus roseus* Day
248. *Paraploactis taprobanensis* (Whitley)

Family 64 TRIGLIDAE

249. *Lepidotrigla omanensis* Regan
250. *L. longipinnis* Alcock
251. *L. spiloptera* Gunther

Family 65 PERISTEDIIDAE

252. *Satyrichthys adeni* (Lloyd)

Family 66 PLATYCEPHALIDAE

253. *Cociella crocodila* (Tilseus)
254. *Grammoplites scaber* (Linnaeus)
255. *G. suppositus* (Troschel)
256. *Inegocia japonica* (Tilseus)
257. *Platycephalus indicus* (Linnaeus)
258. *Rogadius serrata* (Cuvier)
259. *Sorsogona melanoptera* Knap & Wongratana
260. *S. tuberculata* (Cuvier)
261. *Suggrundus macracanthus* (Bleeker)
262. *S. rodricensis* (Cuvier)
263. *Thysanophrys carbunculus* (Valenciennes)
264. *T. celebica* (Bleeker)

Order 23 PERCIFORMES

Family 67 LATIDAE

265. *Lates calcarifer* (Bloch)
266. *Psammoperca waigensis* (Cuvier)

Family 68 AMBASSIDAE

267. *Ambassis ambassis* (Lacepede)
268. *A. dayi* Bleeker
269. *A. gymnocephalus* (Lacepede)
270. *A. interruptus* Bleeker
271. *A. miops* Gunther
272. *A. nalua* (Hamilton)
273. *A. urotaenia* Bleeker

Family 69 SERRANIDAE

274. *Cephalopholis boenack* (Bloch)
275. *C. formosa* (Shaw & Nodder)
276. *C. miniatus* (Forsskal)
277. *C. sonnerati* (Valenciennes)
278. *Epinephelus areolatus* (Forsskal)
279. *E. bleekeri* (Vaillant)
280. *E. caeruleopunctatus* (Bloch)
281. *E. coioides* (Hamilton)
282. *E. diacanthus* (Valenceinnes)
283. *E. flavocaeruleus* (Lacepede)
284. *E. lanceolatus* (Bloch)
285. *E. latifasciatus* (Temminck & Schlegel)
286. *E. longispinis* (Kner)
287. *E. malabaricus* (Bloch & Schneider)
288. *E. morrhua* (Valenciennes)
289. *E. tauvina* (Forsskal)
290. *E. undulosus* (Quoy & Gaimard)

Family 70 TERAPONIDAE

291. *Pelates quadrilineatus* (Bloch)
292. *Terapon jarbua* (Forsskal)
293. *T. puta* Cuvier
294. *T. theraps* Cuvier

Family 71 PRIACANTHIDAE

295. *Priacanthus cruentatus* Lacepede
296. *P. hamrur* (Forsskal)
297. *P. tayenus* Richardson

Family 72 APOGONIDAE

298. *Apogon aureus* (Lacepede)
299. *A. bandanensis* Bleeker
300. *A. kalosoma* Bleeker
301. *A. multitaeniatus* (Cuvier)
302. *A. nigricans* Day
303. *A. nigripinnis* Cuvier
304. *A. quadrifasciatus* Cuvier
305. *A. novemfasciatus* Cuvier
306. *A. savayensis* Gunther
307. *A. taeniatus* Cuvier
308. *Apogonichthys ellioti* (Day)
309. *A. ocellatus* (Weber)
310. *A. poecilopterus* (Cuvier)

- 311. *Archamia lineolata* (Cuvier)
- 312. *A. macroptera* (Cuvier)
- 313. *Cheilodipterus quinquelineatus* Cuiver
- 314. *Fowleria aurita* (Cuvier)

Family 73 SILLAGINIDAE

- 315. *Sillaginopsis panijus* (Hamilton)
- 316. *Sillago chondropus* Bleeker
- 317. *S. lutea* McKay
- 318. *S. sihama* (Forsskal)
- 319. *S. soringa* Dutt & Sujatha
- 320. *S. vincenti* McKay

Family 74 MALACANTHIDAE

- 321. *Hoplolatilus fronticinctus* (Gunther)

Family 75 LACTARIIDAE

- 322. *Lactarius lactarius* (Schneider)

Family 76 RACHYCENTRIDAE

- 323. *Rachycentron canadus* (Linnaeus)

Family 77 ECHENEIDAE

- 324. *Echeneis naucrates* Linnaeus
- 325. *Remora brachyptera* (Lowe)
- 326. *R. remora* (Linnaeus)

Family 78 CARANGIDAE

- 327. *Alectis ciliaris* (Bloch)
- 328. *A. indicus* (Ruppell)
- 329. *Alepes djedaba* (Forsskal)
- 330. *A. kleinii* (Bloch)
- 331. *A. melanoptera* Swainson
- 332. *A. vari* (Cuvier)
- 333. *Atropus atropos* (Schneider)
- 334. *Atule mate* (Cuvier)
- 335. *Carangoides armatus* (Ruppell)
- 336. *C. caeruleopinnatus* (Ruppell)
- 337. *C. chrysophrys* (Cuvier)
- 338. *C. ferdau* (Forsskal)
- 339. *C. gymnostethus* (Cuiver)
- 340. *C. hedlandensis* (Whitley)
- 341. *C. malabaricus* (Bloch & Schneider)
- 342. *C. oblongus* (Cuvier)
- 343. *C. praeustus* (Bennett)
- 344. *C. talamparoides* Bleeker
- 345. *Caranx carangus* (Bloch)

- 346. *C. heberi* (Bennett)
- 347. *C. ignobilis* (Forsskal)
- 348. *C. melampygus* Cuvier
- 349. *C. sexfasciatus* Quoy & Gaimard
- 350. *C. tille* Cuvier
- 351. *Decapterus russellii* (Ruppell)
- 352. *Elagatis bipinnulata* (Quoy & Gaimard)
- 353. *Gnathanodon speciosus* (Forsskal)
- 354. *Megalaspis cordyla* (Linnaeus)
- 355. *Parastromateus niger* (Bloch)
- 356. *Scomberoides commersonianus*

Lacepede

- 357. *S. lysan* (Forsskal)
- 358. *S. tala* (Cuiver)
- 359. *S. tol* (Cuvier)
- 360. *Selar crumenophthalmus* (Bloch)
- 361. *Selaroides leptolepis* (Cuvier)
- 362. *Trachinotus baillonii* (Lacepede)
- 363. *T. blochii* (Lacepede)
- 364. *T. mookalee* Cuvier
- 365. *T. russelli* Cuvier
- 366. *Ulua mentalis* (Cuvier)

Family 79 CORYPHAENIDAE

- 367. *Coryphaena equisetis* Linnaeus
- 368. *C. hippurus* Linnaeus

Family 80 MENIDAE

- 369. *Mene maculata* (Bloch)

Family 81 LEIOGNATHIDAE

- 370. *Gazza achlamys* Jordan & Starks
- 371. *G. minuta* (Bloch)
- 372. *Leiognathus berbis* (Valenciennes)
- 373. *L. bindus* (Valenciennes)
- 374. *L. blochii* (Valenciennes)
- 375. *L. brevirostris* (Valenciennes)
- 376. *L. daura* (Cuvier)
- 377. *L. dussumieri* (Valenciennes)
- 378. *L. elongatus* (Gunther)
- 379. *L. equulus* (Forsskal)
- 380. *L. fasciatus* (Lacepede)
- 381. *L. leuciscus* (Gunther)
- 382. *L. lineolatus* (Valenciennes)

383. *L. smithursti* (Ramsay & Ogilby)
 384. *L. splendens* (Cuvier)
 385. *Secutor insidiator* (Bloch)
 386. *S. ruconius* (Hamilton)

Family 82 LUTJANIDAE

387. *Lutjanus argentimaculatus* (Forsskal)
 388. *L. bohar* (Forsskal)
 389. *L. decussatus* (Cuvier)
 390. *L. erythropterus* Bloch
 391. *L. fulviflamma* (Forssakal)
 392. *L. fulvus* (Schneider)
 393. *L. gibbus* (Forsskal)
 394. *L. johnii* (Bloch)
 395. *L. kasmira* (Forsskal)
 396. *L. lemniscatus* (Valenciennes)
 397. *L. lutjanus* Bloch
 398. *L. madras* (Valenciennes)
 399. *L. malabaricus* (Schneider)
 400. *L. quinquelineatus* Bloch
 401. *L. rivulatus* (Cuvier)
 402. *L. russelli* Bleeker
 403. *L. sanguineus* (Cuvier)
 404. *L. sebae* (Cuvier)
 405. *L. vitta* (Quoy & Gaimard)
 406. *Pinjalo pinjalo* (Bleeker)

Family 83 CAESIONIDAE

407. *Caesio caeruleus* Lacepede
 408. *Dipterygonotus balteatus* (Valenciennes)
 409. *Gymnocaesio gymnoptera* (Bleeker)
 410. *Pterocaesio chrysozona* (Cuvier)

Family 84 LOBOTIDAE

411. *Lobotes surinamensis* (Bloch)

Family 85 GERREIDAE

412. *Gerres abbreviatus* Bleeker
 413. *G. acinaces* Bleeker
 414. *G. filamentosus* Cuvier
 415. *G. limbatus* Cuvier
 416. *G. lucidus* Cuvier
 417. *G. macracanthus* Bleeker
 418. *G. oblongus* Cuvier
 419. *G. oyena* (Forsskal)

420. *G. poeti* Cuvier
 421. *G. setifer* (Hamilton)
 422. *Pentaprion longimanus* (Cantor)

Family 86 HAEMULIDAE

423. *Diagramma pictum* (Thunberg)
 424. *Plectorhinchus gibbosus* (Lacepede)
 425. *P. orientalis* (Bloch)
 426. *P. pictus* (Tortonese)
 427. *P. schotaf* (Forssakal)
 428. *Pomadasys argenteus* (Forsskal)
 429. *P. argyreus* (Valenciennes)
 430. *P. furcatus* (Schneider)
 431. *P. kaakan* (Cuvier)
 432. *P. maculatum* (Bloch)

Family 87 SPARIDAE

433. *Acanthopagrus berda* (Forsskal)
 434. *A. latus* (Houttuyn)
 435. *Argyrops spinifer* (Forsskal)
 436. *Crenidens crenidens* (Forsskal)
 437. *Rhabdosargus sarba* (Forsskal)
 438. *Sparidentax hasta* (Valenciennes)

Family 88 LETHRINIDAE

439. *Gymnocranius griseus* (Schneider)
 440. *Lethrinus harak* (Forsskal)
 441. *L. lentjan* (Lacepede)
 442. *L. mahsena* (Forsskal)
 443. *L. microdon* Valenciennes
 444. *L. nebulosus* (Forsskal)
 445. *L. obsoletus* (Forsskal)
 446. *L. ornatus* Valenciennes
 447. *L. variegatus* Valenciennes

Family 89 NEMIPTERIDAE

448. *Nemipterus bipunctatus* (Ehenberg)
 449. *N. japonicus* (Bloch)
 450. *N. nematophorus* (Bleeker)
 451. *N. peronii* (Valenciennes)
 452. *N. randalli* Russell
 453. *Scolopsis bimaculatus* Ruppell
 454. *S. vosmeri* (Bloch)

Family 90 SCIAENIDAE

455. *Chrysochir aureus* (Richardson)

456. *Daysciaena albida* (Cuvier)
 457. *Dendrophysa russelli* (Cuvier)
 458. *Johnius amblycephalus* (Bleeker)
 459. *J. belangeri* (Cuvier)
 460. *J. carouna* (Cuvier)
 461. *J. carutta* Bloch
 462. *J. coitor* (Hamilton)
 463. *J. dussumieri* (Cuvier)
 464. *J. elongatus* Mohan
 465. *J. glaucus* (Day)
 466. *J. macropterus* (Bleeker)
 467. *J. macrorhynchus* (Mohan)
 468. *Kathala axillaris* (Cuvier)
 469. *Nibea chui* (Trewavas)
 470. *N. maculata* (Schneider)
 471. *N. soldado* (Lacepede)
 472. *Otolithes cuvieri* (Trewavas)
 473. *O. ruber* (Schneider)
 474. *Otolithoides biauritus* (Cantor)
 475. *Panna microdon* (Bleeker)
 476. *Paranibea semiluctuosa* (Cuvier)
 477. *Pennahia anea* (Bloch)
 478. *Protonibea diacanthus* (Lacepede)
- Family 91 MULLIDAE
479. *Mulloidichthys flavolineatus* (Lacepede)
 480. *M. vanicolensis* (Valenciennes)
 481. *Parupeneus barberinus* (Lacepede)
 482. *P. heptacanthus* (Lacepede)
 483. *P. indicus* (Shaw)
 484. *P. trifasciatus* (Lacepede)
 485. *Upeneus guttatus* (Day)
 486. *U. luzonius* Jordan & Seale
 487. *U. moluccensis* (Bleeker)
 488. *U. sulphureus* Cuvier
 489. *U. sundaicus* (Bleeker)
 490. *U. taeniopterus* Cuvier
 491. *U. tragula* Richardson
 492. *U. vittatus* (Forsskal)
- Family 92 MONODACTYLIDAE
493. *Monodactylus argenteus* (Linnaeus)
 494. *M. falciiformis* Lacepede

- Family 93 PEMPHERIDIDAE
495. *Pempheris moluca* Cuvier
 496. *P. vanicolensis* Cuvier
- Family 94 KYPHOSIDAE
497. *Kyphosus cinerascens* (Forsskal)
 498. *K. vaigiensis* (Quoy & Gaimard)
- Family 95 DREPANIDAE
499. *Drepane longimana* (Bloch & Schneider)
 500. *D. punctata* (Linnaeus)
- Family 96 EPHIPPIDAE
501. *Ephippus orbis* (Bloch)
- Family 97 PLATACIDAE
502. *Platax orbicularis* (Forsskal)
 503. *P. pinnatus* (Linnaeus)
 504. *P. teira* (Forsskal)
- Family 98 SCATOPHAGIDAE
505. *Scatophagus argus* (Bloch)
- Family 99 CHAETODONTIDAE
506. *Chaetodon auriga* (Forsskal)
 507. *C. collare* Bloch
 508. *C. decussatus* Cuvier
 509. *C. melanotus* Bloch
 510. *C. octofasciatus* Bloch
 511. *C. trifasciatus* (Mungopark)
 512. *C. vagabundus* Linnaeus
 513. *C. xanthocephalus* Bennett
 514. *Heniochus acuminatus* (Linnaeus)
- Family 100 POMACANTHIDAE
515. *Apolemichthys xanthurus* (Bennett)
 516. *Pomacanthus annularis* (Bloch)
 517. *P. imperator* (Bloch)
 518. *P. semicirculatus* (Cuvier)
- Family 101 CICHLIDAE
519. *Etroplus maculatus* (Bloch)
 520. *E. suratensis* (Bloch)
 521. *Oreochromis mossambicus* (Peters)
- Family 102 POMACENTRIDAE
522. *Abudefduf septemfasciatus* (Cuvier)
 523. *A. vaigiensis* (Quoy & Gaimard)
 524. *Amphiprion sebae* Bleeker
 525. *Chromis caerulea* (Cuvier)

526. *Chrysiptera biocellata* (Quoy and Gaimard)

527. *Dascyllus aruanus* (Linnaeus)

528. *D. trimaculatus* (Ruppell)

529. *Pomacentrus tripunctatus* (Cuvier)

530. *Pristotis jerdoni* (Day)

Family 103 CIRRHITIDAE

531. *Cirrhitichthys aprinus* (Cuvier)

532. *C. aureus* (Schegel)

Family 104 CEPOLIDAE

533. *Acanthocephala abbreviata* (Valenciennes)

534. *A. indica* (Day)

Family 105 MUGILIDAE

535. *Liza macrolepis* (Smith)

536. *L. melinoptera* (Valenciennes)

537. *L. parsia* (Hamilton)

538. *L. subviridis* (Valenciennes)

539. *L. tade* (Forsskal)

540. *L. vaigiensis* (Quoy & Gaimard)

541. *Mugil cephalus* Linnaeus

542. *Valamugil buchanani* (Bleeker)

543. *V. cunnesius* (Valenciennes)

544. *V. seheli* (Forsskal)

545. *V. speigleri* (Bleeker)

Family 106 SPHYRAENIDAE

546. *Sphyraena acutipinnis* Day

547. *S. barracuda* Walbaum

548. *S. flavicauda* (Ruppell)

549. *S. forsteri* Cuvier

550. *S. jello* Cuvier

551. *S. obtusata* Cuvier

552. *S. putnamae* Jordan & Seale

Family 107 POLYNEMIDAE

553. *Eleutheronema tetradactylum* (Shaw)

554. *Filimanus similis* Feltes

555. *F. xanthonema* (Valenciennes)

556. *Polydactylus indicus* (Shaw)

557. *P. microstoma* (Bleeker)

558. *P. plebius* (Broussonet)

559. *P. sexfilis* (Valenciennes)

560. *P. sextarius* (Schneider)

561. *Polynemus paradiseus* Linnaeus

Family 108 LABRIDAE

562. *Cheilinus chlorurus* (Bloch)

563. *C. trilobatus* Lacepede

564. *C. undulatus* Ruppell

565. *Cheilio innermis* (Forsskal)

566. *Choerodon robustus* (Gunther)

567. *Coris formosa* (Bennett)

568. *Epibulus insidiator* (Pallas)

569. *Halichoeres hortulanus* (Lacepede)

570. *H. ingrescens* (Bloch)

571. *H. nebulosus* (Valenciennes)

572. *Oxycheilinus bimaculatus* (Valenciennes)

573. *O. diagramma* (Lacepede)

574. *Stethojulis interrupta* (Bleeker)

575. *S. trilineata* (Bloch)

576. *Thalassoma lunare* (Linnaeus)

577. *T. herdwicke* (Bennett)

578. *T. purpureum* (Forsskal)

579. *Xyrichtys pavo* (Valenciennes)

580. *X. pentadactylus* (Linnaeus)

Family 109 SCARIDAE

581. *Chlorurus sordidus* (Forsskal)

582. *Leptoscarus vaigiensis* (Quoy & Gaimard)

583. *Scarus ghobban* Forsskal

584. *S. prasiognathus* Valenciennes

585. *S. psitacus* Forsskal

586. *S. quoyi* Valenciennes

587. *S. rivulatus* Valenciennes

588. *S. russelli* Valenciennes

Family 110 OPISTHOGNATHIDAE

589. *Opisthognathus nigromarginatus* Ruppell

590. *O. rosengergii* Bleeker

Family 111 URANOSCOPIDAE

591. *Ichthyoscopus lebeck* (Bloch)

592. *Uranoscopus cognatus* Cantor

593. *U. guttatus* Cuvier

Family 112 TRICHONOTIDAE

594. *Trichonotus setiger* Bloch & Schneider

Family 113 PERCOPHIDAE

595. *Bembrops caudimacula* Steindachner

Family 114 PINGUIPEDIDAE

596. *Parapercis pulchella* (Temminck and Schlegel)

597. *P. punctulata* (Cuvier)

Family 115 TRIPTERYGIIDAE

598. *Enneapterygius fasciatus* (Weber)

Family 116 BLENNIIDAE

599. *Istiblennius dussumieri* (Valenciennes)

600. *Omobranchus elongatus* (Peters)

601. *O. zebra* (Bleeker)

602. *Petroscirtes breviceps* (Valenciennes)

603. *P. variabilis* Cantor

604. *Salarias alboguttatus* Kner

605. *S. fasciatus* (Bloch)

606. *Xiphasia setifer* Swainson

Family 117 AMMODYTIDAE

607. *Bleekeria kallolepis* Gunther

Family 118 CALLIONYMIDAE

608. *Callionymus filamentosus* (Valenciennes)

609. *C. japonicus* Houttuyn

610. *C. marleyi* (Regan)

611. *C. sagitta* Pallas

612. *Eleutherochir opercularis* (Valenciennes)

613. *Synchiropus lineolatus* (Valenciennes)

Family 119 ELEOTRIDIDAE

614. *Butis butis* (Hamilton)

615. *Eleotris fusca* (Schneider)

616. *E. melanosoma* Bleeker

617. *Prionobutis koilomatodon* (Bleeker)

Family 120 GOBIIDAE

618. *Acentrogobius cyanomos* (Bleeker)

619. *A. ennorensis* Menon & Remadevi

620. *A. globiceps* (Hora)

621. *A. griseus* (Day)

622. *A. madraspatensis* (Day)

623. *A. masoni* (Day)

624. *A. viridipunctatus* (Valenciennes)

625. *Apocryptes bato* (Hamilton)

626. *Apocryptodon madurensis* (Bleeker)

627. *Amblyeleotris gymnocephala* (Bleeker)

628. *Amblygobius albimaculatus* (Ruppell)

629. *Bathygobius fuscus* (Ruppell)

630. *B. ostreicola* (Chaudhuri)

631. *Boleophthalmus boddarti* (Pallas)

632. *Brachygobius nusus* (Hamilton)

633. *Callogobius sehsiyai* Jacob & Rangarajan

634. *Favonigobius reichei* (Bleeker)

635. *Glossogobius biocellatus* (Valenciennes)

636. *G. giuris* (Hamilton)

637. *Gobiopsis macrostoma* Steindachner

638. *Gobiopterus chuno* (Hamilton)

639. *Mahidolia mystacina* (Valenciennes)

640. *Oligolepis acutipennis* (Valenciennes)

641. *O. cylindriceps* (Hora)

642. *Oplopomus caninoides* (Bleeker)

643. *Oxuderces dentatus* Exdoux & Souleyet

644. *Oxyurichthys formosanus* Nichols

645. *O. microlepis* (Bleeker)

646. *O. papuensis* (Valenciennes)

647. *O. tentacularis* (Valenciennes)

648. *Parachaeturichthys polynema* (Bleeker)

649. *Parapocryptes rictuosus* (Valenciennes)

650. *P. sepeaster* (Richardson)

651. *Periophthalmus chrysospilos* Bleeker

652. *P. novemradiatus* (Hamilton)

653. *Pseudapocryptes elongatus* (Cuvier)

654. *Pseudogobius javanicus* (Bleeker)

655. *Scartelaos cantoris* (Day)

656. *Sicyopterus griseus* (Day)

657. *Yongeichthys criniger* (Valenciennes)

Family 121 GOBIOIDIDAE

658. *Caragobius urolepis* (Bleeker)

659. *Taenioides anguillaris* (Linnaeus)

660. *T. buchanani* (Day)

661. *T. cirratus* (Blyth)

Family 122 TRYPAUCHENIDAE

662. *Ctenotrypauchen microcephalus*
(Bleeker)

663. *Trypauchen vagina* (Bloch & Schneider)

Family 123 KURTIDAE

664. *Kurtius indicus* Bloch

Family 124 ACANTHURIDAE

665. *Acanthurus leucosternon* (Bennett)

666. *A. lineatus* (Linnaeus)

667. *A. mata* Cuvier

668. *A. nigrofuscus* (Forsskal)

669. *A. triostegus* (Linnaeus)

670. *A. xanthopterus* Valenciennes

671. *Naso brevirostris* (Cuvier)

672. *N. tuberosus* Lacepede

673. *N. unicornis* (Forsskal)

Family 125 ZANCLIDAE

674. *Zanclus cornutus* (Linnaeus)

Family 126 SIGANIDAE

675. *Siganus canaliculatus* (Park)

676. *S. guttatus* (Bloch)

677. *S. javus* (Linnaeus)

678. *S. spinus* (Linnaeus)

679. *S. vermiculatus* (Valenciennes)

Family 127 GEMPYLIDAE

680. *Gempylus serpens* Cuvier

681. *Neolatus tripes* Johnson

682. *Rexea bengalensis* (Alcock)

Family 128 TRICHIURIDAE

683. *Eupleurogrammus glossodon* (Bleeker)

684. *E. muticus* (Gray)

685. *Lepturacanthus savala* (Cuvier)

686. *T. lepturus* Linnaeus

Family 129 SCOMBRIDAE

687. *Acanthocybium solandri* Cuvier

688. *Auxis rochei* (Risso)

689. *A. thazard* (Lacepede)

690. *Euthynnus affinis* (Cantor)

691. *Katsuwonus pelamis* (Linnaeus)

692. *Rastrelliger faughni* Matsui

693. *R. kanagurta* (Cuvier)

694. *Sarda orientalis* (Temminck & Schlegel)

695. *Scomberomorus commerson* (Lacepede)

696. *S. guttatus* (Bloch & Schneider)

697. *S. koreanus* (Kishinouye)

698. *S. lineolatus* (Cuvier)

699. *Thunnus albacares* (Bonnaterre)

700. *T. tonggol* (Bleeker)

Family 130 XIPHIIDAE

701. *Xiphias gladius* Linnaeus

Family 131 ISTIOPHORIDAE

702. *Istiophorus platypterus* (Shaw & Nodder)

703. *Makaira indica* (Cuvier)

Family 132 NOMEIDAE

704. *Psenus cyanophrys* (Cuvier)

Family 133 ARIOMMATIDAE

705. *Ariomma indica* (Day)

Family 134 STROMATEIDAE

706. *Pampus argenteus* (Euphrasen)

707. *P. chinensis* (Euphrasen)

Order 24 PLEURONECTIFORMES

Family 135 PSETTODIDAE

708. *Psettodes erumei* (Schneider)

Family 136 CITHARIDAE

709. *Brachypleura novaezeelandiae* Gunther

Family 137 BOTHIDAE

710. *Asterorhombus intermedius* (Bleeker)

711. *Bothus myriaster* (Temminck & Schlegel)

712. *B. pantherinus* (Ruppell)

713. *Crossorhombus azureus* (Alcock)

714. *C. valderostratus* (Alcock)

715. *Engyprosopon grandisquama*
(Temminck & Schlegel)

716. *Laeops guentheri* Alcock

717. *Pseudorhombus arsius* (Hamilton)

718. *P. elevatus* Ogilby

719. *P. javanicus* (Bleeker)

720. *P. malayanus* Bleeker

721. *P. triocellatus* (Schneider)

Family 138 PLEURONECTIDAE

722. *Samaris cristatus* (Gray)

Family 139 CYNOGLOSSIDAE

723. *Cynoglossus arel* (Schneider)

724. *C. bilineatus* (Lacepede)

725. *C. cynoglossus* (Hamilton)

726. *C. dispar* Day

727. *C. dubius* Day

728. *C. itinus* (Snyder)

729. *C. kopsi* (Bleeker)

730. *C. lida* (Bleeker)
 731. *C. lingua* Hamilton
 732. *C. macrostomus* Norman
 733. *C. monopus* (Bleeker)
 734. *C. puncticeps* (Richardson)
 735. *C. semifasciatus* Day
 736. *Paraplagusia bilineata* (Bloch)
 737. *P. blochii* (Bleeker)

Family 140 SOLEIDAE

738. *Aesopia cornuta* Kaup
 739. *Brachirus orientalis* (Bloch)
 740. *B. pan* (Hamilton)
 741. *Heteromycteris oculus* (Alcock)
 742. *Solea elongata* Day
 743. *S. ovata* Richardson
 744. *Synaptura albomaculata* Kaup
 745. *S. commersoniana* (Lacepede)
 746. *Zebrias altipinnis* Alcock
 747. *Z. quagga* (Kaup)
 748. *Z. synapturoides* (Jenkins)

Order 25 TETRAODONTIFORMES

Family 141 TRIACANTHODIDAE

749. *Triacanthodes ethiops* Alcock

Family 142 TRIACANTHIDAE

750. *Pseudotriacanthus strigillifer* (Cantor)
 751. *Triacanthus biaculeatus* (Bloch)

Family 143 BALISTIDAE

752. *Abalistes stellaris* (Bloch)
 753. *Balistes ellioti* Day
 754. *Balistapus undulatus* (Park)
 755. *Balistoides viridescens* (Bloch & Schneider)
 756. *Canthidermis maculata* (Bloch)
 757. *Odonus niger* (Ruppell)
 758. *Pseudobalistes flavimarginatus* (Bloch & Schneider)

759. *Rhinecanthus aculeatus* (Linnaeus)
 760. *Sufflamen fraenatus* (Bloch & Schneider)

Family 144 MONACANTHIDAE

761. *Aluterus scripta* (Osbeck)
 762. *Acreichthys tomentosus* (Linnaeus)

763. *Anacanthus barbatus* Gray
 764. *Cantherhinus pardalis* (Ruppell)
 765. *Paramonacanthus choirocephalus* (Bleeker)

Family 145 OSTRACIIDAE

766. *Lactoria cornuta* (Linnaeus)
 767. *Ostracion cubicus* Linnaeus
 768. *O. meliagris* (Shaw)
 769. *O. nasus* Bloch
 770. *O. rhinorhynchus* (Bleeker)
 771. *Tetrosomus gibbosus* (Linnaeus)

Family 146 TETRADONTIDAE

772. *Arothron hispidus* Linnaeus
 773. *A. immaculatus* (Bloch & Schneider)
 774. *A. leopardus* (Day)
 775. *A. nigropunctatus* (Bloch & Schneider)
 776. *A. reticularis* (Bloch & Schneider)
 777. *A. stellatus* (Bloch & Schneider)
 778. *Canthigaster margaritatus* (Ruppell)
 779. *Chelonodon fluviatilis* (Hamilton)
 780. *C. patoca* (Hamilton)
 781. *Lagocephalus inermis* (Temminck & Schlegel)

782. *L. lunaris* (Bloch & Schneider)
 783. *L. spadiceus* (Richardson)
 784. *Takifugu oblongus* (Bloch)
 785. *Torquigener florealis* (Cope)
 786. *T. hypselogeneion* (Bleeker)

Family 147 DIODONTIDAE

787. *Cyclichthys orbicularis* Bloch
 788. *Diodon holocanthus* Linnaeus
 789. *Diodon hystrix* Linnaeus

The marine and estuarine fish fauna of Kerala are divided into two classes : **Chondrichthyes** and **Osteichthyes** as follows :

Key to the classes

- Body made up of cartilaginous skeleton. Five to seven pairs of lateral or ventral, nonconfluent gill slits without gill covers
 CHONDRICHTHYES

- Body made up of bony skeleton. One pair of lateral gill slits confluent as a single ventral slit or nonconfluent as lateral gill slits with gill cover OSTEICHTHYES

Class CHONDRICHTHYES
(Cartilaginous fishes)

- 1a. Gill slits present on lateral sides of head. Anal fin present 2
- 1b. Gill slits present on ventral sides of head. Anal fin absent (Batoid fishes – Skates and Rays) 4
- 2a. Mouth anterior to orbit ORECTOLOBIFORMES
- 2b. Mouth posterior to front margin of orbit 3
- 3a. Eyes with nictitating eyelids. Intestine with spiral or scroll valve CARCHARHINIFORMES
- 3b. Eyes without nictitating eyelids. Intestine without spiral or scroll valve LAMNIFORMES
- 4a. Body shark-like appearance, somewhat depressed. Pectoral fins barely enlarged. Tail not distinctly marked off from the body 5
- 4b. Body not shark-like, but distinctly depressed. Pectoral fins broadly enlarged. Tail almost marked off from the body ... 6
- 5a. Snout conspicuously elongate, prolonged into a long, flat plate having a row of large teeth-like structure (saw-like) on each side PRISTIFORMES
- 5b. Snout wedge-shaped and much prolonged, but not as a blade and without lateral teeth RAJIFORMES
- 6a. Caudal fin well-developed. Electric organs in head region present. Skin soft and flabby TORPEDINIFORMES
- 6b. Caudal fin and electric organs absent. Skin firm MYLIOBATIFORMES

Order 1 ORECTOLOBIFORMES

Key to the families

- 1a. Caudal fin almost equal to rest of body ..
..... STEGOSTOMATIDAE
- 1b. Caudal fin considerably shorter than rest of body 2
- 2a. Mouth extremely large and terminal. External gill slits very large, internal gill slits inside mouth cavity with filter screens. Caudal peduncle with strong lateral keels and an upper precaudal pit. Caudal fin with a strong ventral lobe and subterminal notch RHINIODONTIDAE
- 2b. Mouth smaller and subterminal. External gill slits small, internal gill slits without filter screens. Caudal peduncle without strong lateral keels and precaudal pits. Caudal fin with a weak ventral lobe or none, but with a strong terminal lobe and subterminal notch 3
- 3a. Nostrils with a lobe and groove around outer borders. Spiracles large, below eyes. Precaudal tail much greater than head length and body depth HEMISCYLLIDAE
- 3b. Nostrils without a lobe and groove around outer borders. Spiracles small, behind but not below eyes. Precaudal tail short, much shorter than head length and body depth GINGLYMOSTOMATIDAE

Family 1 HEMISCYLLIDAE

(Bamboo sharks, Longtailed carpet sharks)

Body cylindrical or slightly depressed, with or without ridges on sides. Mouth small and transverse, anterior to eyes. Eyes dorsolateral with large spiracles below them. Gill slits small and fifth overlapping fourth. Two dorsal fins without spines, the second dorsal fin insertion well ahead of anal fin origin. Anal fin rounded with keel-like apex, separated from the lower caudal origin by a narrow notch. Precaudal tail long, much greater than head length and body depth. Caudal peduncle without lateral keels and precaudal pits.

Species known to occur in Tamil Nadu

1. *Chiloscyllium griseum* Muller and Henle (Grey bamboo shark)
2. *C. indicum* (Gmelin) (Slender bambooshark)
3. *C. plagiosum* (Bennett) (Whitespotted bamboo shark)
4. *C. punctatum* Muller and Henle (Brownbanded bamboo shark)

Key to the species

- 1a. Body and tail very slender; anal fin origin considerably posterior to free rear tip of second dorsal fin; length of anal fin from origin to free rear tip subequal to length of hypural caudal lobe from lower caudal origin to subterminal notch; body with numerous small dark spots and bars
..... *C. indicum*
- 1b. Body and tail moderately slender to relatively stout; anal fin origin below or close behind free tip of second dorsal fin; length of anal fin very shorter than hypural caudal lobe; body colour varied but without numerous small dark spots and bars 2
- 2a. Ground colour of body dark with numerous light spots *C. plagiosum*
- 2b. Ground colour of body light, with or without scattered dark spots or dusky bands 3
- 3a. Dorsal fins smaller than pelvic fins, dorsal fins without projecting free rear tips
..... *C. griseum*
- 3b. Dorsal fin larger than pelvic fins, dorsal fins with projecting free rear tips
..... *C. punctatum*

Fisheries information : *C. griseum* and *C. indicum* are very common species occurring in both the coasts of our country. *C. plagiosum* and *C. punctatum* are common species of the east coast of our country. All these fishes are captured in shore fisheries and are utilized for human consumption.

Family 2 STEGOSTOMATIDAE (Zebra shark)

Body cylindrical with conspicuous ridges on sides. Mouth small and transverse, anterior to eyes. Eyes lateral and spiracles subequal in size to eyes but not below them. Gill slits small, fifth overlapping fourth. Caudal peduncle without lateral keels and precaudal pits. First dorsal fin larger than second, its origin extended well anterior to origin of pelvic fins and insertion almost over pelvic fins. Immature specimens with dark saddles, but the adult specimens with dark spots.

Species known to occur in Tamil Nadu

Stegostoma fasciatum (Hermann) (Zebra shark)

Fisheries information : Zebra shark is a common species occurring both the coasts of our country. The flesh is used fresh and dried salted for human consumption. Its livers are processed for vitamins; fins dried and processed for the oriental shark fin trade and offal used for fishmeal.

Family 3 GINGLYMOSTOMATIDAE (Nurse sharks)

Head without lateral flaps of skin. Body cylindrical, somewhat depressed, without ridges on sides. Eyes dorsolateral or lateral. Spiracles much smaller than eyes, posterior to eyes but not below them. Gill openings small, fifth practically overlapping fourth. Nostrils with short or moderately long, pointed barbels, but without circumnarial folds or grooves. Mouth small, transverse, anterior to eyes. Caudal peduncle without lateral keels and precaudal pits. Dorsal fins two, without spines; the second dorsal fin insertion well anterior to anal fin insertion. Precaudal tail short, much shorter than head length and body depth. Juvenile specimens plain or with dark spots.

Species known to occur in Tamil Nadu

Nebrius ferrugineus (Lesson) (Tawny nurse shark)

Fisheries information : Tawny nurse shark is a common species occurring in both the coasts of our country. Its flesh is used fresh and dried salted for human consumption. Its livers are utilized for oils and vitamins, fins are utilized in the oriental shark fin trade and offal is used for fishmeal. Its thick, armor-like skin is potentially valuable for leather.

Family 4 RHINCODONTIDAE
(Whale sharks)

Head broad and flattened, without lateral flaps of skin. Body cylindrical or more or less depressed, with prominent ridges on sides. Eyes lateral, without subocular pockets. Spiracles smaller than eyes, posterior to them but not below them. Gill openings very large, fifth considerably separated from fourth. Nostrils with very small barbels and without circumnarial folds and grooves. Mouth practically terminal, anterior to eyes. Caudal peduncle with strong lateral keels and an upper precaudal pit. First dorsal fin much larger than second, its origin well anterior to insertion of pelvic fins and opposite to its bases. Body colour light with vertical and horizontal stripes, in the form of a checkerboard.

Species known to occur in Tamil Nadu

Rhincodon typus Smith (Whale shark)

Fisheries information : Whale shark is a common species occurring in both the coasts of our country. Its flesh is utilized for human consumption either in fresh or dried salted and also utilized for treating boat hulls.

Remarks : Previous records of this species are as *Rhiniodon typus* (Smith).

Order 2 LAMNIFORMES

Key to the families

- 1a. Caudal fin length almost as long as rest of the body ALOPIIDAE
- 1b. Caudal fin length much shorter than rest of body 2
- 2a. Caudal fin somewhat symmetrical and lunate; with a long ventral lobe. Caudal

peduncle with very strong lateral keels ...
..... LAMNIDAE

- 2b. Caudal fin asymmetrical, not lunate, ventral caudal lobe short. Caudal peduncle without lateral keels or with weak ones
..... ODONTASPIDIDAE

Family 5 ODONTASPIDIDAE
(Sand tiger shark)

Mouth large, extending beyond eyes. Snout conical to slightly depressed and pointed. Gill slits not extending onto dorsal surface of head, anterior to pectoral fin bases. Two dorsal fins and an anal fin. Pectoral fins small. Caudal peduncle compressed without keels but with an upper precaudal pit and an asymmetrical caudal fin with a strong and short ventral lobe.

Species known to occur in Tamil Nadu

Carcharias tricuspidatus (Day) (Indian sand tiger)

Fisheries information : Indian sand tiger shark is a common species found in both the coasts of our country. This species is apparently captured in India and Pakistan.

Remarks : It is a poorly known species and may be a junior synonym of *Carcharias taurus* (Rafinesque) (Campagno, 1984). But Eschmeyer (1999) retain the validity of this species, which was earlier placed under the genus *Eugomhodus* Gill.

Family 6 ALOPIDAE
(Thresher sharks)

A family of large sharks where upper lobe of caudal fin greatly elongate, caudal fin almost half of the total length. Third and fifth gill openings over origin of pectoral fins. Snout moderately long, bluntly conical. Mouth small but arched and elongated, extending well beyond eyes. Eyes without nictitating lower eyelids. Two dorsal fins, the second one minute. Pectoral fins narrow, long and falcate, broad-tipped. Precaudal pit present.

Species known to occur in Tamil Nadu

Alopias vulpinus (Bonnaterre) (Thresher shark)

Fisheries information : Its fisheries importance is minor, eaten locally fresh and salted and dried.

Remarks : This species uses its long tail to make herd small fishes into a ball and then attacks the fish.

Family 7 LAMNIDAE (Mackerel shark)

Body spindle shaped with pointed snouts. Mouth large, extending beyond eyes. Gill slits extending onto dorsal surface of head, anterior to pectoral fin bases. First dorsal fin large and second dorsal fin and anal fins minute and pivoting. Pectoral fins moderately long and broad, shorter than head length. Caudal fin lunate. Precaudal pits present, caudal peduncle strongly depressed and with strong keels. Ventral side of body white.

Species known to occur in Tamil Nadu

Isurus oxyrinchus Rafinesque (Shortfin mako)

Fisheries information : Shortfin mako is a common species occurring in both the coasts of our country. Its flesh is utilized fresh, frozen, smoked and dried salted for human consumption; its liver is used for oils and vitamins; the fins utilized for shark-fin soup; the hides are processed into leather and the jaws and teeth are used for ornaments.

Order 3 CARCHARINIFORMES (Ground sharks)

Key to the families

- 1a. Head with lateral, blade-like expansions SPHYRNIDAE
- 1b. Head normal, without lateral expansions 2
- 2a. First dorsal fin base opposite or behind pelvic fin bases.....SCYLIIORHINIDAE
- 2b. First dorsal fin base anterior to pelvic fin bases 3

- 3a. Precaudal pits absent. Dorsal caudal border not undulated 4
- 3b. Precaudal pits present. Dorsal caudal border undulated 5
- 4a. Posterior teeth on jaws comb-like. Labial furrows very short or absent, when present confined to mouth corners..... PROSCYLLIDAE
- 4b. Posterior teeth on jaws not comb-like. Labial furrows relatively long with upper extending a distance about half of mouth width TRIAKIDAE
- 5a. Intestinal valve of scroll type; Internarial width 3 to 6 times the nostril width CARCHARHINIDAE
- 5b. Intestinal valve of spiral type; Internarial width 2 to 3 times the nostril width HEMIGALEIDAE

Family 8 SCYLIIORHINIDAE (Catsharks)

Body generally elongated and head without lateral expansions. Eyes cat-like with nictitating eyelids. Mouth large, maxilla extending front border of eyes. Two dorsal fins and an anal fin, the first dorsal fin base over or behind pelvic fin bases. Precaudal pits absent. Caudal fin without a strong ventral lobe or lateral undulations on its dorsal border. Body colour generally variegated.

Species known to occur in Tamil Nadu

Atelomycterus marmoratus (Bennett) (Coral catshark)

Fisheries information : The coral cat shark is a common species occurring in both the coasts of our country. Its flesh utilized fresh or dried salted for human consumption or processed for fishmeal and its livers are used for oils.

Family 9 TRIAKIDAE (Hound sharks)

Head without lateral expansions. Mouth large, extending front border of eyes. Eyes with

nictitating eyelids. Two moderate sized spineless dorsal fins and an anal fin, the first dorsal fin well ahead to pelvic fin bases. Caudal fin without a strong ventral lobe or lateral undulations on its dorsal surface. Vulvular intestine with a spiral valve of 4 to 11 turns.

Species known to occur in Tamil Nadu

Mustelus mosis Hemprich and Ehrenberg
(Arabian Smooth-hound)

Fisheries information : Arabian smooth hound is a common species occurring in both the coasts of our country. Its flesh is used for human consumption.

Family 10 PROSCYLLIDAE (Finback catsharks)

Body elongate and head without lateral expansions. Mouth large and angular, arched and extending to anterior margin of eyes. Eyes cat-like with nictitating eyelids. Nostrils without barbels or narial grooves. Two small, spineless dorsal fins and an anal fin, the first dorsal fin base considerably anterior to pelvic fin base. Pecaual pits absent. Caudal fin without a strong ventral or lateral undulations on its dorsal border.

Species known to occur in Tamil Nadu

Eridacnis radcliffei Smith (Pygmy ribbontail catshark)

Fisheries informarion : Pygmy ribbontail catshark is generally found in the southeast coast of our country. It is one of the smallest living sharks, not extending 24 cm. It is a species of minor commercial importance.

Family 11 HEMIGALEIDAE (Weasel sharks)

Head without lateral expansions. Mouth large, extending to anterior border of eyes. Eyes with internal nictitating eyelids. Two moderate sized spineless dorsal fins and an anal fin, the first dorsal fin base considerably anterior to pelvic fin bases. Precaudal pits present. Caudal fin with a strong ventral lobe and lateral

undulations on its dorsal border. Intestine with a spiral valve.

Species known to occur in Tamil Nadu

1. *Chaenogaleus macrostoma* (Bleeker)
(Hooktooth shark)
2. *Hemigaleus microstoma* Bleeker (Sicklefin weasel shark)
3. *Hemipristis elongata* (Klunzinger)
(Snaggletooth shark)

Key to the species

- 1a. Lower anterolateral teeth with short, straight or weak hooked cusps that concealed in the mouth or protrude slightly from it. Gill slits short, 1.1 to 1.3 times eye length in adults *H. microstoma*
- 1b. Lower anterolateral teeth with long, hooked cusps that prominently protrude from mouth. Gill slits long, 1.8 to 3 times eye length in adults 2
- 2a. Snout obtusely wedge-shaped in dorsolateral view. Lower jaw rounded at symphysis. No toothless space at middle of jaws. Mesial edges of teeth unserrated, sometimes a few cusplets on mesial edges of lower teeth. Fins not falcate, posterior margin of anal and second dorsal moderately concave, those of pectorals and pelvics straight or slightly concave
..... *C. macrostoma*
- 2b. Snout bluntly rounded in dorsolateral view. Lower jaw truncated at sysmphysis. A toothless space at middle of both jaws. Mesial edges of upper teeth and most of lower teeth with serrated or with a few cusplets (except for young below 55 cm. where they are smooth). Fins strongly falcate, posterior margin of anal, second dorsal, pectoral and pelvic fins deeply concave *H. elongata*

Fisheries information : Hook tooth shark and snaggletooth shark are very commonly occurring in both the coasts of our country. The flesh of Hooktooth shark and Snaggletooth shark are utilized for human consumption. The livers of

Snaggletooth shark are processed for vitamins, fins used in the oriental shark fin trade and offal for fishmeal. Sickie fin shark is generally found in the south east coast of our country. Its flesh is utilized for human consumption.

Family 12 CARCHARHINIDAE (Requiem sharks)

Head without lateral expansions. Mouth extends front margin of eyes. Eyes with internal nictitating eyelids. Two dorsal fins and an anal fin, the first dorsal fin with its base well anterior to pelvic fin bases. Precaudal pits present. Caudal fin with a strong ventral lobe and lateral undulations on its dorsal border. Intestine with a scroll valve. Body colour variable, usually no colour pattern.

Species known to occur in Tamil Nadu

1. *Carcharhinus dussumieri* (Valenciennes) (Whitecheek shark)
2. *C. hemiodon* (Valenciennes) (Pondicherry shark)
3. *C. limbatus* (Valenciennes) (Blacktip shark)
4. *C. macroti* (Muller and Henle) (Hardnose shark)
5. *C. melanopterus* (Quoy and Gaimard) (Blacktip reef shark)
6. *C. sorrah* (Valenciennes) (Spot-tail shark)
7. *Galeocerdo cuvier* (Peron and Le Sueur) (Tiger shark)
8. *Lamiopsis temminckii* (Muller and Henle) (Broadfin shark)
9. *Loxodon macrorhinus* (Muller and Henle) (Sliteye shark)
10. *Negaprion acutidens* (Ruppell) (Sicklefin Lemon shark)
11. *Rhizoprionodon acutus* (Ruppell) (Milk shark)
12. *R. olgoinx* Springer (Grey sharpnose shark)
13. *Scoliodon laticaudus* Muller and Henle (Spadenose shark)

Key to the species

- 1a. Upper labial furrows very long, extending to front of eyes. Spiracles present and

relatively large. Caudal peduncle with prominent lateral keels. Vertical black or dusky bars on back, obscure or absent in adults *G. cuvier*

- 1b. Upper labial furrows long to very short, not extending in front of eyes. Spiracles usually absent. Caudal peduncle usually without lateral keels 2
- 2a. Second dorsal fin almost or quite equal to first dorsal fin 3
- 2b. Second dorsal fin considerably smaller than first 4
- 3a. Snout short, preoral length much less than mouth width. Upper and lower teeth with narrow, unserrated cusps *N. acutidens*
- 3b. Snout longer, preoral length almost equal to mouth width. Upper teeth with broad, triangular, serrated cusps; lowers with narrow, smooth cusps *L. temminckii*
- 4a. Head greatly depressed and trowel-shaped. Pectoral fins broadly triangular, length from origin to free rear tips almost equal to their anterior margins. Free rear tips of first dorsal fin about over midbases of pelvic fins. Postventral margin of caudal fin usually only shallowly concave *S. laticaudus*
- 4b. Head varying from conical to slightly depressed. Pectoral fins narrow, length 4/5 or less of anterior margin (generally less). Free rear tip of dorsal fin over (or usually anterior to) pelvic fin origin. Post ventral margin of caudal fin deeply incised 5
- 5a. Second dorsal fin origin well posterior to anal fin origin, generally over or slightly ahead of anal fin insertion. Preanal ridges very long and conspicuous, subequal to or greater in length than anal fin base. Posterior border of anal fin straight or slightly concave 6
- 5b. Second dorsal fin origin generally near anal fin origin, in some species posterior to it, but generally well anterior to anal fin insertion. Preanal ridges variably developed, short and half the anal fin base

- length or less. Posterior border of anal fin deeply concave or deeply notched 8
- 6a. Eyes with posterior notches present. Lateral furrows reduced and confined to mouth corners. First dorsal fin base 2 to 3 times in distance between pectoral and pelvic fins *L. macrorhinus*
- 6b. Eyes without notches. Labial furrows generally conspicuous and long, (reduced in *R. oligolinx*). First dorsal fin base generally less than 2 times in distance between pectoral and pelvic fin bases (up to 2 in adult *R. acutus*) 7
- 7a. Upper labial furrows reduced and often inconspicuous, 0.3 to 1.3% of total length. Total hyomandibular pores on both sides of head behind angle of mouth usually less than 16 *R. oligolinx*
- 7b. Upper labial furrows long and rather conspicuous, 1.4 to 2% of total length. Total hyomandibular pores on both sides of head behind angle of mouth usually more than 16 *R. acutus*
- 8a. Second dorsal fin with a prominent black tip but other fins plain *C. dussumieri*
- 8b. Second dorsal fin plain, white or black-tipped. If black, it never the only fin with markings 9
- 9a. Interdorsal ridge present 10
- 9b. Interdorsal ridge absent 11
- 10a. Second dorsal fin low, with very elongated inner margin over twice fin height. Upper anterolateral teeth with strongly serrated cusps; generally 12 rows of upper anteroposterior teeth *C. sorrah*
- 10b. Second dorsal fin higher, with shorter inner margin 1.4 to 1.6 times fin height. Upper anterolateral teeth with smooth or weakly serrated cusps; 14 or 15 rows of upper anteroposterior teeth *C. hemiodon*
- 11a. Entire posterior margin of caudal fin with a narrow but obvious black edge; pectoral, first and second dorsal and caudal fins with prominent black tips *C. melanopterus*
- 11b. Posterior margin of caudal fin not black or only partly dusky or black; fins black-tipped or not 12
- 12a. Origin of second dorsal fin well behind anal fin origin, about opposite its midbase *C. macroti*
- 12b. Origin of second dorsal fin over anal fin origin *C. limbatus*
- Fisheries information :** *C. sorrah* are generally found in south-east coast and the rest species are found in both the coasts of our country. The livers are utilized for vitamin oils, hides are utilized for leathers, fins are used for shark-fin soup base and carcasses are utilized for fishmeal extracted from *C. limbatus*, *C. longimanus*, *C. cuvier*, *L. temminckii*, *N. acutidens*, *P. glauca* and *T. obesus*. *G. cuvier* and *P. glauca* have been recognized as big game fish by the International Game Fish Association.

Family 13 SPHYRNIDAE (Hammerhead sharks)

Head with laterally expanded blades, like a double-bitted axe. Eyes with internal nictitating eyelids. Spiracles absent. First dorsal fin anterior to pelvic fin bases, varying from equidistant between pectoral and pelvic fin bases to closer to pectoral fin bases; midpoint of first dorsal fin base always anterior to pelvic fin origins. Second dorsal fin much smaller than first. Precaudal pits present. Ventral caudal lobe strong, undulations or ripples present in dorsal caudal border. Intestine with a scroll valve. Colour light grey or brownish above, white below or no colour pattern.

Species known to occur in Tamil Nadu

1. *Eusphyra blochii* (Cuvier) (Winghead shark)
2. *Sphyrna lewini* (Griffith & Smith) (Scalloped hammerhead shark)
3. *S. zygaena* (Linnaeus) (Smooth hammerhead shark)

Key to the species

- 1a. Lateral blades of head very narrow and wing-like. Nostrils greatly enlarged, their

widths 0.8 to 0.9 times in the internarial width and almost twice the mouth width. Knobs present along anterior border of head, opposite nostrils *E. blochii*

1b. Lateral blades of head anteroposteriorly broad, not wing-like. Nostrils short, their widths 7 to 14 times in internarial width and less than half of mouth width. No knobs along anterior border of head 2

2a. A conspicuous median indentation on anterior border of head. Free rear tip of second dorsal fin almost reaching upper caudal origin. Anal fin base noticeably larger than that of second dorsal fin
..... *S. lewini*

2b. No median indentation on anterior border of head. Free rear tip of second dorsal fin considerably anterior to upper caudal origin. Anal fin base as large as second dorsal fin base..... *S. zygaena*

Fisheries information : *S. zygaena* is found in the south-east and south-west coasts and the rest two species are in both the coasts of our country. The flesh of the hammerhead sharks are utilized for human consumption, hides are processed for leather, fins are used in the shark-fin soup base, livers are processed for vitamins and carcasses for fishmeal.

Order 4 PRISTIFORMES

Family 14 PRISTIDAE (Sawfishes)

Body shark-like and snout markedly produced into a narrow, flat blade, armed with teeth-like structures (saw-like). Gill openings on ventral side. Eyes and spiracles on top of head. Two dorsal fins widely separated. Pectoral fins small. Caudal fin well developed. Tail not marked off from the trunk. Body, fins and rostrum covered with small, closely set dermal denticles in adults but juveniles of *Anoxypristis* are completely naked.

Species known to occur in Tamil Nadu

1. *Anoxypristis cuspidata* (Latham) (Pointed sawfish)

2. *Pristis microdon* Latham (Small toothed sawfish)

3. *P. zijsron* Bleeker (Longcomb sawfish)

Key to the species

1a. Rostral teeth depressed, broad and blade-like, in shallow broad sockets on the rostrum. Caudal fin with a prominent subterminal notch and long ventral lobe. Rostral teeth 24 to 25 pairs
..... *A. cuspidata*

1b. Rostral teeth narrow, not greatly depressed and spike-like, in deep, narrow sockets on the rostrum. Caudal fin without a subterminal notch, with a short ventral lobe or none 2

2a. First dorsal fin almost entirely anterior to pelvic fins. Rostral teeth 17 to 22 pairs ...
..... *P. microdon*

2b. First dorsal fin distinctly posterior to origin of pelvic fin. Rostral teeth 25 to 32 pairs
..... *P. zijsron*

Fisheries information : *A. cuspidata* is a monotypic and euryhaline species and is generally found on the east coast of our country especially in the Tamil Nadu coast. The livers of the sawfishes are used for extraction of oils, which contain high percentage of vitamin A and flesh is utilized for human consumption.

Order 5 TORPEDINIFORMES

Key to the families

1a. Disc truncate or emarginate anteriorly. Jaws extremely slender. Labial cartilage absent. Rostrum absent or reduced
..... TORPEDINIDAE

1b. Disc roundish anteriorly. Jaws stout. Labial cartilage strong. Rostrum present 2

2a. Deep groove around mouth and lips. Jaws long and strongly protractile. Rostrum broad. Generally two dorsal fins
..... NARCINIDAE

2b. Shallow groove around mouth. Jaws short and weakly protractile. Rostrum narrow. Generally a single dorsal fin
..... NARKIDAE

Family 15 TORPEDINIDAE
(Electric rays)

Body soft and flabby with powerful electric organs, derived from branchial muscles in the head region. Disc truncate or emarginate anteriorly. Caudal fin well developed. Labial cartilage absent. Rostrum absent or reduced. Two spineless dorsal fins inserted on tail region. Pelvic fins well developed. Anal fin absent.

Species known to occur in Tamil Nadu

Torpedo panthera Olfers (Electric ray)

Fishries information : Electric ray is a littoral species and its flesh is edible. This species can produce electric current over 100 volts. Its electric nervous energy gets exhausted easily.

Family 16 NARCINIDAE
(Numbfishes)

Body soft and flabby with electric organs derived from branchial muscles present in the head region. Disc roundish anteriorly. Deep groove present around mouth and lips. Jaws long and highly protractile. Rostrum broad. Two spineless dorsal fins present on tail region. Dorsal fins, pelvic fins and caudal fin well developed. Anal fin absent.

Species known to occur in Tamil Nadu

1. *Narcine brunnea* Annandale (Brown electric ray)
2. *N. indica* Henle (Blotched Electric ray)
3. *N. timlei* (Bloch & Schneider) (Spotted electric ray)

Key to the species

- 1a. Mouth without buccal process. Disc surface uniform brown *N. brunnea*
- 1b. Mouth with a pair of buccal processes. Disc surface with dark spots 2
- 2a. Interdorsal space 2.0 times in first dorsal fin base. Teeth in 27 rows in upper jaw and 26 rows in lower jaw *N. indica*
- 2b. Interdorsal space 1.5 times in first dorsal

fin base. Teeth in 23 rows in upper jaw and 21 rows in lower jaw *N. timlei*

Fisheries information : The fishes of this family have no commercial value and are occasionally captured as by catch.

Remarks : *N. indica* is currently considered as a junior synonym of *N. timlei*, while Misra (1969) considered it as *N. maculata*.

Family 17 NARKIDAE
(Numb-fish)

Body soft and flabby with disc roundish anteriorly. Shallow groove present around mouth. Jaws stout and weakly protractile. Rostrum narrow. Dorsal fin one, well developed. Pelvic fins and caudal fin also well developed. Anal fin absent. Electric organs present on disc, used to stun the prey.

Species known to occur in Tamil Nadu

1. *Narke dipterygia* (Bloch & Schneider) (Spottail sleeper ray)

Fisheries information : The numb fishes are of no commercial value and these fishes are occasionally captured as by catch.

Remarks : *Bengalichthys impennis* Annandale is a junior synonym of *N. dipterygia*.

Order 6 RAJIFORMES

Key to the families

- 1a. Caudal fin bilobed. First dorsal fin inserted above pelvic fin bases. Posterior margins of pectoral fin considerably anterior to pelvic fins origin RHYNCHOBATIDAE
- 1b. Caudal fin not bilobed. First dorsal fin inserted considerably posterior to hind tip of pelvic fins. Posterior margins of pectoral fins extend rearward as far or further than origin of pelvic fins RHINOBATIDAE

Family 18 RHINOBATIDAE
(Guitar fishes)

Body more or less intermediate between shark-like and skate-like. Anterior part of trunk

varying from more or less flattened to strongly flattened body. Snout elongate and tapering. Hind border of pectoral fins extending rearward as far or further than origin of pelvic fins. Tail stout and not definitely marked off from body. Two well developed dorsal fins and a caudal fin. Caudal fin without a distinct lower lobe. Denticles over body constitute a row on middle of back.

Species known to occur in Tamil Nadu

1. *Rhinobatos granulatus* Cuvier (Granulated shovelnose ray)
2. *R. obtusus* Muller and Henle (Grey guitarfish)
3. *R. thouniana* (Shaw) (Shaw's shovelnose guitarfish)
4. *R. variegatus* Nair and Mohan (Variegated shovelnose guitarfish)

Key to the species

- 1a. Anterior nasal valve extending only as far as level of inner (anterior) margin of nostril.
..... *R. variegatus*
- 1b. Anterior nasal valve extending across inner (anterior) margin of nostril, sometimes that of opposite side 2
- 2a. Length of nostril less than twice width of mouth, greater than distance between them
..... *R. thouniana*
- 2b. Length of nostril 2 to 3 times width of mouth, almost equal to internarial length
..... 3
- 3a. Snout very long and narrow; rostral ridges close together throughout their length. Width of mouth 2.6 to 3.25 times in snout length *R. granulatus*
- 3b. Snout short and narrow; rostral ridges separated by a considerable distance throughout their length. Width of mouth about 1.9 times in snout length
..... *R. obtusus*

Fisheries information : The guitarfishes are of no economic value. These fishes are found in good number along with the catches of other batoid fishes.

Family 19 RHYNCHOBATIDAE (Wedgefishes)

Head depressed with broad rounded or long pointed snout. First dorsal fin insertion above pelvic fins. Pelvic fins inserted considerably posterior to pectoral fins. Pectoral fins well ahead of pelvic fins origin. Caudal fin bilobed, subcaudal fin well developed.

Species known to occur in Tamil Nadu

1. *Rhina ancylostoma* Schneider (Bowmouth guitarfish)
2. *Rhynchobatus djiddensis* (Forsskal) (Whitespotted guitarfish)

Key to the species

- 1a. Snout long and pointed. Posterior border of spiracles with two continuous folds. Mouth slightly undulated, with median projection of lower jaw fitting into a corresponding depression in upper jaw ...
..... *R. djiddensis*
- 1b. Snout broad and rounded. Spiracular folds absent. Mouth deeply undulated, with three forward projections of lower jaw corresponding with three indentations of upper jaw *R. ancylostoma*

Fisheries information : *R. ancylostoma* is a monotypic species, usually found in both the coasts of our country. *R. djiddensis* grows up to 240 kg. The livers of this fish produce a good quality of liver oil. Its flesh is also considered nourishing when consumed salted or fresh.

Order 7 MYLIOBATIFORMES

Key to the families

- 1a. Eyes and spiracles on top of head. No distinct dorsal fin 2
- 1b. Eyes and spiracles on sides of head. Dorsal fin present 3
- 2a. Disc extremely broad, more than 1.5 times broader than long. Tail slender, shorter than disc width. No buccal papillae on floor of mouth GYMNURIDAE

- 2b. Disc at least 1.3 times as broad as long. Tail (if complete) much longer than disc width. Floor of mouth with several papillae DASYATIDAE
- 3a. Head with to widely separated anterior horn-like projections (cephalic fin) resemble ears MOBULIDAE
- 3b. Head with one soft fleshy lobe (subrostral lobe) protruding markedly forward under the head resemble a duck's beak..... 4
- 4a. Subrostral lobe (snout) undivided. Floor of mouth with several fleshy papillae MYLIOBATIDAE
- 4b. Subrostral lobe deeply incised in middle, thus forming two basally continuous lobes. Floor of mouth without papillae..... RHINOPTERIDAE

Family 20 MYLIOBATIDAE
(Eagle rays)

Head elevated and conspicuously marked off from disc. Disc rhomboic, much broader than long, its width in adults of different species up to more than 2.5 m. Head distinct with lateral prominent eyes. Anterior subdivision of pectoral fins form a single subrostral lobe. Floor of mouth with several fleshy papillae. Tail long and whip-like and much longer than disc, a serrated spine (or spines) at its base.

Species known to occur in Tamil Nadu

1. *Aetobatus narinari* (Euphrasen) (Spotted eagle ray)
2. *Aetomylaeus maculatus* (Gray) (Mottled eagle ray)
3. *A. nichofii* (Schneider) (Nieuhof's eagle ray)

Key to the species

- 1a. Single series of large teeth only in each jaw. Caudal spine (s) present *A. narinari*
- 1b. Teeth in three series in each jaw. No caudal spine 2
- 2a. Dorsal fin insertion behind pelvic fin base. Disc with whitish spots or rings on dark background *A. maculatus*

- 2b. Dorsal fin insertion above end of pelvic fin base. Disc with 3 to 5 greyish blue bands *A. nichofii*

Fisheries information : The eagle rays are generally common in the commercial catches in our country. These fishes are usually processed for fishmeal. The oil extracted from the livers of these fishes is utilized for smearing boats.

Family 21 RHINOPTERIDAE
(Cownosed rays)

Head elevated and distinctly marked off from the disc. Head broad and conspicuous with a soft bilobed subrostral lobe on its lower surface, anterior border of head concave. Floor of mouth with papillae. Tail long, slender, and whip-like with dorsal fin above basal portion and serrated spine further back.

Species known to occur in Tamil Nadu

1. *Rhinoptera adpersa* Muller and Henle (Rough cownosed ray)
2. *R. javanica* Muller and Henle (Javanese cownose ray)

Key to the species

- 1a. Teeth normally in 7 series in each jaw *R. javanica*
- 1b. Teeth in 9 series in upper jaw; in 7 series in lower jaw *R. adpersa*

Fisheries information : The cownosed rays are of little economic value. These fishes are often found in the commercial catches of our country.

Family 22 MOBULIDAE
(Devil rays, Mantas)

Rays with a broad rhomboic disc. Tail conspicuously marked off from body, very long and whip-like. Head distinct from disc, on each side of snout is a fleshy projection, a cephalic fin or 'horn' separated by width of mouth which is either terminal or below head. Eyes and spiracles on sides of head. A small fin present at base of tail. Caudal fin absent.

Species known to occur in Tamil Nadu

1. *Manta birostris* (Dandroff) (Manta ray)
2. *Mobula eregoodootenkee* Garman (Pigmy devil ray)

Key to the species

- 1a. Mouth terminal, extending across front of head *M. birostris*
- 1b. Mouth on lower surface of head
..... *M. eregoodootenkee*

Fisheries information : The Devil rays are mainly utilized for the preparation of fishmeal and their livers are processed for oil, used for smearing boats.

Family 23 DASYATIDAE
(Sting rays, Whiprays)

Disc kite-like, flattened, outer front margin of pectoral fins continuous along side of head. A long tail distinct from disc, with one or more long poisonous spines. Dorsal and caudal fin absent. Spiracles large, close to posterior of eyes on top of head. Pelvic fins small, inserted below pectoral fins.

Species known to occur in Tamil Nadu

1. *Dasyatis kuhlii* (Muller and Henle) (Blue spotted sting ray)
2. *D. zugei* (Muller and Henle) (Pale-edged sting ray)
3. *Himantura bleekeri* (Blyth) (Whiptail sting ray)
4. *H. fava* (Annandale) (Honeycomb whip ray)
5. *H. imbricata* (Schneider) (Scaly sting ray)
6. *H. jenkinsii* (Annandale) (Sharpnose sting ray)
7. *H. uarnak* (Forsskal) (Honeycomb sting ray)
8. *H. walga* (Muller and Henle) (Scaly sting ray)
9. *Pasinachus sephen* (Forsskal) (Drab sting ray)
10. *Urogymnus asperrimus* (Bloch and Schneider) (Thorny sting ray)

Key to the species

- 1a. Tail without serrated spine. Upper surface of disc profusely covered with tubercles ..
..... *U. asperrimus*
- 1b. Tail with serrated spine. Upper surface of disc sparsely covered with tubercles 2
- 2a. Tail with a longitudinal cutaneous fold 3
- 2b. Tail without a longitudinal cutaneous fold
..... 5
- 3a. Tail with very prominent cutaneous fold (only on lower side), lower tailfold very prominent, its height 2 or 3 times in height of tail above fold *P. sephen*
- 3b. Tail with a short cutaneous fold (on both sides) 4
- 4a. Floor of mouth without buccal processes. Disc plain dusky brown *D. zugei*
- 4b. Floor of mouth with two buccal processes. Disc brown with reddish margin
..... *D. kuhlii*
- 5a. Disc oval; usually with two functional stings
..... 6
- 5b. Disc diamond shaped; usually with single functional sting 9
- 6a. Dorsal surface of disc with well marked reticulated pattern *H. fava*
- 6b. Dorsal surface of disc plain 7
- 7a. Ventral side of disc with a broad blackish margin *H. bleekeri*
- 7b. Ventral side of disc entirely white 8
- 8a. Eye diameter 6.0 times in snout and 3.5 times in interorbital width. Caudal spine short, shorter than 1/2 eye diameter
..... *H. imbricata*
- 8b. Eye diameter 5.5 times in snout and 3.3 times in interorbital width. Caudal spine elongate, longer than 1/2 eye diameter
..... *H. walga*
- 9a. Disc surface brown to black with honey comb or reticulated pattern in adult, 'leopard' pattern in young. Mouth with 4 buccal processes *H. uarnak*

- 9b. Disc surface plain brown. Mouth with 2 buccal processes. *H. marginatus*

Fisheries information : The liver of *P. sephen* is utilized for the preparation of oil, which contains high vitamin A potency. The flaps of the Stingrays and Whip rays are utilized for the preparation of fishmeal.

Family 24 GYMNURIDAE
(Butterfly rays)

Disc rhomboic, at least 1.5 times broader than long. Tail conspicuously marked off, slender and shorter than disc; with longitudinal folds on upper and/or lower surface. Some species have spiracular tentacles and one or more long, saw-edged tail spines. Caudal fin absent.

Species known to occur in Tamil Nadu

1. *Gymnura japonica* (Schlegel) (Japanese butterfly ray)
2. *G. micrura* (Bloch & Schneider) (Smooth butterfly ray)
3. *G. poecilura* (Shaw) (Longtail butterfly ray)

Key to the species

- 1a. Tail armed with a small, weak, serrated spine at its first third *G. japonica*
- 1b. Tail without serrated spine 2
- 2a. Tail almost equal to length of disc
..... *G. poecilura*
- 2b. Tail length less than half length of disc ...
..... *G. micrura*

Fisheries information : The Butterfly rays are utilized for the preparation of fishmeal. These fishes are common in the commercial catches but are of no commercial value.

Class OSTEICHTHYES
(Bony fishes)

- 1a. Body not bilaterally symmetrical, highly flattened. Eyes present on one side of body only. Dorsal and anal fins long
..... PLEURONECTIFORMES

- 1b. Body bilaterally symmetrical. Eyes present on both sides of body 2
- 2a. Gill openings below or posterior to pectoral fins. First spine of dorsal fin modified into a fishing pole. Body globose or depressed LOPHIFORMES
- 2b. Gill openings anterior to pectoral fins 3
- 3a. Body greatly elongate, cylindrical and eel-like. Gill openings narrow, on sides of head. Fin spines absent ANGUILLIFORMES
- 3b. Body not very elongate and eel-like, but if eel-like, then either the gill openings not separate from each other (as in true eel) but united on ventral side of body near throat, or pelvic fins present, or spiny rays in dorsal and anal fins, or else gill cavity not enlarged 4
- 4a. Snout considerably elongate, tube-like, with the mouth at the end of tube. Pelvic fins, when present, abdominal. Gill tufted, lobe-like SYNGNATHIFORMES
- 4b. Snout not tubular, but if it resemble a tube then pelvic fins under or not far behind pectoral fins and as a rule with a strong spine 5
- 5a. Snout beak-like with upper and/or lower jaws greatly prolonged or with enlarged wing-like pectoral fin and sometimes also pelvic fins. Lateral line near ventral profile of body. A single dorsal fin consisting of soft rays. Pelvic fins abdominal
..... BELONIFORMES
- 5b. Snout not beak-like without prolongation of upper or lower jaw. Pectoral fins not greatly elongated, if so not wing-like 6
- 6a. Pelvic fins with 2 rays. Dorsal and anal fins united with caudal fin
..... OPHIDIFORMES
- 6b. Pelvic fins with more than 2 rays. Dorsal and anal fins not united with caudal fin 7
- 7a. Body without scales but a bony head shield often present. Barbels well developed, present around mouth. A strong spine

- generally present at front of dorsal and pectoral fins. An adipose fin often present**SILURIFORMES**
- 7b. Body with scales. Barbels usually not present, if present poorly developed. Adipose fin generally absent 8
- 8a. Mouth very small. Gill openings restricted (small). Scales usually modified into spines, shields or plates**TETRAODONTIFORMES**
- 8b. Mouth moderate. Gill openings normal. Scales not modified as in 8a 9
- 9a. Head generally with well-developed spines. Cheeks with a bony strut (posterior extension of suborbital bone to preopercle). Pectoral fins usually rounded. Caudal fin rarely forked**SCORPAENIFORMES**
- 9b. Head and cheeks without spines and bony strut. Pectoral fin not rounded 10
- 10a. Head large and depressed, body compressed. Eyes dorsolateral. Body without scales... **BATRACHOIDIFORMES**
- 10b. Head not depressed. Eyes lateral. Body with scales 11
- 11a. Mesocoracoid present 12
- 11b. Mesocoracoid absent 14
- 12a. Lateral line absent. Body generally compressed**CLUPEIFORMES**
- 12b. Lateral line present 13
- 13a. Jaws toothless. Branchiostegal rays 3 or 4**GONORHYNCHIFORMES**
- 13b. Jaws with tooth. Branchiostegal rays 6 to 35 **ELOPIFORMES**
- 14a. Adipose dorsal fin usually present. Premaxillae form the gape of mouth (maxillae extended). Photophores often present **AULOPIFORMES**
- 14b. Adipose dorsal fin absent 15
- 15a. Fins without spine. Pelvic fins widely separated. First dorsal fin with a single ray **GADIFORMES**

- 15b. Fins with spines. Pelvic fins close together 16
- 16a. A silvery stripe present on side. Anal fin generally with one spine**ATHERINIFORMES**
- 16b. A silvery stripe absent on side. Anal fin generally with more than one spine 17
- 17a. Orbitosphenoid present **BERICIFORMES**
- 17b. Orbitosphenoid absent ... **PERCIFORMES**

Order 8 ELOPIFORMES

Key to the families

- 1a. Mouth inferior, snout projecting beyond tip of lower jaw. Bony gular plate between arms of lower jaw small **ALBULIDAE**
- 1b. Mouth terminal or superior. Gular plate clearly visible between arms of lower jaw 2
- 2a. Lateral line with 30 to 40 scales. Last dorsal fin ray filamentous **MEGALOPIDAE**
- 2b. Lateral line scales 95 to 120 scales. Last dorsal fin ray not filamentous **ELOPIDAE**

Family 25 ELOPIDAE

Body cylindrical, elongate and fusiform. Mouth terminal, gape of mouth well posterior to hind margin of the orbit. A fairly large bony gular plate present below mouth, between the arms of the lower jaw. Dorsal fin with 20 to 25 unbranched soft rays, last ray not elongated; inserted almost middle of the body. Anal fin with 18 to 20 rays, inserted considerably posterior to dorsal fin. Lateral line with 95 to 120 scales.

Species known to occur in Tamil Nadu

Elops machnata (Forsskal) (Lady fish)

Fisheries information : The ladyfishes are generally abundantly found in the east coast of our country. These fishes are of minor commercial importance.

Family 26 MEGALOPIDAE
(Tarpons)

Body more or less compressed and almost deep. Mouth terminal or superior, its gape not extending hind border of the orbit. A bony gular plate present below mouth between the arms of lower jaw. Dorsal fin with 13 to 21 unbranched soft rays, the last ray elongated and filamentous. Anal fin with 22 to 31 soft rays, inserted slightly behind last dorsal fin ray. Lateral line with 30 to 40 scales.

Species known to occur in Tamil Nadu

Megalops cyprinoides (Broussonet) (Indo-Pacific tarpon)

Fisheries information : *M. cyprinoides* is a carnivorous and fast growing fish. It occurs in both the coasts of our country.

Family 27 ALBULIDAE
(Bonefishes)

Body elongate, fusiform. It resembles clupeoid fishes but possesses a lateral line containing 66 to 84 scales. Snout conical, projecting beyond tip of lower jaw; mouth inferior. Bony gular plate between the arms of lower jaw small and often overlooked. Branchiostegal rays 10 to 16. Fins without spines. A single dorsal fin with 16 to 21 rays. Pelvic fin with 10 to 14 rays. Gillrakers 15 to 17. Head scaleless, body scales small.

Species known to occur in Tamil Nadu

Albula vulpus (Linnaeus) (Bonefish)

Fisheries information : An edible fish, but with numerous fine bones. Occasionally forms a part of commercial catches.

Order 9 ANGUILLIFORMES

Key to the families

- 1a. Body with minute embedded scales
..... ANGUILLIDAE
- 1b. Body without scales 2
- 2a. Large canine teeth (usually fang-like) on vomer (medially on roof of mouth) 3

- 2b. Vomer without large canine teeth 4
- 3a. Well developed pectoral fins present
..... MURAENESOCIDAE
- 3b. Pectoral fins absent MURAENIDAE
- 4a. Gape of mouth generally extending beyond orbits. Pectoral fins present or absent. Branchiostegal rays overlapping midventrally. Hind nostrils openings inside mouth, on upper lip or just above mouth
..... OPHICHTHIDAE
- 4b. Gape of mouth never extending beyond orbits. Pectoral fins always present. Branchiostegal rays not overlapping ventrally. Hind nostrils not labial, but lateral or superior 5
- 5a. Dorsal and anal fins reduced, confined to posterior part of body. Lower jaw projecting
..... MORINGUIDAE
- 5b. Dorsal and anal fins well developed. Lower jaw not projecting CONGRIDAE

Family 28 ANGUILLIDAE
(Freshwater eels)

Body eel-like, cylindrical anteriorly with minute embedded scales. Mouth terminal or slightly oblique, gape never extending posterior much beyond orbits. Gill slits vertical, below origin of pectoral fins. Fins without spines. Dorsal and anal fins confluent with caudal fin. Dorsal fin inserted variously between pectoral fins and vent or over vent, in anterior part of body. Pelvic fins absent. Pectoral fins well developed. Lateral line systems present but not conspicuous, typically a series of minute, white pores. Usually freshwater eels are catadromous fishes.

Species known to occur in Tamil Nadu

1. *Anguilla bengalensis bengalensis* (Gray and Hardwicke) (Long-finned eel)
2. *A. bicolor bicolor* McClelland (Shrotfin eel)

Key to the species

- 1a. Dorsal fin inserted above vent or almost near to it *A. bicolor bicolor*

- 1b. Dorsal fin inserted above almost in the middle of gill slits and vent
.....*A. bengalensis bengalensis*

Fisheries information : *A. bengalensis bengalensis* is one of the most important commercial eels and fairly abundant along both the coasts of our country. *A. bicolor bicolor* appears not so much commonly found like the former. There is a good export market for both live elvers as well as eels.

Family 29 MORINGUIDAE

Body extremely elongate, thread-like. Gill openings low on body. Dorsal and anal fin reduced, placed posterior to anus and confluent with the caudal fin. Pectoral fins reduced or absent. Eyes small and covered with skin. No scales on body.

Species known to occur in Tamil Nadu

Moringua raitaborua (Hamilton) (Purple spaghetti eel)

Fisheries information : Of no fishery importance.

Family 30 MURAENIDAE (Moray eels)

Body cylindrical and eel-like, almost compressed along tail. Body without scales. Mouth wide, maxilla extending well behind the orbits. Teeth usually sharp, mostly raptorial but sometimes molar-like. Teeth on vomer uniserial or in a median multiserial patch. Gill slits restricted to small roundish lateral openings. Fins without spines. Dorsal and anal fins confluent posteriorly with the caudal fin. Pectoral and pelvic fins absent.

Species known to occur in Tamil Nadu

1. *Echidna nebulosa* (Ahl) (Starry moray)
2. *E. zebra* (Shaw and Nodder) (Zebra moray eel)
3. *Gymnothorax punctata* (Bloch & Schneider) (White spotted moray)
4. *G. reticularis* Bloch (Reticulated moray)

5. *Lycodontis favagineus* (Bloch & Schneider) (Blacklined moray)
6. *L. undulatus* (Lacepede) (Leopard moray)
7. *Siderea picta* (Ahl) (Painted moray)
8. *S. thyrsoidea* (Richardson) (Slender moray)
9. *Strophidon sathete* (Hamilton) (Giant slender moray eel)

Key to the species

- 1a. Teeth mostly blunt, some even molar-like, particularly those on roof of mouth 2
- 1b. Teeth sharp, some of them fang-like or shark-like 3
- 2a. Body deep blackish brown with numerous narrow, yellow, vertical bars, some of which join each other and which turn white on preservation. Vent considerably behind midpoint of body *E. zebra*
- 2b. Body yellowish brown with 3 longitudinal series of darker star-shaped spots along body. Vent almost in midpoint of body ...
..... *E. nebulosa*
- 3a. Tail almost twice as long as rest of body
..... *S. sathete*
- 3b. Tail less than 1.5 times rest of body 4
- 4a. Lateral jaw teeth with some serrations on their margins 5
- 4b. Lateral jaw teeth without serrations 6
- 5a. Body yellowish brown with reticulations, spots and 14 or 15 dark cross-bars, more distinct on tail *G. reticularis*
- 5b. Body purplish brown with white dots smaller than eye and increasing in size posteriorly *G. punctatus*
- 6a. One or more long median depressible fangs in front of upper jaw 7
- 6b. No long median depressible fangs in upper jaw, at most a single median stout conical tooth in front 8
- 7a. Background of body light, the whole head and body with large dark blotches, as honey combing, dark area greater than light background *L. favagineus*

- 7b. Background of body light with large brown blotches arranged more or less regularly and separated by narrow pale lines that occur more or less as irregular vertical streaks posteriorly..... *L. undulatus*
- 8a. Teeth in upper jaw in one row. Body grey or whitish with fine dots *S. picta*
- 8b. Teeth in upper jaw in two rows. Body brownish, dotted and speckled with darker brown and white *S. thyrsoides*

Fisheries information : *S. sathete* is the largest known species used as fish bait. The moray eels are of no commercial value.

Family 31 OPHICHTHIDAE (Snake or worm eels)

Body cylindrical, snake-like or worm-like. Body without scales. Mouth terminal or inferior, maxilla generally extending posterior to the orbits. Teeth on jaws highly variable, strong and fang-like or small and pointed or blunt and granular; teeth on vomer either in 1 to 3 or in a solid patch. Gill openings small, slit-like or rounded. Fins without spines. Dorsal and anal fins, when present, continuous around the tail externally, or discontinuous, with the caudal fin rays reduced. Pectoral fins either present or absent. Pelvic fins absent.

Species known to occur in Tamil Nadu

1. *Bascanichthys deraniyagalai* Menon (Indian longtailed sand eel)
2. *Lamnostoma orientalis* (McClelland) (Oriental worm eel)
3. *Ophichthus apicalis* Bennett (Pointed-tail snake eel)
4. *O. cephalozona* (Bleeker) (Dark shouldered snake eel)
5. *O. microcephalus* Day (Day's snake eel)
6. *Pisodonophis boro* (Hamilton) (Bengal's snake eel)
7. *P. cancrivorus* (Richardson) (Longfin snake eel)

Key to the species

- 1a. Pectoral fins much reduced or absent. Dorsal and anal fins low but distinct 2
- 1b. Pectoral fins present, generally well developed. Median fins generally elevated, developed 3
- 2a. Dorsal fin originates well forward on head. Gill openings low-lateral, crescentic. Body depth more than 50 times in total length *B. deraniyagalai*
- 2b. Dorsal fin originates above or behind gill openings. Gill openings entirely ventral. Body depth less than 30 times in total length *L. orientalis*
- 3a. Teeth molariform or granular. Pectoral fins broad based 4
- 3b. Teeth pointed. Pectoral fin base restricted, opposite upper half of gill openings 5
- 4a. Dorsal fin origin above middle of pectoral fins *P. cancrivorus*
- 4b. Dorsal fin origin behind end of pectoral fins *P. boro*
- 5a. Head and trunk combined about equal to tail *O. cephalozona*
- 5b. Head and trunk combined 1.5 to more times in tail 6
- 6a. Teeth in upper jaw in a single row on sides of jaws *O. apicalis*
- 6b. Teeth in upper jaw in 3 rows on sides of jaws *O. microcephalus*

Fisheries information : The snake eels are of little commercial value. *L. orientalis* is a very common species generally abundant in the east coast of our country.

Family 32 CONGRIDAE (Conger eels)

Body eel-like and cylindrical, generally with a thin, delicate tail region that is readily damaged and body without scales. Mouth usually slightly inferior but sometimes terminal. Maxilla never extending beyond the orbits. Teeth on vomer typically a triangular or oval, multiserial patch but may also be uniserial.

Nostrils separated, the anterior one is not tubular; the posterior nostril lateral or superior, as a simple aperture anterior to eyes. Gill slits ahead of pectoral fins. Dorsal and anal fins continuous around tail. Dorsal fin inserted almost above gill openings. Pectoral fins present but pelvic fins absent.

Species known to occur in Tamil Nadu

1. *Ariosoma anago* (Temminck & Schelegel) (Silver conger)
2. *A. gnanadossi* Talwar and Mukherji
3. *Uroconger lepturus* (Richardson) (Slender conger eel)

Key to species

- 1a. Snout equal to eye diameter. Vomerine teeth present, teeth 2 or 3 rows in jaws. .
..... *U. lepturus*
- 1b. Snout shorter than eye diameter. Vomerine teeth absent, teeth in several rows in jaws.
..... 2
- 2a. Head and trunk combined 1.5 times in tail length *A. gnanadossi*
- 2b. Head and trunk combined 0.95 to 1.13 times in tail length *A. anago*

Fisheries information : The slender conger eels are of minor commercial values. These fishes are generally locally consumed by poor people.

Family 33 MURAENESOCIDAE (Pike congers)

Body cylindrical, eel-like without scales and with compressed tail. Mouth terminal, maxilla extending well beyond the orbits. Snout very pointed. Teeth large, prominent especially in front; sharp, multiserial on jaws and typically in 3 rows on vomer – a median row of canines flanked on each side by a row of much smaller teeth. Gill slits large, vertical or oblique, anterior to pectoral fins. Dorsal fin inserted almost above gill slits. Dorsal and anal fins united with caudal fin. Pectoral fins present but pelvic fins absent. Fins without spines.

Species known to occur in Tamil Nadu

1. *Congresox talabon* (Cuvier) (Yellow pike conger)
2. *C. talabonoides* (Bleeker) (Indian pike conger)
3. *Muraenesox bagio* (Hamilton) (Common pike-conger)
4. *M. cinereus* (Forsskal) (Daggertooth pike conger)

Key to the species

- 1a. Largest teeth on lower jaw laterally compressed, sharp, with conspicuous anterior and posterior basal bulges, erect; principal teeth on vomer similar to jaw teeth 2
- 1b. Largest teeth on lower jaw conical, not laterally compressed, very sharp, without basal bulges, but with slightly swollen tips, directed outward; principal teeth on vomer similar but sometimes with weak basal bulges in juveniles 3
- 2a. Snout longer and narrower, interorbital width 10 to 11 times in head; lateral line pores 33 to 39 before vent; dorsal fin rays 47 to 59 before level of vent *M. bagio*
- 2b. Snout shorter and broader, interorbital width about 8 times in head; lateral line pores 39 to 47 before vent; dorsal fin rays 66 to 78 before level of vent
..... *M. cinereus*
- 3a. Length of pectoral fins almost 4 times in head length. Teeth on vomer needle-like, with minute, basal cusps. Dorsal fin rays 57 to 68 before vent *C. talabonoides*
- 3b. Length of pectoral fins almost 3 times in head length. Teeth on vomer needle-like; without basal cusps. Dorsal fin rays 70 to 75 before vent *C. talabon*

Fisheries information : Indian conger pike and Daggertooth pike congers are two important commercial fishes occur in both the coasts of our country.

Order 10 CLUPEIFORMES

Key to the families

- 1a. Articulation of lower jaw well behind the orbits, lower jaw generally slender. Snout 'pig-like' structure and projecting. Mouth inferior ENGRAULIDIDAE
- 1b. Articulation of lower jaw below the orbit. Lower jaw deep. Mouth terminal 2
- 2a. Abdomen without scutes (including pelvic scutes). Upper jaw with two fang-like teeth, pointing forward. Body elongate and highly compressed..... CHIROCENTRIDAE
- 2b. Abdomen usually with scutes (pelvic scutes always present). Canine teeth rare, never pointing, directing forward in upper jaw. Body oval or rounded in cross section .. 3
- 3a. Anal fin with more than 30 rays. Lower jaw projecting, mouth directed almost upward PRISTIGASTERIDAE
- 3b. Anal fin with less than 30 rays CLUPEIDAE

Family 34 CLUPEIDAE
(Herrings, Sardines)

Body fusiform with a complete series of scutes along the abdomen (pelvic scutes always present). Mouth terminal with minute or small jaw teeth. Dorsal fin short, inserted almost near middle of body. Anal fin short, inserted well behind the dorsal fin. Pelvic fins inserted anterior, below or just posterior to dorsal fin. Body with 40 to 50 scales in lateral series.

Species known to occur in Tamil Nadu

1. *Amblygaster clupeioides* Bleeker (Sharpnose sardinella)
2. *A. sirm* (Walbaum) (Spotted sardinella)
3. *Anodontostoma chacunda* (Hamilton) (Chacunda gizzard shad)
4. *Dussumieria acuta* Valenciennes (Rainbow sardinella)
5. *D. elopsoides* Bleeker (Slender rainbow sardinella)
6. *Ehirava fluviatilis* Deraniyagala (Malabar sprat)
7. *Escualosa thoracata* (Valenciennes) (White sardine)
8. *Hilsa kelee* (Cuvier) (Kelee shad)
9. *Nematalosa galathea* Nelson & Rothman (Galathea gizzard shad)
10. *N. nasus* (Bloch) (Bloch's gizzard shad)
11. *Sardinella albella* (Valenciennes) (White sardinella)
12. *S. brachysoma* (Steindachner) (Deepbody sardinella)
13. *S. dayi* Regan (Day's sardinella)
14. *S. fimbriata* (Valenciennes) (Fringescale sardinella)
15. *S. gibbosa* (Bleeker) (Goldstripe sardinella)
16. *S. longiceps* Valenciennes (Indian oil sardinella)
17. *S. melanura* (Cuvier) (Blacktip sardinella)
18. *S. sindensis* (Day) (Sind sardinella)
19. *Tenuulosa ilisha* (Hamilton) (Hilsa shad)
20. *T. toli* (Valenciennes) (Toli shad)

Key to the species

- 1a. Pelvic scutes W-shaped. No other scutes along belly 2
- 1b. Pelvic scute with ascending arms. Scutes present before and behind pelvic fins... 3
- 2a. Body deeper, generally 22 to 29% of standard length. Lower gillrakers fewer (19 to 26). Posterior part of scales marked with numerous tiny radiating striae *D. acuta*
- 2b. Body slender, depth generally 16 to 22% of standard length. Lower gillrakers more (21 to 32). No striae on posterior part of scales *D. elopsoides*
- 3a. Upper jaw with a distinct median notch or cleft when seen from front..... 4
- 3b. Upper jaw rounded when seen from front 9

- 4a. Lower jaw normal. Mouth terminal. Last dorsal fin ray normal 5
- 4b. Lower jaw flared outward. Mouth generally inferior. Last dorsal fin ray filamentous in some species 7
- 5a. Fronto-parietal striae (on top of head) many (8 to 14). Gillrakers on inner arches distinctly curled outward. Scales perforated *H. kelee*
- 5b. Frontoparietal striae weakly developed, generally hidden by skin. Gillrakers on inner arches straight. Scales not perforated 6
- 6a. Head length 28 to 32% of standard length. Gillrakers numerous, almost 100 to 250 on lower arm of 1st arch. Caudal fin 25 to 31% of standard length. A dark blotch behind gill openings, followed by a series of small spots along flank *T. ilisha*
- 6b. Head length 25 to 27% of standard length. Gillrakers fewer, 60 to 100 on lower arm of 1st arch (barely more after 10 cm standard length). Caudal fin 31 to 34% of standard length. A dark diffuse mark behind gill opening; no other spots on flank *T. toli*
- 7a. Last dorsal fin ray normal, not filamentous *A. chacunda*
- 7b. Last dorsal fin ray produced, filamentous 8
- 8a. A pair of grooves in the spongy skin on top of head, converging posteriorly. Hind margin of scales not toothed *N. galathea*
- 8b. No grooves in the spongy skin on top of head. Hind margin of scales toothed *N. nasus*
- 9a. Only 2nd (posterior) supramaxilla present *E. fluviatilis*
- 9b. First (anterior) and 2nd (posterior) supramaxilla present 10
- 10a. Hind margin of gill opening evenly rounded, without fleshy outgrowth *E. thoracata*
- 10b. Hind margin of gill opening with two distinct fleshy outgrowth 11
- 11a. Lower gillrakers 26 to 43. A median row of predorsal scales 12
- 11b. Lower gillrakers rarely less than 40 (mostly 45 to 90, but over 200 in some species). Predorsal scales usually paired 13
- 12a. A series of 10 to 20 gold (in life) or black (on preservation) spots down the flanks. Lower gill rakers 33 to 43 *A. sirm*
- 12b. No spots on flanks. Lower gillrakers 26 to 33 *A. clupeoides*
- 13a. Pelvic fin with 9 rays. Pseudobranch long, with distinct ventral ridge. Epibranchial gillrakers curled upwards. Lower gillraker on first arch 145 to 258 *S. longiceps*
- 13b. Pelvic fin with 8 rays. Pseudobranch short, flat. Epibranchial gillrakers almost straight. Lower gillraker on first arch not more than 130 14
- 14a. Caudal fin tips jet black. Lower gillrakers on first arch 38 to 74 (at 75 to 100 mm standard length). Abdominal scutes usually 16 to 17 + 12 to 13 *S. melanura*
- 14b. Caudal fin tips plain, at most caudal margin dusky. Lower gillrakers on first arch 43 to 132 15
- 15a. Post-pelvic scutes 12 to 14 (rarely 11 or 15) 16
- 15b. Post-pelvic scutes usually 15 (less common 14, rarely 13) 19
- 16a. Gillrakers 90 to 132 (at 87 to 116 mm standard length) on lower arm of first arch *S. dayi*
- 16b. Gillrakers 43 to 82 on lower arm of first arch 17
- 17a. Posterior scales with numerous vertical striae, overlapping at center of scale *S. brachysoma*
- 17b. Posterior scales with 4 or 5 vertical striae, interrupted at center of scales 18
- 18a. Lower gillrakers on first arch 40 to 67 (50 to 130 mm standard length). Body depth 24 to 39% of standard length ... *S. albella*

- 18b. Lower gillrakers on first arch 53 to 82 (50 to 130 mm standard length). Body depth 25 to 35 % of standard length *S. fimbriata*
- 19a. Lower gillrakers on first arch 38 to 65 (at 40 to 170 mm standard length). Many perforations on exposed portion of scales *S. gibbosa*
- 19b. Lower gillrakers on first arch to 50 to 77 (at 50 to 140 mm standard length). Rather few perforations on exposed portion of scales *S. sindensis*

Fisheries information : The herrings and sardines are very important commercial fishes. These fishes are abundantly found throughout our coastal line. *T. ilisha* is one of the very important commercial fishes of our country. It is well known anadromous migratory fish, entering all the major river systems of India. *H. kelee* is a monotypic species, found seasonally abundant in the south-east and south-west coasts of our country.

Family 35 PRISTIGASTERIDAE (Pristigasterids)

Body more or less compressed, abdomen with sharp median keel of scutes. Mouth moderate, terminal; lower jaw projecting. Teeth in jaws very small. Dorsal fin short, inserted ahead of middle of body in deep forms, but behind in elongate forms and sometimes missing (in *Raconda*). Anal fin long, with more than 30 rays. Pelvic fin with 6 or 7 rays or entirely absent. Body with 35 to 55 thin and easily shade scales in the lateral series.

Species known to occur in Tamil Nadu

1. *Ilisha elongata* (Bennett) (Elongate ilisha)
2. *I. filigera* (Valenciennes) (Coromandel ilisha)
3. *I. kampeni* (Weber & de Beaufort) (Kampen's ilisha)
4. *I. megaloptera* (Swainson) (Bigeye ilisha)
5. *I. melanostoma* (Schneider) (Indian ilisha)
6. *I. obfuscata* Wongratana (Hidden ilisha)
7. *I. sirishai* Seshagiri Rao (Lobejaw ilisha)
8. *I. striatula* Wongratana (Banded ilisha)
9. *Opisthopterus tardoore* (Cuvier) (Longfinned herring)
10. *Pellona dayi* Wongratana (Day's pellona)
11. *P. ditchella* Valenciennes (Indian pellona)
12. *Raconda russeliana* Gray (Russell's smoothback herring)

Key to the genera and species

- 1a. Toothed hypo-maxilla present 2
- 1b. No toothed hypo-maxilla present 3
- 2a. Lower gillrakers 20 to 21 on first arch. Vertical scale striae not meeting at center of scale *P. dayi*
- 2b. Lower gillrakers 22 to 27 on first arch. Vertical scale striae overlapping at center of scale *P. ditchella*
- 3a. Dorsal and pelvic fins absent. Anal fin very long with 81 to 92 fin rays *R. russeliana*
- 3b. Dorsal fin present and pelvic fins either present or absent. Anal fin not very long with 34 to 65 fin rays 4
- 4a. Anal fin long with 51 to 65 fin rays. Pelvic fins absent *O. tardoore*
- 4b. Anal fin moderate with 34 to 53 fin rays. Pelvic fins present 5
- 5a. Swimbladder without a posterior tube passing backward into the body muscles *I. sirishai*
- 5b. Swimbladder with long one or two post coelomic extensions 6
- 6a. Swimbladder with one post coelomic extension on right side of body 7
- 6b. Swimbladder with two post coelomic extensions 9
- 7a. Total scutes 30 to 32 *I. megaloptera*
- 7b. Total scutes 34 to 42 8

- 8a. Body depth 31 to 35 % of standard length. Pectoral fin tip reaching pelvic fin base *I. filigera*
- 8b. Body slender, its depth 27 to 31% of standard length. Pectoral fin tip not reaching pelvic fin base (in adults) *I. elongata*
- 9a. Total gillrakers on lower arm of first arch 27 *I. obfuscata*
- 9b. Total gillrakers on lower arm of first arch less than 27 10
- 10a. Vertical striae on scales traversing whole scale or overlapping across center of scale *I. melanostoma*
- 10b. Vertical striae on scales not continuous, but with a distinct gap across center of scale 11
- 11a. Pectoral fin length 15 to 17% of standard length *I. kampeni*
- 11b. Pectoral fin length 18 to 21% of standard length *I. striatula*

Fisheries information : The fishes of this family are of little commercial value. *O. tardoore* is a very common species found in both the coasts of our country. *R. russeliana* is a monotypic species generally abundantly found in the east coast of our country.

Family 36 ENGRAULIDIDAE (Anchovies)

Body cylindrical, usually fusiform and sometimes greatly compressed (body tapering to a point in the Grenadier anchovies, *Coilia*). Abdomen generally with scutes. Snout prominent and generally 'pig-like' and projecting. Mouth conspicuously inferior. Posterior tip of maxilla extending far, sometimes projecting beyond operculum. Fins without spines. Pectoral fins inserted low on body, sometimes with free upper rays or filamentous rays. Dorsal fin generally short and inserted at midpoint of body. Caudal fin generally forked but sometimes tapering to a point. Body sometimes with light organs along sides.

Species known to occur in Tamil Nadu

1. *Coilia dussumieri* Valenciennes (Gold-spotted grenadier anchovy)
2. *C. neglecta* Whitehead (Neglected grenadier anchovy)
3. *C. reynaldi* Valenciennes (Karua grenadier anchovy)
4. *Encrasicholina heteroloba* (Ruppell) (Short head anchovy)
5. *Setipinna taty* (Valenciennes) (Hairfin anchovy)
6. *S. tenuifilis* (Valenciennes) (Govadari anchovy)
7. *Stolephorus andhraensis* Babu Rao (Andhra anchovy)
8. *S. bagenensis* Hardenberg (Bagan Anchovy)
9. *S. commersonii* Lacepede (Commerson's anchovy)
10. *S. indicus* (van Hasselt) (Indian anchovy)
11. *S. insularis* (Hardenberg) (Hardenberg's anchovy)
12. *S. waitei* Jordan and Seale (Spotty-face anchovy)
13. *Thryssa dayi* Wongratana (Day's thryssa)
14. *T. dussumieri* (Valenciennes) (Dussumier's thryssa)
15. *T. hamiltoni* (Gray) (Hamilton's thryssa)
16. *T. malabarica* (Bloch) (Malabar thryssa)
17. *T. mystax* (Schneider) (Moustached thryssa)
18. *T. polybranchialis* Wongratana (Humphead thryssa)
19. *T. purava* (Hamilton) (Oblique jaw thryssa)
20. *T. setirostris* (Broussonet) (Long jaw thryssa)
21. *T. vitrirostris* (Gilchrist and Thompson) (Orange mouth thryssa)

Key to the genera and species

- 1a. Body tapering, "rat tailed" Caudal fin small, rhomboid. Anal fin long, confluent

- with caudal fin. Five to 14 upper pectoral fin rays unbranched and free from each other 2
- 1b. Body normal, not greatly tapering and rat tailed. Caudal fin large, forked. Anal fin short or moderate, not confluent with caudal fin. Upper pectoral fin rays not detached from each other 4
- 2a. Pectoral filaments 10 to 14 ... *C. reynaldi*
- 2b. Pectoral filaments 6 (rarely 5) 3
- 3a. Longitudinal rows of pearl spots (light organs) on flanks present *C. dussumieri*
- 3b. Pearly spots on flanks absent *C. neglecta*
- 4a. Only needle-like prepelvic scutes present. Anal fin short, with less than 25 rays ... 5
- 4b. Prepelvic and post pelvic scutes present. Anal fin long, with more than 25 rays 11
- 5a. Isthmus muscle not reaching forward to hind border of gill membrane. Urohyal exposed *E. heteroloba*
- 5b. Isthmus muscle reaching to and beyond gill membrane. Urohyal not exposed 6
- 6a. Hind border of preoperculum indented near tip of maxilla 7
- 6b. Hind border of preoperculum rounded near tip of maxilla 9
- 7a. Spine on pelvic scute and predorsal spine present; gillrakers on lower arm of first gill arch usually 20 to 23 *S. baganensis*
- 7b. No spine on pelvic scute and no predorsal spine; gillrakers on lower arm of first gill arch usually 20 to 28 8
- 8a. Double pigment line along back behind dorsal fin present; body deep, its depth equal to upper jaw *S. insularis*
- 8b. No double pigment line along back behind dorsal fin, melanophores irregularly scattered or absent; body slender, its depth less than upper jaw *S. andhraensis*
- 9a. Maxilla tip reaching to or only just beyond front margin of preoperculum. Pelvic fin tips failing to reach vertical from dorsal fin origin. 3 to 5 prepelvic scutes *S. indicus*
- 9b. Maxilla tip reaching to or beyond posterior margin of preoperculum 10
- 10a. Pelvic fin tips reaching well past vertical from dorsal fin origin. A pair of dark predorsal lines on back *S. commersonii*
- 10b. Pelvic fin tips not reaching to vertical from dorsal fin origin. No dark lines on back. *S. waitei*
- 11a. Upper pectoral fin ray produced into a filament 12
- 11b. Upper pectoral fin ray not extending as a filament 13
- 12a. Gillrakers on lower arm of first arch 13 to 14. Belly scutes 25 to 27. *S. tenuifilis*
- 12b. Gillrakers on lower arm of first arch 17 to 21. Belly scutes more than 30 *S. taty*
- 13a. Maxilla reaches beyond pectoral fin tip; lower jaw with high coronoid process *T. setirostris*
- 13b. Maxilla not reaching pectoral fin tip. Lower jaw slender 14
- 14a. Maxilla long, reaching to pectoral fin base or beyond 15
- 14b. Maxilla short, not reaching to pectoral fin base 18
- 15a. Anal fin with 40 to 49 branched rays; first pectoral fin ray filamentous in some specimens *T. dayi*
- 15b. Anal fin with 40 to 49 branched rays. 16
- 16a. Lower gillrakers 13 to 16 on first arch, the serrae not clumped *T. mystax*
- 16b. Lower gillrakers 16 to 24 on first arch, the serrae in distinct clumps 17
- 17a. Maxilla reaching atleast half way along pectoral fin length; postpelvic scutes 6 to 9; anterior supramaxilla absent; lower

- gillrakers 17 to 19 (rarely 20)
 *T. dussumieri*
- 17b. Maxilla shorter, reaching up to $\frac{1}{3}$ along pectoral fin; postpelvic scutes 8 to 12; anterior supramaxilla generally present; lower gillrakers 18 to 24 (usually 20 to 23)
 *T. vitrirostris*
- 18a. Lower gillrakers on first arch 11 to 15; branched anal fin rays 32 to 39
 *T. hamiltoni*
- 18b. Lower gillrakers on first arch 17 to 27 ...
 19
- 19a. Lower gillrakers 25 to 27; branched anal fin rays 35 to 39 *T. polybranchialis*
- 19b. Lower gillrakers 17 to 21 20
- 20a. Branched anal fin rays 33 to 38; teeth on jaws small *T. malabarica*
- 20b. Branched anal fin rays 38 to 44; enlarged teeth on lower jaw only *T. purava*

Fisheries information : The anchovies are important commercial fishes of our country. The fishes of the genus *Stolephorus* are important food fishes. *C. dussumieri* is a common species found in both the coasts of our country.

Family 37 CHIROCENTRIDAE (Wolf herrings)

Body greatly elongate and compressed with small, cycloid scales. Jaws with fang-like teeth. Dorsal fin with 16 to 19 rays, inserted posterior to middle of body. Anal fin with 32 to 35 rays, inserted below vertical from front of dorsal fin base. Pectoral fins inserted low on body, with 13 to 15 rays. Pelvic fins with 6 to 7 rays, inserted about in the middle of pectoral fin base and origin of anal fin. Fins without spines. Caudal fin deeply forked.

Species known to occur in Tamil Nadu

1. *Chirocentrus dorab* (Forsskal) (Dorab wolf-herring)
2. *C. nudus* Swainson (Whitefin wolf herring)

Key to the species

- 1a. Upper part of dorsal fin black. Pectoral fin length almost equal to length from center of eye to posterior border of operculum .
 *C. dorab*
- 1b. Dorsal fin white or colourless. Length of pectoral fin longer than length from center of eye to posterior border of operculum .
 *C. nudus*

Fisheries information : *C. nudus* contributes 80% of the total catch of the wolf herrings. *C. dorab* is found in both the coasts but 76% of the catch comes from the east coast.

Order 11 GONORHYNCHIFORMES

Family 38 CHANIDAE (Milkfish)

Body elongate and almost compressed with small cycloid scales. Mouth small and terminal. Maxilla extending to middle of the orbit. Gular plate absent in between the arms of the lower jaw. Dorsal fin with 13 to 17 rays, inserted almost in the middle of body. Anal fin with 9 to 11 rays, inserted close to caudal fin. Dorsal fin and anal fins with basal sheath of scales. Pelvic and pectoral bases with large axillary scales. Fins without spines. Caudal fin deeply forked. Lateral line present.

Species known to occur in Tamil Nadu

Chanos chanos (Forsskal) (Milkfish)

Fisheries information : The milkfish can be cultured in the tanks and ponds where the water is slightly saline. It is an important commercial fish, found in both the coasts of our country.

Order 12 SILURIFORMES

Key to the families

- 1a. Dorsal and anal fins long and united with the caudal fin. Barbels 4 pairs. Adipose dorsal fin absent PLOTOSIDAE
- 1b. Dorsal and anal fins small and not united with the caudal fin. Barbels 1 to 3 pairs, or entirely absent. Adipose fin present
 ARIIDAE

Family 39 ARIIDAE
(Sea catfishes)

Body elongate without scales. Head covered with plates. Teeth on palate villiform or conical, granular or molar-like, arranged in 1 to 3 patches on each side of palate. Barbels generally 3 pairs, nasal barbels absent. Dorsal and pectoral fins with spines. A short adipose dorsal fin present. Caudal fin forked.

Species known to occur in Tamil Nadu

1. *Arius arius* (Hamilton) (Threadfin sea catfish)
2. *A. caelatus* Valenciennes (Engraved sea catfish)
3. *A. crossocheilus* Bleeker (Rough back sea catfish)
4. *A. dussumieri* Valenciennes (Blacktip sea catfish)
5. *A. jella* Day (Blackfin sea catfish)
6. *A. maculatus* (Thunberg) (Spotted sea catfish)
7. *A. platystomus* Day (Flat mouth sea catfish)
8. *A. sagor* (Hamilton) (Sagor sea catfish)
9. *A. sona* (Hamilton) (Sona sea catfish)
10. *A. subrostratus* (Valenciennes) (Shovelnose sea catfish)
11. *A. tenuispinis* Day (Thinspine sea catfish)
12. *A. thalassinus* (Ruppell) (Giant sea catfish)
13. *Batrachocephalus mino* (Hamilton) (Beardless sea catfish)
14. *Osteogeneiosus militaris* (Linnaeus) (Soldier sea catfish)

Key to the species

- 1a. One or two pair of barbels..... 2
- 1b. Three pairs of slender barbels (1 pair maxillary and 2 pairs mandibular)..... 3
- 2a. One pair of stiff and semiosseous maxillary barbel (no mental barbels) .. *O. militaris*
- 2b. Only 1 or 2 pairs of very small mental barbels (no maxillary barbels).... *B. mino*

- 3a. Teeth on palate as a single patch on each side..... 4
- 3b. Teth on palate in 2 or 3 patches on each side..... 10
- 4a. Teeth on palate as a triangular or oval small patch 5
- 4b. Teeth on palate as an elliptical, large patch 7
- 5a. Maxillary barbels short, not extending beyond orbit. Snout long and spatulate.. *A. subrostratus*
- 5b. Maxillary barbels long, extending beyond orbit. Snout short, obtusely rounded 6
- 6a. Head shield strongly granulated behind orbit, with a conical protuberance above eye, tapering as a wide "Y" towards occiput *A. caelatus*
- 6b. Head shield not very granulated. Preorbital conical protuberance not well pronounced *A. platystomus*
- 7a. Teeth patch packed far back in buccal cavity. Dorsal fin spine slender, equal to or slightly longer than pectoral fin spine. Median longitudinal groove long, narrow, running onto supraoccipital process *A. tenuispinis*
- 7b. Teeth patch placed well forward in buccal cavity. Dorsal fin spine strong, equal to or shorter than pectoral fin spine. Median longitudinal groove shorter, not running onto supraoccipital process 8
- 8a. Teeth patches on palate fully elliptical, well forward, with densely packed teeth *A. maculatus*
- 8b. Teeth patches on palate irregularly ovate, not fully formed, with loosely packed teeth, inner margins of patches being not straight 10
- 9a. Anal fin with 14 to 16 rays (12 to 14 branched) *A. jella*
- 9b. Anal fin with 20 to 22 rays (14 to 16 branched) *A. arius*

- 10a. Teeth on palate in 3 patches on each side, triangular, villiform, the vomerine patch in the middle and the ectopterygoid patch either from the sides of the vomerine patch or below them, not fused in juveniles, but joined in adults *A. thalasinus*
- 10b. Teeth in palate in 2 patches on each side 11
- 11a. Patches of teeth on palate placed 1 below the other, the posterior patch very large, 3 or 4 times larger than anterior patch 12
- 11b. Patches of teeth on palate placed side by side and not below the other 13
- 12a. A preorbital oval protuberance of the lateral ethmoid present. ... *A. dussumieri*
- 12b. No such preorbital protuberance of lateral ethmoid *A. crossocheilus*
- 13a. Basal bone of dorsal fin very large and butterfly shaped *A. sagor*
- 13b. Basal bone of dorsal fin (predorsal plate) smaller, not butterfly-shaped *A. sona*

Fisheries information : The species of the family Ariidae are of important commercial fishes. These fishes are generally esteemed as food for human consumption. The swimbladder of these fishes are utilized for the manufacture of isinglass.

Family 40 PLOTOSIDAE (Eel catfishes)

Body elongate, almost eel-like without scales, tapering to a point posteriorly. Barbels 4 pairs, nasal and maxillary one pair each and mental 2 pairs. Dorsal fin two, first fin with 1 serrated spine and 4 to 6 soft rays and second fin with 69 to 143 soft rays. Pectoral fins with 1 serrated spine and 9 to 16 soft rays. Pelvic fins with 10 to 16 soft rays. Anal fin with 58 to 131 rays. Caudal fin united with second dorsal and anal fins.

Species known to occur in Tamil Nadu

1. *Plotosus canius* Hamilton (Eel catfish)

2. *P. limbatus* Valenciennes (Darkfin eel catfish)
3. *P. lineatus* (Thunberg) (Striped eel catfish)

Key to species

- 1a. Body generally with 2 or 3 pale lateral stripes. Maxillary barbels extending almost posterior to orbits *P. lineatus*
- 1b. Body without stripes. Maxillary barbels extending to or beyond opercular margin 2
- 2a. Eyes smaller, 7 to 12% in head length. Nasal barbels extending well behind eyes *P. canius*
- 2b. Eyes larger, 13 to 20% in head length. Nasal barbels shorter, extending only as far as hind border of eyes or slightly beyond *P. limbatus*

Fisheries information : The dorsal and pectoral fin spines of the eel catfishes contain venomous glands, therefore, great care has to be taken while handling these fishes. Death may even result during careless handling of these fishes.

Order 13 AULOPIFORMES

Key to families

- 1a. Caudal fin trilobed. Lateral line extending up to pointed median lobe of caudal fin HARPADONTIDAE
- 1b. Caudal fin forked 2
- 2a. Mouth lizard-like. Upper jaw extending beyond level of middle of orbits. Pectoral fins short, not extending beyond tip of dorsal fin SYNODIDAE
- 2b. Mouth not lizard-like. Upper jaw not extending beyond level of middle of eyes. Pectoral fins long, extending beyond tip of dorsal fin CHLOROPHTHALMIDAE

Family 41 SYNODIDAE (Lizardfishes)

Head usually lizard-like. Body elongate, generally cylindrical with adipose dorsal fin.

Mouth terminal, large with rows of small, slender and pointed teeth, visible even when the mouth is closed. Dorsal fin with 9 to 14 rays. Anal fin with 8 to 16 rays. Caudal fin forked. Body and head with scales. Lizardfishes not only resemble reptiles but also behave like that of reptiles. Most of their time is spent sitting on the bottom with the body at a slight angle, propped up on the front end by the pelvic fins, like a jet fighter ready to take off.

Species known to occur in Tamil Nadu

1. *Saurida gracilis* (Quoy & Gaimard) (Slender lizardfish)
2. *S. micropectoralis* Shindo and Yamda (Shortfin lizardfish)
3. *S. pseudotumbil* Dutt & Sagar (False Greater lizardfish)
4. *S. tumbil* (Bloch) (Greater lizardfish)
5. *S. undosquamis* (Richardson) (Brushtooth lizardfish)
6. *Synodus indicus* (Day) (Indian lizardfish)
7. *S. variegatus* (Lacepede) (Variegated lizardfish)
8. *Trachinocephalus myops* (Schneider) (Bluntnose lizardfish)

Key to species

- 1a. Pelvic fin with 9 rays, inner ray barely longer than outer. Palatine teeth in 2 pairs of bands 2
- 1b. Pelvic fin with 8 rays, inner ray much longer than outer. Palatine teeth in 1 pair of band 6
- 2a. Pectoral fins short, not reaching to level of pelvic fins origin *S. micropectoralis*
- 2b. Pectoral fins longer, reaching to or beyond level of pelvic fin base 3
- 3a. A series of (4 to 7) distinct dark dots on upper margin of caudal fin *S. undosquamis*
- 3b. No black dots on upper margin of caudal fin 4

- 4a. Dark cross-bars or a series of dark patches on all fins. Pectoral fin with 12 or 13 rays *S. gracilis*
- 4b. No dark patches or cross-bars on fin. Pectoral fin with 14 or 15 rays 5
- 5a. Pectoral fins extending up to pelvic fins origin *S. tumbil*
- 5b. Pectoral fin not extending to pelvic fin origin *S. pseudotumbil*
- 6a. Eyes nearer to anterior end of upper jaw. Head not depressed. Anal fin base longer than dorsal fin base *T. myops*
- 6b. Eyes opposite midpoint of upper jaw. Head depressed. Anal fin base shorter than dorsal fin base 7
- 7a. Anterior most palatine teeth longer than the more posterior teeth and in a discrete group *S. variegatus*
- 7b. Anterior palatine teeth not longer than others and not in a discrete group *S. indicus*

Fisheries information : Lizardfishes are of little commercial value. These fishes are marketed fresh or used for fishmeal.

Family 42 HARPADONTIDAE (Bombay ducks)

Body elongate and flat, compressed, generally with an adipose dorsal fin. Eyes very small, near snout, directed forward. Mouth very large, with slender, recurved and depressible teeth; lower jaw longer than upper. Dorsal fin inserted opposite to pelvic fins. Pelvic fins very long. Lateral line extending up to pointed median lobe of caudal fin. Caudal fin trilobed.

Species known to occur in Tamil Nadu

Harpadon nehereus (Hamilton) (Bombay duck)

Fisheries information : The Bombay duck constitute a major fishery of commercial importance, particularly in the Maharashtra and Gujrat coasts. Although these fishes are found in both the coasts of our country but almost 98% of its catch is obtained from the west coast.

Maharashtra stands first in the landing of these fishes followed by Gujrat in the west coast. The remaining 2% of the Bombay duck is captured along the east coast of our country. It is marketed fresh, salted dried or smoked.

Remarks : This group of fish currently placed under family Synodidae.

Order 14 GADIFORMES

Family 43 BREGMACEROTIDAE (Codlets, Codlings)

Body elongate, almost cylindrical. Snout short. Head small and more or less compressed. Dorsal fins two, the first dorsal inserted on nape with one elongated ray. Second dorsal fin and anal fins very long with large notch in middle. Pelvic fins inserted to throat with 5 rays, outer 3 rays elongate free filaments, extending backward up to one half length of the fish. Lateral line near to second dorsal fin.

Species known to occur in Tamil Nadu

Bregmaceros maclellandi Thompson (Indian cod)

Fisheries information : The Indian cod is generally abundant along the west coast. It forms a seasonal fishery around Bombay coast. It is marketed fresh.

Order 15 OPHIDIIFORMES

Key to families

- 1a. Anal fin origin under or anterior to dorsal fin origin CARAPIDAE
- 1b. Anal fin origin well behind dorsal fin origin 2
- 2a. Anterior nostril usually well above upper lip OPHIDIIDAE
- 2b. Anterior nostril usually immediately above upper lip BATHYTIDAE

Family 44 OPHIDIIDAE (Cusk eels, Brotulas)

Body elongate with a tapering caudal portion. Barbels present on snout and chin in

some species. Dorsal fin rays generally equal to or longer than opposing anal fin rays. Pelvic fins with one or 2 soft rays or absent, inserted close together below preopercle or further anterior. Dorsal and anal fins with long bases, confluent with caudal fin. Fins without spines.

Species known to occur in Tamil Nadu

Brotula multibarбата (Temminck & Schlegel) (Goatbeared brotula)

Fisheries information : The cusk eels are minor commercial value and are marketed fresh. *B. multibarбата* is occasionally found in the commercial catches.

Family 45 CARAPIDAE (Pearlfishes)

Body without scales, compressed or cylindrical tapering to a long slender tail. Mouth with fine teeth on jaws and palate, sometimes with large fang-like teeth. Gill membranes separate or united, always free from isthmus. Vent located below or anterior to pectoral fin base.

Species known to occur in Tamil Nadu

Carapus homei (Richardson) (Silver pearlfish)

Fisheries information : Of no fishery importance.

Remarks : This species is known to inhabit holothurian hosts.

Family 46 BATHYTIDAE (Bythitids)

Body more or less elongate. Dorsal and anal fins single, with long bases continuous with or adjoining the caudal fin. Pelvic fins in form of a single filamentous ray. Scales small and cycloid, absent in a few species. Gillrakers on first arch 6 or less.

Species known to occur in Tamil Nadu

Heptocara simum Alcock (Snub-nosed blind fish)

Fisheries information : Of no fishery importance.

Order 16 BATRACHOIDIFORMES

Family 47 BATRACHOIDIDAE (Toadfishes)

Body cylindrical and compressed posteriorly. Head and anterior part of body usually depressed. Mouth moderate with small conical teeth in both jaws and on palate. Gill openings a relatively large oblique slit above pectoral fin base. Operculum with 3 or 4 strong spines. Opercle usually with fleshy tentacles, around mouth and above eyes. Dorsal fin two, first dorsal fin with 3 spines, inserted just behind head. Second dorsal fin and anal fin with long bases. Pelvic fins jugular. Pectoral and caudal fins rounded. A moderate sized pocket may be present in upper part of pectoral fin axil. Body with three lateral lines along sides represented by a series of small bifid tentacles.

Species known to occur in Tamil Nadu

Austrobatrachus dussumieri (Valenciennes)
(Flat toadfish)

Fisheries information : The toadfishes are of no commercial importance. They are found in their artisanal or trawl fisheries. These fishes are utilized for the production of the fishmeal.

Order 17 LOPHIFORMES

Key to families

- 1a. Head and body not depressed, but globose and slightly compressed
..... ANTENNARIIDAE
- 1b. Head and body greatly depressed 2
- 2a. Head prolonged into a snout that overhangs the small mouth. Head broader and more strongly depressed, devoid of long, slender dorsal spine
..... OGCOCEPHALIDAE
- 2b. Head not prolonged, but rounded, with numerous sharp spines and ridges on dorsal and lateral surfaces
..... LOPHIIDAE

Family 48 LOPHIIDAE (Goosefishes)

Anterior part of body much depressed and very broad, posterior part tapering. Head rounded, with numerous sharp spines and ridges on dorsal and lateral surfaces. Mouth very large and wide, upper jaw protractile and lower jaw projecting; both having numerous long, sharp depressible teeth. Two dorsal fins, the first with 2 or 3 isolated slender spines on head (Cephalic spines) and second with 1 to 3 spines (often connected by a membrane, at least in juveniles) at the level of pectoral fins (post cephalic spines). Pectoral fin rays unbranched, terminating in small fleshy filaments. Anal fin with 6 to 11 rays, inserted below second dorsal fin. Caudal fin with 8 rays, outer 2 rays unbranched.

Species known to occur in Tamil Nadu

Lophiodes mutilus (Alcock) (Smooth angler)

Fisheries information : The goosefishes are of no commercial importance. These fishes are found in the bottom trawls as bycatch in the commercial fisheries.

Family 49 ANTENNARIIDAE (Anglers or frogfishes)

Body globose, slightly compressed. Mouth large, oblique to vertical, with numerous small teeth. Gill opening is a small pore present behind and below pectoral fin base. Illicium slender, esca well developed. Second and third dorsal fin spines free from soft dorsal fin. Pectoral fin base elongate and limb-like. Skin spinulose or naked, often with membranous filaments or flaps.

Species known to occur in Tamil Nadu

1. *Antennarius hispidus* (Bloch and Schneider) (Shaggy angler)
2. *A. nummifer* (Cuvier) (Ocellated fringed frogfish)

Key to species

- 1a. Illicium very short, with wedge-shaped tip
..... *A. nummifer*

- 1b. Illicium long, with lanceolate ciliated lobe
..... *A. hispidus*

Fisheries information : These fishes are of no economic importance and, hence, unwanted in commercial catches, but can be well utilized in aquarium trade.

Family 50 OGCOEPHALIDAE (Batfishes)

Body greatly depressed and flattened ventrally. Head broader and more strongly depressed, prolonged into a snout that overhangs the small mouth. A bifid spine of dorsal fin hangs down as a tentacle from beneath the snout and serves as a lure. Pelvic fins widely separated, stout and leg-like used for "walking" over the bottom. Pectoral fins large that extend out at sides of the head. Body with well developed tubercle-like scales.

Species known to occur in Tamil Nadu

Halieutaea stellata (Vahl) (Batfish)

Fisheries information : The batfishes are of no commercial importance. These fishes are sometimes found in the commercial catches.

Order 18 BELONIFORMES

Key to families

- 1a. Both upper and lower jaw extended into long beak with numerous needle-like teeth. Mouth large BELONIDAE
- 1b. Only lower jaw prolonged or none of jaws prolonged, with minute teeth or without teeth. Mouth small 2
- 2a. Lower jaw usually prolonged, much longer than upper. Pectoral and pelvic fins short HEMIRAMPHIDAE
- 2b. Both jaws short and normal, and not prolonged into a long beak. Pectoral fins strikingly long, extending beyond origin of dorsal fin. Pelvic fins exceptionally large in some species EXOCOETIDAE

Family 51 EXOCOETIDAE (Flying fishes)

Body elongate and cylindrical, flattened ventrally. Fins without spines. Dorsal and anal fins inserted far back on body. Pectoral fins considerably long, inserted high on sides, extending beyond dorsal fin origin. Pelvic fins inserted abdominal in position and greatly enlarged in many species. Caudal fin deeply forked, lower lobe longer than upper. Lateral line low on body.

Species known to occur in Tamil Nadu

1. *Cheilopogon cyanopterrus* (Valenciennes) (Margined flyingfish)
2. *C. furcatus* (Mitchill) (Spotfin flyingfish)
3. *C. nigricans* (Bennett) (African flyingfish)
4. *C. spilopterus* (Valenciennes) (Manyspotted flyingfish)
5. *Cypselurus oligolepis* (Bleeker) (Largescale flyingfish)
6. *C. poecilopterus* (Valenciennes) (Yellow-wing flyingfish)
7. *Exocoetus monocirrhus* Richardson (Barbel flyingfish)
8. *E. volitans* Linnaeus (Tropical two-wing flyingfish)
9. *Hirundichthys coromandelensis* (Hornell) (Coromandel flyingfish)
10. *H. oxycephalus* (Bleeker) (Bony flyingfish)
11. *Parexocoetus mento* (Valenciennes) (African sailfin flyingfish)
12. *Prognichthys brevipinnis* (Valenciennes) (Shortfin flying fish)

Key to species

- 1a. Pelvic fins short, not reaching anal fin origin (barely reaching in juveniles) 2
- 1b. Pelvic fins long, reaching beyond anal fin origin 4
- 2a. Pectoral fins not reaching beyond anal fin base, its length about 60% of standard

- length; pelvic fin insertion closer to anal fin origin than to pectoral fin base; lateral line with a branch extending to pectoral fin base; upper jaw protrusible.....
.....*P. mento*
- 2b. Pectoral fins reaching beyond anal fin base, its length about 69% of standard length; pelvic fin insertion nearer to pectoral fin base than to anal fin origin; lateral line without a branch extending to pectoral fin base; upper jaw not protrusible.....3
- 3a. Body depth usually greater than 20% of standard length; gillrakers 21 to 29 on first arch; 7 rows of scales between dorsal fin origin and lateral line*E. monocirrhus*
- 3b. Body depth usually less than 19% of standard length; gillrakers 29 to 37 on first arch; 6 rows of scales between dorsal fin origin and lateral line*E. volitans*
- 4a. Anal fin origin anterior to 3rd ray of dorsal fin; dorsal fin usually with less or equal number of rays than anal fin (rarely with 1 or 2 more) 5
- 4b. Anal fin origin under or behind 3rd ray of dorsal fin; dorsal fin rays usually 2 to 4 (rarely 1) more than the rays in anal fin 6
- 5a. Predorsal scales 28 to 32; jaw teeth in 3 or 4 irregular rows; pectoral fin with a broad pale transverse stripe and a pale margin *H. coromandelensis*
- 5b. Predorsal scales 32 to 35; jaw teeth in a single rows; pectoral fin with a small pale basal triangle and a narrow pale margin *H. oxycephalus*
- 6a. First 3 rays of pectoral fin unbranched ..
..... *P. brevipinnis*
- 6b. Only the first ray of pectoral fin unbranched..... 7
- 7a. Lower jaw usually a little shorter than upper jaw, and included beneath the upper jaw; at least some jaw teeth tricuspid.....
.....8
- 7b. Jaws subequal, or lower jaw a little longer than upper jaw; jaw teeth mostly unicuspid or with smaller supplementary cusps laterally 9
- 8a. Pectoral fin pale, with numerous dark spots arranged in bands; lateral line with 45 scales; juveniles with a chin barbel
.....*C. poecilopterus*
- 8b. Pectoral fin dark, without dark spots; lateral line with about 40 scales; juveniles without barbels *C. oligolepis*
- 9a. Pectoral fin of adults with small dark spots scattered on pale background; predorsal scales 30 to 32 *C. spilopterus*
- 9b. Pectoral fin without spots, uniformly dark or with pale cross bands 10
- 10a. Predorsal scales 33 to 41; pectoral fin uniformly dark, without transverse stripe *C. cyanopterus*
- 10b. Predorsal scales 24 to 33; pectoral fin dark, with a pale transverse stripe 11
- 11a. Dorsal fin with prominent dark spot; palatine teeth present; jaw teeth clearly noticeable; pelvic fin usually with a prominent black spot..... *C. nigricans*
- 11b. Dorsal fin uniformly pale; palatine teeth absent; jaw teeth barely visible; pelvic fin without spot *C. furcatus*
- Fisheries information* : The flying fishes are of very much of commercial importance. These fishes are marketed fresh. The importance of the fisheries of the flying fishes are increasing due to the rising popularity of the delicately flavoured and highly nutritious fishes.

Family 52 HEMIRAMPHIDAE (Halfbeaks)

Body greatly elongate. Lower jaw prolonged and a short triangular upper jaw. Fins without spines. Dorsal and anal fins inserted in posterior half of body. Pelvic fins with 6 soft rays, abdominal in position. Pectoral fins generally short. Lateral line originates from pectoral fins origin and then bends downward extending backward along the ventral border of body. Body with cycloid scales.

Species known to occur in Tamil Nadu

1. *Euleptorhamphus viridis* (van Hasselt) (Ribbon half beak)
2. *Hemiramphus far* (Forsskal) (Black-barred halfbeak)
3. *H. lutkei* (Valenciennes) (Lutke's half beak)
4. *Hyporhamphus dussumieri* (Valenciennes) (Dussumieri's half beak)
5. *H. limbatus* (Valenciennes) (Congaturi halfbeak)
6. *H. quoyi* (Valenciennes)
7. *H. xanthopterus* (Valenciennes)
8. *Rhynchorhamphus georgii* (Valenciennes) (Long billed half beak)
9. *R. malabaricus* Collette (Malabar halbeak)

Key to species

- 1a. Dorsal fin rays 20 to 25. Anal fin rays 20 to 25. Pectoral fins long, 25 to 28% of standard length. Pectoral fins rays 7 to 9 *E. viridis*
- 1b. Dorsal fin rays 12 to 18. Anal fin rays 10 to 19. Pectoral fins short, less than 20% of standard length. Pectoral fins rays 9 to 13 2
- 2a. Scales absent on snout. Preorbital ridge absent 3
- 2b. Scales present on snout. Preorbital ridge well developed 4
- 3a. Pectoral fins very long, reaching beyond anterior margin of nasal pit when folded, 4.8 to 5.4 times in standard length. Gillrakers on first arch 33 to 46, usually 36 to 43. No spots or vertical bars on sides *H. lutkei*
- 3b. Pectoral fins short, reaching anterior margin of nasal pit when folded, 5.4 to 6.6 times in standard length. Gillrakers on first arch 25 to 36, usually 33 or fewer. 3 to 9 (usually 4 to 6) vertical bars on sides *H. far*
- 4a. Nasal papillae fimbriate. Upper jaw arched. Gillrakers on first arch 47 to 78. Lateral

- line with two branches ascending behind opercle and pectoral fin origin 5
- 4b. Nasal papillae not fimbriate. Upper jaw flat or almost flat. Gillrakers on first arch 19 to 47. Lateral line with one branch ascending towards pectoral fin origin 6
- 5a. Upper jaw more highly domed, longer, its width 1.2 to 1.3 times in its length. Sum of dorsal and anal rays usually 29 or more (26 to 32) *R. georgii*
- 5b. Upper jaw less highly domed, about as long as wide, its width 0.95 to 1.2 times in its length. Sum of dorsal and anal rays usually 28 or less (25 to 30) *R. malabaricus*
- 6a. Preorbital canal simple, without posterior branch. Caudal fin weakly or moderately forked 7
- 6b. Preorbital canal T-shaped, with posterior branch. Caudal fin strongly forked, usually with elongate lower lobe 8
- 7a. Total gillrakers 46 to 53 on first arch, 40 to 47 on second arch *H. xanthurus*
- 7b. Total gillrakers 19 to 37 on first arch, 16 to 28 on second arch *H. limbatus*
- 8a. Upper jaw projection pointed. Gillrakers on first arch 36 to 47. Lower jaw moderately short, in adult fish its length up to 1.4 times in head length *H. dussumieri*
- 8b. Upper jaw projection blunt and rounded. Gillrakers on first arch 26 to 34. Lower jaw shorter, in adult fish its length up to 2 times in head length *H. quoyi*

Fisheries information : The halfbeaks are important commercial fishes. These fishes are of considerable fishery value in Tamil Nadu particularly at Rameswaram and Kilakarai from November to April. These fishes are utilized fresh, dried salted and smoked.

Family 53 BELONIDAE (Needlefishes)

Body considerably elongate with both upper and lower jaw extended into long beaks. Fins

without spines. Dorsal and anal fins inserted in posterior half of body. Pelvic fins inserted in abdominal position and with 6 soft rays. Pectoral fins short. Lateral line extending down from pectoral fin origin and then pass along ventral margin of sides.

Species known to occur in Tamil Nadu

1. *Ablennes hians* (Valenciennes) (Flat needlefish)
2. *Strongylura leiura* (Bleeker) (Banded needlefish)
3. *S. strogylura* (van Hasselt) (Spottail needlefish)
4. *Tylosurus acus melanotus* (Bleeker) (Agujon needlefish)
5. *T. crocodilus crocodilus* (Peron and Le Sueur) (Hound needlefish)

Key to species

- 1a. Body strongly laterally compressed and marked with a series of ventral bars. Anal fin with 24 to 28 rays.....*A. hians*
- 1b. Body rounded or squarish in cross-section. Body without vertical bars. Anal fin rays 13 to 23 2
- 2a. Dorsal fin rays 12 to 21. Caudal peduncle without keel. No expanded black posterior dorsal fin lobe at any size 3
- 2b. Dorsal fin rays 20 to 27. A darkly pigmented lateral keel on each side of caudal peduncle present. Juveniles with an expanded black lobe in the posterior part of dorsal fin 4
- 3a. Caudal fin rounded or truncate with a prominent black spot near its base; dorsal fin with 12 to 15 rays and anal fin with 15 to 18 rays *S. strongylura*
- 3b. Caudal fin emarginate without any black spot near its base; dorsal fin with 17 to 21 rays and anal fin with 23 to 25 rays *S. leiura*
- 4a. Dorsal fin rays 24 to 27 and anal fin rays 22 to 24. Upper jaw rather strongly curved

upward at its origin, so that an appreciable gap is formed between the jaws

..... *T. acus melanotus*

- 4b. Dorsal fin rays 20 to 24 and anal fin rays 19 to 22. Upper jaw straight, with no appreciable gap between the jaws
..... *T. crocodilus crocodilus*

Fisheries information : The needle fishes are of fairly commercial importance. These fishes are mostly utilized fresh and are very tasty for their excellent flavour.

Order 19 ATHERINIFORMES

Family 54 ATHERINIDAE (Siversides)

Body elongate, almost compressed and silvery. Mouth usually small, terminal or oblique. Dorsal fins two, well separated, first dorsal fin with a variable number of small, flexible spines. Second dorsal fin and anal fins each with one weak spine, one unbranched ray and a variable number of branched rays. Pectoral fins inserted high on body. Pelvic fins with one spine and 5 rays. Caudal fin almost forked. Lateral line absent. A midlateral band generally present, extending from upper angle of pectoral fins to caudal fin base.

Species known to occur in Tamil Nadu

1. *Atherinomorus duodecimalis* (Valenciennes) (Tropical silverside)
2. *A. lacunosus* (Forster) (Hardyhead silverside)

Key to species

- 1a. Midlateral scale count 33 to 38. Distal end of upper jaw extending backward slightly beyond vertical through anterior border of orbit *A. duodecimalis*
- 1b. Midlateral scale count 39 to 44. Distal end of upper jaw extending backward to vertical through anterior border of pupil *A. lacunosus*

Fisheries information : The silverside fishes are important fishes as forage for commercial fishes. These fishes are generally used as bait.

Order 20 BERYCIFORMES

Family 55 HOLOCENTRIDAE
(Squirrelfishes, Soldierfishes)

Body oblong and compressed. Margins of membrane bones of head serrated or with spines. Mouth terminal or lower jaw projecting. Dorsal fin with 11 or 12 stout spines and 12 to 17 rays, deeply (sometimes completely) notched between spinous and soft rays. The base of spinous part 2 to 3.5 times longer than soft part. Anal fin with 4 spines, the third spine, the stoutest and usually the longest. Pelvic fins with one spine and 7 soft rays. Caudal fin forked, with 17 branched rays. Body with ctenoid scales and complete lateral line.

Species known to occur in Tamil Nadu

1. *Myripristis botche* Cuvier (Blacktip soldierfish)
2. *M. murdjan* (Forsskal) (Blotcheye soldierfish)
3. *Sargocentron rubrum* (Forsskal) (Redcoat)

Key to species

- 1a. Anal fin rays 7 to 10. Preopercle corner with a sharp stout spine. Front of swimbladder blunt, with no connection to auditory bullae of skull..... *S. rubrum*
- 1b. Anal fin rays more than 10. Preopercle corner without a sharp spine. Front of swimbladder bifurcate, anterior projections connecting to auditory bullae of skull ... 2
- 2a. Snout 4.2 to 4.7 times in head. No scale in axil of pectoral fins. Colour silvery white, the edge of scales rimmed with red
..... *M. botche*
- 2b. Snout 4.9 to 5.3 times in head. Small scales present in axil of pectoral fins. Colour light red, the edge of scales brown
..... *M. murdjan*

Fisheries information : The soldierfishes are of little commercial importance. These fishes are caught as bycatch in the commercial trawls.

Order 21 SYNGNATHIFORMES

Key to families

- 1a. Head and body depressed, the scales fused into a bony armour. Large bony rostrum projecting over the small protrusible mouth. Pectoral fins enlarged, wing-like, horizontal..... PEGASIDAE
- 1b. Head and body elongated or S-shaped with curled prehensile tail, or the body deep and compressed. Mouth at the end of a long tubular snout 2
- 2a. Pelvic fins absent. Body encased in a series of bony rings. Gill opening restricted to a small pore on dorsolateral part of head
..... SYNGNATHIDAE
- 2b. Pelvic fins present. Body armoured or not. Gill openings not restricted 3
- 3a. Body compressed, covered with a smooth, stiff, transparent armour with a sharp ventral edge. Caudal and dorsal fins deflected to ventral edge of body. Caudal fin rounded..... CENTRISCIDAE
- 3b. Body depressed, naked. Caudal and dorsal fins in the usual positions. Caudal fin forked, the middle two rays fused and greatly elongated FISTULARIIDAE

Family 56 PEGASIDAE
(Seamoths)

Body armoured with bony rings; tail similar but flexible. Enlarged nasal bone forms rostrum projecting well forward above the small toothless mouth. Dorsal and anal fins with 5 rays each, placed in the tail region. Pectoral fins enlarged and horizontal. Pelvic fins abdominal, with 1 slender spine and 1 or 2 rays.

Species known to occur in Tamil Nadu

1. *Eurypegasmus draconis* (Linnaeus)
(Common seamothe)
2. *Pegasus volitans* Linnaeus (Longtail seamothe)

Key to species

- 1a. Tail short, with 8 rings and quadrangular posteriorly. Rostrum rounded in front. Two deep grooves behind head
 *E. draconis*
- 1b. Tail long, with 11 or 12 rings and flattened posteriorly. Rostrum sword-like. No grooves behind head *P. volitans*

Fisheries information : Of no interest to fisheries.

Remarks : Owing to have a strange shape and cryptic colour pattern these fishes are able to live among weeds undetected by predators. Their biology and breeding habits are unknown to science till date. This family is recently placed under a separate order Gasterosteiformes (Nelson, 1994).

Family 57 FISTULARIIDAE
 (Flutemouths, Cornetfishes)

Body greatly elongate, fleshy and compressed. Mouth small, at the tip of a long tubular snout. Dorsal and anal fins opposite and with short bases, with 14 to 17 soft rays. Pectoral fins with 13 to 17 rays. Pelvic fins with 6 rays, inserted in the abdominal position. Caudal fin with a long filamentous structure, extending from the middle of the lobes.

Species known to occur in Tamil Nadu

Fistularia petimba Lacepede (Red cornetfish)

Fisheries information : The cornetfishes are of little commercial importance. These fishes are used generally for fishmeal.

Family 58 CENTRISCIDAE
 (Razorfish)

Body elongate and strongly compressed. Head anteriorly ending in a long tubular snout; having a small terminal mouth. Two dorsal fins, the first one short and having one of its spines strong. Second dorsal fin and anal fins placed ventrally and of moderate extent. Pelvic fins spineless and rudimentary. Pectoral fins

inserted midway between the tip of snout and base of first dorsal spine.

Species known to occur in Tamil Nadu

Centriscus scutatus Linnaeus (Razorfish)

Fisheries information : The razor fishes are of no commercial value. These fishes are caught as a bycatch in the commercial catches and it is a common species found along the coast of Tamil Nadu.

Family 59 SYNGNATHIDAE
 (Sea horses, Pipefishes)

Body elongate, angular or laterally compressed or rounded. Head slender, generally with a produced tube-like snout. Mouth terminal and oblique. Dorsal fin with soft rays only. Pelvic fins absent. Caudal fin sometimes absent. Tail long, prehensile in Sea horses. Body completely armoured by bony scutes, arranged regularly in series and forming rings round the body.

Species known to occur in Tamil Nadu

1. *Hippichthys cyanospilos* (Bleeker) (Bluespeckled pipefish)
2. *Hippocampus kuda* Bleeker (Yellow seahorse)
3. *Microphis brachyurus* (Bleeker) (Short-tail pipefish)
4. *M. cuncalus* (Hamilton) (Crocodile-tooth pipefish)
5. *Syngnathoides biaculeatus* (Bloch) (Alligator pipefish)
6. *Trachyrhamphus longirostris* Kaup (Longsnout pipefish)
7. *T. serratus* (Schlegel) (Crested pipefish)

Key to species

- 1a. Caudal fin absent. Distal part of tail clearly prehensile, typically coiled ventrad in preservative 2
- 1b. Caudal fin present. Distal part of tail not clearly prehensile, not coiled ventrad in preservative 3

- 2a. Body depressed or subcylindrical. Head clearly angled (usually 70°) from longitudinal axis of body. Lateral trunk ridge confluent with inferior tail ridge. Tail rings 33 to 37. Dorsal fin rays 16 to 18 ..
..... *H. kuda*
- 2b. Body compressed. Head essentially in line with longitudinal axis of body. Lateral trunk ridge confluent with lateral tail ridge. Tail rings 40 to 54. Dorsal fin rays 37 to 50
..... *S. biaculeatus*
- 3a. Inferior trunk and tail ridges continuous. Trunk rings 12 to 14 *H. cyanospilos*
- 3b. Inferior trunk and tail ridge discontinuous, the lateral trunk ridge confluent with inferior tail ridge. Trunk rings 15 or more
..... 4
- 4a. Caudal fin rudimentary. Brood pouch in male subcaudal. Trunk rings 21 to 24, the first clearly larger than second 5
- 4b. Caudal fin well developed. Brood pouch in male abdominal. Trunk rings 15 to 25, the first not much larger than second 6
- 5a. Snout less than half head length, with serrated crest *T. serratus*
- 5b. Snout more than half head length, with low rough median ridge *T. longirostris*
- 6a. Opercle without supplemental ridges below longitudinal ridges. Dorsal fin rays 47 to 56. Trunk rings 16 to 18 and tail rings 24 to 27 *M. cuncalus*
- 6b. Opercle with one or more supplemental ridges below longitudinal ridges. Dorsal fin rays 37 to 41. Trunk rings 20 to 22 and tail rings 21 to 24 *M. brachyurus*
- 1b. Head not encased by bony armour 4
- 2a. Body covered by bony plates
..... PERISTEDIIDAE
- 2b. Body not covered by bony plates 3
- 3a. Preopercular spine very long. Dorsal fin with 1 or 2 spines on nape
..... DACTYLOPTERIDAE
- 3b. Preopercular spine short. No isolated dorsal fin spine on nape TRIGLIDAE
- 4a. Two dorsal fins. Head strongly flattened
..... PLATYCEPHALIDAE
- 4b. One dorsal fin. Head not strongly flattened
..... 5
- 5a. A fleshy papilla at front of isthmus
..... APLOACTINIDAE
- 5b. No fleshy papilla at front of isthmus 6
- 6a. Dorsal fin begins before or above eye
..... TETRAROGIDAE
- 6b. Dorsal fin begins after eye
..... SCORPAENIDAE

Family 60 DACTYLOPTERIDAE
(Flying gurnard)

Body more or less elongate with heavily armoured large and blunt head. Eyes large with a small movable bone between plate-like bones around eye and preopercle. Preopercle with a prominent spine. Spinous and soft dorsal fins separated by a deep notch with 6 to 7 spines, of which the first or first two anterior ones are separated from the rest of the fin; soft dorsal fin with 8 rays. Anal fin with 6 or 7 soft rays. Pectoral fins divided into 2 parts, a short anterior part with 5 rays and a long posterior part with 25 to 31 rays, extending to base of caudal fin in adults. Lower side of posterior part of trunk with 2 to 4 enlarged keel-like scales. Scale scute forming prominent keels.

Species known to occur in Tamil Nadu

1. *Dactyloptena macracantha* (Bleeker)
(Spotwing flying gurnard)
2. *D. orientalis* (Cuvier) (Oriental flying gurnard)

Fisheries information : The sea horses are of great commercial importance since these fishes are used for medicinal purposes. These fishes are also used in the aquarium trade.

Order 22 SCORPAENIFORMES

Key to families

- 1a. Head encased by expanded bones that are firmly attached to each other 2

Key to species

- 1a. Lateral line present and extending to caudal peduncle. An oblong black blotch over middle of pectoral fins
..... *D. macracantha*
- 1b. Lateral line absent. No black blotch over middle of pectoral fins *D. orientalis*

Fisheries information : The flying gurnard fishes are of no commercial importance. These fishes are often seen in the commercial catches.

Family 61 SCORPAENIDAE
(Scorpionfishes)

Body almost compressed to robust, usually bass-like with large spiny head. A bony ridge below eye (suborbital stay) extending posteriorly and firmly attaching to preopercle. Preopercular border with 3 to 5 spines, the uppermost 3 better developed. Opercle with 2 divergent spines or a single spine, the other spines scattered on head. A single dorsal fin, generally notched posterior to the spinous part, with 8 to 18 spines and 4 to 14 segmented rays. Anal fin with 2 to 4 spines and 5 to 14 segmented rays. Pectoral fins broad based, large, fan-like with 11 to 23 rays. Pelvic fins inserted in thoracic region, with one spine and 3 to 5 branched or simple rays. Caudal fin rounded to square-cut but never forked.

Species known to occur in Tamil Nadu

1. *Apistus carinatus* (Bloch & Schneider) (Ocellated waspfish)
2. *Choridactylus multibarbus* Richardson (Orangebanded goblinfish)
3. *Dendrochirus brachypterus* (Cuvier) (Shortfin turkeyfish)
4. *D. zebra* (Quoy & Gaimard) (Zebra turkeyfish)
5. *Minous monodactylus* (Bloch & Schneider) (Grey stingfish)
6. *Pterois miles* (Bennett) (Devil firefish)
7. *P. mombasae* (Smith) (Deepwater firefish)
8. *P. russellii* (Bennett) (Plaintail firefish)

9. *P. volitans* (Linnaeus) (Winged firefish)
10. *Scorpaenopsis cirrhosa* (Thunberg) (Hairy stingfish)
11. *S. gibbosa* (Bloch & Schneider) (Humpback scorpionfish)
12. *S. venosa* (Cuvier) (Raggy scorpionfish)
13. *Sebastapistes strongia* (Cuvier) (Barchin scorpionfish)
14. *Trachicephalus uranoscopus* (Bloch & Schneider)

Key to species

- 1a. Ventralmost pectoral fin rays detached, separate from remainder of fin 2
- 1b. Ventralmost pectoral fin rays not detached or separate from remainder of fin 4
- 2a. Body covered with scales. Branchiostegal membranes not fused to isthmus. Posterior half of spinous dorsal fin with a large black blotch *A. carinatus*
- 2b. Body scaleless, except for lateral line and sometimes a few deeply buried scales above lateral line. Branchiostegal membranes broadly fused to isthmus. Posterior half of spinous dorsal fin without large black blotch 3
- 3a. Pectoral fin with a single free ray ventrally *M. monodactylus*
- 3b. Pectoral fin with 3 free rays ventrally *C. multibarbus*
- 4a. Branchiostegal membranes broadly fused to isthmus *T. uranoscopus*
- 4b. Branchiostegal membranes not broadly fused to isthmus 5
- 5a. Pectoral fin rays greatly elongate, the longest reaching beyond base of posteriormost segmented anal ray. A single strong spine on opercle 6
- 5b. Pectoral fin rays not greatly elongate, the longest not reaching base of posteriormost segmented anal ray. Two spines (sometimes weak) on opercle 11

- 6a. Upper pectoral fin rays branched. Pectoral fin membrane between upper rays only slightly incised 7
- 6b. Upper pectoral fin rays unbranched. Pectoral fin membrane between upper rays strongly incised 8
- 7a. Lateral line scales 50 to 55. Ventrals dark, with a few light spots near tip of fin
..... *D. zebra*
- 7b. Lateral line scales 41 to 49. Ventrals light, with 4 to 5 dark transverse bands.....
..... *D. brachypterus*
- 8a. Pectoral fin rays 19 *P. mombasae*
- 8b. Pectoral fin rays 13 to 16 9
- 9a. Lateral line scales 70 to 80.... *P. russellii*
- 9b. Lateral line scales 90 to 95 10
- 10a. Interorbital space scaled *P. miles*
- 10b. Interorbital space scaleless..... *P. volitans*
- 11a. Palatine teeth present..... *S. strongia*
- 11b. Palatine teeth absent 12
- 12a. Lateral line scales 50 to 60 ...*S. cirrhosus*
- 12b. Lateral line scales 43 to 48 13
- 13a. Body depth 2.3 to 2.9 in standard length. Pit behind eyes very deep. Back gibbous
..... *S. gibbosa*
- 13b. Body depth 3.0 in standard length. Pit behind eyes not very deep. Back not gibbous*S. venosa*

Fisheries information : The scorpionfishes are of little commercial importance. A few species are used in the aquarium.

Remarks : The inclusion of *P. volitans* is only following the earlier reports. But the distributional range of the species does not confirm its occurrence in the Indian coast which needs confirmation. Since the scorpionfishes contain venomous spines, these fishes should be very carefully handled.

Family 62 TETRAROGIDAE (Wasp fishes)

Body covered with small embedded scales. Dorsal fin originates on head, usually 2 or 3

pairs of pharyngeal tooth plates. Pseudobranch well developed with 10 to 15 filaments. These are small to moderate sized benthic fishes, primarily restricted to Indo-West Pacific region and found up to the depth of 300 m.

Species known to occur in Tamil Nadu

1. *Tetraroge niger* (Cuvier) (Black waspfish)
2. *Vespacula dracaena* (Cuvier) (Draco wasp fish)

Key to species

- 1a. Body covered with small scales. Anterior 3 dorsal fin spines remote from the rest and connected by a very low membrane. First dorsal fin spine $\frac{1}{3}$ of the second. Colour grey-brown with black patch on dorsal fin *V. dracaena*
- 1b. Body scaleless, but covered with more or less tubercles. Anterior spines of dorsal fin not remote as in 1a. First dorsal fin spine minute, about $\frac{1}{4}$ of the second. Colour nearly black *T. niger*

Fisheries information : Of no fishery value.

Family 63 APLOACTINIDAE (Velvetfishes)

These are small benthic fishes found from shore to depths of 100m, but rare in occurrence. Body sometimes covered with modified scales that form spinous points. All fin rays unbranched. A fleshy papillose extension on anterior part of isthmus often present. Head with blunt spines. A single pair of upper pharyngeal tooth plates present.

Species known to occur in Tamil Nadu

1. *Cocotropus roseus* Day
2. *Paraploactis taprobanensis* (Whitley)

Key to species

- 1a. Interorbital ridges run in parallel or converge posteriorly. Dorsal fin continuous, not separated *C. roseus*

- 1b. Interorbital ridges diverge strongly posteriorly. First 4 spines of dorsal fin separated from the rest.....*P. taprobanensis*

Fisheries information : Of no fishery value.

Family 64 TRIGLIDAE
(Gurnards or Sea robins)

Body elongate, fusiform, with a row of spines along each side of dorsal fin bases. Scales small, ctenoid and imbricate or rudimentary and more or less embedded. Head large, encased in bony plates. Pectoral fin with lower 3 rays free and enlarged. Dorsal fin divided into spinous and soft-rayed part. Pelvic fins originate below pectoral fin base. Caudal fin with 11 or 12 principal rays and 9 or 10 branched rays. Maxilla covered by preorbital bone.

Species known to occur in Tamil Nadu

1. *Lepidotrigla omanensis* Regan (Oman gurnard)
2. *L. longipinnis* Alcock (Longfin gurnard)
3. *L. spiloptera* Gunther (Spottedwing gurnard)

Key to species

- 1a. Rostral process with several prominent spines *L. spiloptera*
- 1b. Rostral process with a single pair of prominent blade-like spines 2
- 2a. Scales firmly attached, in even, distinct rows. Rostral spines short, about as long as their base *L. omanensis*
- 2b. Scales very loosely attached, in uneven, indistinct rows. Rostral spines longer, more than twice their base
..... *L. longipinnis*

Fisheries information : Not of any fishery importance.

Remarks : Swimbladder, present in these species, are known to be used in sound production. Particularly when they are taken from the water, they produce a bird-like chirping noise for which they are known as Sea robins.

Family 65 PERISTEDIIDAE

Head and body flattened ventrally completely encased in bony plates. Front of snout with 2 flat bony processes projecting forward. Pectoral fin with lower 2 rays free and enlarged. Dorsal fin divided into spinous and soft rayed part. Pelvic fins wide apart, situated below pectoral fins. Caudal fin 9 or 10 branched rays. Maxillary covered by preorbital bones. A series of barbels on lower jaw. The fishes of this family resembles those of family Triglidae.

Species known to occur in Tamil Nadu

Satyrichthys adeni (Lloyd)

Fisheries information : Of no fishery value.

Family 66 PLATYCEPHALIDAE
(Spiny flatheads)

Body elongate with almost to strongly depressed head. Bony ridges of head generally with spines or serrations. Mouth large, lower jaw longer than upper. Two dorsal fins, considerably separated; spinous dorsal fin with 8 to 10 spines (usually 9 spines), the first spine short and scarcely connected to the second. Soft dorsal and anal fins with 10 to 15 rays. Pelvic fins thoracic in position and set far apart towards sides of body with 1 spine and 5 soft rays. Lateral line complete, anterior scales of lateral line usually with spines.

Species known to occur in Tamil Nadu

1. *Cociella crocodila* (Tileseus) (Crocodile flathead fish)
2. *Grammoplites scaber* (Linnaeus) (Rough flathead fish)
3. *G. suppositus* (Troschel) (Softfin flathead fish)
4. *Inegocia japonica* (Tileseus) (Japanese flathead fish)
5. *Platycephalus indicus* (Linnaeus) (Rough flathead fish)
6. *Rogadius serrata* (Cuvier) (Thorny flathead fish)

7. *Sorsogona melanoptera* Knap & Wongratana
8. *S. tuberculata* (Cuvier) (Tuberculated flathead fish)
9. *Suggrundus macracanthus* (Bleeker)
10. *S. rodricensis* (Cuvier) (Spiny flathead fish)
11. *Thyssanophrys carbunculus* (Valenciennes) (Carbuncled flathead fish)
12. *T. celebica* (Bleeker) (Quarterspined flatheadfish)

Key to species

- 1a. Pored scales in lateral series about 65 or more. Vomerine teeth in 1 transverse patch. Soft dorsal fin rays 13 *P. indicus*
- 1b. Pored scales in the lateral series about 60 or less. Vomerine teeth in 2 separate patches. Soft dorsal fin rays 11 or 12 2
- 2a. Body ridges above and below eye either with small spines or finely serrated 3
- 2b. Body ridges above and below eye bearing larger spines 5
- 3a. Preopercular spine single. Interorbital space narrow, 4.5 times or more in eye diameter *R. serrata*
- 3b. Two or more preopercular spines. Interorbital space broader, generally less than 4.5 times in eye diameter 4
- 4a. Second dorsal and anal rays 11. Gillrakers 1 + 7 or 8 *S. tuberculata*
- 4b. Second dorsal and anal rays 12. Gillrakers 2 or 3 + 8 to 10 *S. melanoptera*
- 5a. Almost all pored lateral line scales bearing a backwardly directed spine 6
- 5b. Pored scales of lateral line at least on posterior half of body without spine 7
- 6a. Anal fin with 12 soft rays. Gillrakers on first arch 1 plus 5 or 6. Upper preopercular spine not reaching margin of opercular membrane. First dorsal fin with a marginal dark band but without blotch *G. scaber*
- 6b. Anal fin with 13 soft rays. Gillrakers on first arch 1 plus 8. Upper preopercular spine long, reaching beyond margin of opercular membrane. First dorsal fin with a large black blotch posteriorly *G. suppositus*
- 7a. Bony ridge crossing below eyes with 2 spines, the first below middle of eyes and the second below rear margin of eyes. Caudal, dorsal and pectoral fins spotted *I. japonica*
- 7b. Bony ridge crossing below eyes with 3 or more spines 8
- 8a. Bony ridge crossing below eyes with 3 spines. Number of scale rows slanting downward and backward above lateral line greater than the number of pored lateral line scales *C. crocodila*
- 8b. Bony ridge crossing below eyes usually with 4 or more spines. Number of scale rows slanting downward and backward above lateral line about the same as the number of pored lateral line scales 9
- 9a. Gillrakers on first arch usually 1 + 4 to 6. Iris lappet of eye with finger-like or branched lobes 10
- 9b. Gillrakers on first arch usually 1 + 6 to 7 or 2 + 7 to 9. Iris lappet of eye without lobes 11
- 10a. A single small papilla on upper surface of eyes. Soft dorsal rays 12 and anal rays 13 *T. celebica*
- 10b. A line of wart-like small papillae on upper surface of eyes. Soft dorsal rays 11 and anal rays 12 *T. carbunculus*
- 11a. Second dorsal fin usually with 11 rays. Gillrakers 2 or 3 + 8 to 10. A pale ocellus on the pectoral while the sides dark. A dark blotch between 2nd and 3rd spine of dorsal fin. Dorsal fin not spotted *S. rodricensis*
- 11b. Second dorsal fin usually with 12 rays. Gillrakers 1 + 6 or 7. No pale ocellus on the pectoral fin. No dark blotch on dorsal fin. Both parts of dorsal fin spotted *S. macracanthus*

Fisheries information : The spiny flathead fishes are of no commercial importance. These fishes are often found in the commercial catches.

Remarks : *S. bengalensis* (Rao) considered as a junior synonym of *S. rodricensis*.

Order 23 PERCIFORMES

Key to families

- 1a. Pectoral fins divided into two parts : the upper part normal with rays attached, the lower part with 4 to 7 free (unattached) filamentous rays POLYNEMIDAE
- 1b. Pectoral fins normal, without free rays in lower part of fin, lower rays sometimes separated from each other 2
- 2a. Two short dorsal fins, widely separated from each other 3
- 2b. Dorsal fin either one or two (when two), with continuous bases, but if (rarely) the fins are separate, the inner space is negligible 5
- 3a. Dorsal fin with 6 to 7 spines APOGONIDAE
- 3b. Dorsal fin with less than 6 spines 4
- 4a. First dorsal fin with 5 spines. Lateral line well developed. Jaws with strong canine teeth SPHYRAENIDAE
- 4b. First dorsal fin with 4 spines. Lateral line absent. Teeth in jaws small, feeble, hidden or absent MUGILIDAE
- 5a. Dorsal fin with 3 parts, 1st of 3 or 4 spines, 2nd of 9 to 16 spines and 3rd of 8 to 12 soft rays TRIPTERYGIIDAE
- 5b. Dorsal fin in one or two parts only 6
- 6a. Head large and cuboid. Eyes dorsolateral or nearly so URANOSCOPIDAE
- 6b. Head not cuboid. Eyes not dorsolateral 7
- 7a. Dorsal and anal fins each with only soft rays, without spines 8
- 7b. Dorsal and anal fins each with spines and soft rays 12
- 8a. Head flattened with a characteristic laminated, oval shaped sucking disc ECHENEIDAE
- 8b. Head without sucking disc 9
- 9a. Lateral line high on body, close to dorsal fin base. Dorsal fin and anal fins almost continuous with caudal fin CEPOLIDAE
- 9b. Lateral line at mid-lateral side. Dorsal and anal fin separate from caudal fin 10
- 10a. Body disc-like with sharp abdomen. Ventral profile of body much more convex than dorsal profile MENIDAE
- 10b. Body elongate and compressed, not disc-like. Ventral profile of body more or less straight 11
- 11a. Dorsal fin originating on nape, very long, continuing to caudal fin. Snout rounded CORYPHAENIDAE
- 11b. Dorsal fin originating behind head, not extending to caudal fin. Snout pointed... TRICHONOTIDAE
- 12a. Dorsal fin short, its base shorter than anal fin base PEMPHERIDIDAE
- 12b. Dorsal fin long, its base equal to or longer than anal fin base 13
- 13a. Cirri present in the interspinous membrane of dorsal fin CIRRHITIDAE
- 13b. Cirri absent in the interspinous membrane of dorsal fin 14
- 14a. Pelvic fins with 2 strong spines separated by 3 soft rays SIGANIDAE
- 14b. Pelvic fins with at most 1 spine or absent 15
- 15a. Upper jaw prolonged into a long bill .. 16
- 15b. Upper jaw normal, not prolonged into a long bill..... 17
- 16a. Pelvic fins absent. First dorsal fin short-based, well separated from the second dorsal fin in adults. Caudal peduncle with a single median keel on each side..... XIPHIIDAE

- 16b. Pelvic fins present. First dorsal fin with very long base, sometimes sail-like, depressible into groove and not well separated from second dorsal fin. Caudal peduncle in adults with two keels on each side ISTIOPHORIDAE
- 17a. Gill openings reduced to a small opening on upper side of head. Preopercle with a strong spine CALLIONYMIDAE
- 17b. Gill openings broad. Preopercle without a strong spine 18
- 18a. Pelvic fins very close together 19
- 18b. Pelvic fins widely separated 22
- 19a. Pelvic fins united only at the bases ELEOTRIDIDAE
- 19b. Pelvic fins united entirely forming a cup-like structure (sucking disc) 12
- 20a. Body not eel-like. Dorsal and anal fins not confluent with caudal fin GOBIIDAE
- 20b. Body eel-like. Dorsal and anal fins confluent with caudal fin 21
- 21a. Opercular region with a pouch-like cavity. Caudal fin lanceolate TRYPAUCHENIDAE
- 21b. Opercular region without a pouch-like cavity. Caudal fin rounded GOBIOIDIDAE
- 22a. Body naked or with modified scales. Head with tentacles BLENNIDAE
- 22b. Body with scales. Head never with tentacles 23
- 23a. Anal fin with 0 to 1 spine 24
- 23b. Anal fin with more than 1 spine 26
- 24a. Lateral line very high on body, close to dorsal fin AMMODYTIDAE
- 24b. Lateral line not high on body, along mid-lateral side of body 25
- 25a. Lower jaw not projecting. Dorsal fin continuous PINGUIPEDIDAE
- 25b. Lower jaw projecting. Dorsal fin bases separated by a notch PERCOPHIDAE
- 26a. A single folding lancet-like spine on side of caudal peduncle ACANTHURIDAE
- 26b. No folding spine on caudal peduncle 27
- 27a. A single pair of nostrils 28
- 27b. Two pairs of nostrils 29
- 28a. Lateral line interrupted CICHLIDAE
- 28b. Lateral line complete, not interrupted POMACENTRIDAE
- 29a. Gills 3½, with slit behind, last small or wanting. Lower pharyngeals fused into a characteristic structure which bears a strong molar teeth 30
- 29b. Gills 4, with a long slit behind. Lower pharyngeals not fused into one bone and not bearing molar teeth 31
- 30a. Mouth protractile. Jaw teeth mostly separate, usually projecting outward LABRIDAE
- 30b. Mouth not protractile. Jaw teeth fused to form beak-like dental plates (Parrot-like) SCARIDAE
- 31a. Anterior part of oesophagus, immediately posterior to last gill arch having lateral sacs (pharyngeal sacs) supplied in side with papillae or longitudinal folds bearing teeth. Small unilateral teeth in jaws 32
- 31b. No toothed pharyngeal sacs 34
- 32a. A continuous dorsal fin or two dorsal fins scarcely separated. Pelvic fins absent STROMATEIDE
- 32b. Two dorsal fins distinct, though scarcely separated. Pelvic fins always present 33
- 33a. Dorsal and anal fins with 13 to 16 rays .. ARIOMMATIDAE
- 33b. Dorsal and anal fins with 23 to 28 rays NOMEIDAE
- 34a. Premaxillae fixed (non protrusible upper jaw), upper jaw often form a long, forward projecting sword-like structure 35

- 34b. Maxillary bones not very firmly attached to premaxillae, free to move forward 37
- 35a. Caudal fin always present, well developed, lunate or strongly notched. Body spindle-shaped. Keels present on caudal peduncle SCOMBRIDAE
- 35b. Caudal fin often absent, but if present then not large nor lunate-shaped. Body oblong or elongate, often ribbon-like. No keel on caudal peduncle 36
- 36a. Body ribbon-like. Single dorsal fin, very long and extending almost entire length of body. No finlets behind dorsal and anal fins. Body silvery TRICHIURIDAE
- 36b. Body elongate and compressed or somewhat fusiform. Two dorsal fins. Isolated finlets behind dorsal and anal fins usually present. Back usually brown GEMPYLIDAE
- 37a. Two long barbels on chin (which can be folded into a median groove on throat). Two widely separated dorsal fins MULLIDAE
- 37b. No barbels on chin 38
- 38a. Dorsal fin with 6 to 9 isolated (not connected by membrane) spines, each depressible in a groove. Two silvery stripes on sides of body RACHYCENTRIDAE
- 38b. Dorsal fin without free spines 39
- 39a. First two anal spines detached from rest of fin (these are partially or completely embedded in large carangids). Scutes on straight part of lateral line usually present CARANGIDAE
- 39b. First two anal spines not detached from rest of fin. No scutes on caudal peduncle 40
- 40a. Anterior rays of soft dorsal and anal fins markedly elongated, giving both fins a sickle shape. Pelvic fins usually small or vestigial MONODACTYLIDAE
- 40b. Anterior rays of soft dorsal and anal fins not elongated, when elongate they do not give either fin a sickle shape. Pelvic fins not small or vestigial 41
- 41a. Pelvic fin origin anterior to pectoral fin base. Lateral line high on body, close to dorsal fin base OPISTOGNATHIDAE
- 41b. Pelvic fin origin posterior to pectoral fin base. Lateral line at mid-lateral side... 42
- 42a. Body very deep, its maximum depth more than half the total length. Single dorsal fin, spines clearly distinguishable 43
- 42b. Body oblong or fairly deep, its depth less than half the total length. When deep-bodied and with single dorsal fin, there are no spines or the spiny rays hard to distinguish from soft rays 48
- 43a. No precumbent spine in dorsal fin 44
- 43b. Precumbent spine in dorsal fin present.. 45
- 44a. No spine at angle of preopercle. Pelvic axillary process well developed CHAETODONTIDAE
- 44b. Preopercular spine present. Pelvic axillary process not developed POMACANTHIDAE
- 45a. Anal fin with 4 spines. Gill membranes narrowly united to isthmus SCATOPHAGIDAE
- 45b. Anal fin with 3 spines. Gill membranes broadly united to isthmus 46
- 46a. Spinous dorsal fin confluent with soft dorsal portion. Spines of dorsal fin increasing in length posteriorly PLATACIDAE
- 46b. Spinous dorsal fin separated from soft rayed dorsal fin by a notch. Spines of dorsal fin not increasing in length posteriorly... 47
- 47a. Mouth protracile. Pectoral fins falcate, longer than head length. Maxillae distally exposed DREPANIDAE
- 47b. Mouth not protractile or scarcely so. Pectoral fins short, rounded, shorter than head length. Maxillae distally hidden EPHIPPIDAE

- 48a. Two dorsal fins well separated but if close together then not joined by membrane ..
..... 49
- 48b. Single dorsal fin, sometimes deeply notched between spinous and soft parts of fin but in such cases, the membrane joining the parts intact 52
- 49a. Anal fin base considerably longer than second dorsal fin bases. Mouth large, oblique, with small canine teeth at front
..... LACTARIIDAE
- 49b. Anal fin base as long as or shorter than second dorsal fin base 50
- 50a. Mouth small, upper jaw (maxilla) ending far short of eye and even before nostrils
..... SILLAGINIDAE
- 50b. Mouth moderate in size or large. Upper jaw (maxilla) reaching nostrils, but often anterior margin of eye 51
- 51a. Caudal fin forked. Preopercle with a double edge (edge and ridge) AMBASSIDAE
- 51b. Caudal fin rounded. Preopercle with a single edge (no ridge) LATIDAE
- 52a. Pelvic fins usually with an axillary scale
..... 53
- 52b. Pelvic fins without an axillary scale 66
- 53a. Anal fin with 2 spines 54
- 53b. Anal fin with 3 spines 56
- 54a. A peculiar hook in males. Lateral line short or very small KURTIDAE
- 54b. No hook in males. Lateral line prominent and long 55
- 55a. Lateral line extending upto end of caudal fin SCIAENIDAE
- 55b. Lateral line extending upto caudal fin base only MALACANTHIDAE
- 56a. Dorsal and anal fins rounded and symmetrical so that with the tail they appear as a single three lobed fin
..... LOBOTIDAE
- 56b. Dorsal and anal fins not as above 57
- 57a. Body strongly compressed. Dorsal fin spine elongated into a whip-like filament
..... ZANCLIDAE
- 57b. Body moderately compressed. Dorsal fin spine not elongated 58
- 58a. Mouth strongly protractile 59
- 58b. Mouth moderately protractile 60
- 59a. Head usually naked (but small scales on cheek in few species), upper surface with bony ridges with a nuchal spine on nape. Gill membrane united with isthmus
..... LEIOGNATHIDAE
- 59b. Head entirely covered with clearly visible scales, upper surface smooth. Gill membranes free from isthmus
..... GERREIDAE
- 60a. Distal end of premaxillae overlapping maxillae externally. Molar-like teeth present at sides of jaws. No tooth on roof of mouth SPARIDAE
- 60b. Maxillae not overlapping by hind tip of premaxillae 61
- 61a. Outer row of teeth in jaws of a peculiar hockey-stick shape, with their bases set horizontally, resembling a radially striated bony plate inside mouth
..... KYPHOSIDAE
- 61b. Typical scalpiform teeth absent 62
- 62a. Suborbital process well developed, sometimes forming a spine posteriorly...
..... 63
- 62b. Suborbital process either absent or weakly developed 65
- 63a. No teeth on roof of mouth. Weak spines in dorsal and anal fins NEMIPTERIDAE
- 63b. Teeth usually present on vomer and palatines. Moderately strong spines in dorsal and anal fins 64
- 64a. Caudal fin deeply forked
..... CAESIONIDAE
- 64b. Caudal fin slightly forked, often truncate or lunate LUTJANIDAE
- 65a. Dorsal fin with 12 to 16 soft rays. Lips not soft and fleshy HAEMULIDAE

- 65b. Dorsal fin with 9 to 10 soft rays. Lips soft and fleshy LETHRINIDAE
- 66a. Inner ray(s) of pelvic fins attached to abdomen by membrane PRIACANTHIDAE
- 66b. Inner ray(s) of pelvic fins not confluent to abdomen by membrane 67
- 67a. Mouth large, the upper jaw usually extended to below hind margin of eye. Dorsal fin with 7 to 12 spines. Operculum with 1 to 3 spines SERRANIDAE
- 67b. Mouth small or moderate, the upper jaw not reaching beyond eye center. Dorsal fin with 11 to 14 spines. Operculum with 1 to 2 strong spines TERAPONIDAE

Family 67 LATIDAE
(Sea perches)

Body elongate or oblong and almost compressed. Mouth large, lower jaw extending to hind border of the orbit. Preopercle with a serrated hind margin or with 2 ridges. Opercle with a spine. Dorsal fin deeply notched or separated into two parts, the first part with 7 to 8 strong spines and second part with 1 spine and 10 to 15 rays. Anal fin with 3 spines and 8 to 13 soft rays. Caudal fin rounded. Lateral line complete.

Species known to occur in Tamil Nadu

1. *Lates calcarifer* (Bloch) (Bhetki)
2. *Psammoperca waigensis* (Cuvier) (Waigeu sea perch)

Key to species

- 1a. Upper jaw reaching to behind eyes. Nostrils close together. Lower margin of preopercle serrated. Tongue smooth. Lower gillrakers 16 to 17 *L. calcarifer*
- 1b. Upper jaw only reaching to below eyes. Nostrils widely separated. Lower margin of preopercle not serrated. Some teeth present on tongue. Lower gillrakers 11 to 13 *P. waigensis*

Fisheries information : The giant sea perch is one of the very important commercial fishes of our country. Its flesh is considered to be most delicious. Its swimbladder is used for making isinglass.

Family 68 AMBASSIDAE
(Glassfishes)

Body more or less translucent and compressed. Mouth large, with fine teeth in jaws and roof of mouth; the upper outer row sometimes enlarge and canine-like. Opercle with an ill-developed spine. Preoperculum with double margin having an edge and ridge. Dorsal fin of two continuous parts defined by a notch. First dorsal fin with 7 spines and a precumbent spine. Second dorsal fin with one spine and 9 to 17 rays. Anal fin with 3 spines and 9 to 16 rays. Caudal fin forked. Lateral line complete, interrupted or very prominently broken.

Species known to occur in Tamil Nadu

1. *Ambassis ambassis* (Lacepede) (Commerson's glassy perchlet)
2. *A. dayi* Bleeker (Day's glassy perchlet)
3. *A. gymnocephalus* (Lacepede) (Nakedhead glassy perchlet)
4. *A. interruptus* Bleeker (Interrupta glassy perchlet)
5. *A. miops* Gunther (Myops glassy perchlet)
6. *A. nalua* (Hamilton) (Nalua chanda)
7. *A. urotaenia* Bleeker (Bandedtail glassy perchlet)

Key to species

- 1a. Supraorbital ridge dentate at least posteriorly. Interoperculum entire. Preorbital dentate on both edge and ridge *A. gymnocephalus*
- 1b. Supraorbital ridge smooth, usually with a single backwardly directed spine posteriorly (rarely two or absent) 2
- 2a. Interoperculum smooth 3
- 2b. Interoperculum denticulate posteriorly 4

- 3a. One transverse row of scales on cheek ...
.....*A. ambassis*
- 3b. Two transverse row of scales on cheek ...
.....*A. miops*
- 4a. Posterior margin of preoperculum
denticulate*A. dayi*
- 4b. Posterior margin of preoperculum entire
.....5
- 5a. Lateral line complete *A. nalua*
- 5b. Lateral line interrupted 6
- 6a. Lateral line once interrupted. Cheek with
two transverse rows of scales
.....*A. interruptus*
- 6b. Lateral line twice interrupted. Cheek with
one transverse row of scales
.....*A. urotaenia*

Fisheries information : The glassfishes are of little commercial importance. These fishes are marketed fresh or dried and generally utilized as bait.

Family 69 SERRANIDAE (Groupers, Seabassess)

Body robust or almost compressed, oblong-oval to elongate. Mouth large, maxilla exposed, with or without supramaxilla. Border of preopercle serrate, opercle with 2 or 3 flat spines. Dorsal fin with 7 to 12 spines and 10 to 19 rays. Anal fin with 3 spines and 7 to 10 rays. Caudal fin usually rounded or truncate, with 15 branched rays. Pelvic fins with 1 spine and 5 rays. Pectoral fins broadly rounded, with a scaly base. Body with variable colour patterns of light or dark stripes, spots, vertical or diagonal bars or almost plain.

Species known to occur in Tamil Nadu

1. *Cephalopholis boenack* (Bloch) (Chocolate hind)
2. *C. formosa* (Shaw and Nodder) (Bluelined hind)
3. *C. miniata* (Forsskal) (Coral hind)
4. *C. sonnerati* (Valenciennes) (Tomato hind)

5. *Epinephelus areolatus* (Forsskal) (Areolate grouper)
6. *E. bleekeri* (Vaillant) (Dusktail grouper)
7. *E. caeruleopunctatus* (Bloch) (Whitespotted grouper)
8. *E. coioides* (Hamilton) (Orange spotted grouper)
9. *E. diacanthus* (Valenceinnes) (Spiny cheek grouper)
10. *E. flavocaeruleus* (Lacepede) (Blue and yellow grouper)
11. *E. lanceolatus* (Bloch) (Giant grouper)
12. *E. latifaciatus* (Temminck and Schlegel)
13. *E. longispinis* (Kner) (Longspine grouper)
14. *E. malabaricus* (Bloch & Schneider) (Malabar grouper)
15. *E. morrhua* (Valencinnes) (Banded-cheek reef-cod)
16. *E. tauvina* (Forsskal) (Greasy grouper)
17. *E. undulosus* (Quoy & Gaimard) (Brown-lined reef cod)

Key to species

- 1a. Dorsal fin spines 9 2
- 1b. Dorsal fin spines 11 5
- 2a. Anal fin rays usually 8. Colour generally brown to dark brown 3
- 2b. Anal fin rays usually 9 (rarely 10). Colour generally red, orange or yellow (except *C. sonnerati*) 4
- 3a. Pectoral fins short, their length 1.5 to 1.8 times in head length. Colour generally brown or yellowish brown, with dark blue lines on head, body and fins
..... *C. formosa*
- 3b. Pectoral fins 1.3 to 1.6 times in head length. Body brown, generally with 7 or 8 dark bars, no blue lines on head or body ; fins dark brown, with a pale blue lines at corners of caudal *C. boenak*

- 4a. Lateral line scales 47 to 56, lateral scale series 94 to 114. Pectoral fin rays 17 to 18 *C. miniata*
- 4b. Lateral line scales 66 to 80, lateral scale series 115 to 134. Pectoral fin rays 18 to 20 *C. sonnerati*
- 5a. Caudal fin of adults emarginate to truncate (may be rounded in juveniles) 6
- 5b. Caudal fin rounded 9
- 6a. Interspinous membranes of dorsal fin not incised 7
- 6b. Interspinous membranes of dorsal fin incised 8
- 7a. Gillrakers elongate, 12 to 16 on upper limb and 20 to 23 on lower limb. Dorsal fin with 17 to 19 rays. Body depth 2.7 to 3.1 in standard length. Purplish to brownish grey with yellowish brown dots on head and longitudinal brown lines on dorsal part of body *E. undulosus*
- 7b. Gillrakers not elongate, 6 to 11 on upper limb and 13 to 18 on lower limb. Dorsal fin with 15 to 17 rays. Body depth 2.3 to 2.9 in standard length. Colour dark blue or grey without longitudinal lines; caudal peduncle and fins bright yellow. Adults brown to nearly black with numerous small irregular blue spots *E. flavocaeruleus*
- 8a. Caudal fin truncate to slightly rounded. Body depth 3.0 to 3.5 in standard length. Head, body, dorsal fin and upper third of caudal fin with small orange yellow spots, the lower two third of caudal fin dark grey *E. bleekeri*
- 8b. Caudal fin slightly emarginate. Body depth 2.7 to 3.3 in standard length. Spots on head, body and fins yellowish brown to dark brown; caudal fin entirely spotted.. *E. areolatus*
- 9a. Dorsal fin rays 12 (rarely 13). Juveniles with two broad, longitudinal black edged whitish band that disappear in adults, dark edges breaking into dashes and spots *E. latifasciatus*
- 9b. Dorsal fin rays 14 to 18. 10
- 10a. Lateral line scales with branched tubules. Eye diameter about 8 times in head length and 9 times in large specimens. Juveniles yellow with 3 broad black bars on body and irregular black bands on head *E. lanceolatus*
- 10b. Lateral line scales with a single tubule. Eye diameter less than 7 times in head length and 8 times in large specimens. Juveniles not coloured as above 11
- 11a. Numerous distinct dark spots (not dots) over most of head and body 12
- 11b. No distinct dark spots over most of head and body (may have yellow or orange spots that disappear in preservation or dark small dots on body) 15
- 12a. Dark spots on body elongate, oblique and more numerous posteriorly; dark spots on head separated by more than two spots diameter *E. longispinis*
- 12b. Dark spots on body not elongate and not more numerous posteriorly; dark spots on head separated by less than a spot diameter 13
- 13a. Lateral line scales 62 to 74, none with branched tubules. No small bony plates on sides of first gillarch *E. tauvina*
- 13b. Lateral line scales 54 to 65, the anterior scales of large adults with branched tubules. Numerous small bony plates on sides of first gillarch 14
- 14a. Head and body with numerous small well-separated black spots (largest spots about twice size of rear nostrils). Irregular white or pale spots or blotches usually present on head and body. Pectoral fin rays modally 19 *E. malabaricus*
- 14b. Head, body and usually median fins with numerous orange to reddish-brown spots (diameter of largest spots about 4 or 5 times that of rear nostrils). No white or pale spots on head and body. Pectoral fin rays modally 20 *E. coioides*

15a. Dorsal fin rays 13 to 15 (rarely 16). Body without dark vertical bars. Dark brown blotch at base of middle dorsal fin spines joined to dark brown band passing to upper edge of gill opening; a second dark band from upper end of gill opening, bifurcating above pectoral fin with branches to anterior and posterior dorsal fin rays. Two bands from eye, the upper branch to nape, and the lower a broad curve or broken line to upper part of caudal peduncle *E. morrhua*

15b. Dorsal fin rays 16 to 18 (rarely 15). Body usually with vertical broad dark bars.....
..... 16

16a. Pelvic fin length 1.7 to 2.3 in head length. Longest dorsal fin spine 2.3 to 3.2 in head length. Pectoral fin rays 17 to 19. Lateral line scales 46 to 55. Head, body and dorsal fin with numerous small white spots and blotches; most white spots on body in adults coalesced forming wavy pale lines and mottlings *E. caeruleopunctatus*

16b. Pelvic fin length 2.3 to 2.5 in head length. Longest dorsal fin spine 3.0 to 3.5 in head length. Pectoral fin rays 18 to 20. Lateral line scales 52 to 59. No dark spots on head or body and no dark spots on fins
..... *E. diacanthus*

Fisheries information : Groupers and seabasses are usually very important commercial fishes. *E. malabaricus* is utilized in the aquaculture. *E. lanceolatus* is the biggest known species, but rare in occurrence and its fishing is banned under law. *E. tauvina* is also rare in occurrence, found in reef areas; in many occasions *E. coioides* is misidentified as *E. tauvina* in our coast.

Family 70 TERAPONIDAE (Terapon-perches, terapons)

Body oblong or oblong-ovate, almost compressed. Opercle with one or two spines, preopercle serrate. Dorsal fin with 11 to 14 spines and 8 to 14 rays, almost separated by a deep notch in some species. Anal fin with 3 spines and 7 to 12 rays. Caudal fin rounded,

truncate or emarginate. Body usually with longitudinal dark stripes on sides and caudal fin with dark stripes.

Species known to occur in Tamil Nadu

1. *Pelates quadrilineatus* (Bloch) (Fourlined terapon)
2. *Terapon jarbua* (Forsskal) (Jarbua terapon)
3. *T. puta* Cuvier (Smallscaled terapon)
4. *T. theraps* Cuvier (Largescaled terapon)

Key to species

- 1a. Post-temporal covered with skin and scales, not extended posteriorly, not with a serrate edge. Gill membranes united with isthmus *P. quadrilineatus*
- 1b. Post-temporal extended and serrate posteriorly, exposed posteriorly, skin and scale covering reduced. Gill membranes free from isthmus 2
- 2a. Lateral line with 46 to 56 scales, 6 to 8 scales above lateral line *T. theraps*
- 2b. Lateral line with 70 or more scales, 10 to 17 scales above lateral line 3
- 3a. Three or 4 straight longitudinal stripes present on lateral side of body. Gillrakers 18 to 24 on lower arm of first gill arch ..
..... *T. puta*
- 3b. Three or 4 curved stripes present on lateral side of body. Gillrakers 12 to 15 on lower arm of first arch *T. jarbua*

Fisheries information : The terapons are important commercial food fishes. *T. jarbua* is a very common species and an aquarium fish found in both the coasts of our country.

Remarks : *P. quadrilineatus* is a common species known for its croaking noise it invariably makes when taken out of water. *T. jarbua* is very common in all coastal waters of the country.

Family 71 PRIACANTHIDAE (Bigeyes, Bulleyes)

Body oblong, relatively deep and compressed. Eyes very large, in the upper

profile of head. Mouth large, with lower jaw projecting. Dorsal fin with 10 spines and 10 to 15 rays. Anal fin with 3 spines and 9 to 16 rays. Pelvic fins with 1 spine and 5 rays, inserted anterior to pectoral fins and broadly united with body by a membrane. Caudal fin slightly emarginated to rounded.

Species known to occur in Tamil Nadu

1. *Priacanthus cruentatus* (Lacepede) (Glasseye)
2. *P. hamrur* (Forsskal) (Duskyfinned bulleye)
3. *P. tayenus* Richardson (Purple spotted bigeye)

Key to species

- 1a. Dorsal fin with 14 to 15 soft rays. Fins dusky to blackish, being darker near borders, a black basal spot on the dorsal surface of pelvic fin bases *P. hamrur*
- 1b. Dorsal fin with 12 to 13 soft rays. Fins not dusky or blackish 2
- 2a. Pelvic fins and membranes with purplish black spots; other fins plain; length of pelvic fins almost equal to head length, 1.0 to 1.3 times in head length *P. tayenus*
- 2b. Pelvic fins and membranes without black spots; length of pelvic fins relatively short, 1.5 or slightly more in head length.
..... *P. cruentatus*

Fisheries information : The Bulleyes fishes are important commercial fishes. These fishes are marketed fresh.

Family 72 APOGONIDAE (Cardinal fishes)

Body elongate, oblong and slightly compressed with ctenoid scales. Mouth usually large with teeth generally in villiform bands in jaws, on vomer. Posterior margin of preopercle serrated. Dorsal fin two, the first with 6 to 8 spines and the second with one spine and 8 to 14 branched rays. Anal fin with 2 spines and 8 to 18 branched rays. Pelvic fins with one spine and 5 branched rays. Lateral line complete.

Species known to occur in Tamil Nadu

1. *Apogon aureus* (Lacepede) (Bandtail cardinal)
2. *A. bandanensis* Bleeker (Bigeye cardinal)
3. *A. kalosoma* Bleeker
4. *A. multitaeniatus* (Cuvier) (Smallscale cardinal)
5. *A. nigricans* Day
6. *A. nigripinnis* Cuvier (Bullseye cardinal)
7. *A. quadrifasciatus* Cuvier (Twostripe cardinal)
8. *A. novemfasciatus* Cuvier (Sevenstripe cardinal)
9. *A. savayensis* Gunther (Ghost cardinal)
10. *A. taeniatus* Cuvier (Twobelt cardinal)
11. *Apogonichthys ellioti* (Day) (Flag-in cardinal)
12. *A. ocellatus* (Weber) (Ocelated cardinal)
13. *A. poecilopterus* (Cuvier)
14. *Archamia lineolata* (Cuvier) (Shimmering cardinal)
15. *A. macroptera* (Cuvier) (Duskytailed cardinal)
16. *Cheilodipterus quinquelineatus* Cuvier (Sharptooth cardinal)
17. *Fowleria aurita* (Cuvier) (Crosseyed cardinal)

Key to species

- 1a. At least a pair of symphyseal teeth and supramaxilla present. Five narrow black stripes along sides of body
..... *C. quinquelineatus*
- 1b. Canine teeth and supramaxilla absent
..... 2
- 2a. Lateral line incomplete. Preopercle edge smooth. Palatine teeth absent. An ocellus on opercle always present *F. aurita*
- 2b. Lateral line complete. Preopercle edge serrate or smooth. Palatine teeth present or absent 3

- 3a. Anal fin with 12 to 18 rays. About 13 narrow vertical bars on body 4
- 3b. Anal fin with 8 to 10 rays 5
- 4a. Anal fin rays 16 to 18. A stripe from snout to eye. Anal fin not white tipped
..... *A. lineolata*
- 4b. Anal fin rays 13 to 15. Snout without a stripe. Anal fin tip distinctively white
..... *A. macroptera*
- 5a. Preopercle edge smooth. Palatine teeth absent. Supramaxilla present. Caudal fin rounded 6
- 5b. Preopercle edge serrate. Palatine teeth usually present. Supramaxilla absent. Caudal fin emarginate 8
- 6a. Third dorsal fin spine stronger and longer than others. A dark ocellus on first dorsal fin present *A. ocellatus*
- 6b. Third dorsal spine not stronger than others, equal to 4th and 5th. No dark ocellus on first dorsal fin 7
- 7a. Upper part of dorsal fin black. Second dorsal fin, anal fin and caudal fin with a median dark band *A. ellioti*
- 7b. Upper part of dorsal fin dark between 3rd and 5th spine. Other fins without dark median band *A. poecilopterus*
- 8a. Lateral line with more than 35 scales. Three scale rows between lateral line and first dorsal fin origin 9
- 8b. Lateral line with less than 35 scales. Two scale rows between lateral line and first dorsal fin origin 10
- 9a. About 13 narrow longitudinal bands on sides *A. multitaeniatus*
- 9b. Two broad longitudinal bands on sides ..
..... *A. kalosoma*
- 10a. Two or more horizontal stripes or lines along sides of body 11
- 10b. No horizontal stripes or lines along sides of body 12
- 11a. Two or three bands on upper part of body only. Orbital rim serrated
..... *A. quadrifasciatus*
- 11b. Bands on both upper and lower part of body. Orbital rim without serrations
..... *A. novemfasciatus*
- 12a. Vertical bars present on body 13
- 12b. No vertical bars on body 15
- 13a. Several vertical bars on body, narrower than ground colour. Head covered with dark brown spots *A. nigricans*
- 13b. Two distinct dark vertical cross-bars on body under each dorsal fin. Head not spotted. 14
- 14a. Ocellus above pectoral fins usually present. A distinct dark bar on caudal peduncle. No caudal spot present Pectoral fin rays 15 or 16. Developed gillrakers 11 to 13 ...
..... *A. nigripinnis*
- 14b. Ocellus on body present in juveniles, disappear with age. Caudal spot present. Pectoral fin rays 14 or 15. Developed gillrakers 9 to 11 *A. taeniatus*
- 15a. Diagonal stripe on cheek absent. A black band around caudal peduncle at caudal fin base (or a large caudal spot in juveniles)
..... *A. aureus*
- 15b. A dark stripe from lower margin of eyes diagonally on cheek present. A dark saddle on caudal fin base not completely encircling peduncle 16
- 16a. A narrow oblique streak from eye across cheek to angle of preopercle. Anterior margin of first dorsal fin dark. Anterior margin of second dorsal and margins of caudal fin dusky *A. bandanensis*
- 16b. A dark triangular stripe from eye across cheek to angle of preopercle. Upper part of first dorsal fin, anterior margin of second dorsal fin and upper lower margins of caudal fin dark *A. savayensis*

Fisheries information : The cardinal fishes are of minor commercial importance. These fishes play an important role in the food chain of carnivorous fishes.

Remarks : Indian Apogonids urgently need revision.

Family 73 SILLAGINIDAE (Whitings)

Body elongate and tapering. Operculum with a small, sharp spine. Mouth small, terminal, maxillary end slides below preorbital bone. Dorsal fin two, first dorsal fin with 10 to 13 spines, the second dorsal fin with one spine and 16 to 27 soft rays. Anal fin with 2 spines and 14 to 26 soft rays. Caudal fin emarginate.

Species known to occur in Tamil Nadu

1. *Sillaginopsis panijus* (Hamilton) (Gangetic whiting)
2. *Sillago chondropus* Bleeker (Club-foot sillago)
3. *S. lutea* McKay (Mud sillago)
4. *S. sihama* (Forsskal) (Silver sillago)
5. *S. soringa* Dutt and Sujatha (Soringa sillago)
6. *S. vincenti* McKay (Vincent's sillago)

Key to species

- 1a. Snout and head greatly depressed. Second dorsal fin spine very elongate. Eyes small, 3 to 11% of head length and covered by adipose tissue. Swimbladder vestigial or absent *S. panijus*
- 1b. Snout and head not depressed. Second dorsal fin spine not elongate. Eyes normal, 17 to 30% of head length. Swimbladder present 2
- 2a. Pelvic fin spine inconspicuous and almost hidden by the much thickened club-like first pelvic fin ray. Swimbladder without postcoelomic projections into the tail section. Vertebral column without modified haemal spines overlapping the posterior extensions of the swimbladder *S. chondropus*
- 2b. Pelvic fins without a thickened club-like first ray. Swimbladder with 1 or 2 postcoelomic extensions. Vertebral column with some modified haemal spines overlapping the posterior part of the swimbladder 3

- 3a. Swimbladder with 2 posterior extensions *S. sihama*
- 3b. Swimbladder with a single posterior extension 4
- 4a. Swimbladder with anterolateral extensions recurved posteriorly up to half length of swimbladder. Membrane of second dorsal fin with a grey stripe formed of minute dots anterior to each ray *S. soringa*
- 4b. Swimbladder without recurved extensions 5
- 5a. Second dorsal fin with at least 5 rows of dusky black or black-brown spots; swimbladder with a small bulbous anterior projection *S. vincenti*
- 5b. Second dorsal fin without dark spots, but may have the membranes tipped with a dusting of very fine black dots; swimbladder with a short median projection and short anterolateral extensions directed forward *S. lutea*

Fisheries information : The whittings are important commercial food fishes. *S. sihama* is a very common species found in both the coasts of our country.

Family 74 MALACANTHIDAE (Tilefishes)

Body oblong, somewhat compressed or elongate and subcylindrical. Gill membranes free from isthmus; branchiostegal rays 6; gills 4, a slit behind last. No scaly axillary process at base on pelvic fins. Villiform teeth and few canines on jaws; palatine and vomer edentulous. Opercle with one spine posteriorly; preopercle serrate or smooth. No fleshy median ridge before dorsal fin in *Haplolatilus* species. The postlarval stages are rather large, upto 5 to 7 cm standard length, and with elongated serrate spines on the head.

Species known to occur in Tamil Nadu

Haplolatilus fronticinctus (Gunther) (Pastel tilefish)

Fisheries information : This fish is of

aquarium importance. It attains a size of 21 cm in standard length, and rare in occurrence.

Family 75 LACTARIIDAE
(False trevallies, Whitefish)

Body oblong and greatly compressed. Mouth large and oblique. Dorsal fin two, the first with 7 or 8 spines and the second with 1 spine and 20 to 22 soft rays. Anal fin with 3 spines and 25 to 28 soft rays. Pelvic fins inserted just below pectoral fins. Caudal fin forked.

Species known to occur in Tamil Nadu

Lactarius lactarius (Schneider) (False trevally)

Fisheries information : The false trevallies are very important commercial fishes. It is marketed fresh or dried salted. *L. lactarius* is a common species, occur in both the coasts of our country.

Family 76 RACHYCENTRIDAE
(Cobias)

Body elongate, subcylindrical with broad and depressed head. Scales embedded in thick skin. Lateral line slightly wavy in anterior half. Mouth large, terminal; lower jaw projecting. Dorsal fin two, the first with 7 to 9 (generally 8) isolated spines, not connected by membrane; the second with one to 3 spines and 26 to 33 soft rays, anterior rays somewhat elevated in adult specimens. Anal fin long, with 2 weak spines and 22 to 28 soft rays. Pectoral fins pointed, becoming more falcate with the maturity of the fish. Caudal fin lunate in adult specimens, upper lobe longer than lower. Juveniles are with caudal fin rounded, the central rays much enlarged. Body with 2 sharply defined narrow light bands.

Species known to occur in Tamil Nadu

Rachycentron canadus (Linnaeus) (Cobia)

Fisheries information : The cobies are very delicate fishes of commercial importance. These fishes are marketed generally fresh or dried salted.

Family 77 ECHENEIDAE
(Sharksuckers, Remoras)

Body elongate with a transverse laminated, oval-shaped cephalic disc. Head wide, depressed to support disc. Dorsal fin with 18 to 45 rays. Anal fin with 18 to 41 rays. Pectoral fins inserted high on body with 18 to 32 rays. Pelvic fins with one spine and 5 rays, far forward, close together and narrowly or broadly united to underside of body. Caudal fin slightly forked, emarginated or slightly rounded. Body with cycloid scales, generally hidden in skin.

Species known to occur in Tamil Nadu

1. *Echeneis naucrates* Linnaeus (Live sharksucker)
2. *Remora brachyptera* (Lowe) (Spearfish remora)
3. *R. remora* (Linnaeus) (Common remora)

Key to the species

- 1a. Body depth 8 to 14 times in standard length. Pectoral fin pointed. Anal fin rays 29 to 41. Usually a dark longitudinal band on sides bordered with white
..... *E. naucrates*
- 1b. Body depth 5 to 8 times in standard length. Pectoral fin rounded. Anal fin rays 18 to 28. No band on sides 2
- 2a. Dorsal fin rays 22 to 26. Anal fin rays 22 to 24 *R. remora*
- 2b. Dorsal fin rays 27 to 34. Anal fin rays 25 to 28 *R. brachyptera*

Fisheries information : The sharksuckers are of minor commercial importance. These fishes are sometimes found in the commercial catches.

Family 78 CARANGIDAE
(Jacks, trevallies, scads, queenfishes, pampanos)

Body greatly variable, from elongate and fusiform to deep and highly compressed. Gillrakers moderate to long and numerous, their number decreasing with the maturity in some

species. Dorsal fins two, the first with 4 to 8 spines (the spines obsolete or embedded in adult specimens of some species), the second dorsal fin with one spine and 18 to 44 rays. Anal fin with 2 anterior spines (one spine in *Elagatis* and *Seriolina*) separated from rest of the fin by a gap (becoming embedded in adult specimens in some species) followed by one spine and 15 to 39 rays. Pectoral fins with one spine and 14 to 24 rays, either long and falcate or short and pointed or rounded. Pelvic fins with one spine and 5 rays (pelvic fins absent in *Parastromateus*). Caudal fin forked, with lobes generally equal. Caudal peduncle in some species with a moderate lateral keel, bilateral paired keels or dorsal and ventral grooves. Scutes in lateral line present and prominent, or reduced in some species and absent in some genera.

Species known to occur in Tamil Nadu

1. *Alectis ciliaris* (Bloch) (African pompano)
2. *A. indicus* (Ruppell) (Indian threadfin)
3. *Alepes djedaba* (Forsskal) (Shrimp scad)
4. *A. kleinii* (Bloch) (Banded scad)
5. *A. melanoptera* Swainson (Blackfin scad)
6. *A. vari* (Cuvier) (Herring scad)
7. *Atropus atropus* (Schneider) (Cleftbelly trevally)
8. *Atule mate* (Cuvier) (Yellowtail scad)
9. *Carangoides armatus* (Ruppell) (Longfin trevally)
10. *C. caeruleopinnatus* (Ruppell) (Costal trevally)
11. *C. chrysophrys* (Cuvier) (Longnose trevally)
12. *C. ferdau* (Forsskal) (Blue trevally)
13. *C. gymnostethus* (Cuvier) (Bludger trevally)
14. *C. hedlandensis* (Whitley) (Bumpnose trevally)
15. *C. malabaricus* (Bloch & Schneider) (Malabar trevally)
16. *C. oblongus* (Cuvier) (Coachwhip trevally)
17. *C. praeustus* (Bennett) (Brown back trevally)
18. *C. talamparoides* Bleeker (Imposter trevally)
19. *Caranx carangus* (Bloch) (Blacktailed trevally)
20. *C. heberi* (Bennett) (Blacktip trevally)
21. *C. ignobilis* (Forsskal) (Giant trevally)
22. *C. melampygus* Cuvier (Bluefin trevally)
23. *C. sexfasciatus* Quoy & Gaimard (Bigeye trevally)
24. *C. tille* Cuvier (Tille trevally)
25. *Decapterus russellii* (Ruppell) (Indian scad)
26. *Elagatis bipinnulata* (Quoy & Gaimard) (Rainbow runner)
27. *Gnathanodon speciosus* (Forsskal) (Golden trevally)
28. *Megalaspis cordyla* (Linnaeus) (Torpedo scad)
29. *Parastromateus niger* (Bloch) (Black pomfret)
30. *Scomberoides commersonnianus* Lacepede (Talang queenfish)
31. *S. lysan* (Forsskal) (Double spotted queenfish)
32. *S. tala* (Cuvier) (Batrred queenfish)
33. *S. tol* (Cuvier) (Neddle scaled queenfish)
34. *Selar crumenophthalmus* (Bloch) (Big eye scad)
35. *Selaroides leptolepis* (Cuvier) (Yellow stripe scad)
36. *Trachinotus bailloni* (Lacepede) (Small spotted dart)
37. *T. blochii* (Lacepede) (Snubnose pompano)
38. *T. mookalee* Cuvier (Indian pompano)
39. *T. russelli* Cuvier (Large spotted dart)
40. *Ulua mentalis* (Cuvier) (Longrakered trevally)

Key to species

- 1a. Posterior straight part of lateral line with hardened scutes. Pectoral fins long and falcate, usually longer than head length (about equal to head length in *Selar* and shorter than head length in some *Decapterus* sp.) 2
- 1b. No scutes in lateral line (only pored scale, not enlarged). Pectoral fins relatively short, shorter than head length and not falcate 32
- 2a. Pelvic fins absent (in specimens larger than about 10 cm fork length); if present, positioned distinctly anterior to vertical line through pectoral fin base *P. niger*
- 2b. Pelvic fins (always present) not positioned distinctly anterior to vertical through pectoral fin base. 3
- 3a. Second dorsal and anal fin with one or more distinct finlets 4
- 3b. Second dorsal and anal fins without finlets 5
- 4a. Eight to 9 finlets behind second dorsal and anal fin rays. Shoulder girdle margin smooth. Maximum scute height larger than eye diameter *M. cordyla*
- 4b. A single detached finlet behind second dorsal and anal fins. Shoulder girdle margin with 2 papillae, the lower papillae larger. Maximum scute height smaller than eye diameter *D. russelli*
- 5a. Shoulder girdle margin with a furrow ventrally, a large fleshy papilla immediately above it. Lateral line with 32 to 38 scutes *S. crumenophthalmus*
- 5b. Shoulder girdle margin smooth 6
- 6a. Body superficially naked, scales minute and embedded where present. In juveniles, anterior soft rays of dorsal and anal fins filamentous 7
- 6b. Small scales present over most of body. In juveniles, anterior soft rays of dorsal and anal fins not filamentous 8
- 7a. Profile of nape and head broadly rounded. Suborbital depth relatively narrow, 1.7 to 3.0 times in upper jaw length. Gillrakers (excluding rudiments) on lower arm of first arch 12 to 17 *A. ciliaris*
- 7b. Profile of nape and head somewhat angular. Suborbital depth relatively broad, 0.8 to 1.0 times in upper jaw length. Gillrakers (excluding rudiments) on lower arm of first arch 21 to 26 *A. indicus*
- 8a. Gillrakers extremely long, project into the mouth along side of tongue. Gillrakers on lower limb of first arch 51 to 61. Lower jaw becoming prominent in adults, with the angle of chin projecting beyond upper jaw *U. mentalis*
- 8b. Gillrakers of normal length and shape. Gillrakers on lower limb of first arch 39 or fewer. Shape of lower jaw not as in 8a 9
- 9a. Belly with a deep median groove, accommodating pelvic fins, anus and anal fin spines. Pelvic fins conspicuously long and black, tip of appressed fins extending almost to base of anal fin. *A. atropos*
- 9b. Belly without median groove. Pelvic fins not conspicuously long and black 10
- 10a. Upper jaw without teeth 11
- 10b. Upper jaw with 1 or 2 rows or a band of minute teeth 12
- 11a. Lower jaw with a series of minute teeth. A prominent black opercular spot encroaching on shoulder. Adipose eyelid well developed posteriorly... *S. leptolepis*
- 11b. Lower jaw with feeble teeth in young (smaller than 10 cm fork length), absent in adult. No black opercular spot. Adipose eyelid poorly developed *G. speciosus*
- 12a. Fleshy adipose eyelid completely covering eye except for a vertical slit centered on pupil. Terminal ray of dorsal and anal fins finlet-like, a little more separated from other rays but not detached, and about twice length of penultimate ray *A. mate*

- 12b. Fleshy adipose eyelid, if present, not developed as in 12a. Terminal ray of dorsal and anal fins not finlet-like (except terminal ray length 1.5 times the length of penultimate ray in large *Alepes djedaba*) 13
- 13a. Both jaws with a single row of numerous, comb-like teeth. Adipose eyelid well developed on posterior half of eye only.. 14
- 13b. Dentition not as in 13a. Adipose eyelid, if present, variably developed..... 17
- 14a. Spinous dorsal fin distinctly black 15
- 14b. Spinous dorsal fin pale 16
- 15a. Straight part of lateral line below 1st and 2nd soft dorsal fin rays. Scutes 61 to 69 on lateral line *A. vari*
- 15b. Straight part of lateral line below 2nd to 4th soft dorsal fin rays. Scutes 48 to 56 on lateral line *A. melanoptera*
- 16a. Lateral line moderately arched anteriorly to below 4th to 6th soft dorsal fin rays. Ventral profile of body more or less convex than its dorsal profile *A. kleinii*
- 16a. Lateral line strongly arched anteriorly to below 2nd to 4th soft dorsal fin rays. Dorsal and ventral profiles of body evenly convex *A. djedaba*
- 17a. Upper jaw with an outer series of moderate to strong canines and an inner band of fine teeth. Lower jaw with a single row of teeth 18
- 17b. Dentition not as in 17a 23
- 18a. Breast completely scaled 19
- 18b. Breast naked ventrally, with a small patch of scale in front of pelvic fins 21
- 19a. Upper jaw extending to vertical from anterior margin of eye (front edge of pupil in juveniles). Anal fin with 19 or 20 soft rays..... *C. melampygus*
- 19b. Upper jaw extend to vertical from middle of eye or beyond to posterior edge of eye. Anal fin with 14 or 19 soft rays 20
- 20a. Gillrakers 11 to 15 on lower arm of first arch *C. tille*
- 20b. Gillrakers 16 to 18 on lower arm of first arch *C. sexfasciatus*
- 21a. Lateral line with 28 to 30 scutes. Dorsal fin with 19 to 20 soft rays. Anal fin with 11 to 16 soft rays. Gillrakers 16 or 17 on lower arm of first arch..... *C. ignobilis*
- 21b. Lateral line with 33 to 37 scutes. Dorsal fin with 18 to 22 soft rays. Anal fin with 15 to 18 soft rays. Gillrakers 15 to 23 on lower arm of first arch..... 22
- 22a. Eye diameter 5.5 to 6.3 (4.1 to 4.3 in juveniles) times in head length. Cleft of mouth at about lower edge of eye *C. heberi*
- 22b. Eye diamter 3.5 to 4.0 times in head length. Cleft of mouth opposite lower third of eye *C. carangus*
- 23a. Naked area of breast separated from naked base of pectoral fin by a broad band of scales..... 24
- 23b. Naked area of breast uninterrupted to naked base of pectoral fins 26
- 24a. Second dorsal fin with a conspicuous black blotch anteriorly. Vomerine tooth patch anchor shaped, with a long posteriomedian extension *C. praeustus*
- 24b. Second dorsal fin without a conspicuous black blotch. Vomerine tooth patch without a distinct posterior extension..... 25
- 25a. Soft dorsal fin rays 17 to 23. Soft anal fin rays 15 to 19 *C. oblongus*
- 25b. Soft dorsal fin rays 25 to 34. Soft anal fin rays 21 to 26 *C. ferdau*
- 26a. Soft dorsal fin rays 25 to 32 *C. gymnostethus*
- 26b. Soft dorsal fin rays 17 to 23..... 27
- 27a. A small naked area anteriorly just above pectoral fin base..... 28
- 27b. Area anteriorly just above pectoral fin base completely scaled 29

- 28a. Gillrakers (including rudiments) on first arch 8 to 12 + 21 to 27, total 30 to 38. In life, tongue greyish brown to brown
..... *C. malabaricus*
- 28b. Gillrakers (including rudiments) on first arch 6 to 9 + 19 to 22, total 27 to 31. In life, tongue white to pale grey
..... *C. talamparoides*
- 29a. Total gillrakers including rudiments on first arch 31 to 37 *C. armatus*
- 29b. Total gillrakers including rudiments on first arch 20 to 27 30
- 30a. Adults with a steep dorsal head profile, and with a distinct break or bump in the interorbital region. 3 to 8 of the central soft rays of dorsal and anal fins elongated in mature males (about 17 cm fork length). Eye diameter about equal to or longer than snout length *C. hedlandensis*
- 30b. Dorsal head profile not steep in adults and no distinct break or bump. Central soft rays of dorsal and anal fins not elongated in matured males. Eye diameter slightly to much smaller than snout length 31
- 31a. Dorsal profile of snout gently slope, then abruptly vertical just above cleft of mouth. Soft dorsal fin rays 18 to 20 and soft anal fin rays 14 to 17 *C. chrysophrys*
- 31b. Dorsal profile of snout not as in above. Soft dorsal fin rays 20 to 23 (usually 22 or 23) and soft anal fin rays 16 to 20 (usually 18 or 19) *C. caeruleopinnatus*
- 32a. Bases of soft dorsal and anal fins unequal in length, anal fin base shorter and only about 45 to 70 percent of dorsal fin base length. Caudal peduncle grooves present dorsally and ventrally *E. bipinnulata*
- 32b. Base of soft anal as long as, or slightly shorter than base of dorsal fin. No groove on caudal peduncle 33
- 33a. Posterior soft dorsal and anal fin rays consisting of semi-detached finlets. Upper lip joined to snout at middle by a bridge of skin (in juveniles crossed by a shallow groove) 34
- 33b. Posterior soft dorsal and anal fin rays not consisting of semi-detached finlets. Upper lip separated from snout at middle by a continuous deep groove 37
- 34a. Total gillrakers on first arch 8 to 15. Lobe of dorsal fin uniformly pigmented. Height of second dorsal fin lobe 14.4 to 19.8 percent of fork length in specimens larger than 15 cm fork length 35
- 34b. Total gillrakers on first arch 21 to 27. Distal half of dorsal fin lobe abruptly and heavily pigmented. Height of second dorsal fin lobe 7.7 to 11.2 percent of fork length in specimens larger than 15 cm fork length 36
- 35a. Upper jaw extends well beyond posterior margin of eye, especially in adults. Teeth of inner and outer rows in lower jaw subequal in size. Large oval blotch above or touching lateral line
..... *S. commersonianus*
- 35b. Upper jaw extends slightly beyond posterior margin of eye. Teeth of inner row in lower jaw distinctly larger than those of outer row. Vertically elongate blotches intersecting lateral line *S. tala*
- 36a. Scales on midbody below lateral line laceolate. In adults, upper jaw extends to or slightly beyond posterior margin of eye. A double series of 6 to 8 dusky, roundish blotches above and below lateral line
..... *S. lysan*
- 36b. Scales on midbody below lateral line slender, needle-like. In adults, upper jaw does not extend to posterior margin of eye. Oval or vertically oblong dark blotches, the first 4 to 5 intersecting lateral line
..... *S. tol*
- 37a. One to five spots in a longitudinal row on or near lateral line (spots absent on specimens smaller than 10 cm fork length). Soft dorsal fin rays 21 to 25 38
- 37b. No spots on or near lateral line. Soft dorsal fin rays 18 to 20 39
- 38a. Anterior 2 spots larger than eye and at least of two-third of spots above lateral line in

adults. Gillrakers on lower limb of first arch
11 to 15 *T. russelli*

38b. All spots equal to smaller than eye and with
about half of spots below lateral line in
adults. Gillrakers on lower limb of first arch
15 to 19 *T. baillonii*

39a. Teeth on tongue absent (except 2 or 3
slender teeth rarely in small specimens).
Anal fin lobe usually orange yellow with a
brownish anterior margin *T. blochii*

39b. Teeth on tongue present in narrow band
(persistent to about 50 cm fork length).
Anal fin lobe usually yellow without a
brownish anterior margin ... *T. mookalee*

Fisheries information : The carangids are
very important commercial fishes. These fishes
are marketed fresh and utilized as food fishes.

Family 79 CORYPHAENIDAE (Dolphinfishes)

Body very elongate and compressed with
cycloid scales. Mouth large with fine teeth in
bands. Adult males have bony crest on front of
head. Dorsal and anal fins very long, extending
from nape to almost caudal fin, with 52 to 66
rays. Pelvic fin inserted in thoracic region,
fitting into a groove on body. Caudal fin deeply
forked, with keels on fin or caudal peduncle.
Lateral line curved upward above pectoral fins.

Species known to occur in Tamil Nadu

1. *Coryphaena equisetis* Linnaeus (Dolphin
fish)
2. *C. hippurus* Linnaeus (Common dolphin
fish)

Key to species

- 1a. Dorsal fin rays 48 to 55. A broad and
square tooth patch on tongue. Greatest
depth of body more than 25% of standard
length *C. equisetis*
- 1b. Dorsal fin rays 55 to 65. An oval tooth patch
on tongue. Greatest body depth less than
25% of standard length *C. hippurus*

Fisheries information : The dolphin fishes
are of highly flavoured food fish. These fishes
are of important commercial value.

Family 80 MENIDAE (Moonfishes)

Body greatly compressed and discoid shaped
and dorsal profile almost horizontal. Mouth
protrudes and having villiform teeth in jaws.
Dorsal fin very long and low, anterior rays
slightly elevated, with 43 to 46 rays, the first 3 to
19 not branched, spine-like in juveniles. Anal
fin also very long and low, with 30 to 33 rays.
Pelvic fins with first 2 rays fused and greatly
elongated. Pectoral fins with 15 rays, shorter than
head. Caudal fin forked. Lateral line extending
up to end of dorsal fin base. Body with numerous
small round spots on dorsal part.

Species known to occur in Tamil Nadu

Mene maculata (Bloch) (Moonfishes)

Fisheries information : The moonfishes are
of little commercial value. These fishes are
marketed fresh or dried.

Family 81 LEIOGNATHIDAE (Ponyfishes, Slipmouths)

Body round or oblong, to somewhat greatly
compressed. Dorsal surface of head with bony
ridges and well developed nuchal crest or spine.
Mouth small and extremely protrusible which
form a tube when extended. Single dorsal fin,
with 8 (rarely 7 or 9) spines and 16 to 17 rays.
Anal fin with 3 spines and 13 to 15 rays. Body
with minute scales but head without scales.
Caudal fin deeply forked or emarginate. Body
silvery, often with various markings on body.

Species known to occur in Tamil Nadu

1. *Gazza-achlamys* Jordan & Starks (Naked
tooth ponyfish)
2. *G. minuta* (Bloch) (Tooth ponyfish)
3. *Leiognathus berbis* (Valenciennes) (Berber
ponyfish)
4. *L. bindus* (Valenciennes) (Orange fin
ponyfish)

5. *L. blochii* (Valenciennes) (Bloch's ponyfish)
6. *L. brevirostris* (Valenciennes) (Shortnose ponyfish)
7. *L. daura* (Cuvier) (Goldstripe ponyfish)
8. *L. dussumieri* (Valenciennes) (Dussumier's ponyfish)
9. *L. elongatus* (Gunther) (Slender ponyfish)
10. *L. equulus* (Forsskal) (Common ponyfish)
11. *L. fasciatus* (Lacepede) (Striped ponyfish)
12. *L. leuciscus* (Gunther) (Whipfin ponyfish)
13. *L. lineolatus* (Valenciennes) (Ornate ponyfish)
14. *L. smithursti* (Ramsay & Ogilby) (Smithurst's ponyfish)
15. *L. splendens* (Cuvier) (Splendid ponyfish)
16. *Secutor insidiator* (Bloch) (Pugnose ponyfish)
17. *S. ruconius* (Hamilton) (Deeppugnose ponyfish)
- 4b. Lateral line ending below about middle of soft part of dorsal fin. Cheek scaly
..... *S. ruconius*
- 5a. Body depth more than 3.3 times in standard length. Cheek with small scales
..... *L. elongatus*
- 5b. Body depth less than 3.0 times in standard length. Cheek without scales 6
- 6a. Breast scaleless 7
- 6b. Breast scaly 11
- 7a. Body depth 1.67 to 1.97 times in standard length 8
- 7b. Body depth 2.02 to 2.47 times in standard length 10
- 8a. Second dorsal and anal fin spines not elongated. A dark brown saddles on caudal peduncle present *L. equulus*
- 8b. Second dorsal fin spine or both second and anal fin spines distinctly elongated. No spot on caudal peduncle 19
- 9a. Only second dorsal fin spine distinctly elongated and filiform. About 11 widely spaced dark vertical lines on back superimposed by a few yellow blotches ..
..... *L. fasciatus*
- 9b. Both second dorsal and anal fin spines greatly elongated (sometimes reaching to caudal fin). Back with a few faint, unevenly spaced and horizontal elongate blotches
..... *L. smithursti*
- 10a. A distinct dark brown blotch on nape. Dorsal profile showing a distinct notch at the commencement of nuchal crest
..... *L. brevirostris*
- 10b. Upper half of spinous dorsal fin with a black blotch between second and sixth spine. No distinct notch on dorsal profile
..... *L. daura*
- 11a. Dark saddle-shaped blotch on nape. Black blotch on upper half of spinous dorsal fin
..... *L. blochii*
- 11b. No saddle-shaped blotch on nape. No black blotch on spinous dorsal fin 12

Key to species

- 1a. Caniniform teeth present in jaws. Mouth pointing forward when protracted 2
- 1b. Caniniform teeth absent in jaws 3
- 2a. Depth of body 1.98 to 2.20 times in standard length. Scales on body absent anterior to a line from origin of soft dorsal fin to behind pectoral fin base
..... *G. achlamys*
- 2b. Depth of body 2.27 to 3.14 times in standard length. Scales on body absent only from breast ahead a line from pectoral fin base to anal fin origin *G. minuta*
- 3a. Mouth oblique, pointing forward, when protracted 4
- 3b. Mouth horizontal, pointing forward or downward when protracted 5
- 4a. Lateral line reaching backward nearly to below end of dorsal fin. Cheek scaleless
..... *S. insidiator*

- 12a. Body depth less than 2.0 in standard length; upper half of dorsal fin with a black or orange blotch 13
- 12b. Body depth more than 2.0 in standard length; upper half of dorsal fin without a black blotch 14
- 13a. Mouth slightly downward when protracted, faint grey wavy vertical lines above lateral line. A black spot on upper third of spinous dorsal fin *L. splendens*
- 13b. Mouth pointing forward when protracted. Dark vermiculations on back above lateral line. Spinous dorsal fin black at half height above which a bright orange blotch between second and fifth spine
..... *L. bindus*
- 14a. Second dorsal fin spine distinctly and second anal fin slightly elongated
..... *L. leuciscus*
- 14b. Second dorsal and second anal spines not elongated 15
- 15a. Body depth 2.02 to 2.28 times in standard length. Side of body with grey wavy vertical lines descending from the back to little beyond lateral line *L. dussumieri*
- 15b. Body depth 2.32 to 2.98 times in standard length. Back greyish to brownish with light grey coloured irregular vermiculations extending on sides to slightly below lateral line 16
- 16a. Both dorsal and ventral profiles almost equally convex. A distinct notch present at nape, comparatively more vermiculation on back *L. berbis*
- 16b. Dorsal profile more evenly curved than ventral profile. No distinct notch at nape, comparatively less vermiculation on back *L. lineolatus*

Fisheries information : The ponyfishes are of commercial importance since they provide a small amount of low cost protein. These fishes are also used for preparation of fishmeal. The ponyfishes are found in both the east and west coasts of our country.

Family 82 LUTJANIDAE (Snappers)

Body more or less oblong to deep, with ctenoid scales. Cheek and preopercle with scales, but scales absent between mouth and eye. Mouth terminal, moderate to large. Maxilla slips below preorbital when mouth closed. Preopercle generally serrate, often finely. Dorsal fin continuous or with a shallow notch, with 10 to 12 spines and 10 to 17 rays. Anal fin with 3 spines and 7 to 11 rays. Caudal fin of various shapes ranging from lunate, emarginate, truncate to slightly forked.

Species known to occur in Tamil Nadu

1. *Lutjanus argentimaculatus* (Forsskal) (Mangroove red snapper)
2. *L. bohar* (Forsskal) (Two spot red snapper)
3. *L. decusatus* (Cuvier) (Ckeckered snapper)
4. *L. erythropterus* Bloch (Crimson snapper)
5. *L. fulviflamma* (Forsskal) (Black spot snapper)
6. *L. fulvus* (Schneider) (Black tail snapper)
7. *L. gibbus* (Forsskal) (Humpback red snapper)
8. *L. johnii* (Bloch) (John's snapper)
9. *L. kasmira* (Forsskal) (Common bluestripe snapper)
10. *L. lemniscatus* (Valenciennes) (Yellow streaked snapper)
11. *L. lutjanus* Bloch (Bigeye snapper)
12. *L. madras* (Valenciennes) (Indian snapper)
13. *L. malabaricus* (Schneider) (Malabar blood snapper)
14. *L. quinquelineatus* Bloch (Fivelined snapper)
15. *L. rivulatus* (Cuvier) (Blubberlip snapper)
16. *L. russelli* Bleeker (Russell's snapper)
17. *L. sanguineus* (Cuvier) (Bloodred snapper)
18. *L. sebae* (Cuvier) (Emperor red snapper)

19. *L. vitta* (Quoy & Gaimard) (Brown striped red snapper)
 20. *Pinjalo pinjalo* (Bleeker) (Pinjalo)

Key to species

- 1a. Mouth rather small, somewhat upturned. No caniniform teeth in jaws. Caudal fin lunate. Eye at mid-level of head behind tip of snout..... *P. pinjalo*
- 1b. Mouth larger, not upturned. Some caniniform teeth in jaws. Caudal fin truncate, emarginate or slightly forked but not broadly lunate. Eye not at mid-level of head behind tip of snout..... 2
- 2a. Preorbital space very narrow, 9.2 to 16.3 times in head length. Body slender, usually 3.0 times or more in standard length. Dorsal fin spines 11, occasionally 10 or rarely 12, soft dorsal rays 12.....*L. lutjanus*
- 2b. Preorbital space wider, 3.3 to 8.9 times in head length. Body deeper, 2.1 to 3.1, but usually less than 3.0 times in standard length. Dorsal fin spines variable 10 to 12, soft dorsal rays usually 13 or more, occasionally 12 3
- 3a. Ground colour pale (mainly yellow in life) with a series of 4 to 8 longitudinal stripes (blue in life, often brownish on preservation) on sides 4
- 3b. Colour not as in 3a 5
- 4a. Four stripes on side, belly more or less abruptly whitish, frequently with thin grey lines. Scale rows on cheek 5 or 6
..... *L. kasmira*
- 4b. Five stripes on side, belly not abruptly whitish and without thin grey lines. Scale rows on cheek 10 or 11
..... *A. quinquelineatus*
- 5a. Longitudinal scale rows above lateral line horizontal (parallel to lateral line) or some rows raising only below middle part of dorsal fin 6
- 5b. Longitudinal scale rows above lateral line rising obliquely..... 7
- 6a. A large black spot on upper back usually present, if absent, ground colour pale
..... *L. johnii*
- 6b. Black spot on upper back absent, ground colour dark*L. argentimaculatus*
- 7a. Vomerine tooth patch triangular or diamond-shaped with a medial posterior extension 8
- 7b. Vomerine tooth patch crescentric or triangular without a posterior extension .
..... 11
- 8a. A large black spot usually present on upper side, juveniles sometimes with an ocellated spot and/or a series of 4 to 7 broad dark stripes on sides 9
- 8b. Black spot absent. A series of narrow yellowish longitudinal lines on sides.....10
- 9a. Soft dorsal rays usually 14. A relatively wide gap between temporal scale bands of each side. Spot on upper side situated mainly above lateral line *L. russelli*
- 9b. Soft dorsal rays usually 13. Little or no gap between temporal scale bands of each side. Spot on upper side situated mostly below lateral line or bisected by it, spot sometimes very elongated
..... *L. fulviflamma*
- 10a. Midlateral stripe usually broader and darker than other stripes on sides. Transverse scale rows on cheek 7 to 10..
..... *L. vitta*
- 10b. Midlateral stripe not broader or darker than other stripes on sides, yellow in life and faint or absent in preserved specimens. Transverse scale rows on cheek 6 or 7, occasionally 8 *L. madras*
- 11a. Total gillrakers on first arch 25 to 30.....
..... *L. gibbus*
- 11b. Total gillrakers on first arch 14 to 23.....12
- 12a. Soft anal rays 10. Dorsal fin with 11 spines and 16 rays (rarely 15). Body with 3 dark brown to red transverse bars, indistinct in large adults *L. sebae*

- 12b. Soft anal rays 8 or 9. Dorsal fin with 10 or 11 spines and 12 to 16 rays. Body colour not as 12a 13
- 13a. Preoperculum notch distinct (moderate to well developed) 14
- 13b. Preoperculum notch indistinct (shallow or absent) 15
- 14a. Soft dorsal fin rays 15 or 16. Body relatively deep, 2.1 to 2.4 times in standard length. Head usually with numerous wavy lines. A chalky spot often present on lateral line below junction of spinous and soft parts of dorsal fin, bordered with black in juveniles, but lost in adults. Lips thick in adults
..... *L. rivulatus*
- 14b. Soft dorsal fin rays 13 or 14. Body usually more slender, 2.3 to 2.8 times in standard length. Colour not as in 14a. Lips not thick in adults..... *L. fulvus*
- 15a. Colour pattern consisting of a series of 5 dark stripes on whitish ground colour. Two or three uppermost stripes crossed by dark vertical bars forming a network of light and dark squares. A large dark spot at base of caudal fin *L. decusatus*
- 15b. Colour pattern not as in 15a 16
- 16a. Nostrils set in a prominent groove running forward from eye in specimens above 20 cm standard length; smaller specimens frequently with 2 whitish spots on upper back, anterior spot below last four dorsal spines and posterior one under last six dorsal rays and meeting that of other side across top of caudal peduncle. Colour dark brown dorsally grading to tan or light brown ventrally; outer portion of anal and pelvic fins blackish. Tongue with a patch of fine, granular teeth *L. bohar*
- 16b. Nostrils not set in a groove at all sizes. Colour pattern not as in 16a. Tongue smooth or with a patch of granular teeth 17
- 17a. Dorsal spines 10. Soft anal rays usually 8, rarely 9. Tongue with a patch of fine, granular teeth. Colour generally grey-brown, reddish or pink ventrally. Juveniles with a broad, black midlateral stripe
..... *L. lemniscatus*
- 17b. Dorsal spines usually 11, rarely 10. Soft anal rays usually 9, occasionally 8. Tongue smooth. Colour largely reddish (brown in preservative). Juveniles usually with a black saddle on upper caudal peduncle ..
..... 18
- 18a. A prominent hump on forehead and a series of shallow, horizontal grooves behind eyes in specimens over 20 cm standard length. Anterior and posterior nostrils widely separated, the distance between them much greater than length of posterior nostril opening
..... *L. sanguineus*
- 18b. Hump on forehead and grooves behind eyes absent at all sizes. Anterior and posterior nostrils close-set, the distance between them about equal or less than length of posterior nostril opening 19
- 19a. Mouth relatively small. Maxilla length much less than distance between bases of last dorsal and anal rays. Interorbital width 3.5 to 4.8 in head length in specimens over 15 cm standard length. Some longitudinal scale rows below lateral line slanting obliquely in postero-dorsal direction. Head profile convex *L. erythropterus*
- 19b. Mouth larger. Maxilla length about equal to distance between bases of last dorsal and anal rays. Interorbital width 5.1 to 6.6 in head length in specimens over 12 cm standard length. Some longitudinal scale rows below lateral line horizontal; but in juveniles under 10 cm standard length, slanting obliquely. Head profile straight or slightly concave *L. malabaricus*

Fisheries information : Snappers are very important commercial fishes. But some species are known to be responsible for ciguatera (the tropical human fish poisoning disease).

Famly 83 CAESIONIDAE
(Fusiliar fishes)

Body oblong to fusiform and almost compressed, with ctenoid scales. Mouth small, oblique and highly protrusible; ascending premaxillary process a separate ossification from premaxilla. Dorsal fin with 10 to 15 slender weak spines and 8 to 22 rays. Anal fin with 3 spines and 9 to 13 rays. Pelvic fins with 1 spine and 5 rays. Pectoral fins with 16 to 24 rays. Caudal fin deeply forked. Lateral line with 45 to 88 scales. Body with or without longitudinal stripes. Caudal fin with a blackish blotch on tips of lobes or with a longitudinal blackish streak in middle of each lobe or without any markings.

Species known to occur in Tamil Nadu

1. *Caesio caerulaureus* Lacepede (Blue and gold fusiliar)
2. *Dipterygonotus balteatus* (Valenciennes) (Mottled fusiliar)
3. *Gymnoaesio gymnoptera* (Bleeker) (Slender fusiliar)
4. *Pterocaesio chrysozona* (Cuvier) (Gold band fusiliar)

Key to species

- 1a. Dorsal fin spines 14. Interorbital space with scales. No distinct supratemporal band of scales..... *D. balteatus*
- 1b. Dorsal fin spines 10 to 12.. Interorbital space below the supratemporal band without scales. A distinct, well delimited, supratemporal band of scales 2
- 2a. Dorsal and anal fins without scales. Interorbital space relatively flat. Body depth 5 to 6 times in standard length
..... *G. gymnoptera*
- 2b. Dorsal and anal fins entirely or partially scaled. Interorbital space not flat. Body depth 2.2 to 4.2 times in standard length 3
- 3a. Premaxilla with a single process on each side, in addition to the median ascending

process. Moderately deep bodied, its depth usually 2.2 to 3.4 times in standard length
..... *C. caerulaureus*

- 3b. Premaxilla with 2 processes on each side, in addition to the median ascending process. Body slender, its depth usually more than 3.4 times in standard length .
..... *P. chrysozona*

Fisheries information : The caesionids are of little commercial value although these fishes are usually considered good for eating. These fishes are also used as tuna baitfish.

Family 84 LOBOTIDAE
(Tripletail fishes)

Body deep, oblong more or less compressed with ctenoid scales. Body depth much greater than head length. Upper jaw slightly protrusible. Preopercle coarsely serrated and opercle with 1 to 2 flat spines. Dorsal fin very long and broadly rounded, with 11 to 13 spines and 13 to 16 rays. Anal fin very long and broadly rounded, with 3 spines and 9 to 12 rays. Caudal fin rounded. Round soft dorsal and anal fins reaching past caudal fin base, resembling the fish with three tails.

Species known to occur in Tamil Nadu

Lobotes surinamensis (Bloch) (Tripletail fish)

Fisheries information : The tripletail fish is a valuable commercial fish on account of its quality flesh. It is marketed fresh.

Family 85 GERREIDAE
(Mojarras, Silver-biddis)

Body compressed and dorsal profile more or less elevated, with shiny scales. Mouth greatly protrusible, extending downwards when protracted. Dorsal fin with 9 to 10 spines and 9 to 15 rays. Anal fin with 3 to 5 spines and 7 to 13 rays. Dorsal and anal fin bases with an elevated scaly sheath. Pelvic fins with 1 spine and 5 rays, a scaly flap present at the base of spine. Pectoral fins long and pointed. Caudal fin forked. Lateral line complete with 33 to 48 scales.

Species known to occur in Tamil Nadu

1. *Gerres abbreviatus* Bleeker (Deepbody mojarrah)
2. *G. acinaces* Bleeker (Longtail silverbidy)
3. *G. filamentosus* Cuvier (Whipfin mojarrah)
4. *G. limbatus* Cuvier (Black tipped mojarrah)
5. *G. lucidus* Cuvier (Saddleback silver-biddy)
6. *G. macracanthus* Bleeker (Longfin mojarrah)
7. *G. oblongus* Cuvier (Slender silver-biddy)
8. *G. oyena* (Forsskal) (Common silver bidy)
9. *G. poeti* Cuvier (Silver mojarrah)
10. *G. setifer* (Hamilton) (Blacktipped mojarrah)
11. *Pentaprion longimanus* (Cantor) (Longfin silverfish)

Key to species

- 1a. Anal fin with 5 spines and 12 to 13 soft rays *P. longimanus*
- 1a. Anal fin with 3 spines and 7 soft rays .. 2
- 2a. Dorsal fin with 10 spines *G. setifer*
- 2b. Dorsal fin with 9 spines 3
- 3a. Second dorsal fin spine greatly elongated forming a long filament, longer than head length 4
- 3b. Second dorsal fin spine not greatly elongated and filamentous structure, usually much less than head length 5
- 4a. Predorsal distance equal to or less than body depth. A series of vertical or horizontal rows of dusky blotches on dorsal surface of body. Lateral line scales 44 to 48 *G. filamentosus*
- 4b. Predorsal distance distinctly greater than body depth. A series of vertical bars on back and sides of body. Lateral line scales 40 to 44 *G. macracanthus*
- 5a. Body elongate, its depth at least 3 times in standard length 6
- 5b. Body relatively deep, its depth less than 3 times (1.9 to 2.8) in standard length 8

- 6a. Lateral line scales 44 to 48 .. *G. oblongus*
- 6b. Lateral line scales 33 to 43 7
- 7a. Four scale rows between lateral line and dorsal fin origin *G. limbatus*
- 7b. Five to six scale rows between lateral line and dorsal fin origin *G. oyena*
- 8a. Pectoral fins short, not extending up to origin of anal fin *G. lucidus*
- 8b. Pectoral fin relatively longer, extending up to origin of anal fin 9
- 9a. Lateral line with 42 to 45 scales; 4½ to 5½ scales between lateral line and 5th dorsal spine base; 4 to 7 rows of dark spots on flank *G. acinaces*
- 9b. Lateral line with 40 or less scales; 3 or 4 scales between lateral line and 5th dorsal spine base 10
- 10a. Body deep, its depth 1.9 to 2.3 times in standard length, forming sharp angle at dorsal fin origin. Lateral line scales 38 to 41 *G. abbreviatus*
- 10b. Body oblong, its depth 2.2 to 2.8 times in standard length. Lateral line scales 34 to 38 *G. poeti*

Fisheries information : The mojarrah are important commercial fishes. Generally *G. macracanthus* are abundantly found in the Gulf of Mannar.

Family 86 HAEMULIDAE
(Grunts, Sweetlips, Hotlips)

Body oblong and compressed with ctenoid scales. Mouth with thick lips, tips of upper jaw hidden when mouth closed. Chin with 2 pores and a pit or 6 pores and no pit in the genus *Plectorhinchus*. Preopercle with a slightly concave and serrated margin, opercle with one indistinct spine. Dorsal fin with 9 to 15 spines and 12 to 26 rays. Pectoral fins long, its first ray sometimes forming a short filament. Pelvic fins inserted below pectoral fin base, with 1 spine and 5 rays. Anal fin with 3 spines, the second often very strong and 7 to 9 rays. Caudal fin truncate or emarginate (rounded in juveniles).

Species known to occur in Tamil Nadu

1. *Diagramma pictum* (Thunberg) (Pointed sweetlips)
2. *Plectorhinchus gibbosus* (Lacepede) (Horny hotlips)
3. *P. orientalis* (Bloch) (Oriental sweetlips)
4. *P. pictus* (Tortonese) (Trout sweetlips)
5. *P. schotaf* (Forsskal) (Ministreal sweetlips)
6. *Pomadasys argenteus* (Forsskal) (Silver grunt)
7. *P. argyreus* (Valenciennes) (Bluecheek silver grunt)
8. *P. furcatus* (Schneider) (Banded grunt)
9. *P. kaakan* (Cuvier) (Javelin grunt)
10. *P. maculatum* (Bloch) (Saddle grunt)

Key to species

- 1a. Chin with two pores followed by a pit containing a pore on each side. Fin spines strong, second anal spine often enlarged and strongest 2
- 1b. Chin with 6 pores and no median pit. Fin spines often weak 6
- 2a. A vertical black band almost 8 scales wide, over nape, terminating about 3 scales below lateral line. About 6 black blotches posterior to vertical band. Spinous part of dorsal fin with a large black blotch
..... *P. maculatum*
- 2b. Colour pattern not as 2a 3
- 3a. A row of interradiated scales behind dorsal and anal fin rays, above the basal sheath; about 6 dark stripes on back and flanks
..... *P. furcatus*
- 3b. No row or rows of fine scales behind the dorsal or anal fin rays 4
- 4a. Spots on body arranged in somewhat thin, longitudinal irregular wavy lines. Spots only on body, absent on head and snout in adults *P. argenteus*
- 4b. Body uniformly silvery, bronce or darker,

no spots or lines. A dark spot may be present on opercle 5

- 5a. Dorsal fin with 14 rays (rarely 13). Seven transverse scales between lateral line and first dorsal fin spine. Spinous part of dorsal fin often spotted juveniles with pairs of spots arranged into vertical interrupted bars *P. kaakan*
- 5b. Dorsal fin with 13 rays. Six transverse scales between lateral line and first dorsal fin spine. Spinous part of dorsal fin never spotted *P. argyreus*
- 6a. Dorsal fin with 9 to 10 spines and 21 to 26 soft rays. 20 to 25 scales between lateral line and dorsal fin origin *D. pictum*
- 6b. Dorsal fin with 11 to 14 spines and 14 to 23 soft rays. 10 to 17 scales between lateral line and dorsal fin origin 7
- 7a. Dorsal fin with 14 spines *P. gibbosus*
- 7b. Dorsal fin with 12 to 13 spines 8
- 8a. Body uniformly grey or dusky. No contrast bars, spots or blotches. Dorsal fin with 12 spines *P. schotaf*
- 8b. Body with longitudinal bands or many dark spots about pupil size or larger 9
- 9a. Body with 3 or 4 longitudinal bands. Dorsal fin with 13 spines *P. orientalis*
- 9b. Body with numerous dark spots. Dorsal fin with 12 spines *P. pictus*

Fisheries information : The sweetlips and grunts are of most important commercial fishes. These fishes are marketed fresh.

Remarks : Report of *Plectorhinchus cinctus* (Temminck and Schlegel) and *P. nigrus* (Cuvier) from Tamil Nadu coast by some authors are probably misidentification of *P. pictus* and *P. gibbosus* respectively.

Family 87 SPARIDAE
(Seabreams)

Body oblong, almost deep and compressed with cycloid or ctenoid scales. Head usually with a steep dorsal profile. Snout without scales but

cheeks with scales. Opercle with or without scales. Mouth subhorizontal and slightly protrusible. Maxilla not extending beyond the middle of the orbit. Posterior tip of premaxilla overlapping maxilla. Dorsal fin with 10 to 13 spines.

Species known to occur in Tamil Nadu

1. *Acanthopagrus berda* (Forsskal) (Picnic seabream)
2. *A. latus* (Houttuyn) (Yellowfin seabream)
3. *Argyrops spinifer* (Forsskal) (Long nose seabream)
4. *Crenidens crenidens* (Forsskal) (Karanteen seabream)
5. *Rhabdosargus sarba* (Forsskal) (Goldlined seabream)
6. *Sparidentex hasta* (Valenciennes) (Sobaity seabream)

Key to species

- 1a. Molariform teeth absent on jaws 2
- 1b. Molar or granular teeth present on jaws 3
- 2a. Outer teeth incisiform, compressed *C. crenidens*
- 2b. Outer teeth canines, some enlarged in front of jaws *S. hasta*
- 3a. Head between eyes scaly (scales reaching beyond level of vertical diameter of eye). *A. spinifer*
- 3b. Head between eyes naked (scales ending at or behind level of vertical eye diameter) 4
- 4a. More than 5 scales between lateral line and 4th dorsal spine. Usually dorsal spines slender, not alternately broad and narrow. One enlarged molar posteriorly on each side *R. sarba*
- 4b. Less than 5 scales between lateral line and 4th dorsal spine. Dorsal spines strong, appearing alternately broad and narrow on each side. No single greatly enlarged molar posteriorly 5

- 5a. Six series of preopercular scales. Body depth less than 2.4 times in standard length. Body dusky grey above, silvery white below, with anal and caudal fins blackish grey. No silvery margin to scales and no dark spot at origin of lateral line *A. berda*
- 5b. Four or 5 series of preopercular scales. Body depth greater than 2.4 times in standard length. Anal and lower caudal fins yellow. Scales with dark bases and silvery margins (especially above lateral line) and a dark spot at the origin of lateral line *A. latus*

Fisheries information : The sea breams are of much commercial importance. These fishes are marketed fresh and are excellent to eat and highly esteemed.

Family 88 LETHRINIDAE (Emperor fishes)

Body generally oblong and compressed. Mouth terminal, lips usually soft and fleshy; upper jaw protrusible. Hind margin of preopercle smooth. Cheek without scales. Dorsal fin with 10 spines and 9 to 10 soft rays. Anal fin with 3 spines and 6 to 10 soft rays. Caudal fin emarginate or forked, with 7 to 9 procurent caudal rays. Lateral line complete.

Species known to occur in Tamil Nadu

1. *Gymnocranius griseus* (Schlegel) (Grey large eye bream)
2. *Lethrinus harak* (Forsskal) (Thumbprint emperor)
3. *L. lentjan* (Lacepede) (Pink ear emperor)
4. *L. mahsena* (Forsskal) (Sky emperor)
5. *L. microdon* Valenciennes (Small tooth emperor)
6. *L. nebulosus* (Forsskal) (Spangled emperor)
7. *L. obsoletus* (Forsskal) (Longface emperor)
8. *L. ornatus* Valenciennes (Ornate emperor)
9. *L. variegatus* Valenciennes (Variegated emperor)

Key to species

- 1a. Cheek with 4 to 6 vertical rows of scales. Dorsal fin with 10 soft rays. Anal fin usually with 9 to 10 soft rays *G. griseus*
- 1b. Cheek naked. Dorsal fin with 9 soft rays. Anal fin with 8 soft rays 2
- 2a. Snout and head elongate. Body depth less than head length, usually more than 2.9 times in standard length. Teeth caninoid or conical, never molariform posterolaterally. Inner surface of pectoral fin base scaleless 3
- 2b. Snout not elongate. Body depth greater than head length (sometimes equal or little less in young). Anterior teeth caninoid, posterolateral teeth obtuse, rounded or distinctly molar-like 4
- 3a. Upper margin of eye almost on dorsal profile. Interorbital space concave, flat or only slightly convex *L. variegates*
- 3b. Upper margin of eye well separated from dorsal profile. Interorbital space moderately or strongly convex
..... *L. microdon*
- 4a. A characteristic series of bright blue lines radiating across cheek from eye. Centres of scales with white spots. Often longitudinal yellowish streaks on body ...
..... *L. nebulosus*
- 4b. No blue radiating lines on head 5
- 5a. An oblong blotch present on sides, usually encircled with a golden rim *L. harak*
- 5b. No obvious large dark blotch present on sides of body 6
- 6a. Snout length (excluding upper lip) distinctly greater than cheek depth 7
- 6b. Snout length (excluding upper lip) equal to, or less than cheek depth 8
- 7a. Posterolateral teeth in jaws include strong molars in adults. Red spot on opercle margin and on pectoral fin base. No conspicuous yellow stripes on body
..... *L. lentjan*

- 7b. Some posterolateral teeth in jaws roundish but small. No distinct molar. No red spot on opercle margin or on pectoral fin base. Several yellow stripes on body, the one at level of pectoral fin base most conspicuous *L. obsoletus*
- 8a. Several prominent bright orange stripes present on body. Opercular and preopercular margins bright red
..... *L. ornatus*
- 8b. No bright orange stripes on body. No red colour on preopercle *L. mahsena*

Fisheries information : The emperor fishes and large eye breams are important commercial fishes. These fishes are generally marketed fresh.

Remarks : *L. obsoletus* was previously recorded as *L. ramak* (Forsskal) and *L. lentjan*, as *L. mahsenoides* Valenciennes.

Family 89 NEMIPTERIDAE (Threadfin breams, Monocle breams)

Body elongate to almost deep and compressed. Mouth terminal, small to moderate; premaxillaries more or less protrusible. Dorsal fin continuous with 10 spines and 9 rays. Anal fin with 3 spines and 7 rays. Pectoral fins with 2 unbranched and 12 to 17 branched rays. Pelvic fins inserted in thoracic region, with 1 spine and 5 rays. Caudal fin emarginate, forked, lunate or falcate; the upper and / or lower tips of the fin with or without elongated or filamentous extensions.

Species known to occur in Tamil Nadu

1. *Nemipterus bipunctatus* (Ehrenberg)
(Delagon threadfin bream)
2. *N. japonicus* (Bloch) (Japanese threadfin bream)
3. *N. nematophorus* (Bleeker) (Doublewhip threadfin bream)
4. *N. peronii* (Valenciennes) (Notchedfin threadfin bream)
5. *N. randalli* (Russell) (Randal's threadfin bream)

6. *Scolopsis bimaculatus* Ruppell
(Thumbprint monocle bream)
7. *S. vosmeri* (Bloch) (Whitecheek monocle bream)

Key to species

- 1a. Suborbital naked, with a large backwardly pointing spine and a series of smaller spine or serrations on its posterior margin. Posterior margin of opercle coarsely denticulate or serrate. Canine teeth absent 2
- 1b. Suborbital scaly or naked, spine absent. Posterior margin of suborbital smooth, finely serrate, or with a few small denticulation. Posterior margin of preopercle finely denticulate or smooth. Canine teeth in jaws present only anteriorly 3
- 2a. Small antrose spine or bony ridge below eye absent *S. bimaculatus*
- 2b. Small antrose spine or bony ridge present below eye *S. vosmeri*
- 3a. First two dorsal spines close together, almost fused, produced to form a long filament *N. nematophorus*
- 3b. First two dorsal spines separated by membrane, not produced into a long filament and shorter than the following spines 4
- 4a. Membrane between dorsal spines deeply incised *N. peronii*
- 4b. Membrane between dorsal spines continuous or slightly emarginated 5
- 5a. Upper lobe of caudal fin pointed or rounded *N. bipunctatus*
- 5b. Upper lobe of caudal fin produced to elongate point, falcate, or extended into a narrow filament 6
- 6a. Pelvic fins long, reaching to or beyond level of origin of anal fin *N. randalli*
- 6b. Pelvic fins short or moderately long, not reaching to level of origin of anal fin *N. japonicus*

Fisheries information : The threadfin breams are of considerable commercial importance. *N. japonicus* and *S. vosmeri* are very common species found in both the coasts of our country.

Family 90 SCIAENIDAE (Croakers)

Body elongate, moderately compressed with cycloid scales on head and ctenoid scales on body. Sensory pores usually conspicuous on tip of snout (rostral pores), on lower margin of snout (marginal pores) and on chin (mental pores). Some species with 1 or 2 mental barbels. Dorsal fin usually long, continuous, with a deep notch between anterior and posterior parts. The anterior spinous part with 8 to 10 spines (usually 10) and posterior part with 1 spine and 21 to 34 rays. Anal fin with 2 spines, the second spine may be greatly enlarged and strong. Caudal fin emarginated to pointed, but never deeply forked. Lateral line extended upto end of caudal fin.

Species known to occur in Tamil Nadu

1. *Chrysochir aureus* (Richardson) (Reeve's croaker)
2. *Daysciaena albida* (Cuvier) (Two-beard croaker)
3. *Dendrophysa russelli* (Cuvier) (Goatee croaker)
4. *Johnius amblycephalus* (Bleeker) (Beared croaker)
5. *J. belangerii* (Cuvier) (Belanger's croaker)
6. *J. carouna* (Cuvier) (Caroun croaker)
7. *J. carutta* Bloch (Karut croaker)
8. *J. coitor* (Hamilton) (Coitor croaker)
9. *J. dussumieri* (Cuvier) (Sin croaker)
10. *J. elongatus* Mohan (Spindle croaker)
11. *J. glaucus* (Day) (Pale spotfin croaker)
12. *J. macropterus* (Bleeker) (Largefin croaker)
13. *J. macrorhynchus* Mohan (Bigsnout croaker)
14. *Kathala axillaris* (Cuvier) (Kathala croaker)

- 15. *Nibea chui* (Trewavas) (Chu's croaker)
- 16. *N. maculata* (Schneider) (Blotched croaker)
- 17. *N. soldado* (Lacepede) (Soldier croaker)
- 18. *Otolithes cuvieri* (Trewavas) (Lesser tigertooth croaker)
- 19. *O. ruber* (Bloch & Schneider) (Tigertooth croaker)
- 20. *Otolithoides biauritus* (Cantor) (Bronze croaker)
- 21. *Panna microdon* (Bleeker) (Panna croaker)
- 22. *Paranibea semiluctuosa* (Cuvier) (Half-mourning croaker)
- 23. *Pennahia anea* (Bloch) (Greyfin croaker)
- 24. *Protonibea diacanthus* (Lacepede) (Spotted croaker)

Key to species

- 1a. Gasbladder with one or two pairs of simple or branched appendages 2
 - 1b. Gasbladder with more than two pairs of diverticula, almost all arborescent..... 4
 - 2a. Gasbladder appendages wholly directed forward from anterior end of bladder *K. axillaris*
 - 2b. Gasbladder appendages with at least the main part lying parallel to bladder 3
 - 3a. Gasbladder appendages arising from anterior end of bladder and immediately dividing into branches, each side dividing into a cephalic and an abdominal branch, the former branching in front of transverse septum *P. microdon*
 - 3b. Gasbladder appendages arising from posterior end of bladder..... *O. biauritus*
 - 4a. Gasbladder carrot shaped 5
 - 4b. Gasbladder hammer shaped 15
 - 5a. Anterior pair of arborescent appendages of gasbladder branching on posterior surface of transverse septum, but not entering the head 6
 - 5b. Anterior pair of arborescent appendages

of gasbladder extending into the head and branching under the skull 10

 - 6a. Outer row of teeth in upper jaw enlarged and spaced, but no outstanding canines. 7
 - 6b. One or 2 pairs of outstanding canine teeth (near symphysis) in upper or both jaws 8
 - 7a. Pores on chin in "false five" pattern, those of first pair close together behind tip of jaw and united by a groove. Lower jaw shorter than upper jaw *P. diacanthus*
 - 7b. First pair pores small, on front of chin, one on each side of tip of jaw, not united by a groove, two pairs behind them. Lower jaw projecting *P. anea*
 - 8a. Canine teeth in upper jaw only. Mouth inferior *C. aureus*
 - 8b. Canine teeth in both jaws. Mouth terminal or lower jaw projecting 9
 - 9a. Gillrakers 8 to 11 on lower arm of first arch. Distance between sphenotic ridge and angle of lower jaw less than length of lower jaw. Canines very strong. Gasbladder with 30 to 38 pairs of arborescent appendages *O. ruber*
 - 9b. Gillrakers 12 to 17 on lower arm of first arch. Distance between sphenotic ridge and angle of lower jaw as long as or longer than lower jaw. Canines moderate. Gasbladder with 25 to 28 pairs of arborescent appendages *O. cuvieri*
 - 10a. Chin with a single mental barbel or with two minute barbels 11
 - 10b. No barbels on chin 12
 - 11a. Chin with a single mental barbel; lower jaw teeth uniform *D. russelli*
 - 11b. Chin with two minute barbels; lower jaw teeth well differentiated in size *D. albida*
 - 12a. Lower jaw teeth uniformly small *P. semiluctuosa*
 - 12b. Lower jaw teeth well differentiated in size, the lower inner row enlarged 13

- 13a. A distinct colour pattern of 4 or 5 broad, dark, broken oblique bands/bars extending obliquely from back to lower part of flanks, and a blotch on top of caudal peduncle *N. maculata*
- 13b. No distinct colour pattern on body 14
- 14a. Soft dorsal fin rays 28 to 31 *N. soldado*
- 14b. Soft dorsal fin rays 24 *N. chui*
- 15a. Teeth of lower jaw differentiated in size, the inner lateral row enlarged. Outer row of teeth of upper jaw enlarged and widely spaced. Mouth usually subterminal 16
- 15b. Teeth of lower jaw subequal. Outer row of teeth of upper jaw enlarged but not widely spaced. Mouth inferior. 17
- 16a. Lower gillrakers 5 to 8 ... *J. macrorhynchus*
- 16b. Lower gillrakers 10 to 15 ... *J. dussumieri*
- 17a. A barbel present on chin 18
- 17b. No mental barbel 19
- 18a. Scales on body ctenoid. Soft dorsal fin rays 30 to 33 *J. macropterus*
- 18b. Scales on body cycloid. Soft dorsal fin rays 22 to 26 *J. amblycephalus*
- 19a. Scales on head and breast cycloid, and most of body scales either cycloid or have a feebly ctenoid zone. Lateral line with a conspicuous silvery or yellow streak. Interorbital width 8.9 to 9.3 percent of standard length *J. carutta*
- 19b. Scales on occiput and whole body (except breast) ctenoid. Lateral line without a distinct silvery streak. Interorbital width narrower, less than 8.5 percent of standard length 20
- 20a. Snout conspicuously prominent and projecting, and 1.5 times in eye diameter. Second anal spine strong, 43 to 56% of head length. Lower gillrakers 10 to 13 *J. coitor*
- 20b. Snout projecting but less timidly, about equal to, or less than eye diameter 21

- 21a. Lower gillrakers 6 to 7. Mental pores surrounded by thickened skin, produced into two short, irregular tags (barbel-like) *J. elongatus*
- 21b. Lower gillrakers 8 to 13. No thickened skin as produced tags near mental pores 22
- 22a. Snout swollen and projecting *J. glaucus*
- 22b. Snout steeply curved, not or very slightly projecting in front of upper jaw 23
- 23a. Dorsal fin with 9 spines. Second anal spine about $\frac{1}{2}$ of head length *J. belangerii*
- 23b. Dorsal fin with 10 spines. Second anal spine about $\frac{1}{3}$ of head length *J. carouna*

Fisheries information : The croakers are very important commercial fishes. The large fishes are usually esteemed as food fishes. The swimbladder of these fishes are used in the preparation of islinglass, a product used in the gelatin in confectionary and for the preparation of certain cements.

Remarks : *Johnieops sina* (Cuvier) have been synonymised with *Johnius dussumieri* (Cuvier). Since generic status of *Johnieops* Mohan is not considered here following recent workers, *J. dussumieri* (Valenciennes) is recorded here as *J. amblycephalus* (Bleeker) as a replacement name. *Johnieops aneus* (Bloch) and *Pennahia macrophthalmus* (Bleeker) have been synonymised with *Pennahia anea* (Bloch)

Family 91 MULLIDAE (Goat fishes)

Body elongate and almost compressed, with ctenoid scales. Chin with 2 long barbels. Mouth inferior, gape slightly diagonal. Eyes situated near dorsal profile on head. Dorsal fin two, well separated, the first with 7 to 8 (generally) slender spines (first spine often very small) and the second with 9 rays (first unbranched). Anal fin with 1 spine and 6 rays. Caudal fin deeply forked, with 13 branched rays.

Species known to occur in Tamil Nadu

1. *Mulloidichthys flavolineatus* (Lacepede) (Yellowstripe goatfish)
2. *M. vanicolensis* (Valenciennes) (Yellowfin goatfish)
3. *Parupeneus barberinus* (Lacepede) (Dash-and-dot goatfish)
4. *P. heptacanthus* (Lacepede) (Cinnabar goatfish)
5. *P. indicus* (Shaw) (Indian goatfish)
6. *P. trifasciatus* (Lacepede) (Doublebar goatfish)
7. *Upeneus guttatus* (Day) (Bensasi goatfish)
8. *U. luzonius* Jordan & Seale (Darkbarred goatfish)
9. *U. moluccensis* (Bleeker) (Goldband goatfish)
10. *U. sulphureus* Cuvier (Sulphur goatfish)
11. *U. sundaicus* (Bleeker) (Ochreband goatfish)
12. *U. taeniopterus* Cuvier (Finstripe goatfish)
13. *U. tragula* Richardson (Freckled goatfish)
14. *U. vittatus* (Forsskal) (Striped goatfish)

Key to species

- 1a. Teeth present on vomer and palatines. Both dorsal fins with stripe. Most species with oblique bands on caudal lobes 2
- 1b. No teeth on vomer and palatines. Stripes sometimes present on second dorsal fin. Caudal fin lobes without black bands ... 9
- 2a. Five to seven vertical scale rows along space between dorsal fins. 12 vertical scale rows along upper part of caudal peduncle 3
- 2b. Four vertical scale rows along space between dorsal fins. 10 vertical scale rows along upper part of caudal peduncle 6
- 3a. No cross-bars on caudal fin *U. sulphureus*
- 3b. Dusky cross-bar on caudal fin 4
- 4a. Caudal fin with 5 to 6 dusky cross-bars on upper lobe only, no bars on lower lobe *U. moluccensis*
- 4b. Caudal fin with black cross bars on both lobes 5
- 5a. Pectoral fins with 13 to 14 rays. Lower lobe of caudal fin with 4 to 5 blackish cross bars. Pelvic fins almost equal to pectoral fin length *U. taeniopterus*
- 5b. Pectoral fins with 15 to 17 rays. Lower lobe of caudal fin with 3 to 4 blackish cross bars. Pelvic fins almost two third of pectoral fins *U. vittatus*
- 6a. Dorsal fin with 7 spines, the first spine longest *U. guttatus*
- 6b. Dorsal fin with 8 spines, the first spine very small 7
- 7a. Caudal fin with a characteristic dark brown triangular stripe prolonging the lateral band along lower fin lobe, but without crossbars; a yellowish brown stripe from eye to caudal fin base *U. sundaicus*
- 7b. Caudal fin with brown or red cross bars (4 to 6 on upper lobe and 5 to 8 on lower lobe); usually with a reddish brown or blackish stripe from snout to middle of caudal fin base 8
- 8a. A large dark saddle-like blotch dorsally on caudal peduncle just behind 2nd dorsal fin; gillrakers 18 to 22 on first arch *U. luzonius*
- 8b. Saddle-like blotch on caudal peduncle absent; gillrakers 21 to 25 on first arch *U. tragula*
- 9a. Teeth in jaws small, in villiform band anteriorly. Five rows of scales between dorsal fins; 11 to 12 rows of scales along upper part of caudal peduncle. Lateral line scales 33 to 38 10
- 9b. Teeth in jaws moderately large, blunt, in a single row. Two or 3 rows of scales between dorsal fins; 8 or 9 rows of scales along upper part of caudal peduncle. Lateral line scales 26 to 31 11

- 10a. A black spot often present in lateral yellow stripe on body. Body depth 3.6 to 4.7 in standard length. Gillrakers 25 to 30. Fins whitish to fairly yellowish
..... *M. flavolineatus*
- 10b. No blackish spot in lateral yellow stripe on body. Body depth 3.3 to 3.6 times standard length. Gillrakers 32 to 36. Fins yellow..
.....*M. vanicolensis*
- 11a. Caudal peduncle with a roundish black spot 12
- 11b. Caudal peduncle without a roundish black spot 13
- 12a. A dark stripe on snout, preorbital head and upper side of body. No large yellow blotch on lateral line*P. barberinus*
- 12b. No dark stripe on body. A large, horizontally elongate yellowish blotch on lateral line below posterior part of dorsal fin and interdorsal space *P. indicus*
- 13a. Body with 2 or 3 blackish vertical broad saddle-like dark bars. Gillrakers on first arch 35 to 41 *P. trifasciatus*
- 13b. Body without dark vertical bars. Gillrakers on first arch 24 to 27*P. heptacanthus*

Fisheries information : The goatfishes are important commercial fishes. These fishes are highly esteemed as food fish.

Remarks : The species *P. heptacanthus* was previously recorded as *P. cinnabaricus* (Cuvier) and *P. trifasciatus*, as *P. bifasciatus* (Lacepede) which are here used as per the current parlence of nomenclature.

Family 92 MONODACTYLIDAE (Silverbat fish, Moon fish)

Body deep and oval, strongly compressed. Mouth small, jaws with feeble teeth; vomer and palate with granulated teeth, maxilla exposed. Upper jaw slightly protrusible. Dorsal fin with 7 to 8 spines and 25 to 31 rays. Anal fin with 3 spines and 25 to 30 rays. Pelvic fins rudimentary or absent. Scales fine, cycloid or ctenoid, deciduous; extending on to median fin and head

Species known to occur in Tamil Nadu

1. *Monodactylus argenteus* (Linnaeus)
(Silverbat fish)
2. *M. falciformis* Lacepede (Moonfish)

Key to species

- 1a. Body depth 1.5 to 2.0 times in standard length. Gillrakers 22 to 24 on lower limb of first arch *M. falciformis*
- 1b. Body depth 1.2 to 1.5 times in standard length. Gillrakers 16 to 21 on lower limb of first arch *M. argenteus*

Fisheries information : The silverbat fishes are usually found in the costal waters on the west coast of our country. *M. argenteus* is a very good aquarium fish since it thrives well in captivity.

Family 93 PEMPHERIDIDAE (Sweepers)

Body strongly compressed and deep. Eyes relatively large, greater than interorbital width. Mouth generally oblique, upper jaw not reaching beyond center of eyes. Dorsal fin single, short, with 4 to 7 graduated spines and 7 to 12 soft rays. Anal fin with 3 (very rarely 2) spines and 17 to 45 soft rays. Lateral line with 40 to 82 scales. Some species with luminescent organs.

Species known to occur in Tamil Nadu

1. *Pempheris moluca* Cuvier (Moluccan sweeper)
2. *P. vanicolensis* Cuvier (Vanicolo sweeper)

Key to species

- 1a. Anterior teeth on mandible directed forward. Body depth almost equal to distance from snout to dorsal fin origin. Lateral line with 64 to 66 tubules.....
..... *P. moluca*
- 1b. No forward directed teeth in mandible. Body depth greater than distance from snout to dorsal fin origin. Lateral line with about 55 tubules *P. vanicolensis*

Fisheries information : The sweeper fishes are of minor fisheries importance. These fishes are sometimes found in the commercial catches.

Family 94 KYPHOSIDAE
(Rudderfishes, Sea chubs)

Body oblong to ovate and compressed, with ctenoid scales. Mouth small, horizontal with an almost exposed maxilla; upper jaw slightly protrusible. Dorsal fin with 6 to 12 spines and 11 to 22 rays, depressible in a sheath. Anal fin with 3 spines and 11 to 26 rays. Pectoral fins short. Pelvic fins with one spine and 5 rays and with a scally axillary process. Caudal fin forked or emarginated.

Species known to occur in Tamil Nadu

1. *Kyphosus cinerascens* (Forsskal) (Blue sea chub)
2. *K. vaigiensis* (Quoy and Gaimard) (Brassy chub)

Key to species

- 1a. Soft dorsal fin higher than spinous part of dorsal fin *K. cinerascens*
- 1b. Soft dorsal fin shorter than spinous part of dorsal fin *K. vaigiensis*

Fisheries information : The blue sea chub is of minor commercial value. It is captured along with commercial catches.

Family 95 DREPANIDAE
(Sicklefishes)

Body highly deep and greatly compressed, with finely ctenoid scales. Head with a parabolic dorsal profile. Mouth terminal and protrusible, forming a downward projecting tube when protracted. Dorsal fin with 8 to 10 spines (the first small, procumbent, visible only in juveniles), the spinous part separated from soft part of dorsal fin by a deep notch and expressible in a high basal scaly sheath. Anal fin with 3 spines. Pectoral fins long and falcate, extending to base of caudal fin. Caudal fin rounded. Lateral line highly arched.

Species known to occur in Tamil Nadu

1. *Drepane longimana* (Bloch & Schneider) (Banded drepane)
2. *D. punctata* (Linnaeus) (Spotted drepane)

Key to species

- 1a. Dorsal fin with 8 spines. Four to 9 vertical grey bars on upper half of sides
..... *D. longimana*
- 1b. Dorsal fin with 9 spines. Four to 11 vertical rows of small black spots on upper half of sides *D. punctata*

Fisheries information : The sicklefishes form seasonal fishery along the coasts of our country. These fishes are marketed fresh only. Their flesh are said to be of excellent quality.

Family 96 EPHIPPIDAE
(Spadefishes)

Body greatly deep to more or less orbicular and highly compressed with scales. Head short, its profile either steep or considerably convex. Mouth small, horizontal; tip of maxilla concealed. Dorsal fin with 9 spines, interspinous membranes deeply incised, sometimes filamentous; spinous part separated from soft part by a deep notch. Anal fin with 3 spines. Pectoral fins short and rounded. Pelvic fins thoracic, pointed, with an axillary process. Caudal fin distally almost sigmoid shaped, with an obtuse median angular process. Body with 4 or 5 vertical black bands which fade with the maturity of the fish.

Species known to occur in Tamil Nadu

Ephippus orbis (Bloch) (Spade fish)

Fisheries information : The spadefish is of little commercial importance. It is sometimes found in the commercial catches.

Family 97 PLATACIDAE
(Batfishes)

Body deep, rhomboid and greatly compressed. Eyes on both sides of flattened

body. Dorsal profile of head almost angular, its length much shorter than height. Mouth, terminal, horizontal and scarcely protractile. Dorsal fin with 5 hidden spines and 35 to 39 rays, increasing in size posteriorly. Anal fin with 3 spines and 25 to 28 rays. Pectoral fins short and almost rounded. Pelvic fins produced, the first soft ray extending to at least anal fin origin. Caudal fin truncate. Lateral line arched with 50 to 55 scales. Scales finely ciliated, small, becoming minute on fins which are densely covered.

Species known to occur in Tamil Nadu

1. *Platax orbicularis* Forsskal (Orbicular batfish)
2. *P. pinnatus* (Linnaeus) (Round batfish)
3. *P. teira* (Forsskal) (Longfin batfish)

Key to species

- 1a. Dorsal finrays 28 to 34. Soft dorsal and anal fins greatly elongated. Mouth profile rounded. Scales small, 40 to 45 from lateral line origin to 1st dorsal spine *P. teira*
- 1b. Dorsal finrays 35 to 37. Soft dorsal and anal fins not much elongated. Mouth profile pointed. Scales larger, 25 to 30 from lateral line origin to 1st dorsal spine 2
- 2a. Snout convex. Chin with 5 mandibular pores each side. Colour and intensity of black bars fade with growth
..... *P. orbicularis*
- 2b. Snout concave before eyes. Chin with 3 to 4 mandibular pores each side. Colour generally dark most of life ... *P. pinnatus*

Fisheries information : The batfishes are of not much commercial importance. These fishes are edible and palatable but not much esteemed as food on account of their foul feeding habits.

Family 98 SCATOPHAGIDAE (Scats)

Body quadrangular and greatly compressed. Head profile steep. Mouth small, horizontal with brush-like teeth. Dorsal fin with 11 to 12

strong spines and 16 to 18 rays, the first spine procumbent; middle of dorsal fin with a deep notch. Anal fin with 4 strong spines and 13 to 16 rays. Pectoral fins, relatively small, with 16 to 17 rays. Caudal fin truncate or slightly emarginate. Lateral line arched and complete. Body silvery or greenish with numerous dark spots.

Species known to occur in Tamil Nadu

Scatophagus argus (Bloch) (Spotted scat)

Fisheries information : The scats are of not much commercial importance. These fishes are popular aquarium fishes due to their attractiveness for their colour pattern of dark spots or bars on their body and orange-red colour on the dorsal profile.

Family 99 CHAETODONTIDAE (Butterflyfishes)

Body oval to orbicular or subrhomboid and highly compressed. Mouth small, terminal and protractile; maxilla not extending to anterior border of eye. Snout slightly produced to highly elongate. Dorsal fin with 6 to 16 spines and 15 to 31 rays, sometimes with a slight notch between spinous and soft rays. Anal fin with 3 spines (rarely 4) and 14 to 27 rays. Lateral line extending either up to base of soft part of dorsal fin or caudal fin base. An axillary scaly process at base of pelvic fin spine.

Species known to occur in Tamil Nadu

1. *Chaetodon auriga* (Forsskal) (Threadfin butterflyfish)
2. *C. collare* Bloch (Collared butterflyfish)
3. *C. decussatus* Cuvier
4. *C. melanotus* Bloch (Blackback butterflyfish)
5. *C. octofasciatus* Bloch (Eightbanded butterflyfish)
6. *C. trifasciatus* (Mungopark) (Purple butterflyfish)
7. *C. vagabundus* Linnaeus (Vagabond butterfly fish)

8. *C. xanthocephalus* Bennett (Yellowhead butterflyfish)
 9. *Heniochus acuminatus* (Linnaeus) (Pennant coral fish)

Key to species

- 1a. Lateral line complete, extending up to caudal fin base. Fourth dorsal spine elongate to filamentous, often longer than body depth *H. acuminatus*
 1b. Lateral line incomplete, extending up to near last rays of dorsal fin. Fourth dorsal spine normal, not extended or filamentous 2
 2a. Dorsal fin spines 10 or 11. Body with 8 broad, dark vertical bands *C. octofasciatus*
 2b. Dorsal fin spines 12 to 14. No bands, but if present, not as in 2a 3
 3a. All scales on body similar in size and shape, small to moderate and evenly rounded and arranged more or less regularly in horizontal rows 4
 3b. Scales of two types on body, larger rhombic scales anteriorly and smaller rounded scales posteriorly; longitudinal rows of large ones indistinct and transverse rows of small ones prominent 7
 4a. Spinous dorsal fin length nearly 2 times of soft dorsal length 5
 4b. Spinous dorsal fin length less than 1½ times of soft dorsal length 6
 5a. Dark ocular band present *C. trifasciatus*
 5b. Dark ocular band absent *C. xanthocephalus*
 6a. A white collar band behind broad ocular band present. No large dark spots on caudal peduncle. *C. collare*
 6b. No white collar band behind a narrow ocular band. Two large dark spots on caudal peduncle *C. melanotus*
 7a. Soft dorsal fin with long pointed filament

and a large black spot over posterior rays *C. auriga*

- 7b. Soft dorsal fin without long pointed filament and large black spot 8
 8a. Snout length 2.5 to 3.2 times in head length. A black band in base of soft dorsal fin to caudal peduncle, extending upto posterior part on anal fin *C. vagabundus*
 8b. Snout length 3.0 to 4.0 times in head length. Soft dorsal and anal fins, caudal peduncle and adjacent part of body black *C. decussatus*

Fisheries information : The juveniles of the butterfly fishes are used in the aquarium trade. These fishes are the most colourful ones among the coral fishes.

Family 100 POMACANTHIDAE (Angelfishes)

Body oval to orbicular and highly compressed with ctenoid scales. Mouth small, terminal, protrusible; maxilla not extending to anterior border of orbit. Preopercle with a strong spine. Dorsal fin with 9 to 15 spines and 15 to 33 rays and prolonged into filaments. Anal fin with 3 spines and 14 to 25 soft rays.

Species known to occur in Tamil Nadu

1. *Apolemichthys xanthurus* (Bennett)
2. *Pomacanthus annularis* (Bloch) (Ringed angelfish)
3. *P. imperator* (Bloch) (Imperial angelfish)
4. *P. semicirculatus* (Cuvier) (Semicircular angelfish)

Key to species

- 1a. Dorsal and anal fins not prolonged into a filamentous extension. Longest dorsal and anal rays about equal to or shorter than middle caudal fin rays. Juveniles similar to adults in colour. Soft dorsal rays usually 18 or less *A. xanthurus*
 1b. Dorsal and/or anal fin frequently prolonged into filamentous extensions.

- Longest dorsal (and usually anal) ray longer than middle caudal fin rays. Juveniles of different colour than adults, generally black with series of blue or white narrow vertical bands on sides. Soft dorsal rays usually 19 or more 2
- 2a. Adults without oblique stripes on body ..
..... *P. semicirculatus*
- 2b. Adults with oblique stripes on body 3
- 3a. Adult with 7 or 9 blue oblique bands on body and a blue ring at origin of lateral line. Juveniles with light bands and stripes not in concentric circles *P. annularis*
- 3b. Adult with 20 to 22 yellow oblique bands on body and dark area from isthmus to origin of lateral line. Bands and stripes of juveniles mostly concentric especially posteriorly *P. imperator*

Fisheries information : The juveniles of the Angelfishes are popular aquarium fishes. These fishes are of little commercial importance.

Family 101 CICHLIDAE (Cichlids)

Body deep and compressed. Single nostril on each side of snout. Jaws toothed; palatine and vomer edentulous. Dorsal fin with 12 to 22 spines and 8 to 23 soft rays; anal fin with 3 to 16 spines and 6 to 24 soft rays. Scales weakly ctenoid. Lateral line interrupted, usually with 30 to 40 scales.

Species known to occur in Tamil Nadu

1. *Etoplus maculatus* (Bloch) (Spotted chromide)
2. *E. suratensis* (Bloch) (Banded Pearlsport)
3. *Oreochromis mossambicus* (Peters) (Tilapia)

Key to species

- 1a. Anal fin with 3 or 4 spines; scales cycloid, rarely indistinctly ctenoid
..... *O. mossambicus*
- 1b. Anal fin with 12 to 15 spines; scales slightly ctenoid 2

- 2a. Body with 1 to 3 dark circular blotches along sides; dorsal fin with 8 to 10 soft rays and anal fin with 8 or 9 soft rays ...
..... *E. maculatus*
- 2b. Body with vertical bands on sides with small white pearly spots; dorsal fin with 14 or 15 soft rays and anal fin with 11 or 12 soft rays *E. suratensis*

Fisheries information : Very common in brackish waters and attains a length of 40 cm. Cichlids are excellent delicious fishes. These are also used in aquaculture and in aquaria.

Family 102 POMACENTRIDAE (Damsel-fishes)

Body orbicular to almost elongate and compressed. Mouth relatively small and oblique. Dorsal fin with 9 to 17 spines and 10 to 20 rays. Pectoral fins with 14 to 24 rays. Anal fin with 2 spines and 10 to 17 rays. Caudal fin forked to rounded.

Species known to occur in Tamil Nadu

1. *Abudefduf septemfasciatus* (Cuvier) (Sevenbar damselfish)
2. *A. vaigiensis* (Quoy & Gaimard) (Sergeant damselfish)
3. *Amphiprion sebae* Bleeker (Yellowtailed clownfish)
4. *Chromis caerulea* (Cuvier) (Bluepuller)
5. *Chrysiptera biocellata* (Quoy and Gaimard) (Ocellated surgeon-major)
6. *Dascyllus aruanus* (Linnaeus) (Zebra humbug)
7. *D. trimaculatus* (Ruppell) (Domino)
8. *Pomacentrus tripunctatus* (Cuvier) (Threespot damselfish)
9. *Pristotis jerdoni* (Day) (Jerdon's damselfish)

Key to species

- 1a. Scales small, usually more than 40 in longitudinal series from upper edge of gill openings to caudal base *A. sebae*

- 1b. Scales larger, usually less than 30 in longitudinal series from upper edge of gill openings to caudal base 2
- 2a. Upper and lower edge of caudal fin base with 2 or 3 projecting spiniform rays ... 3
- 2b. Upper and lower edge of caudal fin base without projecting spiniform rays 5
- 3a. Suborbital margin smooth or covered with scales. Hind margin of preopercle usually smooth, occasionally weakly serrate or crenulate. Dorsal spines 12 to 14. Greatest body depth usually greater than 1.8 times in standard length *C. caerulea*
- 3b. Suborbital and hind margin of preopercle finely serrate. Dorsal spines 12. Greatest body depth 1.4 to 1.6 times in standard length 4
- 4a. Dorsal fin with 12 rays (rarely 11 or 13). Colour of head and body pale with 3 black bars *D. aruanus*
- 4b. Dorsal fin with 14 to 16 rays. Colour not as in 4a *D. trimaculatus*
- 5a. Hind margin of preopercle weakly to strongly serrate. Margin of suborbital and posterior circumorbitals generally serrate, occasionally smooth or crenulate 6
- 5b. Hind margin of preopercle with smooth or finely crenulate. Margin of suborbital and posterior circumorbital smooth 7
- 6a. Lower edge of subopercle and interopercle weakly to moderately serrate. Gillrakers on first arch more than 25 *P. jerdoni*
- 6b. Lower edge of subopercle and interopercle smooth. Gillrakers on first arch 18 to 25 *P. tripunctatus*
- 7a. Horizontal scale rows above middle of lateral line usually $1\frac{1}{2}$, occasionally $2\frac{1}{2}$. Colour pattern variable *C. biocellata*
- 7b. Horizontal scale rows above middle of lateral line usually 3 to $3\frac{1}{2}$. Colour pattern consisting of alternating light and dark bars or uniformly pale with large black spot in middle of tail base 8

- 8a. Five dark bars present on sides, usually distinct *A. vaigiensis*
- 8b. Six dark bars present on sides, sometimes faint *A. septemfasciatus*

Fisheries information : The damselfishes are of little commercial importance. A few species of these fishes are used in the aquarium trade.

Family 103 CIRRHITIDAE (Hawkfishes)

These are small to medium sized fishes, reside on the sea bottom at depths greater than 30 m. Body compressed with a continuous, notched dorsal fin with 10 spines and 11 to 17 rays. Anal fin with 3 spines and 5 to 7 rays. Pectoral fin with 14 rays, the lower 5 to 7 rays unbranched and usually enlarged with membranes deeply incised. One or more cirri projecting from interspinous membranes near tips of dorsal spines; a fringe of cirri on hind edge of front nostrils. Scales cycloid, 3 to 5 rows above lateral line.

Species known to occur in Tamil Nadu

1. *Cirrhichthys aprinus* (Cuvier)
2. *C. aureus* (Schlegel) (Golden curlyfin)

Key to species

- 1a. First dorsal ray prolonged *C. aureus*
- 1b. First dorsal ray not prolonged, equal to other rays *C. aprinus*

Fisheries information : Of no fishery value.

Family 104 CEPOLIDAE (Bandfishes)

Small, moderately elongate fishes with compressed, tapering body and lanceolate caudal fin. Mouth large, oblique with slender, slightly curved teeth. Upper jaw broad at end, ending below rear margin of eye. Dorsal fin continuous, with 0 to 4 flexible spines and 80 to 100 rays. Lateral lines close to dorsal fin base. General colour red to pink. Usually live in burrows at bottom of sea.

Species known to occur in Tamil Nadu

1. *Acanthocephala abbreviata* (Valenciennes) (Bandfish)
2. *A. indica* (Day) (Indian bandfish)

Key to species

- 1a. Dorsal fin with more than 90 rays. Head length 8 times in total length. Black spot on dorsal fin behind 8th ray
.....*A. abbreviata*
- 1b. Dorsal fin with less than 90 rays. Head length 6 to 7 times in total length. Two rows of golden spots along sides
.....*A. indica*

Fisheries information : Of no fisheries importance.

Family 105 MUGILIDAE
(Mulletts)

Body elongate, cylindrical or slightly compressed. Mouth small, terminal or inferior. Eyes usually covered by fatty tissue (adipose eyelids). Dorsal fin two, well separated, the first with 4 spines and the second with soft rays. Pectoral fins set rather high on body. Pelvic fins subabdominal, with one spine and 5 branched rays. Caudal fin moderately forked, emarginate or truncate. Lateral line absent.

Species known to occur in Tamil Nadu

1. *Liza macrolepis* (Smith) (Largescale mullet)
2. *L. melinoptera* (Valenciennes) (Otonebora mullet)
3. *L. parsia* (Hamilton) (Gold-spot mullet)
4. *L. subviridis* (Valenciennes) (Greenback grey mullet)
5. *L. tade* (Forsskal) (Tade grey mullet)
6. *L. vaigiensis* (Quoy & Gaimard) (Square-tail grey mullet)
7. *Mugil cephalus* Linnaeus (Flathead grey mullet)
8. *Valamugil buechanani* (Bleeker) (Buchanan's bluetail mullet)

9. *V. cunnesius* (Valeniennes) (Longfin grey mullet)
10. *V. seheli* (Forsskal) (Blue-spot grey mullet)
11. *V. speigleri* (Bleeker) (Speigler's grey mullet)

Key to species

- 1a. Posterior tip of maxilla (upper jaw) not curved under tip of premaxilla
.....*M. cephalus*
- 1b. Posterior tip of maxilla (upper jaw) curved under tip of premaxilla 2
- 2a. Scales without membranous digitated hind margin. Pectoral axillary scale rudimentary or absent 3
- 2b. Scales with a membranous digitated hind margin. Pectoral axillary scale very long 8
- 3a. Anal fin rays 8*L. vaigiensis*
- 3b. Anal fin rays 9 4
- 4a. Twelve transverse rows of scales
.....*L. macrolepis*
- 4b. Transverse rows of scales less than 12 ... 5
- 5a. Second dorsal fin origin over posterior half of anal fin base*L. tade*
- 5b. Second dorsal fin origin over anterior half of anal fin base 6
- 6a. Preorbital bone narrow, not filling space between mouth and eye. Corner of mouth on vertical through anterior nostril
.....*L. subviridis*
- 6b. Preorbital bone wide, filling space between mouth and eye. Corner of mouth on vertical behind anterior nostril. 7
- 7a. First dorsal fin origin nearer to snout tip than to caudal fin base. Transverse rows of scales 11 *L. parsia*
- 7b. First dorsal fin origin nearer to caudal fin base than to snout tip. Transverse rows of scales 9 to 10 *L. melinoptera*
- 8a. Second dorsal fin origin on vertical through anal fin origin. Hind end of upper jaw

reaching vertical between posterior nostril and anterior margin of eye 9

8b. Second dorsal fin origin on vertical behind anterior fourth of anal fin base. Hind end of upper jaw vertical through anterior margin of eye 10

9a. Scales in lateral series 38 to 42. Second dorsal fin origin opposite 26 to 28 scales in lateral series *V. seheli*

9b. Scales in lateral series 32 to 36. Second dorsal fin origin opposite 21 to 23rd scales in lateral series *V. buehanani*

10a. Scales in lateral series 33 to 36. Soft dorsal and anal fins moderately scaled *V. cunnesius*

10b. Scales in lateral series 37 to 40. Soft dorsal and anal fins densely scaled *V. speigleri*

Fisheries information : Mulletts are very important commercial fishes. Most of the species are suitable for aquaculture due to their rapid growth and hardness.

Family 106 SPHYRAENIDAE (Barracudas)

Body elongate with long pointed snout. Mouth large with lower jaw projecting beyond upper, with large fang-like teeth. Dorsal fin two, considerably separated, the first with 5 spines and second with one spine and 9 rays. Pectoral fins inserted low on body. Caudal fin forked.

Species known to occur in Tamil Nadu

1. *Sphyraena accutipinnis* Day (Sharp-fin barracuda)
2. *S. barracuda* Walbaum (Great barracuda)
3. *S. flavicauda* (Ruppell) (Short-jawed barracuda)
4. *S. forsteri* Cuvier (Bigeye barracuda)
5. *S. jello* Cuvier (Pickhandle barracuda)
6. *S. obtusata* Cuvier (Obtuse barracuda)
7. *S. putnamiae* Jordan and Seale (Sawtooth barracuda)

Key to species

- 1a. First gill arch with platelets, each bearing several small spines. No gillrakers on first arch. A well defined dusky blotch underneath base of pectoral fins *S. forsteri*
- 1b. First gill arch without spine-covered platelets as above. Either 1 or 2 (rarely 3) gill rakers or none on first arch 2
- 2a. Gillrakers present on first arch 3
- 2b. Gillrakers absent on first arch 5
- 3a. Single gillraker at angle of first arch *S. accutipinnis*
- 3b. Two (rarely 3) gillrakers on first arch ... 4
- 4a. Pectoral fin reaching past origin of first dorsal fin; height of first dorsal fin equal to or greater than postorbital length *S. obtusata*
- 4b. Pectoral fin not reaching to origin of first dorsal fin; height of first dorsal fin less than postorbital length *S. flavicauda*
- 5a. Lateral line pores less than 100 (usually 80 to 90). Sides with several inky blotches beneath lateral line *S. barracuda*
- 5b. Lateral line pores more than 100. No black blotches on lower sides of body 6
- 6a. Preopercle edge obliquely rounded. Teeth slanted backwards. Sides with chevron-shaped markings. Lateral line with 122 to 134 pored scales *S. putnamiae*
- 6b. Preopercle edge smoothly rounded. Teeth erect. Dark bars on sides not in form of chevrons. Lateral line pores more than 130, usually 135 to 140 *S. jello*

Fisheries information : The barracudas are of not much commercial importance. These fishes are marketed fresh, frozen, dried, salted or smoked.

Family 107 POLYNEMIDAE (Threadfins)

Body almost elongate and compressed. Mouth subterminal. Dorsal fins two, well

separated from each other, the first with 7 to 8 flexible spines. Anal fin with 2 or 3 spines. Pectoral fins divided into two parts, the upper part normal, the lower part with 3 to 15 free filamentous rays. Pelvic fins with one spine and 5 branched rays, subabdominal in position. Caudal fin deeply forked.

Species known to occur in Tamil Nadu

1. *Eleutheronema tatradyctylum* (Shaw) (Four finger threadfin)
2. *Filimanus similis* Feltes (Seven finger threadfin)
3. *F. xanthonema* (Valenciennes) (Silver sixfinger threadfin)
4. *Leptomelanosoma indicum* Shaw (Indian threadfin)
5. *Polydactylus microstoma* (Bleeker) (Mamali threadfin)
6. *P. plebeius* Broussonet (Striped threadfin)
7. *P. sexfilis* Valenciennes (Golden sixthread tesselfish)
8. *P. sextarius* Schneider (Blackspot threadfin)
9. *Polynemus paradiseus* Linnaeus (Paradise threadfin)

Key to species

- 1a. Pectoral fin insertion near midline of body. Eye diameter 2 or more in snout length *P. paradiseus*
- 1b. Pectoral fin insertion well below midline of body. Eye diameter approximately equal to snout length 2
- 2a. Teeth extending labially on anterior two-third of dentary plate. Free lower lip restricted to posterior third of lower jaw. Tooth plates extending posteriorly from lateral margin of primary tooth plate on vomer. Gillrakers less than 20. Free pectoral filaments 4 *E. tetradyctylum*
- 2b. Teeth on dentary restricted to dorsal surface or extending laterally only along anterior third of lower jaw. Free lower lip well developed. Tooth plate on vomer simple or absent. Gillrakers 18 to 60. Free pectoral filaments 5 to 7 3
- 3a. Width of band of teeth on upper and lower jaws 2 or more in space separating band of teeth on one premaxilla from other. Basisphenoid bones not contact prootic. Free pectoral filaments 6 or 7 4
- 3b. Width of band of teeth on upper and lower jaws less than 2 in space separating band of teeth on one premaxilla from other. Basisphenoid contacts prootic. Free pectoral filaments 5 or 6 5
- 4a. Pectoral filaments 6 (rarely 5), reaching just beyond tip of pelvic fins *F. xanthonema*
- 4b. Pectoral filaments 7, reaching to anal fin origin *F. similis*
- 5a. Eyes small, about 7 times in head length; caudal fin lobes filamentous; airbladder with several appendages *L. indicum*
- 5b. Eyes large, about 4 times in head length; caudal fin lobes not filamentous; airbladder without appendages 6
- 6a. Lateral line with 60 to 68 scales; upper pectoral fin rays mostly unbranched; body silvery with narrow dusky stripes along scale rows; no dark blotch on shoulder at beginning of lateral line 7
- 6b. Lateral line with 46 to 52 scales; upper fin rays mostly branched; body golden yellow with no stripe along scale rows; a dark shoulder blotch at beginning of lateral line 8
- 7a. Free pectoral filaments 5; fin lobes relatively shorter *P. plebeius*
- 7b. Free pectoral filaments 6; fin lobes relatively longer *P. sexfilis*
- 8a. Pectoral fin with 5 free filamentous rays; interorbital region wider than eye diameter *P. microstomus*
- 8b. Pectoral fin with 6 free filamentous rays; interorbital region equal to or less than eye diameter *P. sextarius*

Fisheries information : The threadfin fishes are important commercial fishes. The Indian threadfin fish constitutes one of the important threadfin fisheries in our country.

Remarks : Often *F. similis* are misidentified as *F. heptadactyla* and *F. xanthonema*, as *P. sexfilis*.

Family 108 LABRIDAE
(Tuskfishes, Hogfishes)

Body almost compressed and oblong. Mouth terminal, generally with conspicuous lips. Jaws slightly to extremely protrusible. Dorsal fin with generally 8 to 21 spines and 7 to 14 soft rays. Anal fin with 3 spines and 7 to 18 rays. Lateral line smoothly curved, complete or interrupted.

Species known to occur in Tamil Nadu

1. *Cheilinus chlorurus* (Bloch) (Floral wrasse)
2. *C. trilobatus* Lacepede (Tripletail wrasses)
3. *C. undulatus* Ruppell (Humphead wrasse)
4. *Cheilio innermis* (Forsskal) (Cigar wrasse)
5. *Choerodon robustus* (Gunther) (Robust tuskfish)
6. *Coris formosa* (Bennett) (Queen coris)
7. *Epibulus insidiator* (Pallas) (Sling-jaw wrasse)
8. *Halichoeres hortulanus* (Lacepede) (Checkerboard wrasse)
9. *H. nigrescens* (Bloch) (Bubblefin wrasse)
10. *H. nebulosus* (Valenciennes) (Picture wrasse)
11. *Oxycheilinus bimaculatus* (Valenciennes) (Two-spot wrasse)
12. *O. diagramma* (Lacepede) (Cheeklined wrasse)
13. *Stethojulis interrupta* (Bleeker) (Cutribbon wrasse)
14. *S. trilineata* (Bloch)
15. *Thalassoma lunare* (Linnaeus) (Moon wrasse)

16. *T. hardwicke* (Bennett) (Sixbar wrasse)
17. *T. purpureum* (Forsskal) (Surge wrasse)
18. *Xyrichtys pavo* (Valenciennes) (Peacock wrasse)
19. *X. pentadactylus* (Linnaeus) (Five finger wrasse)

Key to species

- 1a. Dorsal fin with 11 to 12 spines *C. robustus*
- 1b. Dorsal fin with 8 to 10 spines 2
- 2a. Lateral line complete, forming a continuous line..... 3
- 2b. Lateral line interrupted, with anterior segment ending below posterior dorsal fin and posterior segment beginning one or more scale rows below anterior segment 12
- 3a. Lateral line scales 45 to 80 4
- 3b. Lateral line scales 25 to 28 5
- 4a. Body depth 5.5 to 8.0 times in total length. Lateral line descending smoothly to caudal peduncle without abrupt angle below dorsal fin. Lateral line scales 45 to 47
..... *C. innermis*
- 4b. Body depth 3.2 to 3.6 times in total length. Lateral line steeply descending below dorsal fin. Lateral line scales 73 to 80 ...
..... *C. formosa*
- 5a. Dorsal fin with 8 spines and 12 to 14 soft rays 6
- 5b. Dorsal fin with 9 spines and 11 to 13 soft rays 8
- 6a. Body with 6 black bars which are progressively shorter posteriorly, the 1st passing beneath pectoral fin to abdomen, the last a saddle-like spot on caudal peduncle *T. hardwicke*
- 6b. Body without a series of black bars 7
- 7a. Pectoral fin usually with 15 soft rays. Longitudinal reddish or violet bands on body *T. lunarae*

- 7b. Pectoral fin usually with 16 soft rays. No longitudinal bands on body *T. purpureum*
- 8a. Anterior teeth in upper and lower jaw only slightly larger than posterior teeth, not enlarged to form canines. Scale rows $2\frac{1}{2}$ between lateral line and dorsal fin origin 9
- 8b. Anterior teeth in upper and lower jaws enlarged to form canines, often with 2nd upper canine recurved. Scale rows 3 or more between lateral line and dorsal fin origin 10
- 9a. First band on sides from snout through eye to base of caudal, second from upper lip, above base of pectoral, ending about 6 scales behind head, third from corner of mouth below pectoral to base of caudal *S. trilineata*
- 9b. First band on sides from snout through eye, ending on superior border of opercle, second from upper lip, below eye to end of preopercle, third from gill opening to base of caudal, but generally interrupted on sides for 9 or 10 scales *S. interrupta*
- 10a. Isolated patch of small scales on upper part of opercle. Lateral line scales 26 *H. hortulanus*
- 10b. No scales on opercle. Lateral line scales 27 to 28 11
- 11a. Pectoral fin usually with 15 soft rays. Pectoral and pelvic fins hyaline or brownish in colour. A dark triangular blotch superiorly at base of pectoral fin *H. nigrescens*
- 11b. Pectoral fin usually with 14 soft rays. Pectoral and pelvic fins yellowish brown in colour. No dark triangular blotch at base of pectoral fin *H. nebulosus*
- 12a. Anal fin with 2 or 3 spines and 11 or 12 soft rays 13
- 12b. Anal fin with 3 spines and 8 or 9 soft rays 14
- 13a. First 2 dorsal spines much longer than other spines and completely separated by a large gap from the rest of the dorsal fin *X. pavo*
- 13b. First 2 dorsal spines not longer than other spines and connected to rest of fin by a low membrane *X. pentadactylus*
- 14a. Upper and lower jaws highly protrusible, lower jaw extending posteriorly all the way to gill membrane when mouth closed *E. insidiator*
- 14b. Lower jaw not protrusible as above, not extending posteriorly to gill membrane when mouth closed 15
- 15a. Body depth equal to or greater than head length. Pelvic fins unpigmented or solid dark colour, body colour pattern often with distinct or mottled vertical bars of light spots scattered on dark background ... 16
- 15b. Body depth less than head length. Pelvic fins with orange or red pigment on proximal part of fin. Body colour pattern often with horizontal stripe and/or black spot anterior to dorsal fin 18
- 16a. Dorsal fin with 10 spines and 9 soft rays. Body brown to dark olive with small pale spots (whitish to pink in life). Head with small orange-red spots or a few short irregular lines. Dorsal, anal and pelvic fins with whitish dots *C. chlorurus*
- 16b. Dorsal fin with 11 spines and 9 to 11 soft rays. Body colour pattern not as 16a .. 17
- 17a. Adults with a prominent fleshy hump on forehead. Caudal fin not becoming trilobed in adult males. Body greenish yellow with vertical dark green markings on scales (except nape and chest). Head with a highly irregular reticulum of orangish and blue-green. Two black lines extending posteriorly from eye *C. undulatus*
- 17b. Adults without prominent fleshy hump on forehead. Caudal fin becoming trilobed in adult males. Body olivaceous with vertical red line on each scale. Head and chest with numerous small red spots. Red line radiating anteriorly from eye *C. trilobatus*

- 18a. Caudal fin strongly rounded in juveniles. In large adults upper and median caudal fin rays elongated, giving ragged effect. Small dark spot behind eye and a large diffused one on side of body behind pectoral fin. Orange red lines radiating from eyes. *O. bimaculatus*
- 18b. Caudal fin slightly rounded to slightly emarginate. No dark spot on head and body. Diagonal red to maroon lines on lower cheek. *O. diagrammus*

Fisheries information : The hogfishes are of important commercial value. These fishes have a considerable fishery importance in our country.

Family 109 SCARIDAE (Parrotfishes)

Body oblong, almost compressed. Head usually bluntly rounded anteriorly. Mouth small, with jaws fused into a beak-like dental plates. Some species with posterior canine teeth. Dorsal fin with 9 spines and 10 to 11 rays. Anal fin with 3 spines and 9 rays. Pelvic fins with one spine and 5 rays. Caudal fin rounded in juvenile specimens but lobes usually extended in adults. Lateral line interrupted below posterior margin of dorsal fin, with 22 to 24 cycloid scales.

Species known to occur in Tamil Nadu

1. *Chlorurus sordidus* (Forsskal) (Daisy parrotfish)
2. *Leptoscarus vaigiensis* (Quoy & Gaimard) (Marbled parrotfish)
3. *Scarus ghobban* Forsskal (Yelloscale parrotfish)
4. *S. prasiognathus* Valenciennes (Singapore parrotfish)
5. *S. psittacus* Forsskal (Common parrotfish)
6. *S. quoyi* Valenciennes (Quoy's parrotfish)
7. *S. rivulatus* Valenciennes (Rivulated parrotfish)
8. *S. russelli* Valenciennes (Eclipse parrotfish)

Key to species

- 1a. Cheek with only one row of scales containing 3 or 4 scales below eye; teeth incompletely fused; head and body covered with white or yellow blotches *L. vaigiensis*
- 1b. Cheek with 2 to 3 rows of scales below eye; teeth completely fused to form broad dental plates 2
- 2a. Dental plates broadly exposed, lips cover less than half of dental plates; cutting edge of jaws irregular, zig-zag sutures joining lower jaw; median predorsal scales 4; initial phase dark brown, red around mouth, often with 2 rows of whitish spots on sides; terminal phase green with green cheek and pink chin *C. sordidus*
- 2b. Dental plates usually covered by lips more than half; cutting edge of jaws usually even, straight sutures joining lower jaw; median predorsal scales usually 5 to 7 3
- 3a. Median predorsal scales 4; 2 rows of cheek scales 4
- 3b. Median predorsal scales 5 to 7; 3 rows of cheek scales 5
- 4a. Median predorsal scales subequal; caudal fin of initial phase slightly emarginate and of terminal phase deeply emarginate; a dark brown spot basally at front of 1st interspinous membrane of dorsal fin; initial phase reddish brown without dark bars, lips without bands of green or orange; terminal phase not abruptly darker on anterior half of body *S. psittacus*
- 4b. First two median predorsal scales larger than last two; caudal fin of initial phase slightly rounded, becoming double emarginate with prolonged lobes in terminal phase; no dark spot on 1st interspinous membrane of dorsal fin; initial phase reddish-brown, often with 5 dark bars on body, lips with transverse bands of dull green and orange; terminal phase abruptly darker anterior to a line from base of 9th dorsal spine to anal fin origin *S. russelli*

- 5a. Pectoral fins usually with 12 branched rays; dental plates yellowish 6
- 5b. Pectoral fins usually with 13 branched rays; dental plates white or green 7
- 6a. Dorsal and anal fins rosy; head with blue green streaks radiating from eyes
..... *S. quoyi*
- 6b. Dorsal and anal fins bluish-green; head light orange with irregular blue-green lines and spots forming reticulum on chin and snout; cheek yellow-orange
..... *S. rivulatus*
- 7a. Posterior nostril oval, 2.5 times larger than anterior nostril; 3rd row of scales on cheek, if present, usually with 1 scale; dental plates white; initial phase yellow, the centers of scales blue, often with 5 blue bars on body; terminal phase light green, scales edged with salmon-pink; a broad irregular green band across lower cheek
..... *S. ghobban*
- 7b. Posterior nostril at most slight larger than anterior nostril; 3rd row of scales on cheek with 1 to 4 scales; dental plates greenish; initial phase reddish-brown, without dark bars, pale posteriorly on caudal peduncle with whitish spots; head with few dark green dots and a narrow dark green band from chin to near eye; terminal phase dark green; cheek and opercle below eyes bright blue green, head above cheek and around mouth abruptly orange; caudal fin pale blue-green with blue margin and a broad submarginal orange band on each lobe ..
..... *S. prasiognathus*

Fisheries information : The parrot fishes are of minor commercial value. These fishes are one of the important group of coral fishes associated with artisanal fisheries.

Family 110 OPISTOGNATHIDAE (Jawfishes)

Body with cycloid scales. Head naked. Mouth large. Palate without teeth. Pelvic fins inserted anterior to pectoral fins, with one spine and five soft rays (inner three weak and branched

and outer two stout and unbranched, unlike any other perciform. Dorsal fin continuous, with 9 to 12 spines. Lateral line high, ending near middle of dorsal fin (one species has both ventral and dorsal lateral line).

Species known to occur in Tamil Nadu

1. *Opistognathus nigromarginatus* Ruppell (Bridled jawfish)
2. *O. rosenbergii* Bleeker

Key to species

- 1a. Maxilla produced backward to beyond angle of preopercle. Dorsal fin with a dark ocellated blotch between 4 to 8th spine
..... *O. nigromarginatus*
- 1b. Maxilla truncate, reaching to just behind posterior edge of eye. Dorsal fin with four large blotches on lower tow-third
..... *O. rosenbergii*

Fisheries information : Of no fishery value.

Family 111 URANOSCOPIDAE (Stargazers)

Body elongate, thick, compressed posteriorly, naked or with small scales. Head large and cuboid with eyes on dorsal profile of it. Mouth large and oblique with fringed lips and small teeth in jaws. Lower jaw heavy and projecting, upper jaw protrusible; maxillaries exposed with supramaxilla. Lateral line on upper side of body. Pelvic fins narrowly separated, with one spine and 5 rays and inserted under throat. Spinous dorsal fin small or absent, or continuous with soft part of it; soft dorsal and anal fins similar, inserted in opposite position.

Species known to occur in Tamil Nadu

1. *Ichthyscopus lebeck* (Bloch) (Long nose stargazer)
2. *Uranoscopus cognatus* Cantor (Two spine yellow tail stargazer)
3. *U. guttatus* Cuvier

Key to species

- 1a. Spinous dorsal fin continuous with soft rayed portion. No spine above pectoral fin base *I. lebeck*
- 1b. Spinous dorsal fin separate from soft rayed portion by a notch. Large spine present just above pectoral fin base 2
- 2a. Head 2.3 to 3.1 in total length. Three pair of short forwardly directed spines under head. Colour brown above, light below. Anterior part of dorsal fin black.....
..... *U. cognatus*
- 2b. Head 3.3 to 3.5 in total length. No spines under head. Colour slaty brown with 2 or 3 rows of bluish white spots along back. Upper $\frac{2}{3}$ of dorsal fin black, pure white at base *U. guttatus*

Fisheries information : The stargazers are of no commercial importance. These fishes are sometimes seen in the commercial catches.

Remarks : Previous reports of *I. lebeck* are referred as *I. inermis* (Cuvier).

Family 112 TRICHONOTIDAE
(Sanddivers)

Lower jaw extending beyond upper jaw. Anterior rays of dorsal fin usually elongated. Pelvic fin with one spine and five soft rays. Lateral line on midside of body. Lateral line scales have a deep V-shaped notch in the posterior margin.

Species known to occur in Tamil Nadu

Trichonotus setiger Bloch and Schneider
(Filamented sand diver)

Fisheries information : Of no fishery value.

Family 113 PERCOPHIDAE
(Duckbills)

Head depressed. Eyes generally large and interorbital space narrow. Spinous dorsal fin if present, separate from soft dorsal fin. Anal fin with or without a single spine. Pelvic fin with one spine and five soft rays, interpelvic space wide.

Species known to occur in Tamil Nadu

Bembrops caudimacula Steindachner
(Bigeye smelt)

Fisheries information : Of no fishery value.

Family 114 PINGUIPEDIDAE
(Sandmelts, Sandperches)

Body elongate, subcylindrical and posteriorly compressed. Mouth large. Opercle with one stout spine. Dorsal fin with 4 to 5 spines and 19 to 24 rays, the last spine attached by a membrane to the first soft ray. Anal fin with one weak spine and 16 to 19 branched soft rays. Pelvic fins with one short spine concealed in the skin and 5 rays. Caudal fin rounded or truncate to emarginate. Body with ctenoid scales but opercle and cheek with cycloid scales.

Species known to occur in Tamil Nadu

- 1. *Parapercis pulchella* (Temminck & Schlegel) (Harlequin sandsmelt)
- 2. *P. punctulata* (Cuvier) (Spotted sandsmelt)

Key to species

- 1a. Front of lower jaw with 6 canines in outer row. Lateral line scales 55 to 57. Scales around caudal peduncle 26. Membrane of last dorsal spine joins 1st ray slightly below spine tip. A large black blotch covering most of spinous dorsal fin
..... *P. punctulata*
- 1b. Front of lower jaw with 8 canines in outer row. Lateral line scales 58 to 64. Scales around caudal peduncle 30 to 34. Membrane of last dorsal spine joins 1st ray at its base. No black blotch covering most of spinous dorsal fin *P. pulchella*

Fisheries information : The sandperches are of little commercial importance. These fishes are sometimes found in the bottom trawls.

Family 115 TRIPTERYGIIDAE
(Threefin blennies)

Body elongate usually with ctenoid scales, radii on anterior field only. Dorsal fin divided

into three segments, the first two composed of spines and the third with never fewer than 7 soft rays. Anal fin spines one, two (generally), or none. Pelvic fins jugular, spine present but reduced. Branchiostegal rays 6 or 7. First gill arch attached to opercle by a membrane.

Species known to occur in Tamil Nadu

Enneapterygius fasciatus (Weber)

Fisheries information : Of no fishery value.

Family 116 BLENNIIDAE (Combtooth blennies)

Body elongate without scales. Head always with cirri on eye, on nape and on posterior rim of anterior nostril. Mouth ventral, upper jaw not protractile. Eyes high on sides of head. Dorsal and anal fins long, their spines flexible. Dorsal fin with fewer spines than soft rays. Anal fin with 2 spines, usually rugose bulbous swellings on these spines, hardly separated from soft rays. Pelvic fins inserted ahead of pectoral fins, with one spine (not visible outwardly) and 2 to 4 soft rays. Pelvic fins sometimes deformed or absent. Caudal fin rounded.

Species known to occur in Tamil Nadu

1. *Istiblennius dussumieri* (Valenciennes) (Streaky rockskipper)
2. *Omobranchus elongatus* (Peters) (Cloister blenny)
3. *O. zebra* (Bleeker) (Zebra blenny)
4. *Petroscirtes breviceps* (Valenciennes) (Sabretooth blenny)
5. *P. variabilis* Cantor (Variable blenny)
6. *Salarias alboguttatus* Kner (White-spotted blenny)
7. *S. fasciatus* (Bloch) (Jewelled rockskipper)
8. *Xiphasia setifer* Swainson (Snake blenny)

Key to species

- 1a. Gill opening continuous from one side of

head to the other across ventral surface of head. Caudal fin rays branched 2

- 1b. Gill opening restricted to side of head. Caudal fin rays unbranched 4
- 2a. Dorsal fin spines 13 or 14. Segmented pelvic rays 3 or 4. Anterior anal fin rays not elongate in mature males *I. dussumieri*
- 2b. Dorsal fin spines 12 or 13 (usually 12). Segmented pelvic rays 3 (innermost ray reduced, only visible in skeletal preparations). Anterior anal fin rays often elongated in mature males 3
- 3a. Dorsal fin not distinctly notched. No crest on head *S. fasciatus*
- 3b. Dorsal fin distinctly notched. A longitudinal crest on head *S. alboguttatus*
- 4a. Pelvic fin with one spine and 2 segmented rays 5
- 4b. Pelvic fin with one spine and 3 segmented rays or absent 6
- 5a. Dorsal spines usually 13. Gill openings extend ventrally to level of upper half of pectoral fin base *O. elongatus*
- 5b. Dorsal spines usually 12. Gill openings not extending below dorsalmost ray of pectoral fin. *O. zebra*
- 6a. Origin of dorsal fin over eye. Last ray of dorsal and anal fins broadly bound by a membrane to caudal fin. Segmented anal fin rays 97 to 119 *X. setifer*
- 6a. Origin of dorsal fin distinctly behind or over posterior part of eye. Last ray of dorsal and anal fins broadly bound by a membrane to caudal peduncle (not to caudal fin). Segmented anal fin rays 14 to 21 7
- 7a. Broad dark sripe from snout through eye to caudal fin *P. breviceps*
- 7b. Blotches along side of body but no stripe from snout to caudal fin *P. variabilis*

Fisheries information : The blennies are of little commercial importance. These fishes are generally used for preparation of fishmeal.

Family 117 AMMODYTIDAE
(Sadlages)

Body elongate, cylindrical with or without scales. Mouth large, lower jaw strongly projecting and upper jaw protrusible. Dorsal fin continuous with 41 to 54 rays and without spines. Anal fin with 14 to 15 rays and without spines and half the length of dorsal fin. Pectoral fins rudimentary or absent. Caudal fin shallowly forked, lower lobe longer. Lateral line near dorsal fin.

Species known to occur in Tamil Nadu

1. *Bleekeria kallolepis* Gunther

Fisheries information : The sandlages are of little commercial importance. These fishes are sometimes found in the commercial catch and are used as bait.

Family 118 CALLIONYMIDAE
(Dragonnets)

Body elongate and more or less compressed. Jaws with villiform teeth and upper jaw very protrusible. Preopercle armed with stout spine. Gill openings restricted to a small dorsal or sublateral pores. Eyes generally directed upwards. Dorsal fin two, the first with 4 flexible spines and the second with 7 to 11 rays. Anal fin with 6 to 12 rays. Pelvic fins with one spine and 5 rays, jugular in position, well separated from each other. Body without scales. Lateral line consisting of pores.

Species known to occur in Tamil Nadu

1. *Callionymus filamentosus* (Valenciennes) (Blotchfin dragonet)
2. *C. japonicus* Houttuyn (Japanese dragonet)
3. *C. marleyi* (Regan) (Sand dragonet)
4. *C. sagitta* Pallas (Arrow-headed dragonet)
5. *Eleutherochir opercularis* (Valenciennes) (Indian dragonet)
6. *Synchiropus lineolatus* (Valenciennes)

Key to species

- 1a. Branchial openings lateral, directed more or less backwards 2
- 1b. Branchial openings on upper surface of head 3
- 2a. Last ray of pelvic fin connected by membrane to the base of pectoral fin. Opercle without free flap *S. lineolatus*
- 2b. Last ray of pelvic fin not connected by membrane to the base of pectoral fin. Opercle with a long pointed free flap *E. opercularis*
- 3a. Preopercular spine slender, straight, tapering into a point behind 4
- 3b. Preopercular spine strong, robust, with a upcurved tip 5
- 4a. Anal fin with 8 rays, the last ray divided. A smooth area behind eyes flanked by 2 bony ridged tubercles *C. japonicus*
- 4b. Anal fin with 9 rays, the last ray divided. A smooth area behind eyes, with a rugose area covered by skin on each side *C. filamentosus*
- 5a. Preopercular spine short and narrow, with 2 to 4 sharp points at its dorsal side. Anal fin with 9 rays. Caudal fin 3.6 to 3.8 times in standard length *C. sagitta*
- 5b. Preopercular spine broad, with 3 to 6 (usually 5) sharp points at its dorsal side. Anal fin with 8 rays. Caudal fin 4.0 to 4.5 times in standard length *C. marleyi*

Fisheries information : The Dragonnet fishes are of no commercial importance. These fishes are caught as bycatch in shrimps trawls.

Family 119 ELEOTRIDIDAE
(Sleepers)

Body elongate with ctenoid or cycloid scales, sometimes partially or completely naked. Dorsal fin two, the first with 6 flexible spines and the second with 1 spine and 8 to 19 rays. Anal fin with one spine and 6 to 19 rays. Pelvic fins separated with sucking disc, bases close together or united, with one spine and 5 rays. Caudal fin with 15 or 17 rays. Lateral line absent.

Species known to occur in Tamil Nadu

1. *Bu is butis* (Hamilton) (Duckbill sleeper)
2. *Eleotris fusca* (Schneider) (Dusky sleeper)
3. *E. melanosoma* Bleeker (Broadhead sleeper)
4. *Prinobutis koilomatodon* (Bleeker)

Key to species

- 1a. Angle of preopercle with a single ventrally directed spine 2
- 1b. Angle of preopercle without spines 3
- 2a. Scales in longitudinal series 45 to 55. Anterior 3 vertical papillae rows below eye extend below longitudinal row of midcheek *E. melanosoma*
- 2b. Scales in longitudinal series 60 to 68. Anterior most and third papilla row under eye extend below longitudinal row of midcheek *E. fusca*
- 3a. Jaws and snout short; snout rounded, subequal to eye. Lower jaw not projecting. Head rounded *P. koilomatodon*
- 3b. Jaws and snout elongate; snout flat, about twice eye diameter. Lower jaw projecting. Head flat *B. butis*

Fisheries information : The sleeper fishes are of no commercial importance. These fishes are generally used for the preparation of fishmeal.

Family 120 GOBIIDAE
(Gobias)

Body elongate or oval and compressed, with ctenoid or cycloid scales. Head with or without pores, but typically having sensory pore canals. Dorsal fin usually two, spinous dorsal fin when present, separated from soft dorsal fin and with 2 to 17 spines. The second or soft rayed dorsal fin and the anal fins are similar in shape and size. Pelvic fins united, sometimes entirely or posteriorly incised, usually forming an adhesive or sucking disc.

Species known to occur in Tamil Nadu

1. *Acentrogobius cyanomos* (Bleeker)
2. *A. ennorensis* Menon & Remadevi
3. *A. globiceps* (Hora) (Bighead goby)
4. *A. griseus* (Day) (Grey goby)
5. *A. madraspatensis* (Day)
6. *A. masoni* (Day)
7. *A. viridipunctatus* (Valenciennes)
8. *Apocryptes bato* (Hamilton)
9. *Apocryptodon madurensis* (Bleeker)
10. *Amblyeleotris gymnocephala* (Bleeker)
11. *Amblygobius albimaculatus* (Ruppell)
12. *Bathygobius fuscus* (Ruppell) (Frill goby)
13. *B. ostreicola* (Chaudhuri)
14. *Boleophthalmus boddarti* (Pallas) (Boddart's goggle-eyed goby)
15. *Brachygobius nusus* (Hamilton) (Bumblebel goby)
16. *Callogobius seshaiyai* Jacob & Rangarajan
17. *Favonigobius reichei* (Bleeker) (Tropical sandgoby)
18. *Glossogobius biocellatus* (Valenciennes) (Sleepy goby)
19. *G. giuris* (Hamilton) (Tank goby)
20. *Gobiopsis macrostoma* Steindachner
21. *Gobiopterus chuno* (Hamilton)
22. *Mahidolia mystacina* (Valenciennes) (Smiling goby)
23. *Oligolepis acutipennis* (Valenciennes) (Sharptail goby)
24. *O. cylindriceps* (Hora)
25. *Oplopomus caninoides* (Bleeker)
26. *Oxuderces dentatus* Exdoux & Souleyet
27. *Oxyurichthys formosanus* Nichols
28. *O. microlepis* (Bleeker) (Maned goby)
29. *O. papuensis* (Valenciennes)

30. *O. tentacularis* (Valenciennes) (Tentacled goby)
31. *Parachaeturichthys polynema* (Bleeker) (Taileyed goby)
32. *Parapocryptes rictuosus* (Valenciennes)
33. *P. sepperaster* (Richardson)
34. *Periophthalmus chrysospilos* Bleeker
35. *P. novemradiatus* (Hamilton)
36. *Pseudapocryptes elongatus* (Cuvier)
37. *Pseudogobius javanicus* (Bleeker)
38. *Scartelaos cantoris* (Day)
39. *Sicyopterus griseus* (Day)
40. *Yongeichthys criniger* (Valenciennes)

Key to species

- 1a. Teeth on lower jaw in one row 2
- 1b. Teeth on lower jaw in several rows 13
- 2a. Second dorsal fin not elongated 3
- 2b. Second dorsal fin elongated 6
- 3a. Eyes not prominent. Free lower eyelid wanting. Base of pectoral fin not muscular 4
- 3b. Eyes prominent, placed above dorsal profile. Free lower eyelid developed. Base of pectoral fin muscular 5
- 4a. Pelvic fins forming together a sucking disc, which is attached to belly. Upper jaw prominent. Teeth on lower lip present ...
..... *S. griseus*
- 4b. Pelvic fins united, but not adherent to belly. Lower jaw prominent. No teeth on lower lip *G. chuno*
- 5a. Pelvic fins not emarginate
..... *P. chrysospilos*
- 5b. Pelvic fins emarginated
..... *P. novemradiatus*
- 6a. Free lower eyelid present. Eyes erectile above dorsal profile of head. First dorsal fin higher than long 7
- 6b. Free lower eyelid absent. Eyes not or only above dorsal profile of head. First dorsal fin longer than high 8
- 7a. Mandibular teeth pointed. Scales minute to rudimentary. Lower side of head with barbels *S. cantoris*
- 7b. Mandibular teeth obliquely notched. Scales small, 75 to 100 in longitudinal series. No barbels on head *B. boddarti*
- 8a. Scales minute, more than 200 in longitudinal series. Teeth on upper jaw pointed *P. elongatus*
- 8b. Scales small to moderate, less than 150 in longitudinal series. Teeth on upper jaw not pointed 9
- 9a. Teeth on lower jaw truncate or obtuse or bilobate 10
- 9b. Teeth on lower jaw pointed 12
- 10a. First dorsal fin with 5 spines. Anterior teeth of upper jaw bilobate, not caninoid. About 100 scales in longitudinal series ..
..... *A. bato*
- 10b. First dorsal fin with 6 spines. Anterior teeth of upper jaw caninoid 11
- 11a. Anterior teeth on upper jaw caninoid. Scales 50 to 55 in longitudinal series
..... *A. madurensis*
- 11b. Upper jaw with one or two prominent canines on each side of premaxillary symphysis. Scales 60 to 70 in longitudinal series *O. dentatus*
- 12a. Body depth 6.0 to 8.5 times in standard length. Second dorsal fin with 26 to 27 soft rays *P. sepperaster*
- 12b. Body depth 10.0 to 12.5 times in standard length. Second dorsal fin with 23 to 26 soft rays *P. rictuosus*
- 13a. First spine in first and second dorsal fins stiff and thickened. Preopercle with one to three flat short spines *O. caninoides*
- 13b. Dorsal spines all thin and flexible 14
- 14a. Foremost median scale on nape unpaired and enlarged *P. javanicus*

- 14b. Foremost median scale on nape not unpaired and not enlarged 15
- 15a. Upper pectoral fin rays free and silk-like. Head depressed 16
- 15b. Upper pectoral fin rays not free 17
- 16a. Tongue rounded *B. ostreicola*
- 16b. Tongue bilobate to emarginate *B. fuscus*
- 17a. Sensory papillae on raised flaps on head *C. seshaiyai*
- 17b. Head without raised flap, with or without sensory papillae 18
- 18a. Gill membranes fused to a free fold across isthmus 19
- 18b. Gill membranes not fused together to a free fold 20
- 19a. Branchiostegal membranes form a free fold across isthmus. Body dark with many longitudinal lines and saddles on back. Iris with a lappet dorsally covering part of pupil *G. biocellatus*
- 19b. Branchiostegal membranes attached to sides of isthmus. Body pale, without longitudinal lines and saddles on back. Iris without lappet dorsally covering part of pupil *G. giuris*
- 20a. Barbels present 21
- 20b. Barbels absent 22
- 21a. Head depressed. Small barbels on lower surface and sides of head *G. macrostoma*
- 21b. Head rounded. Barbels restricted to chin only *P. polynema*
- 22a. Teeth on upper jaw in one to three rows 23
- 22b. Teeth on upper jaw in several rows 27
- 23a. Caudal fin shorter than head *A. albimaculatus*
- 23b. Caudal fin longer than head 24
- 24a. Distinct elongate tentacle over eye *O. tentacularis*
- 24b. No tentacle, but often a bump over eye 25
- 25a. A striking dark vertical band below eye *O. formosanus*
- 25b. No dark vertical band below eye 26
- 26a. Eye with a small bump. Scales 65 to 75 in longitudinal series *O. papuensis*
- 26b. Eye without a bump dorsally. Scales about 55 in longitudinal series *O. microlepis*
- 27a. Caudal fin not longer than head 28
- 27b. Caudal fin longer than head 31
- 28a. Maxillary prolonged posteriorly beyond eyes. Anal fin with 9 soft rays *M. mystacina*
- 28b. Maxillary not prolonged posteriorly beyond eyes. 29
- 29a. Tongue rounded *B. nusus*
- 29b. Tongue emarginate or truncate 30
- 30a. Tongue emarginate *Y. criniger*
- 30b. Tongue truncate *F. reichei*
- 31a. Head naked 32
- 31b. Head scaled 34
- 32a. Scales cycloid on body, 117 to 124 in longitudinal series *A. gymnocephalus*
- 32b. Scales ctenoid on body, 25 to 30 in longitudinal series 33
- 33a. Soft dorsal fin with 9 rays. Anal fin with 9 soft rays. Scales 25 in longitudinal series. *O. cylindriceps*
- 33b. Soft dorsal fin with 10 or 11 rays. Anal fin with 10 or 11 soft rays. Scales 27 to 30 in longitudinal series *O. acutipennis*
- 34a. A broad papilla on each side of chin *A. masoni*
- 34b. No papilla behind chin 35
- 35a. Scales 40 to 42 in longitudinal series *A. griseus*
- 35b. Scales 26 to 36 in longitudinal series 36
- 36a. Scales 35 to 36 in longitudinal series *A. viridipunctatus*

36b. Scales large, 26 to 32 in longitudinal series	37
37a. Predorsal scales 17 to 20	
..... <i>A. madraspatensis</i>	
37b. Predorsal scales less than 17	38
38a. Predorsal scales 14	<i>A. cyanomos</i>
38b. Predorsal scales 7 to 11	39
39a. Body depth 3.72 to 4.69 in standard length	<i>A. ennorensis</i>
39b. Body depth 4.74 to 5.31 in standard length	<i>A. globiceps</i>

Fisheries information : The gobiids are most commonly sighted in estuaries, but of minor commercial importance in general. A few species, like *G. giuris* and *P. elongatus* are of some importance in commercial fisheries.

Remarks : In current parlance of nomenclature *Pseudapocryptes lanceolatus* (Bloch & Schneider) is known as *P. elongatus*. Some authors place *Acentrogobius globiceps* under genus *Drombus* Jordan and Seale. In accordance with the current nomenclature, *Periophthalmus pearsi* is here considered as junior synonym of *P. novemradiatus*.

Family 121 GOBIOIDIDAE
(Eel-like gobies)

Body eel-like and compressed, naked or with cycloid scales. Eyes very small or practically absent. Opercular margin without pouch-like cavity. Dorsal fin single, very long, generally united or almost so with the caudal fin. Pelvic fins united. Anal fin long, with 31 to 65 rays.

- Species known to occur in Tamil Nadu**
1. *Caragobius urolepis* (Bleeker) (Sumatra eel-goby)
 2. *Taenioides anguillaris* (Linnaeus) (Anguilla eel-goby)
 3. *T. buchanani* (Day) (Burmese eel-goby)
 4. *T. cirratus* (Blyth) (Hooghly eel-goby)

Key to species

- 1a. No barbels on chin and lower jaw. Canine teeth absent *C. urolepis*
- 1b. Barbels on chin and lower jaw. Canine teeth present 2
- 2a. Dorsal and anal fins completely separated from caudal fin by a deep notch. Caudal fin rhomboid *T. cirratus*
- 2b. Dorsal and anal fins more or less completely confluent with caudal fin. Caudal fin pointed 3
- 3a. Vertical fins yellowish. Preanal distance less than 40% of standard length *T. anguillaris*
- 3b. Vertical fins black. Preanal distance more than 40% of standard length *T. buchanani*

Fisheries information : The eel-like gobies are of minor commercial importance. These fishes are generally used for preparation of fishmeal.

Remarks : *Caragobius urolepis* (Bleeker) have previously recorded as *Brachyamblyopus urolepis* (Bleeker).

Family 122 TRYPACHENIDAE
(Burrowing gobies)

Body very elongate and eel-like. Eyes very small or indistinct. A pit opening into a pouch-like cavity at the superior margin of the opercular region. Dorsal fin single, very long with a distinct spinous portion. Pelvic fins usually form an adhesive disc.

Species known to occur in Tamil Nadu

1. *Ctenotrypauchen microcephalus* (Bleeker) (Comb goby)
2. *Trypauchen vagina* (Bloch & Schneider) (Burrowing goby)

Key to species

- 1a. Pelvic fins not completely united, either emarginated posteriorly or separated *C. microcephalus*

- 1b. Pelvic fins completely united forming a funnel-like disc *T. vagina*

Fisheries information : The borrowing goby is of no commercial value. It is rather used for the preparation of the fishmeal.

Family 123 KURTIDAE
(Nursery fishes, Humpheads)

Body oblong and highly compressed with cycloid scales. Mouth large. Opercular bones thin and paper-like. Dorsal fin very small with 5 spines preceded by a recumbent spine directed anteriorly, and 12 or 13 rays. Anal fin with 2 spines and 31 to 47 rays. Pelvic fins with one spine and 5 rays. Caudal fin deeply forked. Males with occipital hook, used for carrying eggs.

Species known to occur in Tamil Nadu

Kurtus indicus Bloch (Indian humphead)

Fisheries information : The Indian humphead fishes are of little commercial importance. These fishes are often caught as bycatch in the commercial catches.

Family 124 ACANTHURIDAE
(Surgeon fishes)

Body almost elongate or deep, compressed with a single folding lancet-like spine or one or two bony plates generally bearing sharp keels on sides of caudal peduncle. Mouth small, teeth in a single row, variable in shape with genus, but never caniniform or molariform. Dorsal fin with 4 to 9 spines and 19 to 31 soft rays. Anal fin with 2 to 3 spines and 19 to 36 soft rays. Pelvic fins with one spine and 3 to 5 soft rays. Caudal fin lunate or truncate.

Species known to occur in Tamil Nadu

1. *Acanthurus leucosternon* (Bennett)
(Powderblue surgeonfish)
2. *A. lineatus* (Linnaeus) (Lined surgeonfish)
3. *A. mata* Cuvier (Elongate surgeonfish)
4. *A. nigrofuscus* (Forsskal) (Dusky surgeonfish)

5. *A. triostegus* (Linnaeus) (Convict surgeonfish)
6. *A. xanthopterus* Valenciennes (Yellowfin surgeonfish)
7. *Naso brevirostris* (Cuvier) (Spotted unicorn)
8. *N. tuberosus* Lacepede (Humpnose unicorn)
9. *N. unicornis* (Forsskal) (Bluespine unicorn)

Key to species

- 1a. A single folding spine on side of caudal peduncle; least depth of caudal peduncle 2.1 to 3.5 times in head length 2
- 1b. One or two immovable bony plates, often keeled, on side of caudal peduncle; least depth of caudal peduncle 4 to 6 times in head length 7
- 2a. Body pale with vertical black bars. Caudal truncate or slightly emarginate; caudal spine very small *A. triostegus*
- 2b. Body not pale and without black bars. Caudal emarginate or lunate; caudal spine not very small 3
- 3a. Snout length 6.6 to 7.1 times in standard length. Least depth of caudal peduncle 2.7 to 3.0 times in head length. The whole body and head with long blue lines
..... *A. mata*
- 3b. Snout length 7.9 to 8.2 times in standard length. Least depth of caudal peduncle 2.2 to 2.5 times in head length. No blue lines on head and body 4
- 4a. Caudal spine length 1.9 to 2.0 times in head length. Dorsal three fourth of head and body with light blue stripes, broadly edged in black, alternately with yellow stripes *A. lineatus*
- 4b. Caudal spine length 2.1 to 8.0 times in head length. Colour not as in 4a 5
- 5a. Dorsal ray 28 to 30. Body depth 1.7 to 1.9 in standard length. Caudal fin emarginate. Body blue, the chest crossed by a broad

white band; head black; dorsal and caudal peduncle yellow; caudal fin black and white
.....*A. leucosternon*

5b. Dorsal ray 23 to 28. Body depth 1.8 to 2.3 in standard length. Caudal fin lunate. Colour not as in 5a 6

6a. Prominent black spot present at end of dorsal fin base and a smaller one at end of anal fin base. Head and chest with numerous orange dots. Body depth 2.0 to 2.3 times in standard length
..... *A. nigrofuscus*

6b. No black spot at base of dorsal and anal fin rays. No orange dots on head and chest. Body depth 1.8 to 2.3 times in standard length*A. xanthopterus*

7a. Forehead without a bony rostral projection (horn). Snout with a strongly convex protuberance *N. tuberosus*

7b. Forehead with a distinct bony rostral projection (horn) directed anteriorly 8

8a. Horn not extending anterior to mouth. Body depth of large adult less than 3.0 in fork length. Peduncular plates blue in life, blackish on preservation*N. unicornis*

8b. Horn extending well anterior to mouth when fully developed. Body depth of large adults greater than 3.0 in fork length. Peduncular plates not blue
.....*N. brevirostris*

Fisheries information : The surgeonfishes are of little commercial importance. These fishes are generally found near coral reefs.

Family 125 ZANCLIDAE (Moorish dol)

Body discoid and strongly compressed. Snout tubular and extended with a small mouth containing numerous elongate bristle-like teeth. A short spine develops in front of each eye in adults. Dorsal fin with 6 to 7 spines and 39 to 43 soft rays and dorsal spines elongated into a whip-like filament. Anal fin with 3 spines and 31 to 37 soft rays. Body with two broad dark vertical bands, the first one in between front

margin of eye and anterior margin of dorsal fin much more broader than second one, at middle of midbase of dorsal fin and posterior margin of soft dorsal fin.

Species known to occur in Tamil Nadu

Zanclus cornutus (Linnaeus) (Moorish dol)

Fisheries information : This species is used as a good aquarium fish and it has subsistence fisheries value.

Remarks : This species is mostly found in coral reef areas. It has a close resemblance to the butterflyfish, *Heniochus acuminatus* (family Chaetodontidae) which have dorsal fin with 11 to 12 spines and 23 to 26 soft rays and anal fin with 17 to 19 soft rays.

Family 126 SIGANIDAE (Rabbitfishes)

Body oval, compressed with very small and thin cycloid scales. Mouth small with a single row of fine, close-set teeth in each jaw. Dorsal fin with 13 strong spines and 10 rays, preceded by a forward projecting spines (sometimes covered by skin). Anal fin with 7 strong spines and 9 rays. Pelvic fins with 2 strong spines separated by 3 rays.

Species known to occur in Tamil Nadu

1. *Siganus canaliculatus* (Park)
(Whitespotted spinefoot)
2. *S. guttatus* (Bloch) (Orange-spotted spinefoot)
3. *S. javus* (Linnaeus) (Streaked spinefoot)
4. *S. spinus* (Linnaeus) (Little spinefoot)
5. *S. vermiculatus* (Valenciennes)
(Vermiculated spinefoot)

Key to species

- 1a. Body depth 2.4 to 2.8 times in standard length *S. canaliculatus*
- 1b. Body depth 1.8 to 2.3 times in standard length 2

- 2a. Scale rows between mid-dorsal fin base and lateral line 30 to 35 *S. javus*
- 2b. Scale rows between mid-dorsal fin base and lateral line 17 to 28 3
- 3a. Midline of thorax in front of pelvic fins scaleless *S. spinus*
- 3b. Midline of thorax in front of pelvic fins scaly 4
- 4a. Head and body with a vermiculate pattern. Dark lines breaking into spots on caudal fin, spots arranged in 4 vertical rows *S. vermiculatus*
- 4b. No vermiculate pattern. Body covered with orange spots equal to or larger than interspaces *S. guttatus*

Fisheries information : The rabbitfishes are generally found in the reef areas and among inshore commercial fishes of our country.

Remarks : The siganids are generally known as rabbitfishes due to their similarity with the mouth of rabbits. The spines of these fishes have the side grooves containing venom glands. The slightest contact with one of these spine tips may produce a very painful puncture wound.

Family 127 GEMPYLIDAE (Snake mackerel)

Body elongate and compressed or semifusiform. Mouth large with strong teeth in jaws, those at front of upper jaw generally fang-like. Two nostrils on each side of snout. Dorsal fin two, base of second dorsal fin (excluding finlets) shorter than the first. Pelvic fins usually small, often reduced to a single spine with only a few or without soft rays, or entirely absent in adults. Anal fin like second dorsal fin, with 1 to 2 free or comprised spines. Caudal fin forked, the rays attached only to distal border of hypurals. Lateral line single or double. Caudal peduncle without keels. Scales variously modified or absent.

Species known to occur in Tamil Nadu

1. *Gempylus serpens* Cuvier (Snake mackerel)
2. *Neolatus tripes* Johnson (Black mackerel)

3. *Rexea bengalensis* (Alcock) (Bengal escolar)

Key to species

- 1a. Lateral line single *N. tripes*
- 1b. Lateral line double 2
- 2a. Body depth 5 to 7 times in standard length. Two lateral lines, the lower one originating below 3rd to 7th spine of first dorsal fin.. *R. bengalensis*
- 2b. Body depth 15 to 18 times in standard length. Two lateral lines, originating at one point, near upper margin of opercle *G. serpens*

Fisheries information : The snake mackerels are of no commercial importance. These fishes are found in the commercial catch as bycatch.

Family 128 TRICHIURIDAE (Ribbonfishes)

Body very elongate, compressed, ribbon-like with a small forked or hair-like caudal fin. Mouth large, with strong teeth in jaws; those at front of upper jaw fang-like. A single dorsal fin, extending almost the entire length of body, the spinous part either short and continuous with a very short soft part, or the spinous part somewhat long and separated from soft part by a notch. Anal fin preceded by 2 free spines posterior to anus (first inconspicuous and second variously enlarged as leaf-like or keeled scutes, or as a stout spine), without or reduced soft rays. Pelvic fins absent, or reduced to one scale-like spine and 0 to 2 rudimentary soft rays. Pectoral fins rather small. Lateral line single. Body without scales.

Species known to occur in Tamil Nadu

1. *Eupleurogrammus glossodon* (Bleeker) (Longtooth hairtail)
2. *E. muticus* (Gray) (Smallhead hairtail)
3. *Lapturacanthus savala* (Cuvier) (Savalani hairtail)
4. *Trichiurus lepturus* Linnaeus (Largehead hairtail)

Key to species

- 1a. Pelvic fins scale-like. Free margin of subopercle convex 2
- 1b. Pelvic fins absent. Free margin of subopercle concave 3
- 2a. A pair of fangs on tips of lower jaw. Dorsal fin membrane slightly tinged with black along spines. Dorsal side of posterior part of body slightly black. A black spot just behind dermal process of lower jaw. Pelvic fins inserted below 11th to 14th dorsal fin rays *E. glossodon*
- 2b. No fangs on tip of lower jaw. Dorsal fin membrane pale. Both dorsal and ventral sides of posterior part of body black. No black spot behind dermal process of ventral side of lower jaw. Pelvic fins inserted below 15th to 18th dorsal fin rays *E. muticus*
- 3a. First anal fin spine large, its length half of eye diameter. Soft anal fin rays pungent spinules breaking through vertical skin. Two small canine teeth on upper jaw project forward. A small slit present on ventral side of lower jaw for receiving anteriormost fang of upper jaw *L. savala*
- 3b. First anal fin spine small, its length less than pupil of eye. Soft anal fin rays slightly breaking through ventral skin in smaller specimens. No canine teeth on upper jaw project forward. No slit on ventral side of lower jaw *T. lepturus*

Fisheries information : The ribbonfishes are of poor quality food fishes. These fishes constitute one of the important commercial fisheries in especially in Kerala, Andhra Pradesh and Tamil Nadu. These are used fresh and dried.

Family 129 SCOMBRIDAE (Mackerels and Tunas)

Body torpedo-like strongly built with generally metallic blue or blue green back. Dorsal fin two (depressible into groove) with finlets posterior to second dorsal fin and anal

fin in some species. Lateral line simple or branched. Caudal fin rays deeply divided covering completely the hypural plate. Caudal peduncle slender with a pair of oblique keels close to the end of caudal fin. Body uniformly covered with small cycloid scales or restricted to a corselet around anterior part of body.

Species known to occur in Tamil Nadu

1. *Acanthocybium solandri* Cuvier (Wahoo)
2. *Auxis rochei* (Risso) (Bullet tuna)
3. *A. thazard* (Lacepede) (Frigate tuna)
4. *Euthynnus affinis* (Cantor) (Kawakawa)
5. *Katsuwonus pelamis* (Linnaeus) (Skipjack tuna)
6. *Rastrelliger faughni* Matsui (Faughn's mackerel)
7. *R. kanagurta* (Cuvier) (Indian mackerel)
8. *Sarda orientalis* (Temminck & Schlegel) (Striped bonto)
9. *Scomberomorus commerson* (Lacepede) (Narrow Spanish mackerel)
10. *S. guttatus* (Bloch & Schneider) (Indo-Pacific king mackerel)
11. *S. koreanus* (Kishinouye) (Korean seer fish)
12. *S. lineolatus* (Cuvier) (Streak seer fish)
13. *Thunnus albacares* (Bonnaterre) (Yellowfin tuna)
14. *T. tonggol* (Bleeker) (Longtail tuna)

Key to species

- 1a. Two small keels on either side of caudal peduncle. Dorsal and anal finlets 5 each. Adipose eyelids cover front and rear eyes 2
- 1b. Two small keels and a large median keel between them on either side of caudal peduncle. Seven to 10 dorsal and 6 to 10 anal finlets. Adipose eyelids absent 3
- 2a. Lower gillrakers 21 to 26 on first arch. Depth at opercular margin 4.9 to 6.0 times in fork length *R. faughni*

- 2b. Lower gillrakers 30 to 48 on first arch. Depth at opercular margin 3.7 to 5.2 times in fork length *R. kanagurta*
- 3a. Teeth in jaws strong, compressed, almost triangular or knife-like. Corselet of scales obscure 4
- 3b. Teeth in jaws slender, conical, hardly compressed. Corselet of scales well developed 8
- 4a. Snout as long as rest of head. No gillrakers. First dorsal fin with 23 to 27 spine. Posterior end of maxilla concealed under preorbital bone *A. solandri*
- 4b. Snout much shorter than rest of head. Gillrakers on first arch 1 to 27. First dorsal fin 12 to 22 spines. Posterior end of maxilla exposed 5
- 5a. Lateral line with deep dip below first or second dorsal fin *S. commerson*
- 5b. Lateral line straight or descending gradually backwards 6
- 6a. Lateral line without auxillary branches or with only few anteriorly *S. lineolatus*
- 6b. Lateral line with many auxillary branches anteriorly 7
- 7a. Dorsal fin spines 15 to 18, generally 16 or more. Intestine with 2 loops and 3 limbs. Head longer, 20.2 to 21.5% of fork length *S. guttatus*
- 7b. Dorsal fin spines 14 to 17, generally 14 or 15. Intestine with 4 loops and 5 limbs. Head shorter, 19.7 to 20.4% of fork length. Body depth greater, 24.4 to 26.7% of fork length *S. koreanus*
- 8a. Upper surface of tongue without cartilaginous longitudinal stripes. Five to 10 narrow, dark longitudinal stripes on upper part of body *S. orientalis*
- 8b. Upper surface of tongue with two longitudinal ridges. Stripes on body not like above, if present, either above lateral line or on lower part also 9
- 9a. First and second dorsal fins widely separated, the space between them at least equal to length of first dorsal fin base. First dorsal fin with 10 to 12 spines. Interpelvic process single and long, at least as long as longest pelvic fin ray 10
- 9b. First and second dorsal fins barely at most by a space equal to eye diameter. First dorsal fin with 12 to 16 spines. Interpelvic process bifid and short, much shorter than pelvic fin rays 11
- 10a. Posterior extension of corselet narrow only 1 to 5 scales wide under origin of second dorsal fin. Pectoral fin extends backwards beyond a vertical with the first border of dorsal scaleless area. *A. thazard*
- 10b. Posterior extension of corselet much wider, usually 10 to 15 scales wide under origin of second dorsal fin. Pectoral fin does not extend as far as dorsal scaleless area *A. rochei*
- 11a. Three to 5 conspicuous dark longitudinal stripes on belly. Total gillrakers on first arch 53 to 63 *K. pelamis*
- 11b. No dark longitudinal stripes on belly. Total gillrakers on first arch 19 to 45 12
- 12a. Body naked behind corselet of enlarged and thickened scales. Several black spots usually present between pectoral and pelvic fin bases. Back blue green with a complex striped pattern under dorsal fin bases. Pectoral fin rays with 25 to 29 *E. affinis*
- 12b. Body covered with very small scales behind corselet. No black spots on body. Back dark blue without any striped pattern. Pectoral fin rays 30 to 36 13
- 13a. Total gillrakers on first arch 26 to 34, usually 27 or more. Second dorsal and anal fins of longer specimens (120 cm fork length or longer) elongate, more than 20% of fork length *T. albacares*
- 13b. Total gillrakers on first arch 19 to 28, usually 26 or fewer. Second dorsal and anal fin never greatly elongate, less than 20% of fork length at all sizes *T. tonggol*

Fisheries information : The tunas and mackerels are very important commercial fishes. These fishes constitute an important economical, recreational and artisanal fisheries. The monotypic species, viz, *A. solandri* and *K. pelamis* form a very important fishery in both the coasts of our country.

Family 130 XIPHIIDAE (Swordfishes)

Body elongate and cylindrical without scales in adults but scales with spines present in specimens of almost one meter total length. Upper jaw enlarged into a long bill (both jaws enlarged into long bills in juveniles). Dorsal fin two, well separated in adults (but united in juveniles), first with 34 to 49 and second with 4 to 6 rays. Anal fin two, separated in adults (but united in juveniles), first anal fin with 13 to 14 and second anal fin with 3 to 4 rays. Pectoral fins falcate with 16 to 18 rays. Pelvic fins and pelvic girdles absent. Caudal fin large and lunate. Caudal peduncle with a single median keel on each side and a deep notch on both the dorsal and ventral surfaces.

Species known to occur in Tamil Nadu

Xiphias gladius Linnaeus (Swordfish)

Fisheries information : The liver oil of the Swordfish contains vitamin A. Its flesh is greatly esteemed.

Family 131 ISTIOPHORIDAE (Sailfishes, Marlins)

Body elongate and cylindrical with embedded elongate and pointed scales. Premaxillaries prolonged forming a long bill. Dorsal fin two, close together, the first much larger than second. Anal fin two, separated, the first longer than the second. The dorsal fin and anal fins can be folded into groove. Pectoral fins falcate, inserted low on lateral sides of body. Pelvic fins with 1 spine and 2 rays fused together, depressible into a groove. Caudal fin large and forked. Caudal peduncle with a pair of keels on each side and a shallow notch on the both dorsal and ventral surfaces.

Species known to occur in Tamil Nadu

1. *Istiophorus platypterus* (Shaw & Nodder) (Indo-Pacific sailfish)
2. *Makaira indica* (Cuvier) (Black marlin)

Key to species

- 1a. First dorsal fin sail-like and considerably higher than body depth at the level of middle of body. Pelvic fins very low, almost reaching to origin of anal fin, with conspicuous membrane *I. platypterus*
- 1b. First dorsal fin lower than body depth at level of middle of body and not sail-like. Pelvic fin rays short, considerably separated from origin of anal fin with moderately developed membrane *M. indica*

Fisheries information : Indo-Pacific sailfish is very common species of all sailfishes occurring in both the coasts of our country. The liver oil of these fishes are probably the richest of all containing vitamin A.

Family 132 NOMEIDAE (Man-of-war fishes, Driftfishes)

Body slender to deep and laterally compressed. Mouth small, maxilla rarely extending below eyes. Generally adipose tissue present around eyes. Branchiostegal rays 6. Two dorsal fins, the first with 9 to 12 slender spines and second with 0 to 3 spines and 15 to 32 soft rays. Pelvic fins present in adults. Pectoral fins becoming long and wing-like with growth, their bases inclined about 45°. Anal fin with 1 to 3 spines and 14 to 30 soft rays. Lateral line high, following dorsal profile and often not extending onto caudal peduncle. Skin thin, subdermal mucus canal system well developed and visible in most species. Caudal fin forked, the lobes often folded one another.

Species known to occur in Tamil Nadu

Psenus cyanophrys (Cuvier) (Freckled driftfish)

Fisheries information : This species is of minor fishery value.

Family 133 ARIOMMATIDAE
(Driftfishes)

Body oval and almost deep, compressed with cycloid and easily detachable scales. Mouth small with minute teeth in jaws. Dorsal fin two, first with 10 to 13 spines and second with one spine and 14 to 18 rays. Anal fin with 3 spines and 13 to 16 rays. Pectoral fins with 20 to 24 rays. Pelvic fins thoracic, attached to the abdomen with a membrane and folding into a long pronounced groove. Caudal fin stiff and deeply forked. Caudal peduncle with 2 low fleshy keels on each side.

Species known to occur in Tamil Nadu

Ariomma indica (Day) (Indian arioma)

Fisheries information : The driftfishes are of limited commercial importance. These fishes are captured off Kerala, Andhra Pradesh and Tamil Nadu. These fishes contain high amount of fat.

Family 134 STROMATEIDAE
(Pomfrets)

Body very deep and compressed. Mouth small with immovable maxilla. Eyes with adipose eyelid. Single dorsal fin and anal fins, long-based and slightly to deeply falcate, preceded by none or 5 to 10 flat, blade-like spines (mostly in juveniles). Pectoral fins long and wing-like. Pelvic fins absent. Caudal fin generally forked.

Species known to occur in

1. *Pampus argenteus* (Euphrasen) (Silver pomfret)
2. *P. chinensis* (Euphrasen) (Chinese pomfret)

Key to species

- 1a. Dorsal and anal fins falcate, preceded by 5 to 10 flat, blade-like spines. Caudal fin deeply forked *P. argenteus*
- 1b. Dorsal and anal fins not falcate but fin rays gradually diminish in length posteriorly, no spines preceding the median fins. Caudal fin emarginated *P. chinensis*

Fisheries information : Silver pomfret is one of the very important commercial fishes. It has a great demand and marketed fresh.

Order 24 PLEURONECTIFORMES

Key to families

- 1a. Dorsal fin with spinous rays, its origin considerably posterior to eye PSETTODIDAE
- 1b. Dorsal fin with soft rays only, its origin above or anterior to lower eyes 2
- 2a. Anus placed on eyed side; pelvic fin with a flexible spine CITHARIDAE
- 2b. Anus placed on midventral or blind side; pelvic fin without spine 3
- 3a. Preopercular margin free and visible, not concealed by skin or scales BOTHIDAE
- 3b. Preopercular margin not free, concealed under the skin or scales 4
- 4a. Eyes on right side of head SOLEIDAE
- 4b. Eyes on left side of head CYNOGLOSSIDAE

Family 135 PSETTODIDAE
(Indian Halibuts)

Body oval, flat and highly thick with eyes on either left or right side. The upper eye very close to dorsal margin of body. Mouth large, maxilla extends considerably beyond posterior border of lower eye. Single dorsal fin, long; its origin well behind eyes; anterior fin rays spinous. Lateral line almost straight, with 70 to 75 scales.

Species known to occur in Tamil Nadu:

Psettodes erumei (Schneider) (Indian Halibut)

Fisheries information : The Indian halibut constitute an important fishery in the Chennai and Mumbai coasts. It is found in both coasts of our country.

Family 136 CITHARIDAE (Flounders)

A family of flatfishes with eyes either on left side or right side of the body. Branchiostegal membranes separated from each other. Dorsal fin origin in front of upper eyes. Pelvic fins with 1 spine and 5 soft rays and its fin bases short. Anus placed on eyed side.

Species known to occur in Tamil Nadu

Brachypleura novaezeelandiae Gunther

Fisheries information : This species is of no fishery value.

Family 137 BOTHIDAE (Lefteye flounders)

Body flat with eyes on left side. Mouth asymmetrical with teeth in jaws. Preopercle exposed, its hind margin free and visible. Pectoral and pelvic fins present. Dorsal fin long, inserted above or anterior to eyes continued up to base of caudal fin. Anal fin also long, originating below pectoral fins and continued up to caudal fin base. Caudal fin separate, free from dorsal and anal fins. Fins without spines. Lateral line single, sometimes obscure or absent on blind side.

Species known to occur in Tamil Nadu

1. *Asterorhombus intermedius* (Bleeker)
2. *Bothus myriaster* (Temminck & Schlegel) (Oval flounder)
3. *B. pantherinus* (Ruppell) (Leopard flounder)
4. *Crossorhombus azureus* (Alcock) (Blue spotted flounder)
5. *C. valderostratus* (Alcock) (Broadbrow flounder)
6. *Engyprosopon grandisquamis* (Temminck & Schlegel) (Warthog flounder)
7. *Laeops guentheri* Alcock (Brown flounder)
8. *Pseudorhombus arsius* (Hamolton) (Large toothed flounder)

9. *P. elevatus* Ogilby (Deep flounder)
10. *P. javanicus* (Bleeker) (Javan flounder)
11. *P. malayanus* Bleeker (Malayan flounder)
12. *P. triocellatus* (Schneider) (Three spotted flounder)

Key to species

- 1a. Bases of pelvic fins on ocular side short, equal in size and symmetrical in placement as that of blind side..... 2
- 1b. Bases of pelvic fins of ocular side generally much longer than that of blind side, the first ray of ocular side ahead of that of blind side..... 6
- 2a. Anterior rays of dorsal fin longer than those follows. Gill rakers 23 to 25 on lower arm of first arch *P. triocellatus*
- 2b. Anterior rays of dorsal fin not prolonged. Gill rakers 8 to 15 on lower arm of first arch 3
- 3a. Scales on blind side of body ctenoid
.....*P. malayanus*
- 3b. Scales on blind side of body cycloid 4
- 4a. Teeth strong, rather widely set, canines enlarged, 6 to 13 teeth on blind side of lower jaw *P. arsius*
- 4b. Teeth smaller, more close set, not much enlarged anteriorly, more than 24 teeth on blind side of lower jaw 5
- 5a. Scales ctenoid on ocular side. Upper profile on head notched *P. elevatus*
- 5b. Scales on ocular side more or less ctenoid anteriorly, mostly cycloid posteriorly. Upper profile of head scarcely notched, usually evenly curved *P. javanicus*
- 6a. All upper jaw teeth and all or nearly all lower jaw teeth confined to blind side ...
..... *L. guentheri*
- 6b. Teeth present on both sides of jaws 7
- 7a. Lateral line scales more than 69 8
- 7b. Lateral line scales 36 to 67 9

- 8a. Scales mostly cycloid on ocular side, ctenoid at edges of body *B. myriaster*
- 8b. Scales all ctenoid on ocular side *B. pantherinus*
- 9a. Scales on ocular side with elongate ctenii. Lateral line scales 50 to 63 10
- 9b. Scales on ocular side with short ctenii ... 11
- 10a. Interorbital width 1.3 to 1.4 times in head length. Anterior edge of upper eye opposite posterior part of lower eye *C. valderostratus*
- 10b. Interorbital width 0.2 to 1.0 times in head length. Anterior edge of upper eye opposite middle or anterior part of lower eye *C. azureus*
- 11a. Gillrakers with rounded or pointed tips, not palmate. First dorsal ray shorter than or equal to second and attached to dorsal membrane for most or all of its length .. *E. grandisquama*
- 11b. Gillrakers palmate. First dorsal ray usually longer than second and free from dorsal membrane for most or all of its length .. *A. intermedius*

Fisheries information : The left-eye flounders are of little commercial importance. These fishes are caught as bycatch in the commercial catches.

Family 138 PLEURONECTIDAE (Righteye flounders)

Flatfishes with eyes on right side of body. Mouth asymmetrical, lower jaw more or less prominent. Preopercle exposed, its hind margin free and visible. Dorsal fin origin above or in front of eye. Pectoral and pelvic fins present. Caudal fin free from dorsal and anal fins. Fins without spiny rays. Lateral line single. Anus placed on midventral or blind side of body.

Species known to occur in Tamil Nadu

Samaris cristatus (Gray) (Crested flounder)

Fishery information : This species is of minor fishery value.

Family 139 CYNOGLOSSIDAE (Tongue soles)

Tongue-shaped flat fishes with eyes sinistral (left side of head). Mouth asymmetrical, lips entire or fringed, rostral hook present below mouth. Preopercle margin not free, covered with skin and scales. Dorsal fin inserted on head, both dorsal and anal fins united with caudal fin. Pectoral fins absent. Only left pelvic fins present. Dorsal and pelvic fins without spiny rays. Lateral line variable 0 to 3 on ocular side and 0 to 2 on blind side.

Species known to occur in Tamil Nadu

1. *Cynoglossus arel* (Schneider) (Largescale tongue sole)
2. *C. bilineatus* (Lacepede) (Four lined tongue sole)
3. *C. cynoglossus* (Hamilton) (Gangetic tongue sole)
4. *C. dispar* Day (Day's tongue sole)
5. *C. dubius* Day (Large tongue sole)
6. *C. itinus* (Snyder)
7. *C. kopsi* (Bleeker) (Shortheaded tongue sole)
8. *C. lida* (Bleeker) (Shoulderspot tongue sole)
9. *C. lingua* Hamilton (Long tongue sole)
10. *C. macrostomus* Norman (Malabar tongue sole)
11. *C. monopus* (Bleeker)
12. *C. puncticeps* (Richardson) (Speckled tongue sole)
13. *C. semifasciatus* Day (Indian tongue sole)
14. *Paraplaglusia bilineata* (Bloch) (Doublelined tongue sole)
15. *P. blochii* (Bleeker) (Bloch's tongue sole)

Key to species

- 1a. Lips with rows of fringed tentacles 2
- 1b. Lips small, not fringed 3
- 2a. Scales between upper and middle lateral

- lines 13 to 15. Rostral hooks not reaching beyond lower eyes *P. blochii*
- 2b. Scales between upper and middle lateral lines 16 to 19. Rostral hooks usually reaching beyond lower eyes
..... *P. bilineata*
- 3a. Caudal fin with 12 rays 4
- 3b. Caudal fin with 8 to 10 rays 5
- 4a. One lateral line on blind side .. *C. dubius*
- 4b. Two lateral lines on blind side
..... *C. bilineatus*
- 5a. Caudal fin with 8 rays *C. itinus*
- 5b. Caudal fin with 10 rays 6
- 6a. Two lateral lines on blind side. Scales 18 to 20 between lateral lines *C. dispar*
- 6b. No lateral line on blind side 7
- 7a. Both nostrils situated before eyes. Eyes pedunculate *C. monopus*
- 7b. Posterior nostril situated in interorbital space or between anterior part of eyes. Eyes non-pedunculate 8
- 8a. Scales cycloid on blind side of the body .
.....9
- 8b. Scales ctenoid on blind side 10
- 9a. Scales 11 or 12 between lateral lines on ocular side of the body *C. lingua*
- 9b. Scales 7 to 9 between lateral lines on ocular side of the body *C. arel*
- 10a. Angles of mouth distinctly nearer to gill openings than tip of snout *C. lida*
- 10b. Angle of mouth nearer to tip of snout than to gill openings 11
- 11a. Cleft of mouth extending far back to posterior margin of fixed eye
..... *C. macrostoma*
- 11b. Cleft of mouth extending to only middle or about posterior border of fixed eye
.....12
- 12a. Eyes contiguous *C. kopsi*
- 12b. Eyes not contiguous 13

- 13a. Scales 16 to 19 between upper and middle lateral lines *C. puncticeps*
- 13b. Scales 11 to 14 between upper and middle lateral lines 14
- 14a. Snout rounded and short, about 27 percent of head length *C. semifasciatus*
- 14b. Snout somewhat pointed and longer, about 32 percent of head length
..... *C. cynoglossus*

Fisheries information : The tongue soles are of minor commercial importance. *C. macrostomus* forms an important fishery in the south-west of our contry.

Family 140 SOLEIDAE (Soles)

Body oval or almost elongate and highly compressed flat fish with eyes dextral (on right side of body). Mouth small and asymmetrical, terminal or slightly inferior. Snout sometimes hook-shaped. Preopercle without a free border, embedded in skin. Dorsal fin extends on head to above eye or forward; dorsal and anal fins free or confluent with caudal fin. Pectoral fins generally absent in adults. Pelvic fins sometimes asymmetrical, either free or joined to anal fin. Lateral line single and straight on body, sometimes branched on head. Scales moderately large, cycloid or ctenoid; sometimes modified into skin flaps fringed with sensory filaments.

Species known to occur in Tamil Nadu

1. *Aesopia cornuta* Kaup (Horned sole)
2. *Brachirus orientalis* (Bloch) (Oriental sole)
3. *B. pan* (Hamilton) (Pan sole)
4. *Heteromycteris oculus* (Alcock) (Alcock's cape sole)
5. *Solea elongata* Day (Elongate sole)
6. *S. ovata* Richardson (Ovate sole)
7. *Synaptura albomaculata* Kaup (Kaup's sole)
8. *Synaptura commersonia* (Lacepede) (Commerson's sole)

9. *Zebrias altipinnis* Alcock (Alcock's zebra sole)
 10. *Z. quagga* (Kaup) (Quagga sole)
 11. *Z. synapturoides* (Jenkins) (Jenkins sole)

Key to species

- 1a. Snout forming a distinct hook
 *H. oculus*
 1b. Snout not forming a distinct hook 2
 2a. Gill openings on ocular side ending opposite lower edge or lower part of pectoral fin base. Pectoral fins on both sides generally well developed, rounded or obtusely pointed, not connected with opercular membrane 3
 2b. Gill openings on ocular side ending opposite upper part of pectoral fin base. Pectoral fins small, especially on blind side. Opercular membrane joined to upper portion of pectoral fins. Posterior rays of dorsal and anal fins rather long 6
 3a. Posterior rays of dorsal and anal fins more or less elongate and confluent to caudal fin. Urinogenital papilla situated between the pelvic fin and close to anus 4
 3b. Posterior rays of dorsal and anal fins short and not confluent with caudal fin. Urinogenital papilla situated on right side of the body at some distance from the anus 5
 4a. Dorsal fin with 62 to 72 rays. Anal fin with 47 to 57 rays, none of the scales enlarged *B. orientalis*
 4b. Dorsal fin with 57 to 61 rays. Anal fin with 43 to 46 rays, scales on nape and part of head enlarged *B. pan*
 5a. Body ovate, its depth 2.0 to 2.2 times in total length. Dorsal fin with 58 to 67 rays. Anal fin with 41 to 51 rays *S. ovata*
 5b. Body elongate, its depth 2.5 to 3.0 times in total length. Dorsal fin with 67 to 77 rays. Anal fin with 52 to 63 rays
 *S. elongata*
 6a. Opercular membrane not joined to pectoral fins 7

- 6b. Opercular membranes of both sides of body joined to upper rays of pectoral fins 8
 7a. Scales on head and nape of ocular (eyed) side larger than those on body; body without spots. No tentacles between nostrils *S. commersonia*
 7b. Scales on head and body similar in size; 2 or 3 rows of white spots on ocular side of body. A tentacle present between nostrils *S. albomaculata*
 8a. First rays of dorsal fin enlarged and free *A. cornuta*
 8b. First ray of dorsal fin not enlarged and free 9
 9a. Posterior rays of dorsal and anal fins partly confluent with caudal fin, joined only to basal half of caudal fin, leaving the latter distinct, outline of fins not continuous around caudal fin. Eyes without tentacles. *Z. synapturoides*
 9b. Posterior rays of dorsal and anal fins completely confluent to caudal fin, outline of fins continuous around caudal fin 10
 10a. Body with 14 unpaired cross-bars on ocular side. Eyes without tentacles
 *Z. altipinnis*
 10b. Body with 10 to 12 paired cross-bars on ocular side *Z. quagga*

Fisheries information : The soles are of little commercial importance. A few species are of some commercial importance. These fishes are marketed fresh and dried salted.

Order 25 TETRAODONTIFORMES

Key to families

- 1a. Teeth fused forming a parrot-like beak. Pelvic fins and dorsal fins without spines 2
 1b. Teeth not fused to form a parrot-like beak as in 1a 3
 2a. Body covered with spines, capable of great inflation, fused into a single beak-like

structure in each jaw, without a median suture dividing upper and lower jaw into right and left halves..... DIODONTIDAE

- 2b. Body naked or with only small scattered prickles. Teeth fused to form a beak-like structure, but separated by a median suture so that they are literally 'four toothed' as their family indicates
..... TETRAODONTIDAE

- 3a. Body almost completely encased in a bony shell or carapace formed of enlarged, thickened scale plates, generally hexagonal in shape. Spinous dorsal fin absent
..... OSTRACIIDAE

- 3b. Body not encased in a bony shell or carapace like as in 3a. Spinous dorsal fin present 4

- 4a. Pelvic fins represented by a pair of strong spines. Dorsal fin with 6 spines (generally only 5 visible, the 6th being very small)..
..... 5

- 4b. Pelvic fins and spines very small or absent. Dorsal fin with 2 or 3 spines 6

- 5a. Caudal peduncle short, not tapering. First dorsal with 2 to 6 spines and second dorsal fin with 12 to 17 soft rays. Anal fin with 11 to 15 soft rays TRIACANTHODIDAE

- 5b. Caudal peduncle tapering towards base of caudal fin. First dorsal with 5 spines and second dorsal fin with 20 to 25 soft rays. Anal fin with 15 to 20 soft rays
..... TRIACANTHIDAE

- 6a. Dorsal fin with 2 spines, only first spine large and prominent. Body covered by smooth to rough shagreen like skin consisting of small scales armed with 1 to many fin spinules
..... MONACANTHIDAE

- 6b. Dorsal fin with 3 visible spines. Body covered with very thick, tough skin with large rectilinear scale plates easily discernible as individual units
..... BALISTIDAE

Family 141 TRIACANTHODIDAE (Spikefishes)

Body compressed, covered with scales which do not overlap. Teeth in jaws separate, not coalesced, in a single series, absent in upper jaw in one genus. First dorsal fin with 2 to 4 spines, second with 12 to 17 soft rays. Anal fin with 11 to 15 soft rays. Pelvic fin with a long spine and occasionally with a small soft ray. Caudal peduncle short, not much tapering towards base of caudal fin which is rounded to truncate.

Species known to occur in Tamil Nadu

Triacanthodes ethiops Alcock

Fisheries information : Of no fishery value.

Remarks : Probably another species of this family *Triacanthodes indicus* Matsuura occur along this coast of India, but for want of information this is not included here.

Family 142 TRIACANTHIDAE (Tripodfishes).

Body compressed and deep with numerous scales not normally visible individually. Each scale with upright spinules. Mouth small and generally terminal. Dorsal fin with 6 spines (generally 5 visible only, 6th being very small) and 20 to 25 rays. Anal fin rays 15 to 20. Pelvic fins represented by a large spine which is movably articulated with anterior end of pelvis and capable of being locked erect on the pelvis. Caudal fin deeply forked. Caudal peduncle distinctly tapered.

Species known to occur in Tamil Nadu

1. *Pseudotriacanthus strigillifer* (Cantor)
(Long spines tripodfish)
2. *Triacanthus biaculeatus* (Bloch) (Short-nosed tripodfish)

Key to species

- 1a. Tips of dorsal and ventral spines naked. Second dorsal spine more than half the length of first. Spinous dorsal with high scaly sheath *P. strigillifer*

- 1b. Tips of dorsal and ventral spines covered with integument. Second dorsal spine not more than half of first. Spinous dorsal without scale *T. biaculeatus*

Fisheries information : The tripodfishes are of no commercial importance. These fishes are sometimes found in the commercial fish catches.

Remarks : *T. brevirostris* Schlegel is considered as junior synonym of *T. biaculeatus*.

Family 143 BALISTIDAE
(Trigerfishes)

Body usually deep and compressed, covered with thick, tough skin with large rectilinear scale plates. Scales above pectoral fin base usually enlarged and slightly separated, forming a flexible tympanum. Mouth small and terminal. Dorsal fin two, the first with 3 spines and second spine more than one half the length of the first; the spine capable of being locked in an upright position of erection by the second. Most dorsal, anal and pectoral rays branched. Pelvic fins and spines very small or absent, represented by a series of 4 pairs of enlarged scales encasing the end of pelvis.

Species known to occur in Tamil Nadu

1. *Abalistes stellaris* (Bloch)(Starry triggerfish)
2. *Balistes ellioti* Day (Elliot's filefish)
3. *Balistapus undulatus* (Park)
(Orangestriped triggerfish)
4. *Balistoides viridescens* (Bloch & Schneider)
(Dotty triggerfish)
5. *Canthidermis maculata* (Bloch) (Rough triggerfish)
6. *Odonus niger* (Ruppell) (Redtoothed triggerfish)
7. *Pseudobalistes flavimarginatus* (Bloch & Schneider) (Yellowface triggerfish)
8. *Rhinecanthus aculeatus* (Linnaeus)
(Blackbar triggerfish)
9. *Sufflamen fraenatus* (Bloch & Schneider)
(Masked triggerfish)

Key to species

- 1a. Scales above pectoral fin base and just behind gill slit not enlarged and not especially well separated, not forming a tympanum *C. maculata*
- 1b. Scales above pectoral fin base and just behind gill slit much enlarged and partially separated, forming a flexible tympanum 2
- 2a. Cheeks naked anteriorly, with small scales in separate elevated rows behind *P. flavimarginatus*
- 2b. Cheeks scaly 3
- 3a. Teeth normally red *O. niger*
- 3b. Teeth never red 4
- 4a. No groove on snout before eye 5
- 4b. A prominent groove on snout before eye 6
- 5a. Third dorsal spine minute *R. aculeatus*
- 5b. Third dorsal spine moderate *B. undulatus*
- 6a. Caudal peduncle distinctly depressed *A. stellaris*
- 6b. Caudal peduncle not depressed 7
- 7a. Scales on posterior part of body without keels forming longitudinal ridges *B. ellioti*
- 7b. Scales on posterior part of body with keels at the center forming longitudinal ridges, relatively low in juveniles and females, high in adult males 8
- 8a. Longitudinal scale ridges extend only a short distance forward of caudal peduncle *B. viridescens*
- 8b. Longitudinal scale ridges extend to at least middle of body *S. fraenatus*

Fisheries information : The trigger or filefishes are of no commercial importance. These fishes are caught as bycatch in the commercial catches.

Family 144 MONACANTHIDAE
(Leatherjackets)

Body fusiform, deep and compressed covered by smooth to rough shagreen like skin consisting of minute to small scales armed with 1 to many fin spinules. Mouth small, terminal with pointed teeth not fused together. Gill openings are small.

Species known to occur in Tamil Nadu

1. *Aluterus scripta* (Osbeck) (Scribbled leatherjacket)
2. *Acreichthys tomentosus* (Linnaeus) (Matted leatherjacket)
3. *Anacanthus barbatus* Gray (Barbeled leatherjacket)
4. *Cantherhinus pardalis* (Ruppell) (Honeycomb filefish)
5. *Paramonacanthus choirocephalus* (Bleeker) (Pigface leatherjacket)

Key to species

- 1a. A fleshy barbel on lower jaw
..... *A. barbatus*
- 1b. No fleshy barbel on lower jaw 2
- 2a. Both second dorsal and anal fins with 43 or more rays *A. scripta*
- 2b. Both second dorsal and anal fins with 39 or less rays 3
- 3a. Pelvic fins not movably articulated with pelvis *C. pardalis*
- 3b. Pelvic fins movably articulated with pelvis 4
- 4a. Pelvic fin rudiment large, armed with prominent barbs. First dorsal fin spine strong, armed with large barbs and originating over center to anterior half of eye. No produced fin rays in either second dorsal or caudal fin *A. tomentosus*
- 4b. Pelvic fin rudiment slender and tapering, either elongate or short, armed with small barbs and originating over posterior half of eye. Adult males usually with some rays produced into filaments in the caudal or second dorsal fin *P. choirocephalus*

Fisheries information : The unicorn leather jacket is of no commercial value. This species is caught as bycatch in the commercial catches.

Family 145 OSTRACIIDAE
(Boxfish, Cowfish)

Body elongate, almost completely covered in a bony shell or carapace formed of enlarged, thickened scale/plates, usually hexagonal in shape and firmly sutured to one another. The carapace has opening for mouth, eyes, gill slits, pectoral, dorsal and anal fins and for the flexible caudal peduncle. Scales plates sometimes have surface granulations and in some species these are enlarged into conspicuous carapace spine above eye or long ventrolateral or dorsal angles of body. Mouth small, terminal with fleshy lips. Spinous dorsal and pelvic fins absent. Caudal fin long.

Species known to occur in Tamil Nadu

1. *Lactoria cornuta* (Linnaeus) (Longhorn cowfish)
2. *Ostracion cubicus* Linnaeus (Darkspotted boxfish)
3. *O. meliagris* (Shaw) (Whitespotted boxfish)
4. *O. nasus* Bloch (Small-nosed boxfish)
5. *O. rhinorhynchus* (Bleeker) (Horn-nosed boxfish)
6. *Tetrosomus gibbosus* (Linnaeus) (Hunchback boxfish)

Key to species

- 1a. Body triangular in cross section, carapace with 5 angle (two dorsolateral ridges low and indistinct) *T. gibbosus*
- 1b. Body not triangular in cross section, carapace with 4 or 5 angle. 2
- 2a. Carapace 4 angled, no ridge along middle of back, no spines on carapace 3
- 2b. Carapace 5 angled, a central ridge along back. Spines either present or absent ... 4
- 3a. Length of anterior opening of carapace (mouth) 0.9 to 1.2 times in horizontal eye

- diameter. Body brown with white spots on carapce, caudal peduncle and caudal fin *O. meliagris*
- 3b. Length of anterior opening of carapace (mouth) 1.3 to 2.0 times in horizontal eye diameter. Body yellow to purplish-brown with dark edge pale blue or white spots on carapce, and dark spots on caudal peduncle and caudal fin *O. cubicus*
- 4a. Spines present on carapace projecting anteriorly from eye, posteriorly from ventrolateral ridge *L. cornuta*
- 4b. No spines on carapace 5
- 5a. A small projection directly above mouth followed by a long concave profile. Ridges on back well-developed. Round black spots irregularly scattered on carapce.....*O. nasus*
- 5b. A large lump occupying most of the snout. Ridge on back poorly defined. Numerous small brown dots on carapce
..... *O. rhinorhynchus*

Fisheries information : The boxfishes and cowfishes are of no commercial importance. These fishes are caught in the commercial catches as bycatch.

Remarks : *O. nasus* and *O. rhinorhynchus* are placed under genus *Rhynchostracion* by some authors.

Family 146 TETRAODONTIDAE (Pufferfishes)

Body naked or with only short prickles. Body heavy and blunt capable of rapid inflation by intake of water (or air). Jaws modified to form a beak of heavy, powerful teeth, 2 above and 2 below. Gill openings simple slits anterior to pectoral fins. Pelvic fins absent. Dorsal and anal fins inserted far posteriorly, without spines, but each with 7 to 15 rays. Caudal fin truncate, rounded or emarginate to almost lunate.

Species known to occur in Tamil Nadu

1. *Arothron hispidus* Linnaeus (Whitespotted blowfish)
2. *A. immaculatus* (Bloch & Schneider) (Immaculate blowfish)

3. *A. leopardus* (Day) (Banded leopard blowfish)
4. *A. nigropunctatus* (Bloch & Schneider) (Blackspotted blowfish)
5. *A. reticularis* (Bloch & Schneider) (Reticulated pufferfish)
6. *A. stellatus* (Bloch & Schneider) (Starry blowfish)
7. *Canthigaster margaritatus* (Ruppell) (Ocellated tode fish)
8. *Chelonodon fluviatilis* (Hamilton) (Estuarine blowfish)
9. *C. patoca* (Hamilton) (Gangetic blowfish)
10. *Lagocephalus inermis* (Temminck & Schlegel) (Smooth backed blowfish)
11. *L. lunaris* (Bloch & Schneider) (Green rough-backed blowfish)
12. *L. spadiceus* (Richardson) (Chinese pufferfish)
13. *Takifugu oblongus* (Bloch) (Oblong blowfish)
14. *Torquigener florealis* (Cope)
15. *T. hypselogeneion* (Bleeker)

Key to species

- 1a. Snout long, 1.3 to 1.8 times in head length. A single, inconspicuous nostril on each side of snout *C. margaritatus*
- 1b. Snout short, 1.8 to 3.1 times in head length. Nasal organ variable, not as in 1a 2
- 2a. Nasal organ covered by a small sac with 2 nostrils 3
- 2b. Nasal organ not covered by a small sac with 2 nostrils 8
- 3a. Dorsal fin rays 8 to 10. Anal fin rays 6 to 9 4
- 3b. Dorsal fin rays 11 to 15. Anal fin rays 10 to 13 5
- 4a. Length of base of dorsal fin 3 times or more in its height. Origin of anal fin below end of dorsal fin *T. florealis*

- 4b. Length of base of dorsal fin 2.0 to 2.5 times or more in its height. Origin of anal fin below that of dorsal fin *T. hypselogeneion*
 - 5a. Interorbital space longer than snout. Caudal peduncle depth subequal to its length. Caudal fin truncate .. *T. oblongus*
 - 5b. Interorbital space shorter than snout. Caudal peduncle depth $\frac{1}{2}$ or less of its length. Caudal fin emarginate or truncate 6
 - 6a. No spinules on dorsal surface of head and body. Dorsal fin rays 12 or 13 *L. inermis*
 - 6b. Spinules on dorsal surface of head and body. Dorsal fin rays 11 or 12 7
 - 7a. Spinules on dorsal surface of body extend to dorsal fin..... *L. lunaris*
 - 7b. Spinules on dorsal surface of body extend only about halfway from interorbital region to dorsal fin origin..... *L. spadiceus*
 - 8a. Nasal organs in form of a depression with slightly raised margin expanded before and behind into a pair of elongate flaps, or cup-shaped with front and rear edges produced into broadly rounded flaps. Two lateral lines 9
 - 8b. Nasal organ a bifid tentacle, the opposing surface of each tentacle with minute pits. Single lateral line 10
 - 9a. Nasal organ a depression with slightly raised margin, expanded before and behind into a pair of triangular flaps. Dorsal fin rays 9 or 10. Anal fin rays 8 to 10 *C. patoca*
 - 9b. Nasal organ cup-like, with 2 rounded lobes at its tip. Dorsal fin rays 14 to 16. Anal fin rays 12 to 15 *C. fluviatilis*
 - 10a. Margins of caudal fin black. No marks on body except a dark blotch at base of pectoral fin *A. immaculatus*
 - 10b. Margins of caudal fin not black. Body with various markings 11
 - 11a. Anus in a black area 12
 - 11b. Anus not in black area 13
 - 12a. Upper part of body spotted, ventral part in adults uniform, in juveniles with wide bands. Caudal fin spotted *A. stellatus*
 - 12b. Whole body with irregularly spaced dark blotches of variable size. Caudal fin not spotted *A. nigropunctatus*
 - 13a. Back and abdomen spiny, sides spineless *A. leopardus*
 - 13b. Whole body spiny 14
 - 14a. Caudal peduncle depth less than its length. White spots on head, back and sides. A short dark bar below eye and another below pectoral fin *A. hispidus*
 - 14b. Caudal peduncle depth more than its length. Dark longitudinal band on abdomen ascending to cheeks and snout *A. reticularis*
- Fisheries information :** The pufferfishes are of no commercial importance. These fishes are sometimes found in the commercial catches.
- Family 147 DIODONTIDAE**
(Porcupinefish)
- Body fusiform and capable of inflation, covered with well developed sharp spines. Long spines are generally erectile and two rooted, while short spines are fixed in an erect position by three rooted bases. Head broad and blunt. Mouth terminal with two fused teeth in jaws to form a beak-like structure without a median suture dividing upper and lower jaws into right and left halves. Dorsal and anal fins without spines, inserted far back on body. Pelvic fins absent. Caudal fin rounded.
- Species known to occur in Tamil Nadu**
1. *Chilomycterus orbicularis* Bloch (Birdbeak burrfish)
 2. *Diodon holocanthus* Linnaeus (Ballon fish)
 3. *D. hystrix* Linnaeus (Porcupinefish)
- Key to species**
- 1a. All spines three or four rooted and fixed except possibly one or two immediately behind the pectoral fin base or near the corner of the mouth *C. orbicularis*

- 1b. All spines two rooted, long and erectile, except for a few around gill openings, dorsal fin base and on caudal peduncle 2
- 2a. None of the spines wholly on caudal peduncle. Body with several large dark blotches. No small dark spots on fins *D. holocanthus*
- 2b. One or more small spines wholly on the dorsal surface of caudal peduncle. Body without large dorsal blotches. All fins heavily spotted *D. hystrix*

Fisheries information : The porcupine or balloonfishes are of no commercial value. These fishes are caught along with the commercial fishes as bycatch.

SUMMARY

Tamil Nadu, one of the states of the Peninsular India, situated on the south-eastern coast of our country, mostly on the bank of the Bay of Bengal and a small part of this state (60 km.) lies on the bank of the Arabian Sea. It has a coastal line of 1000 km long. The coastal line

of the state were visited by our survey parties covering almost all the fish landing centres in order to get fish collections for study. The present work is a synthesis of the study of materials collected during our survey tour to Tamil Nadu and the fishes already known to occur in this state as depicted in the literature. This work presents a record of 789 species belonging to 147 families and 25 orders. A brief description of all the families has been provided. The systematic key to the orders, families, genera and species have been incorporated in this study for easy segregation of the species in order to identify them to ascertain their taxonomic and biodiversity significance. The common English names of the species are given within parentheses where ever it is known.

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ADDENDUM TO MARINE FISH

Subsequent upon the original manuscript on marine and estuarine fish fauna of Tamil Nadu went to press, the second author had an opportunity to examine few lots of fish specimens from Tamil Nadu coast and it was resulted in finding few species hitherto not known from this region. Further scrutiny of few recent literatures also reveals report of some more species from this coast. Certain works pertaining to the family Alepocephalidae and Ophidiidae were omitted in the original manuscript by mistake. Although we found it difficult to incorporate all these species in the original manuscript, in view of giving a complete list of species from Tamil Nadu coast, the names of these species are appended hereunder. Further, this list is also followed by an addition of references pertaining to Tamil Nadu coast, most of which are published in recent past.

RHINICHIMAERIDAE

01. *Neoharriota pinnata* (Schnakenbeck)

HEXANCHIDAE

02. *Heptranchias perlo* (Bonnaterre)

TORPEDINIDAE

03. *Torpedo sinuspersici* Olfers

DASYATIDAE

04. *Dasyatis bennetti* (Muller and Henle)

MURAENIDAE

05. *Enchelynassa canina* (Quoy and Gaimard)

06. *Gymnothorax meleagris* (Shaw)

OPHICHTHYIDAE

07. *Brachysomophis cirrocheilos* (Bleeker)

ALEPOCEPHALIDAE

08. *Alepocephalus blanfordii* Alcock

09. *Einara edentula* (Alcock)

10. *Rouleina guentheri* (Alcock)

OPHIDIIDAE

11. *Bassozetus glutinosus* (Alcock)

12. *Holcomycteropus pterotus* (Alcock)

13. *Sirembo jerdoni* (Day)

14. *Tauredophidium hextii* Alcock

BATRACHOIDIDAE

15. *Perulibatrachus aquilonarius* Greenfield

ANTENNARIIDAE

16. *Antennarius indicus* Schultz

ZEIDAE

17. *Zenopsis conchifer* (Lowe)

PEGASIDAE

18. *Pegasus laternarius* Cuvier

SYNGNATHIDAE

19. *Halicampus grayi* Kaup

20. *Hippichthys spicifer* (Ruppell)

21. *Hippocampus borboniensis* Duméril

22. *Hippocampus fuscus* Ruppell

23. *Hippocampus histrix* Kaup

24. *Hippocampus kelloggi* Jordan & Snyder

25. *Hippocampus mohnikei* Bleeker

26. *Hippocampus trimaculatus* Leach

27. *Hippocampus spinosissimus* Weber

28. *Microgathus brevirostris* (Ruppell)

29. *Trachyrhamphus bicoarctatus* (Bleeker)

SCORPAENIDAE

30. *Brachypterois serrulata* (Richardson)

31. *Scorpaenodes guamensis* (Quoy & Gaimard)

PERISTEDIIDAE

32. *Peristedion riversandersoni* Alcock

SERRANIDAE

33. *Epinephelus radiatus* (Day)

APOGONIDAE

34. *Apogon fasciatus* (White)

35. *Apogon fleurieu* (Lacepede)

36. *Apogon oxina* Fraser

37. *Apogon pseudotaeniatus* Gon

38. *Archamia bleekeri* (Gunther)

39. *Archamia fucata* (Cantor)

CARANGIDAE

41. *Seriola rivoliana* Valenciennes

LEIOGNATHIDAE

42. *Leiognathus striatus* James & Badrudeen

CAESIONIDAE

- 43.
- Caesio cuning*
- (Bloch)

GERREIDAE

- 44.
- Gerres infasciatus*
- Iwatsuki & Kimura

HAEMULIDAE

- 45.
- Pomadasys guoraca*
- (Cuvier)

NEMIPTERIDAE

- 46.
- Nemipterus zysron*
- (Bleeker)

- 47.
- Parascolopsis eriomma*
- (Jordan & Richardson)

PEMPHERIDAE

- 48.
- Pempheris mangula*
- Cuvier

POMACENTRIDAE

- 49.
- Abudefduf sordidus*
- (Forsskal)

- 50.
- Neopomacentrus taeniurus*
- (Bleeker)

LABRIDAE

- 51.
- Xyrichtys bimaculatus*
- Rüppell

CHIASMODONTIDAE

- 52.
- Chiasmodon niger*
- Johnson

PINGUIPEDIDAE

- 53.
- Parapercis nebulosa*
- (Quoy & Gaimard)

- 54.
- Parapercis punctata*
- (Cuvier)

URANOSCOPIDAE

- 55.
- Uranoscopus crassiceps*
- Alcock

BLENNIIDAE

- 56.
- Entomacrodus vermiculatus*
- (Valenciennes)

- 57.
- Istiblennius edentulus*
- (Forster & Schneider)

- 58.
- Parablennius thysanius*
- (Jordan & Seale)

CALLIONYMIDAE

- 59.
- Callionymus erythraeus*
- Ninni

GOBIIDAE

- 60.
- Acentrogobius janthinopterus*
- (Bleeker)

- 61.
- Gobiopsis woodsi*
- Lachner & McKinney

- 62.
- Oxyurichthys ophthalmonema*
- (Bleeker)

- 63.
- Pseudogobius melanostictus*
- (Day)

SCOMBRIDAE

- 64.
- Thunnus obesus*
- (Lowe)

BOTHIDAE

- 65.
- Laeops macrophthalmus*
- (Alcock)

BALISTIDAE

- 66.
- Sufflamen chrysopterus*
- (Bloch & Schneider)

MONACANTHIDAE

- 67.
- Aluterus monoceros*
- (Linnaeus)

- 68.
- Lalmohania velutina*
- Hutchins

TETRAODONTIDAE

- 69.
- Canthigaster solandri*
- (Richardson)

- 70.
- Torquigener brevipinnis*
- (Regan)

Specimens of *Neoharriota pinnata* and *Zenopsis conchifer* were recently sited at Nagapattinam during March 2011. Compagno and Talwar (1985) observed that record of *Notorhynchus* (as *Notidanus indicus* Agassiz) from Madras (= Chennai) (Day, 1878) is possibly erroneous and referable to *Heptranchias perlo*. *Brachysomophis cirrocheilos* was reported by Biswas *et al* (2010a). Thangaraj and Lipton (2007) have reported *Hippocampus mohnikei* from Palk Bay, while the seahorses and pipe fishes of the Tamil Nadu coast were studied by Murugan *et al* (2008). *Perulibatrachus aquilonarius*, *Apogon oxina* and *Apogon pseudotaeniatus* were described from Tamil Nadu coast by Greenfield (2005), Fraser (1999) and Gon (1986) respectively. *Gerres infasciatus* has been recorded from Chennai (Fukuhara *et al.*, 2006) and *Leiognathus striatus* has been described from the Gulf of Mannar (James and Badrudeen, 1991). *Ponerodon vastator* Alcock, 1890, collected from off Madras coast (15°38'N, 82°30'E), has been relegated to synonymy of *Chiasmodon niger* Johnson (Johnson and Keene, 1990). *Gobiopsis woodsi* has been recorded from Mandapam, Gulf of Mannar (Lachner & McKinney, 1978). The record of *Torquigener brevipinnis* results in setting aside the reports of *T. florealis* (Cope) and *T. hypselogeneion* (Bleeker) as erroneous (Biswas *et al*, 2010b).

Many names used in the original text have become obsolete due to further studies done in different families around the world. The authors feel it necessary to provide the current status of those species and that is annexed an Appendix-I.

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Appendix-I

Sl. No.*	Species name used	Current status
08.	<i>Carcharias tricuspidatus</i> Day	<i>Carcharias taurus</i> Rafinesque
55.	<i>Dasyatis kuhlii</i> (Muller and Henle)	<i>Neotrygon kuhlii</i> (Muller & Henle)
74.	<i>Echidna zebra</i> (Shaw and Nodder)	<i>Gymnomuraena zebra</i> (Shaw)
77.	<i>Lycodontis favagineus</i> (Bloch & Schneider)	<i>Gymnothorax favagineus</i> Bloch & Schneider
78.	<i>Lycodontis undulatus</i> (Lacepede)	<i>Gymnothorax undulatus</i> (Lacepède)
79.	<i>Siderea picta</i> (Ahl)	<i>Gymnothorax pictus</i> (Ahl)
80.	<i>Sideria thyrsoides</i> (Richardson)	<i>Gymnothorax thyrsoides</i> (Richardson)
153.	<i>Arius caelatus</i> Valenciennes	<i>Nemapteryx caelata</i> (Valenciennes)
154.	<i>Arius crossoceros</i> Bleeker	<i>Plicofollis tonggol</i> (Bleeker)
155.	<i>Arius dussumieri</i> (Valenciennes)	<i>Plicofollis dussumieri</i> (Valenciennes)
158.	<i>Arius platystomus</i> Day	<i>Plicofollis platystomus</i> (Day)
159.	<i>Arius sagor</i> (Hamilton)	<i>Hexanematichthys sagor</i> (Hamilton)
160.	<i>Arius sona</i> (Hamilton)	<i>Hemiaris sona</i> (Hamilton)
162.	<i>Arius tenuispinis</i> Day	<i>Plicofollis tenuispinis</i> (Day)
163.	<i>Arius thalassinus</i> (Ruppell)	<i>Netuma thalassina</i> (Rüppell)
261.	<i>Suggrundus rodricensis</i> (Cuvier)	<i>Kumococius rodericensis</i> (Cuvier)
373.	<i>Leiognathus bindus</i> (Valenciennes)	<i>Photoptoralis bindus</i> (Valenciennes)
374.	<i>Leiognathus blochii</i> (Valenciennes)	<i>Nuchequula blochii</i> (Valenciennes)
375.	<i>Leiognathus brevirostris</i> (Valenciennes)	<i>Nuchequula gerreoides</i> (Bleeker)
378.	<i>Leiognathus elongatus</i> (Gunther)	<i>Equulites elongatus</i> (Gunther)
381.	<i>Leiognathus leuciscus</i> (Gunther)	<i>Equulites leuciscus</i> (Gunther)
383.	<i>Leiognathus smithursti</i> (Ransay & Ogilby)	<i>Leiognathus longispinis</i> (Valenciennes)
384.	<i>Leiognathus splendens</i> (Cuvier)	<i>Eubleekeria splendens</i> (Cuvier)
412.	<i>Gerres abbreviatus</i> Bleeker	<i>Gerres erythrourus</i> (Bloch)
413.	<i>Gerres acinaces</i> Bleeker	<i>Gerres longirostris</i> (Lacepède)
420.	<i>Gerres poeti</i> Cuvier	<i>Gerres phaiya</i> Iwatsuki & Heemstra
579.	<i>Xyrichtys pavo</i> (Valenciennes)	<i>Iniistius pavo</i> (Valenciennes)
620.	<i>Acentrogobius globiceps</i> (Hora)	<i>Drombus globiceps</i> (Hora)
622.	<i>Acentrogobius madraspatensis</i> (Day)	<i>Amoya madraspatensis</i> (Day)
635.	<i>Glossogobius biocellatus</i> (Valenciennes)	<i>Psammogobius biocellatus</i> (Valenciennes)

* The serial Number is as in the 'Systematic List' in the original text.

