

# FAUNA OF ANDHRA PRADESH

## PART - 2

Mammals and Marine & Estuarine Fishes

ZOOLOGICAL SURVEY OF INDIA



*State Fauna Series 5*

# **FAUNA OF ANDHRA PRADESH**

**(PART-2)**

**Mammals and Marine & Estuarine Fishes**

*Edited by*  
*The Director, Zoological Survey of India, Kolkata*



सत्यमेव जयते

**Zoological Survey of India**  
**Kolkata**

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## MAMMALS

**S. CHAKRABORTY, T.P. BHATTACHARYYA, J.K. DE, M.K. GHOSH,  
T.K. CHAKRABORTY AND A.K. PODDAR**

*Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053*

### INTRODUCTION

Andhra Pradesh (12°37'-19°54' N. lat. and 76°46'-84°46' E. long.) with a spread of 275068 km<sup>2</sup> is the biggest and most populous State in the south of India. The State is endowed with varied physiographic and climatic situations. These in turn resulted diverse wildlife habitats such as wetlands of Kolleru and Pulicat, mangroves of Coringa, rich coastal lands, dry grass and arid lands of Deccan plateau, humid moist deciduous forests of Northern Eastern Ghats and dry deciduous forests of Nallamalais. Consequently, the State is rich in floral and faunal diversity.

About 63771 km<sup>2</sup> of the State is under forest of which 70% is deciduous type—45% tropical dry deciduous, 25% moist deciduous; another 25% is southern tropical thorn forests, while littoral and mangrove forests together constitute 5%. About 47 km<sup>2</sup> area is under sal (*Shorea robusta*) and 9145 km<sup>2</sup> is under teak (*Tectona grandis*) with the rest under mixed, miscellaneous tree and shrub species.

Three major physiographic regions are—coastal plains, Eastern Ghats consisting of a series of broken hills and ridges of varying elevations, and Deccan plateau which is generally rocky with several outcrops. Rainfall ranges from 500 mm in the south-western parts to 1400 mm in the northeastern areas—with an average of 890 mm. Good water sources in the form of rain, rivers and irrigation support a large variety of agricultural crops like rice, sugarcane, groundnut, tobacco, chilli, cotton, maize, *etc.*, as well as plantation crops like mango, coconut, cashewnut and others.

It is obvious that each of the forest types, crop fields, wetlands, caves and other habitats supports varied ecotypes which in turn resulted a rich and diverse mammalian fauna. For developing appropriate conservation programme, details knowledge about the species composition, population, distribution and other ecological aspects are the necessary requirement. On examination of material present in the Zoological Survey of India and Bombay Natural

History Society it has become obvious that 'Mammal Survey' conducted by the B.N.H.S. collected a good series of specimens during 1929-30 specially from Cuddapah and Kurnool districts, but no report on the same is available. Subba Rao *et al.* (1984), Krishna Raju *et al.* (1987) and Nagalu *et al.* (1998) have contributed valuable information about the mammalian species specially those of conservation significance of the State. Agrawal and Bhattacharyya (1976), Das (1986) and Ghosh (1989) have recorded a number of small mammalian species alongwith taxonomic notes and distribution from Andhra Pradesh. However, no detail report on the mammalian fauna of the entire State is available.

Under the district-wise mopping survey programme, the Zoological Survey of India conducted survey of the different districts of Andhra Pradesh with special reference to mammals (Table 1). During the surveys, collection of specimens of small mammals alongwith observation on other mammalian species were made. The present report is based on the collection and observation made during these mopping surveys. The specimens which were already present in the Z.S.I. and B.N.H.S. collection were also incorporated for the study. Further, for the completeness of the report, species recorded in the literature have also been included.

All measurements are in millimetres and taken after Pocock (1939) for Carnivora, Khajuria (1953) for Chiroptera and Ellerman (1961) for Rodentia. The figures in parenthesis followed after the range of measurements indicate arithmetic means (for more than two specimens). Number, before the range of measurements, indicate the number of specimens available for that particular measurements.

A list of species alongwith their distribution in the different districts in Andhra Pradesh is given in Table 2.

Following is the list of abbreviations used for various measurements :

- apf = length of anterior palatal foramina;
- b* = length of bulla;
- c'-c'* = distance between outer surfaces of upper canines;
- cb* = condylobasal length;
- cr* = cranial rostrum;
- cw* = cranial width;
- d* = length of diastema;
- E = length of ear;
- Fa = length of forearm;
- F & cl = length of foot and claw;
- fr* = frontal width;
- HB = length of head and body;

Hf = length of hindfoot;  
*iw* = least interorbital width;  
*l* = greatest length of skull;  
*m*<sub>1</sub> = length of first lower molar;  
*m*<sub>3</sub> = length of third lower molar;  
*m*<sup>2</sup>-*m*<sup>2</sup> = distance between outer surfaces of second upper molars;  
*m*<sup>3</sup>-*m*<sup>3</sup> = distance between outer surfaces of third upper molars;  
*ml* = mandibular length;  
*mtr* = length of maxillary tooth-row;  
*mw* = maxillary width;  
*n* = nasal length;  
*on* = occipitonasal length;  
*orb* = length of orbit;  
*pl* = length of palate;  
*pm*<sup>4</sup> = length of fourth upper premolar;  
*po* = postorbital width;  
Tb = length of tibia;  
Tl = length of tail;  
Tr = length of tragus;  
*zw* = zygomatic width.

**Table 1.** Recent Surveys conducted by the Zoological Survey of India in the different districts of Andhra Pradesh with special reference to Mammals.

Year	District	Leader of the Party
1980	Adilabad	S. S. Saha
1983	Visakhapatnam	P. K. Das
1985	Visakhapatnam	S. S. Saha
1993	Hyderabad	A. K. Poddar
1993	Medak	A. K. Poddar
1993	Rangareddy	A. K. Poddar
1993	Nalgonda	A. K. Poddar
1994	Chittoor	S. Chakraborty
1994	Cuddapah	S. Chakraborty
1994	Nellore	S. Chakraborty

Year	District	Leader of the Party
1995	Anantapur	J. K. De
1995	Kurnool	J. K. De
1995	Prakasam	J. K. De
1996	East Godavari	T. P. Bhattacharyya
1996	Krishna	T. P. Bhattacharyya
1996	West Godavari	T. P. Bhattacharyya
1996	Adilabad	S. Chakraborty
1996	Nizamabad	S. Chakraborty
1996	Karimnagar	S. Chakraborty

## SYSTEMATIC ACCOUNT

### Order INSECTIVORA

Small-sized; snout pointed, projecting far beyond lower jaw; limbs short, five-toed; orbits open posteriorly; nocturnal and mainly insectivorous.

Order Insectivora is represented in Andhra Pradesh by two families.

### Key to the families of the Order INSECTIVORA

- . Back and sides of the body covered with spines; crown of first and second upper molars with a central fifth cusp ..... ERINACEIDAE
- . Back and sides of the body covered with soft hairs; central fifth cusp absent ..... SORICIDAE

### Family ERINACEIDAE

One genus occurs in Andhra Pradesh

### Genus *Paraechinus* Trouessart, 1879

The genus *Paraechinus* is represented by a single species in Andhra Pradesh.

#### 1. *Paraechinus micropus nudiventris* (Horsfield)

1851. *Erinaceus nudiventris* Horsfield, *Cat. Mamm. Mus. E. India Co.*, : 136 (Madras = Tamil Nadu).

*Common names* : Indian Hedgehog (Eng.), Kanta Chuha (Hin.).

*Material examined* : Nil

*Diagnosis* : Spiny body; short ears, brown collar and very rudimentary third upper premolar.

*Distribution* : India : Andhra Pradesh : Adilabad district, Chittoor district, Cuddapah district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Prakasam district, Warangal district; Tamil Nadu.

*Remarks* : A single specimen was observed near Nerabyloo, in Chittoor district, among the thorny bushes in a dry sandy field. Appears to be very rare in the State.

Hutterer (in Wilson and Reeder, 1993) considered *nudiventris* as a distinct species following Biswas and Ghose (1970), while Corbet (1978) regarded it as a subspecies.

### Family SORICIDAE

Family Soricidae is represented by only one genus in Andhra Pradesh.

Genus *Suncus* Ehrenberg, 1833

Two species of the genus *Suncus* occur in Andhra Pradesh.

#### Key to the species and subspecies of the genus *Suncus*

1. Head and body length around 50 ..... *S. etruscus perrotteti*
- Head and body length over 90 ..... 2
2. Head and body length around 100. Dorsum brown with rufous tinge .....  
..... *S. murinus niger*
- Head and body length over 110 ..... 3
3. Ventral colour clear grey or buffy ..... *S. murinus murinus*
- Ventral colour greenish yellow ..... *S. murinus viridescens*

#### 2. *Suncus murinus murinus* (Linnaeus)

1766. *Sorex murinus* Linnaeus, *Syst. Nat.*, 12th ed., 1 : 74 (Java, Indonesia).

*Common names* : House Shrew (Eng.), Chuchundar (Hin.).

*Material examined* : Adilabad district : 1♂1♀ Chennur, 27.x.1996; 1♂ Kotapalli, 27.iii.1980. Karimnagar district : 2♀, Jagtial, 30, 31.x.1996. Visakhapatnam district : 2♂ Borra Guhalu, 3, 6.iii.1983.

*Measurements* : External : 4♂ : HB 115.0-130.0 (122.0); TL 72.0-85.0 (76.0); Hf 20.5-22.0 (21.0); E 11.0-15.0 (14.0). 2♀ : HB 120.0, 123.0; TL 62.0, 70.0; Hf 17.0, 17.0; E 8.0, 15.0. Cranial : 1♂ : *l* 31.2; *cb* 30.7; *cw* 12.8; *mw* 9.5; *mtr* 14.4.

*Diagnosis* : Moderately large sized, head and body length around 120. Dorsum bluish grey, washed with fawn, pale clear grey or buffy below.

*Distribution* : India : Andhra Pradesh : Adilabad district, East Godavari district, Karimnagar district, Kurnool district, Nizamabad district, Srikakulam district, Visakhapatnam district, Vizianagaram district; Bihar; Madhya Pradesh; Meghalaya; Orissa; Pondicherry; Tamil Nadu; West Bengal

*Elsewhere* : China, Indonesia, Malaysia, Nepal and Sri Lanka.

*Remarks* : Present subspecies has been recorded for the first time from Andhra Pradesh. Fairly common in the urban areas. Lives in holes among the bushes particularly in and around open drains. Frequently visits the houses during night.

### 3. *Suncus murinus niger* (Horsfield)

1851. *Sorex niger* Horsfield, *Cat. Mamm. Mus. E. India Co.*, : 135 (Madras, Tamil Nadu, India).

*Common names* : House Shrew (Eng.), Chuchundar (Hin.).

*Material examined* : Anantapur district : 1 ♂, Amdigubba, 29.v.1995; 1 ♀, Kadiri, 25.v.1995. Chittoor district : 1 ♀, Tirupati, 13.vi.1994.

*Measurements* : External : 1 ♂: HB 100.0; Tl 60.0; Hf 15.0; E 11.0. 2 ♀: HB 85.0, 103.0; TL 50.0, 65.0; Hf 15.0, 17.0; E 10.0, 12.0. Cranial : 1 ♂: *l* 28.3; *cb* 27.9; *cw* 11.5; *mw* 9.0; *mtr* 12.1. 1 ♀: *l* 27.0; *cb* 25.8; *cw* 10.7; *mw* 8.2; *mtr* 11.5.

*Diagnosis* : Medium sized, head and body length around 100. Fur short, soft and fine. Dorsum brown or with a rufescent tinge, venter little lighter.

*Distribution* : India, Andhra Pradesh : Anantapur district, Chittoor district, Cuddapah district, Nellore district; Tamil Nadu.

*Remarks* : This subspecies has been recorded for the first time from Andhra Pradesh. Fairly common in the small hills amongst rocks and vegetation. Frequently enters in the houses during night.

### 4. *Suncus murinus viridescens* (Blyth)

1859. *Sorex viridescens* Blyth, *J. Asiat. Soc. Beng.*, **28** : 285 (Southern Malabar, Kerala).

*Common names* : House Shrew (Eng.), Chuchundar (Hin.).

*Material examined* : Hyderabad district : 2 ♂, 1 ♀ Hyderabad, 17.xii.1977.

*Measurements* : External : 1 ♂: HB 110.0; Tl 68.1; Hf 18.3; E 13.4. 1 ♀ : HB 114.0; TL 61.1; Hf 17.7, E 11.8.

*Diagnosis* : Moderately large-sized, head and body 110 and above averaging 123. Lower parts distinctly greenish yellow.

*Distribution* : India : Andhra Pradesh : Guntur district, Hyderabad district, Khammam district, Kurnool district, Mahbubnagar district, Medak district, Nalgonda district, Warangal district, West Godavari district; Kerala; Tamil Nadu.

*Remarks* : Present material make the first record of this subspecies from Andhra Pradesh. The specimens have also been observed in other neighbouring districts.

### 5. *Suncus etruscus perrotteti* (Duvernoy)

1842. *Sorex perrotteti* Duvernoy, *Mag. Zool. Paris*, : 29 (Nilgiri Hills, Southern India).

*Common names* : Savi's Pygmy Shrew (Eng.), Chuchundar (Hin.).

*Material examined* : Cuddapah district : 1 ♂, Palkonda Hills, 14.vii.1930.

*Measurements* : External : 1 ♂: HB 49.0; Tl 36.0; Hf 10.0; E 6.0. Cranial : 1 ♂: / 18.0.

*Diagnosis* : Very small sized, head and body on average 48. Fur short, reddish brown above, paler below.

*Distribution* : India : Andhra Pradesh : Chittoor district, Cuddapah district, Karimnagar district; Karnataka; Kerala; Tamil Nadu.

*Remarks* : Present specimen was collected during the Bombay Natural History Society's Mammal Survey of India. Very rare, no specimens could be collected during the present surveys.

## Order SCANDENTIA

Squirrel-like in appearance. but with a long snout; long whiskers absent.

The order contains a single family Tupaiidae.

## Family TUPAIIDAE

Only one genus occurs in Andhra Pradesh

### Genus *Anathana* Lyon, 1913

The genus *Anathana* is represented by a single species in Andhra Pradesh.

### 6. *Anathana ellioti ellioti* (Waterhouse)

1850. *Tupaia ellioti* Waterhouse, *Proc. zool. Soc. Lond.*, 1849 : 107 (Hills between Cuddapah and Nellore, Andhra Pradesh).

*Common name* : Madras Tree Shrew (Eng.).

*Material examined* : Nil.

*Diagnosis* : Upper part reddish brown; feet buff.

*Distribution* : India : Andhra Pradesh : Adilabad district, Chittoor district, Cuddapah district, Guntur district, Khammam district, Kurnool district, Mahbubnagar district, Karimnagar district, Nalgonda district, Prakasam district, Nellore district, Nizambad district, Warangal district; Tamil Nadu.

*Remarks* : Fairly common in the fringe areas of dry deciduous forests. A good population of this species was observed at Kudrapally beat and Kaleshwar beat of Karimnagar district. It has been reported that in other parts its population have been dwindled due to various disturbances in the fringe areas of the forests.

### Order CHIROPTERA

The only order of mammals having membranous wings for true flight. Fingers enormously developed to support the wings. Nocturnal in habit.

Two clearly defined suborders, viz., Megachiroptera and Microchiroptera are recognised and both are well represented in Andhra Pradesh.

### Suborder MEGACHIROPTERA

Second finger usually bearing a claw; margin of ear forms complete ring. Eyes large. Tail rod-like, short, often absent. Bony palate continues behind the last molar; molar teeth with longitudinal furrow.

Represented by only one family Pteropodidae.

### Family PTEROPODIDAE

The family is represented by four genera in Andhra Pradesh.

### Key to the genera of the family PTEROPODIDAE

1. No tail; neck and shoulder paler than back..... *Pteropus*
  - A short tail present, dorsum of one colour throughout ..... 2
2. Second finger of wing without any claw ..... *Eonycteris*
  - Second finger of wing with a claw ..... 3
3. Five teeth in upper molar series and six in lower ..... *Rousettus*
  - Four teeth in upper molar series and five in lower ..... *Cynopterus*

Genus *Cynopterus* Cuvier, 1824

The genus *Cynopterus* is represented in Andhra Pradesh by one species.

7. *Cynopterus sphinx sphinx* (Vahl)

1797. *Vespertilio sphinx* Vahl, *Skr. Nat. Selsk. Copenhagen*, 4(1) : 123 (Tranquebar, Tanjavar, Tamil Nadu).

*Common name* : Short-nosed Fruit Bat (Eng.).

*Material examined* : Adilabad district : 7♂ 1♂ (Juv.), 5♀, 1♀ (Juv), Chennur, 26, 27.x.1996. Anantapur district : 7♂, 12♀, Kalasamudram, 27-30.v.1995, 2-4.vi.1995. Chittoor district : 1♂, Nerabyloo, 11.vi.1994. Cuddapah district : 2♂, Bhakrapet, 6,7.vi.1994; 1♂, 3♀, Koduru, 21-22.viii.1929; 1♂, Rajampeta, 4.xi.1929. East Godavari district : 2♂, Addatigala, 3.iv.1996. Hyderabad district : 1♀, 4♀, Kanchanbagh, 15.xii.1993. Karimnagar district : 1♂ 1♀ Jagtial, 31.x.1996. Kurnool district : 4♂, 3♀, Atmakur, 23,24.v.1995. Medak district : 3♂ 2♀, Narsapur, 11.xii.1993. Nalgonda district : 1♂, 4♀, Bhongir, 9.xii.1993. Nellore district : 1♂, 1♀, Kavali, 28.v.1994. Nizamabad district : 1♂, Varni, 5.xi.1996; 1♂ Mallarum, 6.xi.1996. Prakasam district : 11♂, 20♀, Giddalur, 12-17.v.1995. Rangareddy district : 5♂ 6♀, Tandoor, 29,30.ix.1993. Visakhapatnam district : 6♂, 5♀, Borra Guhalu, 5.iii.1983; 5♂ 1♀, Wangasara, 8.iii.1985; 4♂, 1♀, Lankapakalu, 12-17.iii.1985; 2♂ 4♀, Anantagiri, 21-23.iii.1985. West Godavari district : 1♂, Koraturu, 12.iv.1996.

*Measurements* : External : 17♂ : Fa 62.6-71.6 (67.2); E 15.8-23.4 (20.0); Tb 24.1-26.8 (25.8); F&cl 13.1-17.2 (14.4). 11♀ : Fa 63.5-70.5 (67.9); E 17.0-23.4 (20.5); Tb 21.8-27.7 (25.2); F&cl 12.6-16.7 (14.6). Cranial : 10♂ : l 30.0-32.2 (31.3); cr 6.8-8.2 (7.7); cw 12.4-13.9 (13.3); iw 5.6-6.8 (6.0); mtr 9.9-11.0 (10.6); zw 19.2-20.6 (20.0); c<sup>1</sup>-c<sup>1</sup> 5.7-6.9 (6.6); m<sup>2</sup>-m<sup>2</sup> 8.8-9.5 (9.2). 10♀, l 29.6-31.9 (31.1); cr 6.7-8.0 (7.5); cw 12.7-13.8 (13.1); iw 5.3-6.1 (5.8); mtr 9.8-10.9 (10.3); zw 18.7-20.0 (19.4); c<sup>1</sup>-c<sup>1</sup> 5.9-6.8 (6.4); m<sup>2</sup>-m<sup>2</sup> 8.5-9.4 (9.0).

*Diagnosis* : Medium-sized, forearm around 70. Ear margin, metacarpals, phalanges whitish; nostrils divergent with deep inter-narial groove. Dorsum grey to greyish brown, often with a broad rufescent or chestnut area around the shoulder and throat, ventrally paler; wings and muzzle blackish brown. Tail very small, rod like.

*Distribution* : India : Andhra Pradesh : Throughout the State; all over Indian Union except the extreme drier zone.

*Elsewhere* : Bangladesh, China, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, Thailand, Vietnam and many other southeast Asian smaller Islands.

*Remarks* : Most common bat of the State except in the drier zone. Found in forests as well as in rural and urban areas. Most of the specimens collected during summer season were in breeding condition.

Genus *Pteropus* Brisson, 1962

The genus *Pteropus* is represented in Andhra Pradesh by one species.

8. *Pteropus giganteus giganteus* (Brnünich)

1782. *Vespertilio gigantea* Brünnich, *Dyrenes Historie*, 1 : 45 (Bengal = West Bengal, India).

*Common name* : Indian Flying Fox (Eng.).

*Material examined* : Cuddapah district : 3♂, 3♀, Kondogorolapenta, 12-20.vii.1930; 3♂, Palkonda, 13, 20.vii.1930. Visakhapatnam district : 5♂, 1♀, Araku Valley, 29,30.i.1984.

*Measurements* : External : 5♂ : Fa 151.5-171.0 (158.0) : E 35.0-39.2 (37.0); Tb 72.2-85.7 (77.4); F&cl 53.0-59.6 (57.8). 1♀ : Fa 169.0; E 35.6; Tb 81.5; F&cl 57.0. Cranial : 5♀ : l 64.0-69.5 (66.3); cr 20.9-22.7 (21.8); cw 24.0-25.5 (24.5); iw 8.1-9.6 (8.9); mtr 24.4-27.4 (25.4); zw 32.6-38.3 (34.8); c<sup>1</sup>-c<sup>1</sup> 12.4-13.4 (12.9); m<sup>2</sup>-m<sup>2</sup> 47.5-52.6 (49.3). 1♀ : l 69.1; cr 23.1; cw 25.6; iw 9.8; mtr 26.8; zw 36.3; c<sup>1</sup>-c<sup>1</sup> 12.6; m<sup>2</sup>-m<sup>2</sup> 17.4.

*Diagnosis* : Very large, forearm over 150. Rufous brown around head and neck; a conspicuous orange or honey-coloured band across upper back; lower back blackish brown; ventral part dark chestnut brown; wings, ear, muzzle, jet black; no tail; a narrow flap of skin inside each leg.

*Distribution* : India : Andhra Pradesh : Throughout the State; widely distributed in the Indian Union including Andaman Islands (Mason, 1908).

*Elsewhere* : Bangladesh, China (Wang *et al.* 1962), Maldiv Island, Myanmar, Nepal, Pakistan and Sri Lanka.

*Remarks* : Fairly common almost throughout the state particularly in the rural areas, but not in the deep forests.

Genus *Rousettus* Gray, 1821

The genus *Rousettus* is represented by one species in Andhra Pradesh.

9. *Rousettus leschenaulti lesehenaulti* (Desmarest)

1820. *Pteropus leschenaulti* Desmarest, *Encycl. Meth. Mammal.*, 1 : 110 (Pondicherry, India).

*Common name* : Indian Fulvous Fruit Bat (Eng.)

*Material examined* : Adilabad district : 2♂, Chennur, 28.x.1996. Visakapatnam district : 1♀, 1♀, Anantagiri, 21.iii.1985; 2♂, Borra Guhalu, 8.iii.1983; 2♂, 2♀, Lankapakalu, 14-17.iii.1985.

*Measurements* : External : 2♂ : Fa 84.0, 85.0; E 20.7, 20.7; Tb 41.0, 41.5; F&cl 19.3,

19.6. Cranial : 2♂ : *l* 37.6, 38.0; *cr* 12.5, 13.2; *cw* 15.0, 15.9; *iw* 7.7, 8.0; *mtr* 14.4, 14.8; *zw* 22.2, 23.5; *c<sup>1</sup>-c<sup>1</sup>* 7.1, 7.3; *m<sup>2</sup>-m<sup>2</sup>* 11.0, 11.9.

*Diagnosis* : Medium-sized, forearm around 80; long muzzle, large eyes, tail reduced and rod like; ears with a notch at the lower edge; Dorsum light brown with a rufescent tone, venter lighter; back of neck and shoulder sparsely haired; last lower molar elliptical.

*Distribution* : India : Andhra Pradesh : Throughout the State; widely distributed in the Indian mainland, east to Arunachal Pradesh (Rookmaker and Bergmans 1981), north to Jammu and Kashmir (Chakraborty 1983) and south to Kerala.

*Elsewhere* : Bangladesh (Khan 1982), Bhutan (Chakraborty 1975), Cambodia (Rookmaker and Bergmans 1981), northern China (Andersen 1912, Allen 1938), Hong Kong, Laos (Phillips 1967), Myanmar, Nepal, Pakistan (Siddiqui 1961), Sri Lanka (Sinha 1969), Thailand, Tibet (Cai and Zhang 1981) and Vietnam.

*Remarks* : Specimens collected in March were in breeding condition.

#### Genus *Eonycteris* Dobson, 1873

The genus *Eonycteris* is represented by one species in Andhra Pradesh.

#### 10. *Eonycteris spelaea* (Dobson)

1871. *Macroglossus spelaeus* Dobson, *Proc. Asiat. Soc. Beng.* : 105 (Farm Caves, Moulmein, Myanmar).

*Common names* : Dawn Bat, Cave Fruit Bat (Eng.).

*Material examined* : Kurnool district : 1♀, Pothurajeepta, 23.v.1995. Visakhapatnam district : 3♂, Borra Guhalu, 8.iii.1983; 2♂, 1♀, Lankapakalu, 14.iii.1985.

*Measurements* : External : 5♂ : *Fa* 68.4-69.6 (69.0); *E* 19.0-21.2 (19.9); *Tb* 28.6-31.3 (30.0); *F&cl* 16.8-20.8 (18.8). 1♀ : *Fa* 64.5; *E* 17.9; *Tb* 28.0; *F&cl* 16.0. Cranial : 4♂ : *l* 33.0-35.7 (35.2); *cr* 10.4-11.0 (10.7); *cw* 14.0-14.8 (14.3); *iw* 6.2-6.8 (6.5); *mtr* 12.2-12.7 (12.4); *zw* 19.7-21.6 (20.8); *c<sup>1</sup>-c<sup>1</sup>* 6.5-7.4 (6.9); *m<sup>2</sup>-m<sup>2</sup>* 8.4-8.7 (8.5). 1♀ : *l* 33.0; *cr* 9.6; *cw* 13.7; *iw* 6.5; *mtr* 11.8; *c<sup>1</sup>-c<sup>1</sup>* 11.9; *m<sup>2</sup>-m<sup>2</sup>* 8.6.

*Diagnosis* : Second finger without a claw; fur short and scanty particularly on back of neck; back brownish, head darker, venter greyish; adult male with yellowish red ruff on neck. Small reniform perianal gland present.

*Distribution* : India : Andhra Pradesh : Kurnool district, Visakhapatnam district : Andaman Islands; Arunachal Pradesh; Assam; Karnataka; Manipur; Meghalaya; Mizoram; Sikkim. Uttar Pradesh; West Bengal.

*Elsewhere* : China, Indonesia, Malaysia, Myanmar, Thailand, Vietnam and many other nearby islands.

*Remarks* : This species is not very common and restricted to hilly region.

## Suborder MICROCHIROPTERA

Second finger without any claw; margin of ears not forming a complete ring. Crown of molar teeth with transverse furrow. Bony palate not extending behind the last molar.

All the six families of Microchiroptera occurring in India are well represented in Andhra Pradesh.

## Key to the family of the suborder MICROCHIROPTERA

1. Both nose leaf and tragus present ..... MEGADERMATIDAE
  - Either nose leaf or tragus present, but not both ..... 2
2. A nose leaf present but no tragus ..... RHINOLOPHIDAE
  - A tragus present but no nose leaf ..... 3
3. Tail entirely enclosed in interfemoral membrane ..... VESPERTILIONIDAE
  - Distal portion of tail free from interfemoral membrane ..... 4
4. Tail emerging from upper surface of interfemoral membrane .....
  - ..... EMBALLONURIDAE
  - Tail emerging from the end of interfemoral membrane ..... 5
5. Tail very long and slender ..... RHINOPOMATIDAE
  - Tail comparatively short and stout ..... MOLOSSIDAE

## Family RHINOPOMATIDAE

Family Rhinopomatidae consists of a single genus *Rhinopoma*.

Genus *Rhinopoma* Geoffroy, 1818

The genus *Rhinopoma* is represented by one species in Andhra Pradesh.

11. *Rhinopoma hardwickei hardwickei* (Gray)

1831. *Rhinopoma hardwickei* Gray, *Zool. Misc.*, : 37 (India).

*Common name* : Lesser Rat-tailed Bat (Eng.).

*Material examined* : Cuddapah district : 1 ♂, 5 ♀ Chintarajanpalli, 11-19.vi.1930; 3 ♀, Koduru, 28,30.viii.1929; 2 ♂, 2 ♀ Kondogololapenta, 11-31.vii.1930; 2 ♀, Siddavatam, 9.vi.1994. Karimnagar district : 1 ♂, 2 ♀ Jagtial, 2.3.xi.1996. Kurnool district : 1 ♀, Nilapilam cave, 10.x.1949.

**Measurements** : External : 2♀, Fa 55.6, 56.5; Tl 72.2, 77.4; E 17.6, 18.7; Tb 27.8, 28.5; F&cl 14.2, 14.3. Cranial : 2♀: l 18.4, 19.1; cw 8.0, 8.1; iw 2.8, 3.0; zw 10.8, 10.9;  $m^1$ - $m^3$  8.1, 8.2;  $c^1$ - $c^1$  4.4, 4.4.

**Diagnosis** : Medium sized. forearm 53.3-62.7; mouse like tail emerging from the edge of narrow uropatagium; tail longer than forearm; muzzle with thick narial pad.

**Distribution** : India : Andhra Pradesh : Cuddapah district, Karimnagar district, Kurnool district, Nagalu *et al.* (1998) recorded this species also from Adilabad, Guntur, Khammam, Mahbubnagar, Nalgonda, Prakasam and Warangal districts; Bihar; Delhi; Gujarat; Jammu and Kashmir; Karnataka; Kerala; Madhya Pradesh; Orissa; Rajasthan; Tamil Nadu; Uttar Pradesh; West Bengal.

**Elsewhere** : Afganistan, Myanmar, Pakistan and Thailand.

**Remarks** : Nagalu *et al.* (1998) regarded this species as uncommon in different sanctuaries of the State. However, it appears that this species prefers ruins of fort, temples, buildings and other man-made structures for roosting and found in good numbers in and around human habitat areas.

Altogether 12 individuals were caught in the mist nets placed in the compound of a deserted fort at Siddavatam in three days of netting. All the animals were lactating female and each of them carrying a very young individual attached to mammae. Except two, all the specimens were released after noting the relevant data. All the specimens were netted between 10-30 to 11-45 P.M.

This species was found roosting in association with other species in different interconnected chambers of a fort at Jagtail. Here emergence time was noted as 6 P.M. All the November specimens were in non-breeding condition with little deposition of subcutaneous fat around the genital region.

### Family EMBALLONURIDAE

In Andhra Pradesh, the family Emballonuridae is represented by only one genus *Taphozous*.

#### Genus *Taphozous* Geoffroy, 1818

Four species of the genus *Taphozous* found in Andhra Pradesh.

#### Key to the species and subspecies of the genus *Taphozous*

- Gular sac present at least in males ..... 1
  - Gular sac absent in either sex ..... 2
1. Dorsal fur extending over wing membrane and inter-femoral membrane; forearm on

average below 65. Most of the males have a black beared.....  
 ..... *T. melanopogon melanopogon*

- Dorsal fur not extending over the wing or inter-femoral membrane; forearm on average more than 68. No black beared in either sex.....*T. nudiventris kachhensis*
- 2. Gular sac moderately developed in males but absent in females; distal margin of tragus not wavy; calcar weak; posterior margin of palate inverted U-shaped .....  
 ..... *T. perforatus perforatus*
- Gular sac well developed in males; rudimentary in females; distal margin of tragus wavy; calcar well developed; posterior margin of palate inverted V-shaped .....  
*T. longimanus longimanus*

### 12. *Taphozous longimanus longimanus* (Hardwicke)

1825. *Taphozous longimanus* Hardwicke, *Trans. Linn. Soc. Lond.*, **14** : 525 (Calcutta, West Bengal, India).

*Common name* : Long-armed Sheath tailed Bat (Eng.).

*Material examined* : Cuddapah district : 3 ♂, 2 ♀, Vontimitta Range, 8.viii.1930.

*Measurements* : External : 1 ♂ : Fa 59.2; Tl 23.5; E 13.0; Tb 24.5; F&cl 11.5. 1 ♀ : Fa 58.8; Tl 23.0; E 12.8; Tb 24.3; F&cl 11.3.

*Diagnosis* : Dark to light brown coloured, medium-sized bat with broad tragus; gular sac moderately developed in males, in females represented by a rudimentary fold of naked skin; radio-metacarpal pouch moderately developed; inner margin of ear smooth, lower lip scarcely grooved.

*Distribution* : India : Andhra Pradesh : Adilabad district, Cuddapah district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Prakasam district, Warangal district; widely distributed in the Indian Peninsula, northwards to Gujarat on the west, and West Bengal and Tripura in the east.

*Elsewhere* : Bangladesh, Cambodia, Indonesia, Malaysia, Myanmar, Nepal, Sri Lanka and Thailand.

*Remarks* : Uncommon, roost of about 12-15 was observed inside the dome of a almost deserted temple at Siddavatam.

### 13. *Taphozous melanopogon melanopogon* Temminck

1841. *Taphozous melanopogon* Temminck, *Monogr. Mammal*, **2** : 287 (Bantam, Java, Indonesia).

*Common name* : Black-bearded Tomb Bat (Eng.).

*Material examined* : Cuddapah district : 3 ♂, 2 ♀, Koduru, 2 ♂, 7 ♀, Kondogorolapenta,

9.vii.1930; 2♂, 2♀, Siddavatam, 6-9.vi.1994. Visakhapatnam district : 2♂, 3♀ Borra Guhalu, 3.iii.1983. Warangal district : 3♂, Hanam Konda (Thousand Pillars Temple),-- .viii.1977.

*Measurements* : External : 2♂, Fa 63.7, 64.0; Tl 25.0, 25.5; E 21.0, 22.5; Tb 24.5, 24.7; F&cl 12.3, 13.3; Tr 7.0, 7.5. 3♀: Fa 62.5, 63.4, 63.8; Tl 21.4, 25.0, 28.8; E 20.4, 21.0., 22.3; Tb 24.0, 24.3, 24.5; F&cl 13.0, 13.5, 14.0; Tr 6.5, 7.2, 7.7. Cranial : 1♂: l 23.0; cw 10.0; iw 5.0; zw 12.6;  $m^3-m^3$  8.9;  $c^1-c^1$  3.9; mtr 8.6, 2♀: l 22.6, 22.9; cw 10.0, 10.3; iw 4.9, 5.3; zw 12.5, 12.7;  $m^3-m^3$  8.7, 8.8;  $c^1-c^1$  3.7, 3.8; mtr 8.7, 9.4.

*Diagnosis* : Male with black beard; gular sac and pectoral glands absent in both sexes. Upper incisors weak and minute, but present.

*Distribution* : India : Andhra Pradesh : Adilabad district, Cuddapah district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Prakasam district, Visakhapatnam district, Warangal district; Andaman Islands; Bihar; Karnataka; Maharashtra; Orissa; Rajasthan; Tamil Nadu; West Bengal (recorded as 'Lower Bengal' by Blanford 1888-91).

*Elsewhere* : China, Indonesia, Malaysia, Myanmar, Sri Lanka, Vietnam and many small adjacent islands.

*Remarks* : Common. Roosts were observed in the ceilings and walls of deserted man made structures like temple, mosque, buildings, forts, *etc.* Whenever disturbed, rapidly moves sidewise and tries to enter in the available cracks or crevices of the wall. Emergence takes place always after the sunset. Faecal pellets revealed hard parts of different groups of insects specially of the Coleoptera.

Quite a number of roosts were observed in a fort at Siddavatam and all of them consists of male only.

Following breeding records have been noted.

2♀ collected in March were in early stage of pregnancy, 2 female of June were in advance stage of pregnancy with foetus of 46, 47 in head and body length. Sinha (1986) found pregnant females from January to May in Bihar and most of the females of May-June had young attached to the breast.

In the specimens collected during June no inter-femoral fat deposition was found.

This bat remains silent while taking out of the net.

#### 14. *Taphozous nudiventris kachhensis* (Dobson)

1872. *Taphozous kachhensis* Dobson, *J. Asiat. Soc. Bengal*, **41**, **2** : 221 (Cutch, Gujarat, India).

*Common name* : Naked-bellied Tomb Bat (Eng.).

*Material examined* : Cuddapah district : 1 ♂, 4 ♀, Siddavatam, 6-9.vi.1994.

*Measurements* : External : 1 ♂ : Fa 74.4; Tl 31.5; E 17.9; Tb 32.3; F&cl 16.7. 4 ♀ : Fa 70.2-75.3 (73.4); Tl 32.9-34.7 (33.5); E 19.3-19.6 (19.5); Tb 30.0-30.9 (30.6); F&cl 14.2-16.2 (15.1). Cranial : 1 ♂ : l 24.9; cw 11.4; zw 15.5;  $m^3-m^3$  10.7;  $c^1-c^1$  5.2; mtr 10.9. 3 ♀ : l 26.0, 26.0, 26.5; cw 11.7, 12.0, 12.1; iw 5.0, 5.2, 5.3; zw 15.9, 16.0, 16.1;  $m^3-m^3$  10.6, 10.7, 10.8;  $c^1-c^1$  5.3, 5.5, 5.5; mtr 11.1, 11.1, 11.5.

*Diagnosis* : Blackish grey in colour. Gular sac absent in both the sexes, but in male its position is indicated by a semicircular fold of skin. Muzzle and throat naked; ear papillate along the margin; radio-metacarpal pouch very small; wings from tibia above the ankles.

*Distribution* : India : Andhra Pradesh : Adilabad district, Cuddapah district, Guntur district, Karimnagar district, Khammam district, Warangal district; Bihar; Delhi; Gujarat; Jammu and Kashmir; Karnataka; Madhya Pradesh; Maharashtra; Rajasthan; Sikkim; Uttar Pradesh; West Bengal.

*Elsewhere* : Afghanistan and Pakistan.

*Remarks* : Roosts were observed in the similar places as that of previous species. Remains very active even during the day time and with slight disturbances, all the individuals try to shift in further secluded parts or in crevices by sidewise movement on the wall.

Sinha (1986) found female in April in early stage of pregnancy. In the present series, three female were observed in very advanced stage of pregnancy, each carrying one foetus. Length of foetuses varied from 46-48.

Each specimen had thick fat deposition in the lower abdomen, thigh and interfemoral membrane.

Unlike the previous species, it makes shrill and loud sound like *Cynopterus sphinx* while taking out from the mist nets.

### 15. *Taphozous perforatus perforatus* Geoffroy

1818. *Taphozous perforatus* Geoffroy, *Descrip. de L'Egypte*, 2 : 126 (Kom Ombo, Egypt).

*Common name* : Tomb Bat (Eng.).

*Material examined* : Cuddapah district : 8 ♂, Siddavatam, 5-9.vi.1994.

*Measurements* : External : 8 ♂ : Fa 62.6-67.1 (64.7); Tl 24.0-32.2 (27.6); E 16.3-19.0 (18.1); Tb 23.0-25.5 (24.0); F&cl 13.0-13.8 (13.5). Cranial : 4 ♂ : l 21.3-22.1 (21.6); cw 9.8-10.2 (10.0); iw 4.6-5.5 (5.0); zw 12.4-12.7 (12.6);  $m^3-m^3$  8.7-8.9 (8.8);  $c^1-c^1$  3.7-4.0 (3.8); mtr 8.8-9.0 (8.9).

*Diagnosis* : Gular sac moderately developed in males but rudimentary in females. Tail tip pointed. Tragus hammer-shaped and its distal margin not wavy. Calcar weak.

**Distribution** : India, Andhra Pradesh : Adilabad district, Cuddapah district, Guntur district, Karimnagar district, Kurnool district, Mahbubnagar district, Nalgonda district, Prakasam district; Gujarat; Madhya Pradesh; Rajasthan.

**Elsewhere** : Egypt and Pakistan.

**Remarks** : Roosts were observed inside the cracks of the walls of the forts of Karimnagar and Siddavatam. Specimens could be collected from one roost of Siddavatam and all the specimens were male and in breeding condition with enlarged testes. Final emergence from the roosts takes place at least one hour after the sunset, but prior to final emergence few individuals come out of the roosts and move on the wall.

Moderate deposition of fat could be noted on the abdomen and interfemoral membrane of all the specimens.

Much individual variation of colour was marked in the present series from dark to grey and some individual have whitish bases to the dorsal and ventral hairs.

Specimens were collected from the cracks of the wall with the help of a long forceps and during collection no sound was made by this species.

Nagalu *et al.* (1998) considered it as uncommon in the State, but from our observation it appears that this species is fairly common but rather difficult to see or collect them. Nagalu *et al.* (1998) though recorded this species on the basis of observation, the present series constitutes the first collection of this species from Andhra Pradesh.

### Family MEGADERMATIDAE

The family Megadermatidae is represented in Andhra Pradesh by a single genus *Megaderma*.

#### Genus *Megaderma* Geoffroy, 1810

The genus *Megaderma* consists of two species, both of which occur in Andhra Pradesh.

#### Key to the species and subspecies of the genus *Megaderma*

- Posterior termination of nose-leaf rounded ..... *M. spasma spasma*
- Posterior termination of nose-leaf truncated ..... *M. lyra lyra*

#### 16. *Megaderma lyra lyra* Geoffroy

1810. *Megaderma lyra* Geoffroy, *Ann. Mag. nat. Hist. Paris.*, **15** : 190 (India, possibly Madras, Tamil Nadu, India).

**Common name** : Indian False Vampire (Eng.).

*Material examined* : Adilabad district : 4♂, 2♀, Chennur, 28,29.x.1996, Cuddapah district : 1♂ 1♀, Ballapalli, 19.20.vii.1929; 6♂, 4♀, Chintaranjanpalli, 28.vi.1930. Karimnagar district : 1♂, Jagtial, 3.xi.1996. Krishna district : 3♂, Kaikalur, 19.vi.1996. Kurnool district : 1♂, Diguvametta, 26.vi.1930. Medak district : 2♀, Narshapur, 11.xii.1993. Nizamabad district : 1♂, Mallaram, 6.xi.1996. Rangareddy district : 2♂, 13♀, Anantagiri, 6.xii.1993. Visakhapatnam district : 1♂, 1♀, Borra Guhalu, 6.7.iii.1983; 1♀, Lankapakalu, 14.iii.1985. West Godavari district : 1♂, Koraturu, 15.iv.1996.

*Measurements* : External : 5♂: Fa 61.7-66.0 (64.0); E 35.5-38.2 (37.0); Tr 14.5-17.2 (16.0); Tb 29.5-33.6 (31.7); F&cl 15.3-19.7 (17.6). 12♀: Fa 57.1-70.1 (66.0); E 35.0-40.4 (37.8); Tr 14.5-15.1 (14.7); Tb 31.9-36.6 (33.9); F&cl 16.0-20.9 (17.7). Cranial : 5♂: *l* 27.2-28.3 (27.7); *cw* 11.5-12.3 (12.0); *iw* 4.4-4.9 (4.7); *zw* 16.3-16.6 (16.4); *c*<sup>1</sup>-*c*<sup>1</sup> 4.4-5.7 (5.3); *m*<sup>3</sup>-*m*<sup>3</sup> 9.4-10.2 (9.9); *mtr* 10.7-11.3 (11.0). 5♀: *l* 28.3-28.7 (28.5); *cw* 10.9-12.3 (12.0); *iw* 4.1-4.8 (4.5); *zw* 14.2-14.7 (16.0); *c*<sup>1</sup>-*c*<sup>1</sup> 4.9-5.7 (5.4); *m*<sup>3</sup>-*m*<sup>3</sup> 8.3-10.2 (9.7); *mtr* 9.6-11.3 (10.8).

*Diagnosis* : Medium-sized, forearm usually above 60; ear, nose leaf and tragus very large; without externally visible tail; ears conjoined for nearly half the length of inner margin; tragus bifid, posterior portion long, narrow and acutely pointed; posterior termination of noseleaf truncated; Dorsum slaty grey, venter paler to dirty white.

*Distribution* : India : Andhra Pradesh : Throughout the State; from Jammu and Kashmir to Kanya Kumari and from Gujarat to the extreme east.

*Elsewhere* : Afghanistan, Bangladesh, Nepal, Pakistan and Sri Lanka.

*Remarks* : Very common. Roosts were found in ruins and deserted rooms, as well as regularly used semi dark garrage, godowns, cowsheds, huts, and various other places. At Karimnagar, it was found roosting in the same room along with *Hipposideros lakadiva*.

### 17. *Megaderma spasma spasma* (Linnaeus)

1758. *Vespertilio spasma* Linnaeus, *Syst. Nat.*, 10th ed., 1 : 32 (Ternate, Molucca, Indonesia).

*Common name* : Malay False Vampire (Eng.).

*Material examined* : Kurnool district : 7♂, 6♀, Malakondapenta, 9-13.v.1930.

*Measurements* : External : 1♂: Fa 58.8; E 37.0; Tr-; Tb 33.4; F&cl 15.3. 1♀: Fa 60.7; E 37.0; Tr 17.2; Tb 33.7; F&cl 16.0. Cranial : 1♂: *l* 26.0; *cw* 10.6; *iw* 3.9; *zw* 14.3; *c*<sup>1</sup>-*c*<sup>1</sup> 5.0; *m*<sup>3</sup>-*m*<sup>3</sup> 8.2; *mtr* 9.9.

*Diagnosis* : Very similar to the previous species, but slightly smaller, forearm on average less than 60. Posterior termination of noseleaf rounded.

*Distribution* : India : Andhra Pradesh : Adilabad district, Guntur district, Karimnagar district, Kurnool district, Mahbubnagar district, Nalgonda district, Prakasam district, Warangal

district; Andaman and Nicobar Islands; Assam; Goa; Karnataka; Kerala; Tamil Nadu; West Bengal.

*Elsewhere* : Indonesia, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam and various adjacent small islands.

*Remarks* : Appears to be uncommon and during the recent surveys no material could be collected.

### Family RHINOLOPHIDAE

This family is represented by two genera in Andhra Pradesh.

#### Key to the genera of the family RHINOLOPHIDAE

1. Nose-leaf square in outline, posterior portion takes the shape of a flattened disc. Two premolars in the lower jaw ..... *Hipposideros*
2. Nose-leaf circular or horse-shoe shaped, posterior portion narrows into a thin pointed appendage-lancet. Three premolars in the lower jaw ..... *Rhinolophus*

#### Genus *Rhinolophus* Lacepede, 1799

Genus *Rhinolophus* is represented by three species in Andhra Pradesh.

#### Key to the species and subspecies of the genus *Rhinolophus*

1. Frontal sac present ..... *R. luctus perniger*
- Frontal sac absent ..... 2
2. Connecting process level with top of sella forming a shallow notch between them ..... *R. rouxi rouxi*
- Connecting process higher than top of sella forming a deep notch between them ..... *R. lepidus lepidus*

#### 18. *Rhinolophus lepidus lepidus* Blyth

1844. *Rhinolophus lepidus* Blyth, *J. Asiat. Soc. Beng.*, **13** : 486 (Calcutta, West Bengal, India).

*Common name* : Blyth's Horse-shoe Bat (Eng.).

*Material examined* : Visakhapatnam district : 4♂ 6♀ Borra Guhalu, 4-9.iii.1983; 1♀ Jyothimamidi, 21.ii.1985; 2♂, Wangasara, 6, 11.iii.1985. West Godavari district : 4♀ Koraturu, 12.iv.1996.

*Measurements* : External : 6♂: Fa 40.4-42.2 (41.3); TI 17.9-25.0(21.4); E 16.3-18.8

(17.1); Tb 16.0-17.6 (16.9); F&cl 6.8-8.3 (7.4). 7 ♀: Fa 40.0-43.6 (41.7); Tl 20.0-24.7 (21.6); E 15.5-19.0 (17.5); Tb 16.0-17.5 (16.7); F&cl 6.9-8.3 (7.4). Cranial : 3 ♂: *l* 15.9, 16.3, 16.8; *cw* 6.6, 6.8, 7.0; *iw* 1.9, 2.1, 2.3; *zw* 8.0, 8.1, 8.1; *c<sup>1</sup>-c<sup>1</sup>* 3.8, 3.8, 3.8; *m<sup>3</sup>-m<sup>3</sup>* 5.9, 6.2, 6.1; *mtr* 6.3, 6.3, 6.3. 4 ♀: *l* 16.4-17.0 (16.6); *cw* 6.5-7.1 (6.8); *iw* 2.0-2.3 (2.1); *zw* 7.9-8.2 (8.1); *c<sup>1</sup>-c<sup>1</sup>* 3.7-3.9 (3.8); *m<sup>3</sup>-m<sup>3</sup>* 6.0-6.2 (6.1); *mtr* 6.1-6.6 (6.3).

*Diagnosis* : Forearm over 40; horizontal base of sella arched and equal in width to vertical part; connecting process triangular in lateral view. Tibia on average over 16.5.

*Distribution* : India : Andhra Pradesh : Visakhapatnam district, West Godavari district; Bihar; Delhi; Karnataka; Kerala; Madhya Pradesh; Maharashtra; Meghalaya; Mizoram; Orissa; Rajasthan; Tamil Nadu; Uttar Pradesh; West Bengal.

*Elsewhere* : Bangladesh and Nepal.

*Remarks* : Appears to be very rare in the State. Das (1986) recorded this species for the first time from Visakhapatnam district. Specimens from West Godavari extends its range further south in the State.

### 19. *Rhinolophus luctus perniger* Hodgson

1843. *Rhinolophus perniger* Hodgson, *J. Asiat. Soc. Beng.*, **12** : 414 (Nepal).

*Common name* : Great Eastern Horse-shoe Bat (Eng.).

*Material examined* : Visakhapatnam district : 1 ♂, Lankapakalu, 14.iii.1985.

*Measurements* : External : 1 ♂ : Fa 67.5; Tl 43.8; E 33.0; Tb 37.2; F&cl 18.3. Cranial : 1 ♂ *l* 29.1; *cw* 12.0; *iw* 3.0; *zw* 15.0; *c<sup>1</sup>-c<sup>1</sup>* 12.1; *m<sup>3</sup>-m<sup>3</sup>* 10.5; *mtr* 11.5.

*Diagnosis* : Largest of Indian Horse-shoe Bat, forearm up to 78. Fur dense, woolly, basally blackish; frontal sac present. Sella with lateral projecting lappets at its base, narrowed above, more wedge-like; tip of upper incisors convergent.

*Distribution* : India : Andhra Pradesh : Visakhapatnam district; Assam; Madhya Pradesh; Meghalaya; Nagaland; Sikkim; Uttar Pradesh; West Bengal.

*Elsewhere* : Myanmar, Nepal, Thailand.

*Remarks* : Appears to be not very common. Present specimen constitutes its first record from Andhra Pradesh.

### 20. *Rhinolophus rouxi rouxi* Temminck

1835. *Rhinolophus rouxi* Temminck, *Monogr. Mamm.*, **2** : 306 (Pondicherry/Calcutta, West Bengal, India).

*Common name* : Rufous Horse-shoe Bat (Eng.).

*Material examined* : Cuddapah district : 1 ♂, 2 ♀, Koduru, 26.vii.1929. Visakhapatnam

district : 3♂, 2♀, Anantagiri, 21.iii.1985; 4♂, 9♀, Jyothimamidi, 21.ii.1985; 4♀ Lankapakalu, 16, 17.iii.1985. West Godavari district : 5♀, Koraturu, 12,16.iv.1996.

*Measurements* : External : 7♂: Fa 49.3-51.3 (50.2); Tl 22.6-29.3 (25.3); E 18.3-20.0 (18.8); Tb 22.3-24.0 (23.2); F&cl 10.6-12.0 (11.3) 15♀: Fa 48.4-52.3 (50.1); Tl 25.0-30.6 (26.6); E 17.2-20.3 (18.9); Tb 22.1-29.0 (23.6); F&cl 10.5-12.0 (11.4). Cranial : 5♂ l 21.2-22.9 (22.1); cw 9.0-10.0 (9.4); iw 2.4-2.6 (2.5); zw 11.3-12.0 (11.6); c<sup>1</sup>-c<sup>1</sup> 5.2-6.0 (5.6); m<sup>1</sup>-m<sup>3</sup> 8.2-8.7 (8.5); mtr 9.1-9.5 (9.3). 5♀: l 21.0-22.7 (21.8); cw 8.8-9.5 (9.1); iw 2.3-2.8 (2.5); zw 11.0-11.3 (11.2); c<sup>1</sup>-c<sup>1</sup> 5.3-5.6 (5.4); m<sup>1</sup>-m<sup>3</sup> 8.1-8.7 (8.4); mtr 8.5-8.8 (8.7).

*Diagnosis* : Forearm around 50; colour varies from brown to orange yellow. Sella parallel-sided, margin of horizontal base of sella straight.

*Distribution* : India : Andhra Pradesh : Adilabad district, Anantapur district, Chittoor district, Cuddapah district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Nizamabad district, Prakasam district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; Arunachal Pradesh; Goa; Himachal Pradesh; Karnataka; Kerala; Madhya Pradesh; Maharashtra; Mizoram; Orissa; Pondicherry; Tamil Nadu; Uttar Pradesh; West Bengal.

*Elsewhere* : Myanmar, Nepal and Sri Lanka.

*Remarks* : Fairly common. Roosts were observed in the deserted part of dilapidated buildings, rock crevices, tunnels, caves, *etc.* It has been observed that a single colony of about 200-500 animals roost in a number of groups of 20 to 50 individuals within a deserted, dark room.

All the females collected during April were pregnant, each containing a single foetus in a medium stage of development.

### Genus *Hipposideros* Gray, 1831

Three species of the genus *Hipposideros* occur in Andhra Pradesh.

#### Key to the species of the genus *Hipposideros*

1. No supplementary leaflet present on each side of the horseshoe .....  
..... *H. fulvus pallidus*
- Supplementary leaflets present on each side of the horseshoe ..... 2
2. Four supplementary leaflets on each side; forearm length about 90 .....  
..... *H. lankadiva*
- Three supplementary leaflets on each side; forearm length about 50 .....  
..... *H. speoris speoris*

### 21. *Hipposideros fulvus pallidus* Andersen

1918. *Hipposideros fulvus pallidus* Anderson, *Ann. Mag. Nat. Hist.*, Ser 9, 2 : 381 (Junagadh, Gujarat, India).

*Common name* : Fulvous Leaf-nosed Bat (Eng.).

*Material examined* : Mahbubnagar district : 1 ♀, Nagarjunasagar, 12.ix.1962.

*Measurements* : External : 1 ♀ : Fa 40.1

*Diagnosis* : Ears very large, larger than head; rounded, and outer margin straight, when laid forward extend to muzzle. Dorsum full brown, ventral creamy. Vomer blade like.

*Distribution* : India : Andhra Pradesh : Adilabad district, East Godavari district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Nizamabad district, Prakasam district, Rangareddy district; West Godavari district; Bihar; Gujarat; Madhya Pradesh.

*Elsewhere* : Afghanistan and Pakistan.

*Remarks* : Rare, no specimen or roost could be observed during the recent surveys.

### 22. *Hipposideros lankadiva* Kelaart

1850. *Hipposideros lankadiva* Kelaart, *J. Sri Lanka Branch Asiat. Soc.*, 2 (2) : 216 (Kandy, Sri Lanka)

*Common name* : Sri Lanka Gigantic Leaf-nosed Bat or Kelaart's Leaf-nosed Bat (Eng.).

*Material examined* : Adilabad district : 2 ♀, Chennur, 29.x.1996. Cuddapah district : 1 ♂ 1 ♀ Chintaranjanpalli, 9, 10.iv.1930; 2 ♂, Palkonda, 9.vi.1930. Karimnagar district : 5 ♂ 4 ♀, Jagtial, 2,3.xi.1996. Kurnool district : 5 ♀, 1 ♀, Diguva metta, 26.iv.1930. Visakhapatnam district : 13 ♂, 1 ♀, Borra Guhalu, 6-9.iii.1983; 1 ♂, 1 ♀, Lankapakalu, 12.iii.1985.

*Measurements* : External : 15 ♀ : Fa 81.6-91.0 (87.5); Tl 38.4-52.5 (45.8); E 24.2-28.7 (26.4); Tb 32.4-36.1 (34.4); F&cl 15.7-17.7 (16.9). 6 ♀ : Fa 81.6-88.8 (86.2); Tl 44.0-53.0 (46.4); E 24.0-28.0 (26.1); Tb 30.4-34.8 (33.4); F&cl 15.8-17.3 (16.8). Cranial : 13 ♀, l 31.0-32.2 (31.4); cw 12.1-13.0 (12.6); iw 3.4-4.0 (3.7); zw 18.1-19.1 (18.5); c<sup>1</sup>-c<sup>1</sup> 8.0-8.8 (8.4); m<sup>3</sup>-m<sup>3</sup> 12.5-12.7 (12.6); mtr 13.2-13.9 (13.6). 2 ♀ : l 31.4, -32.0; cw 13.0, -; iw 3.6, 3.6; zw 17.1, 17.2; c<sup>1</sup>-c<sup>1</sup> 8.1, -; m<sup>3</sup>-m<sup>3</sup> 12.6,-; mtr 13.1, 13.5.

*Diagnosis* : Ears broad at base, large, acutely pointed with posterior margin slightly concave behind the tip. Fourth lateral supplementary leaflet of noseleaf reduced or absent. skull large and without frontal depression; maxillary toothrow exceeding 12.0.

*Distribution* : India : Andhra Pradesh : Adilabad district, Chittoor district, Cuddapah district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Medak district, Nalgonda district, Nizamabad district, Prakasam district, Visakhapatnam

district, Warangal district; Karnataka; Madhya Pradesh; Maharashtra; Manipur; Meghalaya; Mizoram; Orissa; West Bengal.

*Elsewhere* : Sri Lanka.

*Remarks* : Very common. Large roosts of several hundreds animals were observed in the extremely dark, interconnected chambers and tunnels of a deserted fort at Jagtial. These roosts are reported to be permanent and hence deep deposits of their faecal matters were found on the floors. Various other microchiropteran species such as *Hipposideros speoris* (Schneider) are found roosting in the same chambers.

Emergence started almost immediately after the sun set during November and continued for about next one and half hour. Specimens were netted during the emergence time and also at different hours of the night and it appeared that they frequently visit the roost at night.

Inguinal region of all the specimens are haired and with thick deposition of fat.

None of the females were in breeding condition.

Faecal matter revealed remains of Wall Lizard, Mouse and various insects.

Ellerman & Morrison-Scott (1951) recognised three subspecies of *H. lankadiva* from Indian region, viz. *H.L. indus* Andersen, *H.l. mixtus* Andersen and *H.l. unitus* Andersen. Hill (1963) though maintained all the three subspecies but opined that *indus* and *mixtus* may prove to be synonyms. Brosset (1962 b) did not consider the variation in the colour of the present species as zoogeographically related and considered it as monotypic. Das *et al.* (1995) opined that a detailed study of specimens from the different geographical region is needed to review the status of the different subspecies.

### 23. *Hipposideros speoris speoris* (Schneider)

1800. *Vespertilio speoris* Schneider, In Schneider, *Die Säugethiere*, pl 596 (Tranquebar, Tamil Nadu, India).

*Common name* : Schneider's Leaf-nosed Bat (Eng.).

*Material examined* : Cuddapah district : 8♂, 4♀ Chintaranjan palli, 3-5.vi.1930; 5♂ 4♀, Konduru,—vii.1929; 1♂, 3♀, Rajampetta, 5.ix.1929. Hyderabad district : 2♂ Dumapally, 14.xii.1993.

*Measurements* : External : 2♂: Fa 51.4, 52.0; Tl 26.7-26.6; E 12.8, 14.5; Tb 22.4, 23.5; F&cl 9.9, -. Cranial : 2♂, l 19.2, 19.2; ccl 15.5, 15.8; cw 8.1, 8.1; iw 3.0, 3.0; zw 10.4, 10.7; c<sup>1</sup>-c<sup>1</sup> 4.3, 4.6; m<sup>3</sup>-m<sup>3</sup> 7.2, 7.4; mtr 6.8, 7.0.

*Diagnosis* : Posterior margin of ear slightly concave behind the tip and have a small projecting process at the antitragal lobe. Posterior noseleaf supported by three septa and its upper edge semicircular. Frontal sac in males. Vomer not projecting beyond the edge of the palate.

*Distribution* : India : Andhra Pradesh : Adilabad district, Anantapur district, Chittoor district, Cuddapah district, East Godavari district, Guntur district, Hyderabad district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Nizamabad district, Prakasam district, West Godavari district, Warangal district; Karnataka; Orissa; Tamil Nadu.

*Elsewhere* : Sri Lanka.

*Remarks* : Not very common. Roost of six animals was observed in the ceiling of a deserted building at Dumapally. Both the males collected during December have moderate deposition of fat in the inguinal region.

Based on size two subspecies viz. *H. s. speoris* and *H. s. pulchellus* Andersen have been recognised which according to Corbet and Hill (1992) is very weakly defined.

### Family VESPERTILIONIDAE

Four subfamilies of the family Vespertilionidae occur in Andhra Pradesh.

#### Key to the subfamilies of the family VESPERTILIONIDAE

1. Nostrils laterally elongated and tubular ..... MURININAE
- Nostrils not elongated ..... 2
2. Ears funnel-shaped ..... KERIVOULINAE
- Ears not funnel-shaped ..... 3
3. Second phalanx of third finger elongated, three times as long as first .....  
..... MINIOPTERINAE
- Second phalanx of third finger not elongated ..... VESPERTILIONINAE

#### Subfamily KERIVOULINAE

Subfamily Kerivoulinae is represented in Andhra Pradesh by a single genus *Kerivoula*.

Genus *Kerivoula* Gray. 1842

Only one species and subspecies of the genus *Kerivoula* occur in Andhra Pradesh.

#### 24. *Kerivoula picta picta* (Pallas)

1767. *Vespertilio picta* Pallas, *Spicil. Zool.* 3:7 (Ternate Island, Molucca Island, Indonesia).

*Common name* : Painted Bat (Eng.).

*Material examined* : Nil

*Diagnosis* : Forearm around 35. Ears large, bluntly pointed and of bright orange colour; posterior margin with shallow concavity below tip; tragus long and slender; fur soft, silky; dorsum light orange, ventral slightly paler, wing membrane orange coloured with prominent black markings between fingers. A distinct fringe of short, white hairs along posterior margin of inter-femoral membrane.

*Distribution* : India, : Andhra Pradesh : Adilabad district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Prakasam district, Warangal district; Assam; Bihar; Goa; Karnataka; Maharashtra; Orissa; Rajasthan; Sikkim; Tamil Nadu; West Bengal.

*Elsewhere* : Bangladesh, Indonesia, Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam.

*Remarks* : Rare and no specimen or roost could be observed during the recent surveys. Nagalu *et al.* (1998) recorded this species from the Eastern Ghats region of the State.

#### Subfamily VESPERTILIONINAE

Subfamily Vespertilioninae is represented in Andhra Pradesh by four genera.

#### Key to the genera of the subfamily VESPERTILIONINAE

1. Cheek-teeth six on each side of upper and lower jaw ..... *Myotis*  
– Cheek-teeth less than six on each side of upper and lower jaw ..... 2
2. Upper premolars 2-2 ..... *Pipistrellus*  
– Upper premolars 1-1 ..... 3
3. Upper incisors 2-2, outer incisor large, crowded inward between inner incisor and canine ..... *Hesperoptenus*  
– Upper incisors 1-1, first and second upper molar with 'W' pattern distorted or nearly absent ..... *Scotophilus*

#### Genus *Hesperoptenus* Pcters, 1868

The genus *Hesperoptenus* is represented by a single species in Andhra Pradesh.

#### 25. *Hesperoptenus tickelli* (Blyth)

1852. *Nycticejus tickelli* Blyth, *J. Asiat. Soc. Beng.*, **20** : 157 (Chaibasa, Bihar, India).

*Common name* : Tickell's Bat (Eng.).

*Material examined* : Nil

**Diagnosis** : A rather large-sized bat, forearm about 60; colour golden yellow, head greyish, wing membrane blackish. Ears oval. Wings from the base of toes. Small pad under thumb. Second upper incisors small and placed at base of first.

**Distribution** : India : Andhra Pradesh : Adilabad district, Guntoor district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Prakasam district, Warangal district; Andaman Island; Bihar; Karnataka; Madhya Pradesh; Maharashtra; Orissa; Rajasthan; Tamil Nadu; West Bengal.

**Elsewhere** : Bangladesh, China, Myanmar, Nepal, Thailand.

**Remarks** : Rare and could not be observed during the recent surveys. Nagalu *et al* (1998) recorded this species from the state.

### Genus *Myotis* Kaup, 1829

Only one species of the genus is known from Andhra Pradesh

#### 26. *Myotis montivagus peytoni* Wroughton & Ryley

1913. *Myotis peytoni* Wroughton & Ryley, *J. Bombay nat. Hist. Soc.*, 22 : 13 (Gersoppa Falls, Karnataka, India).

**Common name** : Burmese whiskered Bat (Eng.).

**Material examined** : Visakhapatnam district : 1 ♂, Anantagiri, 21.iii.1985; 1 ♀ Lankapakalu, 14.iii.1985.

**Measurements** : External : 1 ♂ : Fa 43.4; Tl 46.5; E 15.6; Tr 7.4; Tb 19.0; F&cl 7.8. 1 ♀ : Fa 42.5; Tl 48.2; E 14.2; Tr 5.3; Tb 18.6; F&cl 9.6. Cranial : 1 ♂ : l 16.9; cw 7.9; iw 3.9; zw 11.6; c<sup>1</sup>-c<sup>1</sup> 4.5; m<sup>3</sup>-m<sup>3</sup> 7.3; mtr 6.7. 1 ♀ : l 16.2; cw 7.3; iw 3.9; zw—; c<sup>1</sup>-c<sup>1</sup> 4.7; m<sup>3</sup>-m<sup>3</sup> 7.3; mtr 6.7.

**Diagnosis** : Medium-sized, forearm 38-47; inner margin of ear closely approximated, joined over forehead by a band of integument; nostrils opening on the upper surface of nose. Anteorbital foramen widely separated from anterior rims of orbit.

**Distribution** : India : Andhra Pradesh : Visakhapatnam district; Karnataka.

**Remarks** : Very rare. The species was first recorded by Ghosh (1989) from Andhra Pradesh on the basis of the present specimens.

### Genus *Pipistrellus* Kaup, 1829

Four species and subspecies of the genus *Pipistrellus* occur in Andhra Pradesh.

#### Key to the species and subspecies of the genus *Pipistrellus*

1 Outer upper incisor not extending beyond cingulum of inner.....*P. dormeri*

- Outer upper incisor extending distinctly beyond cingulum of inner ..... 2
- 2. Size larger (forearm 38.0 mm or more) ..... *P. ceylonicus indicus*
- Size smaller (forearm less than 38.0 mm) ..... 3
- 3. Forearm more than 30.0 mm ..... *P. coromandra coromandra*
- Forearm less than 29.0 mm ..... *P. mimus*

### 27. *Pipistrellus ceylonicus indicus* (Dobson)

1878. *Vesperugo indicus* Dobson, *Cat. Chiroptera Brit. Mus.*, 222 (Mangalore, Malabar Coast, Kerala, India).

*Common name* : Kelaart's Pipistrelle (Eng.).

*Material examined* : Mahbubnagar district : 2♂ 1♀ Mahbubnagar, 9.iv.1980; 1♀ Mannanur, 14.ii.1979. Visakhapatnam district : 1♂, 3♀, Borra Guhalu, 9.iii.1983. Warangal district : 1♀, Mulug, 21.ii.1979; 1♂, Warangal,—.

*Measurements* : External : 5♂: Fa 33.9-39.5 (36.9); Tl 33.3-39.2 (35.5); E 8.4-12.2 (10.7); Tb 14.1-15.7 (14.7); F&cl 7.5-9.3 (8.6). 5♀: Fa 29.5-41.2 (37.6); Tl 29.2-45.7 (36.8); E 8.8-15.2 (11.5); Tb 12.1-16.4 (14.6); F&cl 6.4-9.1 (8.4). Cranial : 2♂: l 14.6, 15.3; cw 7.1, 7.4; iw 3.9, 4.2; zw-, -; c<sup>1</sup>-c<sup>1</sup> 3.7, 5.0; m<sup>3</sup>-m<sup>3</sup> 6.5, 6.8; mtr 5.6, 5.7. 4♂: l 15.0-16.4 (15.4); cw 7.0-7.8 (7.4); iw 3.9-4.2 (4.0); zw 10.0-11.4 (10.5); c<sup>1</sup>-c<sup>1</sup> 4.4-5.6 (4.9); m<sup>3</sup>-m<sup>3</sup> 6.8-7.3 (7.0); mtr 5.5-6.0 (5.7).

*Diagnosis* : Large pipistrelle, forearm reaching nearly 40. Ear short and triangular, outer margin straight; tragus with straight inner end, outer margin convex and a triangular lobe at base. Wing from base of toes. Post-calcarial lobe semicircular. Dorsum brown, reddish brown or greyish brown, venter paler.

*Distribution* : India : Andhra Pradesh : Adilabad district, East Godavari district, Guntur district, Hyderabad district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Medak district, Nalgonda district, Nizamabad district, Prakasam district, Rangareddy district, Visakhapatnam district, Warangal district, West Godavari district; Bihar; Gujarat; Karnataka; Kerala; Madhya Pradesh; Maharashtra; Orissa; Rajasthan; Tamil Nadu; Uttar Pradesh; West Bengal.

*Elsewhere* : Bangladesh, Pakistan.

*Remarks* : Common. Roosts of single as well as more animals were observed in narrow gaps and crevices of walls, ceilings, signboards, bamboo poles, trees and many other places even among the very busy areas. No sign of pregnancy was observed in the females collected during February to April.

### 28. *Pipistrellus coromandra coromandra* (Gray)

1838. *Scotophilus coromandra* Gray, *Mag. Zool. Bot.*, 2 : 498 (Pondicherry, India).

*Common name* : Indian Pipistrelle (Eng.).

*Material examined* : Cuddapah district : 2♂, 7♀, Ballapalli, 1-17.vii.1929; 1-18.viii.1929. Kurnool district : 2♀, Diguvametta, 16, 22.iv.1930. Visakhapatnam district : 1♀, Lankapakalu, 12.iii.1985.

*Measurements* : External : 1♂ : Fa 32.9; Tl 29.0; E 11.0; Tb—; F&cl—. 4♀ : Fa 31.0-35.0 (33.4); Tl 31.5-34.0 (33.1); E 12.0-13.0 (12.0); Tb 10.6-13.6 (12.2); F&cl 6.1-7.5 (6.8). Cranial : 1♂ : l 14.2; cw 7.2; iw 4.0; zw—; c<sup>1</sup>-c<sup>1</sup> 4.5; m<sup>3</sup>-m<sup>3</sup> 6.2; mtr 5.1. 3♀ : l 12.5, 13.7, 14.5; cw 6.1, 6.9, 7.4; iw 3.3, 3.8, 4.3; zw 9.6, -, -; c<sup>1</sup>-c<sup>1</sup> 3.6, 4.2, 4.6; m<sup>3</sup>-m<sup>3</sup> 5.1, 6.0, 6.5; mtr 4.4, 5.0, 5.4.

*Diagnosis* : Small-sized pipistrelle, forearm around 31; tragus forward curving and bluntly rounded; a small calcarial lobe present. Dorsal fur blackish brown with slightly rufescent tips, belly little paler.

*Distribution* : India : Andhra Pradesh : Adilabad district, Anantapur district, Cuddapah district, East Godavari district, Guntur district, Hyderabad district, Khammam district, Karimnagar district, Kurnool district, Mahbubnagar district, Medak district, Nalgonda district, Nellore district, Nizamabad district, Prakasam district, Rangareddy district, Visakhapatnam district, Warangal district, West Godavari district; widely distributed almost throughout the country.

*Elsewhere* : Afghanistan, Nepal, Pakistan, Sri Lanka.

*Remarks* : Very common. Roosts were found in holes, crevices, between logs, ventilator, ceilings, godowns and many other places even in the busy areas. It has been observed to emerge little before sunset and fly for certain period over some water bodies.

### 29. *Pipistrellus dormeri* (Dobson)

1875. *Scotozous dormeri* Dobson, *Proc. zool. Soc. Lond.*, : 373 (Bellary hills, Bellary district, Karnataka, India).

*Common name* : Dormer's Bat (Eng.).

*Material examined* : Nil.

*Diagnosis* : Medium sized, forearm 34 on average; Ear with rounded tip, margin below tip nearly straight; tragus pointed with a small lobe at base. Second upper incisor very small, not extending beyond cingulum of inner incisor. Dorsal fur dark brown with ashy tip; ventral fur whitish or lemon yellow.

*Distribution* : India : Andhra Pradesh : Adilabad district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Prakasam district, Warangal district; widely distributed in the country from Jammu and Kashmir in the north to at least Karnataka in the south and West Bengal in the east.

*Elsewhere* : Pakistan and possibly Taiwan.

*Remarks* : Rare and could not be observed during the recent surveys. Nagalu *et al.* (1998) recorded this species from the State.

### 30. *Pipistrellus mimus* Wroughton

1899. *Pipistrellus mimus* Wroughton, *J. Bombay nat. Hist. Soc.*, 12 : 722 (Maheshkatri, Dangs district, Gujarat, India).

*Common name* : Indian Pygmy Pipistrelle (Eng.).

*Material examined* : Cuddapah district : 5 ♀, Koduru, 26-29.vii.1929; 2 ♀ Rajampeta, 29.vii.1929, 2.ix.1929. East Godavari district : 1 ♀, Addathigala, 5.iv.1996. Krishna district : 1 ♂, Kaikaluru, 18.iv.1996. Cuddapah district : 1 ♂, 2 ♀, Palkonda Hills, 2.vi.1930, 22-23.vii.1930. Visakhapatnam district : 1 ♂, Jyothimamidi, 21.ii.1985. West Godavari district : 1 ♀, Koraturu, 12.iv.1996.

*Measurements* : External : 3 ♂ : Fa 25.9-27.0, 28.5; Tl 27.0, 30.5, 33.7; E 10.0, 10.6, 11.0; Tb 10.5, 11.6, 13.0; F&cl 5.6, 6.0, 6.3. 1 ♀ : Fa 25.7-28.4 (27.4); Tl 27.0-33.1 (30.0); E 9.0-11.0 (10.7); Tb 9.3-14.7 (10.6); F&cl 4.9-6.1 (5.5). Cranial : 1 ♂ : l 11.7; cw 6.2; iw 3.6; zw 7.5; c<sup>1</sup>-c<sup>1</sup> 3.6; m<sup>3</sup>-m<sup>3</sup> 5.0; mtr 3.7.

*Diagnosis* : Smallest pipistrelle of Andhra Pradesh, forearm below 30; tragus short, curving forward; post calcarial lobe present; fur dense and short, dorsal hairs black at bases and bistre brown at tips; ventral a little lighter.

*Distribution* : India : Andhra Pradesh : Adilabad district, Anantapur district, Chittoor district, Cuddapah district, East Godavari district, Guntur district, Hyderabad district, Karimnagar district, Khammam district, Krishna district, Kurnool district, Mahbubnagar district, Medak district, Nalgonda district, Nizamabad district, Prakasam district, Rangreddy district, Visakhapatnam district, Warangal district, West Godavari district; widely distributed almost throughout the country.

*Elsewhere* : Afghanistan, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand and Vietnam.

*Remarks* : Very common. Roosts of single and also of many animals were observed in narrow gaps and crevices of walls, ceilings, signboards, bamboo poles, tree holes and even among the very busy areas. It has been observed to emerge a little before sunset.

### Genus *Scotophilus* Leach, 1821

The genus *Scotophilus* is represented in Andhra Pradesh by two species and subspecies.

**Key to the species and subspecies of the genus *Scotophilus***

- Size larger, forearm more than 55 ..... *S. heathi heathi*
- Size smaller, forearm less than 55 ..... *S. kuhli kuhli*

**31. *Scotophilus heathi heathi* (Horsfield)**

1831. *Nycticejus heathi* Horsfield, *Proc. zool. Soc. Lond.*, : 113 (Madras=Chennai, Tamil Nadu, India).

*Common name* : Greater Yellow Bat (Eng.).

*Material examined* : Nalgonda district : 3♂, 1♀, Bhongir. 9.xii.1993.

*Measurements* : External : 3♂ : Fa 60.5, 60.5, 61.0; Tl 53.5, 61.2, 60.7; E 16.0, 15.8, 15.9; Tb 21.1, 23.6, 25.1; F&cl 13.5, 12.2, 14.3. 1♀; Fa 62.0; Tl 64.7; E 15.7; Tb 24.4; F&cl 13.9.

*Diagnosis* : Fur short and sleek; dorsal colour olive to grey brown, venter lemon yellow to orange yellow; muzzle sparsely haired.

*Distribution* : India : Andhra Pradesh : Throughout the State; widely distributed all over the country.

*Elsewhere* : Afghanistan, Bangladesh, Myanmar, Nepal, Pakistan, Sri Lanka.

*Remarks* : Very common, Specimens were observed in all the districts. Lives in close association with human beings and roosts mainly in between roof and false ceiling or in the cracks of wall. Roost of 20-25 animals was observed in a school building at Kaikaluru.

**32. *Scotophilus kuhli kuhli* Leach**

1822. *Scotophilus kuhli* Leach, *Trans. Linn. Soc. Lond.*, **13** : 72 (India, according to Hill & Thonglongya, 1972).

*Common name* : Lesser Yellow Bat (Eng.).

*Material examined* : Kurnool district : 2♂, Kotalacharu, 15 Km W of Makur, 21.v.1995.

*Measurements* : External : 2♂ : Fa 50.0, 50.8; Tl 43.5, 48.5; E 12.5, 13.2; Tb 20.3, 21.0; F & cl 9.0, 9.7.

*Diagnosis* : Very similar to Greater Yellow Bat. but smaller; forearm below 54. Dorsal colour reddish or olive brown, ventral creamy white with a tinge of red.

*Distribution* : India : Andhra Pradesh : Kurnool district; widely distributed throughout India including Nicobar Island.

*Elsewhere* : Bangladesh, Myanmar, Pakistan and Sri Lanka.

*Remarks* : Not very common. No roost or animals were observed in different districts of

the State excepting the present collection. Prefer roosting in the dead leaves of Palmyra palms, ceilings and crevices in roof. Roosts may have animals of one sex only or of both sexes.

### Subfamily MURININAE

One genus of the subfamily Murininae occur in Andhra Pradesh.

#### Genus *Murina* Gray, 1842

Only one species and subspecies of the genus *Murina* is found in Andhra Pradesh.

#### 33. *Murina cyclotis cyclotis* Dobson

1872. *Murina cyclotis* Dobson, *Proc. Asiat. Soc. Beng.*, : 210 (Darjeeling, West Bengal, India).

*Common name* : Round-eared Tube-nosed Bat (Eng.).

*Material examined* : Visakhapatnam district : 1 ♂, 1 ♀ Wangasara. 6.7.iii.1985.

*Measurements* : External : 1 ♂ : Fa 31.6; Tl 37.0; E 14.6; Tb 16.6; F&cl 8.4. 1 ♀ : Fa 34.5; Tl 36.8; E 15.5; Tb 17.6; F&cl 7.8. Cranial : 1 ♂ : l 15.9; cw 7.5; iw 4.0; zw 9.3; c<sup>1</sup>-c<sup>1</sup> 3.6; m<sup>3</sup>-m<sup>3</sup> 5.4; mtr 5.1. 1 ♀ : l 16.6; cw 7.5; iw 4.1; zw—; c<sup>1</sup>-c<sup>1</sup> 4.3; m<sup>3</sup>-m<sup>3</sup> 5.5; mtr 5.6.

*Diagnosis* : Small bat, forearm around 30. Diverging tubular nostrils opening laterally; circular ear and long tragus; wing from tip of outer toe; dorsal colour warm rufous brown to ferruginous, ventral colour greyish white with a brownish tinge.

*Distribution* : India : Andhra Pradesh : Visakhapatnam district; Mizoram; Sikkim; West Bengal.

*Elsewhere* : China, Myanmar, Nepal, Philippines, Thailand, Vietnam.

*Remarks* : Very rare. Based on the present specimens Ghosh (1989) recorded the species from Andhra Pradesh.

### Subfamily MINIOPTERINAE

Subfamily Miniopterinae consists of the single genus *Miniopterus*.

#### Genus *Miniopterus* Bonaparte, 1837

One species and subspecies of the genus *Miniopterus* occur in Andhra Pradesh.

#### 34. *Miniopterus schreibersi fuliginosus* (Hodgson)

1835. *Vespertilio fuliginosa* Hodgson, *J. Asiat. Soc. Beng.*, 4 : 700 (Nepal).

*Common names* : Schreiber's Bat, Long-winged Bat (Eng.).

*Material examined* : Nil.

*Diagnosis* : Medium sized, forearm between 45 and 50; Head greatly elevated above face line; ears much shorter than head, inner margin much convex, outer margin emarginate opposite base of tragus; third finger or digit bent backwards when at rest, and second phalange of third digit being nearly three times the length of first or proximal phalange.

*Distribution* : India : Andhra Pradesh : Adilabad district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Prakasam district, Warangal district; Karnataka; Maharashtra; Meghalaya; Uttar Pradesh; West Bengal.

*Elsewhere* : Afghanistan, Myanmar, Nepal, ?Pakistan, Sri Lanka.

*Remarks* : Very rare and no specimens could be seen during the recent surveys. Nagalu *et al.* (1998) recorded this species from the State.

#### Family MOLOSSIDAE

Represented in Andhra Pradesh by a single genus.

Genus *Tadarida* Rafinesque, 1814

Two species of the genus *Tadarida* occur in Andhra Pradesh.

#### Key to the species and subspecies of the genus *Tadarida*

- Inner margin of ears have a common point of origin on the forehead; tragus broadened ..... *T. aegyptiaca*
- Ears joined on the muzzle by a narrow band of skin; tragus small and quadrate ..... *T. plicata plicata*

#### 35. *Tadarida aegyptiaca* (Geoffroy)

1818. *Nyctinomus aegyptiacus* Geoffroy, *Descrip. de L'Egypte*, 2 : 128 (Giza, Egypt).

*Common name* : Egyptian Free-tailed Bat (Eng.).

*Material examined* : Nil

*Diagnosis* : Medium sized, forearm about 47; ear large, rounded and separated on the rostrum; tragus large and broadened; upper lip heavily wrinkled. Parietal crest absent.

*Distribution* : India : Andhra Pradesh : Adilabad district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Prakasam district, Warangal district; Gujarat; Karnataka; Madhya Pradesh; Maharashtra; Rajasthan; West Bengal.

*Elsewhere* : Afghanistan, Pakistan, Sri Lanka. SW Asia and Africa.

*Remarks* : Nagalu *et al.* (1998) for the first time recorded this species from a number of sanctuaries of Andhra Pradesh, perhaps on the basis of sightings. Present authors could not observe the species in the State.

### 36. *Tadarida plicata plicata* (Buchanan)

1800. *Vespertilio plicatus* Buchanan, *Trans. Linn. Soc. London*, **5** : 261 (Bengal=West Bengal. India).

*Common name* : Wrinkle-lipped Bat (Eng.).

*Material examined* : Cuddapah district : 1 ♀ Siddavatam, 7.vi.1994.

*Measurements* : External : 1 ♀ : Fa 48.1; Tl 46.6; E 21.2; Tb 14.4; F&cl 10.4 Cranial : 1 ♀ : l 20.2; cw 9.9; iw 4.6; c<sup>1</sup>-c<sup>1</sup> 4.6; m<sup>3</sup>-m<sup>3</sup> 8.3; mtr 7.3.

*Diagnosis* : Medium sized, forearm around 48; ear large, rounded and joined on the muzzle by a narrow band of integument; tragus small and quadrate; upper lip thick overhanging the lower and pronounced by vertical wrinkles. Parietal crest low.

*Distribution* : India : Andhra Pradesh : Adilabad district, Cuddapah district, Warangal district; Madhya Pradesh; Meghalaya; Punjab; Rajasthan; Tamil Nadu; Uttar Pradesh; West Bengal.

*Elsewhere* : Cambodia, China, Indonesia, Malaysia, Singapore. Thailand. Vietnam.

*Remarks* : Rare. At Siddavatam specimen was entangled in the mist net at about 01.00 A.M.

Though this species has been recorded from Andhra Pradesh by Nagalu *et al.* (1998), but the specimen from Siddavatam is the first one collected from the State.

## Order PRIMATES

Arboreal. Limbs with five digits. Hands and feet prehensile. Complete bony rim around orbits. Complete set of collar bones. Brain complex, with great development of braincase. Reduced dentition. Facial region relatively small.

Represented in Andhra Pradesh by two families.

### Key to the families of the order PRIMATES

- All digits with nails ..... CERCOPITHECIDAE
- Second digit of hind limb with small claw ..... LORIDAE

## Family LORIDAE

One genus of the family Loridae occur in Andhra Pradesh.

Genus *Loris* Geoffroy, 1796

The genus *Loris* is represented by a single species in Andhra Pradesh.

37. *Loris tardigradus* (Linnaeus)

1758. *Lemur tardigradus* Linnacus, Syst. Nat. 10th ed., 1 : 29 (Sri Lanka).

*Common names* : Slender Loris (Eng.). Tevangu (Tam.)

*Material examined* : Nil

*Diagnosis* : Small, thin and lanky in appearance; limbs slender and longer; ears circled with black or dark brown; eyes close-set in a dark patch; fur short, soft and woolly; colour varies from grey to earthy brown; muzzle white.

*Distribution* : India : Andhra Pradesh : Chittoor district, Cuddapah district, Visakhapatnam district; Karnataka; Kerala; Tamil Nadu.

*Elsewhere* : Sri Lanka.

*Remarks* : Rare, Krishna Raju *et al.* (1987) reported the species only from Sri Venkateshwara Sanctuary of the State and its occurrence in other districts of Andhra Pradesh in doubtful. Nocturnal in habit and very shy, so it is difficult to locate. A single specimen was observed at Araku valley.

## Family CERCOPITHECIDAE

The family Cercopithecidae is represented in Andhra Pradesh by two genera.

**Key to the genera of the family CERCOPITHECIDAE**

- Face red, cheek pouches present, tail variable but generally smaller than head and body ..... *Macaca*
- Face black, cheek pouches absent, tail always longer than head and body ..... *Semnopithecus*

Genus *Macaca* Lacepede, 1799

Two species and subspecies of the genus *Macaca* occur in Andhra Pradesh.

**Key to the species and subspecies of the genus *Macaca***

- Crown hairs radiating, in all directions, from centre ..... *M. radiata radiata*
- Crown hairs not radiating from centre ..... *M. mulatta mulatta*

### 38. *Macaca mulatta mulatta* (Zimmermann)

1780. *Cercopithecus mulatta* Zimmermann, *Geogr. Gesch. Mensch.*, **2** : 195 (India).

*Common names* : Rhesus Macaque (Eng.). Bandar (Hin.), Kothi (Tel.).

*Material examined* : Nil

*Diagnosis* : Medium sized, with tail not more than half of head and body; Hair on head lying straight back. Face and other bare parts flesh-coloured or light pink; coat colour olive brown, becoming reddish or yellowish behind.

*Distribution* : India : Andhra Pradesh : Adilabad district, East Godavari district, Guntur district, Hyderabad district, Karimnagar district, Khammam district, Krishna district, Kurnool district, Mahbubnagar district, Medak district, Nalgonda district, Nizamabad district, Prakasam district, Rangareddy district, Srikakulam district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; Arunachal Pradesh; Assam; Bihar; Delhi; Gujarat; Himachal Pradesh; Jammu and Kashmir; Madhya Pradesh; Maharashtra; Meghalaya; Orissa; Punjab; Rajasthan; Sikkim; Tripura; Uttar Pradesh; West Bengal.

*Elsewhere* : Bangladesh, Bhutan, China, Myanmar, Thailand, Vietnam.

*Remarks* : Very common. Found in good number even in city areas. Forest dwelling animals are shy, but in the cities they are not at all afraid of human beings causing lot of nuisance.

### 39. *Macaca radiata radiata* (Geoffroy)

1812. *Cercocebus radiatus* Geoffroy. *Ann. Mus. Hist. Nat. Paris*, **19** : 98 (India, according to Hill 1974).

*Common names* : Bonnet Monkey (Eng.). Bandar (Hin.), Kothi (Tel.), Korungoo (Tam.).

*Material examined* : Nil.

*Diagnosis* : Not so large as Rhesus Monkey, with tail as long as head and body ; crown hairs dark, radiate in all directions from centre; coat colour varies seasonally. lustrous olive-brown during winter, harsh scraggy buffy grey during summer.

*Distribution* : India : Andhra Pradesh : Adilabad district, Anantapur district, Chittoor district, Cuddapah district, East Godavari district, Guntur district, Hyderabad district, Karimnagar district, Khammam district, Krishna district, Kurnool district, Mahbubnagar district, Medak district, Nalgonda district, Nizamabad district, Nellore district, Prakasam district, Rangareddy district, Warangal district; Goa; Gujarat; Karnataka; Kerala; Maharashtra; Tamil Nadu.

*Remarks* : Common. Animals are found to be very shy and confined in the forested tracts. At Addatigala of East Godavari district the animals were found to be afraid of Rhesus Macaque. In a fight between males, of the two monkeys, the male Rhesus Monkey dropped the Bonnet from the tree.

Genus *Semnopithecus* Desmarest, 1822

The genus *Semnopithecus* is represented by one species in the State.

40. *Semnopithecus entellus entellus* (Dufresne)

1797. *Simia entellus* Dufresne, *Bull. Soc. Philom. Paris*, 1(7): 49 (Bengal, India).

*Common names* : Langur (Eng.), Hanuman (Hin.), Anu pothu (Tel.), Korungoo (Tam.).

*Material examined* : Nil.

*Diagnosis* : Black-faced monkey, tail longer than head and body; whiskers short, partly covering ears; coat colour grey, or light sepia brown, paler on the shoulder, nape and crown; crown hairs radiating from a frontal whorl; hands and feet black or deep brown and strongly contrasted with that of arms and legs.

*Distribution* : India : Andhra Pradesh : Adilabad district, Anantapur district, Chittoor district, Cuddapah district, East Godavari district, Guntur district, Hyderabad district, Karimnagar district, Khammam district, Krishna district, Kurnool district, Mahbubnagar district, Medak district, Nalgonda district, Nellore district, Prakasam district, Sri Kakulum district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; Bihar; Delhi; Gujarat; Haryana; Madhya Pradesh; Orissa; Punjab; Rajasthan; Tamil Nadu; Uttar Pradesh; West Bengal.

*Elsewhere* : Bangladesh.

*Remarks* : Common. Found very much associated with human beings and regularly accept food from them. It is reported to cause serious damage to crops, plantation, orchards of the local villagers.

## Order CARNIVORA

Large conical canine with six closely set small incisors between them in both jaws; fourth upper premolar and first lower molar, with sharp-edged lobes and developed into carnassial (flesh-cutting) teeth.

Species belonging to seven families of the order Carnivora occur in Andhra Pradesh.

## Key to the families of the order CARNIVORA

- 1 Ethno-turbinals very large; covering the greater part of nasal chambers and extending anteriorly to the anterior orifice; auditory bulla composed of two bones; Cowper's gland absent ..... 2
- Ethno-turbinals excluded from the anterior orifice of nasal chamber by large maxillo-

- turbinals; auditory bulla composed of a single tympanic bone; Cowper's gland present ..... 5
- 2. Face flat, muzzle not slender; posterior palatal foramina set far back on the maxillo-palatine suture; teeth highly sectorial and reduced in number; dental formula 3/3, 1/1 3 or 2/3, 1/1; inter-ramal tuft of vibrissae absent ..... FELIDAE
  - Face pointed, muzzle slender; posterior palatal foramina located in front of the maxillo-palatine suture; teeth not so specialised or reduced in number, dental formula 3/3, 1/1 4/2 or 4/4, 2/2 or 1/1; inter-ramal tuft of vibrissae present ..... 3
- 3. Dog-like in appearance; hindfoot with four digits; auditory bulla without oblique groove; massive jaws and teeth ..... HYAENIDAE
  - Not dog-like in appearance; hindfoot with five digits; auditory bulla with distinct groove; jaws and teeth less massive ..... 4
- 4. Ears moderate in size, with well-developed bursa and simple supratragus, but devoid of valvular flap over it; feet compact, with short claws; anus not enclosed in a glandular sac. No bony tube to auditory orifice ..... VIVERRIDAE
  - Ears small and rounded, with vestigial bursa, valvular supratragus and a valvular flap over it; foot with free digits and fossorial claws; anus in centre of a glandular pouch. A well-developed bony tube to auditory orifice ..... HERPESTIDAE
- 5. Legs long, slender and digitigrade; small first digit of forefoot raised above the planter pad; hindfoot with four toes; baculum deeply channelled below ..... CANIDAE
  - Legs relatively short and thick; plantigrade or semiplantigrade; first digit in both feet present, close to the second and not raised above the plantar pad; baculum not deeply channelled below ..... 6
- 6. Large-sized, with relatively short tail; pads of digits forming weak curved line; planter pads very wide; three lower molars on each side ..... URSIDAE
  - Small-sized, with relatively long tail; pads of digits forming a strong curved line; two lower molar on each side ..... MUSTELIDAE

Family CANIDAE

Family CANIDAE is represented by three genera in Andhra Pradesh.

**Key to the genera of the family CANIDAE**

- 1. Tail more than half of head and body length : no frontal sinus; post orbital process concave above ..... *Vulpes*

- Tail less than half of head and body length; a frontal sinus present; post orbital process convex above ..... 2
- 2. Ear, almost rounded at tip; two molar teeth in lower jaws; nasal noticeably expanded at the posterior half ..... ***Cuon***
- Ear almost pointed at tip; three molar teeth in lower jaw; nasal not noticeably expanded at the posterior half ..... ***Canis***

### Genus *Canis* Linnaeus, 1758

Two species of the genus *Canis* occur in Andhra Pradesh.

#### Key to the species and subspecies of the genus *Canis*

- Large-sized, measuring 650-750 high at shoulder; greatest length of skull 180-240; first upper molar with indistinct outer cingulum ..... *Canis lupus pallipes*
- Medium-sized, measuring 380-430 high at shoulder; greatest length of skull 130-162; first upper molar with a prominent outer cingulum ..... *Canis aureus naria*

#### 41. *Canis aureus naria* Wroughton

1916. *Canis naria* Wroughton, *J. Bombay nat. Hist. Soc.*, **24** : 651 (Virajpet, Southern Coorg, Karnataka, India).

*Common names* : Asiatic Jackal (Eng.), Gidar, Shial (Hin.), Nakka (Tel.)

*Material examined* : Kurnool district : 1♂, 1♀, Palkonda Hills, 4.vi.1930, 15.vii.1930; 1♂, Diguvametta, 17.iv.1930. Nalgonda district : 1 unsexed, Madhavaram, 12.x.1963.

*Measurements* : External : 2♂ : HB 585.0, 760.0; TI 215.0, 260.0; Hf 147.0, 157.0; E 70.0, 79.0. 1♀ : HB 680.0; TI 240.0; Hf 149.0; E 73.0. Cranial : 1 unsexed : *l* 152.0; *cb* 146.5; *iw* 25.5; *zw* 79.0; *po* 31.9; *mw* 25.0; *pm*<sup>d</sup> 16.7; *ml* 140.3; *m*<sub>1</sub> 18.5.

*Diagnosis* : Very similar to wolf but smaller in size, and lacks the arching brows and elevated forehead; tail bushy with black tip; dorsal colour variable, fur coarse, sandy buff; back of ear brownish; face and lower flank greyish; belly, chest and inside of legs creamy white.

*Distribution* : India : Andhra Pradesh : Throughout the State; Karnataka; Kerala, Tamil Nadu.

*Remarks* : Very common. But its population is dwindling at a high rate due to extension of agricultural field, random use of pesticides and also killing for its coat. Jackal is not primarily a forest dweller, prefers to live near human habitation and is beneficial in controlling rodent population in crop fields.

#### 42. *Canis lupus pallipes* Sykes

1831. *Canis pallipes* Sykes, *Proc. zool. Soc. Lond.*, : 101 (Decan, India).

*Common names* : Wolf (Eng.), Bheriya (Hin.), Pedda nakka (Tel.).

*Material examined* : Nil.

*Diagnosis* : About the size of an Alsatian Dog; tail bushy, less than half of head and body; forehead elevated, brows arched, ear pointed and upstanding; dorsal colour grizzled with fulvous to rufous and black; a crest of long hairs on neck and shoulder; back of ears black; legs ochraceous, paler on outside.

*Distribution* : India : Andhra Pradesh : Adilabad district, Anantapur district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nizamabad district, Nalgonda district, Prakasam district, Visakhapatnam district, Vizianagaram district, Warangal district; Arunachal Pradesh; Assam; Bihar; Karnataka; Madhya Pradesh; Maharashtra; Orissa; Rajasthan; Uttar Pradesh; West Bengal.

*Elsewhere* : Arabian peninsula, Iran and Pakistan.

*Remarks* : Rare. Not a single animal was sighted during present survey trips to the State. Though Nagalu *et al.* (1998) recorded it from a number of sanctuaries of the State, but at present it is mainly confined to decan plateau. It has practically been wiped out from Visakhapatnam and Vizianagaram areas. Due to its alleged habit of child lifting, it was persecuted by the local people in the recent past.

#### Genus *Cuon* Hodgson, 1838

The genus *Cuon* is represented by one species in the State.

#### 43. *Cuon alpinus* (Pallas)

1811. *Canis alpinus* Pallas. *Zoogr. Ross. Asiat.*, 1 : 34 (Near Udskoi Ustrog. Amurland).

*Common names* : Dhole, Wild Dog (Eng.), Jungli Kutta (Hin.), Resu Kukka (Tel.).

*Material examined* : Nil.

*Diagnosis* : Much like a domestic dog in appearance, with long lanky body, short legs and muzzle; ears rounded, furry; tail more bushy than Jackal and Wolf; body colour bright rust-red to tawny.

*Distribution* : India : Andhra Pradesh : Adilabad district, Chittoor district, Cuddapah district, East Godavari district, Guntur district, Khammam district, Karimnagar district, Kurnool district, Mahbubnagar district, Nalgonda district, Nizamabad district, Prakasam district, Warangal district, West Godavari district; Forested parts of peninsular India, south of the Ganges excepting the western desert.

*Elsewhere* : Bhutan, China, Indo-China, Indonesia, Korea, Malaysia, Manchuria, Mongolia, Nepal, Pakistan, Russia (Ussuri region, Siberia), Tibet.

*Remarks* : Rare, almost restricted to the sanctuaries and forested tracks of the Eastern Ghats. Not a single animal was sighted during recent survey trips. However, Nagalu *et al.* (1998) reported it as fairly common in a number of sanctuaries of the State, probably on the basis of sightings. However, as per local reports its number has been markedly reduced over the years.

#### Genus *Vulpes* Oken, 1816

The genus *Vulpes* is represented by one species in the States.

#### 44. *Vulpes bengalensis* (Shaw)

1800. *Canis bengalensis* Shaw, *Gen. Zool.*, 1, 2 : 330 (Bengal).

*Common names* : Common Indian Fox, Bengal Fox (Eng.), Lomri (Hin.), Chinna nakka (Tel.).

*Material examined* : Kurnool district : 1 ♀, (Juv.), Malabondapenta, 19.v.1930.

*Measurements* : External : 1 ♀ (Juv.) : HB 460.0; TI 290.0; Hf 113.0; E 69.0. Cranial : 1 ♀ (Juv.) : *l* 103.2; *cb* 98.2; *po* 21.9; *iw* 16.9; *zw* 53.3; *mw* 17.5; *pm*<sup>d</sup> 8.5; *m*<sub>3</sub> 11.6; *ml* 75.7.

*Diagnosis* : About the size of a cat, with large ears, slender nose and limbs; coat colour grey tinged with reddish; back of ears sandy brown; tail tip black; nose and limbs rusty. A smudge of black hairs around the upper part of the muzzle in front of eyes.

*Distribution* : India : Andhra Pradesh : Throughout the State; widely distributed throughout the country.

*Elsewhere* : Bangladesh, Nepal and Pakistan.

*Remarks* : Due to extension of agricultural field, random use of pesticides and also killing for its coat and supposed medicinal values population has declined at a very high rate and now one can hardly hear its familiar chattering bark in the evening. Lives in scrubs and bushes adjacent to cultivated fields and villages. It helps in the biological control of several agricultural pest species.

#### Family FELIDAE

Three genera of the family Felidae occur in Andhra Pradesh.

#### Key to the genera of the family FELIDAE

1. Large-sized; hyoideum apparatus modified by the conversion of median part of suspensor into a long elastic tendon.....*Panthera*

- Small to medium-sized; hyoidean apparatus of normal mammalian type; the suspensor consisting of a chain of bones, joined end to end ..... 2
- 2. Ears low, rounded at summit; body-pattern consisting of spots or rosettes on the flanks, and of longitudinal stripes on the head and back ..... *Prionailurus*
- Ears high, triangular at summit; body pattern consisting of transverse stripes on the sides or of spots which at least behind the forelimb turn to vertical stripes ..... *Felis*

Genus *Felis* Linnaeus, 1758

Two species of the genus *Felis* occur in Andhra Pradesh.

**Key to the species and subspecies of the genus *Felis***

- No distinct longitudinal bands on crown; ears pointed; back of ears sandy buff .....  
..... *F. silvestris ornata*
- Distinct longitudinal bands on crown; ears pointed; back of ears reddish chestnut .....  
..... *F. chaus kutas*

**45. *Felis chaus kutas* Pearson**

1832. *Felis kutas* Pearson, *J. Asiat. Soc. Beng.*, 1 : 75 (Midnapur, West Bengal, India).

*Common names* : Jungle cat (Eng.), Jangli billi (Hin.), Bakuru bill (Tel.).

*Material examined* : Adilabad district : 1 ♀, Kotapalli, 13 Km N of Chennur, 27.iii.1980.  
Guntur district : 1 ♀ Nagarjunakonda, 3.xii.1962.

*Measurements* : External : 1 ♂ : HB 612.0; TI 280.0; Hf 142.0; E 75.0. 1 ♀ : HB 530.0; TI 235.0; Hf 138.0; E 68.0. Cranial : 1 ♀ : *l* 93.3; *cb* 85.5; *po* 31.3; *iw* 15.4; *zw* 63.3; *mw* 23.3; *pm*<sup>d</sup> 11.4; *m*<sup>3</sup> 8.7; *ml* 66.5.

*Diagnosis* : Larger than tame cat, higher on the legs, with a shorter tail terminating in a black tip; General colour reddish-grey or greyish-brown, unspotted, except on lower flanks and elbow; black horizontal stripes on the innerside of forelegs; back of ears reddish chestnut with a rudimentary tuft of hairs.

*Distribution* : India : Andhra Pradesh : Adilabad district, Chittoor district, Cuddapah district, East Godavari district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Krishna district, Mahbubnagar district, Nalgonda district, Nellore district, Nizamabad district, Prakasam district, Sri Kakulum district, Visakhapatnam district, Vizianagaram district, Warangal district; Bihar; Gujarat; Madhya Pradesh; Orissa; Rajasthan; Uttar Pradesh; West Bengal.

*Remarks* : Extension of agricultural fields and random use of pesticides destroyed its population outside the conservation areas. It plays an important role in the control of wild rodent population.

#### 46. *Felis silvestris ornata* Gray

1831. *Felis ornata* Gray, *Ill. Ind. Zool.* 1, pl. 2 (India).

*Common name* : Indian Desert Cat (Eng.).

*Material examined* : Nil

*Diagnosis* : Body pale sandy yellow in colour with small greyish black spots; proximal part of the tail spotted, distal half with four to five rings; forehead and lower surface of paws with scattered spots.

*Distribution* : *Distribution* : India : Andhra Pradesh : Adilabad district, Karimnagar district, Khammam district, Warangal district; Gujarat; Madhya Pradesh; Rajasthan.

*Elsewhere* : Afghanistan and Pakistan.

*Remarks* : Very rare and extremely local in distribution. Not a single specimen was observed during recent surveys to the State. However, Nagalu *et al.* (1998) recorded it from a number of sanctuaries of the State, probably on the basis of sightings. It prefers semiarid regions and low hills.

The species is considered as *Felis libyca ornata* by many authors (Ellerman and Morrison-Scott 1951, Roberts 1977).

#### Genus *Prionailurus* Severtzov, 1858

Three species of the genus *Prionailurus* occur in Andhra Pradesh.

#### Key to the species of the genus *Prionailurus*

1. Tail more than half of the head and body length and over twice the length of hind foot ..... 2
  - Tail less than half of the head and body length and less than twice the length of hind foot ..... *P. viverrinus*
2. Tail unspotted; back of ears brown with a large spot in the centre; upper molar series 3 on each side ..... *P. rubiginosus*
  - Tail spotted above; back of ears black with a pale or whitish spot in the centre; upper molar series 4 on each side ..... *P. bengalensis*

**47. *Prionailurus bengalensis* (Kerr)**

1792. *Felis bengalensis* Kerr, *Anim. Kingd.*, : 151 (Southern Bengal).

*Common name* : Leopard Cat (Eng.).

*Material examined* : Nil

*Diagnosis* : Dorsal colour variable, ornamented throughout with numerous elongated blackish brown spots; undersurface white and spotted; four longitudinal black bands from forehead to neck, which break up into short bands or elongated spots on shoulders; transverse stripes on forelegs.

*Distribution* : *Distribution* : India : Andhra Pradesh : Adilabad district, East Godavari district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Nellore district, Prakasam district, Visakhapatnam district, Vizianagaram district, Warangal district; Arunachal Pradesh; Assam; Maharashtra; Manipur; Meghalaya; Mizoram; Nagaland; Orissa; Karnataka; Kerala; Tamil Nadu; Tripura; West Bengal.

*Elsewhere* : Bangladesh, Myanmar, Thailand, Yunan and erstwhile Indo-China.

*Remarks* : Not common. Nagalu *et al.* (1998) recorded this species from a number of sanctuaries of the State. Present authors could not observe any animal for the reason that the distribution of this species is restricted to forested region of Andhra Pradesh and its strictly nocturnal habit.

**48. *Prionailurus rubiginosus* (Geoffroy)**

1831. *Felis rubiginosa* Geoffroy, *In* Belanger (ed.), *Voy. Indes. Orient., Mamm.*, 3 : 140 (Pondicherry, India).

*Common name* : Rusty-spotted Cat (Eng.).

*Material examined* : Nil

*Diagnosis* : Smaller than a domestic cat; dorsal pelage rufescent grey, patterned with brown bars and spots, arranged in regular lines; a pair of check stripe and four dark line present over the head; underparts white with dark spots.

*Distribution* : *Distribution* : India : Andhra Pradesh : Cuddapah district, Kurnool district, Nellore district; Gujarat; Jammu and Kashmir; Madhya Pradesh; Maharashtra; Pondicherry; Tamil Nadu.

*Remarks* : Very rare. However, this cat has a wide range of distribution in the country. Specific survey is required to reveal the exact status of this cat in our country. This species is considered as *Felis rubiginosa* by many authors (Ellerman and Morrison-Scott, 1951; Honacki *et al.* 1982).

49. *Prionailurus viverrinus* (Bennett)

1833. *Felis viverrinus* Bennett, *Proc. zool. Soc. Lond.*, : 68 (India, probably Malabar Coast).

*Common name* : Fishing Cat (Eng.).

*Material examined* : Nil

*Diagnosis* : Medium-sized, 650-700 in head and body length; fur coarse and dull brownish grey in colour, with black or brown spots throughout; six to eight black lines run from forehead to nape, which break up into shorter lines and spots on the shoulders; several cross bands present on the forehead and throat.

*Distribution* : India : Andhra Pradesh : Adilabad district, East Godavari district, Guntur district, Hyderabad district, Karimnagar district, Khammam district, Kurnool district, Krishna district, Mahbubnagar district, Nalgonda district, Nellore district, Nizamabad district, Prakasam district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; Assam; Karnataka; Kerala; Maharashtra; Orissa; Tamil Nadu; Uttar Pradesh; West Bengal.

*Elsewhere* : Bangladesh, Indonesia, Myanmar, Nepal, Pakistan, Sri Lanka, Taiwan, Thailand and Vietnam.

*Remarks* : A waterside animal, feeds on fish and shell fish. Also kills birds, small mammals and also young of dogs, sheep and others. Due to habitat destruction the distribution of this species is at present restricted to protected forests only.

Genus *Panthera* Oken, 1816

Two species of the genus *Panthera* occur in Andhra Pradesh.

**Key to the species and subspecies of the genus *Panthera***

- Body yellow in colour, with distinct black spots irregularly arranged in rosettes; tail relatively slim ..... *P. pardus fusca*
- Body orange-tawny in colour, with vertical black stripes; tail relatively thick ..... *P. tigris tigris*

50. *Panthera pardus fusca* (Meyer)

1794. *Felis fusca* Meyer, *Zool. Ann.*, 1 : 394 (Bengal).

*Common names* : Leopard or Panther (Eng.), Sindhuva (Tel.), Chiruthai (Tam.).

*Material examined* : Nil.

*Diagnosis* : A clean long-limbed animal with compact body; total length 170 to 215 cm;

height at shoulder 60 cm; colour pale fulvous yellow, with clearly defined spots arranged irregularly in rosettes.

*Distribution* : India : Andhra Pradesh : Adilabad district, Anantapur district, Chittoor district, Cuddapah district, East Godavari district, Guntur district, Hyderabad district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Medak district, Nalgonda district, Nellore district, Nizamabad district, Prakasam district, Sri Kakulum district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; widely distributed in the country in suitable habitats.

*Elsewhere* : Bangladesh, Burma, China and Sri Lanka.

*Remarks* : Leopard lives in rocks, cultivated fields with deep nullahs and scrub as well as forests. Though widely distributed in the State, due to habitat destruction the distribution of this animal is now restricted to protected forests only.

### 51. *Panthera tigris tigris* (Linnaeus)

1758. *Felis tigris* Linnaeus, *Syst. Nat.*, 10th ed., 1 : 41 (Bengal).

*Common names* : Tiger (Eng.). Pedda puli (Tel), Poolec (Tam.).

*Material examined* : Nil.

*Diagnosis* : Large heavy-bodied animal, much developed in the fore-quarters; coat colour pale yellow ochre to burnt sienna, with black vertical stripes arranged irregularly; chin, throat, breast and belly pure white.

*Distribution* : India : Andhra Pradesh : Adilabad district, Chittoor district, East Godavari district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Prakasam district, Sri Kakulum district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; found throughout the country, except deserts of Gujarat, Punjab and Rajasthan.

*Elsewhere* : Bangladesh, Myanmar and Nepal.

*Remarks* : Endangered. Main reason being indiscriminate killing and depletion of forest vegetation. Though this majestic species is widely distributed in the State but restricted to different protected forests only.

### Family HERPESTIDAE

Family Herpestidae is represented in India by one genus *Herpestes*.

### Genus *Herpestes* Illiger, 1811

Three species of this genus occur in Andhra Pradesh.

### Key to the species and subspecies of the genus *Herpestes*

1. Size smaller, head and body length less than 350. Contour hairs short, with few bands. Legs not darker than body. Skull smaller, posterior chamber of bulla less inflated, hardly projecting below the anterior ..... *H. javanicus auropunctatus*
- Size larger, head and body length over 360. Contour hairs long, with many bands. Legs darker than body. Skull larger, posterior chamber of bulla much inflated, projecting below the anterior ..... 2
2. Tail tipped with white or yellowish red. Occipital and sagittal crest of skull well developed ..... *H. edwardsii*
- Tail tipped with black. Occipital and sagittal crest of skull less well developed ..... *H. smithi*

#### 52. *Herpestes edwardsii* (Geoffroy)

1818. *Ichneumon edwardsii* E. Geoffroy, *Descrip. de L' Egypte*, 2 : 139 (East Indies; Madras, according to Pocock 1933).

*Common names* : Indian Grey Mongoose (Eng.), Yentawa mangisa (Tel.).

*Material examined* : Nil.

*Diagnosis* : Fur grizzled, rather rough, tawny yellowish-grey in colour, rusty on head and feet; no stripe on sides of neck; eyes reddish brown in colour; claws dark brown; tail as long as body, tipped with white or yellowish-red.

*Distribution* : India : Andhra Pradesh : Adilabad district, Cuddapah district, East Godavari district, Guntur district, Hyderabad district, Karimnagar district, Khammam district, Kurnool district, Krishna district, Medak district, Mahbubnagar district, Nalgonda district, Nellore district, Nizamabad district, Prakasam district, Sri Kakulum district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; Assam; Bihar; Gujarat; Madhya Pradesh; Meghalaya; Orissa; Sikkim; Uttar Pradesh; West Bengal.

*Elsewhere* : Bangladesh and Nepal.

*Remarks* : Common. Animals were observed in cities, villages and also in the forests particularly in the northern districts of the state. Lives in burrows inside bushes. Colonial in habit, 10-12 animals live together in a particular territory. Preys upon animals whatever it can capture.

#### 53. *Herpestes javanicus auropunctatus* (Hodgson)

1836. *Mangusta auropunctata* Hodgson, *J. Asiat. Soc. Beng.*, 5 : 235 (Nepal).

*Common names* : Small Indian Mongoose (Eng.), Yentawa mangisa (Tel.).

*Material examined* : Nil

*Diagnosis* : Sleek in appearance, with grey grizzled body, short sturdy legs and sharp pointed conical face; tail shorter than head and body; fur soft, olive-brown and gold-flecked in colour.

*Distribution* : India : Andhra Pradesh : Adilabad district, East Godavari district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Nizamabad district, Prakasam district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; Arunachal Pradesh; Assam; Bihar; Himachal Pradesh; Jammu & Kashmir; Manipur; Meghalaya; Nagaland; Orissa; Sikkim; Uttar Pradesh; West Bengal.

*Elsewhere* : Bhutan and Nepal.

*Remarks* : Fairly common near villages. Lives in burrows inside bushes preferably near drains, canals, ponds, etc. Though diurnal but occasionally haunts during night. Known to cause considerable damage to poultry.

#### 54. *Herpestes smithii* Gray

1837. *Herpestes smithii* Gray, *Mag. Nat. Hist. [charlesworth's]*, 1 : 578 (near Bombay=Mumbai).

*Common names* : Ruddy Mongoose (Eng.), Yentawa mangisa (Tel.).

*Material examined* : Nil.

*Diagnosis* : Very similar to Grey Mongoose in appearance, but easily distinguished by the black tail dip; tail before tip reddish in colour.

*Distribution* : India : Andhra Pradesh : Adilabad district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Warangal district; Karnataka; Kerala; Rajasthan; Tamil Nadu.

*Elsewhere* : Sri Lanka.

*Remarks* : This is mostly a forest dwelling animal. Nagalu *et al.* (1998) recorded this species from some protected forests of the State. However, not a single specimen could be observed during recent survey trips to the State.

### Family HYAENIDAE

Represented by one genus and one species only.

Genus *Hyaena* Brisson, 1762

#### 55. *Hyaena hyaena hyaena* (Linnaeus)

1758. *Canis hyaena* Linnaeus, *Syst. Nat.* 10th ed, 1 : 40 (Benna Mountains, Laristan, Iran).

*Common names* : Striped Hyaena (Eng.), Korna gundu, Dumula gundu (Tel.).

*Material examined* : Nil.

*Diagnosis* : A large dog-like animal, with fore-legs longer than the hind; a long crest of mane all down the neck and back; shoulder highly sloping. Coat coarse, tawny yellow in colour, with vertical dark stripes on the body and transverse bars on upper portion of legs.

*Distribution* : India : Andhra Pradesh : Adilabad district, Anantapur district, Chittoor district, Cuddapah district, East Godavari district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Krishna district, Mahbubnagar district, Nalgonda district, Nizamabad district, Prakasam district, Sri Kakulum district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; throughout India in forested tracks, the eastern limit being West Bengal.

*Elsewhere* : North Africa, through Arabia, Iran, Iraq, Afghanistan, Pakistan, Transcaucasia, to Turkestan in Russia, China, and Nepal.

*Remarks* : Krishna Raju *et al.* (1987) considered hyaena as the common scavenger in the countryside but during the recent surveys it was found to be almost restricted to same conservation areas particularly in Anantapur and Karimnagar. It lives mainly in forests among bushes, but can also be found living in abandoned burrows of procupines, jackals and foxes. The population of this animal has declined due to substantial loss of its habitat.

#### Family MUSTELIDAE

Two genera belonging to this family occur in Andhra Pradesh.

#### Key to the genera of the family MUSTELIDAE

- Adapted for semi aquatic life; tail thick and muscular; hindfoot wider than forefoot. Vibrissae thick ..... *Lutrogale*
- Adapted for terrestrial life, body without the above mentioned modifications .....  
..... *Mellivora*

#### Genus *Lutrogale* Gray, 1865

The genus is represented by a single species in Andhra Pradesh.

#### 56. *Lutrogale perspicillata* (Geoffroy)

1826. *Lutra perspicillata* Geoffroy, *Dict. Class. Hist. Nat. Paris*, 9 : 519 (Sumatra, Indonesia).

*Common names* : Smooth-coated Indian Otter (Eng.), Niru kuku (Tel.).

*Material examined* : Nil.

*Diagnosis* : Thick fusiform body; hind foot short, web of skin present between all digits of fore and hindfoot; tail paddle shaped, distal portion more or less triangular in outline; fur short and adpressed, dorsal colour brown to olive brown, ventral lighter in shade.

*Distribution* : India : Andhra Pradesh : Adilabad district, East Godavari district, Guntur district, Hyderabad district, Krishna district, Mahbubnagar district, Nalgonda district, Nellore district, Rangareddy district, Visakhapatnam district, West Godavari district; Arunachal Pradesh; Assam; Bihar; Gujarat; Karnataka; Kerala; Madhya Pradesh; Meghalaya; Nagaland; Orissa; Pondicherry; Tamil Nadu; Uttar Pradesh; West Bengal.

*Elsewhere* : Bangladesh, China, Indonesia, Malaysia, Myanmar and Vietnam.

*Remarks* : Moderately common and known to cause certain amount of damage to fish crop. A troop of five individuals were observed in Godavari River during our survey trip at Koraturu of West Godavari district.

#### Genus *Mellivora* Storr, 1780

Genus *Mellivora* is monotypic.

#### 57. *Mellivora capensis indica* (Kerr)

1792. *Ursus indicus* Kerr, *Anim. Kingd.*, : 188 (India).

*Common names* : Ratel, Honey Badger (Eng.), Tirru Elugu. Bigu khawar (Tel.).

*Diagnosis* : Body squat and bear like; legs stumpy; tail short; snout not projecting. Pinna reduced to a thickened rim. Coat grey above and black below.

*Distribution* : India : Andhra Pradesh : Adilabad district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Prakasam district, Visakhapatnam district, Vizianagaram district, Warangal district; Bihar; Gujarat; Madhya Pradesh; Orissa; Punjab; Uttar Pradesh; West Bengal and peninsular India except Malabar Coast.

*Elsewhere* : Afghanistan, Iran and Pakistan.

*Remarks* : Rare. Nagalu *et al.* (1998) reported its occurrence in some conservation areas of the State but it is mostly confined to the forests of northern Eastern Ghats. We could not observe any specimen during recent survey trips to the State. Nocturnal in habit. Lives in rocks, dense forest and cactus bushes during day time. According to Roberts (1977), Ratel preys upon snakes and rodents.

#### Family URSIDAE

Represented in Andhra Pradesh by a monotypic genus *Melursus*.

Genus *Melursus* Meyer, 179358. *Melursus ursinus* (Shaw)

1791. *Bradypus ursinus* Shaw, *Nat. Miss.*, 2 (unpaged), pls. 58-59 (Patna, Bihar, India).

*Common names* : Sloth Bear (Eng.), Elugu bunti (Tel.).

*Material examined* : Nil.

*Diagnosis* : Large sized; 140-170 cm in head and body length; claws on forefoot large and ivory white; face triangular with long grey muzzle. Coat long, rough, shaggy, black; a V-shaped breast patch often present.

*Distribution* : India : Andhra Pradesh : Adilabad district, Anantapur district, Chittoor district, Cuddapah district, East Godavari district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Krishna district, Mahbubnagar district, Medak district, Nalgonda district, Nizamabad district, Prakasam district, Sri Kakulum district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; Arunachal Pradesh; Assam; Bihar; Gujarat; Karnataka; Kerala; Madhya Pradesh; Maharashtra; Meghalaya; Orissa; Uttar Pradesh; West Bengal.

*Elsewhere* : Bangladesh.

*Remarks* : The Sloth Bear is moderately common in the State, particularly in the northern hilly tracks. Attack on human beings by it is regularly reported.

## Family VIVERRIDAE

Two genera of the family Viverridae occur in Andhra Pradesh.

**Key to the genera of the family VIVERRIDAE**

- Feet terrestrial and digitigrade; carpal pad single; metatarsal pad absent. Scent glands opening into highly specialised pouches ..... *Viverricula*
- Feet scansorial and semiplantigrade; carpal and metacarpal pad double; glandular pouches less specialised ..... *Paradoxurus*

Genus *Paradoxurus* Cuvier, 1821

Represented by a single species in Andhra Pradesh.

59. *Paradoxurus hermaphroditus* (Pallas)

1777. *Viverra hermaphrodita* Pallas, in Schreber, *Die Säugethiere*, 3 : 426 (India).

*Common names* : Common Palm Civet, Toddy cat (Eng.), Manu pilli (Tel.).

*Material examined* : Nil.

*Diagnosis* : About 60 cm in head and body length, with subequal tail; fur coarse, grey or blackish brown in colour, with longitudinal black stripes on back and spots on flanks, shoulders and thighs; white spot around eyes and nose.

*Distribution* : India : Andhra Pradesh : Adilabad district, East Godavari district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Krishna district, Mahbubnagar district, Nalgonda district, Nizamabad district, Prakasam district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; widely distributed throughout the country.

*Elsewhere* : Bangladesh, China, Hainan Island, Indonesia, Malaysia, Myanmar, Nepal, Philippines and Sri Lanka.

*Remarks* : Moderately common. A number of specimens were observed during recent survey trips. Found in wooded areas, cities and villages. Usually lives singly in tree holes, but also takes shelter in old buildings having false ceilings.

#### Genus *Viverricula* Hodgson, 1838

It is a monotypic genus.

#### 60. *Viverricula indica indica* (Desmarest)

1817. *Viverra indica* Desmarest, *Nouv. Dict. Hist. Nat, Paris*, 7 : 170 (India).

*Common names* : Small Indian Civet (Eng.), Manu billi, Punagu pilli (Tel.).

*Material examined* : Cuddapah district : 1 ♀, Palkonda Hills, 2.viii.1930. Prakasam district : 1 ♂, Diguva metta,—.

*Measurements* : External : 1 ♂ : HB 535.0; TI 365.0; Hf 102.0; E 40.0. 1 ♀ : HB 530.0; TI 375.0; Hf 96.0; E 36.0. Cranial : 1 ♀ : *l* 89.1; *cb* 86.8; *mw* 13.0; *iw* 11.3; *po* 10.8; *zw* 32.5; *pm*<sup>4</sup> 7.9; *cw* 28.1.

*Diagnosis* : Small sized, 50-62 cm in head and body length, with shorter tail. Muzzle slender and pointed. Ears broad and rounded. Body colour greyish brown, with small black spots on fore quarters; larger black spots form longitudinal lines on the flanks, and six to eight lines down the back.

*Distribution* : India : Andhra Pradesh : Almost throughout the State; whole of India.

*Elsewhere* : Bangladesh, Bhutan, Pakistan and Sri Lanka.

*Remarks* : Fairly common. A good number of specimens were observed in different districts of the State. Found to live in various habitats, such as jungles, forests, rocks and even in cultivated fields. Lives singly in self made burrows. Often attacks poultry and other domestic stocks. A good climber, could be seen moving considerable distance through branches.

## Order PROBOSCIDEA

Massive build, with long, flexible proboscis; generally males possess large tusks which are enlarged incisor teeth; molars large and transversely ridged.

The order Proboscidea contains a single family Elephantidae.

### Family ELEPHANTIDAE

This family is represented in India by a single genus.

#### Genus *Elephas* Linnaeus, 1758

One species and subspecies of the genus *Elephas* occurs in Andhra Pradesh.

#### 61. *Elephas maximus indicus* Cuvier

1797. *Elephas indicus* Cuvier, *Tbal. Elem. Hist. Nat.*, : 148 (India).

*Common names* : Indian Elephant (Eng.), Ani (Tel.).

*Material examined* : Nil.

*Diagnosis* : Largest land animal of India; well known by its proboscis at the end of which nostrils are placed; lower lip small, pointed and spout-like; body blackish grey throughout; four nails on each hindfoot; eyes small; ears large and flat.

*Distribution* : India : Andhra Pradesh : Chittoor district; Arunachal Pradesh; Assam; Bihar; Karnataka; Kerala; Meghalaya; Nagaland; Orissa; Tamil Nadu; Tripura; Uttar Pradesh; West Bengal.

*Elsewhere* : Bangladesh, Bhutan, Borneo, Malaysia, Myanmar, Sumatra, Thailand and Vietnam.

*Remarks* : Owing to loss of natural habitat and shortage of food the population of this animal is declining in the State. As per report of M.O.E.&F (1998-99) only 46 elephants are surviving in the State.

## Order ARTIODACTYLA

Animals belonging to this order are even-toed; axis of the foot passes between third and fourth toes; toes enclosed in horny hooves of approximately equal size, giving the appearance of a single hoof split down in the middle.

The order Artiodactyla is represented by four families in Andhra Pradesh.

### Key to the families of the order ARTIODACTYLA

1. Upper incisors present ..... SUIDAE
  - Upper incisors absent ..... 2
2. Horns or antlers absent, second and fifth digits complete ..... TRAGULIDAE
  - Horns or antlers present, at least in males; second and fifth digits incomplete ..... 3
3. Horns consist of a hollow outer sheath and an inner bony core, unbranched and permanent ..... BOVIDAE
  - Antlers solid, branched, ornamented with knots and ridges, and periodically shed ..... CERVIDAE

#### Family SUIDAE

Represented by one genus in Andhra Pradesh.

Genus *Sus* Linnaeus, 1758

Only one species occurs in Andhra Pradesh.

#### 62. *Sus scrofa cristatus* Wagner

1839. *Sus cristatus* Wagner, *Munch. Gelehrt. Anz.*, 9 : 435 (probably Malabar Coast, India).

*Common names* : Wild Boar (Eng.), Pandi (Tel.).

*Material examined* : Nalgonda district : 1 ♂, (Juv.), Yalleswaram.

*Measurements* : External : 1 ♂ : (Juv.) : HB 370.0; TI 76.0; Hf 95.0; E 44.0.

*Diagnosis* : Height at shoulders 76-102 cm; coat coarse, dark grey in colour; a crest of black bristles from nape to back; tail thin, fringed at tips, barely reaching hocks; young dark brown, with buff stripes.

*Distribution* : India : Andhra Pradesh : throughout the State in forested tracts; whole of India in forested or semiforested areas.

*Elsewhere* : Bangladesh, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, Sri Lanka and Vietnam.

*Remarks* : Moderately common. Found in grass or scanty bush jungles and also in the forest near muddy and swampy areas. Krishna Raju *et al.* (1987) considered wild boar as the most commonest wild animal in the State. However, at present except in conservation areas, its number has reduced due to random use of pesticides and indiscriminate killing for flesh.

## Family TRAGULIDAE

Represented by one genus in Andhra Pradesh.

Genus *Moschiola* Hodgson, 1843

Only one species occurs in Andhra Pradesh.

63. *Moschiola meminna* (Erxleben)

1777. *Moschus meminna* Erxleben, *Syst. Regn. Anim.*, 1 : 322 (Sri Lanka).

*Common names* : Indian Spotted Chevrotain, Mouse-Deer (Eng.), Kuru-pandi (Tel.).

*Material examined* : Nil.

*Diagnosis* : Smallest of the Indian Deer, 30 cm in shoulder height; limbs very slender; hindquarters high; dorsal colour olive-brown with lines of white spots along the body; ventral surface white; throat white striped.

*Distribution* : India : Andhra Pradesh : Adilabad district, Chittoor district, Cuddapah district, East Godavari district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Prakasam district, Sri Kakulum district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; Karnataka; Kerala; Tamil Nadu.

*Elsewhere* : Sri Lanka.

*Remarks* : Could not be observed or heard about its occurrence in Andhra Pradesh during recent surveys. However, Nagalu *et al.* (1998) reported its occurrence as uncommon in some conservation areas of the State probably on the basis of sightings. The species is mostly seen in Vizianagaram areas (Krishna Raju *et al.* 1987).

This species is considered as *Tragulus meminna* by many authors (Ellerman and Morrison-Scott 1951, Prater 1965).

## Family CERVIDAE

Three species belonging to three genera occur in Andhra Pradesh.

## Key to the genera of CERVIDAE

1. Antlers short, consisting of a short brow tine and an unbranched beam; no phalanges to lateral digits; tusk like canine in males ..... *Muntiacus*
- Antlers long and branched; bony phalanges to lateral digits; upper canine when present not tusk like ..... 2

2. Body distinctly spotted in adult animals; brow tine sets almost at a right angle to the beam of antler.....**Axis**  
 – Body unspotted; brow tine forms an acute angle with the beam of antler .....  
 ..... **Cervus**

Genus *Axis* H. Smith, 1827

One species of this genus occurs in Andhra Pradesh.

64. *Axis axis axis* (Erxleben)

1777. *Cervus axis* Erxleben, *Syst. Regn. Anim.*, 312 (Bank of Ganges, India).

*Common names* : Chital, Axis Deer, Spotted Deer (Eng.), Dupi (Tel.).

*Material examined* : Nil.

*Diagnosis* : Height at shoulder 91 to 97 cm in males, females slightly smaller; coat bright rufous, with profuse white spots all over the body; a dark dorsal stripe from nape to end of tail, bordered by one or two rows of spots. Antlers with three tines, a long brow tine set at right angle to the beam which branches at top, the outer top tine always longer than inner.

*Distribution* : India : Andhra Pradesh : Adilabad district, Anantapur district, Chittoor district, Cuddapah district, East Godavari district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Krishna district, Mahbubnagar district, Medak district, Nalgonda district, Nizamabad district, Prakasam district, Sri Kakulum district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; widely distributed in peninsular India, northwards to Kumaon in Uttar Pradesh and Sikkim, and eastwards to Assam and Meghalaya.

*Elsewhere* : Bangladesh, Nepal and Sri Lanka.

*Remarks* : Fairly common in conservation areas, but almost wiped out from other areas. Hunting for flesh and skin, and destruction of forests are the main factors for decline of its population.

Genus *Cervus* Linnaeus, 1758

One species of the genus *Cervus* occurs in Andhra Pradesh.

65. *Cervus unicolor niger* Blainville

1816. *Cervus niger* Blainville, *Bull. Soc. Philom. Paris.*: 76 (Probably somewhere in India. Ellerman and Morrison-Scott, 1951).

*Common names* : Sambar (Eng.), 'Kanuju, Kennadi (Tel.).

*Material examined* : Nil.

*Diagnosis* : Largest of Indian deer; about 150 cm height at shoulder in males, females a little smaller; coat coarse and shaggy, general colour brown with yellowish or greyish tinge; venter paler; females lighter in tone; stag with a mane around neck and throat. Antlers normally with three tines, brow-tine joins the beam at an acute angle.

*Distribution* : India : Andhra Pradesh : Adilabad district, Chittoor district, Cuddapah district, East Godavari district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Medak district, Nalgonda district, Nizamabad district, Prakasam district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; Bihar; Goa; Gujarat; Himachal Pradesh; Karnataka; Kerala; Madhya Pradesh; Maharashtra; Orissa; Rajasthan; Tamil Nadu; Uttar Pradesh; West Bengal.

*Elsewhere* : Bangladesh and Nepal.

*Remarks* : Fairly common in conservation areas of the State. Decline in its population is mainly due to hunting and habitat shrinkage.

#### Genus *Muntiacus* Rafinesque, 1815

The genus is represented in India by one species, *Muntiacus muntjak*. Out of three subspecies, one occurs in Andhra Pradesh.

#### 66. *Muntiacus muntjak aureus* (H. Smith)

1826. *Cervus aureus* H. Smith, *Griffith's Cuvier Anim. Kingd.*, 4 : pl. opposite p. 148, text, 148. 1827 (Some part of southern India, Lydekker 1915).

*Common names* : Indian Muntjak, Barking Deer (Eng.), Konda meka, Kuka-gori, Jangli-bakra (Tel.).

*Material examined* : Nil.

*Diagnosis* : Heavy bodied with short dainty legs. Male with a pair of small antlers, consisting of a short brow-tine and an unbranched beam, set on bony hair covered pedicel. Coat reddish chestnut in colour, with black streaks along face ridges, extending up to pedicels in buck; throat, groin and underside of tail white.

*Distribution* : India : Andhra Pradesh : Adilabad district, Anantapur district, Chittoor district, Cuddapah district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Nizamabad district, Prakasam district, Sri Kakulum district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; Karnataka; Kerala; Maharashtra; Tamil Nadu.

*Remarks* : Very rare in Andhra Pradesh. Though Nagalu *et al.* (1998) reported it as present but uncommon in some conservation areas of the State, but during our survey we could not notice any of them.

## Family BOVIDAE

Five genera of the family Bovidae occur in Andhra Pradesh.

**Key to the genera of BOVIDAE**

1. Horns smooth or closely, irregularly or transversely wrinkled ..... 2
  - Horns with prominent rings at subequal intervals ..... 4
2. Horns in both sexes nearly of equal size ..... *Bos*
  - Horns in males, female hornless ..... 3
3. Large-sized, tail long, male with two short horns ..... *Boselaphus*
  - Small-sized, tail short, male with four small horns ..... *Tetracerus*
4. Horns much longer than head, females generally without horns ..... *Antilope*
  - Horns scarcely longer than head, females sometimes with horns ..... *Gazella*

Genus *Antilope* Pallas, 1766

*Antilope* is a monotypic genus.

**67. *Antilope cervicapra cervicapra* (Linnaeus)**

1758. *Capra cervicapra* Linnaeus, *Syst. Nat.*, 10th ed., 1 : 69 (Travancore, inland of Trivandrum, India).

*Common names* : Blackbuck (Eng.), Jinka (Tel.).

*Material examined* : Nil.

*Diagnosis* : Males black dorsally, white on throat and venter; females reddish fawn dorsally, white ventrally. Horns of male long, slender, spirally twisted and bearing rounded transverse ridges. Females generally hornless.

*Distribution* : India : Andhra Pradesh : Adilabad district, East Godavari district, Guntur district, Karimnagar district, Medak district, Nalgonda district, Nellore district, Prakasam district, Rangareddy district, Warangal district, West Godavari district; widely distributed in the forested tracts from Punjab south to Tamil Nadu and east to West Bengal.

*Elsewhere* : Argentina, Nepal, Pakistan and Texas (USA).

*Remarks* : Common, occurs mostly in plains of Deccan and North-Western districts, as well as islands of the river Godavari. The total population of the State was between 1108 to 1138 (Ranjitsinh 1989). Blackbuck is the State animal of Andhra Pradesh.

Genus *Gazella* Blainville, 1816

Represented in Andhra Pradesh by one species.

68. *Gazella bennetti* (Sykes)

1831. *Antelope bennetti* Sykes, *Proc. zool. Soc. Lond.*, 1830-31 : 104 (Deccan, India).

*Common names* : Indian Gazelle, Chinkara (Eng.), Burra jinka (Tel.).

*Material examined* : Nil.

*Diagnosis* : Body colour light chestnut above, colour deepening on the flanks and buttocks; underparts white; a white streak down each side of face. Tail nearly black. A tuft of long hairs on each knee. Horn in males curved S-shaped, with 15-25 rings; horn in female, if present, smooth and short.

*Distribution* : India : Andhra Pradesh : Adilabad district, Chittoor district, Cuddapah district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Krishna district, Mahbubnagar district, Medak district, Nalgonda district, Nizamabad district, Prakasam district, Warangal district; Gujarat; Rajasthan.

*Elsewhere* : Pakistan.

*Remarks* : Nagalu *et al.* (1998) though reported to be common in some conservation areas of the State, but it is mostly confined to the north-western part of the State particularly in the districts of Khammam, Adilabad and surrounding areas.

Genus *Bos* Linnaeus, 1758

Represented by one species in Andhra Pradesh.

69. *Bos frontalis* Lambert

1804. *Bos frontalis* Lambert, *Trans. Linn. Soc. Lond.*, 7 : 57 (NE Chittagong, Bangladesh).

*Common names* : Gaur, Indian Bison (Eng.).

*Material examined* : Nil.

*Diagnosis* : Males 175-196 cm in shoulder height, females little smaller; a muscular ridge present on the shoulders which gradually slopes down to the middle of back and ends in an abrupt dip. General colour coffee or reddish brown; jet black in old bulls; forehead ashy; stockings yellowish or white in both sexes.

*Distribution* : India : Andhra Pradesh : Adilabad district, East Godavari district, Karimnagar district, Khammam district, Visakhapatnam district, Warangal district, West Godavari district; Arunachal Pradesh; Assam; Bihar; Goa; Karnataka; Kerala; Madhya Pradesh; Maharashtra; Meghalaya; Mizoram; Nagaland; Orissa; Rajasthan; Tamil Nadu; Uttar Pradesh; West Bengal.

*Elsewhere* : Bangladesh and Nepal.

*Remarks* : Though recorded from many districts, Gaur is now not very common in the State and confined to the well-forested tracks. No specimen could be seen during recent surveys. Previously it was known as *Bos gaurus*, but Honacki *et al.* (1982) and Grubb (1993) treated it as a synonym of *Bos frontalis* Lambert.

Genus *Boselaphus* Pallas, 1766

It is a monotypic genus.

70. *Boselaphus tragocamelus* (Pallas)

1766. *Antilope tragocamelus* Pallas, *Misc. Zool.*, 5 (Plains of Peninsular India).

*Common names* : Nilgai, Blue Bull (Eng.); Manu meka (Tel.).

*Material examined* : Nil.

*Diagnosis* : Horse-like in appearance with stout legs, long and narrow head. Neck with dark manes in both sexes. Male with a tuft of black hair on throat. Colour blue gray in males, light chestnut to reddish tan in females.

*Distribution* : India : Andhra Pradesh : Adilabad district, Chittoor district, Cuddapah district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Medak district, Nalgonda district, Nizamabad district, Prakasam district, Warangal district; widely distributed in the country from base of Himalayas to Karnataka, including Maharashtra.

*Elsewhere* : Pakistan and introduced in Texas (USA).

*Remarks* : Nagalu *et al.* (1998) reported this animal to be common in some conservation areas in the Eastern Ghats part of the State. Present authors also found them as fairly common in Adilabad and Nalgonda districts.

Genus *Tetracerus* Leach 1825

It is a monotypic genus.

71. *Tetracerus quadricornis* (Blainville)

1816. *Cercophorus (Cervicapra) quadricornis* Blainville, *Bull. Sci. Soc. Philom. Pairs*, 75 and 78 (Plains of Peninsular India).

*Common names* : Four-horned Antelope (Eng.), Bayata meka, Konda-gori (Tel.).

*Material examined* : Cuddapah district : 2♂, 1 unsexed, Palkonda Hills, Dasarladoddi, 21, 22.vi.1930, 1.vii.1930.

*Measurements* : External : 2♂ : HB 940.0 (in both); Tl 114.0, 127.0; E 105.0, 107.0.

*Diagnosis* : Male with four horns; posterior pair located on the fore-head, anterior pair between fore head and eyes; female hornless; colour varies from brown to rufous brown above, white below; a dark stripe down the front of each leg.

*Distribution* : India : Andhra Pradesh : Adilabad district, Chittoor district, Cuddapah district, East Godavari district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Nizamabad district, Prakasam district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; widely distributed in Peninsular India except Malabar coast, north to Rajasthan and north-east to Bihar and Orissa.

*Remarks* : Common in conservation areas particularly in the forests of Visakhapatnam and Vizianagaram. Prefer wood and hilly country near water and are usually seen alone or in pairs.

#### Order PHOLIDOTA

Body covered above with large overlapping scales; undersurface clothed with coarse, bristle-like hairs. Head long and narrow. No teeth.

This order contains only one family MANIDAE and only one species occurs in Andhra Pradesh.

#### Family MANIDAE

Genus *Manis* Linnaeus 1758

#### 72. *Manis crassicaudata* Gray

1827. *Manis crassicaudata* Gray. In Griffith et. al., *Anim. Kingdom*, 5 : 282 (India).

*Common names* : Indian Pangolin (Eng.), Alawa (Tel.).

*Material examined* : Nil.

*Diagnosis* : Hump-backed body with tapering tail. Muzzle tapers to a narrow down-curving trunk-like snout. Ear conch less prominent. Body covered with 11-13 rows of overlapping yellowish brown, pointed, horny scales.

*Distribution* : India : Andhra Pradesh : Adilabad district, Anantapur district, Chittoor district, Cuddapah district, East Godavari district, Guntur district, Hyderabad district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Medak district, Nalgonda district, Nizamabad district, Prakasam district, Sri Kakulum district, Visakhapatnam district, Vizianagaram district, Warangal district; Bihar; Delhi; Gujarat; Karnataka; Kerala; Madhya Pradesh; Maharashtra; Orissa; Punjab; Rajasthan; Uttar Pradesh; West Bengal.

*Elsewhere* : China, Pakistan and Sri Lanka.

*Remarks* : Nagalu *et al.* (1998) reported its occurrence as uncommon in certain conservation areas of the State. During recent surveys we could not observe any specimen. In all the areas visited by us, it was reported as becoming rare day by day. Main reason of decline of its population is the increase in agrarian economy combined with improved irrigation and random use of pesticides. For effective conservation of this unique creature, people must be educated about its beneficial role in minimising the damage to agricultural crops and buildings by consuming termites.

### Order RODENTIA

Rodents are characterized by the presence of a pair of chisel-shaped incisors in each jaw; distinct diastema between incisors and molar teeth.

#### Key to the families of RODENTIA

1. Fur modified into quills or stiff hairs; cheekteeth 4/4 in number ..... HYSTRICIDAE
  - Fur not modified into quills, cheekteeth except in genus *Ratufa* never 4/4 in number 2
2. Infraorbital foramen not or scarcely opens for muscular transmission; cheekteeth except in genus *Ratufa* 5/4 in number; skull with postorbital process ..... SCIURIDAE
  - Infraorbital foramen clearly opens for muscle transmission; cheekteeth 3/3 in number; skull without postorbital process ..... MURIDAE

Honacki *et al.* (1982) considered subfamilies Cricetinae and Gerbillinae under a separate family Cricetidae. However, Ellerman (1961), Carleton and Musser (1984) and Corbett and Hill (1986) considered Cricetinae and Gerbillinae as separate subfamilies under the family Muridae and the same has been followed here.

#### Family SCIURIDAE

Three genera of the family Sciuridae occur in Andhra Pradesh.

#### Key to the genera of the family SCIURIDAE

1. Flying membrane present on both sides of the body ..... *Petaurista*
  - Flying membrane absent ..... 2
2. Dorsal surface of body without any stripe; maxillary teeth four in number .....  
..... *Ratufa*

- Dorsal surface of body striped; maxillary teeth five in number.....***Funambulus***

Genus *Funambulus* Lesson, 1835

Two species occur in Andhra Pradesh.

**Key to the species of the genus *Funambulus***

- Dorsal surface of body having 5 buff stripes ..... *F. pennanti*  
 – Dorsal surface of body having 3 buff stripes ..... *F. palmarum*

***Funambulus palmarum* (Linnaeus)**

Two subspecies of *F. palmarum* namely *F. palmarum palmarum* and *F. palmarum robertsoni* occur in Andhra Pradesh.

**73. *Funambulus palmarum palmarum* (Linnaeus)**

1766. *Sciurus palmarum* Linnaeus, *Syst. Nat.*, 12th ed., 1 : 86 (Madras, Tamil Nadu, India).

*Common names* : Indian Palm Squirrel (Eng.), Vodata (Tel.).

*Material examined* : Cuddapah district : 2♂, Palkonda Hills, 12.iv.1929, 7.iv.1930; 1♀, Siddavatam, c 17 Km E of Cuddapah, 7.vi.1994. Kurnool district : 1♀, Kurnool, 16.iv.1930. Nellore district : 2♂, 2♀, Kavali, N of Nellore, 29,30.v.1994.

*Measurements* : External : 2♂ : HB 170.0, 160.0; TI 140.0, 144.0; Hf 37.0, 35.0; E 17.0, 20.0. 2♀ : HB 160.0, 151.0; TI 165.0, 190.0; Hf 35.0, 35.0; E 20.0, 20.0. Cranial : 2♂ : *on* 39.0, 38.2; *pl* 19.1, 18.4; *n* 12.1, 12.2; *orb* 12.0, 12.1; *mtr* 7.5, 7.6; *fr* 10.9, 11.5; *b* 6.7, 7.0; *zw* 20.1, 21.2. 2♀ : *on* 38.5, 37.6; *pl* 19.0, 18.3; *n* 10.7, 12.3; *orb* 11.9, 11.9; *mtr* 7.4, 7.0; *fr* 11.1, 10.4; *b* 7.8, 7.9; *zw* 21.9, 20.6.

*Diagnosis* : Head and body length ranges from 120 to 170. Nasals and frontals averaging less than 30% of the occipitonasal length.

*Distribution* : India : Andhra Pradesh : Adilabad district, Anantapur district, Chittoor district, Cuddapah district, East Godavari district, Hyderabad district, Karimnagar district, Khammam district, Kurnool district, Krishna district, Mahbubnagar district, Medak district, Nalgonda district, Nellore district, Nizamabad district, Prakasam district, Rangareddy district, Warangal district; Bihar; Karnataka; Kerala; Orissa; Tamil Nadu; West Bengal.

*Elsewhere* : Sri Lanka.

*Remarks* : Fairly common, prefers to live in close association with human settlement in towns and villages. It resorts much to the ground for its food. Makes nest in houses, trees and many other suitable places. Causes much damage to orchard but not to crop fields.

Ellerman (1961) recognised a number of subspecies from India and Ceylon based on external and cranial measurements. Agrawal and Chakraborty (1979) have synonymised *F. p. brodei* (Blyth) with the nominate subspecies on the basis of overlapping measurements. Measurements of the present series also overlap with other subspecies in respect of nasal, frontal, toothrow and tail. Thus a detailed study is required to assess the status of different subspecies.

#### 74. *Funumbulus palmarum robertsoni* Wroughton

1916. *Funumbulus palmarum robertsoni* Wroughton, *J. Bombay nat. Hist. Soc.*, **24** : 647 (Pachmarhi, Hoshangabad, Madhya Pradesh, India).

*Common names* : Indian Palm Squirrel (Eng.), Vodata, Urta (Tel.).

*Material examined* : Guntur district : 2♂, Nagarjuna konda, 19.x.1963, 11.xi.1963.

*Diagnosis* : Differs from *F. palmarum palmarum* in lacking brown colour on the head; the grey colour of the sides and nape continues forward on to the crown and face; mandibular tooth-row 7.0 mm or less.

*Distribution* : India : Andhra Pradesh : Guntur district; Madhya Pradesh.

*Remarks* : Uncommon. Not a single specimen could be observed during recent survey trips. Agrawal and Bhattacharyya (1976) recorded it from the State.

#### 75. *Funumbulus pennanti* Wroughton

1905. *Funumbulus pennanti* Wroughton, *J. Bombay nat. Hist. Soc.*, **16** : 411 (Mandvi Taluka, Surat, Gujarat, India).

*Common name* : Northern Palm Squirrel (Eng.).

*Material examined* : Adilabad district : 1♀ Chennur, c 37 Km E of Mancheril, 26.x.1996. Guntur district : 2♂, 1♀, Nagarjunakonda, 1, 2.ix.1963, 29.x.1963. Krishna district 1♂, Kaikalur, c 70 Km E of Vijayawada, 22.iv.1996. Nalgonda district : 1♂ Deverkonda, 20.viii.1962; 1♀, Bhongir, 9.xii.1993. Rangareddy district : 1♂, Hyderabad,— 1855.

*Measurements* : External : 1♂ : HB 144.5; TI 97.5; Hf 37.5; E 16.5. 2♀ : HB 155.0, 145.0; TI 104.0, 147.0; Hf 35.0, 35.0; E 15.0, 15.0. Cranial : 1♂ : *on* 37.0; *pl* 18.6; *n* 12.5; *orb* 12.2; *mtr* 7.2; *fr* 10.3; *b* 7.5; *zw* 20.5. 1♀ : *on* 37.5; *pl* 18.6; *n* 11.4; *orb* 12.0; *mtr* 7.0; *fr* 10.7; *b* 7.7; *zw* 21.3.

*Diagnosis* : Dorsal colour olive-grey, divided by three cream coloured longitudinal stripes; belly and flanks creamy-grey, separated from dorsal by indistinct longitudinal creamy-buff stripes. Tail bushy with creamy or whitish tip.

*Distribution* : India : Andhra Pradesh : Adilabad district, East Godavari district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Krishna district, Mahbubnagar district, Nalgonda district, Nizamabad district, Prakasam district, Rangareddy district, Sri Kakulum district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; Andaman Islands; Bihar; Gujarat; Jammu and Kashmir; Madhya Pradesh; Maharashtra; Meghalaya; Orissa; Punjab; Rajasthan; Sikkim; Uttar Pradesh; West Bengal.

*Elsewhere* : Bangladesh, Iran, Nepal and Pakistan.

*Remarks* : Most common, lives in close association with human beings in cities and villages. It makes its nest in houses, trees, electrical posts and many other suitable places. Causes damage to orchards but not to crop fields. It enters houses freely, picking up crumbs, pulses, grains, etc. If taken when young, it becomes very tame.

#### Genus *Ratufa* Gray, 1867

The genus *Ratufa* is represented by one species in the State.

#### 76. *Ratufa indica centralis* Ryley

1913. *Ratufa indica centralis* Ryley, *J. Bombay nat. Hist. Soc.*, **22** : 436 (Bori, Hoshangabad, Madhya Pradesh).

*Common names* : Large Indian Squirrel (Eng.), Bel udata (Tel.).

*Material examined* : Cuddapah district : 1 ♂, Balapalli Range. Palkonda Hills, 4.viii.1929. Kurnool district : 1 ♀, Kurnool, 14.iv.1913. Prakasam district : 1 ♀, Diguvametta, 160 Km. W. of Ongole, 17.iv.1930.

*Measurements* : External : 1 ♀ : HB 330.0; TI 425.0; E 25.0.

*Diagnosis* : Large squirrel, head and body over 300 and tail longer than head and body. Upper surface deep red but shoulders and upper part of forelimbs usually quite sharply contrasted black; tail black.

*Distribution* : India : Andhra Pradesh : Adilabad district, Chittoor district, Cuddapah district, East Godavari district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Nizamabad district, Prakasam district, Visakhapatnam district, Vizianagaram district, Warangal district; Karnataka; Madhya Pradesh; Orissa.

*Remarks* : Confined to the forested tracks only. According to local reports population of this species dwindled to a great extent due to habitat destruction and fragmentation.

#### Genus *Petaurista* Link, 1795

Only one species of the genus occurs in Andhra Pradesh.

77. *Petaurista petaurista philippensis* (Elliot)

1839. *Pteromys philippensis* Elliot, *Madras J. Litt. and Sci.*, (South Maharatta Country, Maharashtra).

*Common name* : Large Brown Flying Squirrel (Eng.).

*Material examined* : Nil.

*Diagnosis* : Dorsal colour grey, grizzled with brown; forelimbs and parachute brown; feet mostly black; tail usually black; underparts whitish to drab grey.

*Distribution* : India : Andhra Pradesh : Adilabad district, Chittoor district, Cuddapah district, Karimnagar district, Khammam district, Visakhapatnam district, Warangal district; Bihar; Gujarat; Karnataka; Kerala; Maharashtra; Orissa; Tamil Nadu.

*Remarks* : Rare. Not a single specimen could be observed by us during recent surveys. However, Nagalu *et al.* (1998) recorded it in certain conservation areas of the State and considered status as uncommon. This squirrel prefers to remain confined to the patches of moist thick forest.

## Family MURIDAE

Largest family of class Mammalia and is represented by two sub families in Andhra Pradesh.

## Key to the subfamilies of MURIDAE

- Cusps of maxillary teeth arranged in three longitudinal rows; upper incisor except in *Golunda* not grooved ..... *Murinae*
- Cusps of maxillary teeth arranged in two longitudinal rows; upper incisor always grooved in front..... *Gerbillinae*

## Subfamily GERBILLINAE

Only one genus occurs in Andhra Pradesh.

Genus *Tatera* Lataste, 1882

Represented by a single species.

78. *Tatera indica cuvieri* (Waterhouse)

1838. *Gerbillus cuvieri* Waterhouse, *Proc. zool. Soc. Lond.*, : 56 (Arcot, Tamil Nadu, India).

*Common names* : Indian Gerbil or Antelope Rat (Eng.).

*Material examined* : Chittoor district : 1 ♂, Tirupati, 14.vi.1994. Cuddapah district : 3 ♀, (Juv.), 3 ♀ Siddavatam, c 17 Km E of Cuddapah, 6,7.vi.1994; 1 ♀, Bakrapeta, c 15 Km E of Cuddapah, 7.vi.1994. East Godavari district: 1 ♂, 1 ♀, 1 ♀, (Sub ad.), Addatigala, c 78 Km NE of Rajamundry, 5-8.iv.1996. Nellore district: 1 ♀, Kavali, 1.vi.1994.

*Measurements* : External : 2 ♂ : HB 150.0, 188.0; TI 188.0, 193.0; Hf 38.5, 42.0; E 23.0, 26.0. 5 ♀ : HB 144.0-170.0 (153.0), TI 170.0-232.0 (202.0), Hf 37.0-41.0 (39.0), E 22.0-25.0 (23.0). Cranial : 1 ♂ : *on* 43.5; *pl* 22.5; *apf* 8.1; *n* 17.7; *mtr* 6.0; *b* 11.5; *d* 12.2; *zw* 22.9, 1 ♀ : *on* 38.8; *pl* 20.6; *apf* 6.5; *n* 16.0; *mtr* 6.0; *b* 9.8; *d* 10.0; *zw* 20.0.

*Diagnosis* : Similar in size to house rat, tail longer than head and body. Tail well furred, dark above and below, with a pale stripe on each side. Dorsal colour varying from sandy brown to reddish, ventral white. Feet white. Distal one-third of tail with long blackish hairs terminating in a tuft.

*Distribution* : India : Andhra Pradesh : Adilabad district, Anantapur district, Chittoor district, Cuddapah district, Hyderabad district, East Godavari district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Medak district, Nalgonda district, Nellore district, Nizamabad district, Prakasam district, Rangareddy district, Sri Kakulum district, Visakhapatnam district, Vizianagaram district, Warangal district; Karnataka; Kerala; Tamil Nadu.

*Remarks* : Most common. Makes extensive burrows with a number of exists inside bushes. Tracts of their movement from burrows to the field could be easily noticed. It is mainly a ground feeder, but individuals were observed moving along branches and feeding on the ripe fruits of Cashewnut at Addatigala of East Godavari district. It is considered as a serious pest of field crops as well as poultry.

### Subfamily MURINAE

Seven genera of Murinae occur in Andhra Pradesh.

### Key to the genera of MURINAE

1. Hallux opposable; hallux and fifth toe having a flat nail ..... *Vandeleuria*
  - Hallux not opposable; hallux and fifth toe provided with a claw ..... 2
2. Upper incisors grooved on front surface ..... *Golunda*
  - Upper incisors not grooved on front surface ..... 3
3. Condylbasal length exceeds or equal to occipitonasal length; Upper incisors proodont ..... *Bandicota*
  - Condylbasal length less than occipitonasal length; Upper incisors opisthodont or orthodont ..... 4

4. First upper molar more than half the length of cheektooth row, its antero-internal cusp distorted inward to reach the level of second lamina; third molar extremely reduced ..  
..... *Mus*
- First upper molar less than half the length of cheek tooth row, its antero-internal cusp not distorted inwards to reach the second lamina; third molar not so reduced ..... 5
5. Palate and anterior palatal foramina long, more than one-half and one-fifth of occipitonasal length respectively ..... *Millardia*
- Never combining the characters of long palate and long anterior palatal foramina .... 6
6. Palate short, less than half of occipitonasal length ..... *Cremnomys*
- Palate long, more than half of occipitonasal length ..... *Rattus*

Genus *Bandicota* Gray, 1873

Two species are found in Andhra Pradesh.

**Key to the species of the genus *Bandicota***

- Bulla relatively small, less than one-fifth of the occipitonasal length; nasal more than 33% and palate less than 60% of occipitonasal length ..... *B. indica indica*
- Bulla relatively large, more than one-fifth of occipitonasal length; nasal less than 33% and palate more than 60% of occipitonasal length ..... *B. bengalensis bengalensis*

**79. *Bandicota bengalensis bengalensis* (Gray)**

1835. *Arvicola bengalensis* Gray, *Illustr. Ind. Zool.*, 2 : pl 21 (Bengal).

*Common names* : Indian Mole Rat, Lesser Bandicoot Rat (Eng.); Golatta Koku (Tel.).

*Material examined* : Cuddapah district : 2♂, Ballapalli, Palkonda hills, 14.15.viii.1929; 9 unsexed, Koduru, 23-26.viii.1929. Guntur district : 8♂, 7♀, Pullaredigudum, 5-11.ix.1962. 2-5.x.1963.

*Measurements* : External : 9 unsexed: HB 125.0-180.0 (148.0); TI 119.0-160.0 (139.0); HI 33.0-37.0 (34.0); E 20.0-24.0 (22.0).

*Diagnosis* : Rat-like, with relatively less pointed snout. Fur coarse, with black-tipped piles throughout the back; venter grey to dark grey. Tail always shorter than head and body.

*Distribution* : India : Andhra Pradesh : Throughout the State; throughout the country.

*Elsewhere* : Bangladesh, Bhutan, Myanmar, Nepal, Pakistan and Sri Lanka.

*Remarks* : Fairly common in fields, godowns, shops and busy areas of cities. Causes considerable loss to crops and stored articles.

80. *Bandicota indica indica* (Bechstein)

1800. *Mus indicus* Bechstein. In Pennant, *Allgemeine Ueber Vierfuss. Thiere*, 2 : 497 (Pondicherry, India).

*Common names* : Large Bandicoot Rat (Eng.), Golatta Koku (Tel.).

*Material examined* : Cuddapah district : 1♂, 1♀, Balapalli, 13,14.viii.1929; -1♀, Chintarajupalli, 3.vi.1930; 3♂, 1♀, Kondagorla penta, 21-31.vii.1930; 1♀, 1♂, Madhavaram, 6-12.viii.1930. Kurnool district : 1♂, Diguvametta, 22.iv.1930. Visakhapatnam district : 1♀, Borraguhalu, 7.iii.1983.

*Measurements* : External : 6♂ : HB 206.0-300.0 (269.0); TI 222.0-340.0 (303.0); Hf 57.0-64.0 (62.0); E 29.0-36.0 (32.0). 5♀ : HB 250.0-300.0 (272.0); TI 275.0-315.0 (289.0); Hf 54.0-60.0 (56.0); E 31.0-34.0 (32.0). Cranial : 1♂ : *On* 61.1; *cb* 60.9; *pl* 35.4; *apf* 11.8; *n* 24.7; *mtr* 9.5; *b* 9.2; *d* 20.5. 2♀ : *on* 56.9, 58.2; *cb* 57.0, 60.3; *pl* 33.0, 34.3; *apf* 11.0, 10.2; *n* 23.7, 23.6; *mtr* 10.3, 10.6; *b* 9.7, 11.0; *d* 18.3, 19.9; *zw*—, 32.5.

*Diagnosis* : Similar to previous species, but larger; tail longer or subequal to head and body length. Dorsal colour blackish brown with pale yellowish or whitish grizzling; ventral colour greyish brown.

*Distribution* : India : Andhra Pradesh : Adilabad district, Anantapur district, Chittoor district, Cuddapah district, Guntur district, Hyderabad district, East Godavari district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Medak district, Nalgonda district, Nellore district, Nizamabad district, Prakasam district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; Bihar; Delhi; Gujarat; Haryana; Karnataka; Kerala; Madhya Pradesh; Maharashtra; Orissa; Rajasthan; Tamil Nadu.

*Elsewhere* : Sri Lanka.

*Remarks* : Fairly common in food grain shops, godowns, along the sewerage canals and other marshy areas. Causes considerable loss to stored articles, but damage is not evident in the crop fields.

Genus *Cremnomys* Wroughton, 1912

Two species of the genus *Cremnomys* occur in Andhra Pradesh.

Key to the species of the genus *Cremnomys*

- Tail wholly dark basally and wholly white terminally ..... *C. blanfordi*
- Tail either wholly dark or poorly bicolor ..... *C. cutchicus*

81. *Cremnomys blanfordi* (Thomas)

1881. *Mus blanfordi* Thomas, *Ann. Mag. Nat. Hist.*, 7 : 24 (Madras, Tamil Nadu, India).

*Common name* : Blanford's Rat (Eng.).

*Material examined* : East Godavari district : 2♂, (Sub ad.), Addatigala, 4.iv.1996. West Godavari district: 1♂, Koraturu, 12.iv.1996.

*Measurements* : External : 1♂ : HB 190.0; Tl 200.0; Hf 34.0; E 28.0. Cranial : 1♂ : *on* 42.7; *pl* 21.3; *apf* 8.4; *n* 16.0; *mtr* 6.8; *b* 8.1; *d* 11.0; *zw* 20.0.

*Diagnosis* : Dorsal colour grey to reddish brown, ventral white. Terminal one-third of tail white, slightly tufted terminally. Occipitonasal length more than 40.0 mm; palatal foramina about 20% of occipitonasal length.

*Distribution* : India : Andhra Pradesh : East Godavari district, West Godavari district; Bihar; Goa; Karnataka; Kerala; Madhya Pradesh; Maharashtra; Orissa; Tamil Nadu; West Bengal.

*Elsewhere* : Sri Lanka.

*Remarks* : Specimens were collected from forested and rocky areas by using Sherman traps.

#### 80. *Cremnomys cutchicus* (Wroughton)

1912. *Cremnomys cutchicus* Wroughton, *J. Bombay nat. Hist. Soc.*, **21** : 340 (Dhonsa, Kachchh, Gujarat, India).

*Common name* : Cutch Rat (Eng.).

*Material examined* : Cuddapah district : 1♀, Bhakrapeta, c 15 Km E of Cuddapah, 8.vi.1994; 2♂, 2♀, Dasarladedi, Palkonda Hills, 23-30.vi.1930; 1♂ 2♀, Kammapalem, c 19 Km E of Cuddapah, 8, 9.vi.1994; 1♂, 1♀, Siddavatam, c 17 Km E of Cuddapah, 7, 9.vi.1994. Nellore district : 1♂, Kavali, 1.vi.1994. Nizamabad district : 1♂, 2♀ Mallaram, 5, 6.xi.1996.

*Measurements* : External : 4♂ : HB 108.0-127.0 (119.0); Tl 116.0-186.0 (152.0); Hf 26.0-28.0 (27.0); E 16.0-17.0 (17.0). 4♀ : HB 116.0-128.0 (121.0); Tl 153.0-164.0 (159.0); Hf 24.0-27.0 (26.0); E 16.0-20.0 (17.5). Cranial : 2♂ : *on* 32.9, 34.4; *pl* 16.2, 16.5; *apf* 7.1, 7.5; *n* 13.7, 14.3; *mtr* 5.5, 5.6; *b* 6.2, 6.5; *d* 8.6, 8.7; *zw*—, 16.5. 2♀ : *on* 32.9, 33.0; *pl* 15.9, 15.7; *apf* 7.2, 7.2; *n*—, 13.0; *mtr* 5.5, 5.5; *b* 5.5, 6.1; *d* 8.0, 8.0; *zw*—, 16.7.

*Diagnosis* : Medium-sized, head and body below 130 and tail longer than head and body. Fur soft, drab grey to greyish dorsally, dull grey ventrally. Occipitonasal length less than 35 mm; palatal foramina more than 22% of occipitonasal length.

*Distribution* : India : Andhra Pradesh : Cuddapah district, Hyderabad district, Nellore district, Nizamabad district, Bihar; Gujarat; Orissa.

*Remarks* : Ellerman (1961) recognised 5 subspecies of *C. cutchicus* on the basis of

external measurements, the presence or absence of a buffy patch on neck and the ventral coloration. Prakash (1995) found that buffy patch on the neck is not a constant character within the same population from Mount Abu, Rajasthan. As such, he synonymised *C.c. rajput* and *C.c. medius*. Later, Agrawal (2000) studied all the available material from the country and found that absolute lengths of head and body overlap even at 1 standard deviation among the different geographical population. Thus, he synonymised all the subspecies and recognised *C. cutchicus* as a monotypic species.

### Genus *Golunda* Gray, 1837

It is a monotypic genus.

#### 83. *Golunda ellioti ellioti* Gray

1837. *Golunda ellioti* Gray, *Mag. Nat. Hist. [charlesworth's]*, 1 : 586 (Dharwar, Karnataka, India).

*Common name* : Indian Bush Rat (Eng.).

*Material examined* : Nil.

*Diagnosis* : Apparently similar to house rat, but much smaller and tail always shorter than head and body length. Ear almost circular in outline. Tail covered with dark brown hairs dorsally and yellowish grey hairs ventrally. Upper incisors prominently grooved in front.

*Distribution* : India : Andhra Pradesh : Throughout the State; Assam; Bihar; Karnataka; Kerala; Madhya Pradesh; Maharashtra; Orissa; Punjab; Tamil Nadu; Uttar Pradesh; West Bengal.

*Elsewhere* : Afghanistan, Nepal, Pakistan and Sri Lanka.

*Remarks* : Nagalu *et al.* (1998) reported it as common in some protected areas of the State. Bush rat mainly depends upon wild seeds and roots and not reported to cause damage to agriculture.

The species is mainly confined to bushy grassland areas of forests as well as villages, particularly along the boundaries of gardens and crop fields.

### Genus *Millardia* Thomas, 1911

One species of the genus *Millardia* occurs in Andhra Pradesh.

#### 84. *Millardia meltada meltada* (Gray)

1837. *Golunda meltada* Gray, *Ann. Mag. nat. Hist.*, 1 : 586 (Dharwar, Karnataka, India).

*Common name* : Soft-furred Field Rat (Eng.).

*Material examined* : Nil.

*Diagnosis* : Rat like, with short bicoloured tail. Ears large, with rounded tip. Fifth toe short, equal to hallux. Colour dark brownish or greyish above, dark grey to greyish white below.

*Distribution* : India : Andhra Pradesh : Adilabad district, East Godavari district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Nizamabad district, Prakasam district, Rangareddy district, Visakhapatnam district, Vizianagaram district, Warangal district, West Godavari district; Bihar; Karnataka; Kerala; Madhya Pradesh; Maharashtra; Tamil Nadu; Uttar Pradesh;

*Elsewhere* : Sri Lanka.

*Remarks* : Nagalu *et al.* (1998) recorded it as uncommon in some conservation areas of the State, but the species is fairly common in the crop fields making extensive burrows. These rats are considered to be serious pest of agricultural crops in the field. However, it is reported to be displaced from many of the areas by another serious rodent pest species, *viz. Bandicota bengalensis*.

#### Genus *Mus* Linnaeus, 1758

Six species of the genus *Mus* are reported from Andhra Pradesh. The genus is recently revised by Agrawal (2000).

#### Key to the species of *Mus*

1. Tail unicoloured and longer than head and body : diastema equal to or less than one-fourth of occipitonasal length ..... *M. musculus*
  - Tail bicoloured, dark above and pale below, equal to or shorter than head and body; diastema generally more than one-fourth of occipitonasal length ..... 2
2. Fur generally spiny; supraorbital ridges in skull well-developed ..... 3
  - Fur soft, supraorbital ridges either absent or scarcely developed ..... 5
3. Smaller form, occipitonasal length 20-23 mm; maxillary toothrow more than 4 mm in length ..... *M. phillipsi*
  - Larger form, occipitonasal length 20-30 mm; maxillary toothrow more than 4 mm in length ..... 4
4. An anterior accessory cusp present in first lamina of upper first molar; chromosome number 2N=22 or 26 ..... *M. saxicola*
  - No accessory cusp on first lamina of first upper molar; chromosome number 2N=30 ..... *M. platythrix*
5. Back light brown with yellowish highlights; tail small about 55 mm; incisive foramina averaging 4.7 mm ..... *M. booduga*

- Back dull brownish grey; tail about 65 mm; incisive foramina averaging 4.2 mm .....  
 ..... *M. dumni*

### 85. *Mus booduga booduga* (Gray)

1837. *Leggada booduga* Gray, *Mag. Nat. Hist. [charlesworth's]* 1 : 586 (Southern Maharatta Country, Maharashtra, India)

*Common name* : Little Indian Field Mouse (Eng.).

*Material examined* : Chittoor district : 1 ♀, Talkona, c 114 Km N of Chittoor, 12.vi.1994. Cuddapah district : 1 ♀, Koduru, Balapalli Range, 25.vii.1929; 1 ♂, Palkonda Hills, 2.viii.1929. East Godavari district : 2 ♂, 1 ♀, Addatigala, c 78 Km NE of Rajamundry, 4,8.iv.1996. Guntur district : 1 ♂, Tiger Valley, 4.x.1963. Rangareddy district : 2 ♀, Anantagiri, 4.5.xii.1993.

*Measurements* : External : 2 ♂ : HB 63.5, 61.0; Tl 60.0, 55.0; Hf 14.0, 13.5; E 12.0, 12.0. 3 ♀, HB 65.0-72.0 (67.0); Tl 54.0-57.0 (56.0); Hf 14.0-15.0 (15.0); E 12.0-12.0 (12.0). Cranial : 2 ♂ : *on* 19.8, 19.3; *pl* 10.3, 9.8; *apf* 4.4, 4.9; *n* 7.8, 8.3; *mtr* 3.4, 3.4; *b* 4.0, 4.0; *d* 5.1, 5.0. 1 ♀ : *on* 18.1; *pl* 9.3; *apf* 4.6; *n* 7.0; *mtr* 3.1; *b* 3.6; *d* 5.1.

*Diagnosis* : Very small. Dorsal colour brown to light brown, ventral milky white. Tail perfectly bicoloured.

*Distribution* : India : Andhra Pradesh : Throughout the State; widely distributed all over India.

*Elsewhere* : Bangladesh and Pakistan.

*Remarks* : Most common in dry crop fields and adjacent bushes; avoids dry sandy areas. Though depends on agricultural crops, it is not regarded as an economically serious pest.

### Genus *Mus musculus* Linnaeus

Two subspecies occur in Andhra Pradesh.

#### Key to the subspecies of *M. musculus*

- Back tawny, belly ochraceous with slaty under fur ..... *M. m. tytleri*  
 – Back cinnamon or tawny but suffused with black, belly dark ..... *M. m. castaneus*

### 86. *Mus musculus castaneus* Waterhouse

1843. *Mus castaneus* Waterhouse. *Ann. Mag. nat. Hist.*, 12 : 134 (Philippine Islands).

*Common name* : House Mouse (Eng.).

*Material examined* : Karimnagar district : 1 ♀, Jagtial, c 50 Km NW of Karimnagar, 3.xi.1996.

*Measurements* : External : 1 ♀ : HB 78.0; TI 87.0; Hf 18.0; E 13.0. Cranial : 1 ♀ : *on* 22.3; *pl* 11.1; *apf* 4.3; *n* 8.3; *mtr* 3.4; *b* 4.0; *d* 5.5; *zw* 11.3.

*Diagnosis* : A dark-bellied house mouse with no line of colour demarcation between dorsal and ventral surface.

*Distribution* : India : Andhra Pradesh : Throughout the State; Assam; Bihar; Delhi; Gujarat; Jammu & Kashmir; Karnataka; Kerala; Meghalaya; Orissa; West Bengal.

*Elsewhere* : Africa, China, Malaysia, Myanmar, New Guinea, Philippines, Sri Lanka and Thailand.

*Remarks* : Common in houses, godowns and shops. Causes considerable damage to household goods.

### 87. *Mus musculus tytleri* Blyth

1859. *Mus tytleri* Blyth, *J. Asiat. Soc. Beng.*, 28 : 296 (Dehra Dun, Uttar Pradesh, India).

*Common name* : House Mouse (Eng.).

*Material examined* : Prakasam district : 2 ♂, 1 ♀, Diguvametta, c 160 Km W of Ongole, 15.v.1995.

*Measurements* : External : 2 ♂ : HB 72.0, 55.0; TI 80.0, 55.0; Hf 20.0, 13.0; E 13.0, 10.0. 1 ♀ : HB 60.0; TI 70.0; Hf 14.0; E 12.0. Cranial : 1 ♂ : *on* 20.3; *pl* 10.5; *apf* 5.0; *n* 7.2; *mtr* 3.1; *b* 3.2; *d* 5.4; *zw* 10.7.

*Diagnosis* : Back tawny, grizzled with black; belly ochraceous, with slaty underfur; tail poorly bicoloured and usually longer than head and body.

*Distribution* : India : Andhra Pradesh : Throughout the State; widely distributed almost all over India.

*Elsewhere* : Myanmar, Nepal and Sri Lanka.

*Remarks* : Common in the shops, godowns, houses and also in the adjacent fields. It causes huge damage to house hold goods and articles of merchandise. It is often found in close association with other species of the genus. Agrawal (2000) treated *tytleri* as a synonym of *castaneus*.

### 88. *Mus phillipsi* Wroughton

1912. *Mus phillipsi* Wroughton, *J. Bombay nat. Hist. Soc.*, 21 : 772 (Asigarh, Madhya Pradesh, India).

*Common name* : Phillipsi Spiny Mouse (Eng.).

*Material examined* : Anantapur district : 1 ♀, Kalasamudram, c 80 Km S of Anantapur, 27.v.1995; 1 ♀, Mudagabba, c 63 Km S of Anantapur, 29.v.1995. Cuddapah district : 2 ♂ 1 ♀

Bhakrapet, c 15 Km E of Cuddapah, 6-9.vi.1994; 1 ♀, Kammapalen, c 19 Km E of Cuddapah, 8.vi.1994; 5 ♂, 3 ♀ Siddavatam, c 17 Km E of Cuddapah, 6-9.vi.1994. Rangareddy district : 2 ♀ Gutamukul, c 10 Km S of Anantagiri, 5,6.xii.1993.

*Measurements* : External : 4 ♂ : HB 67.0-82.0 (74.0); TI 56.0-60.0 (58.0); Hf 15.0-16.0 (15.0); E 10.0-12.0 (12.0). 7 ♀ : HB 64.0-75.0 (69.0); TI 53.0-61.0 (56.0); Hf 14.0-16.0 (15.0); E 9.0-13.0 (12.0); Cranial : 2 ♂ : *on* 22.7, 21.4; *pl*—, 11.1; *apf*—, 4.6; *n* 9.2, 9.0; *mtr* 3.8, 3.7; *b* 3.3, 3.7; *d*—, 5.9; 4 ♀ : *on* 20.2-22.2 (20.8); *pl* 9.5-11.2 (10.4); *apf* 4.0-4.7 (4.3); *n* 6.3-8.9 (7.8); *mtr* 3.5-3.9 (3.7); *b* 3.0-3.5 (3.4); *d* 5.1-6.0 (5.4).

*Diagnosis* : Medium-sized mouse, head and body length on average 72 (Ellerman 1961), with tail a little shorter. Dorsal colour yellowish grey to dark brown, ventral white. Tail poorly bicoloured. Dorsal fur spiny.

*Distribution* : India : Andhra Pradesh : Anantapur district, Chittoor district, Cuddapah district, Rangareddy district; Gujarat; Karnataka; Madhya Pradesh; Rajasthan; Tamil Nadu.

*Remarks* : Common. It is found in rocky areas within its range of distribution. Pregnant as well as lactating females were found in May-June.

### 89. *Mus platythrix* Bennett

1832. *Mus platythrix* Bennett, *Proc. Zool. Soc. Lond.*, :121 (Dukhun=Deccan, India).

*Common name* : Brown Spiny Mouse (Eng.).

*Material examined* : West Godavari district : 1 ♂, 1 ♀, Koraturu, c 75 Km NW of Rajamundry, 12,13.iv.1996.

*Measurements* : External : 1 ♂ : HB 93.0; TI 66.0; Hf 15.5; E 16.0. Cranial : 1 ♂ : *on* 26.0; *pl* 13.2; *apf* 5.5; *n* 9.8; *mtr* 4.2; *b* 4.4; *d* 7.5; *zw* 12.0. 1 ♀ : *on* 25.0; *pl* 13.4; *apf* 5.2; *n* 10.0; *mtr* 4.2; *b* 4.3; *d* 7.3; *zw* 11.8.

*Diagnosis* : Medium-sized mouse, with tail much shorter (below 90%) than head and body in length. Colour pale to dark brown above, white below, with a clear line of demarcation along the sides. Fur spiny. Tail clearly bicoloured.

*Distribution* : India : Andhra Pradesh : West Godavari district, Bihar; Himachal Pradesh; Karnataka; Kerala; Maharashtra; Madhya Pradesh; Punjab; Rajasthan; Tamil Nadu; West Bengal.

*Elsewhere* : Myanmar, Nepal and Pakistan.

*Remarks* : Not common. Both the specimens were collected from forest. According to Marshall (1977) skull length in adult specimen varies from 26 to 30 mm. However, in both the specimens with molars worn flat the occipitonasal length is less than 26 mm.

90. *Mus saxicola* Elliot

1839. *Mus saxicola* Elliot, *Madras J. Lit. Sci.*, **10** : 215 (Madras, Tamil Nadu, India).

*Common name* : Elliot's Brown Spiny Mouse (Eng.).

*Material examined* : Anantapur district : 1 ♂, 2 ♀, Malakavamala, c 69 Km S of Anantapur, 30.v.1995; 2 ♂, Mudagabba, c 65 Km S of Anantapur, 29.v.1995; 1 ♂, 2 ♀ Nalamada, Bukkapatnum, 31.v.1995; 1 ♀, Pathikuntapalli, c 20 Km E of Hindpur, 4.vi.1995. Chittoor district : 5 ♂, 2 ♀, Ncrabylyu, c 104 Km N of Chittoor, 11-13.vi.1994; 4 ♂ 2 ♀ Talkona, c 114 Km N of Chittoor, 12.vi.1994; 2 ♂, Tirupati, 14.vi.1994.

*Measurements* : External : 11 ♂ : HB 80.0-105.0 (94.0); TI 65.0-74.0 (70.0); HI 17.0-19.0 (18.0); E 13.0-16.0 (15.0). 5 ♀ : HB 85.0-96.0 (92.0); TI 65.0-73.0 (69.0); HI 17.0-19.0 (18.0); E 14.0-16.0 (15.0). Cranial : 5 ♂ : *on* 24.7-26.7 (25.7); *pl* 13.3-14.3 (13.9); *apf* 5.0-6.0 (5.7); *n* 10.1-11.5 (10.8); *mtr* 4.5-5.0 (4.7); *b* 4.3-5.0 (4.7); *d* 6.9-7.7 (7.4); *zw* 11.6-13.4 (12.7). 2 ♀ : *on* 26.6, 25.5; *pl* 14.6, 14.4; *apf* 6.0, 6.0; *n* 11.0, 10.3; *mtr* 5.0, 4.5; *b* 4.9, 4.5; *d* 7.6, 7.3; *zw* 13.0,—.

*Diagnosis* : Large sized, averaging over 90 mm in head and body length; tail much shorter. Colour brownish grey above, creamy white below. Fur spiny. Palatal foramina exceeds 23 percent of occipitonasal length.

*Distribution* : India : Andhra Pradesh : Anantapur district, Chittoor district, Cuddapah district, Kurnool district; Karnataka; Maharashtra; Tamil Nadu.

*Remarks* : Most common field mouse of the State. Causes certain loss to paddy crops.

91. *Mus dunnii* (Wroughton)

1912. *Leggada dunnii* Wroughton, *J. Bombay nat. Hist. Soc.*, **21** : 339 (Ambala, Punjab, India).

*Common name* : Northern Field Mouse (Eng.).

*Material examined* : East Godavari district : 2 ♂, Addatigala, c 78 Km NE of Rajamundry, 4,9.iv.1996. Rangareddy district : 2 ♀, Gutamukul, c 10 Km S of Anantagiri, 4.5.xii.1993; 1 ♀, Tandur, c 124 Km N of Hyderabad, 1.xii.1993.

*Measurements* : External : 2 ♂ : HB 75.0, 67.0; TI 66.0, 70.0; HI 16.0, 15.0; E 13.0, 12.0. 3 ♀ : HB 70.0, 68.0, 65.0; TI 75.0, 75.0, 66.0; HI 16.0, 14.0, 15.0; E 12.0, 11.0, 12.0. Cranial : 1 ♂ : *on* 21.0; *pl* 10.5; *apf* 4.4; *n* 8.1; *mtr* 2.9; *b* 3.9; *d* 6.0; *zw* 10.5. 2 ♀ : *on* 19.6, 19.5; *pl* 10.0, 9.7; *apf* 4.3, 3.7; *n* 7.2, 7.1; *mtr* 3.3, 2.9; *b* 3.5, 3.3; *d* 5.2, 5.2; *zw* 10.5, 10.2.

*Diagnosis* : Soft furred. Dorsal colour grey to greyish brown, venter slaty basally, light brownish apically. Tail bicoloured.

*Distribution* : India: Andhra Pradesh : East Godavari district, Rangareddy district; Bihar; Gujarat; Karnataka; Maharashtra; Madhya Pradesh; Orissa; Tamil Nadu; Uttar Pradesh; West Bengal.

*Remarks* : Common in hedges, bushes or grass jungles adjacent to crop fields as well as in harvested fields.

Marshall (1977) maintained *Mus dunni* as a distinct species. Musser and carleton (1993) placed this under *Mus terricolor* as it was the older available name of this form. However, Agrawal (2000) treated it as a synonym of *Mus booduga*.

#### Genus *Rattus* Fischer, 1803

Two species of the genus *Rattus* occur in Andhra Pradesh.

#### Key to the species of *Rattus*

- Head and body length less than 200 mm; tail longer than head and body and unicolored. Nasal less than 38% of occipitonasal length ..... *R. rattus*
- Head and body length more than 200 mm; tail shorter than head and body and obscurely bicolored. Nasal more than 38% of occipitonasal length ..... *R. norvegicus*

#### 92. *Rattus norvegicus* (Berkenhout)

1769. *Mus norvegicus* Berkenhout, *Outlines N.H. Gt. Britain and Ireland*, 1 : 5 (N.V.) (Great Britain).

*Common names* : Norway Rat or Brown Rat (Eng.).

*Material examined* : Nil.

*Diagnosis* : Distinguished from all rats by its narrowed braincase and obscurely bicolored tail, being shorter than head and body length. Colour dark brown above, greyish below.

*Distribution* : India : Andhra Pradesh : Adilabad district, Chittoor district, Guntur district, Hyderabad district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Nalgonda district, Nizamabad district, Prakasam district, Visakhapatnam district, Warangal district; Jammu and Kashmir; West Bengal.

*Elsewhere* : Siberia, China; introduced worldwide.

*Remarks* : Nagalu *et al.* (1998) recorded this species from some conservation areas of the State, but we could observe the species only in the market areas and near railway station during our recent surveys to the State.

It is a palaeartic species, now distributed throughout the world including India, owing to transportation by human agency. It is found mainly in godowns of all towns and villages, along the banks of navigable rivers, and on high roads.

#### *Rattus rattus* (Linnaeus)

The House Rat or Black Rat, *Rattus rattus* is represented in Andhra Pradesh by two subspecies.

### Key to the subspecies of *Rattus rattus*

- Underparts white..... *R.r. narbadae*
- Underparts with a distinct rusty or rufous tinge ..... *R. r. rufescens*

#### 93. *Rattus rattus narbadae* Hinton

1918. *Rattus rattus narbadae* Hinton, *J. Bombay nat. Hist. Soc.*, **26** : 77 (Sakot, Hoshangabad, Madhya Pradesh, India).

*Common names* : House Rat, Black Rat (Eng.).

*Material examined* : East Godavari district : 1 ♂, 1 ♀, 1 ♂, (Sub ad.), Addatigala, c 75 Km NW of Rajamundry, 4-8.iv.1996. Guntur district : 1 ♂, Nagarjunakonda, 23.vii.1962. Krishna district : 1 ♀, Kaikalur, c 70 Km E of Vijayawada, 22.iv.1996. Kurnool district : 1 ♀, Atmakur, c 70 Km NE of Kurnool, 20.v.1995; 1 ♂, 2 ♀, Kotalacharu, c 15 Km W of Atmakur, 21.v.1995. Nellore district : 1 ♀, Kavali, 30.v.1994. Rangareddy district : 1 ♀, (Sub ad.), Raysam, c 30 Km E of Vikarabad, 7.xii.1993; 1 ♂, Tandur, c 124 Km N of Hyderabad, 1.xii.1993. Visakhapatnam district : 1 ♂, Borra Guhalu, 5.iii.1983. West Godavari district : 1 ♂, Koraturu, c 75 Km NW of Rajamundry, 14.iv.1996.

*Measurements* : External : 6 ♂ : HB 153.0-180.0 (164.0); TI 177.0-235.0 (201.0); Hf 30.3-34.5 (32.0); E 20.0-24.0 (21.0). 5 ♀ : HB 145.0-165.0 (156.0); TI 189.0-235.0 (202.0); Hf 30.0-33.0 (31.0); E 18.0-23.0 (20.0). Cranial : 3 ♂ : *on* 39.3-40.0 (39.8); *pl* 19.3-20.7 (20.1); *apf* 6.9-7.4 (7.2); *n* 13.6-14.2 (13.9); *mtr* 5.9-6.5 (6.3); *b* 7.0-7.2 (7.1); *d* 10.0-10.4 (10.2); *zw* (2) 18.4, 18.7. 2 ♀ : *on* 38.3, 40.0; *pl* 19.4, 21.0; *apf* 7.2, 7.5; *n* 12.9, 13.5; *mtr* 5.9, 6.0; *b* 6.6, 6.5; *d* 11.8, 10.8; *zw*—, 18.8.

*Diagnosis* : White-bellied, with tail much longer than head and body. Upper tooth-row length less than 6.6 or less than 16 percent of occipitonasal length.

*Distribution* : India : Andhra Pradesh : Adilabad district, East Godavari district, Guntur district, Karimnagar district, Krishna district, Kurnool district, Mahbubnagar district, Nalgonda district, Nellore district, Rangareddy district, Visakhapatnam district, Warangal district, West Godavari district; Gujarat; Karnataka; Kerala; Madhya Pradesh; Maharashtra; Tamil Nadu.

*Remarks* : Fairly common.

#### 94. *Rattus rattus rufescens* (Gray)

1837. *Mus rufescens* Gray, *Ann. Mag. nat. Hist.*, **1** : 35 (Dharwar, Karnataka, India).

*Common name* : House Rat (Eng.).

*Material examined* : Adilabad district : 1 ♂, 2 ♀, Chennur, c 37 Km E of Mancheriyal, 26-29.x.1996. Anantapur district : 1 ♀, Kadiri, c 90 Km S of Anantapur, 28.v.1995. Chittoor

district : 1 ♂, Talkona, c 114 Km N of Chittoor, 12.vi.1994; 1 ♂, Tirupati, 14.vi.1994. Cuddapah district : 2 ♀ Kondagorlapenta, Palkonda Hills, 6,7.vii.1930. Guntur district : 15 ♂, 13 ♀ Pullaredigudum, 25.vii.1962—11.ix.1962, 29.ix.1963—12.xi.1963. Karimnagar district : 1 ♂, 2 ♀, Jagtial, c 50 Km NW of Karimnagar, 30.x.1996, 3.xi.1996. Krishna district : 1 ♂, 2 ♀, Kaikalur, c 70 Km E of Vijayawada, 19-22.iv.1996. Kurnool district : 1 ♂, Kotalacharu, 21.v.1995. Nalgaonda district : 1 ♂, Deverkonda, 19.viii.1962. Nellore district : 1 ♀, (Juv.), Kavali, N of Nellore, 29.v.1994. Prakasam district : 3 ♂, 1 ♀, Diguvametta, c 160 Km W of Ongole, 15,16.v.1995; 1 ♂, Vally Pally, c 10 Km E of Diguvametta, 17.v.1995. Rangareddy district : 1 ♀, Nawab Pet, Anantagiri, c 6 Km W of Vikarabad, 4.xii.1993.

*Measurements* : External : 7 ♂ : HB 146.0-190.0 (165.0); TI 177.0-220.0 (196.0); Hf 30.0-34.0 (32.0); E 20.0-24.0 (21.0). 3 ♀ : HB 140.0-158.0 (150.0); TI 192.0-210.0; Hf 30.0-31.0 (30.0); E 20.0-21.0 (20.0). Cranial: 3 ♂ : *on* 36.2-40.9 (38.4); *pl* 18.3-31.1 (19.6); *apf* 6.3-7.7 (6.9); *n* 12.5-14.1 (13.2); *mtr* 5.8-6.6 (6.3); *b* 6.5-6.9 (6.7); *d* 9.3-10.7 (10.0); *zw* 16.6-19.3 (18.2). 5 ♀ : *on* 34.5-39.4 (36.2); *pl* 15.3-20.2 (18.2); *apf* 5.5-6.8 (6.1); *n* 12.4-14.7 (13.4); *mtr* 5.7-6.3 (6.1); *b* 6.1-7.0 (6.6); *d* 8.3-10.7 (9.4); *zw* 16.2-18.3 (17.3).

*Diagnosis* : Dark-bellied, tail always longer than head and body in length; dorsal and ventral hairs rusty or rufous tinged.

*Distribution* : India : Andhra Pradesh : Throughout the State; widely distributed throughout India.

*Elsewhere* : Malaysia, Pakistan and Thailand.

*Remarks* : Fairly common. Mainly found in residential areas.

#### Genus *Vandeleuria* Gray, 1942

It is a monotypic genus.

#### 95. *Vandeleuria oleracea oleracea* (Bennett)

1832. *Mus oleraceus* Bennett, *Proc. zool. Soc. Lond.*, : 121 (Deccan region, India).

*Common names* : Indian Long-tail Tree Mouse, Palm Mouse (Eng.), Meina yelka (Tel.).

*Material examined* : Cuddapah district : 1 ♂ : Ballapalli Range, 31.viii.1929.

*Measurements* : External : 1 ♂ : HB 64.0; TI 112.0; Hf 17.0; E 14.0.

*Diagnosis* : Small-sized, head and body less than 100 mm. Tail, poorly white, much longer than head and body. Outer finger clawless and stumpy. Colour pale tawny brown to reddish dorsally, white to darty white ventrally.

*Distribution* : India : Andhra Pradesh : Cuddapah district, Medak district; Bihar; Gujarat; Karnataka; Madhya Pradesh; Maharashtra; Tamil Nadu.

*Remarks* : Common, but due to small size and arboreal habit it is very difficult to collect them. Proper trapping may reveal the species from other districts of the State.

### Family HYSTRICIDAE

Represented in Andhra Pradesh by one genus and one species.

Genus *Hystrix* Linnaeus, 1755

#### 96. *Hystrix indica* Kerr

1792. *Hystrix cristata* var *indica* Kerr, *Anim Kingd.*, : 218 (India).

*Common names* : Indian Crested Porcupine (Eng.). Yedu Pandi (Tel.).

*Material examined* : Nil.

*Diagnosis* : Body covered with spines; a crest of long black quills on crown and neck; quills bear several alternate bands of white and blackish brown; quills of tail short and whitish.

*Distribution* : India : Andhra Pradesh : Adilabad district, Chittoor district, Cuddapah district, Guntur district, Karimnagar district, Khammam district, Kurnool district, Mahbubnagar district, Medak district, Nalgonda district, Nizamabad district, Prakasam district, Sri Kakulum district, Visakhapatnam district, Vizianagaram district, Warangal district; widely distributed throughout India, except northeastern states.

*Elsewhere* : China, Iraq, Iran, Pakistan, Russia, Turkestan, Soudi Arabia, Sri Lanka, Syria.

*Remarks* : Nagalu *et al.* (1998) reported this as common in certain conservation areas of the State. But we could not notice them due to their strictly nocturnal and burrowing habit. However, in several areas their presence was confirmed by their peculiar, elongated and pointed faecal matter as well as quills. It causes serious damage to forest and agricultural crops.

### Order LAGOMORPHA

Two pairs of incisors in the upper jaw, placed one behind the other. Check-teeth adapted for grinding and separated from incisors by a wide diastema.

Represented in Andhra Pradesh by a single family Leporidae.

### Family LEPORIDAE

Hind limbs very long; soles including digital pads completely covered with hairs. Ears very long and narrow. A short tail present.

Only one genus and one species occur in Andhra Pradesh.

Genus *Lepus* Linnaeus, 175897. *Lepus nigricollis nigricollis* Cuvier

1823. *Lepus nigricollis* F. Cuvier, *Diet. Sci. Nat.*, 26 : 307 (Madras, India).

*Common names* : Indian Hare (Eng.), Choura Pilli (Tel.).

*Material examined* : Cuddapah district : 1 ♂, Chintarajupalli, Palkonda Hills, 14.vi.1930; 1 ♀, Dasarladeddi, Palkonda Hills, 21.vi.1930; 1 ♂, Madhavaram, Vontimitta Range, 6.viii.1930. Guntur district : 2 ♂, 5 ♀, Nagarjunakonda, 29.vii.1962, 1-17.ix.1962, 3.ix.1963. Kurnool district : 1 ♂, Diguva metta, 26.viii.1930.

*Measurements* : External : 3 ♂ : HB 400.0-480.0 (440.0); TI 79.0-96.0 (86.0); Hf 100.0-105.0 (103.0); E 90.0-94.0 (92.0). 1 ♀ : HB 475.0; TI 95.0; Hf 105.0; E 92.0.

*Diagnosis* : Ears longer than tail in general. Fur coarse, above reddish brown mixed with black; throat and belly white; tail brown above, white below.

*Distribution* : India : Andhra Pradesh : Throughout the State, in suitable habitat; Karnataka; Kerala; Maharashtra; Tamil Nadu.

*Remarks* : Fairly common in areas having no hunting pressure. Large tracts of bush and jungle alternating with cultivated fields provide ideal living condition to this hare.

**MARINE MAMMALS**

A good number of marine mammals have been recorded from Andhra Coast. A detail list of species as per record of de silva (1987) and Krishna Raju *et al.* (1987) from Andhra Coast is appended below. Most of the following species have been recorded from Visakhapatnam Coast.

## Order SIRENIA

## Family DUGONGIDAE

98. *Dugong dugong* (Müller)

1776. *Trichecus (Sic) dugon* Müller, *Linne's Vollstand. Natursyst. Suppl.*, p. 21 (Cape of Good Hope to the Philippines).

*Common name* : Dugong (Eng.).

## Order CETACEA

## Family DELPHINIDAE

99. *Tursiops truncatus* (Montagu)

1821. *Delphinus truncatus* Montagu, *Mem. Wernerian Nat. Hist. Soc.*, 3 : 75 (Devonshire, England).

*Common name* : Bottlenosed Dolphin (Eng.).

100. *Delphinus delphis* Linnaeus

1758. *Delphinus delphis* Linnaeus, *Syst. Nat.*, 10th ed., 1 : 77 (E. North Atlantic).

*Common name* : Common Dolphin (Eng.).

101. *Peponocephala electra* (Gray)

1846. *Lagenorhynchus electra* Gray, *Zool. Voy. H.M.S. "Erebus" and "Terror"* 1 : 35 (Unknown).

*Common name* : Melon-headed Whale (Eng.).

102. *Orcaella brevirostris* (Gray)

1866. *Phocaena (Orca) brevirostris* Gray, *Cat. Seals Whales Brit. Mus.*, p. 285 (Visakhapatnam. Andhra Pradesh, India).

*Common name* : Irrawady Dolphin (Eng.).

## Family PHYSETERIDAE

103. *Kogia simus* (Owen)

1866. *Physeter (Euphysetes) simus* Owen, *Trans. zool. Soc. Lond.*, 6(1) : 30 (Visakhapatnam. Andhra Pradesh, India).

*Common name* : Dwarf Sperm Whale (Eng.).

## DISCUSSION

The above account clearly indicates the richness as well as diversity of the mammalian species in the State. Further, many of the districts like Vizianagram, Srikakulam, etc. could not be covered during the present surveys and it is expected that survey of those areas may add many species to the State. However, as in many areas of the country, major wildlife habitats viz., forests, wetlands, grasslands, etc. in Andhra Pradesh are fast deteriorating. As a result, fauna as a whole and specially the mammalian species are worst affected. Many of the species are threatened and wiped out from major parts of their earlier range. One of such species is wild buffalo, *Bubalus bubalis* which roamed in the forests of Sileru/Guntarada areas in Visakhapatnam till 1960s has retreated to Bastar forest of present Chattisgarh State (Krishna Raju *et al.* 1987). Wildlife habitats are getting degraded due to incessant exploitation in the name of development or by illegal encroachments for shifting cultivation and felling for commercial purposes. Further, in some areas management of forested tracks has become difficult due to Geo-political disturbances. During the present surveys, hunting with fire-arms, trapping of animals, and trade in wildlife products were noticed in many areas. All these factors have taken a huge toll of wildlife species particularly of mammals and birds.

during the last few decades. Krishna Raju *et al.* (1987) made a number of suggestions for conservation of important wildlife habitats and species there in. Biodiversity alongwith physical and socio-economic environment of Eastern Ghats have recently been discussed in a National Seminar (1998). A number of recommendations have been made in the seminar for the conservation of Eastern Ghats. The State has already developed a network of protected areas comprising of three National Parks and 21 Sanctuaries covering a total area of about 12903 km<sup>2</sup> in the biogeographic provinces 6D, 6E and 6B. Rodgers *et al.* (2000) put forwarded proposals for further new protected areas covering the biogeographic province 6C in the State. It is expected that with the proper implementation of the scientific recommendations and appropriate management of protected areas alongwith other natural areas will help to prevent the further loss of species and their population.

### SUMMARY

A total of 103 species of mammals belonging to 12 Orders have been reported from Andhra Pradesh alongwith their district-wise distribution. Systematic keys for the identification of each species have been provided. Notes on taxonomy, ecology and population status have also been appended, wherever, felt necessary.

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**Table 2.** Showing the districtwise distribution of the mammalian species of Andhra Pradesh.

Name of the Species	Name of the districts																						
	Adilabad	Anantapur	Chittoor	Cuddapah	East Godavari	Guntur	Hyderabad	Karimnagar	Khammam	Krishna	Kurnool	Mahabubnagar	Medak	Nalgonda	Nellore	Nizamabad	Prakasam	Rangareddy	Srikakulam	Visakhapatnam	Vizianagaram	Warangal	West Godavari
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Order INSECTIVORA																							
Family ERINACEIDAE																							
1. <i>Paraechinus micropus nudiventris</i>	+	-	+	+	-	+	-	+	+	-	+	+	-	+	-	-	+	-	-	-	-	+	-
Family SORICIDAE																							
2. <i>Suncus murinus murinus</i>	+	-	-	-	+	-	-	+	-	-	+	-	-	-	-	+	-	-	+	+	+	-	-
3. <i>Suncus murinus niger</i>	-	+	+	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
4. <i>Suncus murinus viridescens</i>	-	-	-	-	-	+	+	-	+	-	+	+	+	+	-	-	-	-	-	-	-	+	+
5. <i>Suncus etruscus perrotteti</i>	-	-	+	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Order SCANDENTIA																							
Family TUPAIIDAE																							
6. <i>Anathana ellioti ellioti</i>	+	-	+	+	-	+	-	+	+	-	+	+	-	+	+	+	+	-	-	-	-	+	-
Order CHIROPTERA																							
Family PTEROPODIDAE																							
7. <i>Cynopterus sphinx sphinx</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Name of the Species	Name of the districts																						
	Adilabad	Anantapur	Chittoor	Cuddapah	East Godavari	Guntur	Hyderabad	Karimnagar	Khammam	Krishna	Kurnool	Mahabubnagar	Medak	Nalgonda	Nellore	Nizamabad	Prakasam	Rangareddy	Srikakulam	Visakhapatnam	Vizianagaram	Warangal	West Godavari
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
8. <i>Pteropus giganteus giganteus</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
9. <i>Rousettus leschenaulti leschenaulti</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
10. <i>Eonycteris spelaea</i>	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-
Family RHINOPOMATIDAE																							
11. <i>Rhinopoma hardwickei hardwickei</i>	+	-	-	+	-	+	-	+	+	-	+	+	-	+	-	-	+	-	-	-	-	+	-
Family EMBALLONURIDAE																							
12. <i>Taphozous longimanus longimanus</i>	+	-	-	+	-	+	-	+	+	-	+	+	-	+	-	-	+	-	-	-	-	+	-
13. <i>Taphozous melanopogon melanopogon</i>	+	-	-	+	-	+	-	+	+	-	+	+	-	+	-	-	+	-	-	+	-	+	-
14. <i>Taphozous nudiventris kachhensis</i>	+	-	-	+	-	+	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-
15. <i>Taphozous perforatus perforatus</i>	+	-	-	+	-	+	-	+	-	-	+	+	-	+	-	-	+	-	-	-	-	-	-
Family MEGADERMATIDAE																							
16. <i>Megaderma lyra lyra</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
17. <i>Megaderma spasma</i>	+	-	-	-	-	+	-	+	+	-	+	+	-	+	-	-	+	-	-	-	-	+	-

Name of the Species	Name of the districts																							
	Adilabad	Anantapur	Chittoor	Cuddapah	East Godavari	Guntur	Hyderabad	Karimnagar	Khammam	Krishna	Kurnool	Mahbubnagar	Medak	Nalgonda	Nellore	Nizamabad	Prakasam	Rangareddy	Srikakulam	Visakhapatnam	Vizianagaram	Warangal	West Godavari	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
Family RHINOLOPHIDAE																								
18. <i>Rhinolophus lepidus lepidus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19. <i>Rhinolophus luctus perniger</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
20. <i>Rhinolophus rouxi rouxi</i>	+	+	+	+	-	+	-	+	+	-	+	+	-	+	-	+	+	-	-	-	+	+	+	+
21. <i>Hipposideros fulvus pallidus</i>	+	-	-	-	+	+	-	+	+	-	+	+	-	+	-	+	+	+	+	-	-	-	+	+
22. <i>Hipposideros lankadiva</i>	+	-	+	+	-	+	-	+	+	-	+	+	+	+	-	+	+	-	-	+	-	+	-	+
23. <i>Hipposideros speoris speoris</i>	+	+	+	+	+	+	+	+	+	-	+	+	-	+	-	+	+	-	-	-	-	+	+	+
Family VESPERTILIONIDAE																								
24. <i>Kerivoula picta picta</i>	+	-	-	-	-	+	-	+	+	-	+	+	-	+	-	-	+	-	-	-	-	+	-	-
25. <i>Hesperoptenus tickelli</i>	+	-	-	-	-	+	-	+	+	-	+	+	-	+	-	-	+	-	-	-	-	+	-	-
26. <i>Myotis montivagus peytoni</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
27. <i>Pipistrellus ceylonicus indicus</i>	+	-	-	-	+	+	+	+	+	-	+	+	+	+	-	+	+	+	+	+	-	+	+	+
28. <i>Pipistrellus coromandna coromandra</i>	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	-	+	+	+

Name of the Species	Name of the districts																						
	Adilabad	Anantapur	Chittoor	Cuddapah	East Godavari	Guntur	Hyderabad	Karimnagar	Khammam	Krishna	Kurnool	Mahabubnagar	Medak	Nalgonda	Nellore	Nizamabad	Prakasam	Rangareddy	Srikakulam	Visakhapatnam	Vizianagaram	Warangal	West Godavari
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
29. <i>Pipistrellus dormeri</i>	+	-	-	-	-	+	-	+	+	-	+	+	-	+	-	-	+	-	-	-	-	+	-
30. <i>Pipistrellus mimus</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	-	+	+
31. <i>Scotophilus heathi heathi</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
32. <i>Scotophilus kuhli kuhli</i>	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
33. <i>Murina cyclotis cyclotis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
34. <i>Miniopterus schreibersi fuliginosus</i>	+	-	-	-	-	+	-	+	+	-	+	+	-	+	-	-	+	-	-	-	-	+	-
Family MOLOSSIDAE																							
35. <i>Tadarida aegyptiaca</i>	+	-	-	-	-	+	-	+	+	-	+	+	-	+	-	-	+	-	-	-	-	+	-
36. <i>Tadarida plicata plicata</i>	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
Order PRIMATES																							
Family LORIDAE																							
37. <i>Loris tardigradus</i>	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
Family CERCOPITHECIDAE																							
38. <i>Macaca mulatta mulatta</i>	+	-	-	-	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+

Name of the Species	Name of the districts																							
	Adilabad	Anantapur	Chittoor	Cuddapah	East Godavari	Guntur	Hyderabad	Karimnagar	Khammam	Krishna	Kurnool	Mahabubnagar	Medak	Nalgonda	Nellore	Nizamabad	Prakasam	Rangareddy	Srikakulam	Visakhapatnam	Vizianagaram	Warangal	West Godavari	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
39. <i>Macaca radiata radiata</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	+	-	
40. <i>Semnopithecus entellus entellus</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Order CARNIVORA																								
Family CANIDAE																								
41. <i>Canis aureus naria</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
42. <i>Canis lupus pallipes</i>	+	+	-	-	-	+	-	+	+	-	+	+	-	+	-	+	+	-	-	+	+	+	-	+
43. <i>Cuon alpinus</i>	+	-	+	+	+	+	-	-	+	+	-	+	-	+	-	+	+	-	-	-	-	+	+	+
44. <i>Vulpes bengalensis</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Family FELIDAE																								
45. <i>Felis chaus kutas</i>	+	-	+	+	+	+	-	+	+	+	+	+	-	+	+	+	+	-	+	+	+	+	-	-
46. <i>Felis silvestris ornata</i>	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
47. <i>Prionailurus bengalensis</i>	+	-	-	-	+	+	-	+	+	-	+	+	-	+	+	-	+	-	-	+	+	+	-	-
48. <i>Prionailurus rubiginosus</i>	-	-	-	+	-	-	-	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-

Name of the Species	Name of the districts																						
	Adilabad	Anantapur	Chittoor	Cuddapah	East Godavari	Guntur	Hyderabad	Karimnagar	Khammam	Krishna	Kurnool	Mahabnagar	Medak	Nalgonda	Nellore	Nizamabad	Prakasam	Rangareddy	Srikakulam	Visakhapatnam	Vizianagaram	Warangal	West Godavari
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
49. <i>Prionailurus viverrinus</i>	+	-	-	-	+	+	+	+	+	+	+	+	-	+	+	+	+	-	-	+	+	+	+
50. <i>Panthera pardus fusca</i>	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	-	+	+	+	+	+
51. <i>Panthera tigris tigris</i>	+	-	+	-	+	+	-	+	+	-	+	+	-	+	-	-	+	-	+	+	+	+	+
Family HERPESTIDAE																							
52. <i>Herpestes edwardsi</i>	+	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+
53. <i>Herpestes javanicus auropunctatus</i>	+	-	-	-	+	+	-	+	+	-	+	+	-	+	-	+	+	-	-	+	+	+	+
54. <i>Herpestes smithi</i>	+	-	-	-	-	+	-	+	+	-	+	+	-	+	-	-	-	-	-	-	-	+	-
Family HYAENIDAE																							
55. <i>Hyaena hyaena hyaena</i>	+	+	+	+	+	+	-	+	+	+	+	+	-	+	-	+	+	-	+	+	+	+	+
Family MUSTELIDAE																							
56. <i>Lutrogale perspicillata</i>	+	-	-	-	+	+	+	-	-	+	-	+	-	-	+	-	-	+	-	+	-	-	+
57. <i>Mellivora capensis indica</i>	+	-	-	-	-	+	-	+	+	-	+	+	-	+	-	-	+	-	-	+	+	-	-
Family URSIDAE																							
58. <i>Melursus ursinus</i>	+	+	+	+	+	+	-	+	+	-	+	+	+	+	-	+	+	-	+	+	+	+	+

Name of the Species	Name of the districts																						
	Adilabad	Anantapur	Chittoor	Cuddapah	East Godavari	Guntur	Hyderabad	Karimnagar	Khammam	Krishna	Kurnool	Mahabubnagar	Medak	Nalgonda	Nellore	Nizamabad	Prakasam	Rangareddy	Srikakulam	Visakhapatnam	Vizianagaram	Warangal	West Godavari
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Family VIVERRIDAE																							
59. <i>Paradoxurus hermaphroditus</i>	+	-	-	-	+	+	-	+	+	+	+	+	-	+	-	+	+	-	-	+	+	+	+
60. <i>Viverricula indica indica</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Order PROBOSIDEA																							
Family ELEPHANTIDAE																							
61. <i>Elephas maximus indicus</i>	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Order ARTIODACTYLA																							
Family SUIDAE																							
62. <i>Sus scrofa cristatus</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Family TRAGULIDAE																							
63. <i>Moschiola meminna</i>	+	-	+	+	+	+	-	+	+	-	+	+	-	+	-	-	+	-	-	+	+	+	+
Family CERVIDAE																							
64. <i>Axis axis axis</i>	+	+	+	+	+	+	-	+	+	-	+	+	+	+	-	+	+	-	-	+	+	+	+

Name of the Species	Name of the districts																						
	Adilabad	Anantapur	Chittoor	Cuddapah	East Godavari	Guntur	Hyderabad	Karimnagar	Khammam	Krishna	Kurnool	Mahbubnagar	Medak	Nalgonda	Nellore	Nizamabad	Prakasam	Rangareddy	Srikakulam	Visakhapatnam	Vizianagaram	Warangal	West Godavari
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
65. <i>Cervus unicolor niger</i>	+	-	+	+	+	+	-	+	+	-	+	+	+	+	-	+	+	-	-	+	+	+	+
66. <i>Muntiacus muntjak aureus</i>	+	+	+	+	+	+	-	+	+	-	+	+	-	+	-	+	+	-	+	+	+	+	+
Family BOVIDAE																							
67. <i>Antilope cervicapra cervicapra</i>	+	-	-	-	+	-	-	+	-	-	-	-	+	+	+	-	+	+	-	-	-	+	+
68. <i>Gazella bennetti</i>	+	-	+	+	-	+	-	+	+	+	+	+	+	+	-	+	+	-	-	-	-	+	-
69. <i>Bos frontalis</i>	+	-	-	-	+	-	-	+	+	-	-	-	-	-	-	-	-	-	-	+	-	+	+
70. <i>Boselaphus tragocamelus</i>	+	-	+	+	-	+	-	+	+	-	+	+	+	+	-	+	+	-	-	-	-	+	-
71. <i>Tetracerus quadricornis</i>	+	-	+	+	+	+	-	+	+	-	+	+	-	+	-	+	+	-	-	+	+	+	+
Order PHOLIDAOA																							
72. <i>Manis crassicaudata</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	-	+	+	+	+	-
Order RODENTIA																							
Family SCIURIDAE																							
73. <i>Funambulus palmarum palmarum</i>	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	+	-

Name of the Species	Name of the districts																						
	Adilabad	Anantapur	Chittoor	Cuddapah	East Godavari	Guntur	Hyderabad	Karimnagar	Khammam	Krishna	Kurnool	Mahbubnagar	Medak	Nalgonda	Nellore	Nizamabad	Prakasam	Rangareddy	Srikakulam	Visakhapatnam	Vizianagaram	Warangal	West Godavari
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
74. <i>Funambulus palmarum robertsoni</i>	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
75. <i>Funambulus pennanti</i>	+	-	-	-	+	+	-	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+
76. <i>Ratufa indica centralis</i>	+	-	+	+	+	+	-	+	+	-	+	+	-	+	-	+	+	-	-	+	+	+	+
77. <i>Petaurista petaurista philippensis</i>	+	-	+	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-
Family MURIDAE																							
78. <i>Tatera indica cuvieri</i>	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+
79. <i>Bandicota bengalensis bengalensis</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
80. <i>Bandicota indica indica</i>	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	-	-	+	+	+	+
81. <i>Cremnomys blanfordi</i>	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
82. <i>Cremnomys cutchicus</i>	-	-	-	+	-	-	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-
83. <i>Golunda ellioti ellioti</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
84. <i>Millardia meltada meltada</i>	+	-	-	-	+	+	-	+	+	-	+	+	-	+	-	+	+	+	-	+	+	+	+
85. <i>Mus booduga booduga</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Name of the Species	Name of the districts																						
	Adilabad	Anantapur	Chittoor	Cuddapah	East Godavari	Guntur	Hyderabad	Karimnagar	Khammam	Krishna	Kurnool	Mahbubnagar	Medak	Nalgonda	Nellore	Nizamabad	Prakasam	Rangareddy	Srikakulam	Visakhapatnam	Vizianagaram	Warangal	West Godavari
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
86. <i>Mus musculus castaneus</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
87. <i>Mus musculus tytleri</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
88. <i>Mus phillipsi</i>	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
89. <i>Mus platythrix</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
90. <i>Mus saxiola</i>	-	+	+	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
91. <i>Mus dunni</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
92. <i>Rattus norvegicus</i>	+	-	+	-	-	+	+	+	+	-	+	+	-	+	-	+	+	-	-	+	-	+	-
93. <i>Rattus rattus narbadae</i>	+	-	-	-	+	+	-	+	-	+	+	+	-	+	+	-	-	+	-	+	-	+	-
94. <i>Rattus rattus rufescens</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
95. <i>Vandeleuria oleracea oleracea</i>	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Family HYSTRICIDAE																							
96. <i>Hystrix indica</i>	+	-	+	+	-	+	-	+	+	-	+	+	+	+	-	+	+	-	-	+	+	+	+
Order LAGOMORPHA																							
Family LEPORIDAE																							
97. <i>Lepus nigricollis nigricollis</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Name of the Species	Name of the districts																						
	Adilabad	Anantapur	Chittoor	Cuddapah	East Godavari	Guntur	Hyderabad	Karimnagar	Khammam	Krishna	Kurnool	Mahbubnagar	Medak	Nalgonda	Nellore	Nizamabad	Prakasam	Rangareddy	Srikakulam	Visakhapatnam	Vizianagaram	Warangal	West Godavari
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Order SIRENIA																							
Family DUGONGIDAE																							
98. <i>Dugong dugong</i>																							
Order CETACEA																							
Family DELPHINIDAE																							
99. <i>Tarsiops truncatus</i>																							
100. <i>Delphinus delphis</i>																							
101. <i>Peponocephala electra</i>																							
102. <i>Orcaella brevirostris</i>																							
Family PHYSETERIDAE																							
103. <i>Kogia simus</i>																							

## **MARINE AND ESTUARINE FISHES**

**R. P. BARMAN, S. KAR & P. MUKHERJEE**

*Zoological Survey of India, 27, J. L. Nehru Road, Kolkata-700 016*

### **INTRODUCTION**

Andhra Pradesh is one of the eight maritime states of India. It is situated on the eastern coast of the Indian Peninsula and the South-East of India. It has a coastal line 974 kms. bordered by 9 districts from Srikakulam to Nellore out of the 23 districts of the state. This state ranks third next to Gujarat and Tamil Nadu in the length of the coastal line of India. Srikakulam has the maximum coastal line of 200 kms. and West Godavari has the minimum coastal line of only 20 kms. The total coastal line has been surveyed covering almost all the fish landing centres and catchment areas. The present study is the synthesis of the works of earlier studies and the fishes recorded during our surveys. This shows that a total of 580 species under 292 genera, 121 families and 27 orders of fishes known to occur in Andhra Pradesh. A short description of all the families along with key to the families, genera and species are provided in this work. The English and Telugu names of the species (where known) are furnished along with the names of the species listed under the species known to occur in the state—the first name is the English common name and the second name is the Telugu name. The maximum length of the species (where known/recorded) also furnished along with the names of species in the key to the species where more than one species is known under the family.

During the study of the fishes of this state a lot of literature were consulted, the names of all those publications are cited under the bibliography section.

### **SYSTEMATIC LIST OF MARINE & ESTUARINE FISHES**

Class 1 CHONDRICHTHYES

Order 1 ORECTOLOBIFORMES

Family 1 HEMISCYLLIDAE

1. *Chiloscyllium griseum* Muller & Henle
2. *C. indicum* (Gmelin)

3. *C. plagiosum* (Bennett)
4. *C. punctatum* (Muller & Henle)
  - Family 2 STEGOSTOMATIDAE
5. *Stegostoma fasciatum* (Hermann)
  - Family 3 GINGLYMOSTOMATIDAE
6. *Nebrius ferrugineus* (Lesson)
  - Family 4 RHINIODONTIDAE
7. *Rhincodon typus* (Smith)
  - Order 2 LAMNIFORMES
  - Family 5 ODONTASPIDIDAE
8. *Carcharius tricuspidatus* Day
  - Family 6 LAMNIDAE
9. *Isurus oxyrinchus* Rafinesque
  - Order 3 CARCHARHINIFORMES
  - Family 7 SCYLORHINIDAE
10. *Atelomycterus marmoratus* (Bennett)
  - Family 8 TRIAKIDAE
11. *Mustelus mosis* Hemprich & Ehrenberg
  - Family 9 HEMIGALEIDAE
12. *Chaenogaleus macrostoma* (Bleeker)
13. *Hemipristis elongatus* (Klunzinger)
  - Family 10 CARCHARHINIDAE
14. *Carcharhinus dussumieri* (Valenciennes)
15. *C. hemiodon* (Valenciennes)
16. *C. limbatus* (Valenciennes)
17. *C. longimanus* (Poey)
18. *C. macloti* (Muller & Henle)
19. *C. melanopterus* (Quoy & Gaimard)
20. *C. sorrah* (Valenciennes)
21. *Galeocerdo cuvieri* (Peron & Le Sueur)
22. *Lamiopsis temminckii* (Muller & Henle)
23. *Loxodon macrorhinus* Muller & Henle

24. *Negaprion acutidens* (Ruppell)
25. *Pionace glauca* (Linnaeus)
26. *Rhizoprionodon acutus* (Ruppell)
27. *R. oligolinx* (Springer)
28. *Scoliodon laticaudus* Muller & Henle
29. *Triaenodon obesus* (Ruppell)

Family 11 SPHYRNIDAE

30. *Eusphyra blochii* (Cuvier)
31. *Sphyrna lewini* (Griffith & Smith)
32. *S. mokarran* (Ruppell)

Order 4 PRISTIFORMES

Family 12 PRISTIDAE

33. *Anoxypristis cuspidatus* (Latham)
34. *Pristis microdon* Latham
35. *P. zijsron* Bleeker

Order 5 TORPEDINIFORMES

Family 13 TORPEDINIDAE

36. *Torpedo panthera* Olfers

Family 14 NARCINIDAE

37. *Narcine brunnea* Annandale
38. *N. indica* Henle
39. *N. timlei* (Bloch & Schneider)

Family 15 NARKIDAE

40. *Narke dipterygia* (Bloch & Schneider)
41. *N. impennis* (Annandale)

Order 6 RAJIFORMES

Family 16 RHINOBATIDAE

42. *Rhinobatos granulatus* Cuvier
43. *R. obtusus* Muller & Henle
44. *R. thouniana* (Shaw)

Family 17 RHYNCHOBATIDAE

45. *Rhina ancylostoma* Schneider

46. *Rhynchobatus djeddensis* (Forsskal)

Order 7 MYLIOBATIFORMES

Family 18 MYLIOBATIDAE

47. *Aetobatus narinari* (Euphrasen)

48. *Aetomylaeus nichofii* (Schneider)

Family 19 MOBULIDAE

49. *Mobula diabolus* (Shaw)

Family 20 DASYATIDAE

50. *Dasyatis kuhlii* (Muller & Henle)

51. *Himantura favus* (Annandale)

52. *H. imbricata* (Schneider)

53. *H. marginatus* (Blyth)

54. *H. uarnak* (Forsskal)

55. *H. walga* (Muller & Henle)

56. *Hypolophus sephen* (Forsskal)

57. *Taeniura melanospila* Bleeker

Family 21 GYMNURIDAE

58. *Gymnura japonica* (Schlegel)

59. *G. micrura* (Schneider)

60. *G. poecilura* (Shaw)

61. *G. tentaculata* (Valenciennes)

Class 2 OSTEICHTHYES

Order 8 ELOPIFORMES

Family 22 ELOPIDAE

62. *Elops machnata* (Forsskal)

Family 23 MEGALOPIDAE

63. *Megalops cyprinoides* (Broussonet)

Order 9 ANGUILLIFORMES

Family 24 ANGUILLIDAE

64. *Anguilla bengalensis bengalensis* (Gray & Hardwicke)

65. *A. bicolor bicolor* McClelland

Family 25 CONGRIDAE

66. *Uroconger lepturus* (Richardson)

Family 26 MURAENESOCIDAE

67. *Congresox talabon* (Cuvier)
68. *C. talabonoides* (Bleeker)
69. *Muraenesox bagio* (Hamilton-Buchanan)
70. *M. cinereus* (Forsskal)

Family 27 MURAENIDAE

71. *Echidna nebulosa* (Ahl)
72. *E. zebra* (Shaw & Nodder)
73. *Gymnothorax reticularis* Bloch
74. *Lycodontis fimbriatus* (Bennett)
75. *L. punctatus* (Bloch & Schneider)
76. *L. tile* (Hamilton-Buchanan)
77. *Thyrsoidea macrura* (Bleeker)

Family 28 OPHICHTHIDAE

78. *Lamnostoma orientalis* (McClelland)
79. *Neenchelys buitendijki* Weber & de Beaufort
80. *Ophichthus apicalis* (Bennett)
81. *Pisodonophis boro* (Hamilton-Buchanan)
82. *P. cancrivorus* (Richardson)

Order 10 CLUPEIFORMES

Family 29 CLUPEIDAE

83. *Amblygaster clupeoides* Bleeker
84. *A. leiogaster* (Valenciennes)
85. *A. sirm* (Walbaum)
86. *Anodontostoma chacunda* (Hamilton-Buchanan)
87. *Dussumieria acuta* Valenciennes
88. *D. elopsoides* Bleeker
89. *Escualosa thoracata* (Valenciennes)
90. *Herklotsichthys quadrimaculatus* (Ruppell)
91. *Hilsa kelee* (Cuvier)
92. *Nematolosa galathea* Nelson & Rothman
93. *N. nasus* (Bloch)
94. *Sardinella albella* (Valenciennes)

95. *S. brachysoma* Bleeker
96. *S. fimbriata* (Valenciennes)
97. *S. gibbosa* (Bleeker)
98. *S. longiceps* Valenciennes
99. *Spratelloides delicatulus* (Bennett)
100. *S. gracilis* (Temminck & Schlegel)
101. *Tenualosa ilisha* (Hamilton-Buchanan)
102. *T. toli* (Valenciennes)

Family 30    PRISTIGASTERIDAE

103. *Ilisha filigera* (Valenciennes)
104. *I. kampeni* (Weber & Beaufort)
105. *I. megaloptera* (Swainson)
106. *I. melanostoma* (Schneider)
107. *I. sirishai* Seshagiri Rao
108. *I. striatula* Wongratna
109. *Pellona dayi* Wongratna
110. *P. ditchella* Valenciennes
111. *Opisthopterus tardoore* (Cuvier)
112. *Raconda russeliana* Gray

Family 31    ENGRAULIDIDAE

113. *Coilia dussumieri* Valenciennes
114. *C. neglecta* Whitehead
115. *C. ramcarati* (Hamilton-Buchanan)
116. *C. reynaldi* Valenciennes
117. *Setipinna phasa* (Hamilton-Buchanan)
118. *S. taty* (Valenciennes)
119. *S. tenuifillis* Valenciennes
120. *Stolephorus andhraensis* Babu Rao
121. *S. commersonii* Lacepede
122. *S. devisi* (Whitley)
123. *S. heterobolus* (Ruppell)
124. *S. indicus* (van Hasselt)
125. *S. insularis* Hardenberg

- 126. *S. waitei* Jordon & Seale
- 127. *Thryssa dussumierei* (Valenciennes)
- 128. *T. hamiltonii* (Gray)
- 129. *T. kammalensis* (Bleeker)
- 130. *T. malabarica* (Bloch)
- 131. *T. mystax* (Schneider)
- 132. *T. purava* (Hamilton-Buchanan)
- 133. *T. setirostris* (Broussonet)
- 134. *T. vitrirostris* (Gilchrist & Thompson)

Family 32    CHIROCENTRIDAE

- 135. *Chirocentrus dorab* (Forsskal)
- 136. *C. nudus* Swainson

Order 11    GONORYNCHIFORMES

Family 33    CHANIDAE

- 137. *Chanos chanos* (Forsskal)

Order 12    SILURIFORMES

Family 34    ARIIDAE

- 138. *Arius arius* (Hamilton-Buchanan)
- 139. *A. caelatus* Valenciennes
- 140. *A. dussumieri* Valenciennes
- 141. *A. jella* Day
- 142. *A. maculatus* (Thunberg)
- 143. *A. platystomus* Day
- 144. *A. sagor* (Hamilton-Buchanan)
- 145. *A. sona* (Hamilton-Buchanan)
- 146. *A. tenuispinis* Day
- 147. *A. thalassinus* (Ruppell)
- 148. *Batrachocephalus mino* (Hamilton-Buchanan)
- 149. *Osteogeneiosus militaris* (Linnaeus)

Family 35    PLOTOSIDAE

- 150. *Plotosus canius* Hamilton-Buchanan
- 151. *P. lineatus* (Thunberg)

Order 13 AULOPIFORMES

Family 36 CHLOROPHTHALMIDAE

152. *Chlorophthalmus agassizi* Bonaparte

Family 27 SYNODIDAE

153. *Saurida pseudotumbil* Dutt & Sagar

154. *S. tumbil* (Bloch)

155. *S. undosquamis* (Richardson)

156. *Synodus indicus* (Day)

157. *S. variegatus* (Lacepede)

158. *Trachinocephalus myops* (Bloch & Schneider)

Family 38 HARPODONTIDAE

159. *Harpodon nehereus* (Hamilton-Buchanan)

Order 14 GADIFORMES

Family 39 BREGMACEROTIDAE

160. *Bregmaceros mccllellandi* Thompson

Order 15 OPHIDIIFORMES

Family 40 OPHIDIIDAE

161. *Brotula multibarbata* (Temminck & Schlegel)

Order 16 BATRACHOIDIFORMES

Family 41 BRATRACHOIDIDAE

162. *Austrobatrachus dussumieri* (Valenciennes)

Order 17 LOPHIIFORMES

Family 42 LOPHIIDAE

163. *Lophiodes mutilus* (Alcock)

164. *Lophiomus setigerus* (Vahl)

Family 43 OGOCEPHALIDAE

165. *Haliutaea stellata* (Vahl)

Family 44 ANTENNARIDAE

166. *Antennarius hispidus* (Bloch & Schneider)

Order 18 BELONIFORMES

Family 45 EXOCOETIDAE

167. *Cheilopogon cyanopterus* (Valenciennes)

- 168. *C. furcatus* (Michill)
- 169. *C. nigricans* (Bennett)
- 170. *Exocoetus volitans* (Linnaeus)
- 171. *E. monocirrus* Richardson
- 172. *Hirundichthys coromandelensis* (Hornell)
- 173. *H. oxycephalus* (Bleeker)
- 174. *Parexocoetus mento* (Valenciennes)
- 175. *Prognichthys brevipinnis* (Valenciennes)

Family 46 BELONIDAE

- 176. *Ablennes hians* (Valenciennes)
- 177. *Strongylura leiura* (Bleeker)
- 178. *S. strongylura* (van Hasselt)
- 179. *Tylosurus acus melanotus* (Bleeker)
- 180. *T. crocodilus crocodilus* (Person & Le Sueur)

Family 47 HEMIRAMPHIDAE

- 181. *Hemiramphus far* (Forsskal)
- 182. *H. lutkei* (Valenciennes)
- 183. *Hyporhamphus dussumieri* (Valenciennes)
- 184. *H. limbatus* (Valenciennes)
- 185. *Rhynchorhamphus malabaricus* Collette

Order 19 ATHERINIFORMES

Family 48 ATHERINIDAE

- 186. *Atherinomorus lacunosus* (Forster)
- 187. *Hypotherina temminckii* (Bleeker)

Order 20 BERYCIFORMES

Family 49 HOLOCENTRIDAE

- 188. *Myripristis kuntee* Cuvier
- 189. *M. melanostictus* Bleeker
- 190. *Sargocentron rubrum* (Forsskal)

Order 21 ZEIFORMES

Family 50 CAPROIDAE

- 191. *Antigonia rubescens* (Gunther)

## Order 22 SYNGNATHIFORMES

## Family 51 FISTULARIDAE

192. *Fistularia commersonii* Ruppell193. *F. petimba* Lacepede

## Family 52 SYNGNATHIDAE

194. *Hippocampus kuda* Blecker195. *Trachyrhynchus serratus* (Schlegel)

## Order 23 DACTYLOPTERIFORMES

## Family 53 DACTYLOPTERIDAE

196. *Dactylopterus orientalis* (Cuvier)

## Order 24 SCORPAENIFORMES

## Family 54 SCORPAENIDAE

197. *Apistus carinatus* (Bloch & Schneider)198. *Choridactylus multibarbus* Richardson199. *Minous monodactylus* (Bloch & Schneider)200. *Pterois russellii* Bennett201. *P. mombassae* (Smith)202. *P. volitans* (Linnaeus)203. *Synanceia verrucosa* Bloch & Schneider

## Family 55 PLATYCEPHALIDAE

204. *Cociella crocodila* (Tilesius)205. *Platycephalus bengalensis* Viswaswara Rao206. *P. cantori* Blecker207. *P. indicus* (Linnaeus)208. *P. scaber* (Linnaeus)209. *Rogadius asper* (Cuvier)210. *Sorsogona tuberculata* (Cuvier)211. *Suggrundus rodricensis* (Cuvier)

## Order 25 PERCIFORMES

## Family 56 AMBASSIDAE

212. *Ambassis commersonii* Cuvier213. *A. gymnocephalus* (Lacepede)

## Family 57 CENTROPOMIDAE

- 214. *Lates calcarifer* (Bloch)
- 215. *Psammoperca waigensis* (Cuvier)

## Family 58 SERRANIDAE

- 216. *Cephalopholis formosa* (Shaw & Nodder)
- 217. *Epinephelus bleekeri* (Vaillant)
- 218. *E. caeruleopunctatus* (Bloch)
- 219. *E. coioides* (Hamilton-Buchanan)
- 220. *E. diacanthus* (Valenciennes)
- 221. *E. erythrurus* (Valenciennes)
- 222. *E. lanceolatus* (Bloch)
- 223. *E. latifasciatus* (Temminck & Schlegel)
- 224. *E. malabaricus* (Bloch & Scheider)
- 225. *E. radiatus* (Day)
- 226. *E. undulosus* (Quoy & Gaimard)

## Family 59 TERAPONIDAE

- 227. *Terapon jarbua* (Forsskal)
- 228. *T. puta* (Cuvier)
- 229. *T. theraps* (Cuvier)
- 230. *Pelates quadrilineatus* (Bloch)

## Family 60 KUHLIDAE

- 231. *Kuhlia mugil* (Schneider)
- 232. *K. rupestris* (Lacepede)

## Family 61 PRIACANTHIDAE

- 233. *Priacanthus cruenatatus* (Lacepede)
- 234. *P. hamrur* (Forsskal)
- 235. *P. tayenus* Richardson

## Family 62 APOGONIDAE

- 236. *Apogon nigripinnis* Cuvier
- 237. *A. poecilopterus* Kuhl & Van Hasselt
- 238. *A. quadrifasciatus* Cuvier
- 239. *A. taeniatus* (Cuvier)
- 240. *Archamia lineolata* (Cuvier)

## Family 63 SILLAGINIDAE

- 241. *Sillaginopsis panijus* (Hamilton Buchanan)
- 242. *Sillago (Sillaginopodys) chondropus* Bleeker
- 243. *S. (Parasillago) indica* Mckay, Dutt & Sujatha
- 244. *S. (Parasillago) ingenuua* Mckay
- 245. *S. (Sillago) intermedius* Wongratana
- 246. *S. (Parasillago) lutea* Mckay
- 247. *S. (Sillago) sihama* (Forsskal)
- 248. *S. (Parasillago) soringa* Dutta & Sujatha
- 249. *S. (Parasillago) vincenti* Mckay

## Family 64 LACTARIIDAE

- 250. *Lactarius lactarius* (Schneider)

## Family 65 RACHYCENTRIDAE

- 251. *Rachycentron canadum* (Linnaeus)

## Family 66 ECHENEIDAE

- 252. *Echeneis naucrates* Linnaeus

## Family 67 CARANGIDAE

- 253. *Alectis ciliaris* (Bloch)
- 254. *A. indicus* (Ruppell)
- 255. *Alepes djedaba* (Forsskal)
- 256. *A. melanoptera* Swainson
- 257. *A. vari* (Cuvier)
- 258. *Atropus atropos* (Schneider)
- 259. *Atule mate* (Cuvier)
- 260. *Carangoides armatus* (Ruppell)
- 261. *C. chrysophrys* (Cuvier)
- 262. *C. ferdau* (Forsskal)
- 263. *C. malabaricus* (Bloch & Schneider)
- 264. *C. praeustus* (Bennett)
- 265. *C. talamparoides* Bleeker
- 266. *Caranx ignobilis* (Forsskal)
- 267. *C. melampygus* Cuvier
- 268. *C. papuensis* Alleyne & Macleay

269. *C. sem* Cuvier  
 270. *C. sexfasciatus* Ouoy & Gaimard  
 271. *Decapterus macrosoma* Bleeker  
 272. *D. russellii* (Ruppell)  
 273. *Elagatis bipinnulata* (Quoy & Gaimard)  
 274. *Gnathanodon speciosus* (Forsskal)  
 275. *Magalaspis cordyla* (Linnaeus)  
 276. *Naucrates ductor* (Linnaeus)  
 277. *Parastromateus niger* (Bloch)  
 278. *Scomberoides commersonianus* Lacepede  
 279. *S. lysan* (Forsskal)  
 280. *S. tala* (Cuvier)  
 281. *Selar boops* (Cuvier)  
 282. *S. crumenophthalmus* (Bloch)  
 283. *Selaroides leptolepis* (Cuvier)  
 284. *Seriolina nigrofasciata* (Ruppell)  
 285. *Trachinotus baillonii* (Lacepede)  
 286. *T. blochii* (Lacepede)  
 287. *Ulua mentalis* (Cuvier)  
 288. *Uraspis helvola* (Forster)  
 289. *U. uraspis* (Gunther)

Family 68 CORYPHAENIDAE

290. *Coryphaena hippurus* Linnaeus

Family 69 MENIDAE

291. *Mene maculata* (Bloch)

Family 70 LEIOGNATHIDAE

292. *Gazza minuta* (Bloch)  
 293. *Leiognathus berbis* (Valenciennes)  
 294. *L. bindus* (Valenciennes)  
 295. *L. brevirostris* (Valenciennes)  
 296. *L. daura* (Cuvier)  
 297. *L. dussumieri* (Valenciennes)  
 298. *L. equulus* (Forsskal)

- 299. *L. fasciatus* (Lacepede)
- 300. *L. leuciscus* (Gunther)
- 301. *L. lineolatus* (Valenciennes)
- 302. *L. smithursti* (Ramsay & Ogilby)
- 303. *L. splendens* (Cuvier)
- 304. *Secutor insidiator* (Bloch)
- 305. *S. ruconius* (Hamilton-Buchanan)

## Family 71 LUTJANIDAE

- 306. *Aphareus furcatus* (Lacepede)
- 307. *A. rutilans* Cuvier
- 308. *Aprion virescens* Valenciennes
- 309. *Etelis carbunculus* Cuvier
- 310. *E. coruscans* Valenciennes
- 311. *Lipocheilus carnolabrus* (Chan)
- 312. *Lutjanus argentimaculatus* (Forsskal)
- 313. *L. bengalensis* (Bloch)
- 314. *L. biguttatus* (Valenciennes)
- 315. *L. bohar* (Forsskal)
- 316. *L. carponotatus* (Richardson)
- 317. *L. decussatus* (Cuvier)
- 318. *L. ehrenbergii* (Peters)
- 319. *L. erythropterus* Bloch
- 320. *L. fulviflamma* (Forsskal)
- 321. *L. fulvus* (Schneider)
- 322. *L. gibbus* (Forsskal)
- 323. *L. johnii* (Bloch)
- 324. *L. kasmira* (Forsskal)
- 325. *L. lemniscatus* (Valenciennes)
- 326. *L. lunulatus* (Park)
- 327. *L. lutjanus* Bloch
- 328. *L. madras* (Valenciennes)
- 329. *L. malabaricus* (Schneider)
- 330. *L. monostigma* (Cuvier)

- 331. *L. quinquelineatus* Bloch
- 332. *L. rivulatus* (Cuvier)
- 333. *L. russelli* (Bleeker)
- 334. *L. sebae* (Cuvier)
- 335. *L. vitta* (Quoy & Gaimard)
- 336. *Macolor niger* (Forsskal)
- 337. *Paracaesio xanthurus* (Bleeker)
- 338. *Pinjalo pinjalo* (Bleeker)
- 339. *Pristipomoides filamentosus* (Valenciennes)
- 340. *P. multidens* (Day)
- 341. *P. sieboldii* (Bleeker)
- 342. *P. zonatus* (Valenciennes)

Family 72 CAESIONIDAE

- 343. *Caesio caerulea* Lacepede
- 344. *C. cuning* (Bloch)
- 345. *C. lunaris* (Cuvier)
- 346. *C. tares* (Seale)
- 347. *C. xanthonota* Bleeker
- 348. *Dipterygonotus balteatus* (Valenciennes)
- 349. *Gymnoaesio gymnoptera* (Bleeker)
- 350. *Pterocaesio chrysozona* (Cuvier)
- 351. *P. pisang* (Bleeker)
- 352. *P. tessellata* Carpenter
- 353. *P. tile* (Cuvier)

Family 73 LOBOTIDAE

- 354. *Lobotes surinamensis* (Bloch)

Family 74 GERREIDAE

- 355. *Gerres abbreviatus* Bleeker
- 356. *G. acinaces* Bleeker
- 357. *G. filamentosus* Cuvier
- 358. *G. lucidus* Cuvier
- 359. *G. oblongus* Cuvier
- 360. *G. oyena* (Forsskal)

- 361. *G. poeti* Cuvier
- 362. *G. setifer* (Hamilton-Buchanan)
- 363. *G. macracanthus* Bleeker
- 364. *Pentaprion longimanus* (Cantor)

## Family 75 HAEMULIDAE

- 365. *Diagramma pictum* (Thunberg)
- 366. *Plectorhinchus gibbosus* (Lacepede)
- 367. *P. griseus* (Cuvier)
- 368. *P. orientalis* (Bloch)
- 369. *P. pictus* (Tortonnese)
- 370. *P. polytaenia* (Bleeker)
- 371. *P. schotaf* (Forsskal)
- 372. *Pomadasys argenteus* (Forsskal)
- 373. *P. argyreus* (Valenciennes)
- 374. *P. commersonni* (Lacepede)
- 375. *P. furcatus* (Schneider)
- 376. *P. kaakan* (Cuvier)
- 377. *P. maculatus* (Bloch)
- 378. *P. olivaceum* (Day)

## Family 76 SPARIDAE

- 379. *Acanthopagrus berda* (Forsskal)
- 380. *A. bifasciatus* (Forsskal)
- 381. *A. latus* (Houttuyn)
- 382. *Argyrops spinifer* (Forsskal)
- 383. *Rhubdosargus sarba* (Forsskal)

## Family 77 LETHRINIDAE

- 384. *Gnathodentex aurolineatus* (Lacepede)
- 385. *Gymnocranius elongatus* Senta
- 386. *G. grandoculis* Valenciennes
- 387. *Monotaxis grandoculis* (Forsskal)
- 388. *Wattsia mossambica* (Smith)

## Family 78 NEMIPTERIDAE

- 389. *Nemipterus bipunctatus* (Ehrenberg)

- 390. *N. japonicus* (Bloch)
- 391. *N. nematophorus* (Bleeker)
- 392. *N. peronii* (Valenciennes)
- 393. *N. randalli* Russell
- 394. *N. zysron* (Bleeker)
- 395. *Parascolopsis aspinosa* (Rao & Rao)
- 396. *P. boesemani* (Rao & Rao)
- 397. *P. inermis* (Schlegel)
- 398. *Scolopsis bimaculatus* Ruppell
- 399. *S. vosmeri* (Bloch)

Family 79 SCIAENIDAE

- 400. *Atrobucca nibe* (Jordon & Thompson)
- 401. *Chrysochir aureus* (Richardson)
- 402. *Dendrophysa russelli* (Cuvier)
- 403. *Johnieops aneus* (Bloch)
- 404. *J. dussumieri* (Cuvier)
- 405. *J. macrorhynchus* (Mohan)
- 406. *J. sina* (Cuvier)
- 407. *J. vogleri* (Bleeker)
- 408. *Johnius belangeri* (Cuvier)
- 409. *J. carouna* (Cuvier)
- 410. *J. carutta* Bloch
- 411. *J. dussumieri* (Valenciennes)
- 412. *J. elongatus* Mohan
- 413. *J. macropterus* (Bleeker)
- 414. *Kathala axillaris* (Cuvier)
- 415. *Nibea albida* (Cuvier)
- 416. *N. maculata* (Schneider)
- 417. *N. soldado* (Lacepede)
- 418. *Otolithes cuvieri* (Trewavas)
- 419. *O. ruber* (Schneider)
- 420. *Otolithodites biauritus* (Cantor)
- 421. *Panna microdon* (Bleeker)

- 422. *Paranibea semiluctuosa* (Cuvier)
- 423. *Pennahia macrophthalmus* (Bleeker)
- 424. *Protonibea diacanthus* (Lacepede)
- 425. *Pterotolithus maculatus* Kuhl & van Hasselt

## Family 80 MULLIDAE

- 426. *Mulloidichthys flavolineatus* (Lacepede)
- 427. *M. vanicolensis* (Valenciennes)
- 428. *Parupeneus barberinus* (Lacepede)
- 429. *P. bifasciatus* (Lacepede)
- 430. *P. heptacanthus* (Lacepede)
- 431. *P. cyclostomus* (Lacepede)
- 432. *P. indicus* (Shaw)
- 433. *P. macronema* (Lacepede)
- 434. *Upeneus bensasi* (Temminck & Schlegel)
- 435. *U. moluccensis* (Bleeker)
- 436. *U. sulphureus* Cuvier
- 437. *U. sundaicus* (Bleeker)
- 438. *U. taeniopterus* Cuvier
- 439. *U. tragula* Richardson
- 440. *U. vittatus* (Forsskal)

## Family 81 KYPHOSIDAE

- 441. *Kyphosus cinerascens* (Forsskal)

## Family 82 EPHIPPIDAE

- 442. *Ephippus orbis* (Bloch)

## Family 83 PLATACIDAE

- 443. *Platax orbicularis* (Forsskal)
- 444. *P. pinnatus* (Linnaeus)

## Family 84 DREPANIDAE

- 445. *Drepane longimana* (Bloch & Schneider)
- 446. *D. punctata* (Linnaeus)

## Family 85 SCATOPHAGIDAE

- 447. *Sctophagus argus* (Bloch)

Family 86 CAHETODONTIDAE

448. *Chaetodon vagabundus* Linnaeus

449. *Heniochus acuminatus* (Linnaeus)

Family 87 POMACANTHIDAE

450. *Pomacanthus annularis* (Blôch)

451. *P. imperator* (Bloch)

Family 88 POMACENTRIDAE

452. *Abudefduf bengalensis* (Bloch)

453. *A. sordidus* (Forsskal)

454. *Pristotis jerdoni* (Day)

Family 89 CEPOLIDAE

455. *Acanthocephala abbreviata* (Valenciennes)

Family 90 MUGILIDAE

456. *Liza macrolepis* (Smith)

457. *L. persia* (Hamilton-Buchanan)

458. *L. subviridis* (Valenciennes)

459. *L. tade* (Forsskal)

460. *L. vaigiensis* (Quoy & Gaimard)

461. *Mugil cephalus* Linnaeus

462. *Valamugil cunnesius* (Valenciennes)

463. *V. seheli* (Forsskal)

464. *V. speigleri* (Blecker)

Family 91 SPHYRAENIDAE

465. *Sphyraena barracuda* (Walbaum)

466. *S. forsteri* Cuvier

467. *S. jello* Cuvier

468. *S. obtusata* Cuvier

Family 92 POLYNEMIDAE

469. *Eleutheronema tetradactylum* (Shaw)

470. *Polynemus heptadactylus* (Cuvier)

471. *A. indicus* (Shaw)

472. *P. paradiseus* Linnaeus

473. *P. plebeius* Broussonet

474. *P. sexfilis* Valenciennes

475. *P. sextarius* Bloch & Schneider

Family 93 SCARIDAE

476. *Scarus ghobban* Forsskal

477. *S. russelli* Valenciennes

Family 94 OPISTOGNATHIDAE

478. *Opistognathus rosenbergii* Bleeker

Family 95 URANOSCOPIDAE

479. *Uranoscopus guttatus* Cuvier

Family 96 MUGILOIDIDAE

480. *Parapercis hexophthalma* (Ehrenberg)

481. *P. nebulosa* (Quoy & Gaimard)

Family 97 BLENNIDAE

482. *Salarias steindachneri* (Day)

483. *Istiblennius dussumieri* (Valenciennes)

Family 98 GOBIIDAE

484. *Acentrogobius caninus* (Valenciennes)

485. *Apocryptodon madurensis* (Bleeker)

486. *Awaous stamineus* (Valenciennes)

487. *Boleophthalmus boddarti* (Pallas)

488. *Glossogobius biocellatus* (Valenciennes)

489. *G. giuris* (Hamilton-Buchanan)

490. *Oligolepis acutipennis* (Valenciennes)

491. *Oxyurichthys microlepis* (Bleeker)

492. *Parachaeturichthys polynema* (Bleeker)

493. *Pseudapocryptes lanceolatus* (Bloch & Schneider)

Family 99 GOBIOIDIDAE

494. *Brachyamblyopus urolepis* (Bleeker)

495. *Taenioides anguillaris* (Linnaeus)

496. *T. cirratus* (Blyth)

Family 100 ELEOTRIDIDAE

497. *Butis butis* (Hamilton-Buchanan)

498. *Eleotris fusca* (Schneider)

## Family 101 TRYPAUCHENIDAE

499. *Trypauchen vagina* (Bloch & Schneider)

## Family 102 KURTIDAE

500. *Kurtus indicus* Bloch

## Family 103 ACANTHURIDAE

501. *Acanthurus bleekeri* Gunther502. *A. nigrofuscus* (Forsskal)503. *A. triostegus* (Linnaeus)504. *A. xanthopterus* Valenciennes505. *Ctenochaetus strigosus* (Bennett)

## Family 104 SIGANIDAE

506. *Siganus canaliculatus* (Park)507. *S. javus* (Linnaeus)

## Family 105 GEMPYLIDAE

508. *Gempylus serpens* Cuvier509. *Nealotus tripes* Johnson510. *Rexeu bengalensis* (Alcock)

## Family 106 TRICHIURIDAE

511. *Eupleurogrammus glossodon* (Blecker)512. *E. muticus* (Gray)513. *Lepturacanthus pantului* (Gupta)514. *L. savala* (Cuvier)515. *Trichurius gangeticus* Gupta516. *T. lepturus* Linnaeus

## Family 107 SCOMBRIDAE

517. *Auxis rochei* (Risso)518. *A. thazard* (Lacepede)519. *Euthynnus affinis* (Cantor)520. *Katsuwonus pelamis* (Linnaeus)521. *Rastrelliger faughni* Matsui522. *R. kanagurta* (Cuvier)523. *Sarda orientalis* (Temminck & Schlegel)

524. *Scomberomorus commerson* (Lacpede)

525. *S. guttatus* (Bloch & Schneider)

526. *S. koreanus* (Kishinouye)

527. *S. lineolatus* (Cuvier)

528. *Thunnus obesus* (Lowe)

529. *T. albacares* (Bonnaterre)

530. *T. tonggol* (Bleeker)

Family 108 XIPHIDAE

531 *Xiphius gladius* Linnaeus

Family 109 ISTIOPHORIDAE

532. *Istiophorus platypterus* (Shaw & Nodder)

533. *Makaira indica* (Cuvier)

534. *Tetrapturus audax* (Philippi)

Family 110 ARIOMMIDAE

535. *Ariomma indica* (Day)

Family 111 STROMATIDAE

536. *Pampus argenteus* (Euphrasen)

537. *P. chinensis* (Euphrasen)

Order 26 PLEURONECTIFORMES

Family 112 PSETTODIDAE

538. *Psettodes erumei* (Schneider)

Family 113 BOTHIDAE

539. *Bothus myriaster* (Temminck & Schlegel)

540. *B. pantherinus* (Ruppell)

541 *Cephalopsetta ventrocellatus* Dutt & Rao

542. *Engyprosopon grandisquamis* (Temminck & Schlegel)

543. *Grammatobothus polyphthalmus* (Bleeker)

544. *Pseudorhombus arsius* (Hamilton-Buchanan)

545. *P. elevatus* Ogilby

546. *P. javanicus* (Bleeker)

547. *P. malayanus* Bleeker

548. *P. tiocellatus* (Schneider)

Family 114 SOLEIDAE

- 549. *Aesopia cornuta* Kaup
- 550. *Euryglossa orientalis* (Schneider)
- 551. *Heteromycteris oculus* (Alcock)
- 552. *Solea ovata* Richardson
- 553. *Synaptura albomaculata* Kaup
- 554. *S. commersoniana* (Lacepede)
- 555. *Zebrias altipinnis* (Alcock)
- 556. *Z. quagga* (Kaup)
- 557. *Z. synapturoides* (Jenkins)
- 558. *Z. zebra* (Bloch)

Family 115 CYNOGLOSSIDAE

- 559. *Cynoglossus arel* (Schneider)
- 560. *C. bilineatus* (Lacepede)
- 561. *C. dubius* (Day)
- 562. *C. lingua* (Hamilton-Buchanan)
- 563. *C. macrostomus* Norman
- 564. *C. puncticeps* (Richardson)
- 565. *C. semifasciatus* Day
- 566. *Paraplagusia bilineata* (Bloch)
- 567. *P. blochii* (Bleeker)

Order 27 TETRAODONTIFORMES

Family 116 BALISTIDAE

- 568. *Abalistes stellatus* (Lacepede)
- 569. *Balistes erythrodon* Gunther
- 570. *Sufflamen frenatus* (Bloch & Schneider)

Family 117 DIODONTIDAE

- 571. *Diodon hystrix* Linnaeus

Family 118 MONACANTHIDAE

- 572. *Alutera monoceros* Linnaeus

Family 119 OSTRACIIDAE

- 573. *Tetrasona gibbosa* (Linnaeus)

## Family 120 TETRAODONTIDAE

574. *Arothron reticularis* (Bloch & Schneider)  
 575. *Canthigaster margarita* (Ruppell)  
 576. *Chelonodon patoca* (Hamilton-Buchanan)  
 577. *Lagocephalus lunaris* (Bloch & Schneider)  
 578. *Sphoeroides oblongus* (Bloch)

## Family 121 TRIACANTHIDAE

579. *Pseudotriacanthus strigilifer* (Cantor)  
 580. *Triacanthus biaculeatus* (Bloch)

The marine and estuarine fishes found in Andhra Pradesh may be divided into two classes, viz. Chondrichthyes and Osteichthyes.

**Key to the class**

- Skeleton cartilaginous. Five to seven pairs of lateral or ventral, nonconfluent gill openings without operculum .....CHONDRICHTHYES
- Skeleton bony. One pair of lateral gill openings confluent as a single ventral slit or nonconfluent as two lateral slits with gill cover .....OSTEICHTHYES

## Class CHONDRICHTHYES

**Cartilaginous fishes****Key to the orders**

- 1a. Gill slits present on lateral sides of head. Anal fin present ..... 2
- 1b. Gill slits present entirely on ventral sides of head. Anal fin absent (Batoid fishes-Skates and Rays) ..... 4
- 2a. Mouth considerably anterior to orbit ..... ORECTOLOBIFORMES
- 2b. Mouth posterior to anterior border of orbit ..... 3
- 3a. Eyes with nictitating eyelids. Spiral or scroll intestinal valve present.....  
 ..... CARCHARHINIFORMES
- 3b. Eyes without nictitating eyelids. Spiral or scroll intestinal valve absent.....  
 ..... LAMNIFORMES
- 4a. Body shark-like appearance, moderately depressed. Pectoral fins barely enlarged. Tail not conspicuously 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 markedly elongate, prolonged into a narrow, flat plate having a row of large teethlike structures (sawlike) on each side ..... PRISTIFORMES (PRISTIDAE)
- 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 ORECTOLOBIFORMES  
Carpet Sharks**

**Key to the families**

- 1a. Caudal fin nearly equal to rest of shark ..... STEGOSTOMATIDAE
- 1b. Caudal fin considerably shorter than rest of shark ..... 2
- 2a. Mouth huge and almost terminal. External gill slits very large, internal gill slits inside mouth cavity with filter screens. Caudal peduncle with strong lateral keels. Caudal fin with a strong ventral lobe, but without a strong terminal lobe and subterminal notch-Whale sharks ..... RHINIODONTIDAE
- 2b. Mouth smaller and subterminal. External gill slits small, internal gill slits without filter screens. Caudal peduncle without strong lateral keels. Caudal fin with a weak ventral lobe or none, but with a strong terminal lobe and subterminal notch ..... 3
- 3a. A lobe and groove around outer margins of nostrils. Spiracles large below eyes. Precaudal tail much greater than head and body length ..... HEMISCYLLIDAE
- 3b. No lobe and groove around outer margins of nostrils. Spiracles small behind but not below eyes. Precaudal tail much shorter than head and body length ..... GINGLYMOSTOMATIDAE

**Family HEMISCYLLIDAE  
Bamboo sharks, Longtailed carpet sharks  
(Fig. 1)**

Small, slender sharks, with small transverse mouth ahead of eyes. Spiracles large, subequal in size to eyes and somewhat below them. Gill slits small, fifth overlapping fourth ; internal gill slits without filter screens. Nostrils with short, pointed barbels and distinct circumnarial folds and grooves around outer edges of incurrent apertures. Two spineless dorsal fins, the second dorsal origin considerably anterior to origin of anal fin. Anal fin with broad base and broadly rounded, keel-like apex, separated by a narrow notch much less than base length

from lower caudal origin. Caudal peduncle without lateral keels or precaudal pits. Caudal fin with its upper lobe hardly elevated above the body axis, less than a fifth as long as the entire shark, with a strong terminal lobe and subterminal notch but no ventral lobe. Colour pattern of dark saddles and dark or light spots present or colour plain.

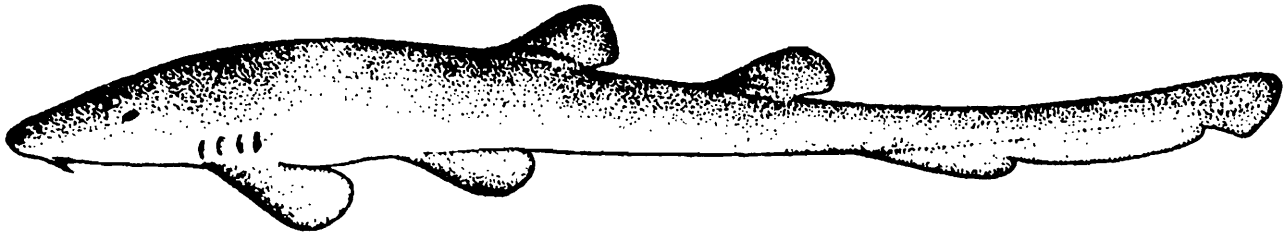


Fig. 1 : *Chiloscylium griseum* Muller & Henle

#### Species known to occur in Andhra Pradesh

- 1 *Chiloscylium griseum* Muller and Henle (Grey bambooshark)
2. *C. indicum* (Gmelin) (Slender bambooshark) (Bokec sorrah, Rasorrah)
3. *C. plagiosum* (Bennett) (Whitespotted bambooshark)
4. *C. punctatum* Muller and Henle (Brownbanded bambooshark)

#### Key to the species

- 1a. Body and tail very slender. Anal fin origin far behind free rear tip of second dorsal, anal fin length from origin to free rear tip subequal to length of hypural caudal lobe from lower caudal origin to subterminal notch. Colour pattern with numerous small dark spots and bars ..... *C. indicum* (65 cm.)
- 1b. Body and tail moderately slender to relatively stout. Anal fin origin below or close behind free rear tip of second dorsal, anal fin length very shorter than hypural caudal lobe. Colour pattern varied but without numerous small dark spots and bars ..... 2
- 2a. Ground colour of body dark with numerous light spots ..... *C. plagiosum* (95 cm.)
- 2b. Ground colour of body light, with or without scattered dark spots or dusky bands 3
- 3a. Dorsal fins smaller than pelvic fins, dorsals without projecting free rear tips .....  
..... *C. griseum* (74 cm.)
- 3b. Dorsal fins larger than pelvic fins, dorsals with projecting free rear tips .....  
..... *C. punctatum* (104 cm.)

*Interest of fisheries* : *C. griseum* and *C. indicum* are very common species found in both the coasts of India and are regularly taken in inshore fisheries and are utilized for human consumption. *C. plagiosum* and *C. punctatum* are common species generally found in the east coast of India, regularly taken in inshore fisheries in India and are utilized for human consumption.

## 2. Family STEGOSTOMATIDAE

### Zebra sharks

(Fig. 2)

Mouth well ahead of the orbit. Caudal fin almost as long as the rest of shark body. Body cylindrical with broad conical head without lateral flaps of skins. Eyes lateral without subocular pockets. Spiracle subequal in size to eyes but not below them. Gill slits small, fifth overlapping fourth ; internal gill slits without filter screens. Caudal peduncle without lateral keels or precaudal pits. First dorsal larger than second, with origin extended considerably anterior to pelvic origins and insertion about opposite the pelvic bases. Colour pattern of dark saddles in young, transforms to dark spots in adult stage.

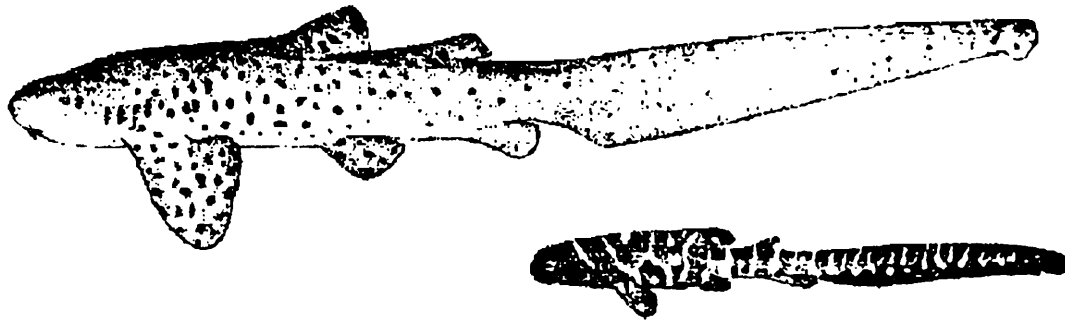


Fig. 2 : *Stegostoma fasciatum* (Hermann)

### Species known to occur in Andhra Pradesh

*Stegostoma fasciatum* (Hermann) (Zebra shark) (Pollee makum, Komarasi)

*Interest to fisheries* : *S. fasciatum* is a common species found in both the coasts and regularly taken in inshore fisheries in India. The meat is utilized fresh and dried salted for human consumption, livers processed for vitamins, fins dried and processed for the oriental sharkfin trade and offal utilized for fishmeal. It attains to a maximum total length almost 354 cm. and it is a hardy shark, readily kept in captivity.

## 3. Family GINGLYMOSTOMATIDAE

### Nurse sharks

(Fig. 3)

Body cylindrical or moderately depressed, without ridges on sides. Head without lateral flaps of skin. Eyes dorsolateral or lateral. without subocular pockets. Spiracles much smaller

than eyes, behind but not below them. Gill slits small, fifth virtually overlapping fourth ; internal gill slits without filter screens. Nostrils with short to moderately long, pointed barbels but without circumnarial folds and grooves. Mouth small, transverse in front of eyes. Caudal peduncle without lateral keels or precaudal pits. Two spineless dorsal fins, the second dorsal origin considerably ahead of anal fin origin. Precaudal tail short, much shorter than the head and body. Colour plain or with dark spots in juveniles.

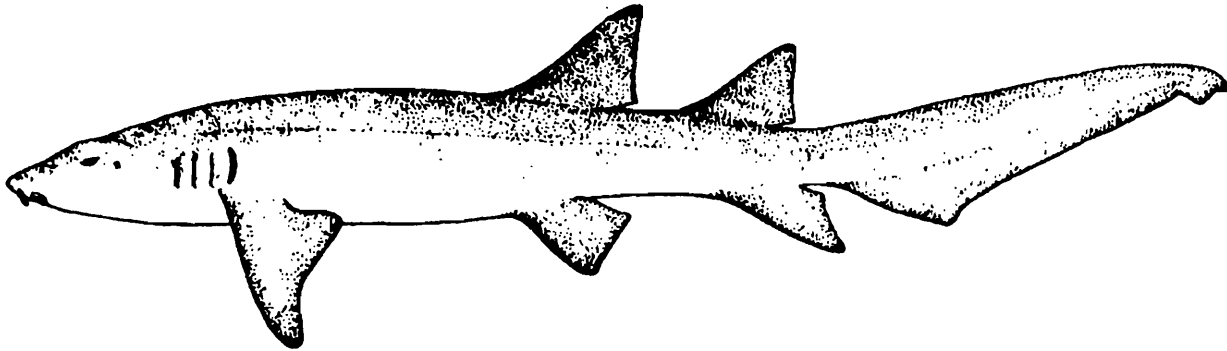


Fig. 3 : *Nebrius ferrugineus* (Lesson)

### Species known to occur in Andhra Pradesh

#### *Nebrius ferrugineus* (Lesson) (Tawny nurse shark)

*Interest to fisheries* : *N. ferrugineus* is a common species found in both the coasts and are caught in shore in India. It is utilized fresh and dried salted for human consumption for food, its liver is rendered for oil and vitamins ; its fins are used in the oriental sharkfin trade and offal is processed into fishmeal. Its thick, armor-like hide is potentially valuable for leather. This species grows up to about 320 cm. and it is a tough, hardy shark that survives in captivity.

## 4. Family RHINIODONTIDAE

### Whale sharks

(Fig. 4)

Body cylindrical or moderately depressed, with conspicuous ridges on sides. Head broad and flattened, without lateral flaps of skin. Eyes lateral, without subocular pockets. Spiracles much smaller than eyes, behind but not below them. Gill slits very large, fifth well separated from fourth ; internal gill slits with unique filter screens. Nostrils with rudimentary barbels and no circumnarial folds and grooves. Mouth virtually terminal in front of eyes. Caudal peduncle with strong lateral keels and an upper pre-caudal pit. First dorsal fin much larger than second. first dorsal origin considerably ahead to pelvic origins and insertion over the pelvic bases. A unique colour pattern of light spots and vertical and horizontal stripes. in the form of a checkboard.

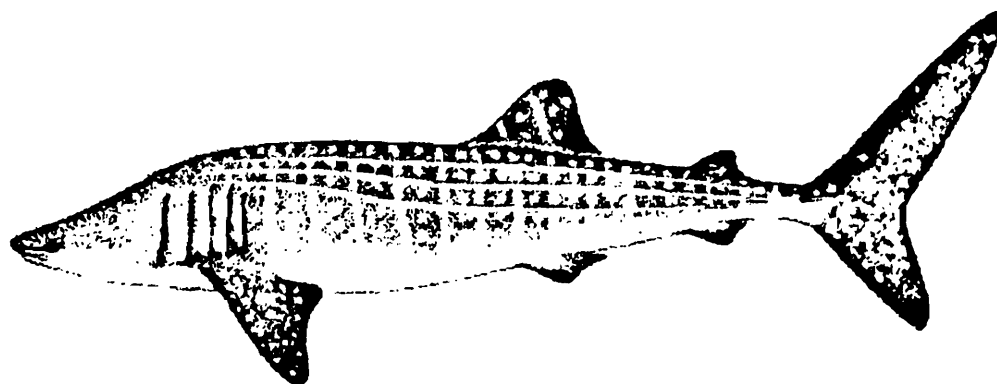


Fig. 4 : *Rhincodon typus* (Smith)

**Species known to occur in Andhra Pradesh**

*Rhincodon typus* (Smith) (Whale shark) (Thimingal sura)

*Interest to fisheries* : *R. typus* is a common species found in both the coasts of India and it is an apparently of relatively, limited interest for fisheries and small harpoon fisheries exist in India. It is utilized for human consumption either fresh or dried salted and used to treat boat hulls. This species grows possibly up to 18 m. and it is by far the world’s largest fish.

2. Order LAMNIFORMES

**Mackerel sharks**

**Key to the families**

- Caudal fin asymmetrical, not lunate, ventral caudal lobe short, pre-ventral caudal margin much shorter than dorsal caudal margin. Caudal peduncle without lateral keels or with weak ones ..... ODONTASPIDIDAE
- Caudal fin almost symmetrical and lunate, with a long ventral lobe and pre-ventral caudal margin almost equal to dorsal caudal margin. Caudal peduncle with very strong lateral keels ..... LAMNIDAE

5. Family ODONTASPIDIDAE

**Sand tiger sharks**

(Fig. 5)

Large sharks, with conical to slightly depressed, pointed snout. Mouth large, extending behind eyes. Small eyes without nictitating eyelids. Gill openings moderately large, not extending onto dorsal surface of head, all anterior to pectoral fin bases. Two large dorsal fins and an anal fin and pectoral fins small. Caudal peduncle compressed without keels but with an upper precaudal pit.

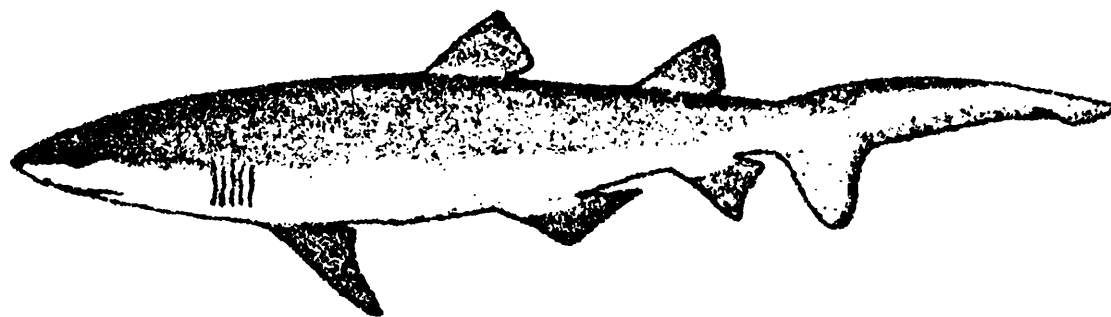


Fig. 5 : *Carcharius tricuspidatus* Day

### Species known to occur in Andhra Pradesh

*Carcharius tricuspidatus* Day (Indian sand tiger shark)

*Interest to fisheries* : This species is apparently fished in India and Pakistan and is said to reach 3.7 or more metres total length. It is a poorly known species and may be a junior synonym of *E. taurus* (Rafinesque) (Compagno, 1984).

## 6. Family LAMNIDAE

### Mackerel sharks

(Fig. 6)

Spindle-shaped large sharks with pointed snouts. Mouth large, extending behind eyes. Gill openings large, extending onto dorsal surface of head ; all anterior to pectoral fin bases. Eyes without nictitating eyelids. Pectoral fins rather narrow-tipped and with anterior margins less

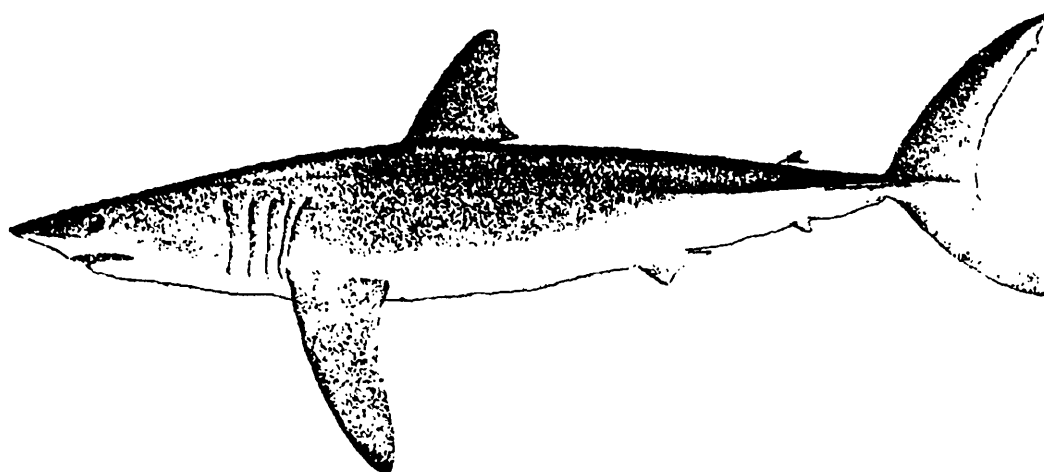


Fig. 6 : *Isurus oxyrinchus* Rafinesque

than head length. First dorsal fin large and minute, pivoting second dorsal and anal fins. Caudal fin lunate. Precaudal pits present, caudal peduncle strongly depressed and with strong, high keels. Colour underside of snout white.

**Species known to occur in Andhra Pradesh**

*Isurus oxyrinchus* (Rafinesque) (Shortfin mako)

*Interest to fisheries* : *I. oxyrinchus* is a common species found in both the coasts of India. It is an important species for longline fisheries because of its high-quality meat and also is a prime game fish prized by spoil anglers. The meat is utilized fresh, frozen, smoked and dried salted for human consumption ; the oil is extracted for vitamins ; the fins soup ; the hides are processed into leather and the jaws and teeth are used for ornaments. This species grows up to 394 cm. total length.

**3. Order CARCHARHINIFORMES**

**Ground sharks**

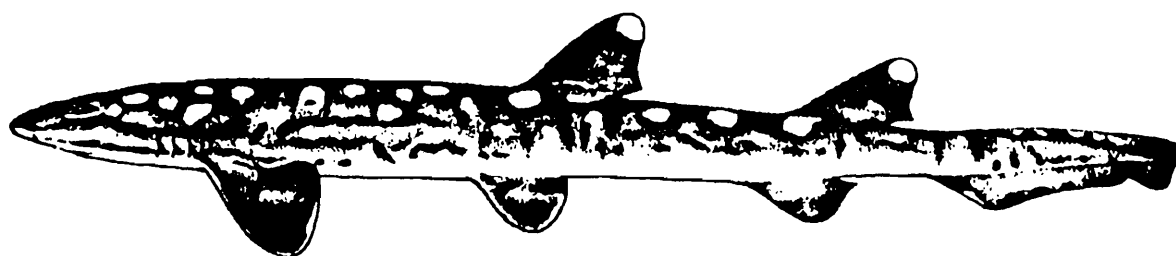
**Key to the families**

- 1a. Head with lateral blade-like expansions-Hammerhead sharks.....SPHYRNIDAE
- 1b. Head normal, without lateral expansions ..... 2
- 2a. First dorsal fin base opposite or behind pelvic fin bases-Catsharks .....  
..... SCYLORHINIDAE
- 2b. First dorsal fin base in front of pelvic fin bases ..... 3
- 3a. Precaudal pits absent. Dorsal caudal margin not undulated ..... TRIAKIDAE
- 3b. Precaudal pit present. Dorsal caudal margin undulated ..... 4
- 4a. Intestinal valve of spiral type-Weasel sharks ..... HEMIGALEIDAE
- 4b. Intestinal valve of scroll type-Requiem sharks ..... CARCHARHINIDAE

**7. Family SCYLORHINIDAE**

(Fig. 7)

Body usually elongated with head without laterally expanded blades. Eyes cat-like with nictitating eyelids. Nostrils generally without nasoral grooves but, when present, these are



**Fig. 7** : *Atelomycterus marmoratus* (Bennett)

broad and shallow. Mouth large, extending anterior border of eyes. Two small 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 margin. Many species with variegated colour patterns, some without them.

### Species known to occur in Andhra Pradesh

*Atelomycterus marmoratus* (Bennett) (Coral catshark)

*Interest to fisheries* : *A. marmoratus* is a common species found in both the coasts of India. Its flesh is utilized fresh and dried salted for food or processed for fishmeal and oil. This species is known to grow 70 cm. in total length.

## 8. Family TRIAKIDAE

### Hound sharks

(Fig. 8)

Head without laterally expanded blades. Eyes with nictitating eyelids. Mouth large, reaches past anterior border of eyes. Precaudal pits absent. Two moderate to large-sized spineless dorsal fins and an anal fin, the first dorsal base considerable anterior 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. Some species with variegated colour patterns but most without them.

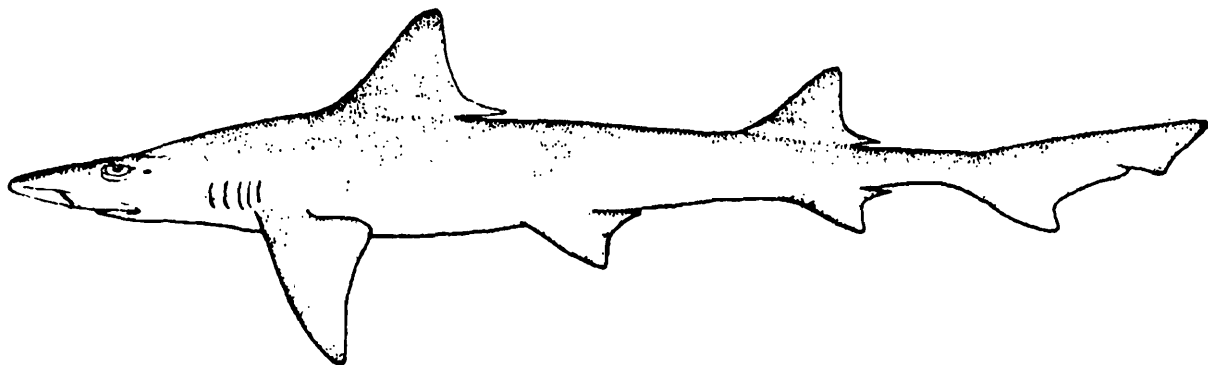


Fig. 8 : *Mustelus mosis* Hemprich & Ehrenberg

### Species known to occur in Andhra Pradesh

*Mustelus mosis* Hemprich & Ehrenberg (Arabian smoothhound)

*Interest to fisheries* : *M. mosis* is a common species found in both the coasts of India and it is apparently regularly fished off India and Pakistan and utilized for human food. It is known to attain to a maximum 150 cm. total length.

9. Family HEMIGALEIDAE

**Weasel sharks**

(Fig. 9)

Head without laterally expanded blades. Eyes with internal nictitating eyelids. Mouth reaches past front ends of eyes. Precaudal pits present. Two moderate-sized spineless dorsal fins and an anal fin, the first dorsal fin base well ahead of pelvic fin bases. Caudal fin with

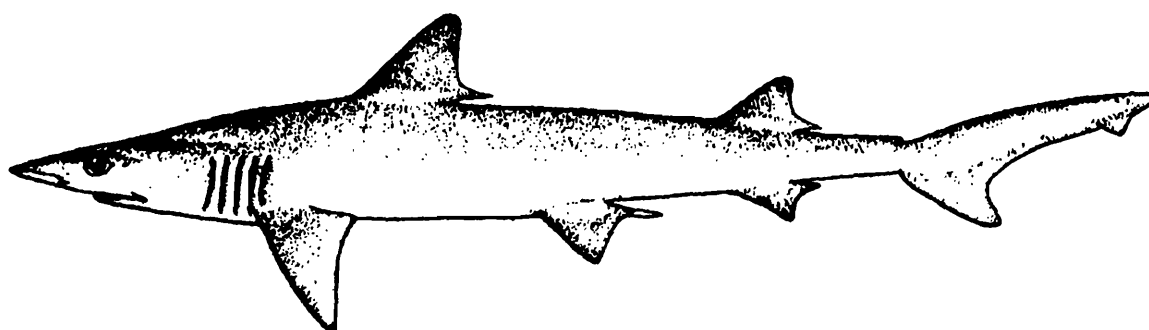


Fig. 9 : *Chaenogaleus macrostoma* (Bleeker)

a strong ventral lobe and lateral undulations on its dorsal margin. Intestine with a spiral valve of 4 to 6 turns. Colour generally uniform greyish, sometimes with horizontal stripes.

**Species known to occur in Andhra Pradesh**

1. *Chaenogaleus macrostoma* (Bleeker) (Hooktooth shark)
2. *Hemipristis elongatus* (Klunzinger) (Snaggletooth shark)

**Key to the genera and species**

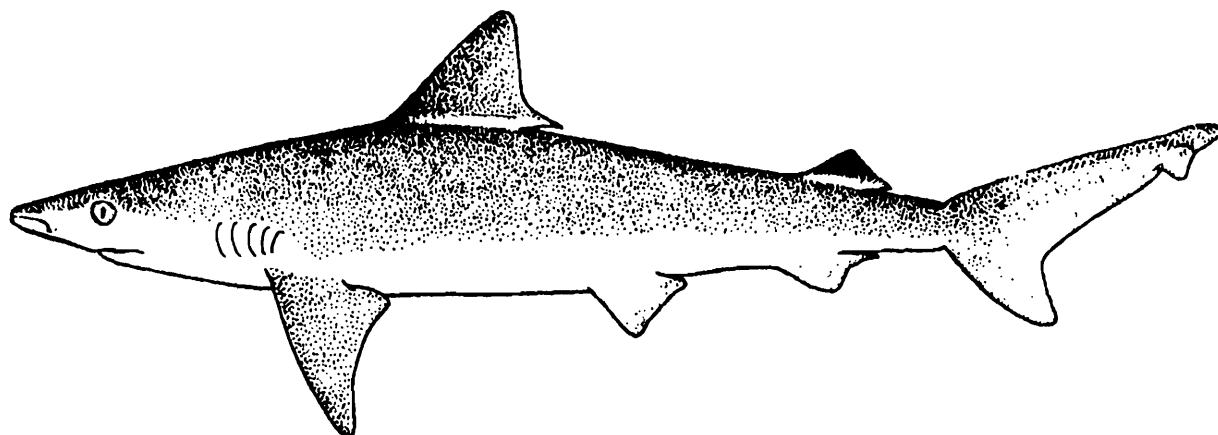
- Snout obtusely wedge-shaped in dorsoventral view. Lower jaw rounded at symphysis. No toothless space at midline of jaws. Mesial edges of teeth unserrated, sometimes a few cusplets on mesial edges of lower teeth. Fins not falcate, posterior margins of anal and second dorsal moderately concave, those of pectorals and pelvics straight or slightly concave .....*Chaenogaleus* Gill (*C. macrostoma*-100 cm.)
- Snout bluntly rounded in dorsolateral view. Lower jaw truncated at symphysis. A toothless space between teeth at midline of both jaws. Mesial edges of upper teeth and most lowers serrated or with a few cusplets (except for juveniles below 55 cm. in which they are smooth). Fins strongly falcate, posterior margins of anal, second dorsal, pectoral and pelvic fins deeply concave .....  
..... *Hemipristis* Agassiz (*H. elongatus*-240 cm.)

## 10. Family CARCHARHINIDAE

**Requiem sharks**

(Fig. 10)

Head without laterally expanded blades, eyes with internal nictitating eyelids. Mouth extends anterior border of eyes. Two dorsal fins and an anal fin, the first dorsal fin with its



**Fig. 10** : *Chrcharhinus dussumieri* (Valenciennes)

base considerably ahead of pelvic fin bases. Precaudal pits present, caudal fin with a strong ventral lobe and lateral undulations on its dorsal margin. Intestine with a scroll valve. Colour variable, generally no colour pattern.

**Species known to occur in Andhra Pradesh**

1. *Carcharhinus dussumieri* (Valenciennes) (Whitecheek shark)
2. *C. hemiodon* (Valenciennes) (Pondicherry shark)
3. *C. limbatus* (Valenciennes) (Blacktip shark) (Sorrah)
4. *C. longimanus* (Poey) (Oceanic whitetip shark)
5. *C. macroti* (Muller & Henle) (Hardnose shark)
6. *C. melanopterus* (Quoy & Gaimard) (Blacktip reef shark) (Cawal sorrah, Bokka sura)
7. *C. sorrah* (Valenciennes) (Spot-tail shark) (Raman sorrah)
8. *Galeocerdo cuvieri* (Peron & Le Sueur) (Tiger shark)
9. *Lamiopsis temminckii* (Muller & Henle) (Broadfin shark) (Noeti sura)
10. *Loxodon macrorhinus* Muller & Henle (Sliteye shark)
11. *Negaprion acutidens* (Ruppell) (Sicklefin lemon shark)

- 12. *Prionace glauca* (Linnaeus) (Blue shark)
- 13. *Rhizoprionodon acutus* (Ruppell) (Milk shark)
- 14. *R. oligolinx* Springer (Grey sharpnose shark)
- 15. *Scoliodon laticaudus* Muller & Henle (Spadenose shark)
- 16. *Triaenodon obesus* (Ruppell) (Whitetip reef shark)

**Key to the genera and species**

- 1a. Upper labial furrows very long, extending to front of eyes. Spiracles present and relatively large. Caudal peduncle with conspicuous lateral keels. Vertical black or dusky bar on back, obscure or absent in adults .....  
 ..... *Galeocerdo* Muller & Henle—*G. cuvieri* (9.1m.)
- 1b. Upper labial furrows long to very short, not extending in front of eyes. Spiracles generally absent. Caudal peduncle generally without lateral keels (except for weak ones in *Prionace*) ..... 2
- 2a. High proximal and distal cusplets present on most teeth in both jaws. Extended anterior nasal and mesonarial flaps forming a tube for the excurrent aperture .....  
 ..... *Triaenodon* Muller & Henle—*T. obesus* (213 cm.)
- 2b. Cusplets generally absent on lower teeth, low or absent on uppers. Nasal flaps not forming a tube ..... 3
- 3a. Second dorsal fin almost or quite equal to first dorsal fin ..... 4
- 3b. Second dorsal fin considerably smaller than first ..... 5
- 4a. Snout short, preoral length much less than mouth width. Upper and lower teeth with narrow, unserrated cusps ..... *Negaprion* Whitley—*N. acutidens* (310 cm.)
- 4b. Snout longer, preoral length almost equal to mouth width. Upper teeth with broad, triangular, serrated cusps, lowers with narrow, smooth cusps .....  
 ..... *Lamiopsis* Gill—*L. temminckii* (168 cm.)
- 5a. Head greatly depressed and trowel-shaped. Pectoral fins broadly triangular, length from origins to free rear tips almost equal to their anterior margins. Free rear tip of first dorsal about over midbases of pelvic fins. Post ventral margin of caudal fin generally only shallowly concave ..... *Scoliodon* Muller & Henle—  
*S. laticaudus* (up to 120 cm. have been reported)
- 5b. Head varying from conical to slightly depressed. Pectoral fins narrow, length 4/5 of less of anterior margin (usually less). Free rear tip of first dorsal over or (usually) anterior to pelvic origins. Post-ventral margin of caudal deeply incised ..... 6

- 6a. Second dorsal origin considerably behind anal origin, usually over or slightly anterior to anal insertion. Preanal ridges very long and prominent, subequal to or greater in length than anal base. Anal posterior margin straight or shallowly concave ..... 7
- 6b. Second dorsal origin usually near anal origin, in some species posterior to it, but usually well anterior to anal insertion. Preanal ridges variably developed, short mid half the anal base length or less. Posterior margin of anal fin deeply concave or deeply notched ..... 9
- 7a. Posterior notches present on eyes. Labial furrows reduced and confined to mouth corners. First dorsal base 2 to 3 times in distance between pectoral and pelvic bases ..... *Loxodon* Muller & Henle–*L. macrorhinus* (91 cm.)
- 7b. Eyes without notches. Labial furrows usually prominent and long (reduced in *R. oligolinx*). First dorsal base usually less than 2 times in distance between pectoral and pelvic bases (up to 2 in adult *R. acutus*) ..... *Rhizoprionodon* Whitley.....8
- 8a. Upper labial furrows reduced and often inconspicuous, usually less than 1% of total length and rarely up to 1.3% ; uppers usually shorter than lower furrows. Tooth rows averaging fewer, counts 23 to 25/21 to 24 but mostly below 25/24 .....  
..... *R. oligolinx* (70 cm.)
- 8b. Upper labial furrows long and rather prominent, more than 1% of total length and usually more than 1.3% ; uppers usually as long or longer than lower furrows. Tooth rows more numerous in average, counts 23 to 30/21 to 28 but mostly 25/24 or higher .....  
..... *R. acutus* (178 cm.)
- 9a. Papillose gillrakers present on gill arches. Weak lateral keels present on caudal peduncle. First dorsal base much closer to pelvic bases than pectorals. Colour brilliant dark blue above in life ..... *Prionace* Cantor–*P. glauca* (383 cm.)
- 9b. No papillose gillrakers on gill arches. No lateral keels on caudal peduncle. First dorsal base equidistant between pectoral and pelvic bases or (usually) closer to pectorals. Colour light to dark grey, grey-brown, brown, or grey-black above .....  
..... *Carcharhinus* Blainville.....10
- 10a. Pectoral and first dorsal fins very broad distally and broadly rounded apically, only slightly tapering toward their apices. Most fin tips mottled white in adults, also black-tipped and with black dorsal saddle-marks on the caudal peduncle in juveniles .....  
..... *C. longimanus* (395 cm)
- 10b. Pectoral and first dorsal fins tapering distally and usually pointed or narrowly rounded. Fins not mottled white, often black tipped but without black saddles on the caudal peduncle ..... 11

- 11a. Second dorsal fin with a prominent black tip but other fins plain .....  
..... *C. dussumieri* (100 cm.)
- 11b. Second dorsal fin plain, white or black-tipped but never the only fin with markings  
..... 12
- 12a. Interdorsal ridge present..... 13
- 12b. Interdorsal ridge absent ..... 14
- 13a. Second dorsal fin low, with very elongated inner margin over twice fin height. Upper  
anterolateral teeth with strongly serrated cusps, generally only 12 rows of upper  
anteroposterior teeth ..... *C. sorrah* (160 cm.)
- 13b. 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  
anterolateral teeth ..... *C. hemiodon* (2 m.)
- 14a. Entire posterior margin of caudal fin with a narrow but obvious black edge ; pectoral,  
second dorsal and caudal fins with obvious black tips .....  
..... *C. melanopterus* (200 cm.)
- 14b. Posterior margin of caudal fin not black or only partly dusky or black ; fins black-tipped  
or not ..... 15
- 15a. Origin of second dorsal fin well behind anal origin, almost opposite its midbase ...  
..... *C. macloiti* (100 cm.)
- 15b. Origin of second dorsal fin almost over anal origin..... *C. limbatus* (255 cm.)

*Interest to fisheries* : All the sharks known to occur in Andhra Pradesh are common species found in both the coasts of India. These sharks are utilized fresh, fresh-frozen or dried salted for human consumption. The livers are utilized for vitamin oils, hides are utilized for leather. fins are used for shark-fin soup base and carcasses are utilized for fishmeal of *C. limbatus*, *C. longimanus*, *G. cuvieri*, *L. temminckii*, *N. acutidens*, *P. glauca* and *T. obesus*. The Carcharhinidae is by far the most important shark family for fisheries and two species, the blue and tiger sharks are listed as International Game Fish Association.

Family 11. SPHYRNIDAE

**Hammerhead sharks**

(Fig. 11)

Head with laterally expanded blades, shaped like a double-bitted axe or mallet in profiles. Eyes with eyelids and spiracles absent. Precaudal pits present. First dorsal fin not keel-like, its base ahead of pelvic bases, varying from equidistant between pectoral and pelvic fin bases to closer to pectoral fin bases ; midpoint of first dorsal fin base always in front of pelvic fin

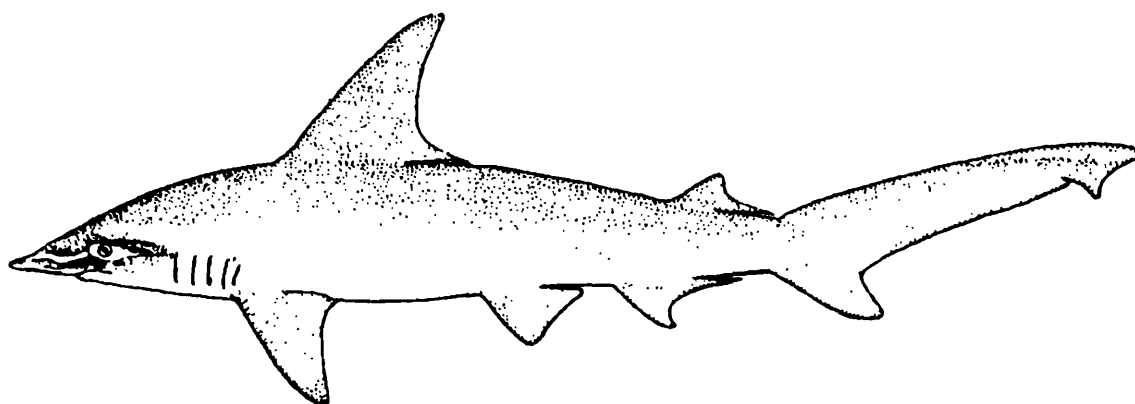


Fig. 11 : *Eusphyra blochii* (Cuvier)

origins ; second dorsal much smaller than first. Ventral caudal lobe strong, undulations or ripples present in dorsal caudal margin. Intestine with a scroll valve. Colour light grey or brownish above, white below or no colour pattern.

#### Species known to occur in Andhra Pradesh

1. *Eusphyra blochii* (Cuvier) (Winghead shark)
2. *Sphyrna lewini* (Griffith & Smith) (Scalloped hammerhead)
3. *S. mokarran* (Ruppell) (Great hammerhead)

#### Key to the genera and species

- 1a. Lateral blades of head very narrow and winglike. Nostrils greatly enlarged, their width 0.8 to 0.9 times in the internarial width and almost twice the mouth width. Knobs present along anterior margin of head, opposite nostrils .....  
..... *Eusphyra* Gill–*E. blochii* (152 cm.)
- 1b. Lateral blades of head anteroposteriorly broad, not winglike. Nostrils short, their widths 7 to 14 times in internarial width and less than half of mouth width. No knobs along anterior margin of head....*Sphyrna* Rafinesque ..... 2
- 2a. Anterior margin of head almost straight in adults. Prenarial grooves absent or hardly developed. Teeth strongly serrated at all sizes. Pelvic fins high and falcate. First dorsal markedly falcate. Second dorsal fin high, with a short inner margin and deeply concave posterior margin .....*S. mokarran* (610 cm.)
- 2b. Anterior margin of head moderately convex in adults, strongly so in young. Prenarial grooves well-developed. Teeth smooth-edged in young, weakly serrate in adults. Pelvic fins low and not falcate, with almost straight posterior edges. First dorsal fin usually semifalcate. Second dorsal fin low, with a long inner margin and nearly straight posterior margin .....*S. lewini* (420 cm.)

*Interest to fisheries* : *E. blochii*, *S. lewini* and *S. mokarran* are common species found in both the coasts of India. Their meats are utilized for human consumption, hides are processed for leather, fins are used in shark-fin soup base, livers are processed for vitamins and carcasses for fishmeal.

Order PRISTIFORMES

Family PRISTIDAE

**Sawfishes**

(Fig. 12)

Body shark like appearance and snout markedly produced into a narrow, flat blade like, armed with tooth like structures (saw like). Pectoral fins small. Gill openings on ventral side. Eyes and spiracles on top of head. Dorsal fin two, widely separated. Caudal fin well developed.

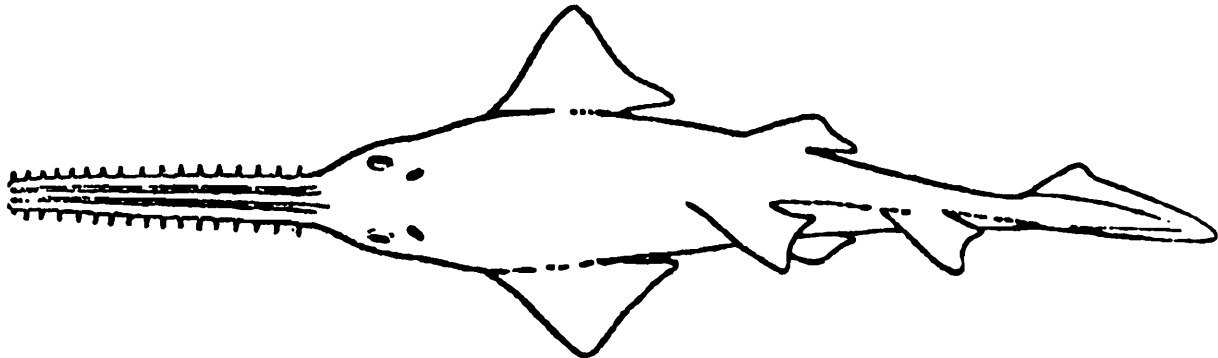


Fig. 12 : *Pristis microdon* Latham

Tail not marked off from the trunk. Body, fins and rostrum covered with small, closely-set dermal denticles in adult but juveniles of *Anoxypristis* are completely naked.

**Species known to occur in Andhra Pradesh**

1. *Anoxypristis cuspidatus* Latham (Pointed sawfish) (Yahla, Hathuthimeena)
2. *Pristis microdon* Latham (Large toothed sawfish) (Shinesi, Hachuttimeenu)
3. *P. zijsron* Bleeker (Green sawfish) (Shinesi, Hachuttimeenu)

**Key to the genera and species**

- 1a. Rostral teeth depressed, broad and blade like, in shallow, broad sockets on the rostrum. Caudal fin with a conspicuous subterminal notch and long ventral lobe. 24 to 25 pairs of rostral teeth .....*A. cuspidatus* (6 m.)
- 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 ..... *Pristis* Linck .....2

- 2a. First dorsal fin almost entirely in advance of pelvic fins. 17 to 22 pairs of rostral teeth ..... *P. microdon* (6 m.)
- 2b. First dorsal fin distinctly behind origin of pelvic fin. 25 to 32 pairs of rostral teeth ..... *P. zijsron* (5 m.)

*Interest to fisheries* : *A. cuspidatus* is a monotypic, euryhaline species ; abundantly found on the east coast of India particularly on the Tamil Nadu coast. *P. microdon* is found abundantly throughout the east coast India. *P. zijsron* is infrequently found along both the east and west coasts of India. The liver oils of sawfishes have a high content of vitamin A and flesh is much esteemed.

### Order TORPEDINIFORMES

#### Key to the families

- 1a. Disc truncate or emarginate anteriorly. Jaws extremely slender. Labial cartilage absent. Rostrum absent or reduce ..... 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. Usually two dorsal fins ..... NARCINIDAE
- 2b. Shallow groove around mouth. Jaws short and weakly protractile. Rostrum narrow. Usually a single dorsal fin ..... NARKIDAE

#### Family TORPEDINIDAE

#### Torpedos, Electric rays

(Fig. 13)

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

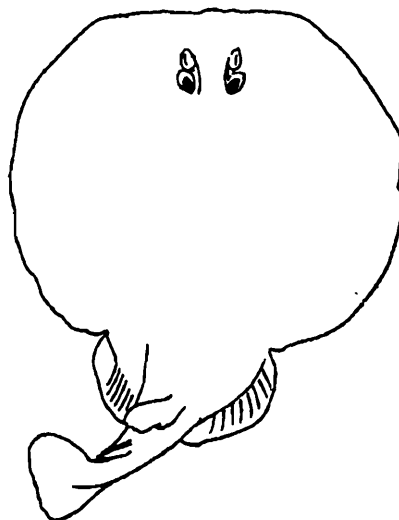


Fig. 13 : *Torpedo panthera* Olfers

absent. Rostrum absent or reduced. Two spineless dorsal fins on tail. Pelvic fins well developed. Anal fin absent. Jaws extremely slender.

**Species known to occur in Andhra Pradesh**

*Torpedo panthera* Olfers (Torpedo, Electric ray) (330 mm.)

*Interest to fisheries* : *T. panthera* is a big fish produces over 100 volts. Its electric nervous energy gets exhausted easily. Its flesh is edible and it is a littoral species.

Family NARCINIDAE

(Fig. 14)

Soft and flabby body with disc roundish anteriorly. Electric organs derived from branchial muscles present in the head region. 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.

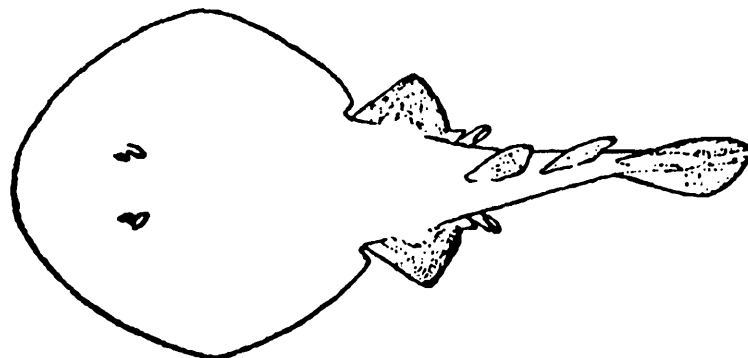


Fig. 14 : *Narcine brunnea* Annandale

**Species known to occur in Andhra Pradesh**

1. *Narcine brunnea* Annandale (Brown electric ray) (Temerec, Talla temerec)
2. *N. indica* Henle (Electric ray) (Temerec, Talla temerec)
3. *N. timlei* (Bloch & Schneider) (Spotted electric ray) (Temerec, Talla temerec)

**Key to the species**

- 1a. Posterior pectoral margins not overlapping anterior part of pelvic fins. Dark spots present on upper side of disc ..... *N. timlei* (340 mm.)
- 1b. Posterior pectoral margins overlapping anterior part of pelvic fins. Upper side of disc plain, coloured ..... 2

- 2a. Mouth with a pair of buccal processes both on roof and floor of mouth .....  
 ..... *N. indica* (445 mm.)
- 2b. Mouth without buccal process ..... *N. brunnea* (220 mm.)

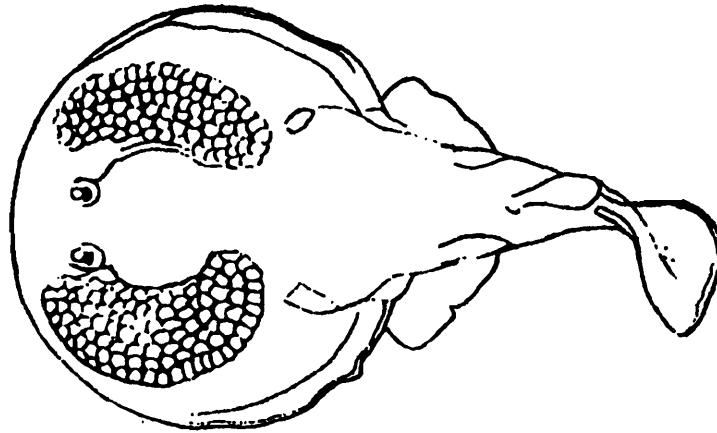
*Interest to fisheries* : The fishes of the family Narcinidae commercially have value and only occasionally captured as by catch.

### Family NARKIDAE

#### **Numb-fish**

(Fig. 15)

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



**Fig. 15** : *Narke dipterygia* (Schneider)

fins and caudal fin also well developed. Anal fin absent. Electric organs present on disc are used to stun the prey.

#### **Species known to occur in Andhra Pradesh**

1. *Narke dipterygia* (Schneider) (Numb fish) (Timri tiki)
2. *N. impennis* Annandale (Numb fish)

#### **Key to the species**

- Pectorals, pelvics and eyes poorly developed ..... *N. impennis* (175 mm.)
- Pectorals, pelvics and eyes well developed ..... *N. dipterygia* (300 mm.)

*Interest to fisheries* : Commercially the numb fishes are not important. These fishes are only occasionally caught as by catch.

Order RAJIFORMES

Key to the families

- Caudal fin bilobed. First dorsal fin inserted above pelvic fin base. Posterior margins of pectoral fins well ahead of origin of pelvic fins ..... RHYNCHOBATIDAE
- Caudal fin not bilobed. First dorsal fin inserted well behind to hind tip of pelvic fins. Posterior margins of pectoral fins extend rearward as far or further than origin of pelvic fins ..... RHINOBATIDAE

Family RHINOBATIDAE

Guitarfishes

(Fig. 16)

Anterior part of trunk varying from moderately 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. Body somewhat intermediate between shark-like and skate-like. Tail stout and not definitely marked off from body. Two distinct dorsal fins and a caudal fin. Denticles over body form a row on middle of back. Caudal fin without a distinct lower lobe.

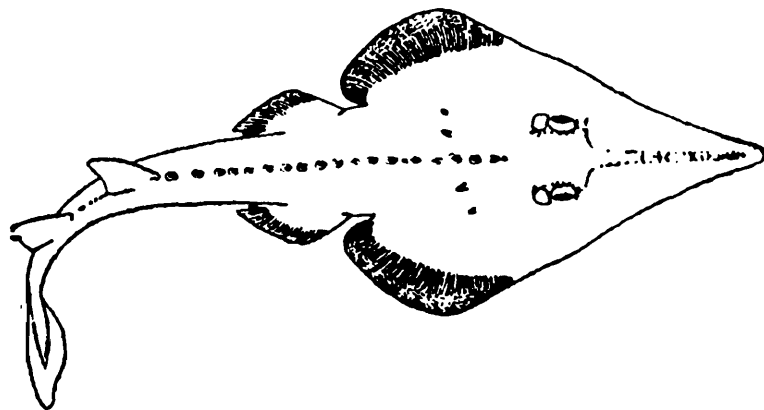


Fig. 16 : *Rhinobatos granulatus* Cuvier

Species known to occur in Andhra Pradesh

1. *Rhinobatos granulatus* Cuvier (Granualated shovelnose ray) (Suttiwarah)
2. *R. obtusus* Muller & Henle (Gray guitarifish) (Suttiwarah)
3. *R. thouiniana* (Shaw) (Shaw's shovelnose guitarfish)

Key to the species

- 1a. Nostril length less than twice width of mouth, greater than distance between them ..... *R. thouiniana* (70 cm.)

- 1b. Nostril length 2 to 3 times width of mouth, about equal to internarial length ..... 2
- 2a. Snout very long and narrow, the rostral ridges close together throughout their length. Width of mouth 2.6 to 3.25 times in snout length ..... *R. granulatus* (1 m.)
- 2b. Snout short and narrow, the rostral ridges separated by a considerable distance throughout their length. Width of mouth almost 1.9 times in snout length .....  
..... *R. obtusus* (180 cm.)

*Interest to fisheries* : Economically the fishes of this family is not important. They constitute a considerable in the commercial catches along with other batoid fishes.

### Family RHYNCHOBATIDAE

#### Wedgefishes

(Fig. 17)

Head depressed with broad rounded or long pointed snout. First dorsal fin insertion above pelvic fins which are placed considerable behind pectoral fins. Pectoral fins well anterior to pelvic fin origin. Caudal fin bilobed, subcaudal fin well developed.

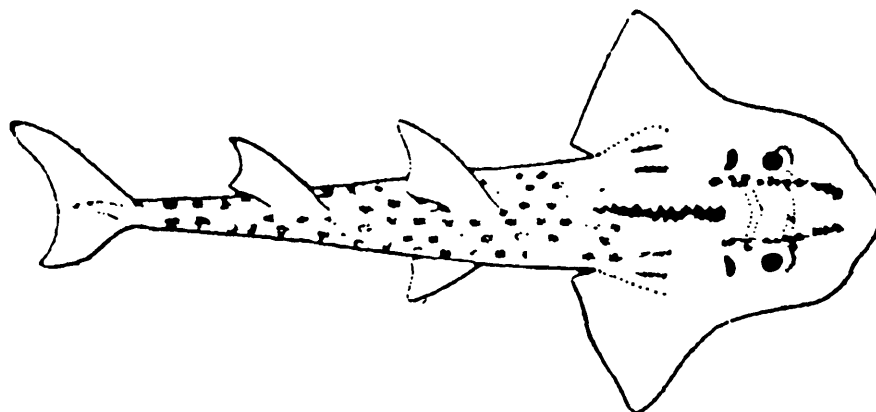


Fig. 17 : *Rhina ancylostoma* Schneider

#### Species known to occur in Andhra Pradesh

1. *Rhina ancylostoma* Schneider (Brownmouthed guitarfish) (Nalla dindi, Pottiba sora)
2. *Rhynchobatus djeddensis* (Forsskal) (Whitespotted shovelnose guitarfish) (Walawah tenkee, Nululavi, Tipiulavi)

#### Key to the species

Snout long and pointed. Posterior margin of spiracles with two continuous folds. Mouth slightly undulated, with median projection of lower jaw fitting into a corresponding depression in upper jaw ..... *R. djeddensis* (300 cms.)

Snout broad and rounded. Spiracular folds absent. Mouth deeply undulated, with three forward projections of lower jaw corresponding with three indentations of lower jaw corresponding with three indentations of upper jaw ..... *R. ancylostoma* (240 cms.)

*Interest to fisheries* : *R. djeddensis*, the large Indo-Pacific can attain a weight of up to 240 kg. Its flesh is considered nourishing when eaten salted or fresh and the oil from the liver is much esteemed. *R. ancylostoma* is a monotypic species is generally caught along the coasts of India.

Order 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 most 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 two widely separated anterior hornlike 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 ..... MYLIOBATIDAE

Family MYLIOBATIDAE

Eagle rays

(Fig. 18)

Large size sting ray with head elevated and distinctly marked off from the disc. Anterior portions of pectoral fins forming a projection undivided subrostral lobe. Eyes and spiracles

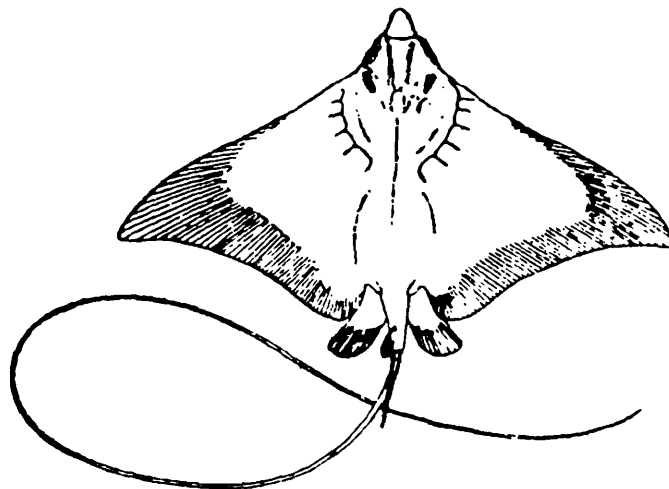


Fig. 18 : *Aetobatus narinari* (Euphrasen)

on sides of head. Tail much longer than disc with venomous spines in some species. A small but distinct dorsal fin present. Caudal fin absent.

### Species known to occur in Andhra Pradesh

*Aetobatus narinari* (Euphrasen) (Spotted eagle ray) (Eel tankee)

*Aetomylaeus nichofii* (Schneider) (Nieuhef's eagle ray) (Mookarah tankee)

### Key to the species

- A single series of teeth in each jaw. Tail with spine. Disc with whitish spots or rings on dark background .....*A. narinari* (335 cms. disc width)
- 7 series of teeth in each jaw. Tail without spine. Disc with 3 to 5 greyish blue bands ..... *A. nichofii*

*Interest to fisheries* : The fishes of this family are common and abundant in the commercial catches. They are not locally used for food, but mainly processed for fishmeal. The oil extracted from the liver is used for smearing boats.

### Family MOBULIDAE

#### Devil rays, Mantas

(Fig. 19)

Stingrays of very large size, with a broad rhombic disc. Tail distinctly 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

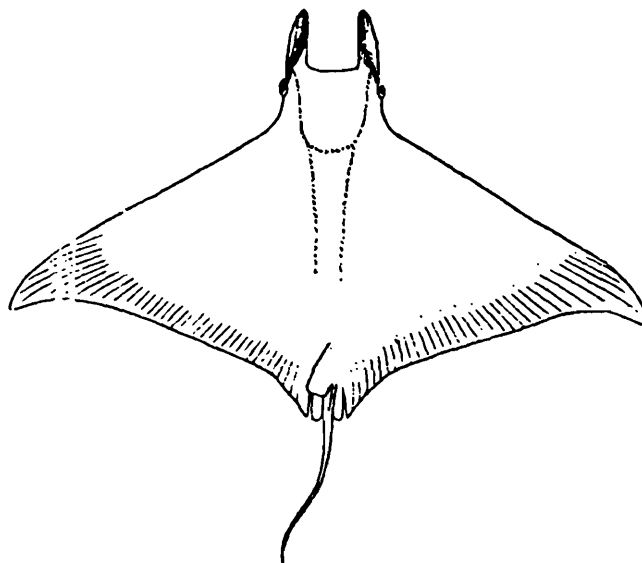


Fig. 19 : *Mobula diabolus* (Shaw)

below head. Eyes and spiracles on sides of head. Caudal fin absent. A small dorsal fin present at base of tail.

### Species known to occur in Andhra Pradesh

*Mobula diabolus* (Shaw) (Pigmy devil-ray) (Eregodeo-tenkee) (1674 mm. disc width).

*Interest to fisheries* : This species is used mainly for fishmeal and oil is extracted from liver and used for smearing boats.

### Family DASYATIDAE

#### Stingrays Whiprays

(Fig. 20)

Disc kite-like, flattened, outer anterior margin of pectorals 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 behind eyes on top of head. Pelvic fins small, below pectoral fins.

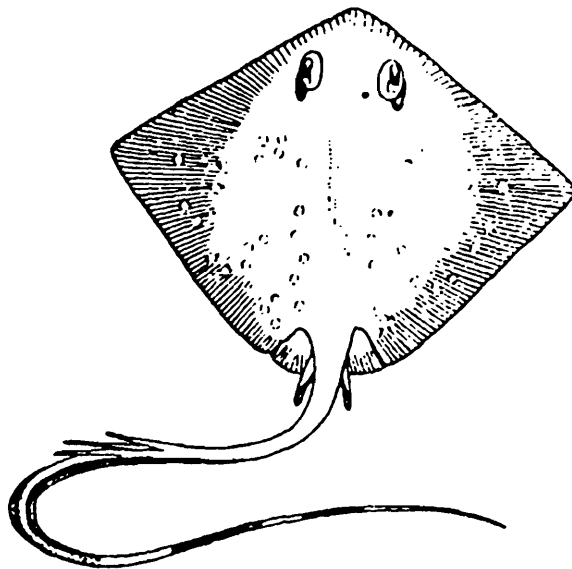


Fig. 20 : *Dasyatis kuhlii* (Muller & Henle)

### Species known to occur in Andhra Pradesh

1. *Dasyatis kuhlii* (Muller & Henle) (Bluespotted stingray) (Shemen-tenkee)
2. *Himantura fавus* (Annandale)
3. *H. imbricata* (Schneider) (Scaly Stingray) (Tenkee shindraki, Isacurrah tenkee)
4. *H. marginatus* (Blyth) (Blackedged Stingray)
5. *H. uarnak* (Forsskal) (Honeycomb Stingray) (Fuli tankee)

6. *H. walga* (Muller & Henle) (Scaly Stingray) (Isacurrahtenkee, Tenkee shindarki, Thiracal)
7. *Hypolophus sephen* (Forsskal) (Drab Stingray) (Velugiri tenkee, Walga tenkee, Bulugiri tenkee).
8. *Taeniura melanospila* Bleeker (Fantail ray) (Giluga tirike)

### Key to the species

- 1a. Disc oval or rounded. Lower surface of tail posterior to origin of spine with longitudinal membranous fold extending to tip of tail .....  
..... *T. melanospila* (147 cm disc length and a width of 17 cm.)
- 1b. Disc quadrangular. Ventral cutaneous fold of tail either absent or terminating far short of tip of tail ..... 2
- 2a. Tail with longitudinal cutaneous fold..... 3
- 2b. Tail without 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 the height of tail above fold .....  
..... *H. sephen* (1750 mm. disc width)
- 3b. Tail with short cutaneous fold (on both sides)..... 4
- 4a. Tail either equal to or 1.5 times longer than length of disc, with 1 caudal spine and tall without any colour pattern. Disc uniform grey .....  
..... *H. imbricata* (250 mm. Disc width)
- 4b. Tail comparatively longer, 2 to 6 times the length of disc ; with 2 to 3 caudal spines and tail with 3 distinct buff rings terminally but crossing cutaneous fold. Disc brown with reddish margins and dark-edged blue circular spots .....  
..... *D. kuhlii* (630 mm. disc length)
- 5a. Mouth with 4 or more buccal process ..... *H. uarnak* (1690 mm. disc length)
- 5b. Mouth with 2 buccal process ..... 6
- 6a. Disc broader than long. Tail 2 to 3 times length of disc .....  
..... *H. marginatus* (342 mm. dic width)
- 6b. Disc longer than broad or equal to broad. Tall less than 2 times length of disc .... 7
- 7a. Tail 1.8 times the length of disc. Eyes 6.0 in interorbital width .....  
..... *H. favus* (1300 mm. disc width)
- 7b. Tail less than 1.5 times the length of disc. Eyes 3.3 in interorbital width .....  
..... *H. walga* (523 mm. disc length)

*Interest to fisheries* : The liver oil of *H. sephen* is of high vitamin A potency. From the skin of its back some of the 'shagreen' of commerce are prepared. The flaps of these fishes are dried for export or used for fishmeal.

Family GYMNURIDAE

**Butterfly rays**

(Fig. 21)

Disc rhomboic, atleast 1.5 times broader than long and a distinctly marked off tail. Buccal papillae on floor of mouth absent. Tail rather slender, shorter than disc, with longitudinal folds on upper and/or lower surface. Some species have spiracular tentacles and one or more long, sawed tail spines.

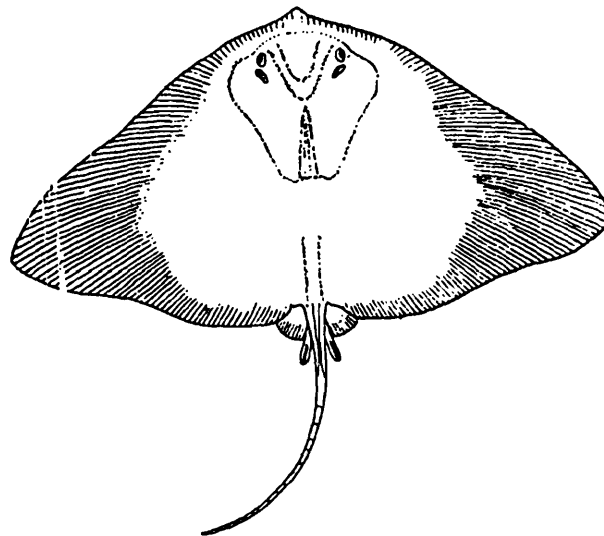


Fig. 21 : *Gymnura poecilura* (Shaw)

**Species known to occur in Andhra Pradesh**

1. *Gymnura japonica* (Schlegel) (Japanese butterfly ray)
2. *G. micrura* (Schneider)
3. *G. poecilura* (Shaw) (Longtailed butterfly ray) (Tappu cooti), Tenkee-kunsul)
4. *G. tentaculata* (Valencienries) (Tentaculated butterfly ray)

**Key to the species**

- 1a. A small but distinct dorsal fin present near midlength of tail. A small longitudinal cutaneous fold present on tail ..... *G. tentaculata* (760 mm. disc width)
- 1b. Dorsal fin absent and no cutaneous fold on tail ..... 2

- 2a. Tail armed with a small, weak, serrate spine at its first third..... *G. japonica*  
 2b. Tail without serrate spine ..... 3  
 3a. Tail almost equal to length of disc ..... *G. poecilura* (700 mm. disc width)  
 3b. Tail less than half length of disc..... *G. micrura*

*Interest to fisheries* : The butterfly rays are not locally consumed, but dried for export or used for fishmeal.

## Class OSTEICHTHYES

### Bony Fishes

#### Key to the orders

- 1a. Body not bilaterally symmetrical, highly flattened. Eyes present on one side of body only. Dorsal and anal fin long..... PLEURONECTIFORMES  
 1b. Body bilaterally symmetrical. Eyes present on both sides of body ..... 2  
 2a. Gill openings, below or behind pectoral fins. First spine of dorsal fin modified to form a fishing pole. Body globose or depressed..... LOPHIIFORMES (Lophiidae)  
 2b. Gill openings before pectoral fins ..... 3  
 3a. Body very elongate 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 eels) but confluent 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 resembles 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 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 fin not greatly elongated, if so not wing-like ..... 6  
 6a. Pelvic fins with 2 rays. Dorsal and anal fin confluent with caudal fin .....  
 ..... OPHIDIIFORMES (Ophidiidae)

- 6b. Pelvic fins with more than 2 rays. Dorsal and anal fins not confluent with caudal fin ..... 7
- 7a. Body without scales but a bony head shield often present. Barbels well developed. present around mouth. A strong spine usually present at front of dorsal and pectoral fins. An adipose fin often present ..... SILURIFORMES
- 7b. Body with scales. Barbels generally not present, if present poorly developed. Adipose fin generally absent ..... 8
- 8a. Mouth very small. Gill openings restricted (small). Scales generally modified into spines, shields or plates ..... TETRAODONTIFORMES
- 8b. Mouth moderate. Gill openings normal. Scales not modified as in 8a ..... 9
- 9a. Head usually 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 respectively. Pectoral fins not rounded ..... 10
- 10a. Pectoral fin greatly enlarged. Head encased in a bony shield with a spiny crest from nape to below base of first dorsal fin ..... DACTYLOPTERIFORMES (Dactylopteridae)
- 10b. Pectoral fin normal, not enlarged. Head not encased in a bony shield and without a spiny crest from nape to below base of first dorsal fin ..... 11
- 11a. Head large and depressed, body compressed. Eyes dorsolateral. Body without scales ..... BATRACHOIDIFORMES (Batrachoididae)
- 11b. Head not depressed. Eyes lateral. Body with scales ..... 12
- 12a. Mesocoracoid present ..... 13
- 12b. Mesocoracoid absent ..... 15
- 13a. Lateral line absent. Body generally compressed ..... CLUPEIFORMES
- 13b. Lateral line present ..... 14
- 14a. Jaws toothless. Branchiostegal rays 3 or 4 ..... GONORHYNCHIFORMES (Chanidae)
- 14b. Jaws with tooth. Branchiostegal rays 6 to 35 ..... ELOPIIFORMES
- 15a. Adipose dorsal fin generally present. Premaxillae form the gape of mouth (maxillae extended). Photophores often present ..... AULOPIIFORMES
- 15b. Adipose dorsal fin absent ..... 16

- 16a. Fins without spine. Pelvic fins widely separated. First dorsal fin with a single ray  
..... GADIFORMES (Bregmacerotidae)
- 16b. Fins with spines. Pelvic fins close together ..... 17
- 17a. A silvery stripe present on side. Anal fin with 1 spine ..... ATHERINIFORMES
- 17b. A silvery stripe absent on side. Anal fin generally with more than 1 spine ..... 18
- 18a. Body usually compressed and deep. Jaws greatly distensible .....  
..... ZEIFORMES (Caproidae)
- 18b. Body usually elongate. Jaws not greatly distensible ..... 19
- 19a. Orbitosphenoid present..... BERYCIFORMES
- 19b. Orbitosphenoid absent ..... PERCIFORMES

### Order ELOPIFORMES

#### Key to the families

- Scales large, 30 to 40 along lateral line. Last dorsal fin ray filamentous .....  
..... MEGALOPIDAE
- Scales small, 95 to 120 along lateral line. Last dorsal fin ray not filamentous .....  
..... ELOPIDAE

#### Family ELOPIDAE

#### Ladyfishes, Tenpounders

(Fig. 22)

Body elongate, fusiform and cylindrical. Mouth terminal, with small, sharp teeth; the maxilla extending well behind the posterior border of the orbit. A fairly large, bony gular plate present under the mouth, between the arms of the lower jaw. Dorsal fin with 20 to 25 soft unbranched rays, last ray not elongated, inserted almost middle of the body. Anal fin with

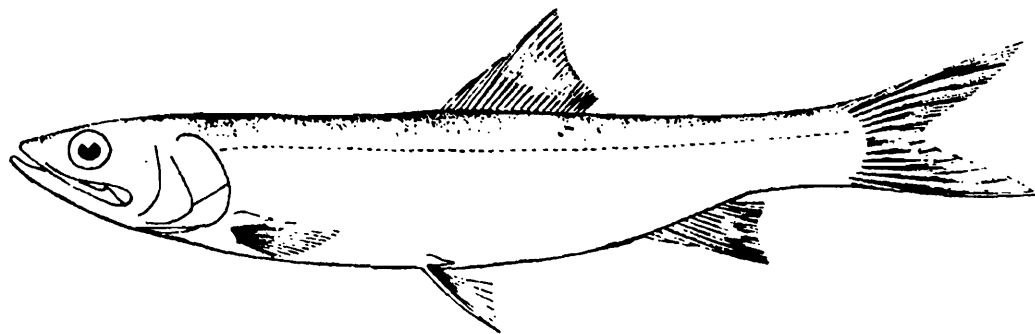


Fig. 22 : *Elops machnata* (Forsskal)

18 to 20 rays, inserted considerably behind dorsal fin. Pelvic fin inserted below middle of dorsal fin. Lateral line present with small 95 to 120 cycloid scales along the lateral line.

**Species known to occur in Andhra Pradesh**

*Elops machnata* (Forsskal) (Ladyfish) (Jallugu, Jinnagow) (90 cm TL)

*Interest to Fisheries* : Tenpounders are captured along the east coast of India, particularly Tamil Nadu and Andhra Pradesh. These fishes are of minor commercial importance, the flesh is disappointing, being insipid and full of bones.

Family MEGALOPIDAE

**Tarpons**

(Fig. 23)

Body more or less compressed and moderately deep. Mouth terminal or superior; a large, bony gular plate present under 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

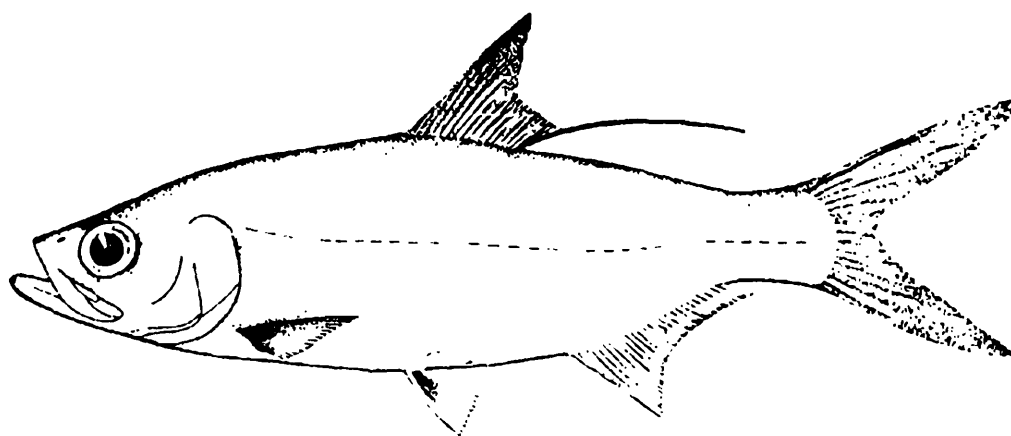


Fig. 23 : *Megalops cyprinoides* (Broussonet)

rays, its insertion little behind last dorsal fin ray. Pelvic fin with 10 to 11 rays. Lateral line with 30 to 40 large scales.

**Species known to occur in Andhra Pradesh**

*Megalops cyprinoides* (Broussonet) (Indo-Pacific tarpon) (Kudinga) (1m TL)

*Interest to fisheries* : The Indo-Pacific tarpon is captured along both the coasts of India. It is a fast growing carnivorous fish. The economic importance of this fish is less, its flesh is poor and bony, and is marketed fresh or dried salted condition.

## Order ANGUILLIFORMES

## Key to the families

- 1a. Body with minute embedded scales. Dorsal, anal, and caudal fins well developed. Pectoral fins present ..... ANGUILLIDAE
- 1b. Body without scales (naked) ..... 2
- 2a. Large canine teeth (often fang-like) on vomer (medially on roof of mouth) ..... 3
- 2b. Large canine teeth on vomer absent ..... 4
- 3a. Well developed pectoral fins present ..... MURAENESOCIDAE
- 3b. Pectoral fins absent ..... MURAENIDAE
- 4a. Posterior nostrils opening inside mouth, on upper lip or just above mouth. Branchiostegal rays over-lapping midventrally ..... OPHICHTHIDAE
- 4b. Posterior nostrils not labial, but lateral or superior. Branchiostegal rays not overlapping ventrally ..... CONGRIDAE

## Family ANGUILLIDAE

## Freshwater eels

(Fig. 24)

Body eel-like, cylindrical, anteriorly with minute embedded scales. Mouth terminal or slightly oblique, and moderately large, but never extending back much beyond orbits. Gill openings vertical slits below origin of pectoral fins. Fins without spines. Dorsal and anal fins continuous around caudal fin. Dorsal fin inserted variously between pectoral fins and anus or over anus, in anterior half of body. Pelvic fins absent. Pectoral fins well developed. Lateral line system present but not particularly prominent, typically a series of minute, white pores. Usually catadromous fishes.

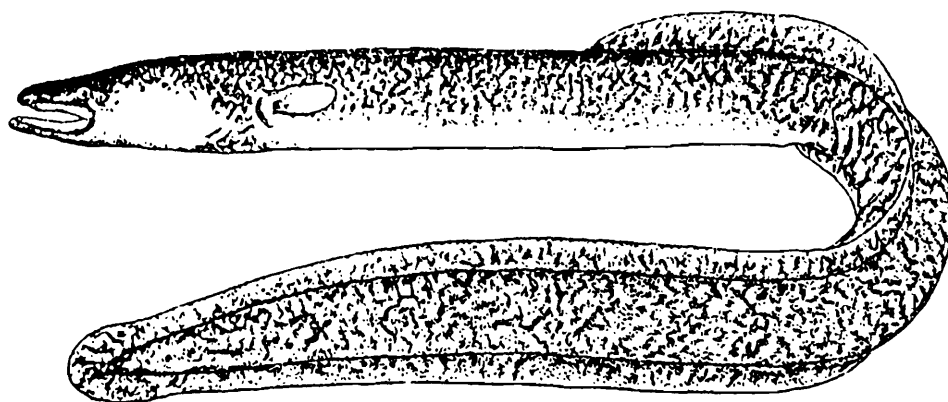


Fig. 24 : *Anguilla bengalensis bengalensis* (Gray & Hardwicke)

### Species known to occur in Andhra Pradesh

1. *Anguilla bengalensis bengalensis* (Gray and Hardwicke) (Long-finned eel) (Malugu)
2. *A. bicolor bicolor* McClelland (Short-finned eel) (Malugu)

#### Key to the species

- Dorsal fin inserted above anus or very nearly so ..... *A. bicolor bicolor* (80 cm. TL)
- Dorsal fin inserted above almost midway between gill opening and anus .....  
..... *A. bengalensis bengalensis* (120 cms. TL)

*Interest to fisheries* : *A. bengalensis bengalensis* is one of the most common eels of commercial importance found in both the coasts of India. *A. bicolor bicolor*, on the contrary appears to be rather rare species, although abundantly found in certain estuaries of India.

*Remarks* : These freshwater eels breed in the open ocean and ocean currents move the young larvae coastward to where they enter freshwaters. Most of the life is subsequently spent in streams and rivers but as maturity approaches the adults migrate seaward to spawn.

#### Family CONGRIDAE Conger eels (Fig. 25)

Body long, cylindrical and eel-like and often with a thin, delicate tail region which is readily damaged. Snout blunt to pointed. Mouth sometimes terminal but often slightly inferior. Lips well developed. Teeth on vomer typically in a triangular or oval, multiserial patch but may also be uniserial. Mouth moderately large but never extending beyond the eyes. Nostrils

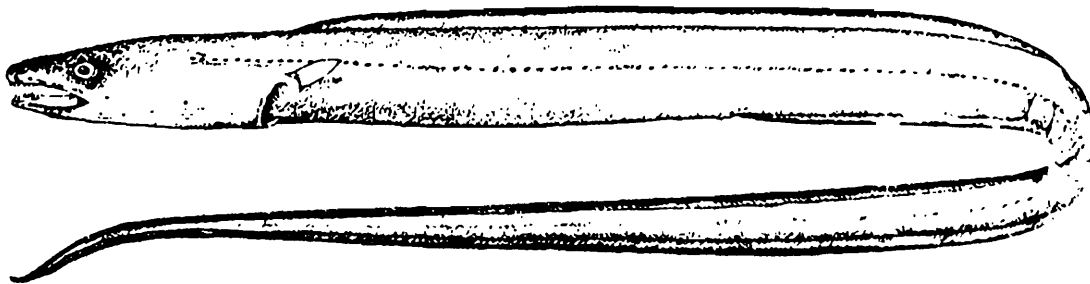


Fig. 25 : *Uroconger lepturus* (Richardson)

separated, the anterior one a short, free tube which penetrates upper lip only in *Heteroconger*, the posterior one a simple aperture ahead of eyes. Gill opening a slit in front of pectoral fins. Fins without spines. Dorsal and anal fins continuous around tail. Dorsal fin origin almost above gill openings. Pectoral fins always present. Pelvic fins absent. Scales absent. Lateral

line systems prominent, extending on to head, the two sides of it connected through a supratemporal canal only.

### Species known to occur in Andhra Pradesh

*Uroconger lepturus* (Richardson) (Slender conger eel) (40 cm TL)

*Interest to fisheries* : The slender conger eel is of minor commercial importance and it is used as fish bait and consumed as food by the poor local people only.

### Family MURAENESOCIDAE

#### Pike congers

(Fig. 26)

Body very long, cylindrical and eel-like with compressed tail. Snout very pointed. Mouth terminal, gape extending well beyond eyes. Teeth always large, conspicuous, 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 openings large a vertical or oblique

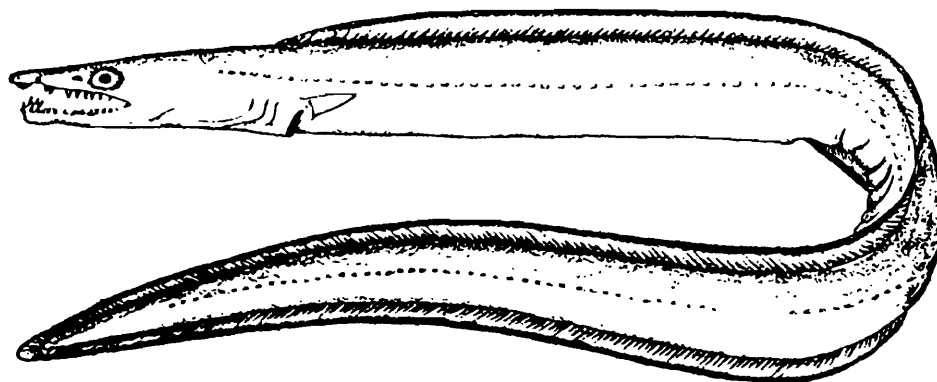


Fig. 26 : *Congresox talabonoides* (Bleeker)

slit ahead of pectoral fins. Dorsal fin origin almost over gill openings. Dorsal and anal fins confluent with the caudal fin. Pectoral fins always present. Pelvic fins absent. Fins without spines. Scales absent.

### Species known to occur in Andhra Pradesh

1. *Congresox talabon* (Cuvier) (Yellow pike conger) (Culim poun)
2. *C. talabonoides* (Bleeker) (Indian pike conger)
3. *Muraenesox bagio* (Hamilton-Buchanan) (Common pike conger)
4. *M. cinereus* (Forsskal) (Dragertooteh pike conger)

**Key to the species**

- 1a. Large 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 ..... 2
- 1b. Largest teeth on lower jaw laterally compressed, sharp, with conspicuous anterior and posterior basal bulges erect ; principal teeth on vomer similar ..... 3
- 2a. Length of pectoral fin almost 3 times in head length. Teeth on vomer more needle-like in specimens of all sizes, never with basal cusps ..... *C. talabon* (280 cm TL)
- 2b. Length of pectoral fin almost 4 times in head length. Teeth on vomer of similar specimens less needle-like, with minute, basal cusps .....  
..... *C. talabonoides* (250 cm TL)
- 3a. Snout longer and narrower, the interorbital width is almost 10 to 11 times in head length. Lateral line pores fewer, 33 to 39. Dorsal fin rays fewer, 47 to 59 before level of vent ..... *M. bagio* (180 cm TL)
- 3b. Snout shorter and broader, the interorbital width is almost 8 times in head length. Lateral line pores more, 39 to 47. Dorsal fin rays more, 66 to 78 before level of vent .....  
..... *M. cinereus* (80 cm TL)

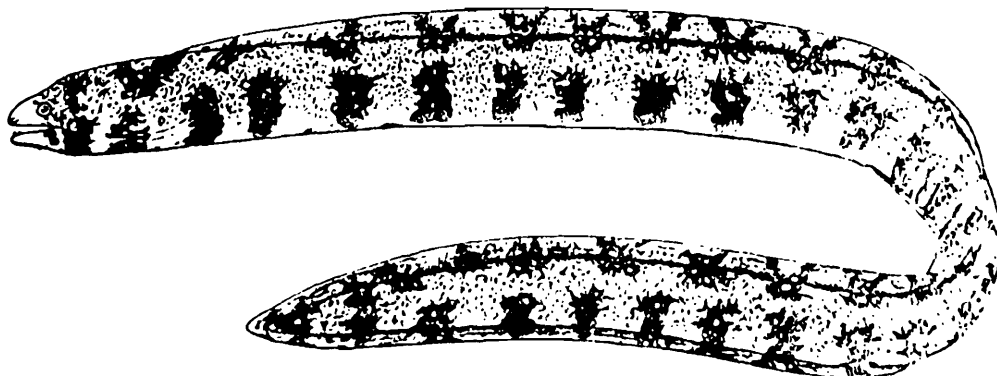
*Interest to fisheries* : *C. talabonoides* supports an important and flourishing fishery along the northwestern coast of India. It is an important food fish found almost in both the coasts of India. *M. cinereus* is one of the common commercial eels of India and it also supports an important fishery in both the east and west coast of India.

**Family MURAENIDAE**

**Moray eels**

(Fig. 27)

Body long, cylindrical and eel-like, somewhat compressed along the tail. Mouth very wide, generally extending considerably posterior to the eyes. Teeth generally sharp, mostly



**Fig. 27** : *Echidna nebulosa* (Ahl)

raptorial but sometimes molar-like. Teeth on vomer uniserial or in a median patch. Gill openings restricted to small roundish lateral openings. Anterior nostril tubular in front of snout, posterior nostril above anterior portion of eyes. Fins without spines. Dorsal and anal fins joined posteriorly with the caudal fin. Pectoral and pelvic fins absent. No lateral line pore on body but present on head, two branchial pores present. Body without scales.

### Species known to occur in Andhra Pradesh

1. *Echidna nebulosa* (Ahl) (Starry moray) (Saulinga pam)
2. *E. zebra* (Shaw) (Zebra morray)
3. *Gymnothorax reticularis* Bloch (Reticulated morray)
4. *Lycodontis fimbriatus* (Bennett)
5. *L. punctatus* (Bloch and Schneider)
6. *L. tile* (Hamilton-Buchanan)
7. *Thyrsoidea macrura* (Blecker) (Giant slender morray)

### 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* (120 cm TL)
- 2b. Body yellowish brown with 3 longitudinal series of darker, star-shaped spots along body. Vent almost in middle of body..... *E. nebulosa* (80 cm TL)
- 3a. Tail almost twice as long as rest of body ..... *T. macrura* (400 cm TL)
- 3b. Tail equal to, or slightly longer than rest of body ..... 4
- 4a. Lateral jaw teeth with minute serrations on their margins .....*G. reticularis*
- 4b. Lateral jaw teeth without serrations ..... 5
- 5a. Teeth biserial. Body brownish yellow, with fine white spots, streaks, or marks, which may be lost in adults.....*L. tile*
- 5b. Teeth uniserial ..... 6
- 6a. Body dark purplish, covered with fine white spots ..... *L. punctatus*

- 6b. Body olive brown, a few dark spots on head and many irregular spots on body and fins  
 ..... *L. fimbriatus*

*Interest to fisheries* : The moray eels are not much commercially important. *T. macrura* is the largest known monotypic species, used as fish bait or consumed as food by local people.

Family OPHICHTHIDAE  
**Snake eels and Worm eels**  
 (Fig. 28)

Body very elongate and cylindrical, snake-like or worm-like. Mouth terminal or inferior, maxilla generally extends beyond eyes. 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 rows or in a solid

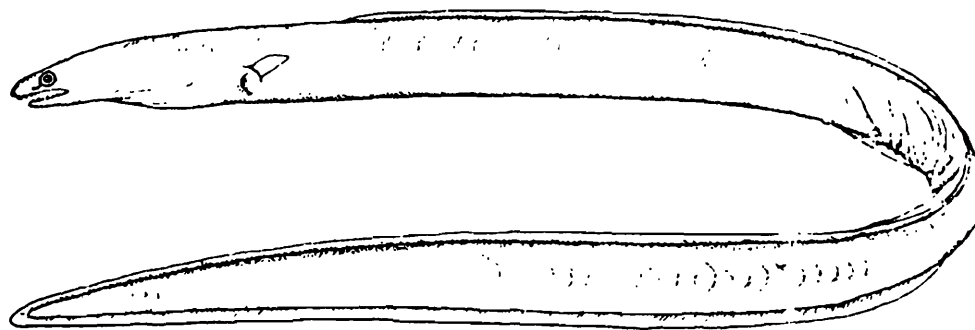


Fig. 28 : *Neechelys buitendijki* Weber & de Beaufort

patch. Nostrils widely separated, the posterior inside mouth or somewhat penetrating or opening through a valve in upper lip. Gill openings small, slit-like or round. Fins without spines. Dorsal and anal fins, when present, continuous around the tail externally, or discontinuous, with the caudal fin rays reduced. Pectoral fins present or absent. Pelvic fins absent. Lateral line extending on to head. Scales absent.

**Species known to occur in Andhra Pradesh**

1. *Lamnostoma orientalis* (McClelland) (Oriental worm eel) (Manti-bukaro paumbu)
2. *Neechelys buitendijki* Weber & de Beaufort (Fintail serpent eel)
3. *Ophichthys apicalis* (Bennett) (Pointed-tail snake eel)
4. *Pisodonophis boro* (Hamilton-Buchanan) (Bengal's snake eel)
5. *P. cancrivorus* (Richardson)

### Key to the species

- 1a. Tip of tail with a fringe of fin around it, the dorsal, caudal and anal fins thus forming one continuous external fin ..... *N. buitendijki* (30 cm TL)
- 1b. Tip of tail finless externally, the tail tip hard and pointed..... 2
- 2a. Pectoral fins much reduced or absent, median fins if present, much reduced, or absent ..... *L. orientalis*
- 2b. Pectoral fins present, generally well developed ; median fins moderately well developed, though low ..... 3
- 3a. Vomerine teeth pointed. Pectoral fin base restricted ..... *O. apicalis*
- 3b. Vomerine teeth molariform. Pectoral fin base broad..... 4
- 4a. Origin of dorsal fin above middle of pectoral fills ..... *P. cancrivorus*
- 4b. Origin of dorsal fin behind end of pectoral fins ..... *P. boro*

*Interest to fisheries* : The snake eels are of minor commercial importance. They are marketed fresh and used as bait. *L. orientalis* is a very common fish mainly found in the eastern coast of India. *N. buitendijki* is chiefly known to occur in the Western coast of India.

### Order CLUPEIFORMES

#### Key to the families

- 1a. Articulation of lower jaw considerably posterior to orbit, lower jaw generally slender. Snout 'pig-like' and projecting, lower jaw .....  
'underslung' .....ENGRAULIDIDAE
- 1b. Articulation of lower jaw under or only just posterior to orbit, lower jaw deep.....2
- 2a. Scutes along abdomen absent (including pelvic scutes). Two fang-like canine teeth in upper jaw, pointing forward. Body greatly compressed and elongate .....  
..... CHIROCENRIDAE
- 2b. Scutes generally present along abdomen (pelvic scutes always present). Canine teeth rare, never pointing directly forward in upper jaw. Body generally oval or round in cross section ..... 3
- 3a. Anal fin long (more than 30 rays). Lower jaw projecting, mouth directed almost upward ..... PRISTIGASTERIDAE
- 3b. Anal fin short (less than 30 rays) ..... CLUPEIDAE

**Family CLUPEIDAE**  
**Herrings, Sardines**

Body typically fusiform, oval in cross section, with a complete series of scutes along the abdomen (pelvic scutes always present). Mouth terminal, jaw teeth minute or small. Dorsal fin short, inserted near the middle of body. Pelvic fins inserted just anterior to, below or just posterior to the dorsal fin base. Anal fin short, its origin considerably posterior to the last dorsal fin ray. Scales adherent and of moderate size, almost 40 to 50 in lateral series.

**Key to the subfamilies of the family CLUPEIDAE**

- 1a. Pelvic scutes 'W' shaped, no other scutes along belly ..... DUSSUMIERIINAE
- 1b. Pelvic scutes with ascending arms, scutes generally present anterior to and posterior to pelvic fins ..... 2
- 2a. Upper jaw rounded when seen from front ..... CLUPEINAE
- 2b. Upper jaw with a distinct median notch or cleft when seen from front ..... 3
- 3a. Lower jaw normal, mouth terminal. Last dorsal fin ray normal ..... ALOSINAE
- 3b. Lower jaw flared outward, mouth generally inferior. Last dorsal fin ray filamentous in many species ..... DOROSOMATINAE

**Subfamily DUSSUMIERIINAE**  
**Round herrings**

**Key to the genera**

- Branchiostegal rays numerous. Premaxillae rectangular ..... *Dussumieria* Valenciennes
- Branchiostegal rays few (6 or 7). Premaxillae triangular ..... *Spratelloides* Bleeker

**Genus *Dussumieria* (Valenciennes)**

**Species known to occur in Andhra Pradesh**

- 1. *D. acuta* Valenciennes (Rainbow sardine) (Marrawa, Morava)
- 2. *D. elopsoides* Bleeker (Slender rainbow sardine) (Morava)

**Key to the species**

- Body deeper, generally 22 to 29% of standard length. Lower gillrakers fewer (19 to 26). Branchiostegal rays fewer (12 to 15). Posterior portion of scales marked with numerous tiny radiating striae ..... *D. acuta* (20 cm SL)

Body slender, depth generally 16 to 22% of standard length. Lower gillrakers more (21 to 32). Branchiostegal rays more (13 to 17). No striae on posterior portion of scales  
 ..... *D. elopsoides* (20 cm SL)

Genus *Spratelloides* Bleeker

Species occur in Andhra Pradesh

1. *S. delicatulus* (Bennet) (Delicate round herring)
2. *S. gracilis* (Temminck & Schlegel)

Key to the species

- A bright silver band along the flanks present. 42 to 48 scales in lateral series .....  
 ..... *S. gracilis* (9.5 cm SL)
- No silver band along flanks. 35 to 41 scales in lateral series .....  
 ..... *S. delicatulus* (7 cm SL)

Subfamily CLUPEINAE

Herrings, Sardines

Key to the genera

- 1a. Posterior margin of gill openings evenly rounded, without fleshy outgrowths .....  
 ..... *Escualosa* Whitley
- 1b. Posterior margin of gill openings with two distinct outgrowths ..... 2
- 2a. Fronto-parietal striae on top of head few, about 3 to 7. Lower part of second (posterior) supramaxilla larger than upper. Last two anal fin rays not enlarged .....  
 ..... *Herklotsichthys* Whitley
- 2b. Fronto-parietal striae on top of head numerous, 7 to 14. Second supramaxilla symmetrical. Last two anal fin rays enlarged ..... 3
- 3a. Lower gillrakers 26 to 43. A median series of predorsal scales .....  
 ..... *Amblygaster* Bleeker
- 3b. Lower gillrakers rarely less than 40 (mostly 45 to 90, but over 200 in some species). Predorsal scales paired ..... *Sardinella* Valenciennes

Genus *Herklotsichthys* Whitley

Species known to occur in Andhra Pradesh

- H. quadrimaculatus* (Ruppell) (Bluestripe herring) (14 cm SL)

Genus *Escualosa* Whitley

**Species known to occur in Andhra Pradesh**

*E. thoracata* (Valenciennes) (White sardine) (Kavallu) (10 cm SL)

Genus *Amblygaster* Bleeker

**Species known to occur in Andhra Pradesh**

1. *A. clupeioides* Bleeker (Bleeker's smoothbelly sardinella)
2. *A. leiogaster* (Valenciennes) (Smoothbelly sardinella)
3. *A. sirm* (Walbaum) (Spotted sardinella)

**Key to the species**

- 1a. A series of 10 to 20 gold (in life) or black (on preservation) spots down the flanks. Lower gillrakers 33 to 43 ..... *A. sirm* (23 cm SL)
- 1b. No spots on flanks. Lower gillrakers 26 to 33 ..... 2
- 2a. Lower gillrakers 26 to 31 ..... *A. clupeioides* (17 cm SL)
- 2b. Lower gillrakers 31 to 33 ..... *A. leiogaster* (23 cm SL)

Genus *Sardinella* Valenciennes

**Species known to occur in Andhra Pradesh**

1. *S. albella* (Valenciennes) (White sardinella) (Kavalley)
2. *S. brachysoma* Bleeker (Deepbody sardinella)
3. *S. fimbriata* (Valenciennes) (Fringlescale sardinella) (Kowal)
4. *S. gibbosa* (Bleeker) (Goldstripe sardinella) (Kavallu)
5. *S. longiceps* (Valenciennes) (Indian oil sardinella) (Noona kavallu)

**Key to the species**

- 1a. Pelvic fins with 9 rays. Gillrakers on lower arms of first arch 145 to 258 ..... *S. longiceps* (23 cm SL)
- 1b. Pelvic fins with 8 rays. Gillrakers on lower arm of first arch not more than 130.... 2
- 2a. Post-pelvic scutes generally 15 (less common 14, rarely 13) ..... *S. gibbosa* (17 cm SL)

- 2b. Post-pelvic scutes 12 to 14 (rarely 11 or 15) ..... 3
- 3a. Vertical striae on scales overlapping or sometimes continuous at centre of scale, numerous small perforations on hind part of scale ..... *S. brachysoma* (13 cm SL)
- 3b. Vertical striae on scales not meeting at centre of scales ..... 4
- 4a. Lower gillrakers on first arch 41 to 68 (at 50 to 130mm SL). Body depth 24 to 39% of standard length ..... *S. albella* (14 cm SL)
- 4b. Lower gillrakers on first arch 54 to 82 (at 50 to 130 mm SL). Body depth 25 to 35% of standard length ..... *S. fimbriata* (13 cm SL)

### Subfamily ALOSINAE

#### Shads

#### Key to the genera

- Fronto-parietal striae (on top of head) many, 8 to 14. Gillrakers on inner arches distinctly curled outward. Scales perforated ..... *Hilsa* Regan
- Fronto-parietal striae weakly developed, usually hidden by skin. Gillrakers on inner arches straight. Scales not perforated ..... *Tenualosa* Fowler

#### Genus *Hilsa* Regan

#### Species known to occur in Andhra Pradesh

*Hilsa kelee* (Cuvier) (Kelee shad) (Keelee, Kolirneen) (24.4 cm SL)

#### Genus *Tenualosa* Fowler

#### Species known to occur in Andhra Pradesh

*T. ilisha* (Hamilton-Buchanan) (Hilsa shad) (Palasah)

*T. toli* Valenciennes (Toll shad)

#### Key to the species

- Head length 28 to 32% of standard length. Gillrakers numerous almost 100 to 250 on lower part of arch. Caudal fin 25 to 31% of standard length .....  
..... *T. ilisha* (60 cm SL)
- Head length 25 to 27% of standard length. Gillrakers not numerous, 60 to 100 on lower part of arch (barely increasing after 10 cm standard length). Caudal fin 31 to 34% of standard length ..... *T. toli* (50 cm SL)

Subfamily DOROSOMATINAE  
(Fig. 29)

**Key to the genera**

- Last dorsal fin ray produced, filamentous ..... *Nematolosa* Regan
- Last dorsal fin ray normal, not filamentous ..... *Anodontostoma* Bleeker

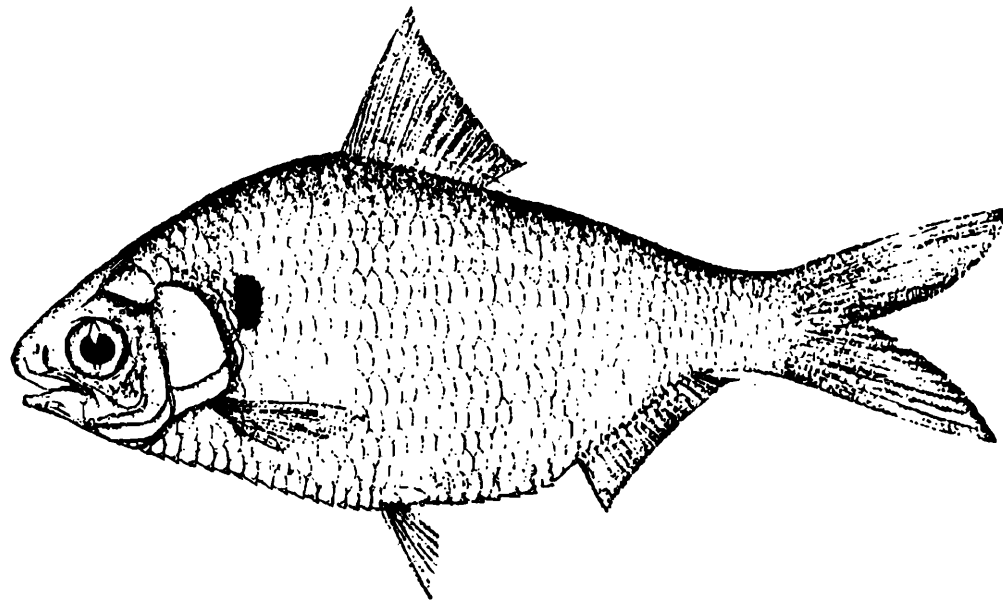


Fig. 29 : *Anodontostoma chacunda* (Hamilton-Buchanan)

Genus *Anodontostoma* Bleeker

**Species known to occur in Andhra Pradesh**

*A. chacunda* (Hamilton-Buchanan) (Chacunda gizzard shad) (Muddeeru, Kome) (17 cm SL)

Genus *Nematolosa* Regan

**Species known to occur in Andhra Pradesh**

1. *N. galathea* (Nelson & Rothman) (Galathea gizzard shad)
2. *N. nasus* (Bloch) (Bloch's gizzard shad) (Kome)

**Key to the species**

- A pair of grooves in the spongy skin on top of head, converging posteriorly. Hind margin of scales not toothed ..... *N. galathea* (15.3 cm SL)
- Supraorbital grooves absent. Hind margin of scales toothed .... *N. nasus* (21 cm SL.)

*Interest to fisheries* : The fishes of the family Clupeidae are of great commercial value in many parts of the world. *T. ilisha* has a considerable commercial value in fisheries of India, Pakistan, Bangladesh and Burma. It is one of the best known Indian migratory fishes ascending all the major river systems. *H. kelee* is a monotypic species seasonally abundantly found along the south-east and south-west coast of India.

### Family PRISTIGASTERIDAE

#### Pristigasterids

(Fig. 30)

Body elongate, deep and compressed, fully scuted along abdomen. Mouth terminal, lower jaw projecting. Dorsal fin short, inserted ahead of midpoint of body in very deep forms, but behind in elongate forms ; sometimes missing (in *Raconda*). Pelvic fins with 6 or 7 rays or entirely absent. Anal fin long, with at least 30 rays. Scales thin and easily lost, almost 35 to 55 in lateral line series.

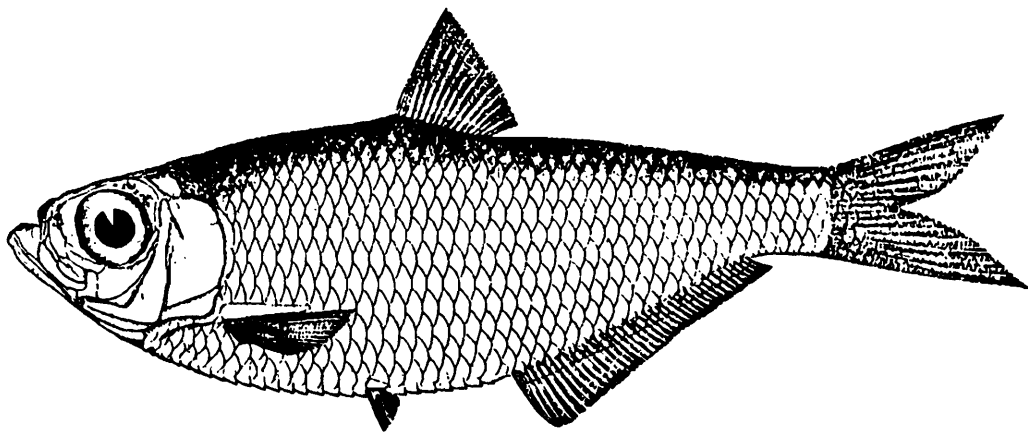


Fig. 30 : *Ilisha melanostoma* (Schneider)

#### Species known to occur in Andhra Pradesh

1. *Ilisha filigera* (Valenciennes) (Coromandel ilisha)
2. *I. kampeni* (Weber & de Beaufort) (Kampen's ilisha)
3. *I. megaloptera* (Swainson) (Bigeye ilisha)
4. *I. melanostoma* (Schneider) (Indian ilisha)
5. *I. sirishai* Seshagiri Rao (Lobejaw ilisaha)
6. *I. striatula* Wongratana (Banded ilisha)
7. *Pellona dayi* Wongratana (Day's pellona)
8. *P. ditchella* Valenciennes (Indian pellona) (Erra engallu)

9. *Opisthopterus tardoore* (Cuvier) (Long finned herring) (Tartoorc)  
 10. *Raconda russeliana* Gray (Russell's smooth-back herring)

**Key to the genera and species**

- 1a. Toothed hypo-maxilla present ..... *Pellona Valenciennes*.....2  
 1b. No toothed hypo-maxilla ..... 3  
 2a. Lower gillrakers 20 or 21. Vertical scale striae not meeting at centre of scale .....  
 ..... *P. dayi*  
 2b. Lower gillrakers 22 to 27. Vertical scale striae overlapping at centre of scale .....  
 ..... *P. ditchella* (16 cm.)  
 3a. Dorsal and pelvic fins absent. Anal fin very long with 81 to 92 fin rays .....  
 ..... *R. russeliana*  
 3b. Dorsal fin present ..... *Opisthopterus* Gill or *Ilisha* Richardson.....4  
 4a. Anal fin long with 51 to 65 fin rays. Pelvic fins absent ..... *O. tardoore* (20 cm.)  
 4b. Anal fin moderate with 34 to 53 fin rays. Pelvic fin present .....  
 ..... *Ilisha* Richardson.....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 ..... 8  
 7a. Abdomen with 30 to 32 scutes ..... *I. megaloptera* (28 cm)  
 7b. Abdomen with 34 to 38 scutes ..... *I. filigera*  
 8a. Vertical striae on scales continuous or overlapping ..... *I. melanostoma* (13 cm)  
 8b. Vertical striae on scales not continuous or overlapping ..... 9  
 9a. Pectoral fin 18 to 21% of standard length. Body depth 32 to 39% of standard length.  
 A faint dark band along flanks ..... *I. striatula*  
 9b. Pectoral fin 15 to 17% of standard length. Body depth 24 to 32% of standard length.  
 No faint dark band along flanks ..... *I. kampeni*

*Interest to fisheries* : The fishes of this family do not constitute special fisheries importance. Nevertheless, pristigasterids are generally found in tropical fish markets and probably make a useful contribution to clupoid catches. *P. ditchella* is a very common species found in both the coasts of India. Among the pristigasterids, *R. russeliana* is a monotypic species, generally found along the eastern coast of India.

## Family ENGRAULIDIDAE

**Anchovies**

(Fig. 31)

Body usually fusiform, subcylindrical and sometimes greatly compressed (body tapering to a point in the grenadier anchovies *Coilia*). Scutes often present along belly. Snout prominent and generally pig-like and projecting. Lower jaw characteristically “underslung” Posterior tip

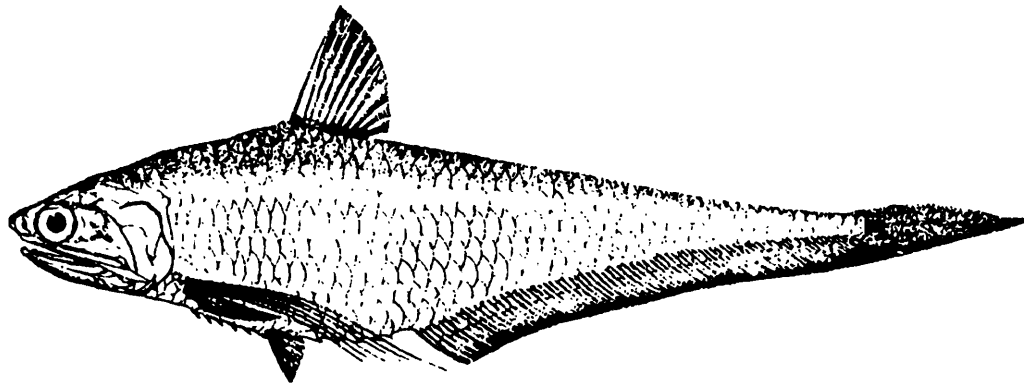


Fig. 31 : *Coilia dussumieri* Valenciennes

of maxilla extending far, sometimes projecting beyond operculum. No spiny rays in fins. Pectoral fins set 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. Light organs along side of body sometimes present.

**Species known to occur in Andhra Pradesh**

1. *Coilia dussumieri* Valenciennes (Gold-spotted grenadier anchovy).
2. *C. neglecta* Whitehead (Neglected grenadier anchovy)
3. *C. ramcarati* (Hamilton-Buchanan) Tapertail anchovy)
4. *C. reynaldi* Valenciennes (Korua grenadier anchovy) (Karua)
5. *Setipinna phasa* (Hamilton-Buchanan) (Gangetic anchovy)
6. *S. taty* (Valenciennes) (Hairfin anchovy) (Kella)
7. *S. tenuifilis* Valenciennes (Godavari anchovy)
8. *Stolephorus andhraensis* Babu Rao (Andhra anchovy)
9. *S. commersonii* Lacepede (Commerson's anchovy) (Purasa)
10. *S. devisi* (Whitley) (Devis's anchovy) (Narnala nethallu)

11. *S. heterolobus* (Ruppell) (Shorthead anchovy)
12. *S. indicus* (van Hasselt) (Indian anchovy) (Nethallu)
13. *S. insularis* Hardenberg (Hardenberg's anchovy)
14. *S. waitei* Jordan & Seale (Batavian anchovy)
15. *Thryssa dussumieri* (Valenciennes) (Dussumier's thryssa) (Potta Porava)
16. *T. hamiltonii* (Gray) (Hamilton's thryssa) (Poorawah)
17. *T. kammalensis* (Bleeker) (Aathuporuva-Tamil name)
18. *T. malabarica* (Bloch) (Malabar thryssa) (Poorwa)
19. *T. mystax* (Schneider) (Moustaced thryssa) (Nedum porava)
20. *T. purava* (Hamilton-Buchanan) (Gangetic anchovy) (Peddah poorawah)
21. *T. setirostris* (Broussonet) (Long jaw thryssa) (Yeeka porava)
22. *T. vitrirostris* (Gilchrist & Thompson) (Orangemouth thryssa)

#### Key to the species

- 1a. Body tapering, 'rat tailed' ; caudal and anal fin confluent. Gillrakers on posterior face of 3rd epibranchial absent ..... 2
- 1b. Body normal, caudal fin bilobed. Gillrakers present on posterior face of 3rd epibranchial ..... 5
- 2a. Longitudinal rows of pearly spots (light organs) on flanks of body ..... *C. dussumieri* (20 cm TL)
- 2b. Pearly spots on flanks of body absent ..... 3
- 3a. Pelvic fin with 9 or 10 rays ..... *C. ramcarati* (25 cm TL)
- 3b. Pelvic fin with 7 rays ..... 4
- 4a. Pectoral filaments 6 ..... *C. neglecta* (20 cm TL)
- 4b. Pectoral filaments 10 to 14 ..... *C. reynaldi*
- 5a. Abdominal scutes present only before pelvic fin bases Anal fin short with less than 25 rays ..... *Stolephorus* Laccpede 6
- 5b. Abdominal scutes present before and behind pelvic fin bases. Anal fin longer, with more than 30 rays ..... 12
- 6a. Anal fin insertion under or a little behind last dorsal fin ray. Muscular portion of isthmus not reaching to posterior margin of branchiostegal membrane ..... 7

- 6b. Anal fin insertion under dorsal fin base. Muscular portion of isthmus extending forward beyond posterior margin of branchiostegal membrane ..... 8
- 7a. Gillrakers 23 to 29 on lower arm of first arch. Dorsal and anal fin with 2 unbranched rays each ..... *S. heterolobus* (12 cm TL)
- 7b. Gillrakers with 21 to 26 on lower arm of first arch. Dorsal and anal fin with 3 unbranched rays each ..... *S. devisi* (8 cm TL)
- 8a. Hind border of preoperculum indented near tip of maxilla ..... 9
- 8b. Hind border of preoperculum evenly rounded near tip of maxilla ..... 10
- 9a. Double pigment line along back behind dorsal fin. Body deep, its depth equal to upper jaw. Snout short and blunt. Scutes usually 5 to 7 ..... *S. insularis*
- 9b. Double pigment line on back absent, melanophores irregularly scattered or absent. Body slender, its depth less than upper jaw. Snout longer, pointed. Scutes usually 6 or 7 ..... *S. andhraensis*
- 10a. Maxilla tip reaching to or only just beyond anterior border of preoperculum. Pelvic fin tips failing to reach vertical from dorsal fin origin. 3 to 5 prepelvic scutes .....  
..... *S. indicus* (15.5 cm TL)
- 10b. Maxilla tip reaching to or beyond posterior border of preoperculum ..... 11
- 11a. Pelvic fin tips reaching, well past vertical from dorsal fin origin. A pair of dark predorsal lines on back ..... *S. commersonii* ( 10 cm TL)
- 11b. Pelvic fin tips not reaching to vertical from dorsal fin origin. Dark lines on back absent .....  
..... *S. waitei* ( 10 cm TL)
- 12a. First pectoral fin ray filamentous. Anterior supra-maxilla absent .....  
..... *Setipinna* Swainson.....13
- 12b. First pectoral fin ray normal, not filamentous. Anterior supra-maxilla small or absent .....  
..... *Thryssa* Cuvier.....15
- 13a. Gillrakers on lower arm of first arch 13 or 14, serrae on rakers not forming distinct clumps ..... *S. tenuifilis*
- 13b. Gillrakers on lower arm of first arch 17 to 21 ..... 14
- 14a. Anal fin with 48 to 58 rays. Prepelvic scutes 20 to 29. Gillraker serrae in distinct clumps of longer serrae ..... *S. taty* (20 cm TL)
- 14b. Anal fin with 69 to 81 rays. Prepelvic scutes 15. Gillrakers serrae slightly clumped in smaller fishes ..... *S. phasa*
- 15a. Lower jaw with high coronoid process, maxilla (upper jaw) very long, extending to beyond pectoral fin tip ..... *T. setirostris* ( 15 cm TL)

- 15b. Lower jaw slender, maxilla (upper jaw) not extending beyond pectoral fin tip .... 16
- 16a. Maxilla long, reaching to pectoral fin base or beyond ..... 17
- 16b. Maxilla short, not reaching to pectoral fin base ..... 20
- 17a. Gillrakers serrae uneven but not clumped, lower gillrakers on first arch 13 to 21 ...  
..... 18
- 17b. Gillrakers serrae in distinct clumps, lower gillrakers on first arch 16 to 24 ..... 19
- 18a. Anal fin with 29 to 37 branched rays. Mouth almost horizontal. Prepelvic scutes 16  
to 20. Snout tip on level of eye centre ..... *T. mystax* (16 cm TL)
- 18b. Anal fin with 38 to 44 branched rays. Mouth oblique. Prepelvic scutes 15 to 17. Snout  
tip above level of eye centre ..... *T. purava*
- 19a. Maxilla reaching 1/2 to 7/8 along pectoral fin. Postpelvic scutes 6 to 9. Anterior  
supramaxilla absent ..... *T. dussumieri* (12 cm TL)
- 19b. Maxilla shorter, reaching to 1/3 along pectoral fin. Post-pelvic scutes 8 to 12. Anterior  
supramaxilla usually present ..... *T. vitrirostris* (18 cm TL)
- 20a. Lower gillrakers on first arch 11 to 15 ..... *T. hamiltonii* (20 cm TL)
- 20b. Lower gillrakers on first arch 17 to 19 ..... 21
- 21a. Anal fin with 38 to 43 rays. Lower gillrakers on first arch 16 to 20 .....  
..... *T. malabarica* (18 cm TL)
- 21b. Anal fin with 34 rays. Lower gillrakers on first arch 27 to 29 ..... *T. kammalensis*

*Interest to fisheries* : The anchovies are valuable marine fishes as a sources of food and fishmeal. These fishes are also suitable for salting, sun drying and canning. *C. ramcarati* is the largest rat-tailed anchovy but of minor fishery value. *C. reynaldi* is a very common species of the Andhra coast. *C. dussumieri* is a very common species of the East and West coasts of India and it is also a common food fishes of both the coasts of our country. *S. phasa* is a common species found on both the coasts of India. The fishes of the genus *Stolephorus* (Whitebaits) are the most important among the anchovies, accounting for almost 70% of the total anchovy catch. *T. dussumieri*, *T. hamiltonii*, *T. malabarica*, *T. mystax*, *T. purava* and *T. setirostris* are very common species found in the Andhra coast.

### Family CHIROCENTRIDAE

#### Wolf herrings

(Fig. 32)

Body greatly elongate and compressed, lacking abdominal scutes. Jaws with fang-like teeth. Fins without any spines. Dorsal fin single, inserted posterior to middle of body, with 16 to 19 rays. Pectoral fins inserted low on body, with 13 to 15 rays. Pelvic fins small, with

6 to 7 rays, inserted almost in between pectoral fin base and origin of anal fin. Anal fin inserted below vertical from front dorsal fin base, with 32 to 35 rays. Scales small, cycloid and very deciduous. Lateral line absent. Caudal fin deeply forked.

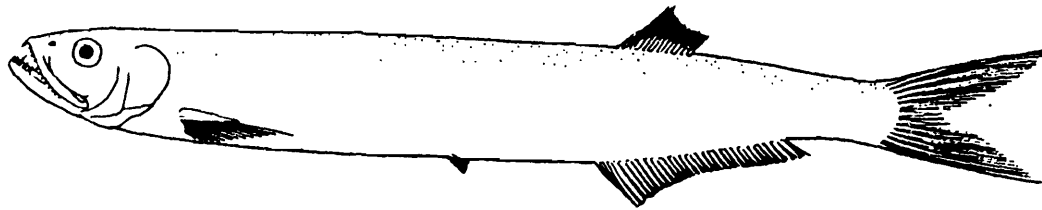


Fig. 32 : *Chirocentrus dorab* (Forsskal)

### Species known to occur in Andhra Pradesh

1. *Chirocentrus dorab* (Forsskal) (Dorab wolf-herring) (Wahlah)
2. *C. nudus* Swainson (Whitefin wolf-herring) (Wahlah)

### Key to the species

- Upper part of dorsal fin black. Pectoral fin length almost equal to length from eye centre to posterior border of operculum ..... *C. dorab* (100 cm TL)
- Dorsal fin white or colourless. Pectoral fin length greater than the length from eye centre to posterior margin of operculum ..... *C. nudus* (100 cm TL)

*Interest to fisheries* : *C. dorab* constitutes an important fishery along the east and west coasts of India, but almost 76 per cent of the total landings comes from the east coast. Andhra Pradesh stands second next to Tamil Nadu in the catch of this species. *C. nudus* is the dominating species in the dorab fishery and contributes almost 80 per cent of the total catch of the two species in India.

## Order GONORHYNCHIFORMES

### Family CHANIDAE

#### Milkfishes

(Fig. 33)

Body elongate, somewhat compressed, lacking abdominal scutes. Mouth small, terminal ; maxilla not extending beyond vertical from centre of eye. Jaws without teeth, lower jaw with symphyseal knob. Gular plate absent between arms of lower jaw. Dorsal fin with 13 to 17 rays, inserted almost in the middle of body, opposite to pelvic fins. Anal fin with 9 to 11 rays, inserted almost in between pectoral and anal fin. Fins without spines. Dorsal and anal fins with basal sheath of scales. Pelvic and pectoral fin bases with large axillary scales. Caudal fin deeply forked. Lateral line present. Scales small and cycloid.

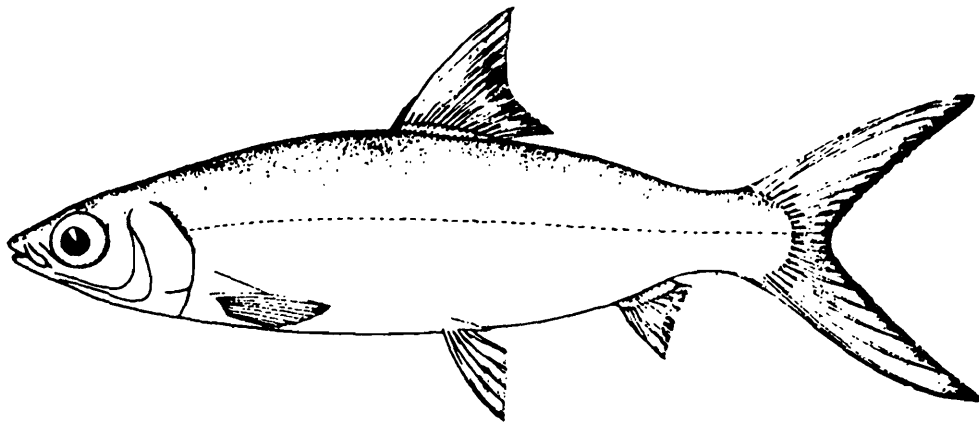


Fig. 33 : *Chanos chanos* (Forsskal)

**Species known to occur in Andhra Pradesh**

*Chanos chanos* (Forsskal) (Milkfish) (Polah bontah) (180 cm TL)

*Interest to fisheries* : *C. chanos* is a common species found along the east and west coasts of India. This is an important food fish of our country and is a suitable species for culture into tanks and ponds particularly where the water is slightly saline.

*Systematic note* : *C. chanos* more or less resembles *Elops machnata* but the former fish can be separated from the latter by the absence of gular plate and maxilla not extending below the centre of the orbit.

Order SILURIFORMES

**Key to the families**

- Dorsal and anal fins long and confluent with the caudal fin. 4 pairs of barbels. Adipose dorsal fin absent..... PLOTOSIDAE
- Dorsal and anal fins comparatively very small and not confluent with the caudal fin. Barbels 1 to 3 pairs or totally absent. Adipose dorsal fin present ..... ARIIDAE

Family ARIIDAE

**Sea catfishes**

(Fig. 34)

Body elongate with snout and head rounded to depressed. Mouth terminal to inferior. Jaws with fine and villiform teeth. Teeth on palate villiform or conical, granular or molar-like, arranged in 1 to 3 patches of varying shapes and sizes on each side of plate. Barbels 1 to 3 pairs, generally a pair of maxillary (but absent in *Batrachocephalus*), generally 2 pairs of

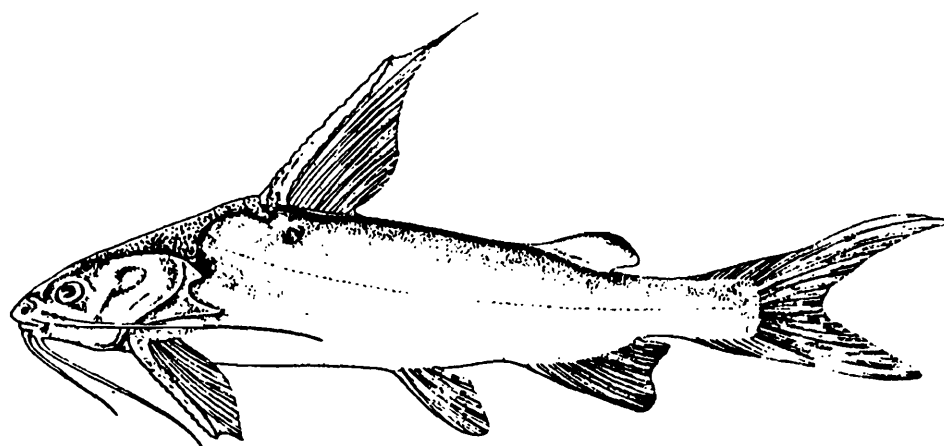


Fig. 34 : *Arius caelatus* Valenciennes

mental barbels (rarely a single pair in *Batrachocephalus* and none in *Osteogeneiosus*). Head covered with a bony shield, usually rugose, granulated, part of which is generally visible under the skin, posterior portion of bony shield (supraoccipital process) extending backward, and medially to meet the predorsal plate (basal bone of first dorsal fin). First dorsal fin short with a long, usually rough spine, almost serrated on inner margin, sometimes also on outer border, preceded by a very short spine or buckler and followed by 7 rays ; a short adipose fin present. Pectoral fins low on sides, with a strong, mostly serrated spine and 7 to 13 rays. Pelvic fins with 6 rays. Anal fin with 14 to 30 rays. Caudal fin forked with 13 branched rays. Lateral line complete. Scales absent.

#### Species known to occur in Andhra Pradesh

1. *Arius arius* (Hamilton-Buchanan) (Threadfin sea catfish) (Jella)
2. *A. caelatus* Valenciennes (Engraved sea catfish)
3. *A. dussumieri* Valenciennes (Blacktip sea catfish) (Nellah jella)
4. *A. jella* Day (Blacktip sea catfish) (Thella jellah)
5. *A. maculatus* (Thunberg) (Spotted sea catfish)
6. *A. platystomus* Day (Flatmouth sea catfish)
7. *A. sagor* (Hamilton-Buchanan) (Sagor sea catfish)
8. *A. sona* (Hamilton-Buchanan) (Sona sea catfish) (Jella)
9. *A. tenuispinis* Day (Thinspine sea catfish)
10. *A. thalassinus* (Ruppell) (Giant sea catfish) (Jeddi-jellu)
11. *Batrachocephalus mino* (Hamilton-Buchanan) (Beardless sea catfish)
12. *Osteogeneiosus militaris* (Linnaeus) (Soldier sea catfish) (Pirathi jella)

**Key to the genera and species**

- 1a. Only 1 or 2 pairs of barbels ..... 2
- 1b. Three pairs of slender barbels (1 pair maxillary and 2 pairs mandibular) .....  
..... *Arius Valenciennes*.....3
- 2a. One pair of stiff and semiosseous maxillary barbels (mental barbels absent) .....  
..... *O. militaris* (35 cm. TL)
- 2b. Only 1 or 2 pairs of very small mental barbels (maxillary barbels absent) .....  
..... *B. mino* (215 cm TL)
- 3a. Teeth on palate as a single patch on each side..... 4
- 3b. Teeth on palate in 2 or 3 patches on each side ..... 9
- 4a. Teeth on palate as a triangular or oval small patch..... 5
- 4b. Teeth on palate as an elliptical, large patch ..... 6
- 5a. Head shield strongly granulated posterior to eye, with a preorbital conical projection,  
tapering as a wide V toward occiput ..... *A. caelatus* (45 cm TL)
- 5b. Head shield not very granulated, preorbital conical projection not very prominent ..  
..... *A. platystomus* (15 cm TL)
- 6a. Tooth patch inserted far back in buccal cavity. Dorsal fin spine slender, equal to or  
slightly longer than pectoral fin spine. Median longitudinal groove long, narrow,  
extending up to supraoccipital process ..... *A. tenuispinis* (36 cm TL)
- 6b. Tooth patch inserted considerably ahead in buccal cavity. Dorsal fin spine strong, equal  
to or shorter than pectoral fin spine. Median longitudinal groove shorter, not extending  
up to supraoccipital process ..... 7
- 7a. Tooth patches on palate fully elliptical, well formed, with densely packed teeth ....  
..... *A. maculatus* (61 cm TL)
- 7b. Tooth patches on palate irregularly ovate, not fully formed, with loosely packed teeth,  
inner margins of patches being not straight ..... 8
- 8a. Anal fin with 14 to 16 rays (12 to 14 branched) ..... *A. jella* (13 cm TL)
- 8b. Anal fin with 20 to 22 rays (14 to 16 branched) ..... *A. arius* (20 cm TL)
- 9a. Teeth on palate in 3 patches on each side, triangular, villiform, the vomerine patch in  
middle and the ectopterygoid patch either from the sides of the vomerine patch or  
below them, not fused in juveniles, but joined in adult stage .....  
..... *A. thalassinus* (185 cm TL)
- 9b. Teeth on palate in 2 patches on each side ..... 10
- 10a. Patches of teeth on palate placed 1 below the other, the posterior patch very large, 3  
or 4 times larger than the anterior patch ..... *A. dussumieri* (31 cm TL)

- 10b. Patches of teeth on palate placed side by side and not one below the other ..... 11
- 11a. Basal bone of dorsal fin (predorsal plate) very large and butterfly-shaped .....  
 ..... *A. sagor* (45 cm TL)
- 11b. Basal bone of dorsal fin (predorsal plate) smaller, not butterfly-shaped .....  
 ..... *A. sona* (92 cm TL)

*Interest to fisheries* : The sea catfishes are important fishes as food for human consumption. These are sold usually fresh and also dried salted for export and used for the production of fishmeal. The flesh is generally good quality, but the sharp dorsal and pectoral spines can inflict painful wounds. The swimbladder is employed for the manufacture of isinglass. *A. dussumieri* is a very common catfish and forms an important element in the catfish in India.

### Family PLOTOSIDAE

#### Eel catfish

(Fig. 35)

Body elongate with naked slimy skin, tapering to a point posteriorly. Barbels 4 pairs, nasal and maxillary 1 pair each and mental 2 pairs. Dorsal fin two, first dorsal fin with 1 serrated spine and 4 to 6 soft rays and second dorsal fin with 69 to 143 soft rays. Anal fin with 58 to 131 rays. Pectoral fins with 1 serrated spine and 9 to 16 soft rays. Pelvic fins with 10 to 16 soft rays. Second dorsal fin and anal fin confluent with caudal fin.

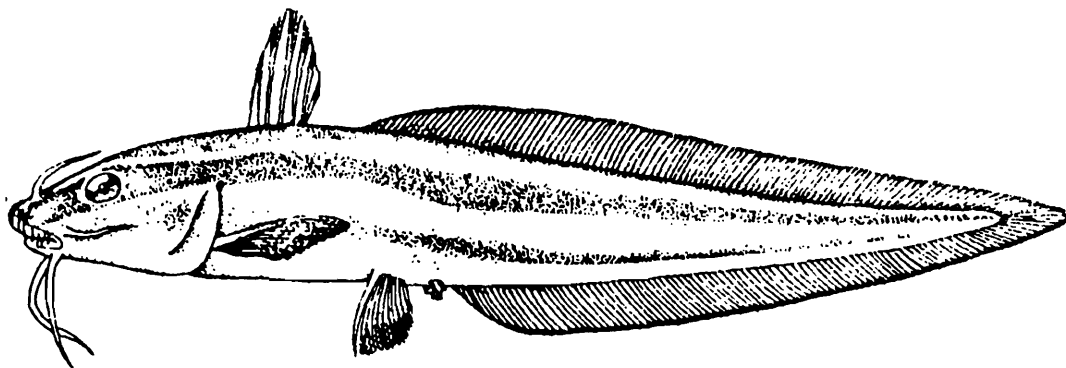


Fig. 35 : *Plotosus lineatus* (Thunberg)

#### Species known to occur in Andhra Pradesh

1. *Plotosus canius* Hamilton-Buchanan (Canine eel catfish) (Ungilayi)
2. *P. lineatus* (Thunberg) (Striped eel catfish) (Ungilayi)

#### Key to the species

- Body usually with 2 to 3 pale lateral stripes. Maxillary barbels not extending base of pectoral fin. Second dorsal fin with 80 to 100 soft rays and anal fin with 58 to 82 rays  
 ..... *P. lineatus* (30 cm TL)

Body without any lateral stripes. Maxillary barbels extending base of pectoral fins. Second dorsal fin with 130 to 140 rays and anal fin with 106 to 131 rays.....  
 .....*P. canius* (80 cm TL)

*Interest to fisheries* : *P. canius* and *P. lineatus* are two important catfishes of India. The flesh of these fishes is believed to have emenagogue properties.

*Remarks* : These are dangerous eel catfishes, death may result from the contact with their dorsal and pectoral spines which are equipped with venom glands.

Order AULOPIFORMES

Key to the families

- 1a. Caudal fin trilobed. Lateral line extending up to pointed median lobe of caudal fin. Body semitransparent ..... HARPADONTIDAE
- 1b. Caudal fin forked ..... 2
- 2a. Upper jaw extending beyond level of middle of eyes and usually much farther. Pectoral fins short, not extending beyond end of dorsal fin ..... SYNODONTIDAE
- 2b. Upper jaw not extending beyond level of middle of eyes. Pectoral fins long, extending beyond end of dorsal fin ..... CHLOROPHTHALMIDAE

Family CHLOROPHTHALMIDAE

Greeneyes

(Fig. 36)

Body elongate, compressed posteriorly, almost rounded in cross section anteriorly. Eyes large, their pupils keyhole-shaped. Fins without spines. Single dorsal fin with 9 to 13 segmented rays. A small adipose fin posteriorly above or just behind anal fin insertion. Anal fin with

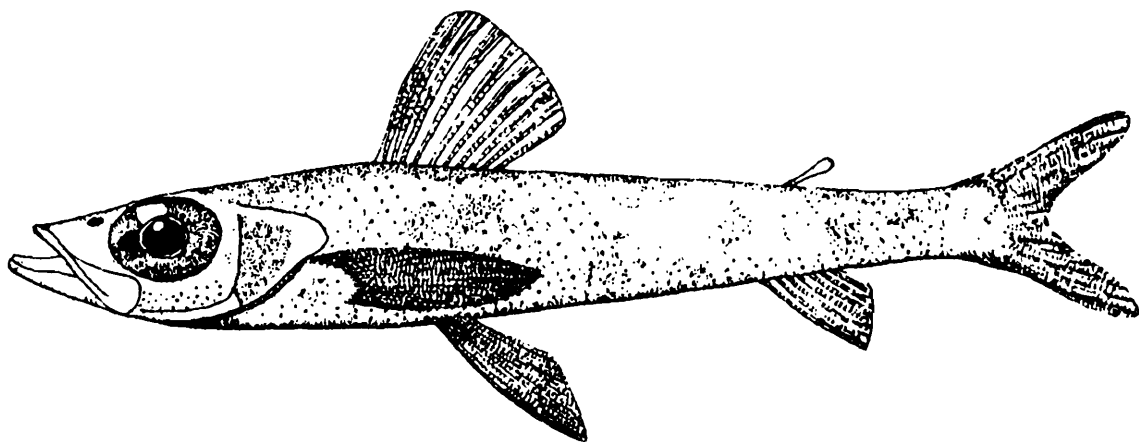


Fig. 36 : *Chlorophthalmus agassizi* Bonaparte

7 to 11 segmented rays. Pectoral fins long, extending beyond end of dorsal fin, with 15 to 20 rays. Caudal fin bilobed. Ctenoid or cycloid scales on cheek, opercle and body but top of head naked.

### Species known to occur in Andhra Pradesh

*Chlorophthalmus agassizi* Bonaparte (Short nose greeneye) (17 cm TL)

*Interest to fisheries* : Greeneyes are of little economic value, but it is largely captured as trash fish throughout the coastal area of India.

### Family SYNODIDAE

(= SYNODONTIDAE)

### Lizardfishes

(Fig. 37)

Body elongate, generally cylindrical with adipose fin. Head usually lizard-like. Mouth large and terminal with rows of numerous small, slender and pointed teeth, visible even when

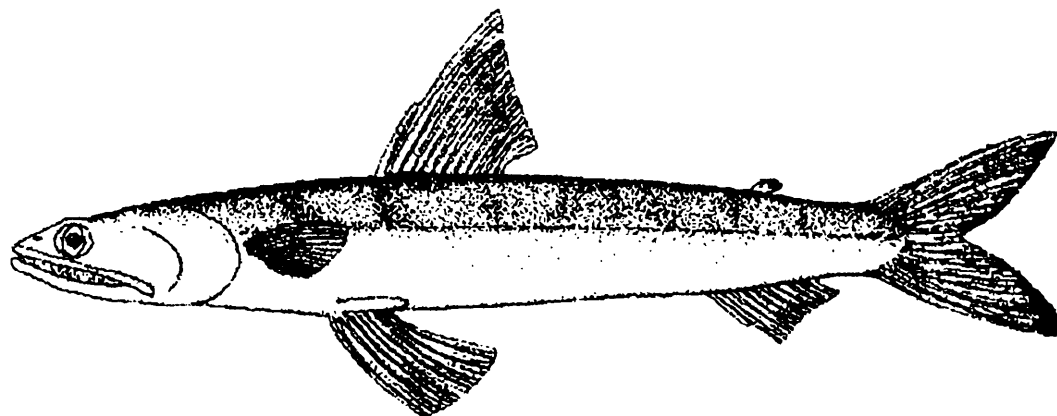


Fig. 37 : *Saurida tumbil* (Bloch)

the mouth is closed. Dorsal fin with 9 to 14 rays. Anal fin with 8 to 16 rays. Caudal fin forked. Head and body with scales. Colour green and brown on back, lighter on flanks, with dark blotches or bars down flanks.

### Species known to occur in Andhra Pradesh

- 1 *Saurida pseudotumbil* Dutt and Sagar
2. *S. tumbil* (Bloch.) (Greater lizardfish) (Bade mottah)
3. *S. undosquamis* (Richardson) (Brushtooth lizardfish)
4. *Synodus indicus* (Day) (Indian lizardfish)
5. *S. variegatus* (Lacepede) (Variegated lizardfish)

6. *Trachinocephalus myops* (Forster) (Bluntnose lizardfish)**Key to the species**

- 1a. Pelvic fin with 9 rays, inner ray barely longer than outer. Palatine teeth (on roof of mouth) in 2 pairs of bands ..... *Saurida Valenciennes*.....2
- 1b. Pelvic fin with 8 rays, inner ray much longer than outer. Palatine teeth in 1 pair of band ..... 4
- 2a. A series of fairly distinct 8 to 10 dark blotches along lateral line present. Anterior margin of dorsal fin and upper border of caudal fin with 4 to 8 dark spots .....  
..... *S. undosquamis* (45 cm TL)
- 2b. No dark spots along lateral line, anterior margin of dorsal fin and upper border of caudal fin ..... 3
- 3a. Pectoral fin extending origin of pelvic fin ..... *S. tumbil* (40 cm TL)
- 3b. Pectoral fin not extending origin of pelvic fin ..... *S. pseudotumbil*
- 4a. Eye nearer to anterior end of upper jaw. Head not depressed and snout shorter than eye diameter. Anal fin base longer than dorsal fin base ..... *T. myops* (40 cm TL)
- 4b. Eye opposite almost middle of upper jaw. Head depressed and snout longer than eye diameter. Anal fin base shorter than dorsal fin base ..... *Synodus Scopoli*.....5
- 5a. A series of 8 to 9 dark brown, saddle-like bars on lateral sides present. Anterior palatine teeth long, forming a discrete group ..... *S. variegatus* (20 cm TL)
- 5b. No such dark brown, saddle-like bars as in 5a. Anterior palatine teeth short, not forming a discrete group. 2 small pigment spots at upper distal corner of operculum present ..... *S. indicus* (20 cm TL)

*Interest to fisheries* : Lizardfishes do not constitute any special fishery for any of their species. These fishes are marketed fresh or used for fishmeal. They are abundantly found in trawl catches in Andhra Pradesh, particularly Visakhapatnam.

*Remarks* : Lizardfishes not only look like reptiles, but they also behave like reptiles. Most of their time is spent sitting on the bottom with the body at slight angle, propped up on the front end by pelvic fins like a jet fighter ready to take off.

## Family HARPADONTIDAE

**Bombay ducks**

(Fig. 38)

Body elongate and flatly compressed generally with an adipose dorsal fin. Head short and compressed with rounded very short snout. Eyes very small, near snout directed forward. Mouth very wide, armed with slender, recurved and depressible teeth of unequal size ;

palatine teeth also large and depressible : lower jaw longer than upper. Dorsal fin inserted opposite to pelvic fins. Pelvic fins very long. Caudal fin trilobed. Lateral line extending up to pointed median lobe of caudal fin. Head and body naked except scales along lateral line and on part of posterior half of the body.

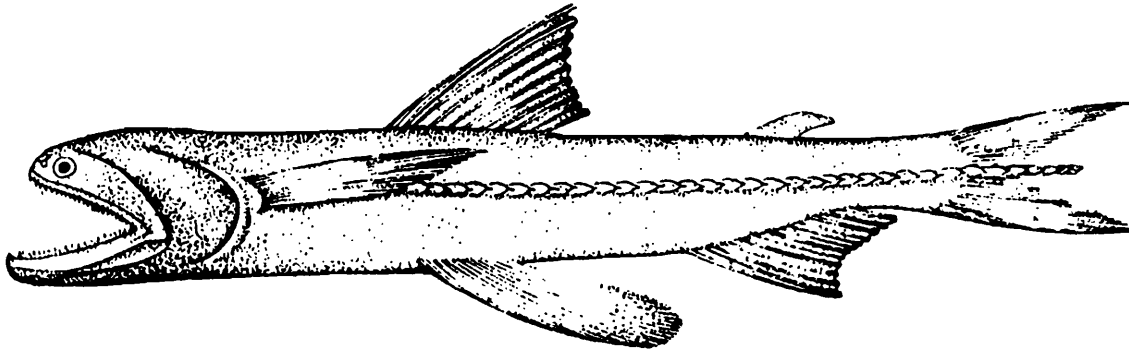


Fig. 38 : *Harpadon nehereus* (Hamilton-Buchanan)

#### Species known to occur in Andhra Pradesh

*Harpadon nehereus* (Hamilton-Buchanan) (Cucuh-sawahri, Coco-mottah) (40 cm TL)

*Interest to fisheries* : The Bombay duck forms an important fishery of great economic value in India. It is found along both the east and west coasts of India but almost 98 per cent is captured from the west coast. The most important landing centres of the western coast is Satpati-Dahanu area of Maharashtra and Jaffrabad-Nawabandar area of Gujarat. The eastern coast contributes only 2 per cent of the Bombay ducks catch of our country. The fishing operation season of this fish lasts from September to June but the bulk landings come from October to December. It is marketed fresh, salted, dired or smoked.

Order GADIFORMES

Family BREGMACEROTIDAE

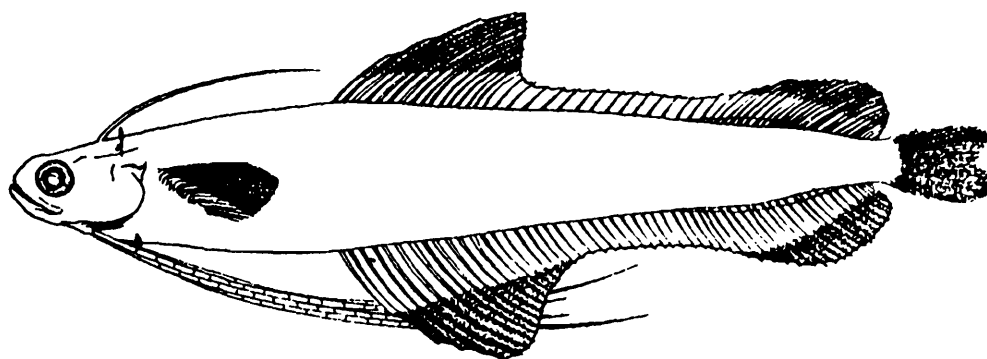
Codlets, Codlings

(Fig 39)

Body elongate, somewhat cylindrical with short snout. Head small and more or less compressed. Two dorsal fins, the first dorsal fin consist of one single elongate ray inserted on nape. Second dorsal fin and anal fin 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 adjacent to second dorsal fin.

#### Species known to occur in Andhra Pradesh

*Bregmaceros mccllellandii* Thompson (Indian cod) (Misalu magu) (13 cm TL)



**Fig. 39** : *Bregmaceros mccllelandi* Thompson

*Interest to fishes* : *B. mccllelandii* is a cod like fish generally captured along the west coast of India. It constitutes a seasonal fishery around Bombay. The fishery commences in October after the south-west monsoon with peak landings but it declines by about March. This fish is found in stray catches along the rest of the coastal states of India. It is marketed fresh condition.

#### Order OPHIDIIFORMES

#### Family OPHIDIIDAE

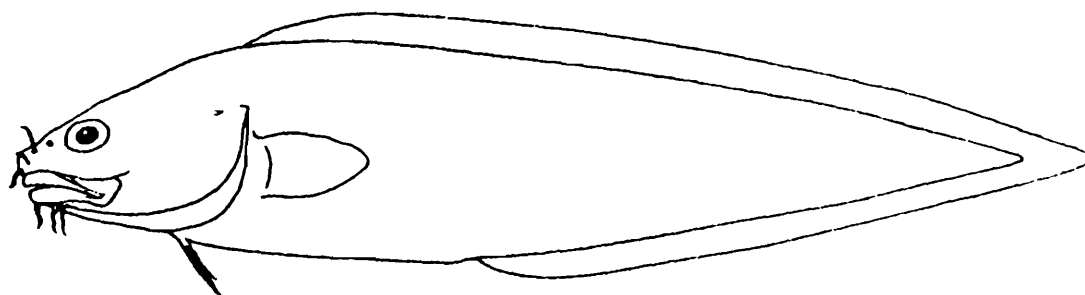
#### Cusk eels, Brotulas

(Fig 40)

Body elongate with a tapering caudal portion. Supramaxilla present. Anterior nostril considerably above upper lip in most species. Gill openings wide. Barbels present on snout and chin in some species. Pelvic fins with 1 or 2 soft rays or absent, inserted close together below preopercle or further anterior. Dorsal fin rays generally equal to or longer than opposing anal rays. Dorsal and anal fins with long bases, confluent with caudal fin. Fins without spines. Body completely covered with cycloid scales.

#### Species known to occur in Andhra Pradesh

*Brotula multibarbata* (Temminck and Schlegel) (Goatbeard brotula) (50 cm TL)



**Fig. 40** : *Brotula multibarbata* (Temminck & Schlegel)

*Interest to fisheries* : Cusk eels are occasionally marketed, generally fresh but these are good food fishes. Cusk eels are rarely found in commercial catches in India.

### Order BATRACHOIDIFORMES

### Family BATRACHOIDIDAE

### Toadfishes

(Fig 41)

Body cylindrical and compressed posteriorly. Head and anterior part of body usually depressed. Mouth moderate to large with small conical teeth in both jaws and on palate. Gill opening a relatively large oblique slit, commencing just above pectoral fin base and ending

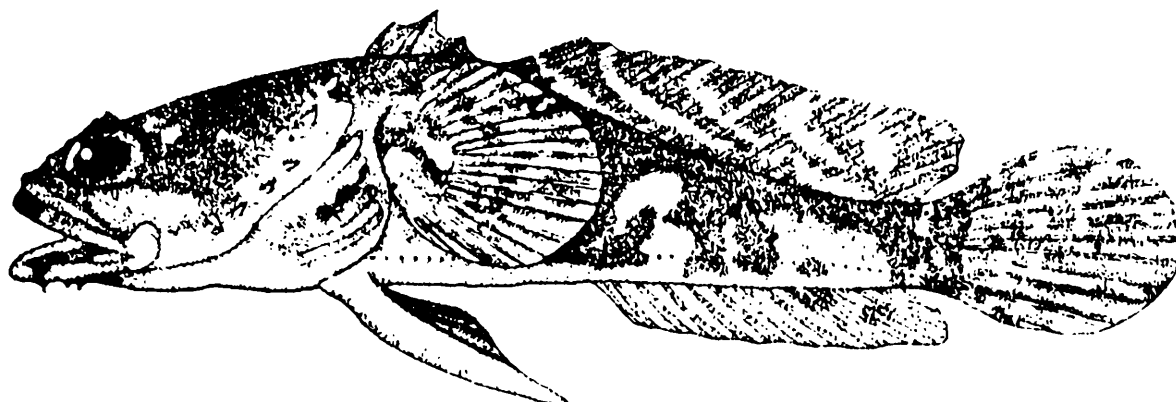


Fig. 41 : *Austrobatrachus dussumieri* (Valenciennes)

below and ahead of it. Gill cover with 3 or 4 strong spines. First dorsal fin with 3 spines, inserted just posterior to head. Second dorsal and anal fins long-based. Pelvic fins jugular. Pectoral and caudal fins rounded. Skin smooth or with ridges, scaleless and loosely attached to head, body and fins. Operculum usually with fleshy tentacles, around mouth and above eye. A moderate sized pocket may be present in upper portion of pectoral axilla. Three lateral line along side of body present represented by series of small bifid tentacles.

### Species known to occur in Andhra Pradesh

*Austrobatrachus dussumieri* (Valenciennes) (Flat toadfish) (27 cm TL)

*Interest to fisheries* : Toadfishes are of minor commercial importance. These fishes are found artisanal or trawl fisheries and are utilised as food or in the production of fishmeal and oil.

*Remarks* : The spines of toadfishes may inflict wounds to people handling these fishes.

Order LOPHIIFORMES

Key to the families

- 1a. Body globose, slightly compressed ..... ANTENNARIDAE
- 1b. Body not globose, but greatly depressed (Flattened dorsoventrally) ..... 2
- 2a. Head prolonged into a snout that overhangs the small mouth. Head broader and more strongly depressed, devoid of long, slender dorsal spines ..... OGOCEPHALIDAE
- 2b. Head not prolonged, but rounded, with numerous sharp spines and ridges on dorsal and lateral surfaces ..... LOPHIIDAE

Family LOPHIIDAE

Anglerfishes

(Fig. 42)

Head and anterior half of body much depressed and very broad, posterior portion of body tapering. Head rounded, with numerous sharp spines and ridges on dorsal and lateral surfaces. the most prominent spines are : one very large, prominent spine or group of spines just ahead of each pectoral fin base (humeral spines) ; one pair of sharp prominent spines on either side of snout, just posterior to mouth (palatine spines) ; a bony ridge above eyes with 2 or 3 short spines (frontal spines), and 2 bony ridges on snout running forward from eyes (frontal ridges). Mouth very large and wide, upper jaw protractile and the lower jaw projecting; both bearing numerous long, sharp, depressible teeth. Gill openings considerably large, low in pectoral fin axil, sometimes extending forward anterior to pectoral fin base. Two separate

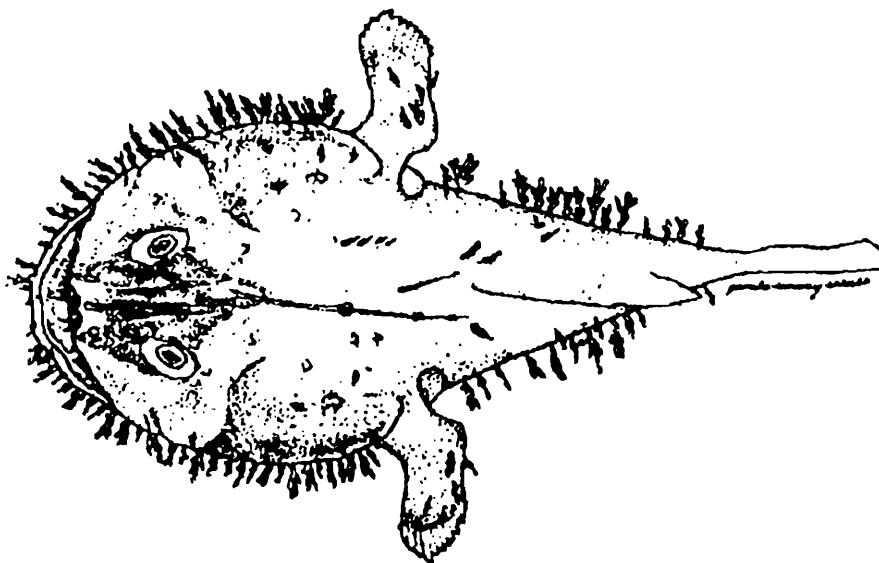


Fig. 42 : *Lophiodes mutilus* (Alcock)

dorsal fins, the first with 2 or 3 isolated slender spines on head (cephalic spines) and the second with 1 to 3 spines (often connected by a membrane, at least in juveniles) at the level of pectoral fins (post cephalic spines) ; the first 2 cephalic spines are located at anterior end of snout, the foremost modified into an angling apparatus, generally bearing a fleshy appendage at tip ; the third cephalic spine, when present, is located much further back, between eyes and humeral spines. Pectoral fin rays unbranched, terminating in small fleshy filaments. Pelvic fins inserted on ventral surface of head, anterior to pectoral fins. Anal fin with 6 to 11 soft rays, inserted below second dorsal fin. Caudal fin with 8 rays, the 2 outer rays unbranched. Lateral line present, but generally indistinct. Body smooth, naked, usually with fleshy flaps on head and/or body.

### Species known to occur in Andhra Pradesh

- 1 *Lophiodes mutilus* (Alcock) (Smooth angler)
2. *Lophiomus setigerus* (Vahl) (Blackmouth angler)

### Key to the species

- Frontal ridges rugose, with low spines, knobs or ridges. Gill openings not extending anterior to pectoral fins. Pectoral fin rays 21 to 25 ..... *L. setigerus* (40 cm TL)
- Frontal ridges smooth, without spines, knobs or ridges. Gill openings extending anterior to pectoral fins. Pectoral fin rays 15 to 18 ..... *L. mutilus* (45 cm TL)

*Interest to fisheries* : The anglerfishes are of no commercial value. These fishes are sometimes caught with bottom trawls as by catch in the commercial catches and are marketed fresh.

### Family OGOCEPHALIDAE

#### Batfishes

(Fig. 43)

Body very much depressed and flattened ventrally. Head broader and more strongly depressed. Prolonged into a snout that overhangs the small mouth. Gill openings in or above

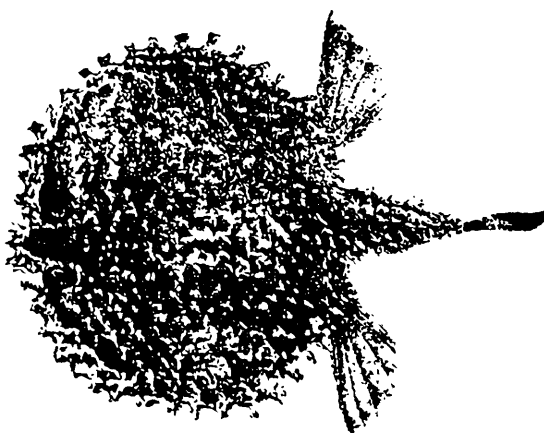


Fig. 43 : *Halieutaea stellata* (Vahl)

pectoral fin base. A modified spine (illicium) of the 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 tuber like scales.

### Species known to occur in Andhra Pradesh

*Halieutaea stellata* (Vahl) (Batfish)

*Interest to fisheries* : Batfishes are of no commercial importance. These fishes are sometimes caught as a by catch in the commercial catches.

### Family ANTENNARIDAE

#### Frogfishes

(Fig 44)

Body short, globose and slightly compressed. Mouth large, oblique to vertical with small villiform teeth. Gill opening restricted to a small slit located posterior to and below pectoral fin base. First dorsal fin spine free and modified into a lure, second and third dorsal fin spines also free from rest of fin, well developed, and covered by skin. Pectoral fin lobe elongate and leg like. Body spinulose or naked, usually with membranous filaments or flaps.

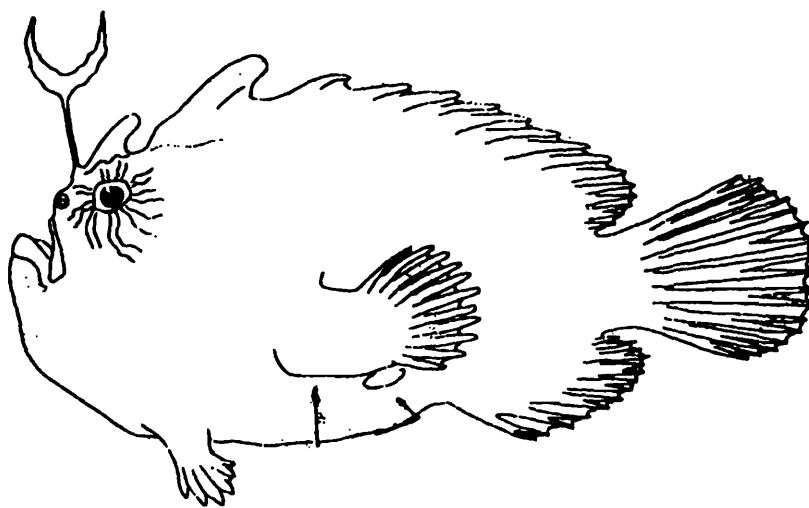


Fig. 44 : *Antennarius hispidus* (Bloch & Schneider)

### Species known to occur in Andhra Pradesh

*Antennarius hispidus* (Bloch and Schneider) (Frogfish) (50 cm TL)

*Interest to fisheries* : Frogfishes are of no commercial importance. When these fishes are caught incidentally in bottom trawls are said to be used as fishmeal.

*Remarks* : Frogfishes spend most part of their lives squatting on the bottom in shallow water or remain clinging in floating Sargassum weed. Their unusual prehensile pectoral fins are used for clasping or moving on algal matter. They sit quietly waiting for smaller fishes to pass by at which time they enticingly wriggle their bait to attract the potential prey to their cavernous mouth.

### Order BELONIFORMES (= CYPRINODONTIFORMES)

#### Key to the families

- 1a. Mouth opening large, both upper and lower jaws extended into long beaks with numerous needle sharp teeth ..... BELONIDAE
- 1b. Mouth small, only lower jaw prolonged or none of the jaws prolonged ; with minute, no needle like teeth ..... 2
- 2a. Lower jaw usually prolonged, much longer than upper jaw. Pectoral and pelvic fins short ..... HEMIRAMPHIDAE
- 2b. Mouth normal, jaws short, and not produced into a long beak. Pectoral fins strikingly long, extending beyond dorsal fin origin. Pelvic fins exceptionally large in some species ..... EXOCOETIDAE

#### Family EXOCOETIDAE

##### Flying fishes

(Fig 45)

Body broadly cylindrical (round in cross section) and elongate fishes. Mouth small with jaw teeth absent or very small. Fins without spines. Dorsal and anal fins inserted far back on body. Pectoral fins inserted high on sides, striking long, always extending beyond dorsal fin

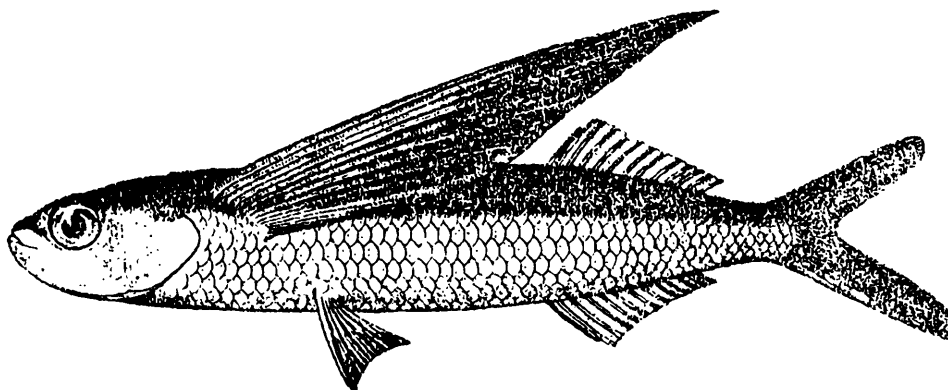


Fig. 45 : *Exocoetus monocirrus* Richardson

origin. Pelvic fins inserted abdominal in position, and greatly enlarged in many species, but not in all species. Caudal fin deeply forked, its lower lobe longer than the upper. Lateral line extending along the lower side of body. Body with large cycloid scales.

**Species known to occur in Andhra Pradesh**

1. *Cheilopogon cyanopterus* (Valenciennes) (Margined flying fish)
2. *C. furcatus* (Michill) (Spotfin flying fish)
3. *C. nigricans* (Bennett) (African flying fish)
4. *Exocoetus volitans* (Linnaeus) (Tropical two wing flying fish)
5. *E. monocirrus* Richardson (Barbel flying fish)
6. *Hirundichthys coromandelensis* (Hornell) (Cornomondel flying fish)
7. *H. oxycephalus* (Blecker) (Bony flying fish)
8. *Parexocoetus mento* (Valenciennes) (African sailfin flying fish)
9. *Prognichthys brevipinnis* (Valenciennes) (Shortfin flying fish)

**Key to the species**

- 1a. Pectoral fins not reaching beyond posterior part of anal fin base. Pectoral branch of lateral line present. Upper jaw protrusible..... *Parexocoetus mento*
- 1b. Pectoral fins reaching beyond anal fin base to or almost to, caudal fin base.. Pectoral branch of lateral line absent. Upper jaw not protrusible ..... 2
- 2a. Pelvic fins short, not reaching anal fin origin (barely reaching in juveniles) : pelvic fins insertion closer to pectoral fin insertion than to anal fin origin ..... *Exocoetus*.....2
- 2b. Pelvic fins long, reaching beyond anal fin origin ; pelvic fins insertion closer to anal fin origin than to pectoral fin insertion ..... 4
- 3a. Gillrakers on first arch 21 to 29. Usually 7 transverse rows of scales between dorsal fin origin and lateral line. Body depth usually more than 20% of standard length. Juveniles hump-backed, with a single of chin barbels and with black pelvic fins .....  
..... *E. monocirrus* (20 cm SL)
- 3b. Gillrakers on first arch 29 to 37. Usually 6 tranverse rows of scales between dorsal fin origin and lateral line. Body depth usually less than 20% of standard length. Juveniles elongated, without chin barbels and unpigmented pelvic fins .....  
..... *E. volitans* (18 cm SL)

- 4a. Origin of anal fin slightly before, under or not more than 3 rays behind origin of dorsal fin ; dorsal fin usually with less, or equal number of rays than anal fin (rarely with 1 or 2 more)..... *Hirundichthys*.....5
- 4b. Origin of anal fin 3 rays or more behind origin of dorsal fin ; dorsal fin usually with 2 to 4 (rarely with one) rays more than anal fin ..... 6
- 5a. Pectoral fin with a broad pale transverse stripe ..... *H. coromandelensis* (19 cm SL)
- 5b. Pectoral fin with a small pale basal triangle and narrow pale margin .....  
..... *H. oxycephalus* (20 cm SL)
- 6a. First 3 or 4 pectoral fin rays unbranched ..... *P. brevipinnis* (19 cm SL)
- 6b. Only the first ray of pectoral fin unbranched ..... 7
- 7a. Head approximately equal to distance between dorsal fin origin and origin of upper caudal fin lobe. Predorsal scales 34 to 41. Pectoral fin without a pale transverse stripe or dark spots ..... *C. cyanopterus* (29 cm SL)
- 7b. Head shorter than distance between dorsal fin origin and origin of upper caudal fin lobe. Predorsal scales 24 to 33. Pectoral fin with the central portion crossed by a transverse stripe becoming narrower toward fin margin ..... 8
- 8a. Dorsal fin with a prominent black spot and pelvic fins usually a prominent black spot ..... *C. nigricans* (24 cm SL)
- 8b. Dorsal fin not pigmented, without a black spot and pelvic fins also without spots...  
..... *C. furcatus* (30 cm SL)

*Interest to fisheries* : Although the flying fishes are usually esteemed as food but there are only few commercial fisheries for these fishes. They are marketed fresh.

#### Family BELONIDAE

#### Needlefishes

(Fig 46)

Body strongly elongate with small cycloid scales, both upper and lower jaws extended into long beaks filled with sharp teeth. Nostrils located in a pit anterior to eyes. Fins without

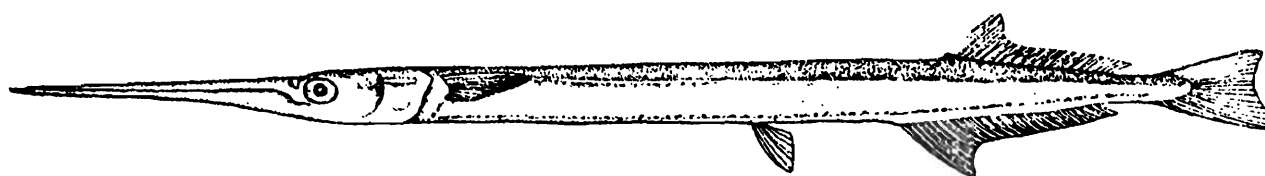


Fig. 46 : *Strongylura leiura* (Bleeker)

spines. Dorsal and anal fins inserted in posterior part of body. Pelvic fins inserted in abdominal position and with 6 soft rays. Pectoral fins short. Lateral line extending down from origin of pectoral fins and then along ventral margin of body.

### Species known to occur in Andhra Pradesh

1. *Ablennes hians* (Valenciennès) (Flat needlefish)
2. *Strongylura leiura* (Bleeker) (Banded needlefish)
3. *S. strongylura* (van Hasselt) (Spottail needlefish) (Kuddera)
4. *Tylosurus acus melanotus* (Bleeker) (Agujon needlefish) (Kuddera)
5. *T. crocodilus crocodilus* (Peron & Le Sueur) (Hound needlefish) (Kuddera)

### Key to the species

- 1a. Body strongly laterally compressed and marked with a series of vertical bars. Anal fin rays 24 to 28 ..... *A. hians* (120 cm TL)
- 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 ..... *Strongylura*.....3
- 2b. Dorsal fin rays 20 to 27. A weak, darkly pigmented lateral keel on each side of caudal peduncle present. Juveniles with an expanded black lobe in the posterior part of dorsal fin ..... *Tylosurus*.....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* (40 cm TL)
- 3b. Caudal fin emarginate without any black spot. Dorsal fin with 17 to 21 rays and anal fin with 23 to 25 rays ..... *S. leiura* (73 cm TL)
- 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* (90 cm TL)
- 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* (124 cm TL)

*Interest to fisheries* : The needlefishes are of minor commercial value. Their flesh excellent in flavour although some people have wrong impression about consumption of these fishes due to their green bones.

## Family HEMIRAMPHIDAE

**Halfbeaks**

(Fig 47)

Body strongly elongate with moderately, large cycloid scales. Lower jaw prolonged and a short triangular upper jaw, a diagnostic character of this family. Nostrils in a pit ahead of the eyes. Fins without spines. Dorsal and anal fins inserted in posterior end of the body.

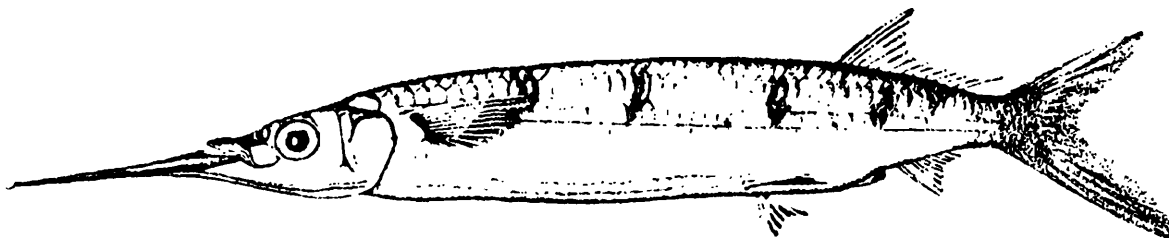


Fig. 47 : *Hemiramphus far* (Forsskal)

Pelvic fins inserted in abdominal in position with 6 soft rays. Pectoral fins generally short. Lateral line originating from the origin of pectoral fins and then bending downward extending backward along the ventral margin of body.

**Species known to occur in Andhra Pradesh**

1. *Hemiramphus far* (Forsskal) (Black-barred halfbeak)
2. *H. lutkei* (Valenciennes) (Lutke's halfbeak) (Gonia)
3. *Hyporhamphus dussumieri* (Valenciennes) (Dussumieri's halfbeak)
4. *H. limbatus* (Valenciennes) (Congaturi halfbeak).
5. *Rhynchorhamphus malabaricus* Collette (Malabar halfbeak)

**Key to the genera and species**

- 1a. Scales present on snout. Preorbital ridge absent ..... *Hemiramphus*.....2
- 1b. Scales absent on snout. Preorbital ridge well developed ..... 3
- 2a. Body with 3 to 9 (usually 4 to 6) vertical bars on sides. Pectoral fins short, not reaching past nasal pit when folded forward ; its length 5.4 to 6.6 times standard length ..... *H. far* (44 cm TL)
- 2b. Body without any spots or vertical bars on sides. Pectoral fins long, reaching beyond anterior margin of nasal pit when folded forward; its length 4.8 to 5.4 times in standard length ..... *H. lutkei* (40 cm TL)

- 3a. Nasal papillae fimbriate. Upper jaw arched. Gillrakers on first arch 47 to 78. Lateral line with 2 branches ascending behind opercle and pectoral fin origin .....  
..... *R. malabaricus* (35 cm TL)
- 3b. Nasal not fimbriate. Upper jaw flat or almost flat. Gillrakers on first arch 19 to 47. Lateral line with one branch ascending toward pectoral fin origin ..... 4
- 4a. Posterior branch of preorbital ridge (bony ridge between nasal opening and eye) canal present. Caudal fin strongly forked with lower lobe longer. Predorsal scales usually 38 to 41 ..... *H. dussumieri* (29.5 cm TL)
- 4b. Posterior branch of preorbital ridge canal absent. Caudal fin not deeply forked but emarginate. Predorsal scales usually 32 to 35 ..... *H. limbatus* (22 cm TL)

*Interest to fisheries* : The halfbeaks are of not great economic value. Their flesh is excellent and are utilized fresh, dried salted and smoked.

Order ATHERINIFORMES

Family ATHERINIDAE

**Silversides**

(Fig 48)

Body elongate and somewhat compressed silvery fishes. Mouth usually small, terminal and oblique. Two short dorsal fins, well separated from each other, the first with a variable number of small, flexible spines ; second dorsal fin and anal fins with 1 weak spine. 1 unbranched ray and a variable number of branched rays. Pectoral fins inserted high on body. Pelvic fins with 1 spine and 5 rays. Caudal fin moderately forked. Lateral line absent. Body with cycloid scales. Generally a midlateral band present, extending from superior border of pectoral fin to base of caudal fin.

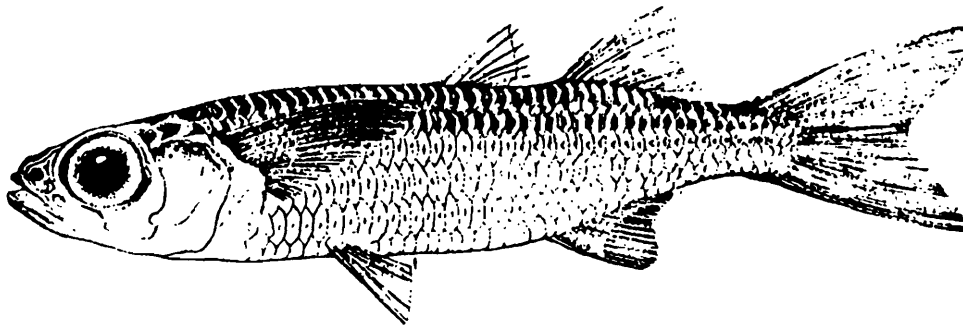


Fig. 48 : *Atherinomorus lacunosus* (Forster)

**Species known to occur in Andhra Pradesh**

- 1 *Atherinomorus lacunosus* (Forster) (Hardyhead silversides)
- 2. *Hypotherina temminckii* (Bleeker) (Samoan) (silversides)

### Key to the Species

- Ascending premaxillary process short and broad, its length  $1/4$  of eye diameter; lateral process of premaxilla broad and flat. Dentary bone sloping gently upward and backward, with or without a slight tubercle-like elevation at distal end .....  
..... *A. lacunosus* (15 cm TL)
- Ascending premaxillary process moderately long, narrow, its length  $1/3$  to  $1/2$  of eye diameter ; lateral process broad and short. Dentary bone sloping strongly upward and backward, with posterior ramus highly elevated ..... *H. temminckii* (11 cm TL)

*Interest to fisheries* : The silversides are very important as forage for commercial fishes and widely utilised as bait.

### Order BERYCIFORMES

#### Family HOLOCENTRIDAE

#### Squirrelfishes, Soldierfishes

(Fig 49)

Body oblong and compressed with coarsely ctenoid scales. Margins of membrane bones of head serrated or with spines. Eyes large and mouth terminal or with lower jaw projecting. Dorsal fin with 11 to 12 stout spines and 12 to 17 soft rays, deeply (sometimes completely) notched between spinous and soft parts, the base of spinous portion 2 to 3.5 times longer than soft part. Anal fin with 4 spines, the third the stoutest and often the longest. Pelvic fins with 1 spine and 7 soft rays. Caudal fin forked, with 17 branched rays. Lateral line complete, extending from superior angle of gill opening to base of caudal fin.

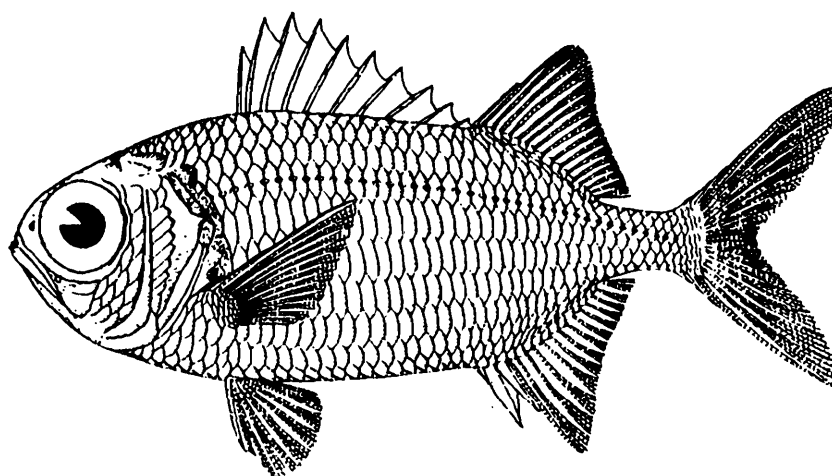


Fig. 49 : *Myripristis kuntee* Cuvier

### Species known to occur in Andhra Pradesh

1. *Myripristis kuntee* Cuvier (Shoulderbar soldierfish)

2. *M. melanostictus* Bleeker (Blacktip soldierfish)

3. *Sargocentron rubrum* (Forsskal) (Redcoat)

**Key to the genera and species**

- 1a. Anal fin rays 7 to 10. Corner of preopercle with a sharp stout spine, longer than broad ..... *S. rubrum* (32 cm TL)
- 1b. Anal fin rays more than 10. Corner of preopercle either rounded or without a sharp spine (at most with a short and very broad spine) ..... 2
- 2a. Lateral line scales 27 to 29. Anal fin with 12 soft rays ..... *M. melanostictus* (28 cm TL)
- 2b. Lateral line scales 37 to 44. Anal fin with 14 to 16 soft rays ..... *M. kuntee* (20 cm TL)

*Interest to fisheries* : The squirrelfishes are of no commercial value and these fishes are marketed fresh.

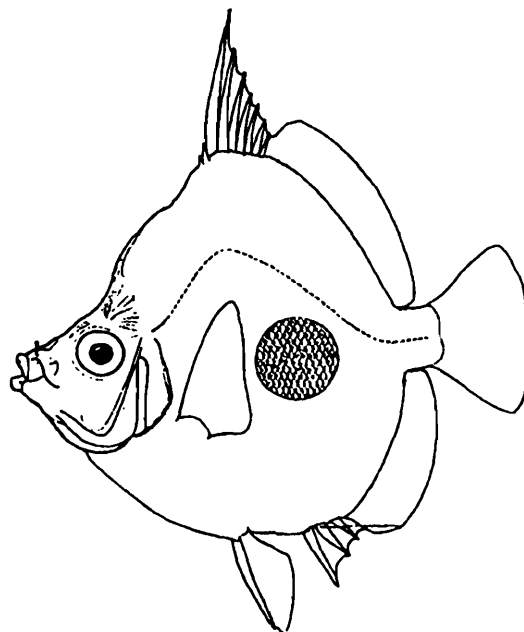
Order ZEIFORMES

Family CAPROIDAE

**Boarfish**

(Fig 50)

Body highly compressed, discoid, with small ctenoid scales. Mouth small, upper jaw protrusible; jaws with band of small teeth; vomer and palatines without tooth. Dorsal fin with



**Fig. 50** : *Antigonia rubescens* (Gunther)

8 to 9 spines and 25 to 27 soft rays. Anal fin with 3 spines and 25 to 27 soft rays. Pelvic fins with 1 strong spine and 5 soft rays. Pectoral fins with 15 rays, longer than pelvic fins and slightly shorter than head. Caudal fin truncate with 10 branched rays.

### Species known to occur in Andhra Pradesh

*Antigonia rubescens* (Gunther) (Indo-Pacific boarfish) (22 cm TL)

*Interest to fisheries* : The boarfishes are of no commercial importance. These fishes are caught as by catch in commercial bottom trawls.

### Order SYNGNATHIFORMES

#### Key to the families

- Pelvic fins absent. Body elongate, angular or laterally compressed or rounded ..... SYNGNATHIDAE
- Pelvic fins present. Body elongate, fleshy and depressed ..... FISTULARIIDAE

#### Family FISTULARIIDAE Cornetfishes, Flutemouths (Fig 51)

Body elongate, fleshy and depressed. Mouth small, at the tip of a long tubular snout, hexagonal in cross section. Teeth small in jaws. Dorsal and anal fins opposite and shortbased, with 14 to 17 soft rays. Pectoral fins with 13 to 17 rays. Pelvic fins with 6 rays, inserted in abdomen. Lateral line arched, extending anteriorly along back, then bending downward on side and continuing posteriorly onto an elongate filament produced by the middle 2 caudal fin rays.

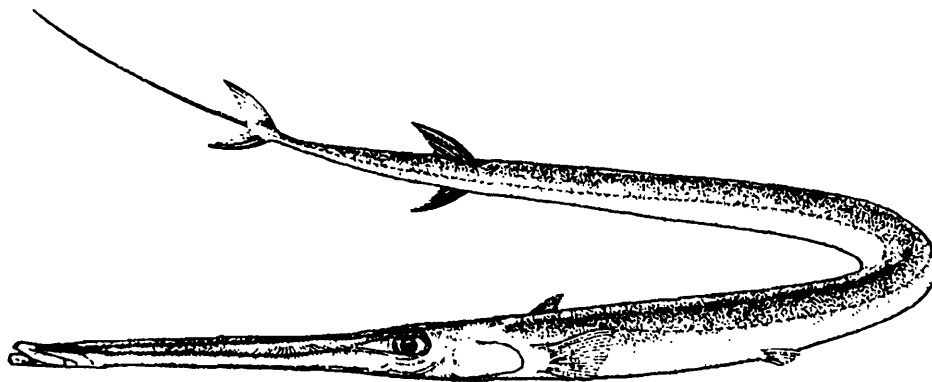


Fig. 51 : *Fistularia petimba* Lacepede

### Species known to occur in Andhra Pradesh

*Fistularia commersonii* (Ruppell) (Bluespotted cornetfish)

*F. petimba* Lacepede (Red cornetfish) (Goorum)

**Key to the species**

- A row of elongate bony plates embedded in skin along middle of back anterior to dorsal fin. Posterior lateral line ossifications ending in a sharp spine. Immaculate red or brown above ..... *F. petimba* (200 cm TL)
- No elongate bony plates along middle of back. posterior lateral line ossifications without a spine. Rows of blue spots on back, sides and snout .....  
..... *F. commersonii* (160 cm TL)

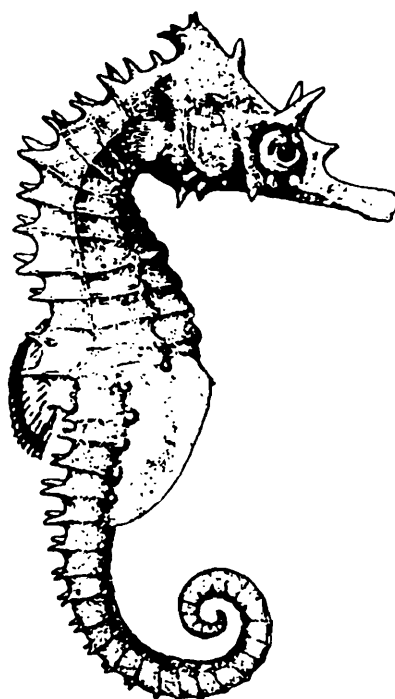
*Interest to fisheries* : The cornetfishes are of no commercial value but these are utilised as food fish or fishmeal.

**Family SYNGNATHIDAE**

**Sea horses, pipefishes**

(Fig. 52)

Body elongate, angular or laterally compressed or rounded. Head slender, usually with a produced tube-like snout. Mouth terminal and oblique. Tail long. Dorsal fin with soft rays only. Pelvic fins absent. Caudal fin sometimes absent. Body is completely armoured by bony scutes, arranged regularly in series and forming rings round the body. Eggs are attached to abdomen of male, often enclosed in a pouch.



**Fig. 52** : *Hippocampus kuda* Bleeker

### Species known to occur in Andhra Pradesh

1. *Hippocampus kuda* Bleeker (Sea-horse)
2. *Trachyrhamphus serratus* (Schlegel) (Crested pipefish)

#### Key to the species

- Caudal fin present. Body more or less round, pipe-like. Head in line with trunk ..... *T. serratus*
- Caudal fin absent. Body compressed with horse like head. Head and trunk at right angle ..... *H. kuda*

*Interest to fisheries* : The sea horses or pipefishes are of no commercial fishery value. These fishes are used in marine aquarium trade.

#### Order DACTYLOPTERIFORMES

#### Family DACTYLOPTERIDAE

#### Flying gurnard

(Fig 53)

Body more or less elongate with heavily armoured, large and blunt head. Mouth subterminal, small, protractile with minute, nodular teeth or teeth absent. Eyes large with a small movable bone between plate-like bones around eye and preopercle. Preopercle with a conspicuous elongate spine. Spinous and soft dorsal fin separated by a deep notch with 6 to 7 spines, of which the first or first two anterior ones are separated from the remainder of the fin ; soft

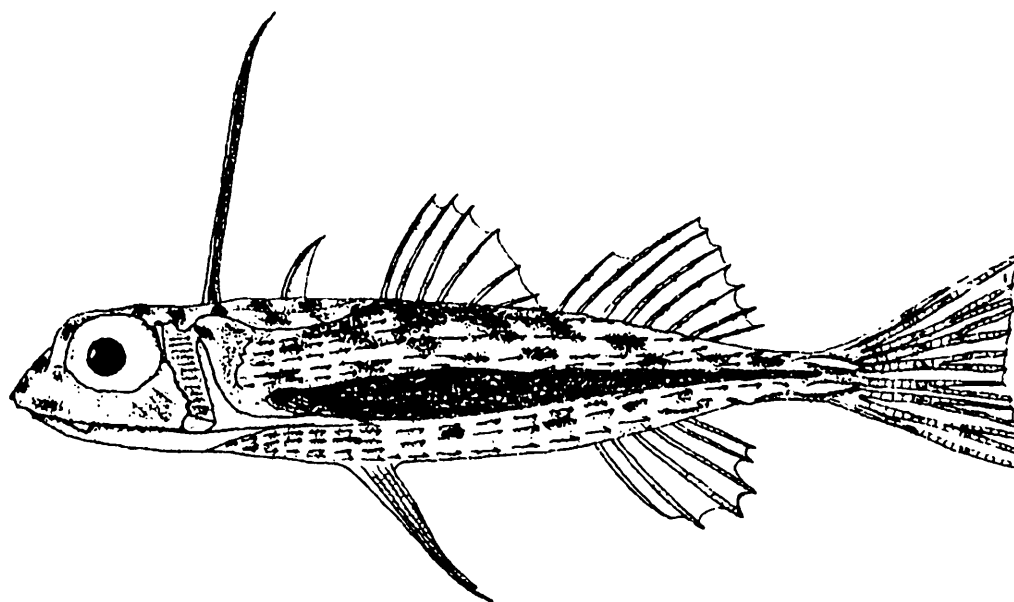


Fig. 53 : *Dactyloptena orientalis* (Cuvier)

dorsal fin with 8 rays. Anal fin with 6 or 7 soft rays. Pectoral fin base horizontal, 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 adult stage. Pelvic fins thoracic, with one spine and 4 soft rays. Caudal fin emarginate. Lower side of posterior part of trunk with 2 to 4 enlarged keel-like scales. Scales scute, forming conspicuous keels. Lateral line present or absent, if present, extends to near caudal fin base.

**Species known to occur in Andhra Pradesh**

*Dactyloptena orientalis* (Cuvier) (Orientalis flying gurnard)

*Interest to fisheries* : *D. orientalis* is generally of no economic importance, but often caught as by catch in nearshore fisheries. This fish is marketed fresh occasionally and its flesh is edible and consumed in some localities.

*Remarks* : The flying gurnards are benthic fishes apparently resemble triglids, can produce sounds by stridulation by the hyomandibular bone and 'walk' for forage on the bottom by alternately moving pelvic fins and short pectoral fin rays. The enlarged pectoral fin rays are spread when the fish is alarmed.

Order SCORPAENIFORMES

**Key to the families**

- Pelvic fins widely separated. Head greatly depressed, much broader than deep .....  
..... PLATYCEPHALIDAE
- Pelvic fin bases adjacent. Head not depressed, usually deeper than its breadth .....  
..... SCORPAENIDAE

Family SCORPAENIDAE

**Scorpionfishes, Turkeyfishes, Stingfishes, Wasp-fishes**

(Fig. 54)

Body somewhat compressed to robust, usually bass-like in appearance, with large spiny head. Mouth oblique, terminal and protractile with generally villiform teeth. A ridge of bone (suborbital stay) below eye extending posteriorly and firmly attaching to preopercle ; preopercular margin with 3 to 5 spines (generally 5), 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 at posterior end of 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 1 spine and 3 to 5 branched or simple rays. Caudal fin rounded to square-cut but never forked. Lateral line always present, sometimes incomplete or represented only as a scaleless groove.

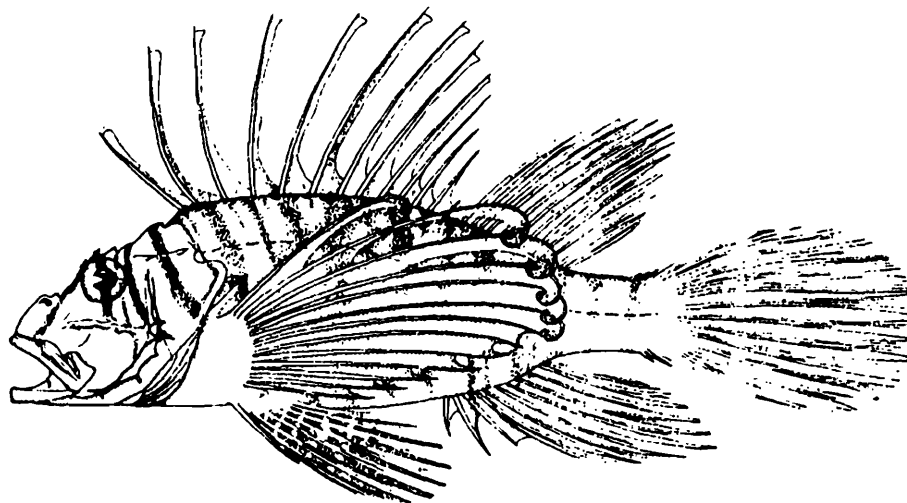


Fig. 54 : *Pterois russellii* Bennet

### Species known to occur in Andhra Pradesh

1. *Apistus carinatus* (Bloch & Schneider) (Ocellated waspfish)
2. *Choridactylus multibarbus* Richardson (Orangebanded stingfish)
3. *Minous monodactylus* (Bloch & Schneider) (Grey stingfish)
4. *Pterois russellii* Bennett (Plaintail turkeyfish)
5. *P. mombassae* (Smith) (Frillfin turkeyfish)
6. *P. volitans* (Linnaeus) (Winged firefish)
7. *Synanceia verrucosa* Bloch & Schneider (Stonefish)

### Key to the genera and species

- 1a. Ventralmost pectoral fin ray not detached or separate from remainder of fin ..... 2
- 1b. Ventralmost pectoral fin rays detached, separate from remainder of fin ..... 5
- 2a. Branchiostegal membranes broadly fused to isthmus ..... *S. verrucosa* (40 cm SL)
- 2b. Branchiostegal membranes not broadly fused to isthmus ..... *Pterois* ..... 3
- 3a. Pectoral fin with 19 rays ..... *P. mombassae* (16 cm SL)
- 3b. Pectoral fin with 13 to 14 rays ..... 4
- 4a. Pectoral fin with 13 rays. Interorbital space scaly ..... *P. russellii* (30 cm SL)
- 4b. Pectoral fin with 14 rays. Interorbital space without scales ..... *P. volitans*

- 5a. Body covered with scales. Branchiostegal membranes not fused to isthmus. Posterior half of spinous dorsal fin with a large black blotch ..... *A. carinatus* (15 cm SL)
- 5b. 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 spot ..... 6
- 6a. Pectoral fin with a single free ray ventrally ..... *M. monodactylus* (10 cm SL)
- 6b. Pectoral fin with 2 or 3 free rays ventrally ..... *C. multibarbus* (12 cm SL)

*Interest to fisheries* : The scorpionfishes are of minor commercially important. A little amount of these fishes are utilised as food. These fishes are marketed fresh, dried and salted condition.

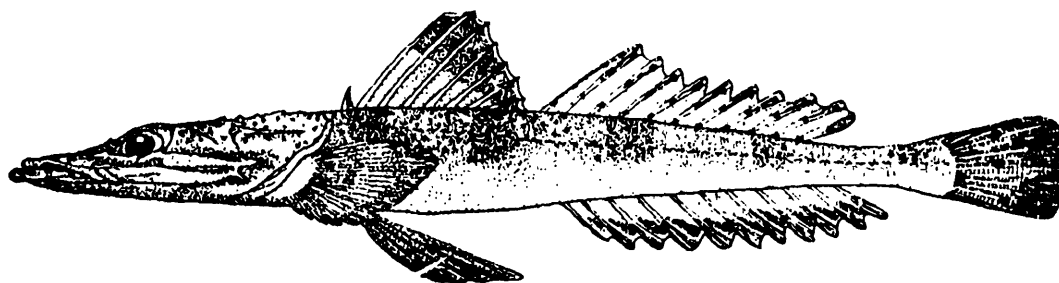
*Remarks* : The scorpionfishes have venous spines and therefore, should be handled with extreme care. This is particularly true for the species of *Pterois* (turkey-fishes) and their allies. Wounds can cause intense pain, swelling and respiratory distress. Wounds caused by stone-fishes have resulted in fatalities and require immediate medical treatment.

Family PLATYCEPHALIDAE

**Spiny flatheads**

(Fig. 55)

Body elongate with flattened head, generally with ridges and spines. Mouth large, lower jaw longer than upper. Fine teeth present on jaws, vomer and palatines in most of the species; canines present in few species. Two dorsal fins, considerably separated; spinous dorsal with 8 to 10 (generally 9), the first spine short and scarcely connected to the second. Soft dorsal



**Fig. 55** : *Cociella crocodila* (Tilesius)

and anal fins with 10 to 15 rays. Pelvic fins inserted in thoracic position and far apart towards sides of body with 1 spine and 5 soft rays. Lateral line complete, anterior pored scales of lateral line usually having spines, all pored scales with a spine in some species. Scales ctenoid, generally embedded on head and breast.

### Species known to occur in Andhra Pradesh

1. *Cociella crocodila* (Tilesius) (Crocodile flathead)
2. *Platycephalus bengalensis* Viswaswara Rao
3. *P. cantori* (Bleeker) (Cantor's flathead)
4. *P. indicus* (Linnaeus) (Bartail flathead) (Irrwa)
5. *P. scaber* (Linnaeus) (Rough flathead)
6. *Rogadius asper* (Cuvier) (Thorny flathead)
7. *Sorsogona tuberculata* (Cuvier) (Tuberculated flathead)
8. *Suggrundus rodricensis* (Cuvier) (Spiny flathead)

### Key to the species

- 1a. Pored scales in lateral line series almost 60 or fewer ..... 2
- 1b. Pored scales in lateral line series almost 65 or more ..... 5
- 2a. Bony ridges above and below eye either with small spines or finely serrated. .... 3
- 2b. Bony ridges above and below eye bearing larger spines ..... 4
- 3a. Preopercular spine single. Interorbital space narrow, 4.5 times or more in eye .....  
..... *R. asper* (17 cm TL)
- 3b. 2 or more preopercular spines. Interorbital space broader, generally less than 4.5 times  
in eye ..... *S. tuberculata* (14 cm TL)
- 4a. Number of scale rows slanting downward and backward above lateral line greater (by  
4 to 23 scale rows) than number of pored lateral line scales .....  
..... *C. crocodila* (50 cm TL)
- 4b. Number of scale rows slanting downward and backward above lateral line about the  
same (may differ by 1 or 2) as the number of pored lateral line scales .....  
..... *S. rodricensis* (25 cm TL)
- 5a. Teeth on vomer in 1 transverse patch. Top of head almost smooth. Caudal fin with 2  
or 3 horizontal black bars near margin ..... *P. indicus* (100 cm TL)
- 5b. Teeth on vomer in 2 separate patches. Top of head with ridges or serrations or spines  
..... 6
- 6a. Lateral line smooth, with about 68 scales bearing no spines. Caudal fin with one or  
two ill-defined vertical bands ..... *P. cantori*
- 6b. Lateral line spiny, with 7 to 54 spines ..... 7

- 7a. Lateral line with 7 to 8 spines. Dorsal fin with 11 soft rays ..... *P. bengalensis*
- 7b. Lateral line with 52 to 54 robust spiny scutes. Dorsal fin with 2 soft rays .....  
..... *P. scaber*

*Interest to fisheries* : The spiny flatheads are of secondary importance in the commercial fisheries, although most of the species of this family are good food fishes. They are mostly caught by bottom trawls.

Order PERCIFORMES

Key to the families

- 1a. Teeth fused in plates forming a parrot-like beak ..... SCARIDAE
- 1b. Teeth not fused in plates ..... 2
- 2a. Pectoral fins divided into two parts-the upper part normal with rays attached, the lower with 4 to 7 free (unattached) filamentous rays ..... POLYNEMIDAE
- 2b. Pectoral fins normal, without free rays in lower part of fin, lower rays sometimes separate from each other ..... 3
- 3a. Two short dorsal fins, widely separated from each other ..... 4
- 3b. Dorsal fin either one or two (when two), with continuous bases, but if (rather rarely) the fins are separate, the interspace is negligible ..... 6
- 4a. Dorsal fin with 6 to 7 spines ..... APOGONIDAE
- 4b. Dorsal fin with less than 6 spines ..... 5
- 5a. Lateral line well developed. First dorsal fin with 5 spines. Jaws with strong canine teeth ..... SPHYRAENIDAE
- 5b. Lateral line absent. First dorsal fin with 4 spines. Teeth in jaws small, feeble, hidden or absent ..... MUGILIDAE
- 6a. Head large and cuboid, eyes dorsolateral or nearly so ..... URANOSCOPIDAE
- 6b. Head not cuboid and eyes not dorsolateral ..... 7
- 7a. Dorsal and anal fins with only soft rays, without spines ..... 8
- 7b. Dorsal and anal fins with spines and soft rays ..... 10
- 8a. Head flattened with a characteristic transversely laminated, oval-shaped sucking disc ..... ECHENEIDAE
- 8b. Head without sucking disc ..... 9

- 9a. Body elongate and compressed. Dorsal fin originating on nape, very long continuing to caudal fin. First fin ray not prolonged ..... CORYPHAENIDAE
- 9b. Body disc-like, with sharp abdomen. Dorsal fin originating far behind head, not extending to caudal fin. First pelvic fin ray in adult specimens prolonged ..... MENIDAE
- 10a. Pelvic fins with 2 strong spines, separated by 3 soft rays ..... SIGANIDAE
- 10b. Pelvic fins with at most 1 spine or absent ..... 11
- 11a. Upper jaw prolonged into a long jaw ..... 12
- 11b. Upper jaw normal, not prolonged into a long bill ..... 13
- 12a. 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 ..... XIPHIDAE
- 12b. Pelvic fins present. First dorsal fin with very long bases, 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
- 13a. Pelvic fins very close together ..... 14
- 13b. Pelvic fins widely separated ..... 17
- 14a. Pelvic fins united only at the bases ..... ELEOTRIDIDAE
- 14b. Pelvic fins united entirely forming a cup-like structure (sucking disc) ..... 15
- 15a. Body not eel-like. Dorsal and anal fins not confluent with caudal fin ..... GOBIIDAE
- 15b. Body eel-like. Dorsal and anal fins confluent with caudal fin ..... 16
- 16a. Opercular region with a pouch-like cavity. Caudal fin lanceolate ..... TRYPAUCHENIDAE
- 16b. Opercular region without a pouch-like cavity. Caudal fin rounded ..... GOBIOIDIDAE
- 17a. Body naked or with modified scales. Head often with tentacles ..... BLENNIDAE
- 17b. Body with scales. Head never with tentacles ..... 18
- 18a. Anal fin with 0 to 1 spine ..... 19
- 18b. Anal fin with more than 1 spine ..... 20
- 19a. One stout spine on opercle ..... MUGILOIDIDAE

- 19b. No spine on opercle ..... CEPOLIDAE
- 20a. A single folding lancet-like spine on side of caudal peduncle .... ACANTHURIDAE
- 20b. No folding spine on caudal peduncle ..... 21
- 21a. Lateral line very high on body, ending below middle of dorsal fin .....  
..... OPISTOGNATHIDAE
- 21b. Lateral line not high on body, extending beyond the dorsal fin ..... 22
- 22a. Anterior part of oesophagus immediately posterior to last gill arch having lateral sacs (pharyngeal sacs) supplied inside with papillae or longitudinal folds bearing teeth; small unilateral teeth in jaw ..... 23
- 22b. No toothed phayngeal sacs ..... 24
- 23a. A continuous dorsal fin, or two dorsal fins scarcely separated. Pelvic fins absent ....  
..... STROMATEIDAE
- 23b. Two dorsal fins distinctly though scarcaly separated. Pelvic fins always present .....  
..... ARIOMATIDAE
- 24a. Premaxillae fixed (non protrusible upper jaw), upper jaw often form a long, forward projecting sword-like structure ..... 25
- 24b. Maxillary bones not very firmly attached to premaxillae which are hence free to move forward ..... 27
- 25a. Caudal fin always present, well developed, lunate or strongly notched. Body spindle shaped. Keels present on caudal peduncle ..... SCOMBRIDAE
- 25b. Caudal fin often absent, but if present that not large nor lunate-shaped. Body oblong or elongate, often ribbon-like. No keel on caudal peduncle ..... 26
- 26a. 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
- 26b. Body elongate and compressed or somewhat fusiform. Two dorsal fins. Isolated finlets behind dorsal and anal fins usually present. Back usually brown .... GEMPYLIDAE
- 27a. A single pair of nostrils (rarely two). Body deep (rarely terete) and laterally compressed. Preorbital and usually suborbitals not attached to check ..... POMACENTRIDAE
- 27b. Two pairs of nostrils. Preorbital and suborbitals attached to check ..... 28
- 28a. Two long barbels behind chin (which can be folded into a median groove on throat). Two widely separated dorsal fins ..... MULLIDAE
- 28b. No barbels on chin ..... 29

- 29a. 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
- 29b. Dorsal fin without free spines ..... 30
- 30a. First 2 anal fin spines detached from rest of fin (these partially or completely embedded in large carangids). Scutes on straight part of lateral line usually present..... CARANGIDAE
- 30b. First 2 anal fin spines not detached from rest of fin. No scutes on caudal peduncle ..... 31
- 31a. Body very deep, its maximum depth more than half the total length. Single dorsal fin, spines clearly distinguishable..... 32
- 31b. Body oblong or moderately deep, its maximum 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..... 37
- 32a. No procumbent spine in dorsal fin ..... 33
- 32b. Procumbent spine in dorsal fin present ..... 34
- 33a. No spine at angle of preopercle. Well developed pelvic axillary process ..... CHAETODONTIDAE
- 33b. Preopercular spine present. Pelvic axillary process not developed ..... POMACANTHIDAE
- 34a. Anal fin with 4 spines. Gill membranes narrowly united to isthmus ..... SCATOPHAGIDAE
- 34b. Anal fin with 3 spines. Gill membranes broadly united to isthmus ..... 35
- 35a. Spinous dorsal fin confluent with soft dorsal portion. Spines of dorsal fin increasing in length posteriorly ..... PLATACIDAE
- 35b. Spinous dorsal fin separated from soft rayed dorsal fin by a notch. Spines in dorsal fin not increasing in length posteriorly ..... 36
- 36a. Mouth protractile. Pectoral fins falcate, longer than head length. Maxillae distally exposed ..... DREPANIDAE
- 36b. Mouth not protractile or scarcely so. Pectoral fin short, rounded, shorter than head length. Maxillae distally hidden ..... EPHIPPIDAE
- 37a. Two dorsal fins, well separated but if close together then not joined by membrane ..... 38
- 37b. Single dorsal fin, sometimes deeply notched between spinous and soft parts of fin but in such cases, the membrane joining the parts intact ..... 41

- 38a. Anal fin base considerably longer than second dorsal fin bases. Mouth large, oblique, with two small canine teeth at front ..... LACTARIIDAE
- 38b. Anal fin base as long as or shorter than second dorsal fin base ..... 39
- 39a. Mouth small. Upper jaw (maxilla) ending far short of eye and even before nostrils ..... SILLAGINIDAE
- 39b. Mouth moderate size or large. Upper jaw (maxilla) reaching nostrils, but often extending beyond anterior margin of eye ..... 40
- 40a. Caudal fin forked. Preopercle with a double edge (edge and ridge) ..... AMBASSIDAE
- 40b. Caudal fin rounded. Preopercle with a single edge (no ridge) ..... CENTROPOMIDAE
- 41a. Pelvic fins usually with an axillary scale ..... 42
- 41b. Pelvic fins without an axillary scale ..... 53
- 42a. Anal fin with 2 spines ..... 43
- 42b. Anal fin with 3 spines ..... 44
- 43a. A peculiar hook in males. Lateral line short or very small ..... KURTIDAE
- 43b. No hook in males. Lateral line prominent and extends up to hind margin of caudal fin ..... SCIAENIDAE
- 44a. Dorsal and anal fins rounded and symmetrical so that with the tail they appear as a single three lobed fin ..... LOBOTIDAE
- 44b. Dorsal and anal fins not as above ..... 45
- 45a. Mouth strongly protractile ..... 46
- 45b. Mouth moderately protractile ..... 47
- 46a. 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
- 46b. Head entirely covered with clearly visible scales, upper surface smooth. Gill membranes free from isthmus ..... GERREIDAE
- 47a. Distal end of premaxillae overlapping maxillae externally. Molar-like teeth present at sides of jaws; no teeth on roof of mouth ..... SPARIDAE
- 47b. Maxillae not overlapping by hind tip of premaxillae ..... 48
- 48a. 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
- 48b. Typical scalpriform teeth absent ..... 49
- 49a. Suborbital process well developed, sometimes forming a spine posteriorly ..... 50
- 49b. Suborbital process either absent or weakly developed ..... 52
- 50a. No teeth on roof of mouth. Weak spines in dorsal and anal fins .....  
 ..... NEMIPTERIDAE
- 50b. Teeth usually present on vomer and palatines (roof of mouth). Moderately strong  
 spines in dorsal and anal fins ..... 51
- 51a. Caudal fin deeply forked ..... CAESIONIDAE
- 51b. Caudal fin slightly forked, often truncate or lunate ..... LUTJANIDAE
- 52a. Dorsal fin with 12 to 16 soft rays. Lips not soft and fleshy ..... HAEMULIDAE
- 52b. Dorsal fin with 9 to 10 soft rays. Lips soft and fleshy ..... LETHRINIDAE
- 53a. Inner ray(s) of pelvic fins attached to abdomen by membrane... PRIACANTHIDAE
- 53b. Inner ray (s) of pelvic fins not confluent to abdomen by a membrane..... 54
- 54a. Dorsal and anal fins each with a well developed basal scaly sheath. Dorsal fin with 10  
 spines ..... KUHLIDAE
- 54b. Dorsal and anal fins each without or low basal scaly sheath ..... 55
- 55a. Mouth large, the upper jaw usually extending to below hind margin of eye. Dorsal fin  
 with 7 to 12 spines. Operculum with 1 to 3 spines .....SERRANIDAE
- 55b. Mouth small or moderate, the upper jaw not reaching beyond eye centre. Dorsal fin  
 with 11 to 14 spines. Operculum with 1 to 2 strong spines ..... TERAPONIDAE

### Family AMBASSIDAE

#### **Glassfishes**

(Fig. 56)

Small fishes, more or less translucent and compressed body. Mouth large with fine teeth in jaws and on roof of mouth; the upper outer row sometimes enlarge and canine-like. Opercle with a ill-developed single spine. A characteristic of this family is the double edge of the preopercle, so that this bone may be said to have an edge and ridge, lower edge is almost always dentate, but the posterior border is entire in several species. Dorsal fin two, the first with 7 spines and a procumbent spine and the second with 1 spine and 9 to 17 soft rays. Anal fin with 3 spines and 9 to 16 soft rays. Pelvic fins with 1 spine and 5 soft rays,

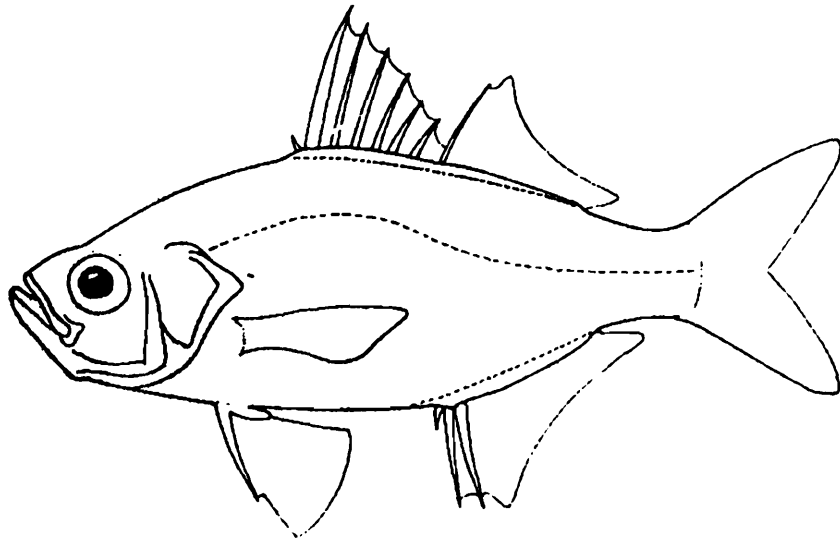


Fig. 56 : *Ambassis commersonii* Cuvier

with an axillary scale. Caudal fin forked. Dorsal and anal fins with a scaly basal sheath. Lateral line complete, interrupted or very distinctly broken. Body with small cycloid scales.

**Species known to occur in Andhra Pradesh**

1. *Ambassis commersonii* Cuvier (Commerson’s glassy perchlet) (Mullu tharu)
2. *A. gymnocephalus* (Lacepede) (Naked-head glassy perchlet)

**Key to the species**

- Supraorbital ridge dentate, with 2 or 4 well developed spines on its hind border. Preorbital margin and ridge with 2 or 3 small serrac. Hind border of preopercle entire. Gillrakers 23 to 25 on lower arm of first arch ..... *A. gymnocephalus*
- Supraorbital ridge smooth, terminating posteriorly in a single backwardly directed spine. Preorbital ridge entire but its border coarsely serrated. Hind border of preopercle ridge serrated, with a spine at angle. Gillrakers 20 to 22 on lower arm of first arch .....  
..... *A. commersonii*

*Interest to fisheries* : The glassfishes are minor commercial importance and marketed mostly fresh or dried and generally utilised as bait.

**Family CENTROPOMIDAE**  
**Sea perches, Barramundis**  
(Fig. 57)

Body elongate or oblong and slightly compressed. Mouth large, maxilla extending posterior border of eyes. Teeth small, in narrow or villiform band on jaws and on vomer and palatines.

Preopercle with a serrated posterior margin or with 2 ridges. Opercle with a single 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 soft rays. Anal fin with 3 spines and 8 to 13 soft rays. Pelvic fins inserted below pectoral fins, with a strong spine and 5 soft rays. Caudal fin rounded. Lateral line extending up to tip of caudal fin. Scales generally large, ctenoid and adherent.

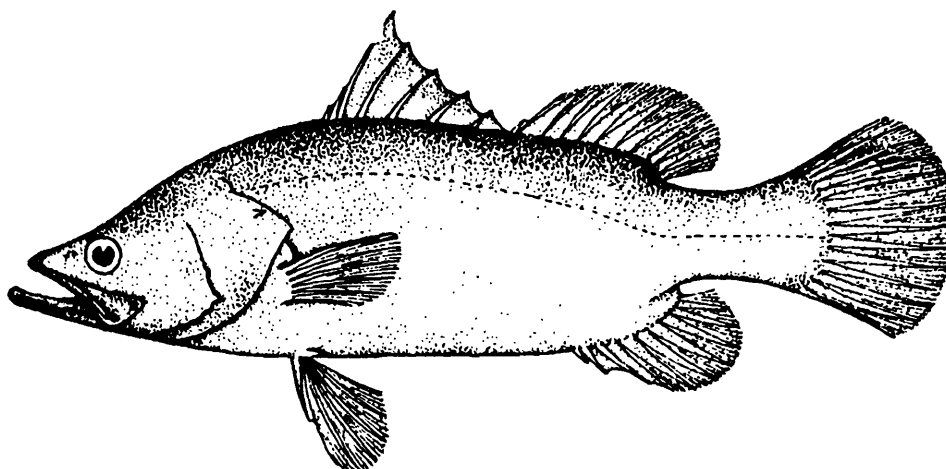


Fig. 57 : *Lates calcarifer* (Bloch)

#### Species known to occur in Andhra Pradesh

1. *Lates calcarifer* (Bloch) (Giant seaperch) (Pandu-menu)
2. *Psammoperca waigensis* (Cuvier) (Waigeu seaperch)

#### Key to the species

- Upper jaw reaching to behind eyes. Nostrils close together. Lower margin of preopercle serrated. Tongue smooth. Lower gill rakers 16 to 17 ..... *L. calcarifer* (200 cm TL)
- 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* (35 cm TL)

*Interest to fisheries* : *L. calcarifer* is a very popular food fish and hence it has an important commercial value, its swimbladder is exported as isinglass.

#### Family SERRANIDAE

#### Groupers, Hinds, Lyretails, Creele-fish

(Fig. 58)

Body robust or more or less compressed, oblong-oval to elongate with ctenoid scales. Mouth protractile, maxilla exposed when mouth is closed. Distinct canine teeth present at

front of mouth in some species and without molars or incisiform teeth. Opercle with 3 spines (upper and lowermost spines generally covered by skin and scales). Hind border of preopercle usually serrate. Dorsal fin with 7 to 11 spines and 10 to 21 soft rays. Anal fin with 3 spines and 7 to 13 soft rays. Pelvic fins with 1 spine and 5 branched rays. Caudal fin rounded, truncate or lunate with 13 to 15 branched rays. Lateral line complete.

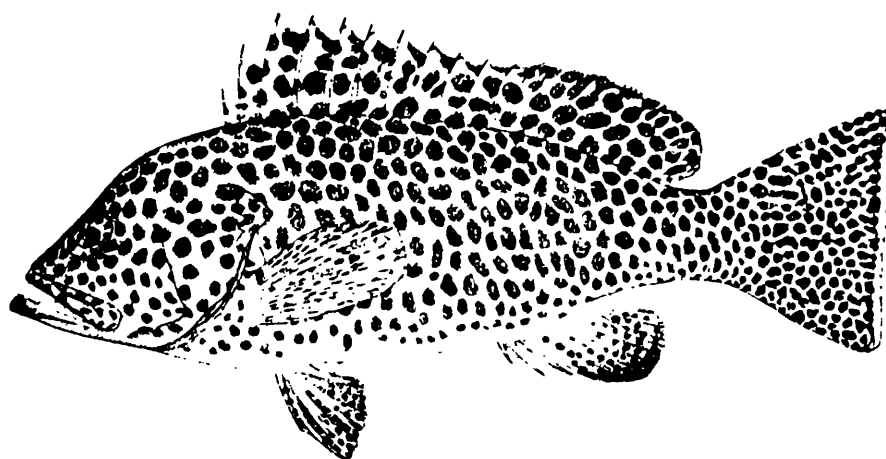


Fig. 58 : *Epinephelus bleekeri* (Vaillant)

#### Species known to occur in Andhra Pradesh

1. *Cephalopholis formosa* (Shaw & Nodder) (Blueline hind)
2. *Epinephelus bleekeri* (Vaillant) Duskytail grouper
3. *E. caeruleopunctatus* (Bloch) (Whitespotted grouper)
4. *E. coioides* (Hamilton-Buchanan) (Orangespotted grouper)
5. *E. diacanthus* (Valenciennes) (Spinycheek grouper)
6. *E. erythrurus* (Valenciennes) (Cloudy grouper)
7. *E. lanceolatus* (Bloch) (Giant grouper)
8. *E. latifasciatus* (Temminck & Schlegel) (Striped grouper)
9. *E. malabaricus* (Bloch & Schneider) (Malabar grouper) (Bontoo)
10. *E. radiatus* (Day) (Obliquebanded grouper)
11. *E. undulosus* (Quoy & Gaimard) (Wavy lined grouper)

#### Key to the genera and species

- 1a. Dorsal fin with 9 spines ..... *C. formosa* (34 cm TL)
- 1b. Dorsal fin with 11 spines ..... *Epinephelus*.....2

- 2a. Caudal fin of adult specimens truncate or slightly marginate (juveniles and some specimens of *E. bleekeri* with slightly rounded caudal fin) ..... 3
- 2b. Caudal fin of adult specimens rounded (some specimens of *E. latifasciatus* may have truncate caudal fin) ..... 4
- 3a. Interspinous membranes of dorsal fin not incised. Lateral line scales 63 to 76 and lateral scale series 124 to 150. Number of gillrakers 12 to 16 on upper limb, 20 to 23 on lower limb; total 32 to 38 on first arch ..... *E. undulosus* (73 cm TL)
- 3b. Interspinous membranes of dorsal fin incised. Lateral line scales 49 to 53 and lateral scale series 99 to 104. Number of gillrakers 9 to 11 on upper limb, 16 to 18 on lower limb; total 25 to 28 on first arch ..... *E. bleekeri* (76 cm TL)
- 4a. Dorsal fin with 12 to 13 rays (rarely 13) ..... *E. latifasciatus* (157 cm TL)
- 4b. Dorsal fin with 14 to 18 rays ..... 5
- 5a. Lateral line scales with branched tubules. Eye diameter about 8 times in head length at 20 cm standard length, about 9 times in head length at 35 cm, and 13 times in head length for 145 cm fish. Maximum total length about 2.7m. Juveniles yellow with 3 broad black bars on body and irregular broad black bands on head .....  
..... *E. lanceolatus* (231 cm TL)
- 5b. Lateral line scales with a single tubule (except anterior scales of large *E. coioides* and *E. malabaricus*). Eye diameter less than 7 times in head length of 20 cm fish and less than 8 times in head length of 35 cm fish. Maximum total length less than 1.5 m. Juveniles not coloured as in 5a ..... 6
- 6a. Numerous distinct dark spots (not dots) over most of head and body (spots brownish red to black in life and distinct in preserved specimens) ..... 7
- 6b. No distinct dark spots over most of head and body (there may be yellow or orange spots in life, but usually do not persist in alcohol or there may be dark dots or scattered small dark spots, but not over most of head and body ..... 8
- 7a. 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* (115 cm TL)
- 7b. Head, body and generally median fins with numerous orange or brownish orange or reddish brown spots (diameter of largest spots about 4 to 5 times that of rear nostrils). No white or pale spots on head or body, orange spots become poorly defined and darker with growth; spots on head often coalesce and become elongate, arranged in irregular rows radiating from eye. Fins brownish, with proximal parts brown spotted; orange spots turn brown after death and are poorly defined on preserved specimens. Pectoral fin rays modally 20 ..... *E. coioides* (95 cm TL)

- 8a. Membranes of spinous dorsal fin usually not or slightly incised. Head and body dark brown or greenish brown, marbled with irregular pale spots and blotches. 1 or 2 faint dark streaks running posteriorly from eye. No dark spot on head, body or fins.....  
..... *E. erythrurus* (43 cm TL)
- 8b. Interspinous dorsal fin membranes moderately to deeply incised. Colour not as in 8a  
..... 9
- 9a. Dorsal fin with 13 to 16 rays (rarely 16). Body without dark vertical bars. 5 irregular dark brown bands (with age only edges remain dark) passing downward and forward from upper edge of body, the first from nape to eye, the second band from middle dorsal fin spines to upper and of gill opening, third and fourth bands from soft dorsal fin rays, branching as they pass ventrally, the fifth band on caudal peduncle .....  
..... *E. radiatus* (70 cm TL)
- 9b. Dorsal fin with 15 to 18 rays (rarely 15). Body usually with vertical or slightly oblique broad dark bars. No bands as in 9a..... 10
- 10a. Adults brownish grey. The body covered with small pale spots overlain with large pale blotches; oblique black saddle on rear half of peduncle 4 or 5 indistinct black blotches at base of dorsal fin. Prominent black streak on maxillary groove. Large adults (over 40 cm standard length) brownish, covered with indistinct, contiguous, small pale spots. Juveniles (less than 20 cm standard length) dark grey to black, covered with prominent pupil-size white spots and smaller white dots .....*E. caeruleopunctatus* (59 cm TL)
- 10b. Body pale greyish brown, generally with 5 dark vertical bars broader than interspaces. 4 below dorsal fin and fifth (faintest) on peduncle. Ventrals part of head and body often pink or reddish. Dark maxillary streak continues faintly to lower edge of preopercle. Fins dusky grey without spots .....*E. diacanthus* (52 cm TL)

*Interest to fisheries* : The groupers are of considerable commercial value in the commercial, sport and artisanal fisheries. Some of the groupers, *E. coioides* and *E. malabaricus* are employed in the aquaculture.

Family TERAPONIDAE  
**Terapon-perches, Terapons**  
 (Fig. 59)

Body oblong or oblong-ovate, somewhat compressed. Operculum with one or two spines. preoperculum serrate. Dorsal fin almost divided by a deep notch in some species, with 11 to 14 spines and 8 to 14 soft rays. Anal fin with 3 spines and 7 to 12 soft rays. Caudal fin

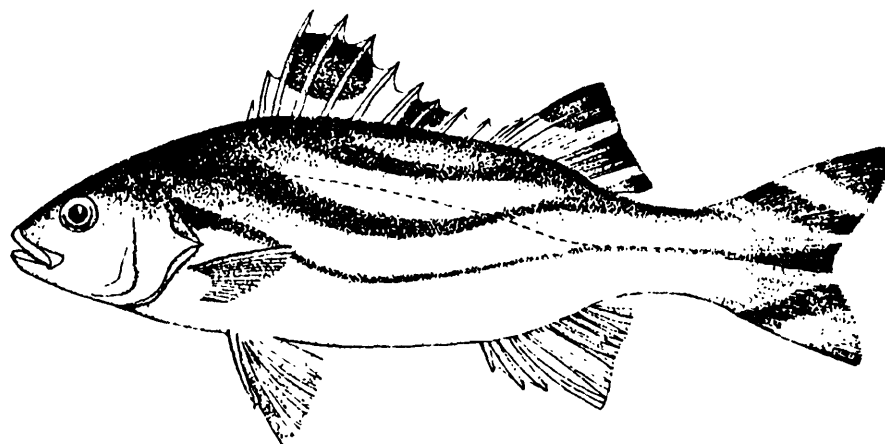


Fig. 59 : *Terapon jarbua* (Forsskal)

rounded, truncate or emarginate. Lateral line continuous. Longitudinal, dark stripes usually present on lateral side of body and dark stripes on caudal fin.

#### Species known to occur in Andhra Pradesh

1. *Terapon jarbua* (Forsskal) (Jerbua terapon) (Baikeeli)
2. *T. puta* (Cuvier) (Smallscaled terapon) (Keelputa)
3. *T. theraps* (Cuvier) (Largescaled terapon) (Keelputa)
4. *Pelates quadrilineatus* (Bloch) (Fourlined terapon) (Kilipothu)

#### Key to the genus and species

- 1a. Posttemporal covered with skin and scales, not extended posteriorly, not with a serrate edge. Gill membranes joined with isthmus..... *P. quadrilineatus* (30 cm)
- 1b. Posttemporal extended and serrate posteriorly, exposed posteriorly, skin and scale covering reduced. Gill membranes free from isthmus.. .....*Terapon* Cuvier.....2
- 2a. Lateral line with 46 to 56 scales, 6 to 8 scales above lateral line .....  
..... *T. theraps* (30 cm)
- 2b. Lateral line with 70 or more scales, 10 to 17 scales above lateral line ..... 3
- 3a. Three or four straight longitudinal stripes present on lateral side of body. Gillrakers 18 to 24 on lower arm of first gill arch ..... *T. puta* (15 cm)
- 3b. Three or four curved stripes present on lateral side of body. Gillrakers 12 to 15 on lower arm of first gill arch ..... *T. jarbua* (30 cm)

*Interest to fisheries* : The terapons are good food fishes and are very common in the commercial catches of India near river mouths and brackish water. *T. jarbua* is one of the

most common fishes and a good aquarium fish found in the east and west coasts of India. *P. quadrilineatus* is also a common species noted for its croaking noise, it invariably makes when taken out of water.

Family KUHLIDAE

**Flagtails**

(Fig. 60)

Body compressed and oblong. Upper jaw slightly protrusible, maxilla mostly exposed and without supra-maxilla. Preorbital and preopercular bones serrate, opercle with 2 exposed flat spines. Dorsal fin with 10 spines and 9 to 16 soft rays. Anal fin with 3 spines and 10 to 16 soft rays. Pelvic fins with 1 spines and 5 soft rays. Caudal fin emarginate or forked. Scales weakly ctenoid. Lateral line extending from superior angle of operculum to base of caudal fin.

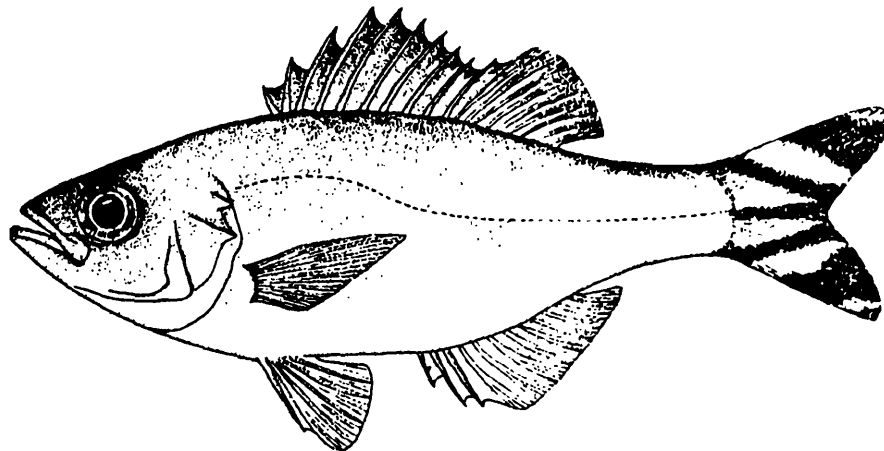


Fig. 60 : *Kuhlia mugil* (Schneider)

**Species known to occur in Andhra Pradesh**

1. *Kuhlia mugil* (Schneider) (Barred flagtail)
2. *K. rupestris* (Lacepede) (Rock flagtail)

**Key to the species**

- Caudal fin with 5 conspicuous dark bands. Lateral line scales 48 to 53. Gillrakers 10 to 12 on upper limb and 23 to 26 on lower limb of first arch .....  
..... *K. mugil* (25 cm TL)
- Caudal fin without dark bands, but juveniles with a blackish blotch on each lobe; forming a broad submarginal black band in adults. Lateral line scales 38 to 43. Gillrakers

6 to 7 on upper limb and 16 to 18 on lower limb of first arch.....  
 ..... *K. rupestris* (40 cm TL)

*Interest to fisheries* : The Flagtails are very food fishes but these fishes are generally too small to be of much economic importance except as bait for larger fishes. These fishes are usually utilised fresh or dried salted.

### Family PRIACANTHIDAE

#### Bigeyes, Bulleeyes

(Fig. 61)

Body oblong, relatively deep and compressed. Eyes very large, near upper profile of head. Mouth large, oblique with lower jaw projecting. Dorsal fin with 10 spines and 10 to 15 soft rays. Anal fin with 3 spines and 9 to 16 soft rays. Pelvic fins with 1 spine and 5 soft rays, inserted ahead of pectoral fins, and broadly joined to body by a membrane. Caudal fin with 16 principal rays, slightly emarginate to rounded.

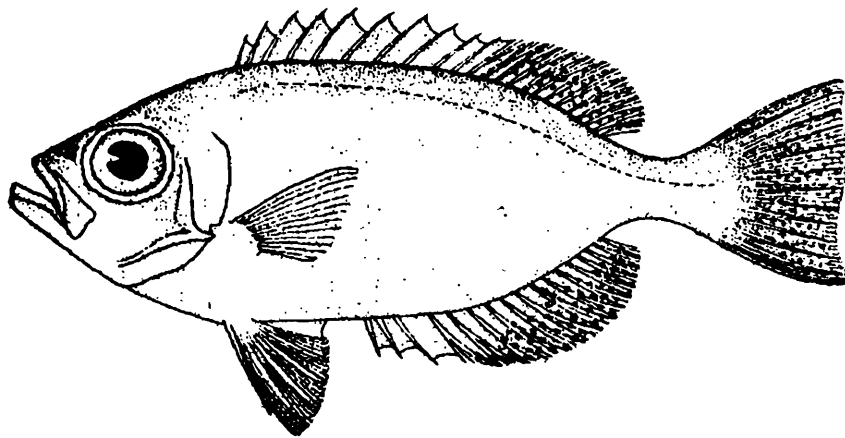


Fig. 61 : *Priacanthus cruentatus* (Lacepede)

#### Species known to occur in Andhra Pradesh

1. *Priacanthus cruentatus* (Lacepede) (Glasseye)
2. *P. hamrur* (Forsskal) (Dusky-finned bulleye)
3. *P. tayenus* Richardson (Purple-spotted bigeye)

#### Key to the 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* (40 cm TL)

- 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* (30 cm TL)
- 2b. Pelvic fins and membranes without black spots, length of pelvic fin relatively short, 1.5 or slightly more times in head length ..... *P. cruentatus* (30 cm TL)

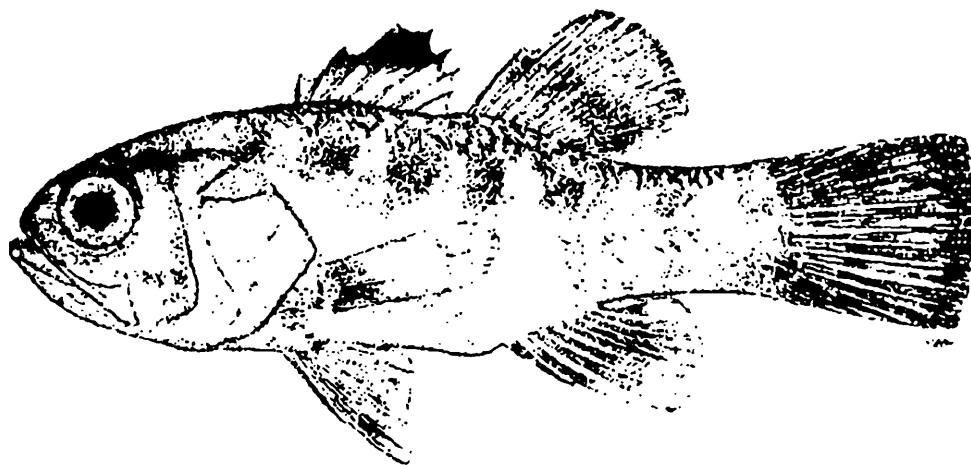
*Interest to fisheries* : The Bigeyes are excellent food fishes. These fishes are generally marketed fresh.

Family APOGONIDAE

**Cardinal fishes**

(Fig. 62)

Body elongate oblong and slightly compressed with ctenoid scales. Mouth generally large with teeth usually in villiform bands in jaws, on vomer and sometimes palatines. Hind border of preopercle serrated. Dorsal fin with 6 to 8 spines in the first and the second dorsal fin with



**Fig. 62** : *Apogon glaga* Blecker

1 spine and 8 to 14 branched rays. Anal fin with 2 spines and 8 to 18 branched rays. Pelvic fins with 1 spine and 5 branched soft rays. Lateral line complete.

**Species known to occur in Andhra Pradesh**

- 1. *Apogon nigripinnis* Cuvier (Bull's eye cardinalfish)
- 2. *A. poecilopterus* Kuhl and van Hasselt (Pearlyfin cardinalfish)
- 3. *A. quadrifasciatus* Cuvier (Twostripe cardinalfish)

4. *A. taeniatus* (Cuvier) (Two-belted cardinalfish)
5. *Archamia lineolata* (Cuvier) (Shimmering cardinalfish)

### Key to the species

- 1a. First dorsal fin with 6 spines. Anal fin with 13 or 14 rays. Head and body with small black spots, more or less arranged in regular rows ..... *A. lineolata*
- 1b. First dorsal fin with 7 spines. Anal fin with 8 or 9 rays ..... 2
- 2a. Caudal peduncle with a dark spot or bar ..... 3
- 2b. Caudal peduncle without a spot or bar ..... 4
- 3a. Body with 2 transverse bands. A dark caudal spot often present. An ocellus on body may present in young. Developed gill rakers 9 to 11 ..... *A. taeniatus*
- 3b. Body without transverse band. A distinct dark bar on caudal peduncle present; no caudal spot. An ocellus above pectoral fin usually present. Developed gill rakers 11 to 13 ..... *A. nigripinnis*
- 4a. Free margin of preoperculum serrated. Suborbital serrated. Two or 3 dark stripes along upper side of body, lower stripe extends to tip of mid caudal fin rays .....  
..... *A. quadrifasciatus*
- 4b. Free margin of preoperculum smooth, with few serrations at angle only. Suborbital smooth. No longitudinal stripes on body ..... *A. poecilopterus*

*Interest to fisheries* : The cardinal fishes are of no commercial importance but they have an important role in the food chain of larger carnivorous fishes.

### Family SILLAGINIDAE

#### Whitings

(Fig. 63)

Elongate, tapering body. Operculum with a small, sharp spine. Mouth small, terminal; end of maxilla slides below preorbital bone. Two dorsal fins, first with 10 to 13 slender spines, the second with 1 spine and 16 to 27 soft rays. Anal fin with 2 slender spines and 14 to 26 soft rays. Caudal fin emarginate.

#### Species known to occur in Andhra Pradesh

1. *Sillaginopsis panijus* (Hamilton-Buchanan) (Gangetic whiting) (Yarra-soring)
2. *Sillago (Sillaginopodys) chondropus* Blecker (Clubfoot sillago)
3. *S. (Parasillago) indica* McKay, Dutt & Sujatha (Indian sillago)

4. *S. (Parasillago) ingenuua* McKay
5. *S. (Sillago) intermedius* Wongratana
6. *S. (Parasillago) lutea* McKay
7. *S. (Sillago) sihama* (Forsskal) (Silver sillago) (Shorangi)
8. *S. (Parasillago) soringa* Dutta & Sujatha (Soringa sillago)
9. *S. (Parasillago) vincenti* McKay (Vincent sillago)

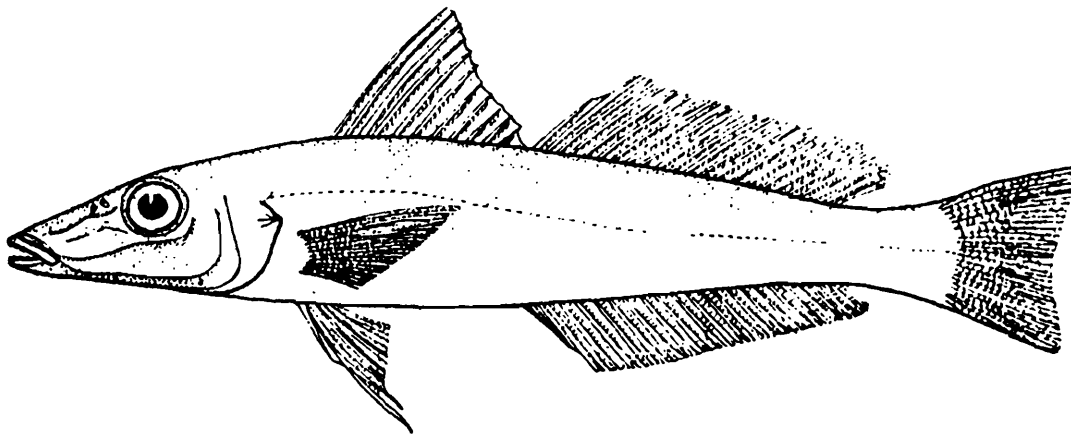


Fig. 63 : *Sillago sihama* (Forsskal)

#### Key to the species

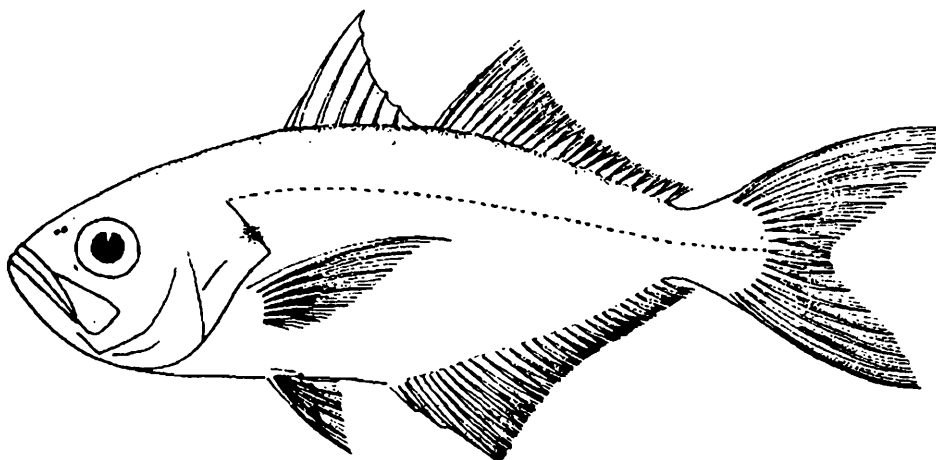
- 1a. Snout and head depressed. Second dorsal fin spine elongate. Eyes small, 3 to 11% in head length and almost covered by skin. Swimbladder minute or absent ..... *S. panijus* (44 cm)
- 1b. Snout and head not depressed. Second dorsal fin spine not elongate. Eyes normal, 17 to 30% in head length. Swimbladder present ..... 2
- 2a. Pelvic fin with the spine inconspicuous and almost hidden by the much thickened club-like first pelvic fin ray. Swimbladder with postcoelomic projections in the tail section ..... *S. chondropus*
- 2b. Pelvic fin without a thickened club-like first ray. Swimbladder with 1 or 2 postcoelomic extensions ..... 3
- 3a. Swimbladder divided posteriorly into 2 tapering extensions projecting below vertebral column in tail musculature ..... 4
- 3b. Swimbladder with a single posterior extension below vertebral column and entering the tail section ..... 5

- 4a. Body with a longitudinal row of dark spots below the lateral line and a series of dark saddle-like blotches on back ..... *S. intermedius*
- 4b. Body uniform in colouration ..... *S. sihama* (25 cm)
- 5a. Swimbladder with anterolateral extensions recurved posteriorly ..... 6
- 5b. Swimbladder without posteriorly recurved anterolateral extensions ..... 7
- 6a. Swimbladder with 2 anterior extensions in addition to the anterolateral extensions extending posteriorly. Lateral line scales 68 to 70 ..... *S. indica*
- 6b. Swimbladder with a single anterior extension in addition to the posteriorly directed anterolateral extensions. Lateral line scales 64 to 68 ..... *S. soringa*
- 7a. Anal fin rays 17 ..... *S. ingenuua*
- 7b. Anal fin rays 21 to 24 ..... 8
- 8a. Swimbladder with a small bulbous anterior projection and without anterolateral extensions projecting anteriorly ..... *S. vincenti*
- 8b. Swimbladder with a pointed median anterior extension and with or without rudimentary anteriorly directed anterolateral extensions ..... *S. lutea*

*Interest to fisheries* : *S. panijus* form a small fishery along the coast of the Bay of Bengal especially near or on river deltas. *S. sihama* is an important food fish throughout its range on both the coasts of India. *S. vincenti* is recognised as having considerable potential for aquaculture in impoundments and tidal ponds.

Family LACTARIIDAE  
**False trevallies, Whitefish**  
 (Fig. 64)

Body oblong and strongly compressed. Mouth large and oblique. Two dorsal fins, the first



**Fig. 64** : *Lactarius lactarius* (Schneider)

with 7 or 8 spines, 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 Andhra Pradesh

*Lactarius lactarius* (Schneider) (False trevally) (Kuthuppu) (400 mm)

*Interest to fisheries* : *L. lactarius* is a monotypic, common species found throughout the coasts of India in sandy bottoms. It is a very important commercial fish, marketed fresh or dried salted.

### Family RACHYCENTRIDAE

#### Cobias

(Fig. 65)

Body elongate, subcylindrical with broad and depressed head. Mouth large, terminal, with projecting lower jaw. Teeth villiform in jaws and on roof of mouth and tongue. First dorsal

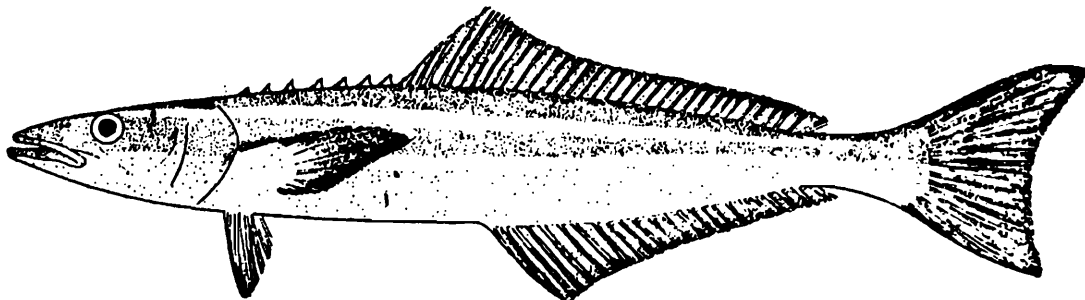


Fig. 65 : *Rachycentron canadum* (Linnaeus)

fin with 7 to 9 (generally 8) isolated short spines, not connected by a membrane; second dorsal fin long, anterior rays more or less elevated in adults, with 1 to 3 spines and 26 to 33 soft rays. Anal fin long, with 2 weak spines and 22 to 28 soft rays. Pectoral fins pointed, becoming more falcate with the growth of the fish. Caudal fin lunate in adult specimens, upper lobe longer than lower (caudal fin rounded in juveniles, the central rays much elongated). Scales small, embedded in thick skin. Lateral line slightly wavy in anterior half of body. Body with 2 sharply defined narrow light bands.

### Species known to occur in Andhra Pradesh

*Rachycentron canadum* (Linnaeus) (Cobia) (200 cm TL)

*Interest to fisheries* : The cobia is a very delicate fish of average food value. They are usually marketed mostly fresh or dry-salted for export.

Family ECHENEIDAE  
**Remoras, sharksuckers**  
 (Fig. 66)

Body elongate with a transversely laminated, oval-shaped cephalic disc. Head wide, depressed to support disc. Jaws broad, the lower projecting beyond the upper. Dorsal and anal fins long, without spines, dorsal rays range from 18 to 45. Anal fin with 18 to 41 rays. Pectoral fins inserted high on body with 18 to 32 rays. Pelvic fins far forward, close together, narrowly or broadly attached to underside of body, with 1 spine and 5 soft rays. Caudal fin slightly forked, emarginate or slightly rounded. Body with cycloid scales, generally embedded in skin.

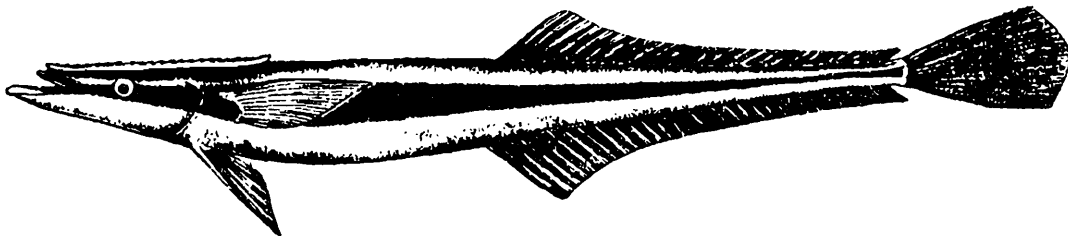


Fig. 66 : *Echeneis naucrates* Linnaeus

**Species known to occur in Andhra Pradesh**

*Echeneis naucrates* Linnaeus (Live sharksucker) (75 cm TL)

*Interest to fisheries* : The remoras are of commercial importance. Those fishes are caught as by catch in the commercial catches and are marketed fresh.

*Remarks* : The remoras attach themselves to a wide variety of marine vertebrates including sharks, rays, tarpons, barracudas, marlins, swordfishes, jacks, basses, groupers, ocean sunfish, sea turtles, whales and dolphins. They may attach to ships and various floating objects.

Family CARANGIDAE  
**Jacks, Trevallies, Scads, Queenfishes, Pampanos**  
 (Fig. 67)

Body highly variable, from elongate and fusiform to deep, greatly compressed. Caudal peduncle in some species with a moderate lateral keel, bilateral paired keels or dorsal and ventral grooves. Teeth in jaws in rows or bands, either small to minute or an enlarged row of recurved canines present; teeth on roof of mouth or tongue present or absent depending on species or developmental stages. Gillrakers moderate in length and number to long and numerous, their number decreasing with growth in some species. Two dorsal fins that are

separate in juveniles, the first of moderate height or very low, with 4 to 8 spines (the spines obsolete or embedded in adults of some species), the second dorsal fin with 1 spine and 18 to 44 soft rays and the anterior lobe scarcely produced to extremely long. Anal fin with 2 anterior spines (but 1 spine in *Elagatis* and *Seriolina*) that are separate from rest of fin by a gap (becoming embedded in adults in some species) followed by 1 spine and 15 to 39 soft rays, with the anterior lobe low to elongate. Pectoral fins with 1 spine and 14 to 24 soft rays,

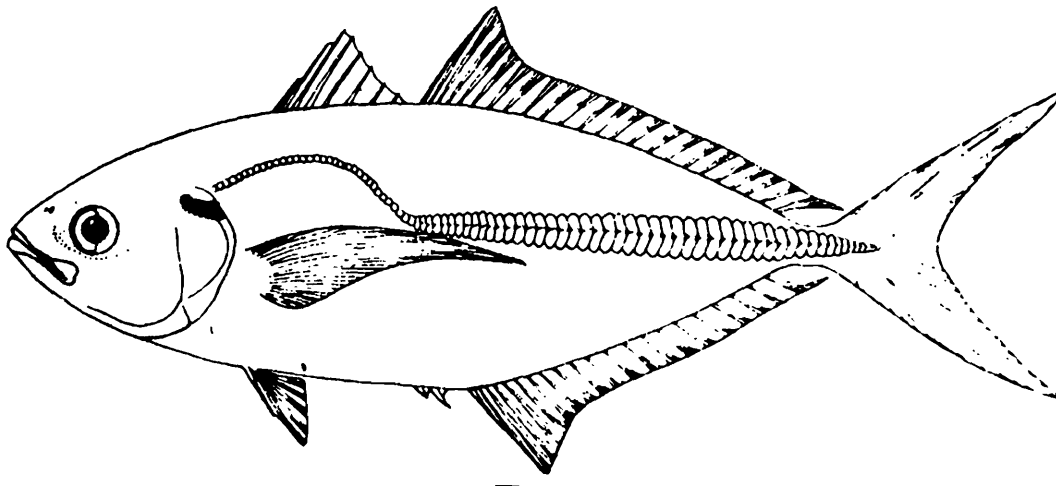


Fig. 67 : *Alepes djedaba* (Forsskal)

either long and falcate or short and pointed or rounded. Pelvic fins with 1 spine and 5 soft rays, moderately long in some species to becoming very small in others (absent in *Parastromateus*). Caudal fin forked, with the lobes generally equal. Lateral line curved or elevated anteriorly and straight posteriorly, extending onto caudal fin. Scutes (enlarged, thickened, and usually pointed scales in lateral line) present and prominent, or reduced in some species and absent in some genera.

#### Species known to occur in Andhra Pradesh

1. *Alectis ciliaris* (Bloch) (African pompano)
2. *A. indicus* (Ruppell) (Indian threadfish)
3. *Alepes djedaba* (Forsskal) (Shrimp scad)
4. *A. melanoptera* Swainson (Blackfin scad)
5. *A. vari* (Cuvier) (Herring scad)
6. *Atropus atropus* (Schneider) (Cleftbelly trevally)
7. *Atule mate* (Cuvier) (Yellowtail scad)
8. *Carangoides armatus* (Ruppell) (Longfin trevally)

9. *C. chrysophrys* (Cuvier) (Longnose trevally)
10. *C. ferdau* (Forsskal) (Blue trevally)
11. *C. malabaricus* (Bloch & Schneider) (Malabar trevally)
12. *C. praeustus* (Bennett) (Brownback trevally)
13. *C. talamparoides* Bleeker (Imposter trevally)
14. *Caranx ignobilis* (Forsskal) (Giant trevally)
15. *C. melampygus* Cuvier (Blue fin trevally)
16. *C. papuensis* Alleyne & MacCleay (Brassy trevally)
17. *C. sem* Cuvier (Blacktip trevally)
18. *C. sexfasciatus* Quoy & Gaimard (Bigeye trevally)
19. *Decapterus macrosoma* Bleeker (Shortfin scad)
20. *D. russellii* (Ruppell) (Indian scad)
21. *Elagatis bipinnulata* (Quoy & Gaimard) (Rainbow runner)
22. *Gnathanodon speciosus* (Forsskal) (Golden trevally)
23. *Megalaspis cordyla* (Linnaeus)
24. *Naucrates ductor* (Linnaeus) (Pilot fish)
25. *Parastromateus niger* (Bloch) (Black pomfret)
26. *Scomberoides commersonianus* Lacepede (Talang queenfish)
27. *S. lysam* (Forsskal) (Doublespotted queenfish)
28. *S. tala* (Cuvier) (Barred queenfish)
29. *Selar boops* (Cuvier) (Oxeye scad)
30. *S. crumenophthalmus* (Bloch) (Bigeye scad)
31. *Selaroides leptolepis* (Cuvier) (Yellowstripe scad)
32. *Seriolina nigrofasciata* (Ruppell) (Blackbanded trevally)
33. *Trachinotus baillonii* (Lacepede) (Small spotted dart)
34. *T. blochii* (Lacepede) (Snubnose pompano)
35. *Ulua mentalis* (Cuvier) (Longrakered trevally)
36. *Uraspis helvola* (Forster) (Whitetongue jack)
37. *U. uraspis* (Gunther) (Whitemouth jack)

**Key to the genera and species**

- 1a. Posterior part of lateral line with hardened scutes. Pectoral fins long and falcate, in most genera longer than head (almost equal to head length in *Selar* and shorter than head length in some *Decapterus*)..... 2
- 1b. No scutes in lateral line (only pored scales, not enlarged). Pectoral fins relatively short, shorter than head length and not falcate ..... 32
- 2a. Pelvic fins (if present, absent in specimens longer than about 10 cm fork length) inserted distinctly anterior to a vertical line through pectoral fin base .....  
..... *P. niger* (53 cm TL)
- 2b. Pelvic fins (always present) not inserted distinctly anterior to a vertical through pectoral fin base ..... 3
- 3a. Second dorsal and anal fins with 1 or more distinct finlets ..... 4
- 3b. Second dorsal and anal fins without finlets ..... 6
- 4a. 8 to 9 finlets behind second dorsal and anal fin rays. Shoulder girdle margin smooth. Maximum scute height larger than eye diameter ..... *M. cordyla* (80 cm TL)
- 4b. A single detached finlet behind second dorsal and anal fins. Shoulder girdle margin with 2 papillae, the lower papilla larger. Maximum scute height smaller than eye diameter..... *Decapterus*.....5
- 5a. Tip of appressed pectoral fin falling considerably short of a vertical line from second dorsal fin origin. Straight part of lateral line with 14 to 29 scales, followed by 24 to 40 scutes ; total scutes and scales in lateral line (excluding caudal scales) 110 to 126. Upper jaw without teeth ..... *D. macrosoma* (30 cm TL)
- 5b. Tip of appressed pectoral fins extending to or nearly to a vertical line from second dorsal fin origin. Straight part of lateral line 0 to 4 scales, followed 30 to 40 scutes: total scales and scutes in lateral line (excluding caudal fin scales) 77 to 102. Upper jaw with minute teeth near symphysis ..... *D. russellii* (35 cm TL)
- 6a. Shoulder girdle margin with a furrow ventrally, large papilla immediately above it and a smaller papilla near upper edge ..... *Selar*.....7
- 6b. Shoulder girdle margin smooth ..... 8
- 7a. Lateral line becoming straight below middle of soft dorsal fin, with 32 to 38 scutes ; largest scute 9 to 10 times in body depth ..... *S. crumenophthalmus* (60 cm TL)
- 7b. Lateral line becoming straight below origin of soft dorsal, with 44 to 46 scutes; largest scute about 4 times in body depth ..... *S. boops*
- 8a. Body superficially naked, scales minute and embedded where present. Anterior soft rays of dorsal and anal fins filamentous in juveniles ..... *Alectis*.....9

- 8b. Small scales present over most of body. Anterior soft rays of dorsal and anal fins not filamentous ..... 10
- 9a. 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 limb of first arch 12 to 17 ..... *A. ciliaris* (150 cm TL)
- 9b. 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 limb of first arch 21 to 26 ..... *A. indicus* (150 cm TL)
- 10a. Gillrakers extremely long, project into mouth along side of tongue. Lower limb of gillrakers on first arch 51 to 61. Lower jaw becoming prominent in large adults, with the angle of "chin" projecting beyond upper jaw ..... *Ulua mentalis* (85 cm TL)
- 10b. Gillrakers of normal length and shape. Lower limb of gillrakers on first arch 39 or fewer. Shape of lower jaw not as in 10a ..... 11
- 11a. Tongue, roof and floor of mouth white, the rest dark. Anal fin spines reduced or reabsorbed ..... *Uraspis*.....12
- 11b. Lining of mouth not distinctly white or dark. Anal fin spines normal and movable ..... 13
- 12a. Naked area of breast extends uninterrupted to naked base of pectoral fin. Scales in curved part of lateral line 61 to 82..... *U. uraspis* (28 cm FL)
- 12b. Naked area of breast separated from naked base of pectoral fins by a broad band of scales. Scales in curved part of lateral line 48 to 66 ..... *U. helvola* (46 cm FL)
- 13a. 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* (30 cm TL)
- 13b. Belly without median groove. Pelvic fins not conspicuously long, black ..... 14
- 14a. Upper jaw without teeth ..... 15
- 14b. Upper jaw with 1 or 2 rows of band of minute teeth ..... 16
- 15a. Lower jaw with a series of minute teeth. A prominent black opercular spot encroaching on shoulder. Adipose eyelid well developed posteriorly ..... *S. leptolepis* (18.5 cm FL)
- 15b. Lower jaw with a feeble teeth in young specimens (smaller than 10 cm FL), absent in adults. No black opercular spot. Adipose eyelid ill-developed ..... *G. speciosus* (110 cm TL)
- 16a. Fleshy adipose eyelid completely covering eye except for a ventral 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* (30 cm TL)
- 16b. Fleshy adipose eyelid, if present, not developed as in 16a. 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 jedaba*)..... 17
- 17a. Both jaws with a single row of numerous, comb-like teeth. Adipose eyelid well developed on posterior half of eye only ..... *Alepes*.....18
- 17b. Dentition not as 17a. Adipose eyelid, if present, variously developed ..... 20
- 18a. Spinous dorsal fin distinctly black. Total gillrakers on first arch 24 to 30. Upper jaw with supramaxilla relatively small and without an anterior spine like extension .....  
 ..... *A. melanoptera* (21 cm TL)
- 18b. Spinous part of dorsal fin transparent to dark dusky. Total gillrakers on first arch 32 to 47. Upper jaw with supramaxilla relatively large and with an anterior spine-like projection ..... 19
- 19a. Gillrakers on first gill arch: upper 10 to 14 and lower 27 to 33, total 38 to 47. Lateral line with 31 to 36 scales and 39 to 51 scutes (total 77 to 85) ; scutes larger. Ultimate ray of dorsal and anal fins about 1.3 to 1.5 times the length of penultimate ray .....  
 ..... *A. djedaba* (29 cm TL)
- 19b. Gillrakers on first gill arch: upper 9 to 12 and lower 23 to 26, total 32 to 38. Lateral line with 42 to 50 scales, 48 to 69 scutes (total 86 to 119) ; scutes smaller. Ultimate and penultimate rays of dorsal and anal fins of equal length .....*A. vari* (56 cm TL)
- 20a. 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 ..... *Caranx*.....21
- 20b. Dentition not as in 20a ..... 26
- 21a. Breast completely scaled ..... 22
- 21b. Breast naked ventrally, with a small patch of prepelvic scales ..... 24
- 22a. Small black spots scattered on head and body (forming at about 16 to 22 cm fork length). Snout length 9.2 to 12.7 times in fork length. Total gillrakers (including rudiments) on first arch 25 to 29 (generally 26 to 27). Total soft dorsal and anal fin rays 39 to 44 ..... *C. melampygus* (100 cm TL)
- 22b. No black spots scattered on head and body. Snout length 13.1 to 18.4 times in fork length. Total gillrakers (including rudiments) on first arch 22 to 25 except 24 to 27 in *C. sem.* Total soft dorsal and anal fin rays 34 to 38 ..... 23

- 23a. No small black spot on upper margin of opercle. Upper lobe of caudal fin generally with distal half noticeable dark or black, particularly in juveniles. In adults adipose eyelid only slightly developed ..... *C. sem*\* (78 cm TL)
- 23b. A small, black spot present on upper margin of opercle. Upper lobe of caudal fin generally pigmented. In adults, adipose eyelid well developed, especially posteriorly. .... *C. sexfasciatus* (78 cm TL)
- 24a. Total gillrakers (including rudiments) on first arch 20 to 24. General body colour silvery to black. In specimens larger than 15 cm fork length, body depth 2.5 to 3.2 times in fork length ..... *C. ignobilis* (165 cm TL)
- 24b. Total gillrakers (including rudiments) on first arch 23 to 30 (rarely 23). General body colour bronze yellow green. In specimens larger than 15 cm fork length, body depth 2.7 to 3.8 times in fork length ..... 25
- 25a. Total soft dorsal and anal fin rays 34 to 38 (rarely 38). Upper lobe of caudal fin generally with distal half noticeably dark or black (especially in juveniles), and posterior margin of lower lobe without a narrow white border. No pale spot on shoulder just behind posterodorsal margin of opercle. Adults without small black spots ..... *C. sem*\* (78 cm TL)
- 25b. Total soft dorsal and anal fin rays 37 to 41 (rarely 37). Upper lobe of caudal fin generally uniformly pigmented and posterior margin of lower lobe with a narrow white border. In life a conspicuous pale spot, approximately the diameter of pupil, on shoulder just behind posterodorsal margin of opercle. Adults with small black spots on body above lateral line (forming at ca. 25 cm fork length) ..... *C. papuensis* (68 cm TL)
- 26a. Breast completely scaled or with a small, median naked area ventrally, scarcely if at all visible in lateral view ..... *C. praeustus*\*\*
- 26b. Breast partially to completely naked ..... 27
- 27a. Naked area of breast separated from naked base of pectoral fin by a broad band of scales ..... 28
- 27b. Naked area of breast uninterrupted to naked base of pectoral fin ..... 29
- 28a. Second dorsal fin with a conspicuous black blotch anteriorly. Vomerine tooth patch anchor shaped, with a long postero-median extension ..... *C. praeustus*\*\* (22 cm TL)
- 28b. Second dorsal fin without a conspicuous black blotch. Vomerine tooth patch without a distinct posterior extension ..... *C. ferdau* (53 cm TL)

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\* *C. sem* and \*\* *C. praeustus* have variable pattern of breast squamation, therefore, they are included under both the sections of couplets when this character is utilized.

- 29a. Small area naked of scales anteriorly just above pectoral fin base ..... 30
- 29b. Area anteriorly just above pectoral fin base completely scaled ..... 31
- 30a. Gillrakers (including rudiments) on first arch: upper 8 to 12, lower 21 to 27, total 32 to 38. In life, tongue greyish brown to brown ..... *C. malabaricus* (24 cm FL)
- 30b. Gillrakers (including rudiments) on first arch: upper 6 to 9, lower 19 to 22, total 27 to 31. In life, tongue white to pale grey ..... *C. talamparoides* (28 cm FL)
- 31a. Total gillrakers (including rudiments) on first arch 31 to 37 .....  
..... *C. armatus* (50 cm FL)
- 31b. Total gillrakers (including rudiments) on first arch 20 to 27 .....  
..... *C. chrysophrys* (60 cm FL)
- 32a. Bases of soft dorsal and anal fins unequal in length, anal fin base shorter and only about 45 to 70 per cent of dorsal fin base length. Caudal peduncle grooves present, dorsally and ventrally. .... 33
- 32b. Base of soft anal fin as long as or only slightly shorter than base of dorsal fin. No caudal peduncle grooves ..... 35
- 33a. Terminal 2-rayed finlet present in dorsal and anal fins. Upper jaw ending distinctly before eye (to below anterior margin of eye in juveniles) .....  
..... *E. bipinnulata* (120 cm TL)
- 33b. No finlets in dorsal and anal fins. Upper jaw ending below anterior margin of eye to posterior margin of eyes ..... 34
- 34a. Upper jaw broadly rounded at end and terminating below posterior margin of eye. Gillrakers on first arch mostly consisting of rudiments, 4 to 10 total elements .....  
..... *S. nigrofasciata* (70 cm TL)
- 34b. Upper jaw truncate or slightly rounded at end and terminating below about anterior margin of eye to middle of eye. Gillrakers on first arch mostly well developed, 11 to 29 total elements ..... *N. ductor* (70 cm TL)
- 35a. Posterior soft dorsal and anal fin rays consisting of semidetached finlets distal 1/4 to 1/2 of rays not connected by interradsial membrane (unattached portion of rays increasing with growth). Upper lip joined to snout at middle by a bridge of skin (frenum), except crossed by a shallow groove in juveniles ..... *Scomberoides*.....36
- 35b. Posterior soft dorsal and anal fin rays not consisting of semidetached finlets. Upper lip separated from snout at middle by a continuous deep groove ..... *Trachinotus*.....38
- 36a. 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 per cent of fork length in specimens larger than 15 cm fork length ..... *S. lysan* (58.5 cm FL)

- 36b. Total gillrakers on first arch 8 to 15. Lobe of dorsal fin uniformly pigmented. Height at second dorsal fin lobe 14.4 to 19.8 per cent of fork length in specimens larger than 15 cm fork length ..... 37
- 37a. Upper jaw extends well beyond posterior margin of eye, particularly in adults. In adults teeth of inner and outer rows on lower jaw subequal in size. In life, large oval blotches above or touching lateral line ..... *S. commersonianus* (94 cm FL)
- 37b. Upper jaw extends slightly beyond posterior margin of eye. In adults teeth of inner row of teeth in lower jaw distinctly larger than those in outer row. In life, vertically elongate blotches intersecting lateral line ..... *S. tala* (62 cm FL)
- 38a. 1 to 5 spots in a longitudinal row on or near lateral line (spots absent on specimens smaller than about 10 to 13 cm fork length). Soft dorsal fin rays 21 to 25 .....  
..... *T. baillonii* (53.5 cm TL)
- 38b. No spots in a longitudinal row on or near lateral line. Soft dorsal fin rays 18 to 20  
..... *T. blochii* (65 cm TL)

*Interest to fisheries* : The carrangids constitute one of the very important groups of commercial fishes and utilised as food fishes and marketed generally fresh.

#### Family CORYPHAENIDAE

#### Dolphinfishes

(Fig. 68)

Body elongate and compressed with cycloid scales. Mouth large with many fine teeth in bands. Adult males have a bony crest on front of head. Dorsal and anal fins very long, extending from nape to almost to caudal fin, without sharp spines or finlets; with 52 to 66 rays. Anal fin origin at or anterior to mid-point of body. Pelvic fins inserted in thoracic region, fitting into a groove on body. Caudal fin deeply forked, without any keels on fin or caudal peduncle. Lateral line curved upward above pectoral fins.

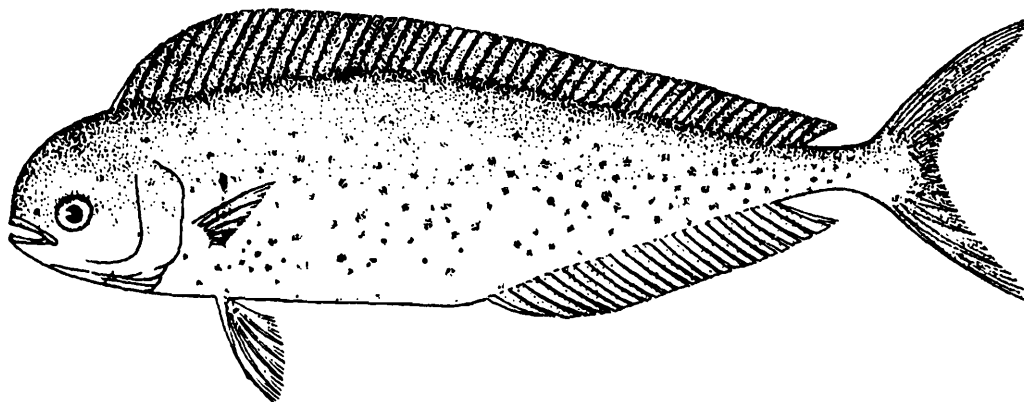


Fig. 68 : *Coryphaena hippurus* Linnaeus

**Species known to occur in Andhra Pradesh**

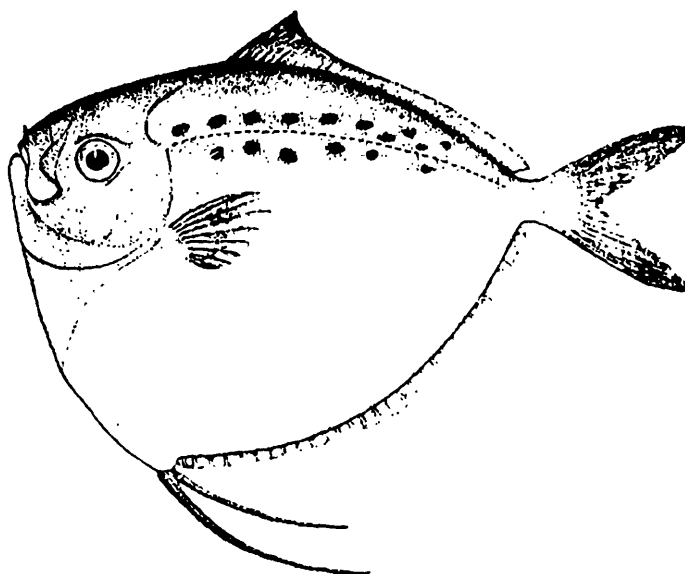
*Coryphaena hippurus* (Linnaeus) (Common dolphin fish) (200 cm TL)

*Interest to fisheries* : The flesh of the dolphin fishes is excellent for human consumption. These fishes are marketed fresh and are highly appreciated as food fishes.

**Family MENIDAE****Moonfishes**

(Fig. 69)

Body greatly compressed and discoid shaped, dorsal profile almost horizontal. Mouth protrudes upward and contains bands of villiform teeth in jaws. Dorsal fin very long and low, anterior rays slightly elevated, with 43 to 46 soft rays, the first 3 to 10 not branched, spine-like in the juveniles. Anal fin also very long and low, with 30 to 33 soft rays and no spines. Pelvic fins with first two rays fused and greatly elongated. Pectoral fins with 15 rays, shorter than head. Caudal fin forked. Lateral line extending up to rear end of dorsal fin base. Body with several round black spots on dorsal part.



**Fig. 69** : *Mene maculata* (Bloch)

**Species known to occur in Andhra Pradesh**

*Mene maculata* (Bloch) (Moonfish) (24 cm TL)

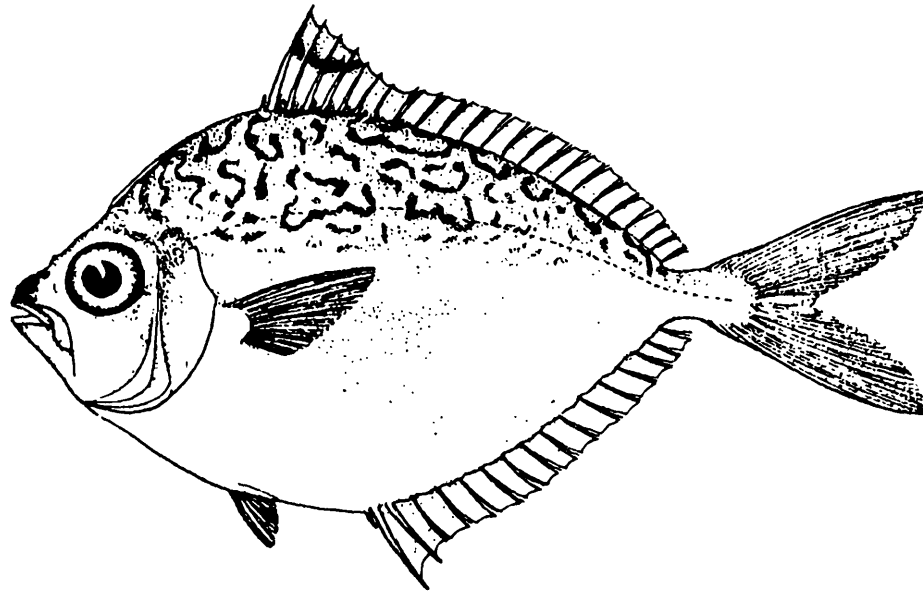
*Interest to fisheries* : The moonfishes are of minor commercial fishery value. These fishes are marketed fresh or dried; although they have little flesh, but of excellent quality.

## Family LEIOGNATHIDAE

**Ponyfishes, Slipmouths**

(Fig. 70)

Body oblong or round, moderately to greatly compressed with cycloid scales but top of head without scales. Dorsal profile of head with bony ridges and a well developed nuchal



**Fig. 70** : *Leiognathus bindus* (Valenciennes)

crest or spine. Mouth highly protrusible. Dorsal fin with 8 (rarely 7 or 9) spines and 16 to 17 soft rays. Anal fin with 3 spines and 14 soft rays. Second dorsal and anal fin spines always the largest. Caudal fin deeply emarginate to forked. Body usually with characteristics markings on body and fins, which are generally helpful in the identification of fresh specimens.

**Species known to occur in Andhra Pradesh**

1. *Gazza minuta* (Bloch) (Toothponyfish)
2. *Leiognathus berbis* (Valenciennes) (Barber ponyfish)
3. *L. bindus* (Valenciennes) (Orangefin ponyfish) (Bindoo karah)
4. *L. brevirostris* (Valenciennes) (Shortnose ponyfish)
5. *L. daura* (Cuvier) (Goldstriped ponyfish) (Dacar karah)
6. *L. dussumieri* (Valenciennes) (Dussumier's ponyfish)
7. *L. equulus* (Forsskal) (Common ponyfish)
8. *L. fasciatus* (Lacepede) (Striped ponyfish) (Karah)

- 9. *L. leuciscus* (Gunther) (Whipfin ponyfish)
- 10. *L. linealatus* (Valenciennes) (Ornate ponyfish)
- 11. *L. smithursti* (Ramsay & Ogilby) (Smithurst's ponyfish)
- 12. *L. splendens* (Cuvier) (Splendid ponyfish) (Goomorah karah)
- 13. *Secutor insidiator* (Bloch) (Pugnose ponyfish)
- 14. *S. ruconius* (Hamilton-Buchanan) (Deep pugnose ponyfish)

**Key to the genera and species**

- 1a. Caniniform teeth present in jaws. Mouth pointing forward when protracted .....  
 ..... *G. minuta* (14 cm TL)
- 1b. Caniniform teeth absent in jaws ..... 2
- 2a. Mouth oblique, pointing upward when protracted ..... *Secutor*.....3
- 2b. Mouth horizontal, pointing forward or downward when protracted .....  
 ..... *Leiognathus*.....4
- 3a. Lateral line reaching backward nearly to below end of dorsal fin. Check scaleless ..  
 ..... *S. insidiator* (10 cm TL)
- 3b. Lateral line ending below about middle of soft part of dorsal fin. Check scaly .....  
 ..... *S. ruconius* (8 cm TL)
- 4a. Breast scaleless ..... 5
- 4b. Breast scaly ..... 9
- 5a. Body depth 1.67 to 1.97 times in standard length ..... 6
- 5b. Body depth 2.02 to 2.47 times in standard length ..... 8
- 6a. Second dorsal and anal fin spines not elongated. A dark brown saddle on caudal  
 peduncle present ..... *L. equulus* (24 cm TL)
- 6b. Either second dorsal fin spine or both second dorsal and anal fin spines distinctly  
 elongated. No spot on caudal peduncle ..... 7
- 7a. 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* (21 cm TL)
- 7b. Both second dorsal and anal fin spines greatly elongated (sometimes reaching to  
 caudal fin). Back with a few faint, unevenly spaced and horizontally elongate blotches  
 ..... *L. smithursti* (16 cm TL)

- 8a. A distinct dark brown blotch on nape. Dorsal profile showing a distinct notch at the commencement of the nuchal crest ..... *L. brevirostris* (13.5 cm TL)
- 8b. Upper half of spinous dorsal fin with a black blotch between second and sixth spine. No distinct notch in dorsal profile ..... *L. daura* (14 cm TL)
- 9a. Mouth pointing forward when protracted. Spinous part of dorsal fin black at half height, above which the membrane between second and fifth spines with a bright orange blotch ..... *L. bindus* (11 cm TL)
- 9b. Mouth pointing downward when protracted. No such markings in the dorsal fin as in 9a ..... 10
- 10a. Second dorsal fin spine distinctly and second anal fin spine slightly elongated .....  
..... *L. leuciscus* (12 cm TL)
- 10b. Second dorsal and anal fin spines not elongated ..... 11
- 11a. Snout blunt and shorter than eye diameter ..... *L. splendens* (14 cm TL)
- 11b. Snout pointed and larger than eye diameter ..... 12
- 12a. Body depth 2.02 to 2.28 times in standard length. Sides of body with grey wavy, vertical lines descending from the back to little beyond lateral line .....  
..... *L. dussumieri* (14 cm TL)
- 12b. Body depth 2.32 to 2.98 times in standard length. Back greenish to brownish with light grey, crowded irregular vermiculations extending on sides to slightly below lateral line ..... 13
- 13a. Both dorsal and ventral profiles almost equally convex. A distinct notch present at nape. Comparatively more vermiculations on back ..... *L. berbis* (11 cm TL)
- 13b. Dorsal profile more evenly curved than ventral profile. No distinct notch at nape. Comparatively less vermiculations on back ..... *L. lineolatus* (9.5 cm TL)

*Interest to fisheries* : The ponyfishes are important in the economy of food of India, since they provide a small amount of low-cost protein. These fishes are good raw materials for fishmeal plants, fish protein and other fish products. They are generally marketed dried salted.

#### Family LUTJANIDAE

##### **Snappers**

(Fig. 71)

Body moderately oblong to deep with moderate to small ctenoid scales. Scales absent between eye and mouth but scales present on cheek and preopercle. Mouth terminal, moderate to large; maxilla slips below preorbital when mouth closed. Preopercle generally serrate,

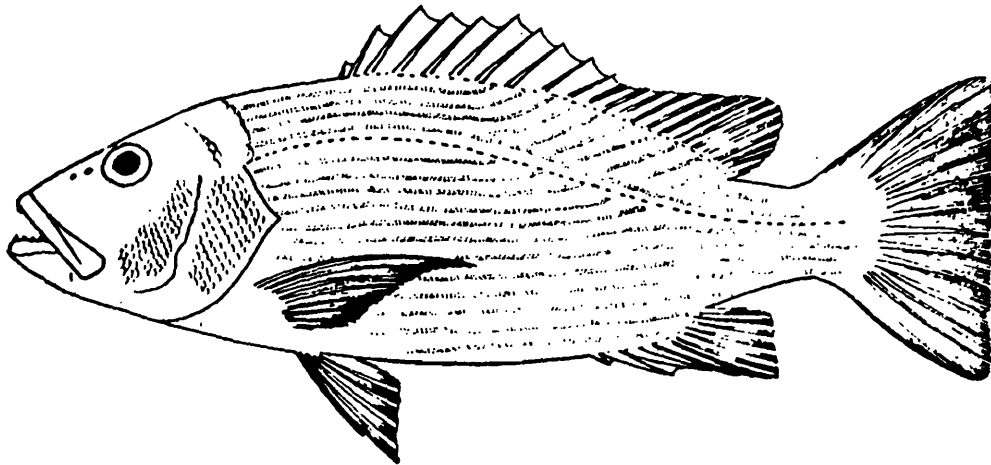


Fig. 71 : *Lutjanus argentimaculatus* (Forsskal)

often finely. Jaw teeth generally in a few rows, conical and sharp, most with enlarged teeth on jaws; teeth present on roof of mouth (vomer and palatines). Dorsal fin continuous or with shallow notch, with 10 to 12 spines and 10 to 17 soft rays. Anal fin with 3 spines and 7 to 11 soft rays. Caudal fin lunate, emarginate, truncate to slightly forked.

#### Species known to occur in Andhra Pradesh

1. *Aphareus furcatus* (Lacepede) (Small toothed jobfish)
2. *A. rutilans* Cuvier (Rusty jobfish)
3. *Aprion virescens* Valenciennes (Green jobfish)
4. *Etelis carbunculus* Cuvier (Ruby snapper)
5. *E. coruscans* Valenciennes (Ruby snapper)
6. *Lipocheilus carnolabrum* (Chan) (Tang's snapper)
7. *Lutjanus argentimaculatus* (Forsskal) Mangroove red snapper)
8. *L. bengalensis* (Bloch) (Bengal snapper)
9. *L. biguttatus* (Valenciennes) (Two-spot banded snapper)
10. *L. bohar* (Forsskal) (Two-spot red snapper)
11. *L. carponotatus* (Richardson) (Spanish flag snapper)
12. *L. decussatus* (Cuvier) (Checkered snapper)
13. *L. ehrenbergii* (Peters) (Black spot snapper)
14. *L. erythropterus* (Bloch) (Crimson snapper)
15. *L. fulviflamma* (Forsskal) (Black spot snapper)

16. *L. fulvus* (Schneider) (Black tail snapper)
17. *L. gibbus* (Forsskal) (Humpback red snapper)
18. *L. johnii* (Bloch) (John's snapper) (Rangu, Thunders)
19. *L. kasmira* (Forsskal) (Common blue stripe snapper)
20. *L. lemniscatus* (Valenciennes) (Yellow streaked snapper)
21. *L. lunulatus* (Park) (Lunartail snapper)
22. *L. lutjanus* (Bloch) Bigeye snapper)
23. *L. madras* (Valenciennes) (Indian snapper)
24. *L. malabaricus* (Schneider) (Malabar blood snapper)
25. *L. monostigma* (Cuvier) (One spot snapper)
26. *L. quinquelineatus* Bloch (Five lined snapper)
27. *L. rivulatus* (Cuvier) (Blubberlip snapper)
28. *L. russelli* (Bleeker) (Russell's snapper)
29. *L. sebae* (Cuvier) (Emperor red snapper)
30. *L. vitta* (Quoy & Gaimard) (Brown stripe snapper)
31. *Macolor niger* (Forsskal) (Black & White snapper)
32. *Paracasio xanthurus* (Bleeker) (Yellowtail blue snapper)
33. *Pinjalo pinjalo* (Bleeker) (Yellowtail blue snapper)
34. *Pristipomoides filamentosus* (Valenciennes) (Crimson jobfish)
35. *P. multidens* (Day) (Gold banded jobfish)
36. *P. sieboldii* (Bleeker) (Lavender jobfish)
37. *P. zonatus* (Valenciennes) (Oblique banded jobfish)

#### Key to the genera and species

- 1a. Base of dorsal and anal fins entirely scaleless ..... 2
- 1b. Base of dorsal and anal fins, particularly soft portions, with covering of scales ..... 12
- 2a. Dorsal fin deeply notched between spinous and soft portions. Maxilla scaled ..... *Etelis* Cuvier..... 3
- 2b. Dorsal fin not deeply notched between spinous and soft portions. Maxilla usually scaleless (except some species of *Paracaesio*)..... 4

- 3a. Total gillrakers on first gill arch 17 to 22 ; gillrakers, excluding rudiments, on first gill arch 10 to 13. Upper lobe of caudal fin short, 26 to 30% of standard length in specimens larger than 120 mm standard length ..... *E. carbunculus* (80 cm TL)
- 3b. Total gillrakers on first gill arch 23 or more; gillrakers, excluding rudiments, on first gill arch 19 or more. Upper lobe of caudal fin longer, almost always 32% of standard length or more in specimen larger than 130mm standard length .....  
..... *E. coruscans* (70 cm TL)
- 4a. Pectoral fins short, almost equal to snout length. A prominent groove present ahead of eye ..... *A. virescens* (100 cm TL)
- 4b. Pectoral fins much longer than snout length. No groove ahead of eye ..... 5
- 5a. Roof of mouth toothless, teeth in jaws minute, no enlarged canines .....  
..... *Aphareus* Cuvier.....6
- 5b. Roof of mouth with villiform teeth on vomer and palatines; teeth in jaws larger, usually with enlarged canines at front ..... 7
- 6a. Gillrakers on first gill arch 5 or 6 + 16 to 18 ..... *A. furcatus* (40 cm TL)
- 6b. Gillrakers on first gill arch 16 to 19 + 30 to 34 ..... *A. rutilans* (40 cm TL)
- 7a. Last ray of dorsal and anal fins conspicuously longer than preceding rays, usually produced into an elongate extension. Interorbital space flattened .....  
..... *Pristipomoides* Bleeker.....8
- 7b. Last ray of dorsal and anal fin shorter than penultimate ray or only slightly longer, not forming a conspicuous filament. Interorbital space convex, except some-what flattened in *Lipocheilus* ..... 11
- 8a. Scales relatively large, almost 47 to 52 in lateral line ..... *P. multidentis* (90 cm TL)
- 8b. Scales smaller, almost 54 to 74 in lateral line ..... 9
- 9a. Scales small, almost 70 to 74 in lateral line. Gillrakers on lower limb (including rudiments) 17 to 22 ..... *P. sieboldii* (60 cm TL)
- 9b. Scales larger, almost 54 to 66 in lateral line. Gillrakers on lower limb 8 to 18.....  
..... 10
- 10a. Body moderately deep, its depth almost 2.6 to 3.0 times in standard length. 4 oblique bars of yellow or orange on sides ..... *P. zonatus* (50 cm TL)
- 10b. Body more slender, its depth almost 3.1 to 3.8 times in standard length. Sides of body without oblique bars ..... *P. filamentosus* (80 cm TL)

- 11a. Upper lip with a median fleshy protuberance, especially well developed in adults. Mouth relatively large. Dorsal spines thick, robust .....  
..... *Lipocheilus carnolabrum* (60 cm TL)
- 11b. Upper lip without a fleshy protuberance. Mouth smaller. Dorsal spines relatively feeble to moderately developed ..... *Paracaesio xanthurus* (40 cm TL)
- 12a. Gillrakers long and slender, very numerous, more than 50 on lower limb of first gill arch ..... *M. niger* (60 cm TL)
- 12b. Gillrakers shorter, less than 25 on lower limb ..... 13
- 13a. Upper and lower profiles of head equally rounded. Eye set toward middle of head, its lower margin below line from tip of snout to middle of caudal fin base. Longitudinal scale rows below lateral line sloping upward in posterior direction. No fang-like canines at front of jaws although they may be slightly enlarged compared to lateral jaw teeth ..... *Pinjalo pinjalo* (50 cm TL)
- 13b. Upper and lower profiles of head unequal, upper profile evenly rounded to steeply sloped and lower profile flattened. Eye closer to upper profile of head, its lower margin usually above line from snout tip to middle of caudal fin base. Longitudinal scale rows below lateral line usually horizontal (except sloping upward in *L. erythropterus* and *L. gibbus*). Some fang-like canines usually present at front of jaws .....  
..... *Lutjanus* Bloch..... 14
- 14a. Preorbital space (distance between upper jaw and eye) very narrow, 9.2 to 16.3 times in head length. Body slender, usually 3.0 (sometimes 2.9) or more times in standard length. Dorsal spines usually 11, sometimes 10 or rarely 12 ; soft dorsal rays 12....  
..... 15
- 14b. 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 spines variable, 10 to 12 ; soft dorsal rays occasionally 12, usually 13 or more ..... 16
- 15a. Body depth 3.5 to 3.8 times in standard length. Tongue smooth without teeth. A dark band from snout to caudal fin base and two pearly spots above lateral line, one below spinous portion and the other below soft portion of dorsal fin .....  
..... *L. biguttatus* (20 cm TL)
- 15b. Body depth 2.9 to 3.3 times in standard length. Tongue with a patch of fine granular teeth. Colour usually silvery-white with a broad yellow stripe along middle of side to caudal fin base and narrow yellowish lines, corresponding with longitudinal scale rows ..... *L. lutjanus* (30 cm TL)
- 16a. Ground colour pale (mainly yellow in life) with a series of 4 to 8 longitudinal stripes blue in life often brownish in preservative) on side ..... 17

- 16b. Colour not as in 16a ..... 19
- 17a. Dorsal spines 11 or 12.....*L. bengalensis* (30 cm TL)
- 17b. Dorsal spines 10 ..... 18
- 18a. Four stripes on side, belly somewhat abruptly whitish, frequently with thin grey lines. Scale rows on cheek 5 or 6. Upper pectoral rays darkish .... *L. kasmira* (35 cm TL)
- 18b. Five stripes on side, belly not abruptly whitish and without thin lines. Scale rows on cheek 10 or 11. Upper pectoral rays pale ..... *L. quinquelineatus* (38 cm TL)
- 19a. Longitudinal scale rows above lateral line entirely horizontal or some rows rising obliquely from below middle part of dorsal fin ..... 20
- 19b. Longitudinal scale rows above lateral line obliquely positioned ..... 22
- 20a. Vomerine tooth patch triangular with a median posterior extension. Preorbital space narrow, 8.6 to 10.3 times in head length. A prominent black spot, larger than eye, bisected by lateral line below posterior part of spinous dorsal fin .....  
..... *L. ehrenbergii* (35 cm TL)
- 20b. Vomerine tooth patch crescentic to triangular without a medial posterior extension. Preorbital space wider, 4.7 to 4.9 times in head length. Black spot on back present or absent ..... 21
- 21a. A large black spot on upper back usually present, if absent ground colour pale .....  
..... *L. johnii* (70 cm TL)
- 21b. Black spot on upper back absent, ground colour dark .....  
.....*L. argentimaculatus* (120 cm TL)
- 22a. Vomerine tooth patch triangular or diamond shaped with a median posterior extension ..... 23
- 22b. Vomerine tooth patch crescentic to triangular without a posterior extension .....  
..... 27
- 23a. Axil of pectoral fin with a distinct black spot on upper portion. A series of 8 to 9 relatively broad orange or yellow stripes on side. Soft dorsal rays usually 15 (sometimes 14, rarely 16). Soft anal rays 9 ..... *L. carponotatus* (40 cm TL)
- 23b. Axil of pectoral fin without a black spot. Colour not as in 23a. Soft dorsal rays usually 13 or 14 (rarely 12). Soft anal rays usually 8 (rarely 9)..... 24
- 24a. 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 side ..... 25

- 24b. Black spot absent. A series of narrow, yellowish longitudinal lines on side, those on upper back slanting upward toward dorsal fin base, sometimes an enlarged dark stripe from eye to middle of caudal fin base ..... 26
- 25a. Soft dorsal fin rays generally 14. A relatively wide gap between temporal scale bands of each side. Spot on upper side situated mainly above lateral line. Juveniles with series of 4 to 7 broad stripes (blackish to orange in life) on side, these persisting as thin stripes in adults ..... *L. russelli* (45 cm TL)
- 25b. Soft dorsal fin rays generally 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. Juveniles without a series of 4 to 7 broad dark stripes on side ..... *L. fulviflamma* (35 cm TL)
- 26a. Mid-lateral stripe generally broader and darker than other stripes on side. Transverse scale rows on cheek 7 to 10 ..... *L. vitta* (40 cm TL)
- 26b. Mid-lateral stripe not broader or darker than other stripes on side, yellow in life and faint or absent in preserved specimens. Transverse scale rows on cheek usually 6 to 7, sometimes 8 ..... *L. madras* (30 cm TL)
- 27a. Total gillrakers on first arch 25 to 30 ..... *L. gibbus* (50 cm TL)
- 27b. Total gillrakers on first arch 14 to 23 ..... 28
- 28a. Soft anal fin rays 10. Dorsal fin with 11 spines and 16 rays (rarely 15). Colour pattern consisting of three dark brown to red transverse bars, although they may be indistinct in large specimens ..... *L. sebae* (100 cm TL)
- 28b. Soft anal fin rays 8 or 9. Dorsal fin elements variable, 10 or 11 spines and 12 to 16 soft rays. Colour not as in 28a ..... 29
- 29a. Preopercular notch distinctive (moderately to well developed) ..... 30
- 29b. Preopercular notch indistinct (shallow or absent) ..... 31
- 30a. Soft dorsal fin rays 15 or 16. Body relatively deep, 2.1 to 2.4 times in standard length. Head generally with numerous wavy lines (bluish in life). A chalky spot usually present on lateral line below junction of spinous and soft parts of dorsal fin, bordered with black in juveniles, but lost with age. Lips thick in large adults .....  
..... *L. rivulatus* (65 cm TL)
- 30b. Soft dorsal fin rays 13 or 14. Body usually more slender, 2.3 to 2.8 times in standard length. Colour not as in 30a. Lips not thick in adults ..... *L. fulvus* ((40 cm TL)
- 31a. Colour pattern consisting of a series of 5 dark stripes on whitish ground colour, 2 or 3 uppermost stripes crossed by dark vertical bars forming a network of light and dark squares. A large dark spot at caudal fin base ..... *L. decussatus* (30 cm TL)

- 31b. Colour pattern not as in 31a ..... 32
- 32a. Nostrils set in prominent groove running forward from eye in specimens exceeding almost 20 cm standard length, specimens under this size usually 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 usually dark brown on upper back grading to tan or light brownish (white or pink in life) ventrally. Dorsal and caudal fins dusky, outer portion of anal and pelvic fins distinctly blackish; upper third of pectoral fin dusky brown. Tongue with a patch of fine granular teeth ..... *L. bohar* (75 cm TL)
- 32b. Nostrils not set in a groove at all sizes. Colour pattern not as in 32a. Tongue smooth or with a patch of granular teeth ..... 33
- 33a. Caudal fin with a distinctive crescentic black marking, remainder of body and fins uniformly yellowish-tan (yellow in life) with a silvery sheen on lower sides .....  
..... *L. lunulatus* (35 cm TL)
- 33b. Caudal fin without a distinctive black marking. Colour of body and fins variable ...  
..... 34
- 34a. A black spot on upper side at level of lateral line below soft dorsal fin (faint or sometimes absent in large adults), remainder of body and fins mainly pale (fins yellow, body pink or yellow in life). Tongue with a patch of fine granular teeth, although sometimes absent in juveniles ..... *L. monostigma* (60 cm TL)
- 34b. Black spot on upper side of body absent, although a saddle or spot sometimes present on upper portion of caudal peduncle. Tongue smooth ..... 35
- 35a. Dorsal spines 10. Soft anal fin rays usually 8, rarely 9. Tongue with a patch of fine granular teeth. Colour variable, pink to grey-brown (tan to brown in preservative); juveniles without black saddle on upper caudal peduncle.....  
..... *L. lemniscatus* (65 cm TL)
- 35b. Dorsal spines usually 11, rarely 10, Soft anal fin rays usually 9, sometimes 8. Tongue smooth. Colour largely reddish (brown in preservative) ; juveniles usually with a black saddle on upper caudal peduncle ..... 36
- 36a. Mouth relatively small, maxilla length much less than distance between base of last dorsal and anal rays. Interorbital width 3.5 to 4.8 times in head length (specimens in excess of 15 cm standard length). Some longitudinal scale rows below lateral line slanting obliquely in posterior direction toward dorsal profile. Head profile convex (in specimens over almost 15 cm standard length)..... *L. erythropterus* (60 cm TL)
- 36b. Mouth larger, maxilla length almost equal to distance between bases of last dorsal and anal rays. Interorbital width 5.1 to 6.6 times in head length (specimens in excess of

12 cm standard length). Longitudinal scale rows below lateral line horizontal, although some rows may slant obliquely in juveniles under almost 10 cm standard length. Head profile straight or slanting concave ..... *L. malabaricus* (100 cm TL)

*Interest to fisheries* : Although the snappers seldom constitute the main focus of major commercial fisheries, they are important component of local artisanal catch throughout geographic range. Snappers are important food fishes but several species are sometimes implicated in cases of human fish poisoning (Ciguatera), including *L. bohar*, *L. fulvus*, *L. gibbus* and *L. monostigma* in the Indian region. The monotypic species, *A. virescens* and *L. carnolabrum* are very common species found in both the coasts of India and are excellent eating fishes. *L. decussatus* and *L. lemniscatus* are usually found in the east coast of India. The largest known species, *L. argentimaculatus* is an important market fish found in both the coasts of India.

### Family CAESIONIDAE

#### Fusiliar fishes

(Fig. 72)

Body oblong to fusiform and moderately compressed. Mouth small and highly protrusible; ascending premaxillary process, a separate ossification from premaxilla and 1 to 2 fingerlike postmaxillary processes; angle of jaw oblique, almost 40° to 50° to horizontal. Dentition

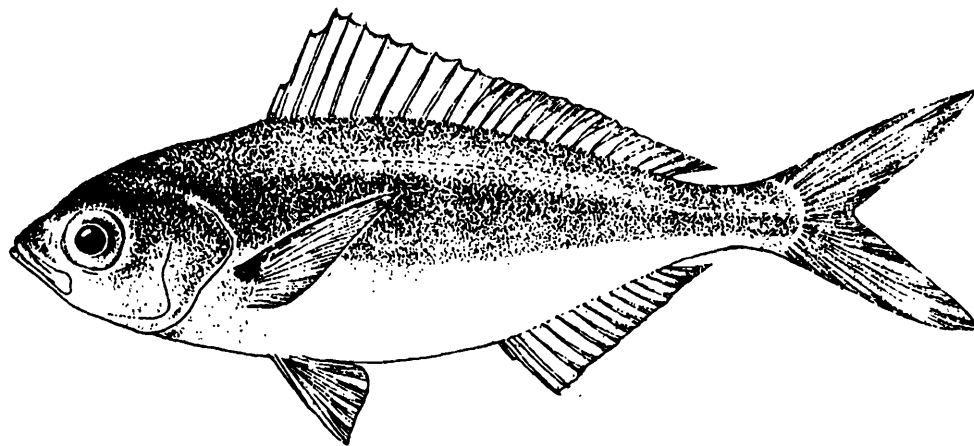


Fig. 72 : *Caesio lunaris* (Cuvier)

variously reduced, small or minute conical teeth; premaxillae, vomer and palatines with or without teeth. Dorsal fin with 10 to 15 slender weak spines and 8 to 22 soft rays. Anal fin with 3 spines and 9 to 13 soft rays. Caudal fin deeply forked. Scales moderate to small, weakly ctenoid; lateral line scales 45 to 88.

#### Species known to occur in Andhra Pradesh

1. *Caesio caerulaurea* Lacepede (Blue- and gold fusilier)

2. *C. cuning* Bloch (Redbelly yellowtail fusilier)
3. *C. lunaris* (Cuvier) (Lunar fusilier)
4. *C. tares* Seale (Yellow and blueback fusilier)
5. *C. xanthonota* Bleeker (Yellowback fusilier)
6. *Dipterygonotus balteatus* (Valenciennes) (Molted fusilier)
7. *Gymnocaesio gymnoptera* (Bleeker) (Slender fusilier)
8. *Pterocaesio chrysozona* (Cuvier) (Goldband fusilier)
9. *P. pisang* (Bleeker) (Banana fusilier)
10. *P. tessellata* Carpenter (One-stripe fusilier)
11. *P. tile* (Cuvier) (Dark-banded fusilier)

#### Key to genera and the species

- 1a. A single postmaxillary process, posterior end of maxilla blunt; its greatest depth posterior to end of premaxilla ..... *Caesio* Lacepede..... 2
- 1b. Two postmaxillary processes, posterior end of maxilla tapered; its greatest depth anterior to end of premaxilla ..... 6
- 2a. Anal fin usually with 3 spines and 11 soft rays ..... 3
- 2b. Anal fin usually with 3 spines and 12 soft rays ..... 4
- 3a. Dorsal fin usually with 10 spines and 15 soft rays. Supratemporal band of scales confluent ..... at dorsal midline. Caudal fin without any prominent blackish marking ..... *C. cuning* (50 cm TL)
- 3b. Dorsal fin usually with 10 spines and 14 soft rays. Supratemporal band of scales interrupted at dorsal midline by a thin scaleless zone. Tips of caudal lobes with a blackish blotch ..... *C. lunaris* (40 cm TL)
- 4a. Lateral line scales 57 to 65. Scale rows on spinous portion of dorsal fin horizontal. Caudal lobes with a black median streak. the tips not markedly darker than streak and caudal fin not yellow ..... *C. caeruleaurea* (35 cm TL)
- 4b. Lateral line scales 51 to 61. Upper scale rows on spinous portion of dorsal fin usually oblique. Caudal fin yellow in life, without blackish marking ..... 5
- 5a. Body yellow dorsally, blue on side, the demarcation horizontal from interorbital space across upper third of body. Predorsal and supratemporal region not considerably darker than dorsal part of caudal peduncle ..... *C. xanthonota* (40 cm TL)

- 5b. Body yellow dorsally, blue on side, the demarcation oblique from slightly anterior to origin of dorsal fin to lower posterior part of caudal peduncle. Predorsal region, particularly supratemporal and interorbital region dark ..... *C. teres* (40 cm TL)
- 6a. Dorsal and anal fins scaled. Premaxilla with small conical teeth, sometimes restricted to front of jaw ..... *Pterocaesio* Bleeker..... 7
- 6b. Dorsal and anal fins without scales. Premaxilla without teeth..... 10
- 7a. Dorsal fin with 11 or 12 (rarely 10) spines and 19 to 22 soft rays. A blackish streak in each caudal lobe ..... *P. tile* (30 cm TL)
- 7b. Dorsal fin with 10 or 11 (usually 10) spines and 14 to 16 soft rays. Tips of caudal lobes with a black blotch ..... 8
- 8a. Dorsal peduncular scales usually 12 or 13 (rarely 11 or 14), lateral line scales 66 to 88. Pectoral rays 20 to 24 (always most frequently 21 or above); scales above lateral line to dorsal fin origin 9 to 11; scales below lateral line to anal fin origin usually 16 to 18. Side with 1 longitudinal stripe covering lateral line for most its length, on caudal peduncle above lateral line ..... *P. tessellata* (25 cm TL)
- 8b. Dorsal peduncular scales usually 11 (rarely 10, 12 or 13), lateral line scales 62 to 72. Pectoral rays 17 to 21 (rarely 22, most frequently 19 or 20); scales above lateral line to dorsal fin origin usually 8 or 9; scales below lateral line to anal fin origin usually 13 to 17. Side with or without stripes ..... 9
- 9a. Body without stripes on side, its colour reddish or greenish blue .....  
..... *P. pisang* (21 cm TL)
- 9b. Body with 1 or 2 yellow longitudinal stripes on side in life .....  
..... *P. chrysozona* (21 cm TL)
- 10a. Dorsal fin with 10 or 11 (usually 10) spines and 14 to 16 (usually 15) soft rays, the fin not deeply notched. Anal fin with 3 spines and 11 to 13 (usually 12) soft rays. Pectoral rays 20 to 22 ..... *G. gymnoptera* (18 cm TL)
- 10b. Dorsal fin with 12 to 15 (usually 14) spines and 8 to 11 (usually 10) soft rays, the fin deeply notched, the last few spines joined only at base by fin membrane. Anal fin with 3 spines and 9 to 11 (usually 10) soft rays. Pectoral rays 16 to 19 .....  
..... *D. balteatus* (14 cm TL)

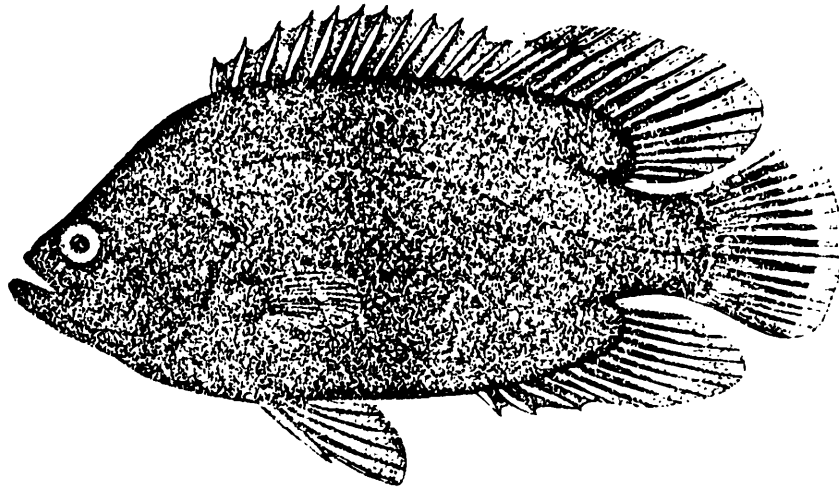
*Interest to fisheries* : The fusiliers are minor to moderate important to coastal fisheries *C. lunaris* is found along the both coasts of India. The rest of the fusiliers found in Andhra Pradesh is mainly available in the east coast of India. *D. balteatus* is the smallest known species of all fusiliers.

## Family LOBOTIDAE

**Tripletail**

(Fig. 73)

Body deep, more or less compressed, oblong with fairly large, weakly ctenoid scales. Depth of body much greater than length of head. Upper jaw slightly protrusible, jaws with an outer row of short, close-set canines and an inner band of much smaller teeth; vomer, palatines and tongue without tooth. Preopercle coarsely serrated and opercle with 1 or 2 flat



**Fig. 73** : *Lobotes surinamensis* (Bloch)

spines. Dorsal fin very long and broadly rounded with 11 to 13 spines and 13 to 16 soft rays. Anal fin very long and broadly rounded with 3 spines and 9 to 12 soft rays. Caudal fin rounded. Rounded broad soft dorsal and anal fins reaching past caudal fin base, giving the fish the appearance of possessing three tails.

**Species known to occur in Andhra Pradesh**

*Lobotes surinamensis* (Bloch) (Tripletail) (100 cm TL)

*Interest to fisheries* : The tripletail fish is a valuable foodfish due to its quality of flesh, although it is never found in large quantities. It is marketed fresh.

## Family GERREIDAE

**Silver-biddis, Mojarras**

(Fig. 74)

Body compressed and elevated with large deciduous scales. Mouth highly protractile, projecting downwards when protracted. Single dorsal with 9 to 10 spines and 9 to 15 soft rays. Anal fin with 3 to 5 spines and 7 to 18 soft rays (typically 10). Dorsal and anal fin bases

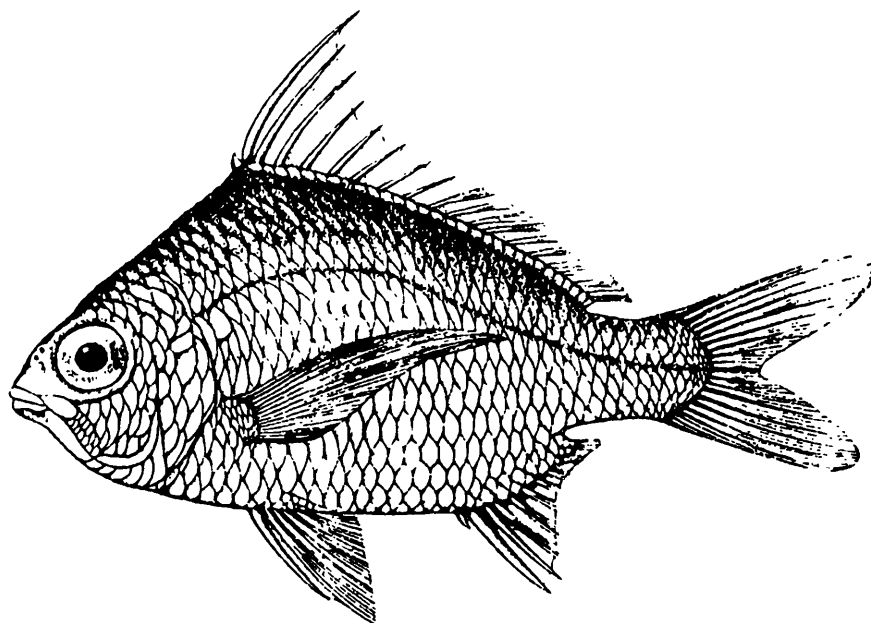


Fig. 74 : *Gerres abbreviatus* Bleeker

with an elevated scaly sheath. Pelvic fin with 1 spine and 5 rays, a scaled flap present at the base of spine. Pectoral fins long and pointed. Lateral line complete with 33 to 48 scales. Caudal fin forked.

#### Species known to occur in Andhra Pradesh

1. *Gerres abbreviatus* Bleeker (Deepbody mojarrah)
2. *G. acinaces* Bleeker (Longtail silver-biddy)
3. *G. filamentosus* Cuvier (Whiplin mojarrah) (Jaggari)
4. *G. lucidus* Cuvier (Saddleback silver-biddy)
5. *G. oblongus* Cuvier (Slender silver-biddy)
6. *G. oyena* Forsskal (Common silver-biddy)
7. *G. poeti* Cuvier (Silver mojarrah)
8. *G. setifer* (Hamilton Buchanan) (Black-tipped mojarrah)
9. *G. macracanthus* Bleeker (Longfin mojarrah)
10. *Pentaprion longimanus* (Cantor) (Longfin mojarrah)

#### Key to the species

- 1a. Anal fin with 5 spines and 12 to 14 soft rays ..... *P. longimanus* (15 cm TL)
- 1b. Anal fin with 3 spines and 7 soft rays ..... 2
- 2a. Dorsal fin with 10 spines ..... *G. setifer* (20 cm TL)

- 2b. Dorsal fin with 9 spines ..... 3
- 3a. Second dorsal fin spine greatly elongated forming a long filament, longer than head ..... 4
- 3b. Second dorsal fin spine not greatly elongated and forming filamentous structure, usually much less than head ..... 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* (25 cm TL)
- 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* (22 cm TL)
- 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 2.9) in standard length .... 7
- 6a. 3.5 rows of scales between lateral line and base of 5th dorsal spine. Lateral line scales 35 to 39 ..... *G. oyena* (25 cm TL)
- 6b. 4.5 to 5.5 rows of scales between lateral line and base of 5th dorsal spine. Lateral line scales 44 to 48 ..... *G. oblongus* (30 cm TL)
- 7a. Pectoral fin short, not extending up to origin of anal fin ..... *G. lucidus* (15 cm TL)
- 7b. Pectoral fin relatively longer, extending up to origin of anal fin ..... 8
- 8a. Caudal fin deeply forked, relatively longer, its longest ray longer than head length. 4.5 to 5.5 rows of scale between lateral line and base of 5th dorsal spine ..... *G. acinaces* (35 cm TL)
- 8b. Caudal fin forked, relatively shorter, its longest ray shorter than head length. 4 rows of scale between lateral line and 5th dorsal spine ..... 9
- 9a. Body deep, its depth 1.9 to 2.3 times in standard length, forming a sharp angle at dorsal fin origin. Lateral line scales 38 to 41 ..... *G. abbreviatus* (25 cm TL)
- 9b. Body oblong, its depth 2.2 to 2.8 times in standard length. Lateral line scales 34 to 38. .... *G. poeti* (20 cm TL)

*Interest to fisheries* : The silver-biddies are of commercially important fishes among the perches. These fishes are marketed fresh and their flesh is excellent for human consumption.

Family HAEMULIDAE (= POMADASYIDAE)

**Grunts, Sweetlips, Hotlips**

(Fig. 75)

Body oblong and compressed with small or moderate ctenoid scales. Mouth small or moderate with thick lips, tip of upper jaw hidden when mouth closed. Chin with 2 pores

anteriorly and a median pore, or 6 pores and no pit in *Plectorhinchus*. Preopercle with a slightly concave and serrated border, opercle with one indistinct spine. Dorsal fin with 9 to 15 strong spines and 12 to 26 soft rays. Pectoral fins long, its first ray sometimes forming a short filament. Pelvic fins inserted below pectoral fin base, 1 spine and 5 soft rays. Anal fin with 3 spines, the second often very strong and 7 to 9 soft rays. Caudal fin truncate or emarginate (rounded in juveniles).

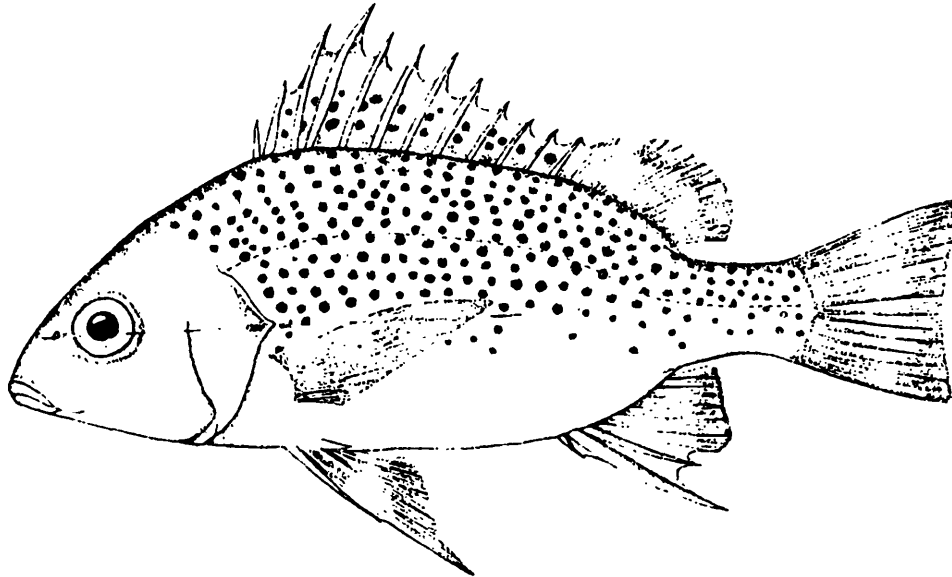


Fig. 75 : *Pomadasys argenteus* (Forsskal)

#### Species known to occur in Andhra Pradesh

1. *Diagramma pictum* (Thunberg) (Pointed sweetlips)
2. *Plectorhinchus gibbosus* (Lacepede) (Harry hotlips)
3. *P. griseus* (Cuvier) (Grey sweetlips)
4. *P. orientalis* (Bloch) (Oriental sweetlips)
5. *P. pictus* (Tortonnesse) (Trout sweetlips)
6. *P. polytaenia* (Bleeker) (Ribboned sweetlips)
7. *P. schotaf* (Forsskal) (Minstrel sweetlips)
8. *Pomadasys argenteus* (Forsskal) (Silver grunt)
9. *P. argyreus* (Valenciennes) (Bluecheck silver grunt)
10. *P. commersonni* (Lacepede) (Small spotted grunt)
11. *P. furcatus* (Schneider) (Banded grunt) (Gorakka)
12. *P. kaakan* (Cuvier) (Javelin grunt) (Gorakka)

13. *P. maculatum* (Bloch) (Saddle grunt)

14. *P. olivaceum* (Day) (Olive grunt)

**Key to the genera and species**

- 1a. Chin with 2 pores followed by a pit containing a pore on each side. Fin spines strong, second anal spine often enlarged ..... *Pomadasys*..... 2
- 1b. Chin with 6 pores and no median pit containing a pore on each side. Fin spines often weak ..... 9
- 2a. A vertical black band almost 8 scales wide, over nape, terminating about 3 scales below lateral line; about 6 black blotches posterior to the vertical band. Spinous part of dorsal fin with a large black blotch ..... *P. maculatum* (50 cm TL)
- 2b. Colour pattern not as 2a ..... 3
- 3a. Anal fin rays 11 to 13. A dark blotch margined with yellow anteriorly at upper corner of gill cover ..... *P. olivaceum* (31 cm TL)
- 3b. Anal fin rays 10 or less ..... 4
- 4a. A row of interradiial scales behind dorsal and anal fin rays, above the basal sheath; about 6 dark stripes on back and flanks ..... *P. furcatus* (38 cm TL)
- 4b. No row or rows of fine scales behind the dorsal or anal fin rays ..... 5
- 5a. Body with prominent dark or beige spots, lines of strips ..... 6
- 5b. Body uniformly silvery, bronze or darker, no spots or lines; a dark spot may be present on opercle ..... 8
- 6a. Spots on body arranged in somewhat thin, longitudinal irregular wavy lines .....  
..... *P. argenteus* (Juvelines)
- 6b. Body and fins with scattered round spots not forming regular wavy lines ..... 7
- 7a. Spots only on body, absent on head and snout. Anal fin with 8 to 10 rays .....  
..... *P. commersonni* (50 cm TL)
- 7b. Spots only body, absent on head and snout. Anal fin rays 7½ (rarely 8).....  
..... *P. argenteus* (adult) (52 cm TL)
- 8a. Dorsal fin with 14 rays (rarely 13). 7 transverse scales between lateral line and first dorsal fin spine. Spinous part often spotted ..... *P. kaakan* (80 cm TL)
- 8b. Dorsal fin with 13 rays. 6 transverse scales between lateral line and first dorsal fin spine. Spinous part of dorsal fin never spotted ..... *P. argyreus* (40 cm TL)

- 9a. 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* (60 cm TL)
- 9b. Dorsal fin with 11 to 14 spines and 14 to 23 soft rays. 10 to 17 scales between lateral line and dorsal fin origin ..... *Plectorhinchus*..... 10
- 10a. Body uniformly grey, brownish or olive, with or without a paler caudal fin or dark tips to fins ..... 11
- 10b. Body not uniformly coloured ..... 13
- 11a. Dorsal fin with 14 spines ..... *P. gibbosus* (70 cm TL)
- 11b. Dorsal fin with 12 to 13 spines ..... 12
- 12a. Pectoral fin length shorter than distance from snout tip to posterior eye margin. 21 to 23 dorsal fin rays ..... *P. griseus* (50 cm TL)
- 12b. Pectoral fin length longer than distance from snout tip to posterior eye margin .....  
..... *P. schotaf* (80 cm TL)
- 13a. Body with distinct spots ..... *P. pictus* (60 cm TL)
- 13b. Colour pattern including large blotches, longitudinal stripes and/or small spots .... 14
- 14a. Body with large blotches ..... *P. orientalis* (Juveniles)
- 14b. Body without large blotches ..... 15
- 15a. Regular dark or light horizontal stripes along body .....  
..... *P. orientalis* (adult) (50 cm TL)
- 15b. Yellow stripes along body or on head only ..... *P. polytaenia* (40 cm TL)

*Interest to fisheries* : The grunts are very good food fishes and are of important commercial value. These fishes are marketed fresh or dry-salted.

Family SPARIDAE  
**Seabreams, Stumpnoses**  
 (Fig. 76)

Oblong body, somewhat deep and compressed. Head usually with a steep dorsal profile and snout scaleless. Cheeks scaly, preopercle with or without scales, without spines or serrations on margin. Mouth sub-horizontal and slightly protrusible, maxilla not extending beyond the middle of orbit. Posterior tip of premaxilla overlapping maxilla. Jaw teeth well developed, differentiated into either conical (canine-like) or flattened (incisor-like), and generally rounded, molar-like. Dorsal fin with 10 to 13 spines and 9 to 13 soft rays, anterior spines sometimes elongate or filamentous. Anal fin with 3 spines and 7 to 15 soft rays, spines, particularly the second, usually stout. Pectoral fins generally long and pointed. Pelvic fins inserted below or

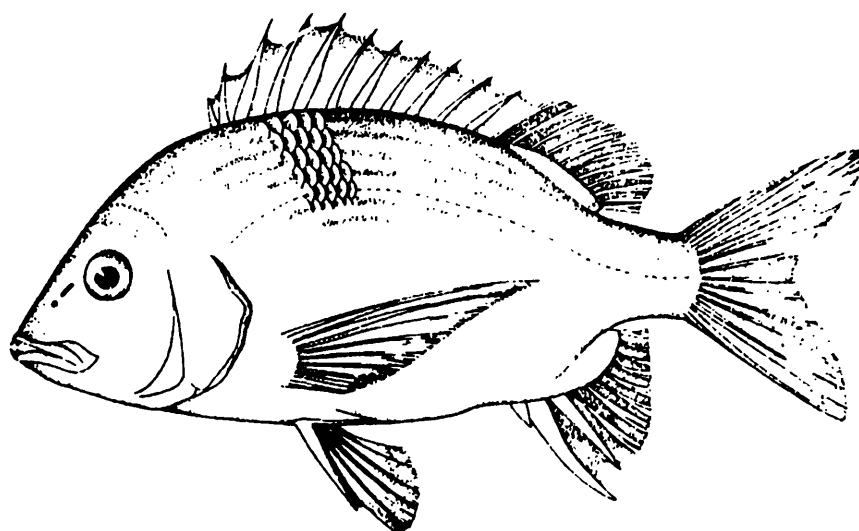


Fig. 76 : *Acanthopagrus berda* (Forsskal)

just posterior to pectoral fin bases, with 1 spines and 5 soft rays, with an axillary scale at their base. Caudal fin somewhat deeply emarginate or forked. Scales cycloid or weakly ctenoid. Lateral line extending from superior angle of operculum to caudal fin base.

#### Species known to occur in Andhra Pradesh

1. *Acanthopagrus berda* (Forsskal) (Picnic seabream) (calamara).
2. *A. bifasciatus* (Forsskal) (Two-bar seabream)
3. *A. latus* (Houttuyn)
4. *Argyrops spinifer* (Forsskal) (Longspine seabream) (Kooroota)
5. *Rhabdosargus sarba* (Forsskal) (Goldlined seabream) (Chitchillee)

#### Key to the genera and species

- 1a. Head between eyes scaly (scaling reaching beyond level of vertical diameter of eye) ..... *A. spinifer* (65 cm TL)
- 1b. Head between eyes naked (scales ending at or behind level of vertical eye diameter) ..... 2
- 2a. More than 5 scales between lateral line and 4th dorsal spine. Dorsal spines usually slender, not appearing alternately broad and narrow on each side. One enlarged molar posteriorly on each jaw ..... *R. sarba* (60 cm TL)
- 2b. 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 ..... *Acanthopagrus* Peters.....3

- 3a. Head with two bars across head, the first through eye and second from nape to opercle ..... *A. bifasciatus* (50 cm TL)
- 3b. Head without markings, or at most with a dark band between eyes ..... 4
- 4a. 6 series of preopercular scales. Depth of body less than 2.4 times standard length. Body dusky grey above, silvery white below, with anal and caudal fins blackish grey; no silvery margins to scales and no dark spot at origin of lateral line ..... *A. berda* (75 cm TL)
- 4b. 4 or 5 series of preopercular scales. Depth of body greater than 2.4 times in standard length. Anal and lower caudal fins yellow. Scales with dark bases and silvery margins (particularly above lateral line) and a dark spot at origin of lateral line ..... *A. latus* (45 cm TL)

*Interest to fisheries* : Seabreams are excellent food fishes and of great economic value in India.

Family LETHRINIDAE  
**Emperor fishes and large-eye breams**  
 (Fig. 77)

Body generally oblong and laterally compressed. Mouth small to moderate, terminal, lips often soft and fleshy; the upper jaw protrusible. An outer row of canine teeth in front of both jaws, on sides the teeth are conical or molar like; an inner row of villiform teeth anteriorly and vomer and palatine toothless. Dorsal fin continuous with 10 spines and 9 to 10 soft rays. Anal fin with 3 spines and 8 to 10 soft rays. Caudal fin emarginate or forked, with 7 to 9 procurrent caudal rays. Scales finely ctenoid.

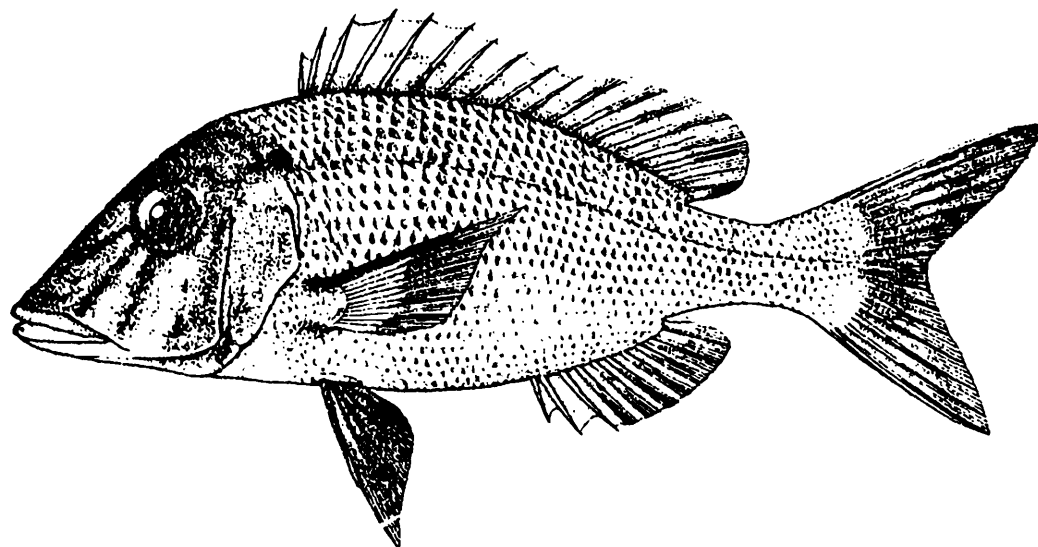


Fig. 77 : *Gnathodentex aurolineatus* (Lacepede)

**Species known to occur in Andhra Pradesh**

1. *Gnathodentex aurolineatus* (Lacepede) (Striped large-eye bream)
2. *Gymnocranius elongatus* Senta (Forktail large eye bream)
3. *G. grandoculis* (Valenciennes) (Blue-line large-eye bream)
4. *Monotaxis grandoculis* (Forsskal) (Humpnoss big-eye bream)
5. *Wattsia mossambica* (Smith) (Mozambique large-eye bream)

**Key to the genera and species**

- 1a. Generally 9 soft rays in anal fin ..... 2
- 1b. Generally 10 soft rays in anal fin ..... 3
- 2a. Sides of jaws with round, flat molars preceded by a patch of small teeth and an anterior series of canines. Profile of head in front of eye strongly convex. Pectoral fin with 14 soft rays, inner surface of pectoral fin base scaled. No longitudinal stripes on body ..... *M. grandoculis* (60 cm TL)
- 2b. Each jaw with a narrow band and of villiform teeth, an outer series of conical teeth and a series of canines at front of both jaws. Profile of head in front of eye slightly convex or straight. Pectoral fin with 15 soft rays, inner surface of pectoral fin base scaleless. Body with yellow longitudinal stripes ..... *G. aurolineatus* (30 cm TL)
- 3a. Maxilla with a strong denticulated longitudinal ridge. Caudal fin lobes rounded ..... *W. mossambica* (55 cm TL)
- 3b. Maxilla surface smooth. Caudal fin lobes almost pointed ..... *Gymnocranius* Klunzinger.....4
- 4a. Caudal fin strongly forked, the median rays shorter than eye diameter; lower margin of eye intersected by line from tip of snout to middle of caudal fin fork ..... *G. elongatus* (35 cm TL).
- 4b. Caudal fin moderately forked, the median rays much longer than eye diameter. Lower margin of eye above line from tip of snout to middle of caudal fin fork ..... *G. grandoculis* (80 cm TL)

*Interest of fisheries* : The fishes of the family Icthrinidae are an important component of commercial, recreational and artisanal fisheries, although the degree of importance varies. *Gymnocranius grandoculis* is found along both the coasts of India and it is a good potential commercial fish.

Family NEMIPTERIDAE  
**Threadfin breams, Whiptail breams, Monocle breams,  
 Dwarf monocle breams and coral breams**  
 (Fig. 78)

Body elongate to moderately deep and compressed. Mouth terminal, small to moderate; premaxillaries moderately protrusible. A single continuous dorsal fin with 10 spines and 9 soft rays. Anal fin with 3 spines and 7 soft rays. Caudal fin emarginate, forked, lunate or falcate; the upper and/or lower tips of the fin with or without pointed or filamentous extensions. Scales finely ctenoid.

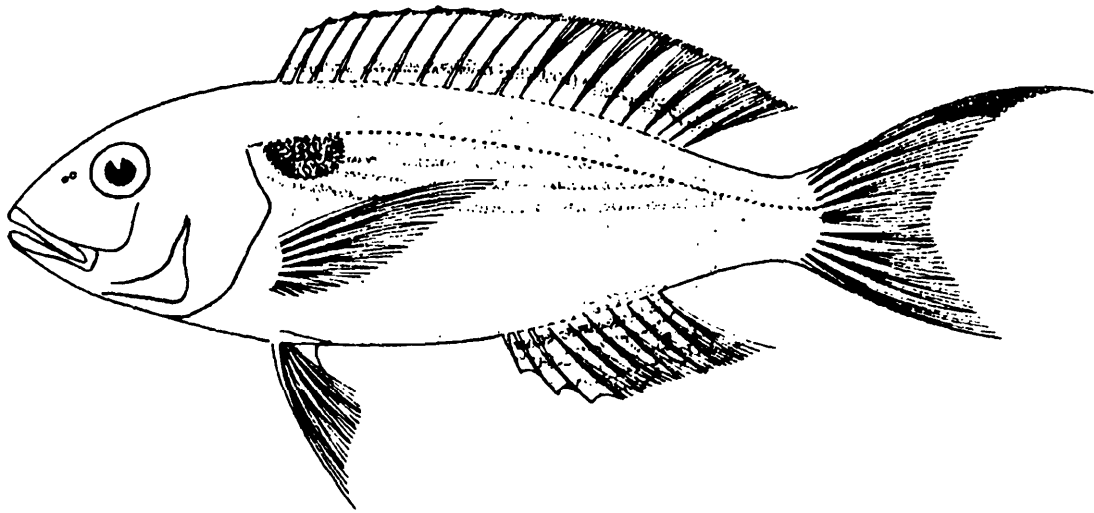


Fig. 78 : *Nemipterus japonicus* (Bloch)

**Species known to occur in Andhra Pradesh**

1. *Nemipterus bipunctatus* (Ehrenberg) (Delagoa threadfin bream)
2. *N. japonicus* (Bloch) (Japanese threadfin bream)
3. *N. nematophorus* (Bleeker) (Dobblewhip threadfin bream)
4. *N. peronii* (Valenciennes) (Notchedfin threadfin bream)
5. *N. randalli* Russell (Randal's threadfin bream)
6. *N. zysron* (Bleeker) (Slender threadfin bream)
7. *Parascolopsis aspinosa* (Rao & Rao) (Smooth dwarf monocle bream)
8. *P. boesemani* (Rao & Rao) (Redfin dwarf monocle bream)
9. *P. inermis* (Schlegel) (Unarmed dwarf monocle bream)
10. *Scolopsis bimaculatus* Ruppell (Thumbprint monocle bream)
11. *S. vosmeri* (Bloch) (Whitecheck monocle bream)

**Key to the genera and species**

- 1a. Suborbital naked, with a large backwardly pointing spine and a series of smaller spines or serrations on its posterior margin. Posterior margin of preopercle coarsely denticulate or serrate. Canine teeth absent ..... *Scolopsis* Cuvier.....2
- 1b. Suborbital scaly or naked, spine weak or absent; posterior margin of suborbital smooth, finely serrate, or with a small denticulations. Posterior margin of preopercle finely denticulate or smooth. Canine teeth in jaws absent, or present only anteriorly ..... 3
- 2a. Small antrose spine or bony ridge present below eye ..... *S. vosmeri* (16 cm SL)
- 2b. Small antrose spine or bony ridge below eye absent ..... *S. himaculatus* (25 cm SL)
- 3a. Suborbital spine weak or absent. 4 to 6 transverse scale rows on preopercle .....  
..... *Parascolopsis* Boulenger...4
- 3b. Suborbital spine absent. 3 transverse scale rows on preopercle .....  
..... *Nemipterus* Swainson...6
- 4a. Head scales reaching forward to about middle of eyes, or between middle and anterior margin of eyes ..... *P. inermis* (18 cm SL)
- 4b. Head scales reaching forward to or in front of anterior margin of eyes ..... 5
- 5a. Posterior margin of suborbital smooth or with just a few tiny spines. Black blotch at base of middle of dorsal fin (colour retained in preserved specimens) .....  
..... *P. aspinosa* (17 cm SL)
- 5b. Posterior and anterior margin of suborbital finely denticulate. Red spot between seventh and tenth dorsal spines (colour not retained in preserved specimens) .....  
..... *P. boesemani* (9.1 cm SL)
- 6a. First two dorsal spines close together, almost fused, produced to form a very long filament ..... *N. nematophorus* (20 cm SL)
- 6b. First two dorsal spines separated by a membrane, not produced into a long filament, and shorter than the following spines ..... 7
- 7a. Membrane between dorsal spines deeply incised ..... *N. peronii* (26.5 cm SL)
- 7b. Membrane between dorsal spines continuous or only slightly emarginate ..... 8
- 8a. Upper lobe of caudal fin pointed or rounded, not produced .....  
..... *N. bipunctatus* (20 cm SL)
- 8b. Upper lobe of caudal fin produced to an elongate point, falcate or extended into a narrow filament ..... 9

- 9a. Pelvic fins very long, reaching to or beyond level of origin of anal fin .....  
 ..... *N. randalli* (18.5 cm SL)
- 9b. Pelvic fins short or moderately long, not reaching to level of origin of anal fin .....  
 ..... 10
- 10a. Pectoral fins very long, reaching to or beyond level of origin of anal fin .....  
 ..... *N. japonicus* (25 cm SL)
- 10b. Pectoral fins short or moderately long, not reaching to level of origin of anal fin .....  
 ..... *N. zysron* (18.5 cm SL)

*Interest to fisheries* : The fishes of the genus *Nemipterus* are important in fisheries. They are marketed mainly fresh and also salted and dried, dry-smoked, fermented and steamed. No major fishery exists for the fishes of the genera *Parascolopsis* and *Scolopsis*.

*Remarks* : Species of the genus *Parascolopsis* have been assigned to the genus *Scolopsis* by earlier authors.

Family SCIAENIDAE  
**Croakers, Drums, Meagres, Weakfishes**  
 (Fig. 79)

Body elongate and moderately compressed. Head and body scaled except at extreme tip of snout. Sensory pores usually conspicuous on snout tip (rostral pores), on lower margin of snout (Marginal pores) and on chin (mental pores). 1 or 2 mental barbels sometimes present on chin. Snout rounded or bluntly pointed. Teeth generally smaller, but outer teeth of upper jaw and sometimes inner teeth of lower jaw enlarged; canines may be present. Dorsal fin usually long, continuous, with a deep notch between anterior (spinous) and posterior (soft) parts. The spinous part with 8 to 10 spines (usually 10) and posterior part with 1 spine and 21 to 34 soft rays. Anal fin with 2 spines, the second spine may be greatly enlarged and

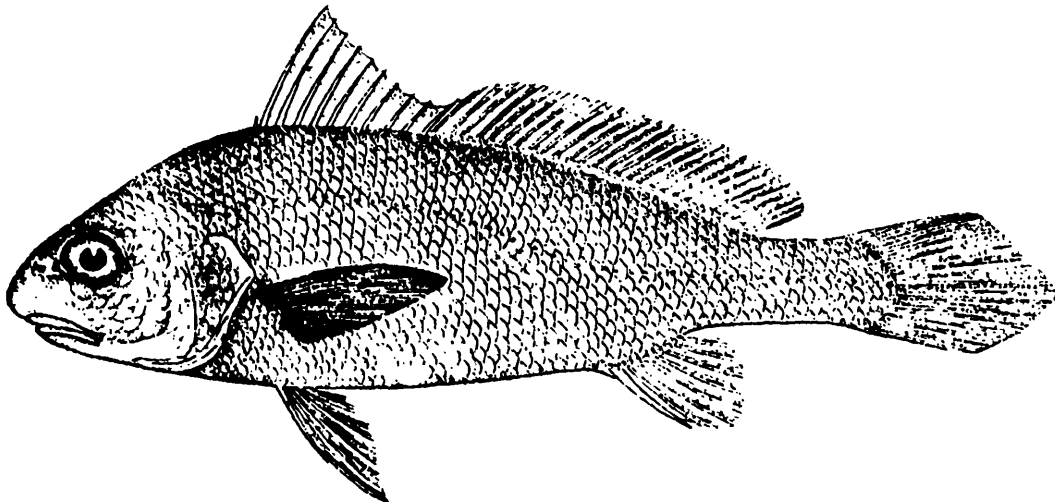


Fig. 79 : *Johnnieops aneus* (Bloch)

strong. Caudal fin emarginate to pointed, but never deeply forked. Lateral line scales extending up to posterior border of caudal fin. Head with cycloid and body with ctenoid scales.

### Species known to occur in Andhra Pradesh

1. *Atrobucca nibe* (Jordan & Thompson) (Black mouth croaker) (Gorasa)
2. *Chrysochir aureus* (Richardson) (Reeve's croaker)
3. *Dendrophysa russelli* (Cuvier) (Goatee croaker) (Qualar-katchelle)
4. *Johnieops aneus* (Bloch) (Greyfin croaker)
5. *J. dussumieri* (Cuvier) (Dussumier's croaker) (Gorassa)
6. *J. macrorhynchus* (Mohan) (Bigsnout croaker)
7. *J. sina* (Cuvier) (Sin croaker)
8. *J. vogleri* (Bleeker) (Sharptooth hammer croaker) (Gorasa)
9. *Johnius belangeri* (Cuvier) (Belanger's croaker)
10. *J. carouna* (Cuvier) (Caroun Croaker)
11. *J. carutta* Bloch (Karut croaker) (Nalla gorasa)
12. *J. dussumieri* (Valenciennes) (Bearded croaker) (Gorasa)
13. *J. elongatus* Mohan (Spindle croaker)
14. *J. macropterus* (Bleeker) (Large fin croaker)
15. *Kathala axillaris* (Cuvier) (Kathala croaker) (Gorasa)
16. *Nibea albida* (Cuvier) (two-brearded croaker)
17. *N. maculata* (Schneider) (Bloched croaker) (Macha gorasa)
18. *N. soldado* (Lacepede) (Soldier croaker) (Tellakatchelle)
19. *Otolithes cuvieri* (Trewavas) (Lasser tigertooth croaker)
20. *O. rubber* (Schneider) (Tigertooth croaker) (Villi gorasa)
21. *Otolithoides biauritus* (Cantor) (Bronza croaker)
22. *Panna microdon* (Bleeker) (Panna croaker)
23. *Paranibea semiluctuosa* (Cuvier) (Half mourning croaker)
24. *Pennahia macrophthalmus* (Bleeker) (Bigeye croaker)
25. *Protonibea diacanthus* (Lacepede) (Spotted croaker)
26. *Pterotolithus maculatus* (Kuhl & van Hasselt) (Bloched tigertooth croaker) (Gorasalu)

### Key to the genera and species

- 1a. Swimbladder with 1 or 2 pair or simple or branched arborescent appendages ..... 2
- 1b. Swimbladder with more than 2 pairs of arborescent appendages ..... 4
- 2a. Swimbladder appendages extended in front of transverse septum into head. Lower gillrakers 19 to 23. .... *K. axillaris* (27 cm TL)
- 2b. Swimbladder appendages with at least the main part lying parallel to the bladder. Lower gillrakers 11 to 13. .... 3
- 3a. Swimbladder appendages arising from posterior end of the bladder ..... *O. biauritus* (160 cm TL)
- 3b. Swimbladder appendages arising from anterior end of the bladder and immediately branched ..... *P. microdon* (30 cm TL)
- 4a. Swimbladder carrot shaped ..... 5
- 4b. Swimbladder hammer shaped ..... 16
- 5a. Anterior pair of arborescent appendages of swimbladder branching on posterior surface of transverse septum and not entering the head ..... 6
- 5b. Anterior pair of swimbladder appendages extending into the head and branching under the skull ..... 12
- 6a. 1 or 2 pair of outstanding canine teeth in upper or both jaws ..... 7
- 6b. No outstanding canine teeth present in jaws ..... 10
- 7a. Canine teeth in upper jaws only. Mouth inferior ..... *C. aureus*
- 7b. Canine teeth in both jaws. Mouth terminal or lower jaw projecting ..... 8
- 8a. Anal fin with 10 to 12 rays ..... *P. maculatus*
- 8b. Anal fin with 7 to 8 rays ..... 9
- 9a. Swimbladder with 28 pairs of appendages. Lower gillrakers 12 to 14. Body depth 2.25 to 4.50 in standard length ..... *O. cuvieri* (30 cm TL)
- 9b. Swimbladder with 32 to 36 pair of appendages. Lower gillrakers 8 to 11. Body depth 4 to 5 times in standard length ..... *O. ruber* (70 cm TL)
- 10a. Pores on chin of the 'false five' pattern those of first pair close together behind tip of jaw and united by a groove. Lower fins dark ..... *P. diacanthus* (120 cm TL)
- 10b. First pair of pores small, in front of chin 1 on each side of tip of jaw, not united by a groove. 1 or 2 pairs behind them. Second anal spine weak ..... 11

- 11a. Swimbladder appendages wing-like, without a well developed dorsal limb, the posterior ones parallel to wall of bladder ..... *P. macrophthalmus* (30 cm TL)
- 11b. Swimbladder appendages each with a short or long branched dorsal limb as well as ventral limb, posterior appendages simple, very short, at right angle to the wall of bladder ..... *A. nibe*
- 12a. Lower jaw with a single mental barbel ..... *D. russelli* (25 cm TL)
- 12b. No barbel on chin ..... 13
- 13a. Lower jaw teeth uniformly small ..... *P. semiluctuosa* (40 cm TL)
- 13b. Lower jaw teeth well differentiated in size, the lower inner row enlarged ..... 14
- 14a. A distinctive colour pattern of 4 to 5 broad, dark, broken bars or bands extending obliquely from back to lower part of flanks. A blotch on top of caudal peduncle....  
..... *N. maculata* (30 cm TL)
- 14b. No distinctive colour pattern as in 13a..... 15
- 15a. Soft dorsal fin rays 28 to 31 ..... *N. soldado* (60 cm TL)
- 15b. Soft dorsal fin rays 24 ..... *N. albida* (36 cm TL)
- 16a. Inner lower teeth more or less enlarged, spaced; upper outer teeth enlarged and widely spaced. Mouth usually subterminal. Gillrakers 9 to 20 on first arch .....  
..... *Johnieops* Mohan ...17
- 16b. Teeth of lower jaw subequal, upper outer teeth not widely spaced. Mouth inferior. Gillrakers 5 to 13 on first arch ..... *Johnius* Bloch...21
- 17a. Inner row of teeth in lower jaw developed and spaced. Mouth terminal.....  
..... *J. vogleri* (30 cm TL)
- 17b. Inner row of teeth moderately or slightly enlarged. Mouth subterminal to inferior ...  
..... 18
- 18a. Lower gillrakers 5 to 8. Outer upper row of teeth slightly enlarged and not widely spaced..... *J. macrorhynchus* (30 cm TL)
- 18b. Lower gillrakers 10 to 15. Outer upper row of teeth clearly enlarged and widely spaced  
..... 19
- 19a. Snout and preorbital inflated. Teeth not well differentiated in size in jaws .....  
..... *J. dussumieri* (40 cm TL)
- 19b. Snout decurved but not inflated ..... 20
- 20a. Teeth well differentiated in size in both jaws ..... *J. sina* (30 cm TL)
- 20b. Teeth slightly differentiated in size in both jaws ..... *J. aneus* (25 cm TL)

- 21a. A barbels on chin ..... 22
- 21b. No barbel on chin ..... 23
- 22a. Scale on body ctenoid. Soft dorsal fin rays 30 to 35 ..... *J. macropterus* (25 cm TL)
- 22b. Scale on body cycloid. Soft dorsal fin rays 22 to 26 ..... *J. dussumieri* (25 cm TL)
- 23a. Snout steeply rounded, not projecting ..... 24
- 23b. Snout swollen, projecting ..... 25
- 24a. Second anal spine rather strong and about 50% of head length. Swimbladder with 11 to 15 arborescent appendages ..... *J. belangeri* (30 cm TL)
- 24b. Second anal spine weak, about 25% of head length. Swimbladder with 16 arborescent appendages ..... *J. carutta* (30 cm TL)
- 25a. Gillrakers 5 to 7. Dorsal fin rays 25 to 27. Swimbladder with 13 arborescent appendages. Body depth 24 to 28% of standard length ..... *J. elongatus* (30 cm TL)
- 25b. Gillrakers 8 to 13. Dorsal fin rays 26 to 29. Swimbladder with 15 pairs of arborescent appendages. Body depth 27 to 30% of standard length ..... *J. carouna* (25 cm TL)

*Interest to fisheries* : The croakers are very important commercial fishes which rank fifth in the quantitative abundance of the marine fishes of our country. Large fishes are usually esteemed as food fishes and transported to different markets. The most profitable by-product of these fishes are probably the swimbladders, called maws in the trade. The maws are utilised in the preparation of isinglass, a substance used in the clarification of wine and beer, as a substitute for gelatin in confectionary and for the preparation of certain cements.

### Family MULLIDAE

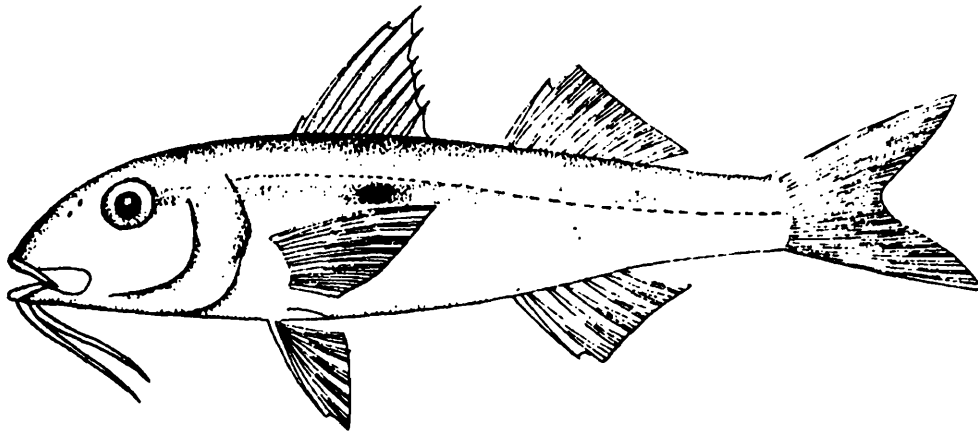
#### Goatfishes

(Fig. 80)

Body elongate and more or less compressed. Eyes situated near dorsal profile on head. Two long barbels present on chin. Two well separated dorsal fins, the first with 7 to 8 slender spines (first spine often very small) and the second with 9 rays (first unbranched). Anal fin with spine and 6 rays. Caudal fin with 13 branched rays and deeply forked.

#### Species known to occur in Andhra Pradesh

1. *Mulloidichthys flavolineatus* (Lacepede) (Yellowstripe goatfish)
2. *M. vanicolensis* (Valenciennes) (Yellowfin goatfish)
3. *Parupeneus barberinus* (Lacepede) (Dash-and dot goatfish)



**Fig. 80** : *Mulloides flavolineatus* (Lacepede)

4. *P. bifasciatus* (Lacepede) (Doublebar goatfish)
5. *P. heptacanthus* (Lacepede) (Cinnabar goatfish)
6. *P. cyclostomus* (Lacepede) (Goldsaddle goatfish)
7. *P. indicus* (Shaw) (Indian goatfish) (Rahtee goolwinda)
8. *P. macronema* (Lacepede) (Longbarbel goatfish)
9. *Upeneus bensasi* (Temminck & Schlegel) (Bensasi goatfish)
10. *U. moluccensis* (Bleeker) (Goldband goatfish)
11. *U. sulphureus* Cuvier (Sulphur goatfish) (Rahtee goolirinda)
12. *U. sundaicus* (Bleeker) (Ochreband goatfish)
13. *U. taeniopterus* Cuvier (Finstripe goatfish)
14. *U. tragula* Richardson (Freckled goatfish)
15. *U. vittatus* (Forsskal) (Striped goatfish)

**Key to the genera and species**

- 1a. Teeth present on vomer and palatines. Both dorsal fins with stripes. Most species with oblique bands on caudal lobes ..... *Upeneus*..... 2
- 1b. No teeth on vomer and palatines. Stripes sometimes present on second dorsal fin. Caudal fin lobes without black bands ..... 8
- 2a. 5 to 7 vertical scale rows along space between dorsal fins. 12 vertical scale rows along upper part of caudal peduncle ..... 3
- 2b. 4 vertical scale rows along space between dorsal fins. 10 vertical scale rows along upper part of caudal peduncle ..... 6

- 3a. Caudal fin without cross bars. .... *U. sulphureus* (23 cm TL)
- 3b. Caudal fin with dusky cross bars ..... 4
- 4a. Caudal fin with 5 to 6 dusky cross bars on upper lobe only, no bars on lower lobe  
..... *U. moluccensis* (20 cm TL)
- 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* (33 cm TL)
- 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 length of pectoral fin ..... *U. vittatus* (28 cm TL)
- 6a. Dorsal fin with 7 spines, the first spine longest ..... *U. bensasi* (20 cm TL)
- 6b. Dorsal fin with 8 spines, the first spine very small ..... 7
- 7a. Lateral line scales 30 to 32. Caudal fin with a characteristic dark brown triangular stripe prolonging the lateral band along lower fin lobe .... *U. sundaicus* (22 cm TL)
- 7b. Lateral line scales 33 to 34. Caudal fin with brown or red cross bars (4 to 6 on upper lobe and 5 to 8 on lower lobe) ..... *U. tragula* (30 cm TL)
- 8a. Teeth in jaws small, in a villiform band anteriorly. 5 rows of scales between dorsal fins. 11 to 12 rows of scales along upper part of caudal peduncle. Lateral line scales 33 to 38 ..... *Mulloidichthys*.....9
- 8b. Teeth in jaws moderately large, blunt, in a single row. 2 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 ..... *Parupeneus*..... 10
- 9a. A black spot often present in lateral yellow stripe on body. Body depth 3.6 to 4.7 times in standard length. Gillrakers 25 to 30. Fins whitish to faintly yellowish .....  
..... *M. flavolineatus* (40 cm TL)
- 9b. No blackish spot in lateral yellow stripe on body. Body depth 3.3 to 3.9 times in standard length. Gillrakers 32 to 36. Fins yellow ..... *M. vanicolensis* (38 cm TL)
- 10a. Caudal peduncle with a roundish black spot ..... 11
- 10b. Caudal peduncle without a roundish black spot ..... 14
- 11a. Barbels very long, reaching or almost reaching base of pelvic fins. Last ray of second dorsal and anal fins elongate. Gillrakers on first arch 28 to 39 ..... 12
- 11b. Barbels short, not reaching base of pelvic fins. Last ray of second dorsal and anal fins normal, not elongate. Gillrakers on first arch 24 to 30 ..... 13

- 12a. Gillrakers on first arch 33 to 39. A roundish black spot on posterior third of caudal peduncle present ..... *P. macronema* (32 cm TL)
- 12b. Gillrakers on first arch 28 to 32. No black spot on caudal peduncle .....  
..... *P. cyclostomus* (50 cm TL)
- 13a. A dark stripe on snout, postorbital head and upper side of body. No large yellow blotch on lateral line..... *P. barberinus* (50 cm TL)
- 13b. 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* (40 cm TL)
- 14a. Body with 2 or 3 blackish vertical broad saddle-like dark bars. Gillrakers on first arch 35 to 41 ..... *P. bifasciatus* (35 cm TL.)
- 14b. Body without dark vertical bars. Gillrakers on first arch 24 to 27 .....  
..... *P. heptacanthus* (30 cm TL.)

*Interest to fisheries* : The goatfishes are of important commercial value and highly esteemed as foodfishes.

Family KYPHOSIDAE  
**Sea chubs, Rudderfishes**  
 (Fig.81)

Body oblong to ovate, compressed with small ctenoid scales. Head small with a blunt snout. Mouth small, horizontal with a somewhat exposed maxilla; upper jaw slightly protrusible. Teeth somewhat lanceolate, with prominent compressed roots set horizontally, resembling a

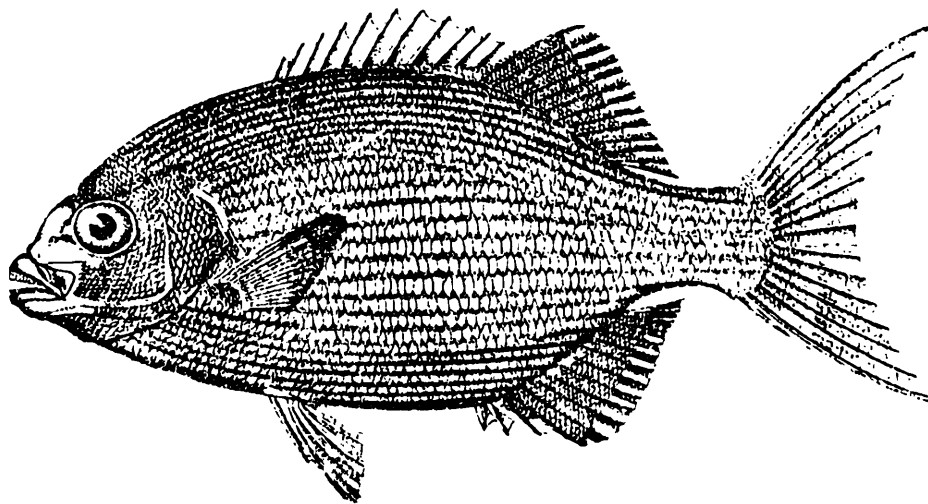


Fig. 81 : *Kyphosus cinerascens* (Forsskal)

radially striated plate inside mouth; each single tooth shaped like a hockey stick. Dorsal fin with 6 to 12 spines and 11 to 22 soft rays, depressible in a sheath. Anal fin with 3 spines and 11 to 26 soft rays. Pectoral fins short. Pelvic fins with 1 spine and 5 soft rays and with a scally axillary process. Caudal fin forked or emarginate.

### Species known to occur in Andhra Pradesh

*Kyphosus cinerascens* (Forsskal) (Blue sea club) (40 cm TL)

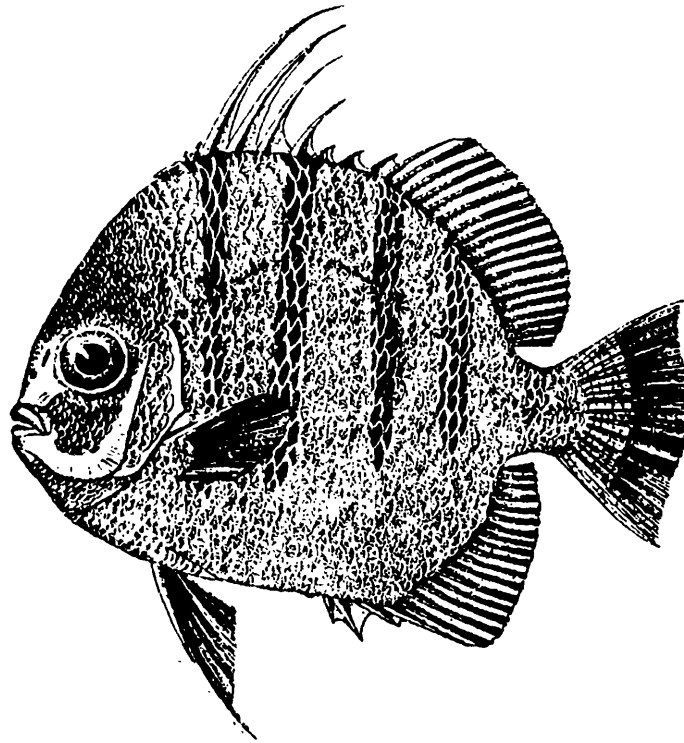
*Interest to fisheries* : The rudderfishes are of minor commercial value. The flesh is edible, but in the odour coming out their gut.

### Family EPHIPPIDAE

#### Spadefishes

(Fig. 82)

Body highly deep to more or less orbicular and greatly compressed with moderate to small scales. Head short, its profile either steep or considerably convex, most of head naked or



**Fig. 82** : *Ephippus orbis* (Bloch)

densely covered with irregular scales. Gill membranes broadly attached to isthmus. Mouth small, horizontal; tip of maxilla concealed. Teeth either setiform, numerous, disposed in bands, or large, incisiform, tricuspid, set in 3 or 4 series in each jaw. 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 to 10 vertical bands which fade with the growth of the fish.

### Species known to occur in Andhra Pradesh

*Ephippus orbis* (Bloch) (Spadefish) (25 cm TL)

*Interest to fisheries* : The spadefishes constitute a small commercial fishery in our country. Its flesh is of good quality and marketed fresh.

### Family PLATACIDAE

#### Batfishes

(Fig. 83)

Body rhomboid, deep and highly compressed. Eyes on both sides of flattened body. Head length much shorter than height, with forehead profile more or less angular. Mouth small, terminal, horizontal and scarcely protractile. Tricuspid teeth, movable, in brush-like bands in each jaw; median cusp of each tooth conspicuously stronger. Dorsal fin with 5 concealed

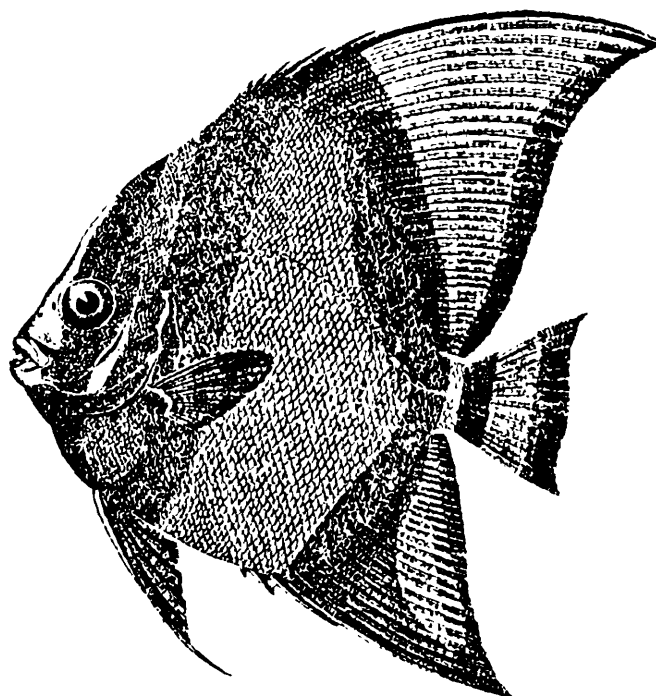


Fig. 83 : *Platax orbicularis* (Forsskal)

spines, increasing in size posteriorly and 35 to 39 soft rays. Anal fin with 3 spines and 25 to 28 soft rays. Pectoral fins short and rounded. Pelvic fins produced, the first soft ray

extending to at least origin of anal fin. Caudal fin truncate. Lateral line arched with 50 to 65 scales. Scales finely ciliated, small, becoming minute on fins which are densely covered.

### Species known to occur in Andhra Pradesh

1. *Platax orbicularis* Forsskal (Batfish)
2. *P. pinnatus* (Linnaeus) (Round batfish) (Kahisandawa)

### Key to the species

Lateral line scales 60 to 65 ..... *P. pinnatus* (45 cm TL)

Lateral line scales 50 to 55 ..... *P. orbicularis* (50 cm TL)

*Interest to fisheries* : The batfishes are of minor commercial importance. These fishes are edible and palatable, but not much esteemed as food due to their foul feeding habits.

### Family DREPANIDAE

#### Sicklefishes

(Fig. 84)

Body very deep and highly compressed. Snout short and head with a parabolic dorsal profile. Mouth terminal and protrusible, forming a downward projecting tube when protracted. Teeth small and setiform in bands on each jaw. Dorsal fin with 8 to 10 spines (the first small,

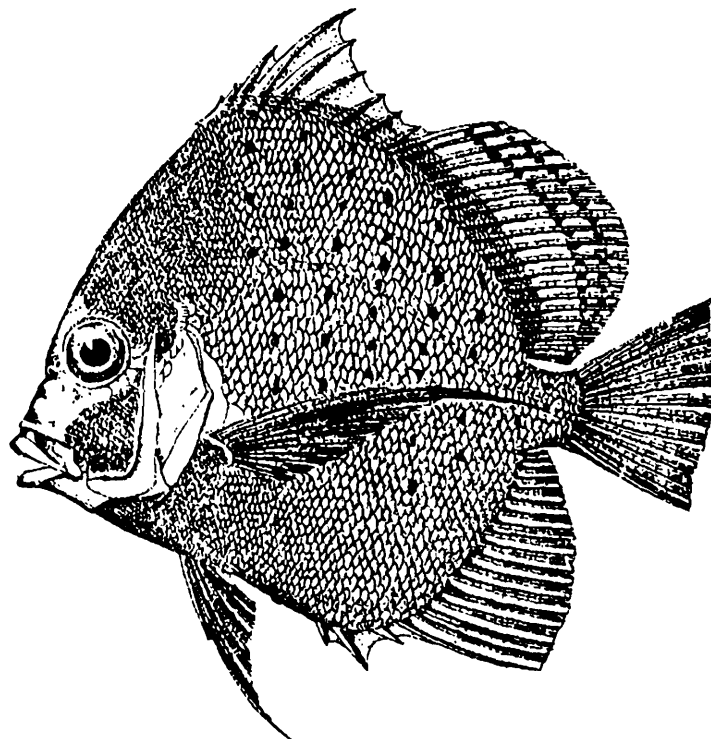


Fig. 84 : *Drepane punctata* (Linnaeus)

procumbent, visible only in juveniles), the spinous portion differentiated from soft portion of dorsal fin by a deep notch and depressible in a high basal scaly sheath. Anal fin with 3 spines. Pectoral fin long and falcate, extending to caudal fin base. Caudal fin rounded. Lateral line highly arched. Body with finely ctenoid scales.

**Species known to occur in Andhra Pradesh**

1. *Drepane longimana* (Bloch & Schneider) (Banded drepane)
2. *D. punctata* (Linnaeus) (Spotted drepane) (Thetti).

**Key to the species**

- Dorsal fin with 8 spines. 4 to 9 vertical grey bars on upper half of sides ..... *D. longimana*
- Dorsal fin with 9 spines. 4 to 11 vertical bars of small black spots on upper half... ..... *D. punctata* (40 cm TL)

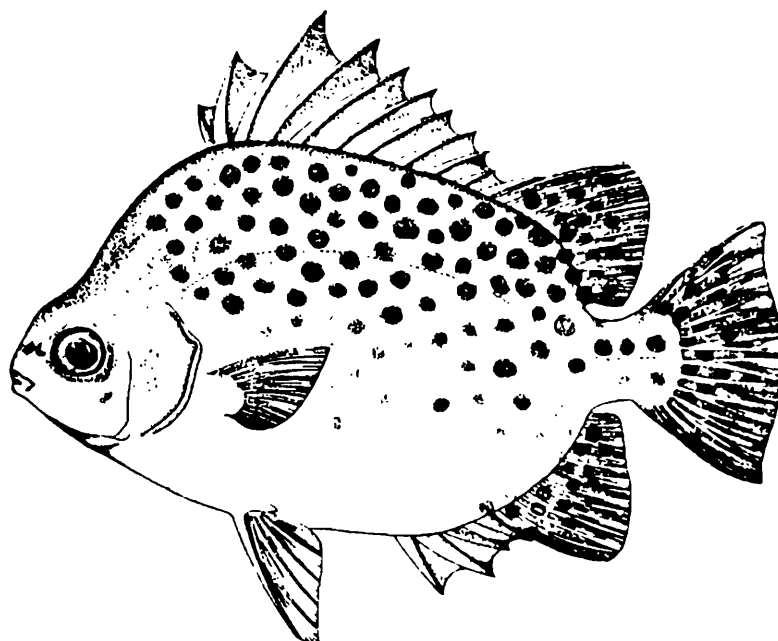
*Interest to fisheries* : The sicklefishes constitute a seasonal fishery along the coast of India. Their flesh said to be of excellent quality. These fishes are marketed fresh only.

**Family SCATOPHACIDAE**

**Scates**

(Fig. 85)

Body quadrangular and highly compressed. Head profile steep, snout and interorbital space rounded. Mouth small, horizontal with brush-like teeth. Dorsal fin with 11 to 12 strong



**Fig. 85** : *Scatophagus argus* (Bloch)

spines and 16 to 18 soft rays, the first spine procumbent; middle of dorsal fin with a deep notch. Anal fin with 4 strong spines and 13 to 16 soft rays. Pectoral fins, relatively small, with 16 to 17 rays. Caudal fin truncate or slightly emarginate. Lateral line complete. Head and body with very small ctenoid scales. Body silvery or greenish with numerous dark spots.

### Species known to occur in Andhra Pradesh

*Scatophagus argus* (Bloch) (Spotted scat) (Chitrilloo, Easputti) (30 cm TL)

*Interest to fisheries* : The scats have little value as food due to their small size and are marketed generally fresh or salted. 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 CHAETODONTIDAE

#### Butterfly fishes

(Fig. 86)

Body oval to orbicular or subrhomboid and highly compressed. Mouth very small, terminal and protractile. Maxilla not extending front border of eye. Snout slightly produced to greatly elongate. Teeth setiform, generally arranged in brush-like bands in jaws. Preopercle never with a strong spine an angle. Dorsal fin with 6 to 16 spines and 15 to 31 soft rays, sometimes with a slight notch between spinous and soft rays. Anal fin with 3 spines (rarely 4) and 14 to 27 soft rays. Lateral line extending to caudal fin base or up to base of soft part of dorsal fin. An axillary scaly process present at base of pelvic fin spine. Body with ctenoid scales.

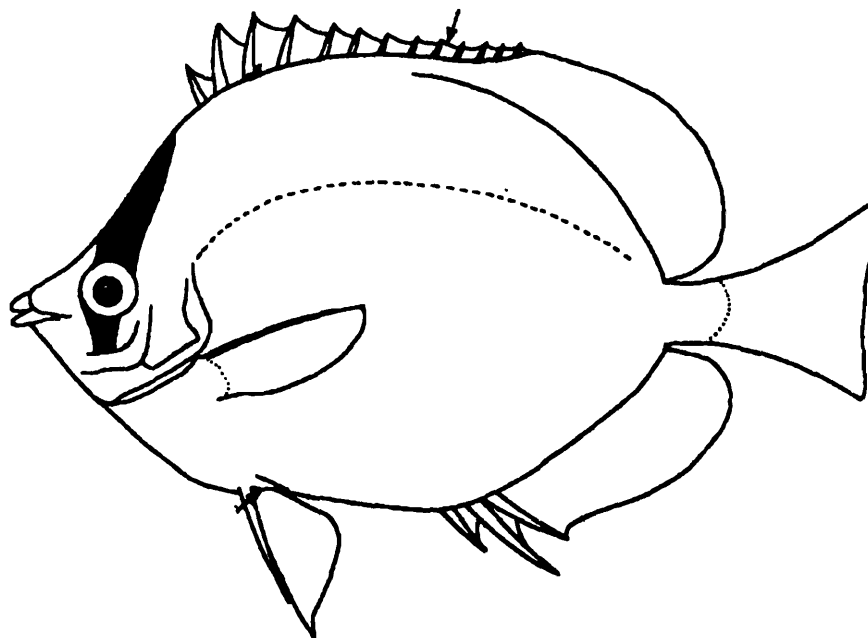


Fig. 86 : *Chaetodon vagabundus* Linnaeus

**Species known to occur in Andhra Pradesh**

1. *Chaetodon vagabundus* Linnaeus (Vagabond butterfly fish) (Painah)
2. *Heniochus acuminatus* (Linnaeus) (Pennant coral fish)

**Key to the species**

- Lateral line incomplete, extending up to near last rays of dorsal fin. 4th dorsal normal, not elongated or filamentous ..... *C. vagabundus*
- Lateral line complete, extending up to caudal fin base. 4th dorsal spine elongate to filamentous, often longer than body depth ..... *H. acuminatus*

*Interest to fisheries* : The butterfly fishes constitute one of the most colourful elements of coral fishes. The juveniles of this species are of commercial value in the marine aquarium trade.

**Family POMACANTHIDAE**

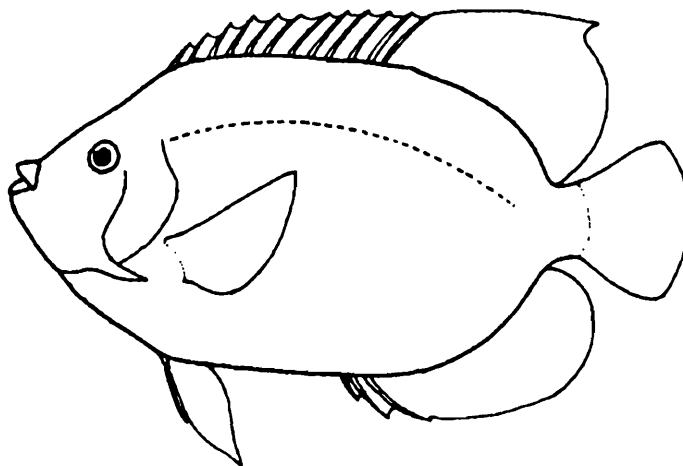
**Angelfishes**

(Fig. 87)

Body oval to orbicular and highly compressed with ctenoid scales. Mouth very small, terminal, protrusible, maxilla not extending not front border of the orbit. Teeth setiform, generally arranged in brush-like bands in jaws. Preopercle with a strong spine. Dorsal fin with 9 to 15 spines and 15 to 23 soft rays and highly extending into filaments. Anal fin with 3 spines and 14 to 25 soft rays. Lateral line complete.

**Species known to occur in Andhra Pradesh**

1. *Pomacanthus annularis* (Bloch) (Ringed angelfish) (Jatipyna)
2. *P. imperator* (Bloch) (Imperial angelfish)



**Fig. 87** : *Pomacanthus annularis* (Bloch)

### Key to the species

- Dorsal fin with 14 spines ..... *P. imperator* (20 cm TL)
- Dorsal fin with 13 spines ..... *P. annularis* (20 cm TL)

*Interest to fisheries* : The angelfishes are very good food fishes and are of highly economic value. The juveniles of these fishes are of great commercial importance in the marine aquarium trade.

### Family POMACENTRIDAE

#### Damselfishes

(Fig. 88)

Body somewhat elongate to orbiculate and compressed with small to moderate-size scales. Mouth relatively small, oblique and terminal with teeth of jaws small, conical to incisiform in 1 or more rows. Dorsal fin with 9 to 17 spines and 10 to 20 soft rays. Anal fin with 2 spines and 10 to 17 soft rays. Pectoral fins with 14 to 24 rays. Caudal fin forked to rounded.

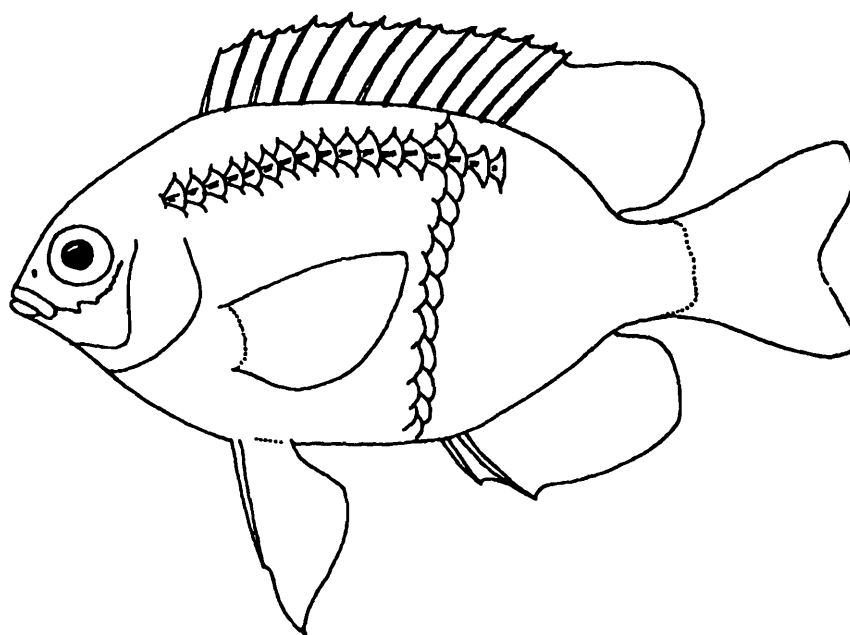


Fig. 88 : *Abudefduf bengalensis* (Bloch)

#### Species known to occur in Andhra Pradesh

1. *Abudefduf bengalensis* (Bloch) (Damselfish)
2. *A. sordidus* (Forsskal) (Damselfish)
3. *Pristotis jerdoni* (Day) Damselfish)

**Key to the genera and species**

- 1a. Hind margin of preopercle weakly to strongly serrate. Margin of suborbital and posterior circumorbitals generally serrate, occasionally smooth or crenulate .....  
..... *P. jerdoni* (12.5 cm TL)
- 1b. Hind margin of preopercle either smooth or finely crenulate. Margin of suborbital and posterior circumorbital smooth ..... *Abudefduf*...2
- 2a. Dorsal fin with 12 to 13 rays and anal fin with 11 to 12 rays. Sides with 7 vertical bands ..... *A. bengalensis*
- 2b. Dorsal with 14 to 16 rays and anal fin with 12 to 15 rays. Sides with 5 vertical bands  
*A. sordidus*

*Interest to fisheries* : The damselfishes are not of commercial importance and are not generally used as food. Some species are used in the aquarium trade.

**Family CEPOLIDAE**

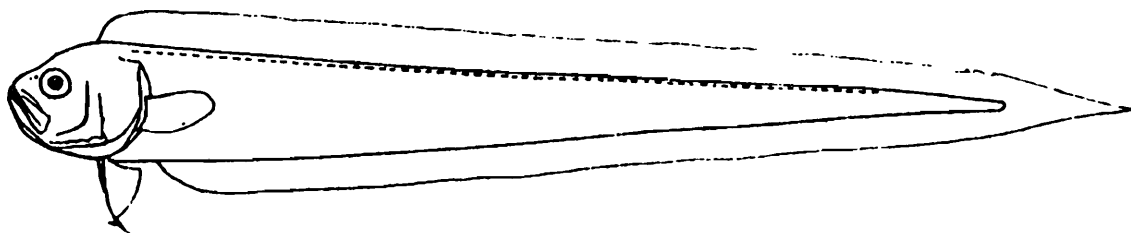
**Bandfishes**

(Fig. 89)

Body elongate, compressed and tapering. Mouth large, oblique; maxilla extending to below hind border of eyes. Eyes relatively large and high on head. Dorsal fin long, continuous with caudal fin, with 0 to 4 flexible spines and 21 to 89 segmented rays. Anal fin long and continuous with caudal fin, with 0 to 1 spine and 13 to 102 segmented rays. Pelvic fins inserted below or slightly anterior to pectoral fins, with 1 spine and 5 segmented rays. Caudal fin lanceolate, middle 9 to 15 rays branched. Lateral line high on body close to dorsal fin base, extending up to end of fin. Lateral line tubes or canals mostly embedded in skin. Body with cycloid scales.

**Species known to occur in Andhra Pradesh**

*Acanthocephala abbreviata* (Valenciennes) (Bandfish) (40 cm TL)



**Fig. 89** : *Acanthocephala abbreviata* (Valenciennes)

*Interest to fisheries* : The bandfishes are of no significant commercial value, but consumed by local people. These fishes are relatively uncommon, caught by commercial trawls as by catch.

### Family MUGILIDAE

#### Mullets

(Fig. 90)

Body elongate, cylindrical or slightly compressed. Mouth rather small, terminal or inferior. Eyes usually covered by fatty tissue (adipose eyelid). Two short, widely separated dorsal fins, the first with 4 spines and the second with soft rays. Pectoral fins set rather high on body. Pelvic fins subabdominal, with 1 spine and 5 branched rays. Caudal fin moderately forked,

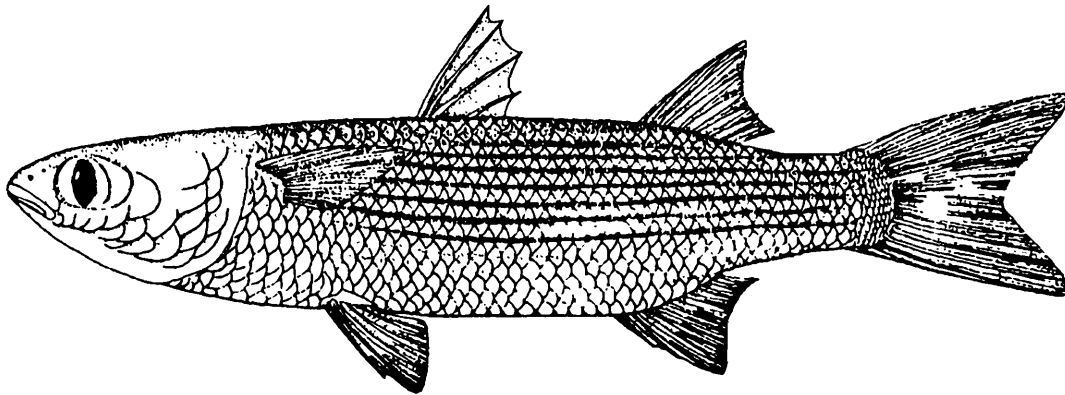


Fig. 90 : *Mugil cephalus* Linnaeus

emarginate or truncate. Lateral line absent. Scales moderate or large, modified (axillary) scales may be present below first dorsal fin and above pectoral and pelvic fins.

#### Species known to occur in Andhra Pradesh

1. *Liza macrolepis* (Smith) (Largescale mullet) (Bonthaparigi)
2. *L. parsia* (Hamilton-Buchanan) (Goldspot mullet) (Bonthalu)
3. *L. subviridis* (Valenciennes) (Greenback grey mullet) (Koinga)
4. *L. tade* (Forsskal) (Tade grey mullet)
5. *L. vaigiensis* (Quoy & Gaimard) (Square-tail grey mullet) (Peddaraki sovero)
6. *Mugil cephalus* Linnaeus (Flathead grey mullet) (Kathiperega)
7. *Valamugil cunnesius* (Valenciennes) (Longfin mullet) (Kunnese)
8. *V. seheli* (Forsskal) (Bluespot grey mullet)
9. *V. speigleri* (Bleeker) (Speigler's mullet) (Bonthalu)

**Key to the genera and species**

- 1a. Posterior tip of maxilla (upper jaw) not curved down tip of premaxilla ..... *M. cephalus* (90 cm)
- 2a. Posterior tip of maxilla (upper jaw) curved down tip of premaxilla ..... *Liza* Jordan & Swain or *Valamugil* Smith.....2
- 2a. Scales without membranous digitated hind margin. Pectoral axillary scale rudimentary or absent ..... *Liza*.....3
- 2b. Scales with membranous digitated hind margin. Pectoral axillary scales very long... ..... *Valamugil*....7
- 3a. Anal fin rays 8 ..... *L. vaigiensis* (55 cm)
- 3b. Anal fin rays 9 ..... 4
- 4a. 12 transverse rows of scales ..... *L. macrolepis* (60 cm)
- 4b. Transverse rows of scales less than 12 ..... 5
- 5a. Second dorsal fin inserted over posterior half of anal fin base ..... *L. tade* (70 cm)
- 5b. Second dorsal fin inserted over anterior half of anal fin base ..... 6
- 6a. Preorbital bone narrow, not filling space between mouth and eye ..... *L. subviridis* (30 cm)
- 6b. Preorbital bone wide, filling space between mouth and eyes ..... *L. parsia* (16 cm)
- 7a. Fatty tissue (Adipose eyelid) covering only a rim around eye ..... *V. seheli* (50 cm)
- 7b. Fatty tissue (Adipose eyelid) covering most of eye ..... 8
- 8a. Scales in lateral line series 30 to 35 ..... *V. cunnesius* (41 cm)
- 8b. Scales lateral line series 37 to 40 ..... *V. speigleri* (20 cm)

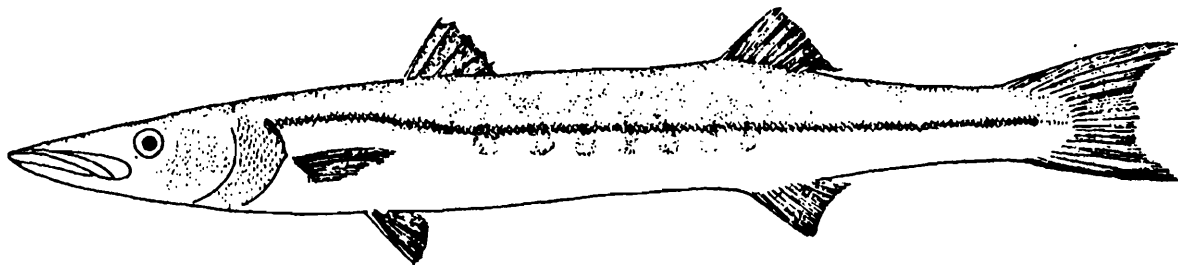
*Interest to fisheries* : Mulletts have been important foodfishes since ancient times throughout their range of occurrence. Most of the species are suitable for pond culture due to their adaptability to a great changes in salinity, from almost freshwater to salinity of 75‰ and their rapid growth and hardiness. Andhra Pradesh stands second in regards to the maximum landings of mulletts *L. vaigiensis* and *M. cephalus* are common species found along the east and west coasts of India. *L. macrolepis* is the second most important species of mulletts in India.

## Family SPHYRAENIDAE

**Barracudas**

(Fig. 91)

Elongate body with long pointed snout. Mouth large with lower jaw projecting beyond upper and large fang-like teeth. Two widely separated short dorsal fins, the first with 5 spines, inserted almost opposite to pelvic fins; the second with 1 spine and 9 soft rays, inserted opposite to anal fin. Pectoral fins set relatively low. Caudal fin forked. Lateral line well developed, almost straight.

Fig. 91 : *Sphyraena jello* Cuvier**Species known to occur in Andhra Pradesh**

1. *Sphyraena barracuda* (Walbaum) (Great barracuda) (Jellow)
2. *S. forsteri* Cuvier (Bigeye barracuda) (Jellow)
3. *S. jello* Cuvier (Pickhandle barracuda) (Jellow)
4. *S. obtusata* Cuvier (Obtuse barracuda) (Jellow)

**Key to the species**

- 1a. Gillrakers present on first arch..... *S. obtusata* (40 cm)
- 1b. Gillrakers absent on first arch ..... 2
- 2a. Scales rather large, less than 100, generally 80 to 90 in lateral line. Adults usually with several scattered inky blotches on hind part of body below lateral line .....  
..... *S. barracuda* (180 cm)
- 2b. Scales moderate or small, more than 100. No inky blotches on hind part of body ...  
..... 3
- 3a. Scales moderate, usually 105 to 115 in lateral line. Upper gill arch platelets rough, lower platelets with distinct spines. Sides without dark bars or chevrons .....  
..... *S. forsteri* (64 cm)

- 3b. Scales small, usually 135 to 140 in lateral line. Upper and lower gill arch platelets rough, but without distinct spines. Sides with a dark pattern of serpentine bars extending a little below lateral line ..... *S. jello* (150 cm)

*Interest to fisheries* : The flesh of the barracudas is good, marketed fresh, frozen, dried, salted or smoked. Large individuals of *S. barracuda* have sometimes been implicated in ciguatera fish poisoning.

### Family POLYNEMIDAE

#### Threadfins

(Fig. 92)

Body somewhat clongate and compressed. Mouth subterminal. Two short dorsal fins, well separated from each other (one spiny and one soft rayed), the first with 7 or 8 flexible spines. Anal fin with 2 or 3 spines. Pectoral fins divided into two parts, the upper normal, the lower with 3 to 15 free filamentous rays. Pelvic fins subabdominal with 1 spine and 5 branched rays. Caudal fin deeply forked. Lateral line present.

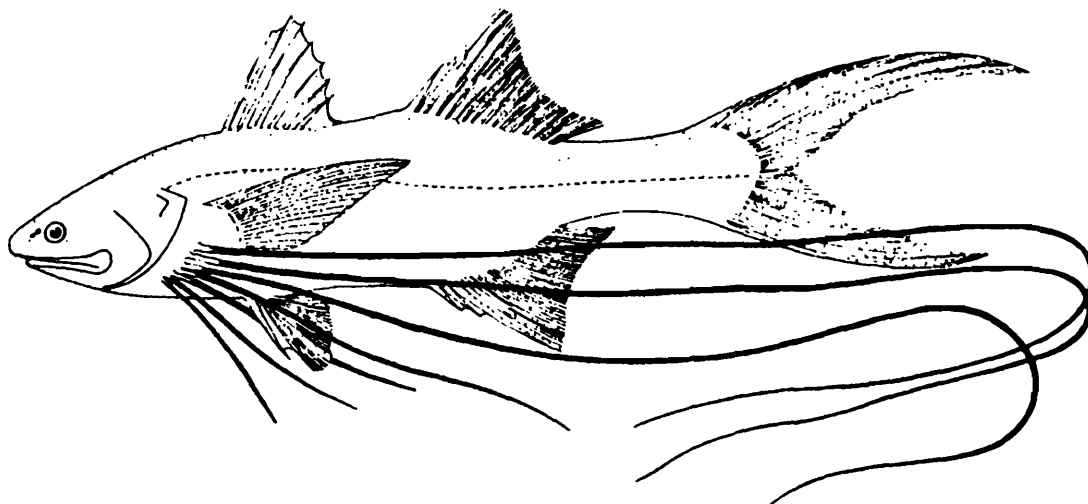


Fig. 92 : *Polynemus paradiseus* Linnaeus

#### Species known to occur in Andhra Pradesh

1. *Eleutheronema tetradactylum* (Shaw) (Four finger threadfin) (Maga)
2. *Polynemus heptadactylus* (Cuvier) (Seven finger threadfin) (Maga)
3. *P. indicus* (Shaw) (Indian threadfin) (Maga booshee)
4. *P. paradiseus* Linnaeus (Paradise threadfin)
5. *P. plebeius* Broussonet (Striped threadfin)

6. *P. sexfilis* Valenciennes

7. *P. sextarius* Bloch & Schneider (Blackspot threadfin)

### Key to the species

- 1a. Lower lip restricted to corner of mouth. Teeth extending to outer edges of jaws 4 free. pectoral filaments ..... *E. tetradactylum* (200 cm TL)
- 1b. Lower lip fully developed. No external teeth, 5 or more free pectoral filaments .... 2
- 2a. Pectoral fin with 5 free filamentous rays ..... 3
- 2b. Pectoral fin with 6 or 7 filamentous rays ..... 4
- 3a. Upper pectoral fin rays branched. Longest free pectoral filamentous rays reaching almost to anal fin origin. Eye diameter 7 times in head length. Caudal fin lobes ending in filaments ..... *P. indicus* (140 cm TL)
- 3b. Upper pectoral fin rays unbranched. Longest free pectoral filamentous rays reaching to end of pelvic fin. Eye diameter 3.8 to 4.0 times in head length. Caudal fin lobes not ending in filaments ..... *P. plebeius* (45 cm TL)
- 4a. Pectoral fin with 6 free filamentous rays ..... 5
- 4b. Pectoral fin with 7 free filamentous rays ..... 6
- 5a. Upper pectoral fin rays unbranched, pectoral fins black. No black blotch at the beginning of the lateral ..... *P. sexfilis*
- 5b. Upper pectoral fin rays branched, different colour pattern. A black blotch at the beginning of the lateral line ..... *P. sextarius* (30 cm TL)
- 6a. Longest free filamentous pectoral fin reaching to anal fin origin. Eye large, diameter 3.5 times in head length ..... *P. heptadactylum*
- 6b. Longest free filamentous pectoral fin reach to or extend beyond tip of caudal fin ...  
..... *P. paradiseus* (23 cm TL)

*Interest to fisheries* : The flesh of the threadfins is highly appreciated. *P. indicus* constitutes one of the important threadfin fisheries in India. Its swimbladder is used for isinglass.

### Family SCARIDAE

#### Parrotfishes

(Fig. 93)

Body oblong, somewhat compressed and head usually bluntly rounded anteriorly. Mouth small and slightly ventral with jaws fused to form beak-like dental plates, some species with posterior canine teeth. Dorsal fin with 9 spines and 10 to 11 soft rays. Anal fin with 3 spines

and 9 soft rays. Pelvic fin with 1 spine and 5 soft rays. Caudal fin rounded in juveniles but the lobes often extended in adult specimens. Lateral line interrupted below posterior margin of dorsal fin, with 22 to 24 cycloid scales.

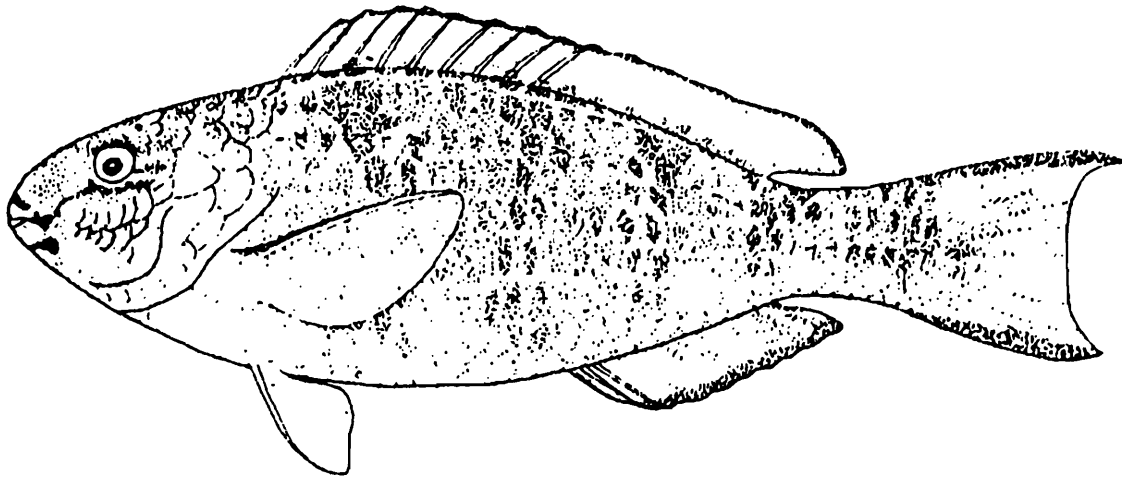


Fig. 93 : *Scarus ghobban* Forsskal

### Species known to occur in Andhra Pradesh

1. *Scarus ghobban* Forsskal (Yellow scale parrot fish)
2. *S. russelii* Valenciennes (Eclipse parrotfish) (Sahnee moia)

### Key to the species

- 4 median predorsal scales. 2 rows of scales on cheek. Pectoral fin with 12 branched rays. Lips dull red orange, margined with dull blue green coloured.....  
..... *S. russelii* (30 cm SL)
- 6 median predorsal scales. 3 rows of scales on cheek. Pectoral fin with 13 branched rays. Lips salmon pink coloured.....  
..... *S. ghobban* (57 cm SL)

*Interest to fisheries* : The parrotfishes are not of significant fisheries importance. These fishes are an important part of coral reef associated artisanal fisheries.

### Family OPISTOGNATHIDAE

#### Jawfishes

(Fig. 94)

Body more or less elongate with a tapering posterior part of body. Head bulbous with dorsolateral relatively large eyes. Mouth large, in some species maxilla extends well beyond hind border of gill flap. Teeth moderate, canine-like in a single row along sides of jaws; several rows of smaller teeth may also present anteriorly. Dorsal fin with 10 to 11 spines and

11 to 15 soft rays. Anal fin with 2 to 3 spines and 10 to 16 soft rays. Pelvic fins inserted anterior to pectoral fins, with 1 spine and 5 soft rays, the outer 2 rays unbranched and stout, the inner rays branched and weaker. Caudal fin rounded, the middle 12 to 14 rays branched

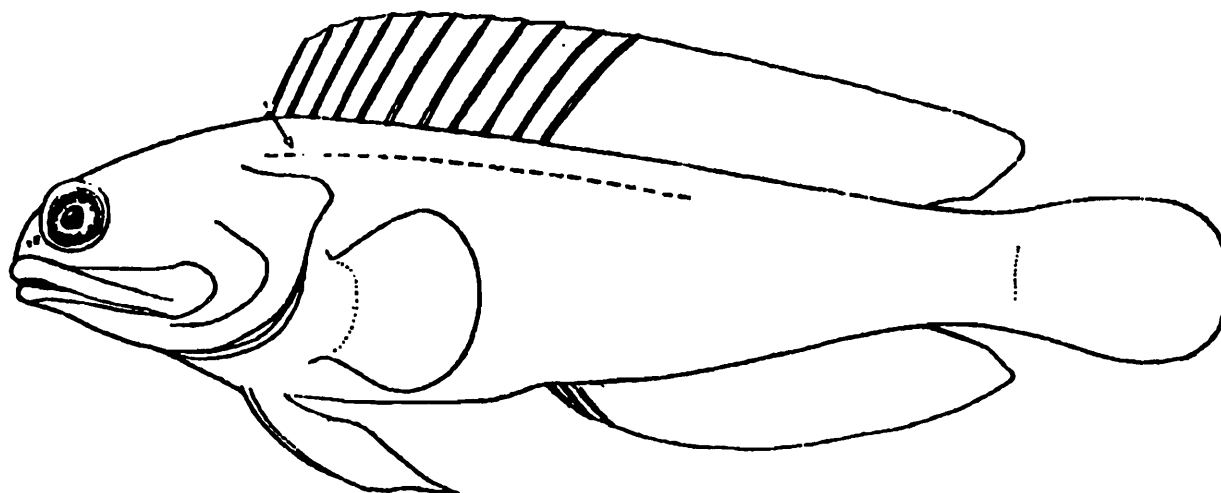


Fig. 94 : *Opistognathus rosenbergii* Blecker

in most species. Lateral line incomplete, high on body, extends up to below middle of dorsal fin; lateral line tubes or canals embedded in skin, rather than occurring on scales. Body with cycloid scales.

#### Species known to occur in Andhra Pradesh

##### *Opistognathus rosenbergii* (Blecker) (Jaw fish)

*Interest to fisheries* : The jawfishes are of no commercial importance. These fishes are occasionally caught by hook and line fishermen and in trawls and are reported to be good to eat.

#### Family URANOSCOPIDAE

##### Stargazers

(Fig. 95)

Body elongate, thick, compressed posteriorly, naked or with small scales. Head large, bony and heavy with eyes situated in dorsal profile of it. Mouth large and oblique with small teeth in jaws, vomer and on palatines. Lower jaw heavy and projecting, upper jaw protrusible ; maxillaries exposed with supramaxilla. Spinous dorsal fin small or absent, or continuous with soft rayed part of it; soft dorsal and anal fins similar, inserted in opposite position. Pelvic fins inserted in isthmus region, considerably anterior to pectoral fins, with 1 short spine and 5 soft rays.

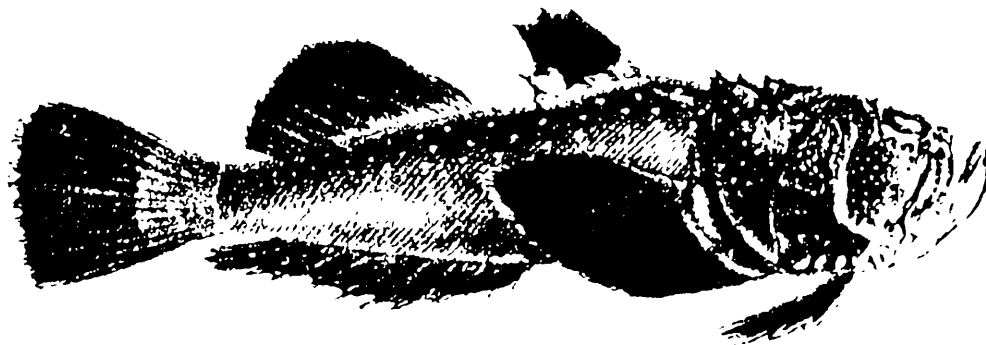


Fig. 95 : *Uranoscopus guttatus* Cuvier

**Species known to occur in Andhra Pradesh**

*Uranoscopus guttatus* Cuvier (Stargazer)

*Interest to fisheries* : The stargazers are of no commercial value. These fishes are sometimes caught in the commercial catches as by catch in the bottom trawls.

Family MUGILOIDIDAE

**Sandmelts, Sandperches, Grubfishes**

(Fig. 96)

Body elongate, subcylindrical and posteriorly compressed. Mouth large, lips more or less thickened; jaws with a band of villiform teeth and an outer row of larger cardiform teeth which are enlarged as canines at front of jaws; teeth present on vomer, present to absent on palatines. Opercle with one stout spine. Dorsal fin with 4 to 5 spines and 19 to 24 soft rays, the last spine attached by a membrane to the first soft ray. Anal fin with 1 spine and 16 to 19 soft rays. Pelvic fins with a short spine concealed in the skin and 5 soft rays. Caudal fin rounded, or truncate to emarginate. Body scales ctenoid and but scales on opercle and cheeks cycloid.

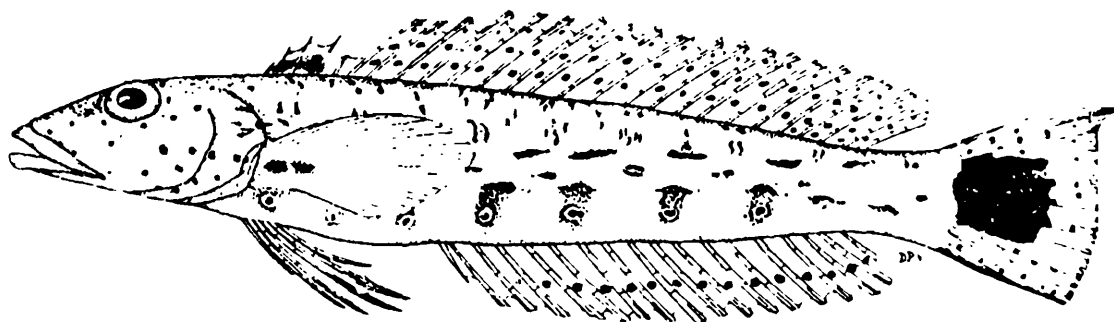


Fig. 96 : *Parapercis hexophthalma* (Ehrenberg)

### Species known to occur in Andhra Pradesh

- 1 *Parapercis hexophthalma* (Ehrenberg) (Spotted sandsmelt)
2. *P. nebulosa* (Quoy & Gaimard) (Barfaced sandsmelt)

#### Key to the species

- 3 to 7 small, white-ringed, black ocelli along the vertical side of the body. Lateral line scale 62 to 72, scales around caudal peduncle 27 to 34 ..... *P. hexophthalma*
- No black ocelli on ventral part of body. Lateral line scales 79 to 85, scales around caudal peduncle 42 to 44 ..... *P. nebulosa*

*Interest to fisheries* : The sandperches are of minor fishery value. These fishes are caught as a by catch in bottom trawls and are marketed mostly fresh or dried.

#### Family BLENNIDAE

#### Combtooth and sobertoath blennis

(Fig. 97)

Body elongate without scales. Head usually with cirri on eye, nape and hind border of front nostril. Mouth ventral, upper jaw not protrusible with a single row of incisor-like teeth in each jaw and generally a canine-like tooth posteriorly on each side of lower jaw. Gill openings either restricted to side or continuous across underside of head. 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 the soft rays. Pelvic fins inserted ahead of pectoral fins, with 1 spine (not visible outwardly) and 2 to 4 soft rays; pelvic fins sometimes deformed or absent. Caudal fin rounded, with branched or unbranched rays. Lateral line tubes or canals varies from complete or incomplete to absent.

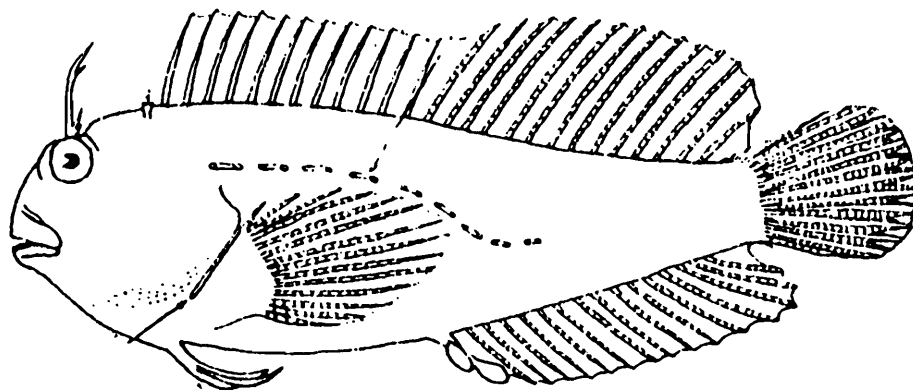


Fig. 97 : *Salarias steindachneri* (Day)

**Species known to occur in Andhra Pradesh**

*Salarias steindachneri* (Day) (Combtooth blennis)

*Istioblennius dussumieri* (Valenciennes) (Combtooth blennis)

**Key to the species**

- Anterior anal fin rays usually elongated in mature males. Dorsal fin with 12 to 13 spines and 15 to 16 soft rays. Second dorsal fin not continued to caudal fin. Caudal fin cut square ..... *S. steindachneri* (10 cm TL)
- Anterior anal fin rays not elongated in mature males. Dorsal fin with 13 to 14 spines and 20 to 21 soft rays. Second dorsal continued to caudal fin. Caudal fin rounded ..... *I. dussumieri*

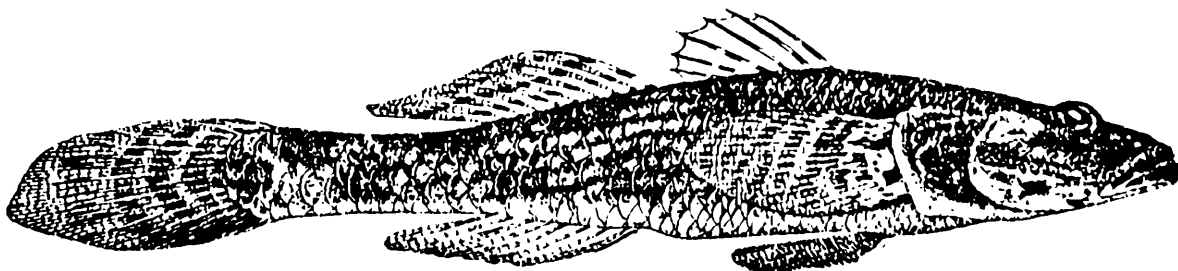
*Interest to fisheries* : The blenniids are no commercial importance and usually not used as food.

**Family GOBIIDAE**

**Gobias**

(Fig. 98)

Body elongate or oval and compressed with ctenoid or cycloid scales. Head with or without pores. Dorsal fin usually two, spinous dorsal fin when present, separated from soft dorsal fin and with 2 to 17 spines. The second dorsal or soft rayed dorsal fin and the anal fin are similar in shape and size. Pelvic fins united, sometimes entirely or posteriorly incised, generally forming an adhesive or sucking disc. Teeth variable in size, in one to several rows on both jaws. Lateral line usually absent.



**Fig. 98** : *Glossogobius giuris* (Ham. Buch)

**Species known to occur in Andhra Pradesh**

1. *Acentrogobius caninus* (Valenciennes)
2. *Apocryptodon madurensis* (Bleeker)

3. *Awaous stamineus* (Valenciennes)
4. *Boleophthalmus boddarti* (Pallas) (Mud skipper) (Ncttee kunta mottah)
5. *Glossogobius biocellatus* (Valenciennes) (Sleepy goby)
6. *G. giuris* (Hamilton-Buchanan) (Tank goby)
7. *Oligolepis acutipennis* (Valenciennes) (Sharptail goby)
8. *Oxyurichthys microlepis* (Bleeker) (Maned goby)
9. *Parachaeturichthys polynema* (Bleeker) (Taileyed goby)
10. *Pseudapocryptes lanceolatus* (Bloch & Schneider) (Gudgeon)

#### Key to the genera and species

- 1a. Teeth on lower jaw in several rows ..... 2
- 1b. Teeth on lower jaw in one series ..... 8
- 2a. Shoulder girdle (under opercle) with one to three finger like flaps ..... *A. stamineus*
- 2b. Shoulder girdle smooth or with minute bumps ..... 3
- 3a. Gill membranes fused to a free fold across isthmus ..... *Glossogobius*.....4
- 3b. Gill membranes not fused together to a free fold ..... 5
- 4a. Branchiostegal membranes form a free fold across isthmus. Body dark with several longitudinal lines and saddles on back. Iris with a lappet covering part of pupil .....  
..... *G. biocellatus*
- 4b. Branchiostegal membranes attached to sides of isthmus. Body pale, without longitudinal lines, sometimes with saddles. Iris without a lappet ..... *G. giuris*
- 5a. Barbels present ..... *P. polynema*
- 5b. Barbels absent ..... 6
- 6a. Teeth on upper jaw in one to three rows ..... *O. microlepis*
- 6b. Teeth on upper jaw in several rows ..... 7
- 7a. Head scaled ..... *A. canius*
- 7b. Head naked ..... *O. acutipennis*
- 8a. Free lower eyelid present. Eyes erectile above dorsal profile of head. First dorsal fin higher than long ..... *B. boddarti*
- 8b. Free lower eyelid absent. Eyes not or only slightly above the dorsal profile of head. First dorsal fin longer than high ..... 9

- 9a. Scales minute, more than 200 in longitudinal series. Teeth on upper jaw pointed. First dorsal fin with 5 spines ..... *P. lanceolatus*
- 9b. Scales small to moderate, less than 150 in longitudinal series. Anterior teeth on upper jaw caninoid. First dorsal fin with 6 spines ..... *A. madurensis*

*Interest to fisheries* : The gobiids are generally of no commercial value, but *G. giuris* has a good economic importance.

Family GOBIOIDIDAE  
**Eel-like gobies**  
 (Fig. 99)

Body eel-like and compressed. Eyes very small to practically absent. Dorsal fin single, very elongated, generally united or almost so with caudal fin. Pelvic fins united. Anal fin long with 31 to 45 rays. Opercular region without pouch-like cavity. Body naked or with cycloid scales.

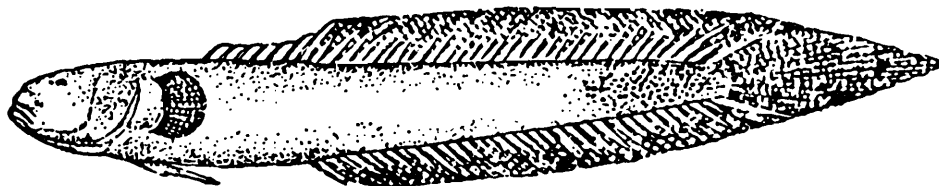


Fig. 99 : *Brachyamblyopus urolepis* (Bleeker)

**Species known to occur in Andhra Pradesh**

- 1. *Brachyamblyopus urolepis* (Bleeker) (Sumatra eelgoby)
- 2. *Taenioides anguillaris* (Linnaeus) (Anguilla eelgoby)
- 3. *T. cirratus* (Blyth) (Hooghly gobyeel)

**Key to the genera and species**

- 1a. No barbels on chin and lower jaw. Canine teeth absent ..... *B. urolepis*
- 1b. Barbels on chin and lower jaw. Canine teeth present ..... *Taenioides*..... 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 ..... *T. anguillaris*

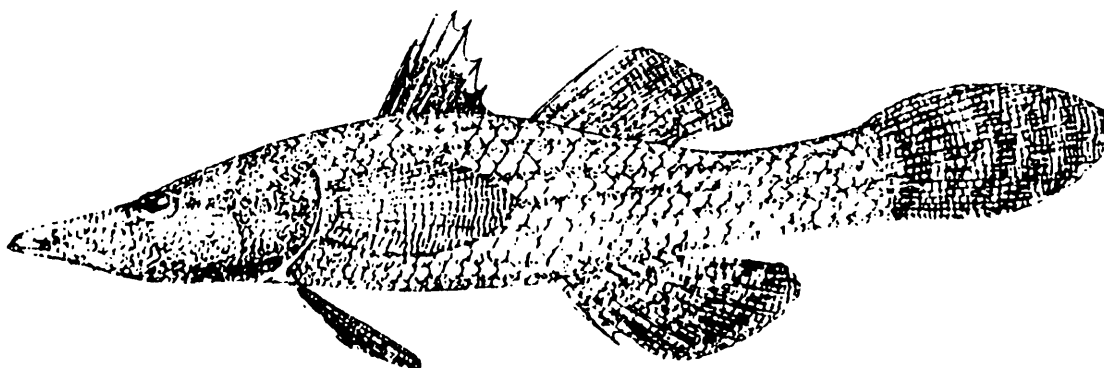
*Interest to fisheries* : The eel-like gobiid fishes are no commercial value.

## Family ELEOTRIDIDAE

**Sleepers**

(Fig. 100)

Body elongate with ctenoid or cycloid scales, sometimes partly or totally naked. Two dorsal fins, separated or connected with their bases, first dorsal fin with 2 to 8 flexible spines. Mouth somewhat oblique, never inferior. Pelvic fins separate with sucking disc, bases close together or united.

Fig. 100 : *Butis butis* (Ham. Buch.)**Species known to occur in Andhra Pradesh**

1. *Butis butis* (Hamilton-Buchanan) (Duckbill sleeper)
2. *Eleotris fusca* (Schneider) (Dusky sleeper)

**Key to the species**

- Angle of preopercle with one or more spines (often covered with skin).....  
..... *Eleotris fusca*
- Preopercle angle without spine..... *Butis butis*

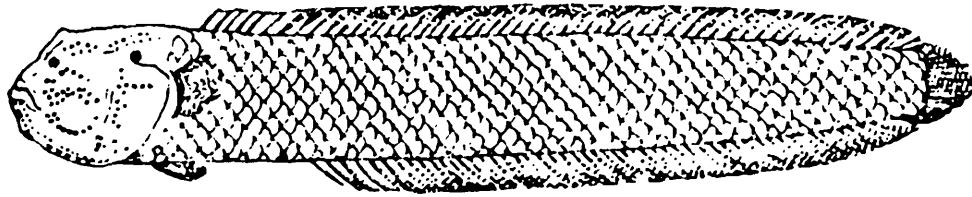
*Interest to fisheries* : The sleepers are of no commercial value.

## Family TRYPACHENIDAE

**Burrowing gobies**

(Fig. 101)

Body very elongated, cel-like. Eyes very small to indistinct. At the superior border of the operculum there is a pit which opens to a pouch-like cavity in opercular region. Dorsal fin one, very elongated with a distinct spinous portion. Pelvic fins generally form an adhesive disc.



**Fig. 101** : *Trypauchen vagina* (Bloch & Schneider)

**Species known to occur in Andhra Pradesh**

*Trypauchen vagina* (Bloch & Schneider) (Burrowing goby)

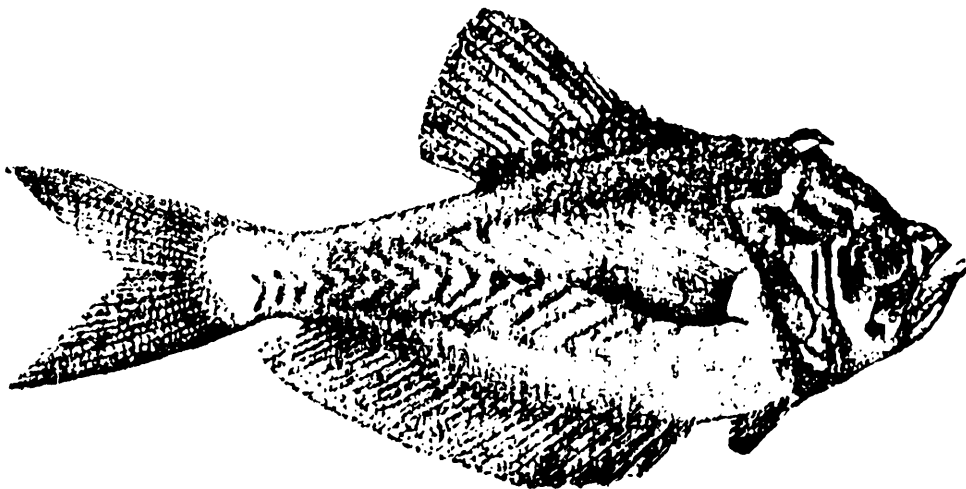
*Interest to fisheries* : The burrowing gobiid fishes are of no commercial value.

Family KURTIDAE  
**Nursery fish, Humpheads**  
(Fig. 102)

Body oblong and greatly compressed with cycloid scales. Mouth large with villiform teeth in jaws, vomer and palatines. Opercular bones thin and paper like. Dorsal fin with very small 5 spines preceded by a recumbent spine directed anteriorly, and 12 to 13 soft rays. Anal fin with 2 spines and 31 to 47 soft rays. Pelvic fin with 1 spine and 5 soft rays. Caudal fin deeply forked. Males with occipital hook, used for carrying eggs.

**Species known to occur in Andhra Pradesh**

*Kurtus indicus* Bloch (Indian humphead) (Kakasi, Somdrum karamooddee)



**Fig. 102** : *Kurtus indicus* Bloch

*Interest to fisheries* : The Nursery fish is not commercially important. *K. indicus* is found all along the east coast of India particularly in the Tamil Nadu coast.

### Family ACANTHURIDAE

#### Surgeonfishes

(Fig. 103)

Body somewhat elongate or deep and laterally compressed with a single folding lancet-like spine or one or two body plates generally bearing sharp keels on side of caudal peduncle. Mouth small, teeth in a single row, variable in shape with genus, but never caniniform or

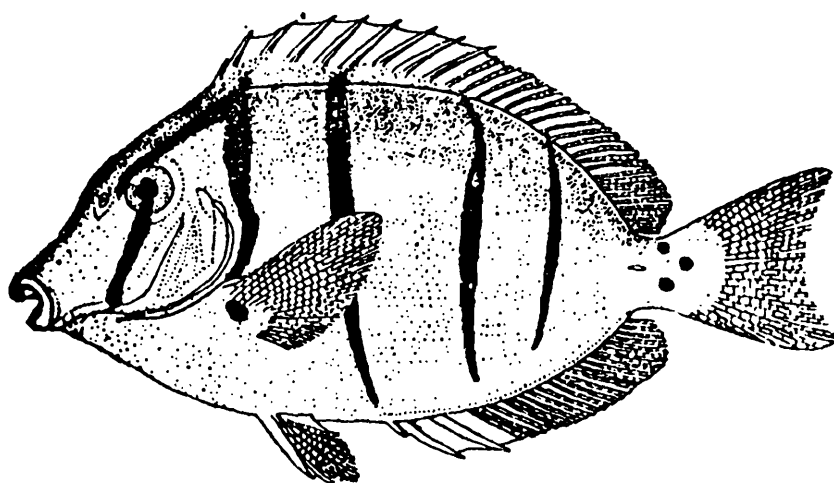


Fig. 103 : *Acanthurus bleekeri* Gunther

molariform. Dorsal fin single with 4 to 9 spines and soft rays. Anal fin with 2 to 3 spines and soft rays. Pelvic fins with 1 spine and 3 to 5 soft rays. Caudal fin lunate or truncate. Scales small.

#### Species known to occur in Andhra Pradesh

- 1 *Acanthurus bleekeri* Gunther (Bluelined surgeonfish)
2. *A. nigrofuscus* (Forsskal) (Dusky surgeonfish)
3. *A. triostegus* (Linnaeus) (Convict surgeonfish) (Mootah)
4. *A. xanthopterus* Valenciennes (Yellowfin surgeonfish)
5. *Ctenochaetus strigosus* (Bennett) (Slender toothed surgeonfish) (Matta)

#### Key to the species

- 1a. Teeth movable, elongate with expanded incurved tips which bear only lateral denticulations, 30 to 60 in upper jaw. Dorsal fin spines 8 ..... *C. strigosus*

- 1b. Teeth fixed, not elongate with expanded incurved tips, denticulate on both margins and not over 26 in upper jaw. Dorsal fin spines 9 ..... 2
- 2a. Body light in colour with vertical black bars ..... *A. triostegus* (24 cm TL)
- 2b. Body not light in colour and without vertical black bars ..... 3
- 3a. Snout short, 6.6 to 6.9 times in standard length. Teeth small and numerous, 22 or more in lower jaw of adults ..... *A. bleekeri* (40 cm TL)
- 3b. Snout not short, 3.9 to 5.3 times in standard length. Teeth not small and numerous, 22 or less (rarely 22) in lower jaw of adults ..... 4
- 4a. A black spot at base of last few rays of both the dorsal and anal fins ..... *A. nigrofuscus*
- 4b. No black spot at base of last few rays of both dorsal and anal fins ..... *A. xanthopterus* (65 cm TL)

*Interest to fisheries* : The surgeonfishes are not of great commercial value. They are found mostly on or near coral reefs where these fishes may have local importance.

Family SIGANIDAE

**Rabbitfishes**

(Fig. 104)

Body oval and compressed, minutes and thin cycloid scales. Mouth small and terminal, with a single row of incisor-like teeth in jaws. Dorsal fin with 13 strong spines and 10 soft rays. An antrorse (procumbent) spine anterior to dorsal fin (sometimes covered by skin) present. Anal fin with 7 spines and 9 (rarely 10) soft rays. Pelvic fins each with 2 spines and 3 soft rays between them, a diagnostic character unique to this family.

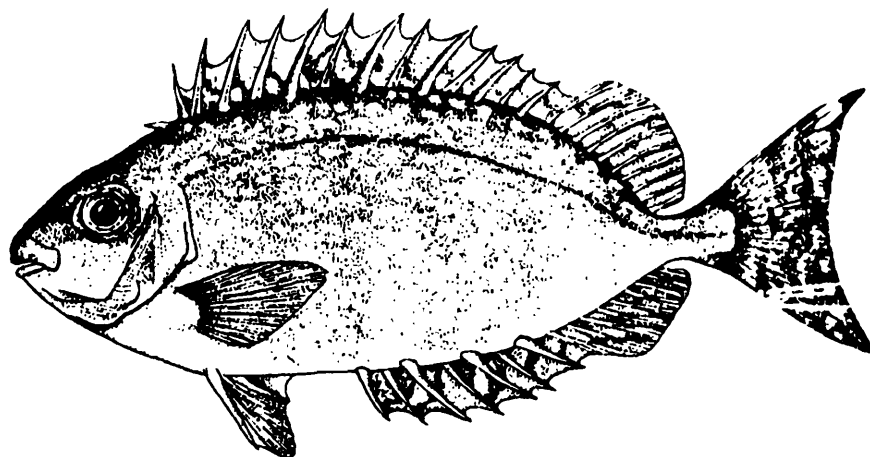


Fig. 104 : *Sigaus canaliculatus* (Park)

### Species known to occur in Andhra Pradesh

1. *Siganus canaliculatus* (Park) (Whitespotted spinefoot) (Warahwah)
2. *S. javus* (Linnaeus) (Streaked spinefoot) (Warahwah)

#### Key to the species

- Body depth 2.4 to 2.8 times in standard length. Scale rows between mid-dorsal fin base and lateral line 21 to 23 ..... *S. canaliculatus* (30 cm TL)
- Body depth 2.0 to 2.3 times in standard length. Scale rows between mid-dorsal fin base and lateral line 30 to 35 ..... *S. javus* (45 cm TL)

*Interest to fisheries* : The rabbitfishes are abundantly found in the reef areas and among the more important inshore commercial fishes of India.

*Remarks* : The siganids which are popularly known as rabbitfishes due to the fact of the rabbit like appearance of the mouth and rounded nose. Spines of these fishes have along sides deep grooves containing venom glands. The slightest contact with one of those spine tips produce a very painful puncture wound.

### Family GEMPYLIDAE

#### Snake mackerels

(Fig. 105)

Body elongate, compressed or semifusiform. Mouth large, jaws with strong teeth; those at front of upper jaw generally fang-like. Two dorsal fins, base of the second (excluding finlets) shorter than the first. Anal fin similar to second dorsal fin, with 1 to 2 free or comprised spines. Length of pectoral shorter than head length. Pelvic fins generally small, often reduced to a single spine with only a few or without soft rays, or entirely absent in adults. Caudal fin forked, the rays attached only to distal margin of hypurals. Lateral line single or double. Caudal peduncle without caudal keels, except *Lepidocybium*. Scales small to minute, or variously modified or absent.

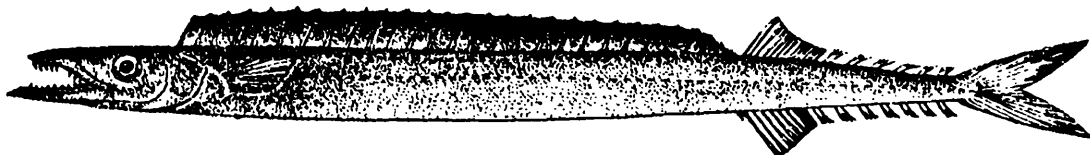


Fig. 105 : *Gempylus serpens* Cuvier

### Species known to occur in Andhra Pradesh

- 1 *Gempylus serpens* Cuvier (Snake mackerel)

2. *Nealotus tripes* Johnson (Black mackerel)

3. *Rexea bengalensis* (Alcock) (Bengal escolar)

**Key to the species**

- 1a. Lateral line single ..... *N. tripes* (25 cm SL)
- 1b. Lateral line double ..... 2
- 2a. Body depth 15 to 18 times in standard length. Two lateral lines, originating at one point near superior margin of operculum ..... *G. serpens* (1 m SL)
- 2b. Body depth 5 to 7 times in standard length. Two lateral lines, the lower one originates below 3rd to 7th spine of first dorsal fin ..... *R. bengalensis* (20 cm SL)

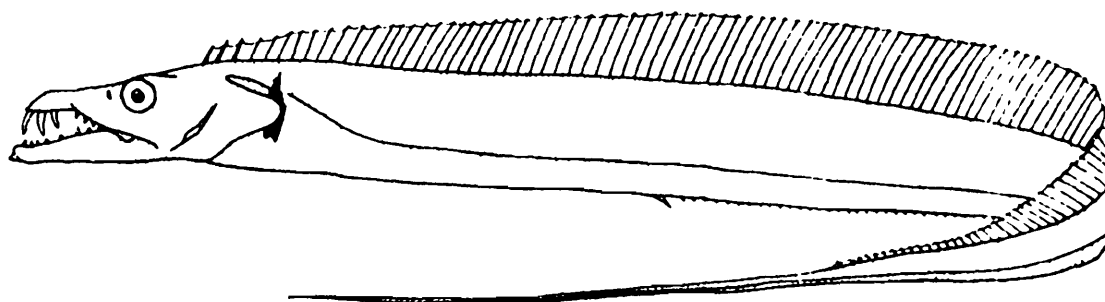
*Interest to fisheries* : There is no special fishery for the snake mackerels. These fishes are caught as by catch.

**Family TRICHIURIDAE**

**Ribbonfishes**

(Fig. 106)

Body very elongate and 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 portion, or the spinous part somewhat long and separated from soft portion by a notch. Anal fin preceded by 2 free spines posterior to anus (first inconspicuous and second variously enlarged as a leaf-like or keeled scute, or as a stout spine), with absent or reduced soft rays (sometimes, restricted to posterior part of the fin). Pelvic fins absent, or reduced to 1 scale-like spine and to 2 rudimentary soft rays. Pectoral fins rather small and inserted mid-laterally or lower on sides. Lateral line single. Scales absent.



**Fig. 106** : *Lepturacanthus savala* (Cuvier)

### Species known to occur in Andhra Pradesh

- 1 *Eupleurogrammus glossodon* (Bleeker) (Longtooth hairtail) (Savallu)
2. *E. muticus* (Gray) (Smallhead hairtail) (Savallu)
3. *Lepturacanthus pantului* (Gupta) (Coromondel hairtail) (Savala)
4. *L. savala* (Cuvier) (Savalani hairtail) (Savala)
5. *Trichirus gangeticus* Gupta (Ganges hairtail) (Sawala)
6. *T. lepturus* Linnaeus (Largehead hairtail) (Sawala)

### Key to the genera and species

- 1a. Pelvic fins scale-like. Free border of subopercle convex .....  
.....*Eupleurogrammus* Gill.....2
- 1b. Pelvic fins absent. Free border of subopercle concave ..... 3
- 2a. A pair of large fangs on tip 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 posterior to dermal process on bottom of lower jaw present. Pelvic fins inserted below 11th to 14th dorsal fin soft ray ..... *E. glossodon* (50 cm TL)
- 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 posterior to dermal process on ventral side of lower jaw. Pelvic fins inserted below 15th to 18th dorsal fin soft ray .....  
.....*E. muticus* (70 cm TL)
- 3a. First anal fin spine large, its length half of eye diameter; soft anal fin rays pungent spinules breaking through ventral skin. Two small canine teeth on upper jaw projects forward. A small slit present on ventral side of lower jaw for receiving anteriormost fang of upper jaw .....*Lepturacanthus* Fowler.....4
- 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 projects forward. No slit on ventral side of lower jaw *Trichiurus* Linnaeus ..... 5
- 4a. Snout rather short, its length almost 3 times in head length. Eye large, its diameter 5 to 7 times in head length. Suborbital length (distance between eye and upper jaw) almost half of eye diameter. Dorsal fin elements 123 to 133 .....  
.....*L. pantului* (92 cm TL)
- 4b. Snout long, its length almost 2 to 2.5 times in head length. Eye small, its diameter 7 to 9 times in head length. Suborbital length (distance between eye and upper jaw) slightly smaller than eye diameter. Dorsal fin elements 113 to 123 .....  
.....*L. savala* (1 m TL)

- 5a. Pectoral fin spine serrated. First anal fin spine inserted below almost 36th dorsal fin soft ray ..... *T. gangeticus* (50 cm TL)
- 5b. Pectoral fin spine not serrate. First anal fin spine inserted below 39th to 41st dorsal fin soft rays ..... *T. lepturus* (120 cm TL)

*Interest to fisheries* : Ribbon fishes are poor quality foodfish but they constitute one of the important commercial fisheries in India. These fishes are available in both the east and west coasts of India and form an exclusive fishery of considerable magnitude, especially in Andhra Pradesh, Tamil Nadu and Kerala. Though the flesh of these fishes are scanty, meat excellent to eat. Ribbon fishes are mostly marketed fresh or salted, sometimes also frozen.

### Family SCOMBRIDAE

#### Mackerels and Tunas

(Fig. 107)

Body torpedo-like and strongly built, generally metallic blue or blue-green dorsal surface. Gill membranes free from isthmus. Dorsal fins two (depressible into grooves) with finlets posterior to second dorsal and anal fins. Lateral line simple or branched. Body either uniformly covered with small cycloid scales or restricted to a corselet around the front part of body. The fishes of this family differ from most other fishes in having the caudal fin rays so deeply divided that they completely cover the hypural plate. Caudal peduncle slender with a pair of oblique keels near the end of caudal fin.

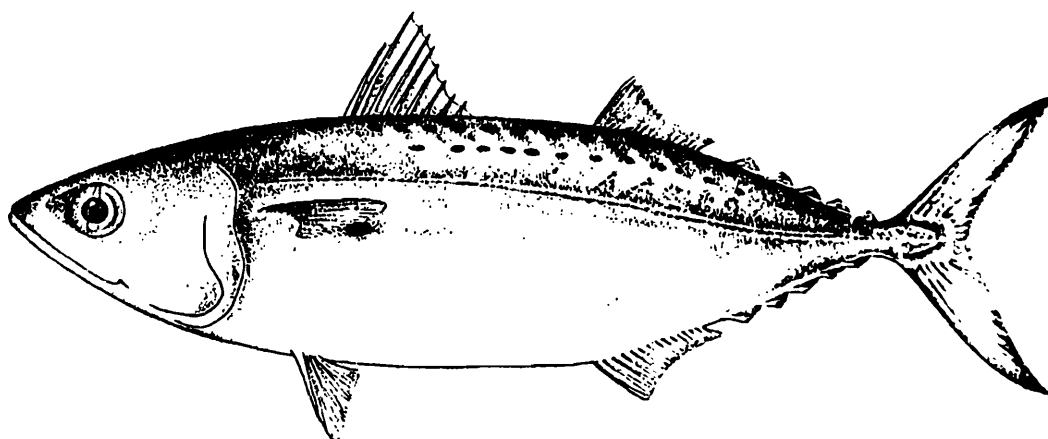


Fig. 107 : *Rastrelliger kanagurta* (Cuvier)

#### Species known to occur in Andhra Pradesh

1. *Auxis rochei* (Risso) (Bullet tuna)
2. *A. thazard* (Lacepede) (Frigate tuna)
3. *Euthynnus affinis* (Cantor) (Kawakawa) (Soora)

4. *Katsuwonus pelamis* (Linnaeus) (Skipjack tuna)
5. *Rastrelliger faughni* Matsui (Island mackerel)
6. *R. kanagurta* (Cuvier) (Indian mackerel) (Kannangatha)
7. *Sarda orientalis* (Temminck & Schlegel) (Striped bonito)
8. *Scomberomorus commerson* (Lacepede) (Narrowbarred Spanish mackerel) (Konema)
9. *S. guttatus* (Bloch & Schneider) (Indo-Pacific king mackerel) (Vanjaramu)
10. *S. koreanus* (Kishinouye) (Korean seerfish)
11. *S. lineolatus* (Cuvier) (Streaked seerfish) (Wingeram)
12. *Thunnus obesus* (Lowe) (Bigeye tuna)
13. *T. albacares* (Bonnaterre) (Yellow fin tuna)
14. *T. tonggol* (Bleeker) (Longtail tuna)

#### Key to the genera and species

- 1a. Two small keels on either side of caudal peduncle. Dorsal and anal finlets 5 each. Adipose eyelids cover front and rear of eye .....*Rastrelliger* Jordan & Starks....2
- 1b. Two small keels and a large median keel between them on either side of caudal peduncle. 7 to 10 dorsal and 6 to 10 anal finlets. Adipose eyelids absent ..... 3
- 2a. Gillrakers on lower half of first arch 21 to 26. Body relatively slender, depth at posterior margin of opercle 4.9 to 6 times in fork length. Length of intestine equal to or less than fork length ..... *R. faughni* (20 cm FL)
- 2b. Gillrakers on lower half of first arch 30 to 48. Body relatively deep, depth at posterior margin of opercle 3.7 to 5.2 times in fork length. Length of intestine 1.4 to 3.6 times in fork length ..... *R. kanagurta* (35 cm FL)
- 3a. Teeth in jaws strong, compressed, almost triangular or knife-like. Corselet of scales obscure ..... *Scomberomorus* Lacepede.....4
- 3b. Teeth in jaws slender, conical, hardly compressed. Corselet of scales well developed ..... 7
- 4a. Lateral line with a deep dip below first or second dorsal fin ..... *S. commerson* (220 cm TL)
- 4b. Lateral line straight or descending gradually backwards ..... 5
- 5a. Lateral line without auxiliary branches or with only a few anteriorly ..... *S. lineolatus* (180 cm FL)

- 5b. Lateral line with many small auxillary branches anteriorly ..... 6
- 6a. Dorsal fin spines 15 to 18, usually 16 or more. Intestine with 2 loops and 3 limbs. Head longer. 20.2 to 21.5% of fork length. Body depth less, 22.8 to 25.2% of fork length ..... *S. guttatus* (76 cm FL)
- 6b. Dorsal fin spines 14 to 17, usually 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* (150 cm FL)
- 7a. Upper surface of tongue without cartilaginous longitudinal ridges .....  
.....*S. orientalis* (161.6 cm FL)
- 7b. Upper surface of tongue with 2 longitudinal ridges ..... 8
- 8a. First and second dorsal fins widely separated, the space between them at least equal to length of first dorsal fin base. 10 to 12 spines in first dorsal fin. Interpelvic process single and long, at least as long as longest pelvic fin ray ..... *Auxis* Cuvier.....9
- 8b. First and second dorsal fins barely separated, at most by a space equal to eye diameter. 12 to 16 spines in first dorsal fin. Interpelvic process bifid and short, much shorter than pelvic fin rays ..... 10
- 9a. 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 front border of dorsal scaleless area ..... *A. thazard* (51 cm FL)
- 9b. 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* (50 cm FL)
- 10a. 3 to 5 conspicuous dark longitudinal stripes on belly. Total gillrakers on first arch 53 to 63 ..... *K. pelamis* (108 cm FL)
- 10b. No dark longitudinal stripes on belly. Total gillrakers on first arch 19 to 45 ..... 11
- 11a. Body naked behind corselet of enlarged and thickened scales. Several black spots usually present between pectoral and pelvic fin bases. Back dark blue green with a complex striped pattern under dorsal fin bases. Pectoral fin rays 25 to 29 .....  
.....*E. affinis* (100 cm FL)
- 11b. 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 .....  
..... *Thunnus* South.....12
- 12a. Ventral surface of liver with prominent striations. Centre lobe of liver equal to or longer than left and right lobes ..... *T. obesus* (200 cm FL)

- 12b. Ventral surface of liver without striations. Right lobe of liver much longer than left or central lobes ..... 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) elongate, more than 20% of fork length ..... *T. albacares* (200 cm FL)
- 13b. Total gillrakers on first arch 19 to 28, usually 26 or fewer. Second dorsal and anal fins never greatly elongate, less than 20% of fork length at all sizes ..... *T. tonggol* (130 cm FL)

*Interest to fisheries* : The fishes of this family constitute a very important commercial and recreational fisheries as well as artisanal fisheries. In fact, all scombrids are highly esteemed fishes for their quality flesh. The monotypic species *K. pelamis* forms a valuable fishery along both the coasts of India. *S. guttatus* and *S. lineolatus* are the most common seer fish along both the coasts of India. *S. koreanus* makes up an important part of the drift net fishery in Palk Bay and the Gulf of Mannar. *T. albacares*, *T. obesus* and *T. tonggol* are widely distributed along the east and west coasts of India.

#### Family XIPHIDAE

##### Swordfish

(Fig. 108)

Body elongate and cylindrical. Upper jaw enlarged into a long bill, flat, oval in cross section (both jaws enlarged into long bills in juveniles). Eyes large. Fine, file like teeth present in specimens of almost 1 m total length but disappear in adults. Dorsal fins two, well

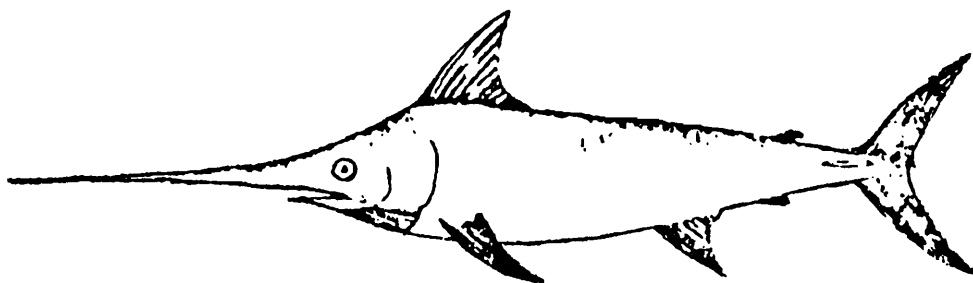


Fig. 108 : *Xiphias gladius* Linnaeus

separated in adults (continuous in juveniles), first dorsal with 34 to 49 and second dorsal with 4 to 6 rays. Anal fins two, separated in adults (continuous in juveniles), first anal with 13 to 14 and second anal with 3 to 4 rays. Pectoral fins falcate, inserted low on body sides, 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. Lateral line absent in adults (present in specimens of almost 1 m total length). Scales absent in adults but scales with spines present in specimens of almost 1m total length.

This family includes a single species throughout the world.

### Species known to occur in Andhra Pradesh

*Xiphius gladius* Linnaeus (Swordfish) (Katttchepa) (445 cm TL)

*Interest to fisheries* : *X. gladius* is a valuable commercial species, attaining almost 540 kg weight. The flesh of this fish greatly esteemed and liver oil of this fish is exceeding rich in vitamin A. This fish is found in deep waters beyond the limit of continental shelf on both the coasts of India.

### Family ISTIOPHORIDAE Billfishes, Sailfishes, Marlins and Spearfishes (Fig. 109)

Body elongated and cylindrical. Premaxilla prolonged, forming a long bill, round in cross section. Adult specimens with file like teeth in jaws. Dorsal fins two, close together, the first, much larger than the second. Anal fin two, separated, the first larger than the second. The first dorsal fin and anal fins can be folded back into grooves. Pectoral fins falcate, inserted

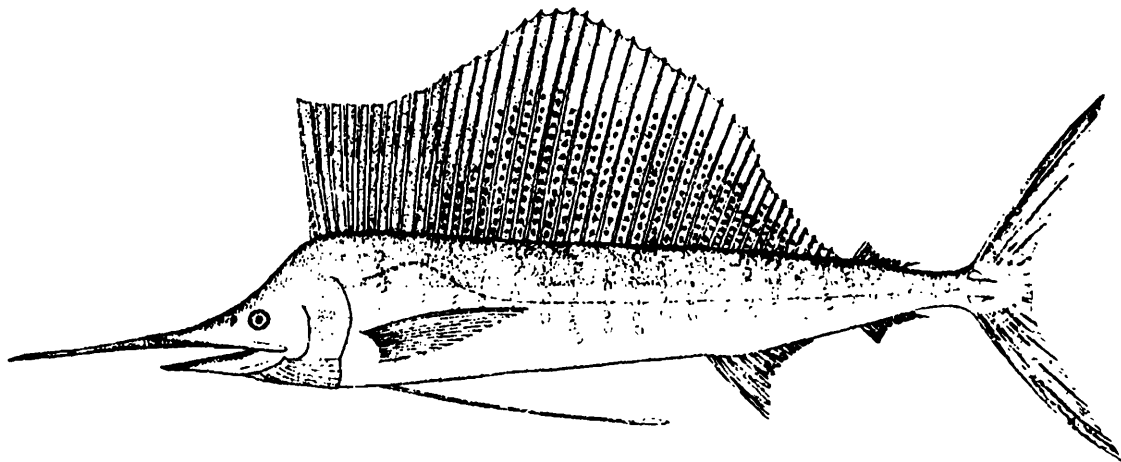


Fig. 109 : *Istiophorus platypterus* (Shaw & Nodder)

low on lateral sides of body. Pelvic fins with one spine and 2 soft 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. Lateral line distinct. Body with ossified and elongate scales, each with one to several points posteriorly.

### Species known to occur in Andhra Pradesh

- 1 *Istiophorus platypterus* (Shaw and Nodder) (Indo-Pacific sailfish)
2. *Makaira indica* (Cuvier) (Black marlin)
3. *Tetrapturus audax* (Philippi) (Striped marlin)

#### Key to the species

- 1a. First dorsal fin sail-like and considerably higher than body depth at level of middle of body. Pelvic fin rays very low, almost reaching to origin of anal fin, with conspicuous membrane ..... *I. platypterus* (340 cm TL)
- 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 membranes ..... 2
- 2a. Height of anterior lobe of first dorsal fin slightly greater than, or almost equal to, body depth. Nape slightly elevated or not elevated. Body considerably compressed .....  
..... *T. audax* (350 cm TL)
- 2b. Height of anterior lobe of first dorsal fin lower than body depth. Nape greatly elevated. Body not compressed laterally ..... *M. indica* (448 cm TL)

*Interest to fisheries* : The sailfishes are of some economic value and provide excellent food. Liver oils of these fishes are perhaps the richest of all in vitamin A. These fishes are keenly sought after by sport fishermen and also commercial longliers. *I. platypterus* is the most common species of all the sailfishes found along both the coasts of India. It grows up to 100 kg in weight. Most of the fishery for these spearfishes from various parts of the Indian Ocean is carried out by the Japanese and the catch data published from Japan show the presence of the rich fishing grounds even within a few miles off the Indian coast during certain seasons. Their distribution and general habits indicate that fishing activities threaten their continued abundance of fish whose biology and ecology are little known.

#### Family ARIOMMIDAE

#### **Arionna, Driftfish**

(Fig. 110)

Body oval and somewhat deep and compressed. Mouth small with minute teeth in jaws. Dorsal fins two, scarcely separated, the first with 10 to 13 spines and the second with 1 spine and 14 to 18 soft rays. Anal fin with 3 spines and 13 to 16 soft rays. Pectoral fins with 20 to 24 soft rays. Pelvic fins thoracic, inserted below pectoral fins or behind; attached to the abdomen with a membrane and folding into a long pronounced groove. Caudal fin stiff and deeply forked. Caudal peduncle square in cross section, with 2 low fleshy keels on each side. Scales cycloid (smooth) and easily detached. Lateral line high, following upper body profile.

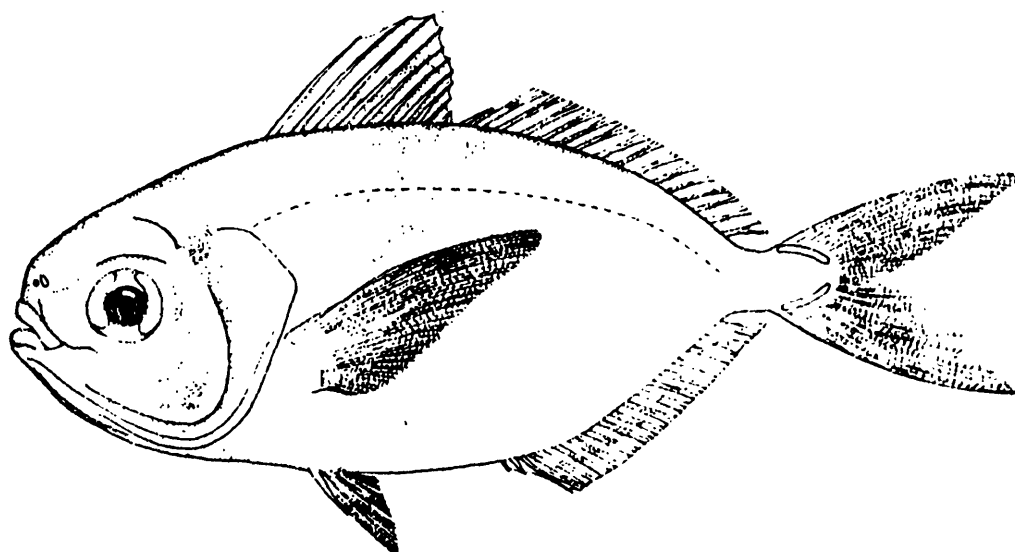


Fig. 110 : *Ariomma indica* (Day)

### Species known to occur in Andhra Pradesh

*Ariomma indica* (Day) (Indian driftfish) (23 cm TL)

*Interest to fisheries* : The driftfishes are found in small shoals in the mid-waters of the continental shelf and are captured commercially off the Kerala and Andhra Pradesh coasts. These are fine food fishes, rich in fat and marketed fresh or dried salted.

Family STROMATEIDAE

**Pomfrets**

(Fig. 111)

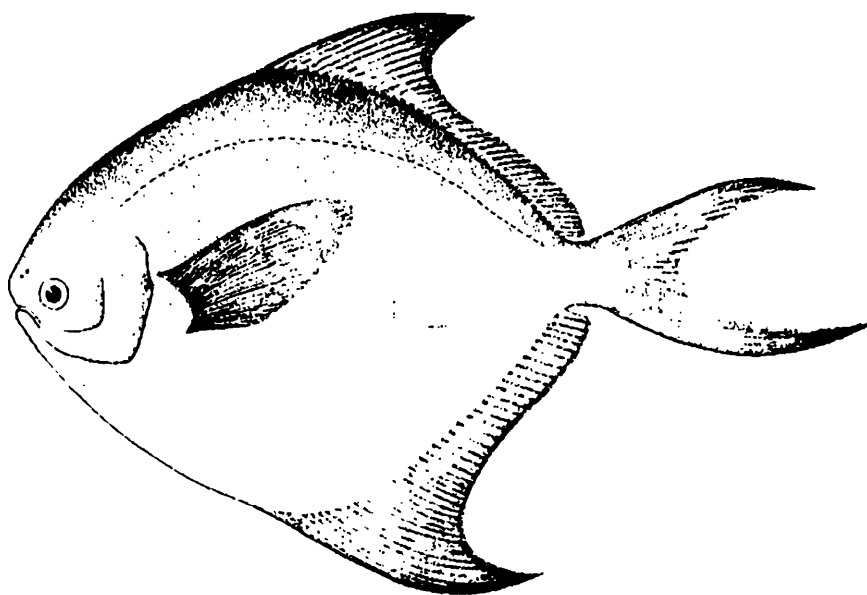
Body very deep and compressed. Mouth small with immovable maxilla. Eye with adipose lid. Teeth small, in a single row in both jaws. Gill membranes united with isthmus. Dorsal fin single, the rays not preceded by stout spines, but in some species 2 to 10 small blade-like spines are present ahead of the fin. Anal fin generally with 2 to 6 spines and 30 to 50 soft rays. Pelvic fins absent in adult specimens.

### Species known to occur in Andhra Pradesh

1. *Pampus argenteus* (Euphrasen) (Silver pomfret) (Chanduva)
2. *P. chinensis* (Euphrasen) (Chinese pomfret) (Chanduva)

### Key to the species

- Dorsal and anal fin falcate, preceded by 5 to 10 flat, blade-like spine. Caudal fin deeply forked ..... *P. argenteus* (31 cm)



**Fig. 111** : *Pampus argenteus* (Euphrasen)

- Dorsal and anal fins not falcate, but fin rays gradually diminish in length posteriorly, no spines preceding the median fins. Caudal fin emarginate .....  
..... *P. chinensis* (20 cm)

*Interest to fisheries* : *P. argenteus* is among the best commercial fishes which is in great demand and marketed fresh. It occurs in shoals generally away from the shore in comparatively deep waters. In Andhra Pradesh there is a gradual decline of the catch from the first to fourth quarters of the year but in Gujarat, Maharashtra and Kerala these fishes are best captured in the fourth quarter of the year. The spawning season of this species from February to August but intensive spawning is during April to June. *P. chinensis* is abundantly found in the coastal waters of India when it migrates to spawn. It is a common species along the coast of Orissa, Andhra Pradesh, Tamil Nadu and Karnataka.

### Order PLEURONECTIFORMES

#### Key to the families

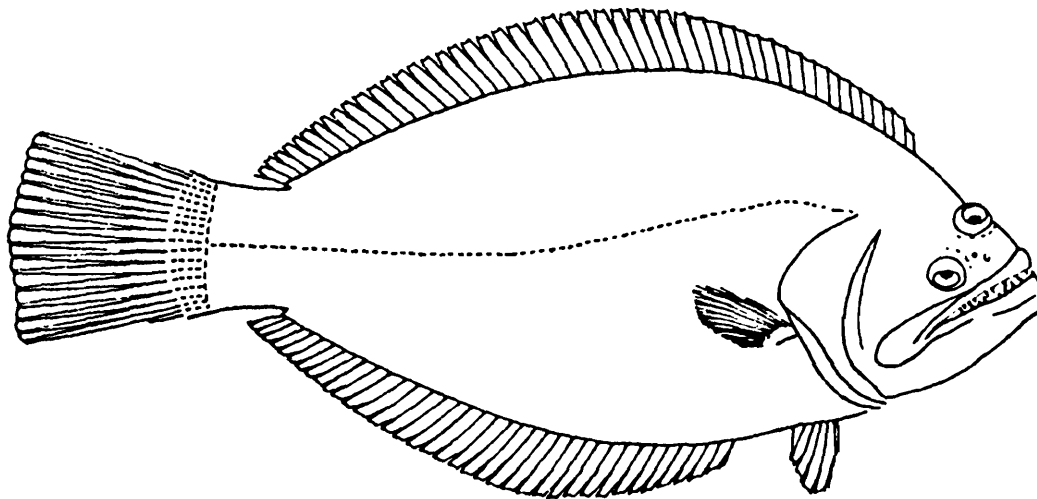
- 1a. Dorsal fin with spinous rays, its origin considerably posterior to eyes .....  
..... PSETTODIDAE
- 1b. Dorsal fin with only soft rays, its origin above or in front of lower eyes ..... 2
- 2a. Preopercular border free and visible, not concealed by skin or scales .....  
..... BOTHIDAE
- 2b. Preopercular border not free, hidden under the skin and scales ..... 3
- 3a. Eyes on right side of head ..... SOLEIDAE
- 3b. Eyes on left side of head ..... CYNOGLOSSIDAE

## Family PSETTODIDAE

**Indian Halibuts**

(Fig. 112)

Body oval, flat and highly thick. Both eyes on either left or right side. The upper eye very close to dorsal edge of body. Mouth large with strong teeth, the maxillary extends well beyond hind edge of lower eye. Gillrakers not developed. Single, long dorsal fin, its origin well behind eyes; anterior fin rays spinous. Lateral line with 70 to 75 scales, almost straight.

Fig. 112 : *Psettodes erumei* (Schneider)**Species known to occur in Andhra Pradesh**

1. *Psettodes erumei* (Schneider) (Indian Halibut) (Norce-nalake) (60 cm TL)

*Interest to fisheries* : *P. erumei* is an important food fish and are found on both the east and west coast of India and also occur in deeper waters. This fish forms an important fishery at Madras and Bombay coast where it is much valued as a good food fish.

## Family BOTHIDAE

**Lefteye flounder**

(Fig. 113)

Flatfishes with eyes on left side of head. Males with spines sometimes present before eyes. Mouth asymmetrical, teeth present in jaws, occasionally caniniform. Preopercle exposed, its posterior border free and visible. Pectoral and pelvic fins present. Dorsal fin long, its origin above or anterior to eyes. Caudal fin free from dorsal and anal fins. No spiny rays in fins. Single lateral line, sometimes forked behind upper eye, occasionally faint or absent on blind side.

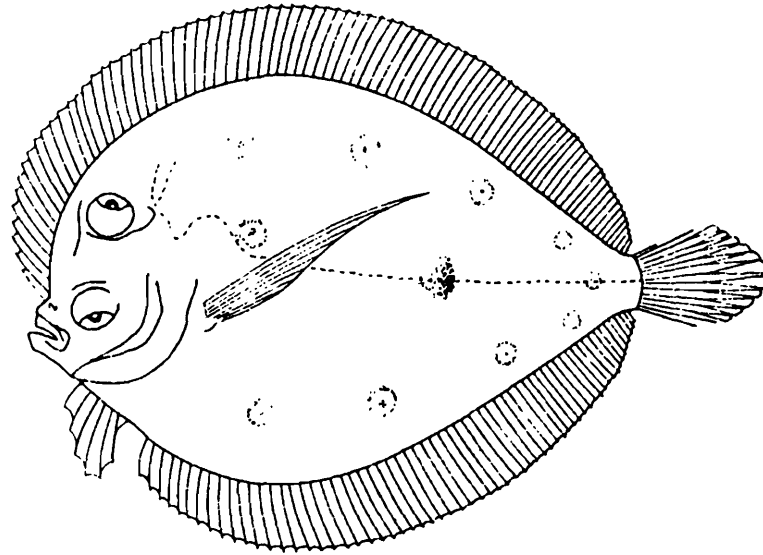


Fig. 113 : *Bothus myriaster* (Temminck & Schlegel)

### Species known to occur in Andhra Pradesh

1. *Bothus myriaster* (Temminck & Schlegel) (Oval flounder)
2. *B. pantherinus* (Ruppell) (Leopard flounder)
3. *Cephalopsetta ventrocellatus* Dutt & Rao
4. *Engyprosopon grandisquamis* (Temminck & Schlegel) (Largescale flounder)
5. *Grammatobothus polyphthalmus* (Bleeker)
6. *Pseudorhombus arsius* (Hamilton-Buchanan) (Largetoothed flounder) (Noree-nalaka)
7. *P. elevatus* Ogilby (Deep flounder)
8. *P. javanicus* (Bleeker) (Javan flounder)
9. *P. malayanus* (Bleeker) (Malayan flounder)
10. *P. triocellatus* (Schneider) (Three spotted flounder)

### Key to the genera and species

- 1a. Pelvic fin base of eyed side generally much longer than that of blind side..... 2
- 1b. Pelvic fin base of eyed side almost equal to that of blind side ..... 5
- 2a. Lateral line equally developed on both sides. 3 prominent blotches forming triangle on eyed side ..... *G. polyphthalmus*
- 2b. Lateral line absent or feebly developed on blind side ..... 3
- 3a. Lateral line without a forked branch behind upper eye.....  
..... *E. grandisquamis* (15 cm TL)

- 3b. Lateral line with a forked branch behind upper eye..... *Bothus* Rafinesque.....4
- 4a. Scales of eyed side cycloid, ctenoid at edges of body ..... *B. myriaster* (20 cm TL)
- 4b. Scales all ctenoid on eyed side ..... *B. pantherinus* (40 cm TL)
- 5a. Head length almost 2.5 times in standard length. Eye diameter about 4 times in head length ..... *C. ventrocellatus* (175 mm TL)
- 5b. Head length at least 3 times in standard length. Eye diameter more than 4 times in head length ..... *Pseudorhombus* Bleeker.....6
- 6a. Anterior rays of dorsal fin prolonged. 3 distinct blotches forming a triangle on body. 20 to 25 gillrakers on lower arm of first arch ..... *P. triocellatus* (15 cm TL)
- 6b. Anterior rays of dorsal fin not prolonged. 1 to 3 distinct blotches on straight part of lateral line but never forming a triangle on body. 8 to 15 gillrakers on lower arm of first arch ..... 7
- 7a. Scales on blind side of body ctenoid ..... *P. malayanus* (35 cm TL)
- 7b. Scales on blind side of body cycloid ..... 8
- 8a. Teeth strong, rather widely set, canines large; 6 to 13 teeth in lower jaw of blind side ..... *P. arsius* (30 cm TL)
- 8b. Teeth smaller, more closeset; not much enlarged anteriorly; generally more than 20 teeth in lower jaw of blind side ..... 9
- 9a. Eyed side with numerous blotches arranged in 5 irregular rows along body and 3 large distinct blotches along straight part of lateral line ..... *P. elevatus* (20 cm TL)
- 9b. Eye side with darker spots and blotches. A large blotch at anterior end of straight part of lateral line and a smaller blotch halfway to caudal fin base ..... *P. javanicus* (35 cm TL)

*Interest to fisheries*: Lefteye flounders are of little fishery value in our country. Although these fishes are never caught in large quantities, some species are often present in the catches. The flesh is of good quality but majority of the species are quite small in size.

### Family SOLEIDAE

#### Soles

(Fig. 114)

Body oval or almost elongate and greatly compressed flat fishes with eyes dextral (on right side of body). Preoperculum without a free margin, embedded in skin. Mouth small and asymmetrical, terminal or slightly inferior. Snout sometimes hookshaped. Dorsal fin extends on head to above eye or beyond; dorsal and anal fins free or confluent with caudal fin.

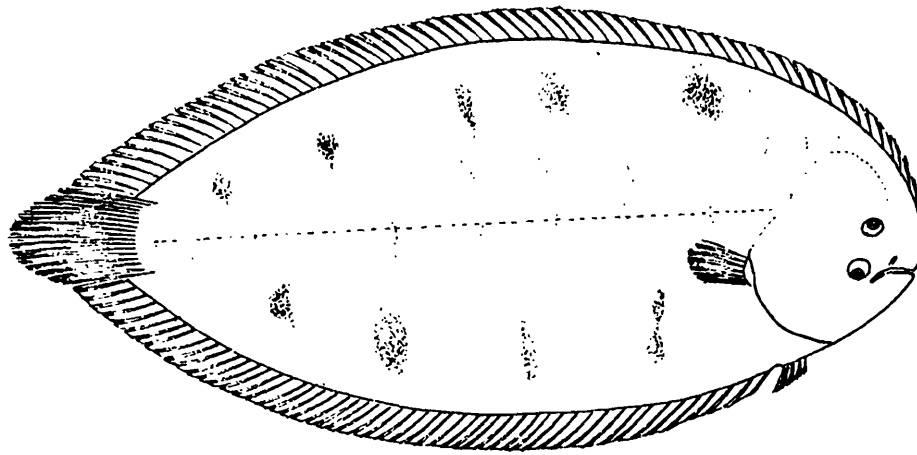


Fig. 114 : *Euryglossa orientalis* (Schneider)

Pectoral fins usually absent in adult. Pelvic fins sometimes asymmetrical, either free or joined to anal fin. Scales moderately large, cycloid or ctenoid; sometimes modified into skin flaps fringed with sensory filaments. Lateral line single and straight on body, sometimes branched on head.

#### Species known to occur in Andhra Pradesh

1. *Aesopia cornuta* Kaup (Horned sole) (Jerree potoo)
2. *Euryglossa orientalis* (Schneider) (Oriental sole)
3. *Heteromycteris oculus* (Alcock)
4. *Solea ovata* Richardson (Ovate sole)
5. *Synaptura albomaculata* Kaup (Kaup's sole)
6. *S. commersoniana* (Lacpede) (Commersoni's sole)
7. *Zebrias altipinnis* (Alcock) (Jerree potoo)
8. *Z. quagga* (Kaup) (Fringefin zebra sole) (Jerree potoo)
9. *Z. synapturoides* (Jenkins) (Zebra sole)
10. *Z. zebra* (Bloch) (Kaup's sole)

#### Key to the genera and species

- 1a. Snout forming a distinct hook ..... *H. oculus*
- 1b. Snout not forming a distinct hook ..... 2
- 2a. Caudal fin separate from dorsal and anal fins ..... *S. ovata*

- 2b. Caudal fin confluent with dorsal and anal fins ..... 3
- 3a. Opercular membrane not joined to pectoral fins ..... 4
- 3b. Opercular membrane on both sides of body joined to upper rays of pectoral fins .. 6
- 4a. Body oval. A bony process on snout absent ..... *E. orientalis* (24 cm TL)
- 4b. Body elongate. A bony process on snout present *Synaptura* Cantor ..... 5
- 5a. Scales on head and nape of ocular (eyed) side larger than those on body. Body without white spots. No tentacles between the nostrils ..... *S. commersonia* (32 cm TL)
- 5b. Scales on head and body similar in size. 2 or 3 rows of white spots on ocular side of body. A tentacle between the nostrils present ..... *S. albomaculata*
- 6a. First ray of dorsal fin elongate and free ..... *A. cornuta*
- 6b. First ray of dorsal fin not modified ..... *Zebrias* Jordan & Snyder ..... 7
- 7a. Posterior rays of dorsal and anal fins only 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* (15 cm TL)
- 7b. Posterior rays of dorsal and anal fins completely confluent to caudal fin. Outline of fins continuous around caudal fin ..... 8
- 8a. Body with 14 unpaired cross anal bands on ocular side. Eyes without tentacles ..... *Z. altipinnis*
- 8b. Body with 10 to 12 paired cross bands on ocular side. Eyes with or without tentacles ..... 9
- 9a. Eyes with small tentacles. 10 to 11 paired dark cross bands on ocular side ..... *Z. quagga* (15 cm. TL)
- 9b. Eyes without tentacles. 12 paired cross bands on ocular side ..... *Z. zebra*

*Interest to fisheries* : Soles are of minor fishery value in our country. Some of the species are of importance, highly esteemed as food and are marketed fresh and dried salted.

### Family CYNOGLOSSIDAE

#### Tongue soles

(Fig. 115)

Tongue-shaped flat fishes, with eyes sinistral (left side of head). Mouth asymmetrical, lips sometimes fringed, rostral hook present below mouth. Teeth minute and on blind side only. Preopercle margin not free, covered with skin and scales. Dorsal fin originates on head: both dorsal and anal fins confluent with caudal fin; pectoral fin absent; only left pelvic fin present;

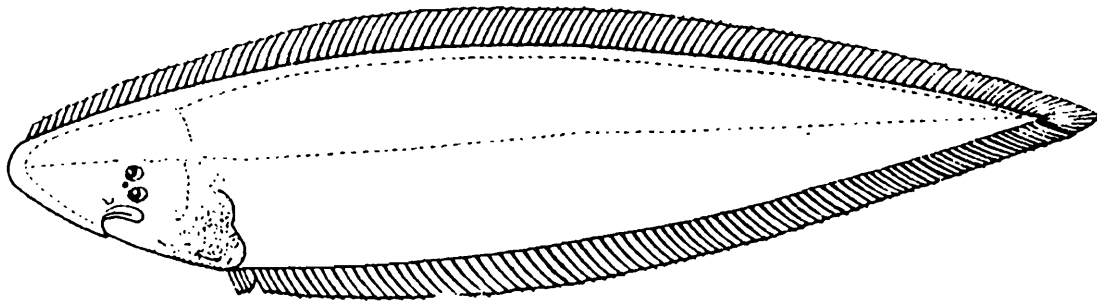


Fig. 115 : *Cynoglossus arel* (Schneider)

no spiny rays in dorsal and pelvic fins. Scales small, ctenoid or cycloid; lateral line variable 0 to 3 on ocular side and 0 to 2 on blind side.

#### Species known to occur in Andhra Pradesh

1. *Cynoglossus arel* (Schneider) (Largescale tonguesole)
2. *C. bilineatus* (Lacepede) (Fourlined tonguesole )
3. *C. dubius* Day (Carrot tonguesole)
4. *C. lingua* Hamilton-Buchanan. (Long tonguesole)
5. *C. macrostomus* Norman (Malabar tonguesole)
6. *C. puncticeps* (Richardson) (Speckled tonguesole )
7. *C. semifasciatus* Day
8. *Paraplagusia bilineata* (Bloch) (Double lined tonguesole ) (Nahiakhkul/Arabu)
9. *P. blochii* (Blecker) (Bloch's tonguesole)

#### Key to the genera and species

- 1a. Lips with row of fringed tentacles ..... *Paraplagusia* Blecker.....2
- 1b. Lips smooth, not fringed ..... *Cynoglossus* Ham. Buch. ....3
- 2a. Scales 16 to 19 between upper and middle lateral lines. Rostral hook long and generally reaching beyond lower eye ..... *P. bilineata* (30 cm TL)
- 2b. Scales 13 to 15 between upper and middle lateral lines. Rostral hook shorter, generally not reaching beyond lower eye ..... *P. blochii*
- 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* (50 cm TL)
- 4b. Two lateral lines blind side.. ..... *C. bilineatus*
- 5a. Scales cycloid on blind side of body ..... 6
- 5b. Scales ctenoid on blind side of body ..... 7
- 6a. Scales 11 to 12 between lateral lines on ocular side of body ..... *C. lingua*
- 6b. Scales 7 to 9 between lateral lines on ocular side of body .....  
..... *C. arel* (38 cm TL)
- 7a. Cleft of mouth extending far back to hind border of fixed eye .....  
..... *C. macrostomus* (15 cm TL)
- 7b. Cleft of mouth extending to only middle or almost hind border of fixed eye .....8
- 8a. Scales 16 to 19 between lateral lines ..... *C. puncticeps* (18 cm TL)
- 8b. Scales 11 to 14 between lateral lines ..... *C. semifasciatus*

*Interest to fisheries* : Tongue soles are of minor fisheries significance. These fishes are marketed fresh, frozen or dried salted.

### Order TETRAODONTIFORMES

#### Key to the families

- 1a. Teeth fused to form a parrot-like beak. Pelvic fins and dorsal fin spines absent..... 2
- 1b. Teeth not fused into a form a parrot-like beak as in 1a ..... 3
- 2a. Body covered with spines, capable of great inflation. Teeth 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 these fishes are literally 'four toothed', as their family name describes ..... TETRAODONTIDAE
- 3a. Body almost completely encased in a bony shell or carapace formed of enlarged, thickened scale plates, usually 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 spines 6 (usually only 5 visible, the 6th being very small) ..... TRIACANTHIDAE

- 4b. Pelvic fins and spines very small or absent. Dorsal fin spines 2 or 3 ..... 5
- 5a. Dorsal fin spines 2, only first spine is especially large and prominent. Body covered by smooth to rough shagreen like skin consisting of small scales armed with 1 to many fin spinules ..... MONACANTHIDAE
- 5b. Dorsal fin with 3 visible spines. Body encased with very thick, tough skin with large rectilinear scale plates easily discernible as individual units ..... BALISTIDAE

Family BALISTIDAE  
**Trigger fish, Durgons**  
 (Fig. 116)

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, teeth 8 in an outer series in the upper jaw and 8 in the lower jaw. Two dorsal fins, the first dorsal with 3 spines, the 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 fin 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.

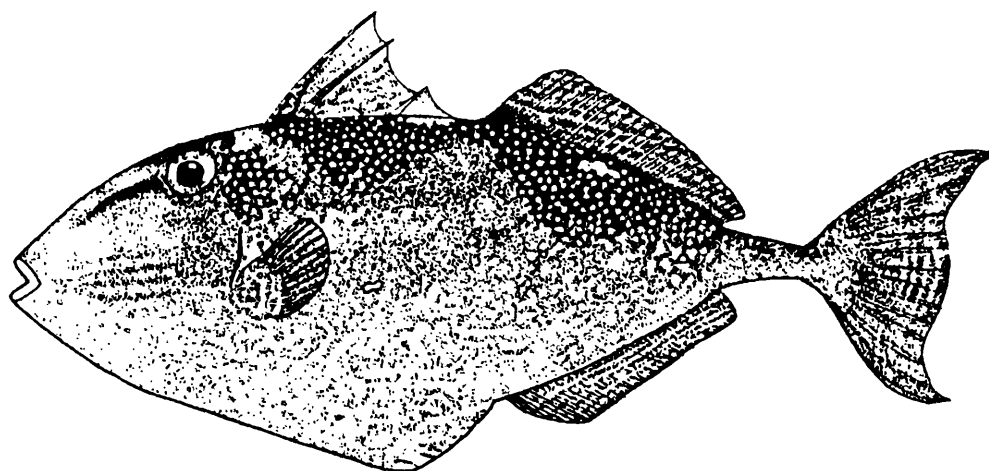


Fig. 116 : *Abalistes stellatus* (Lacepede)

**Species known to occur in Andhra Pradesh**

1. *Abalistes stellatus* (Lacepede) (Starry trigger fish) (Samudrum yelaka)
2. *Balistes erythrodon* Gunther (Red toothed filefish)
3. *Sufflamen freniatus* (Bloch and Schneider) (Masked triggerfish)

**Key to the species**

- 1a. Caudal peduncle distinctly depressed ..... *A. stellatus* (60 cm TL)
- 1b. Caudal peduncle not depressed ..... 2
- 2a. Scales on posterior part of body without keels forming longitudinal ridges .....  
..... *B. erythrodon*
- 2b. Scales on posterior part of body with keels at the centre forming longitudinal ridges.  
relatively low in juveniles and females, high in adult males ..... *S. frenatus*

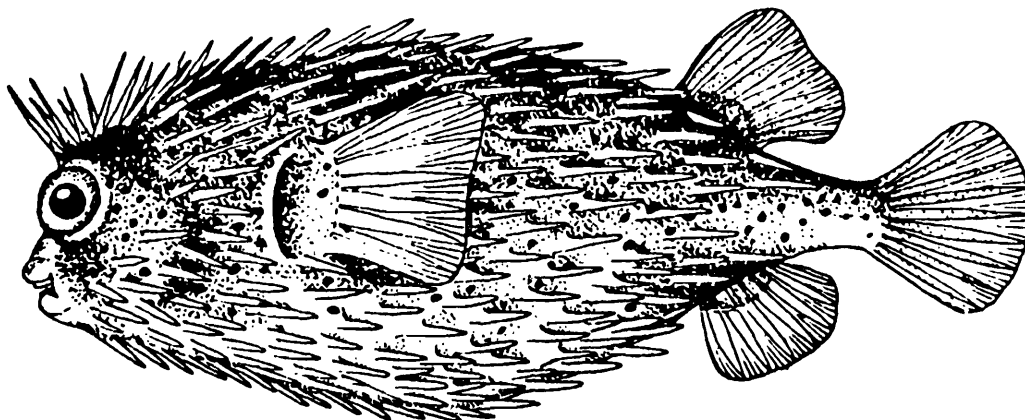
*Interest to fisheries* : The fishes of the family Balistidae are of no commercial importance. They are caught as by catch in commercial bottom trawls.

Family DIODONTIDAE  
**Porcupinefish, Ballonfish**  
 (Fig. 117)

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. Gill openings, a small vertical slit just ahead of the pectoral fins. 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 the body. Most of the fins branched. Caudal fin rounded. Pelvic fins absent. Lateral line not prominent.

**Species known to occur in Andhra Pradesh**

*Diodon hystrix* Linnaeus (Porcupinefish)



**Fig. 117** : *Diodon hystrix* Linnaeus

*Interest to fisheries* : The fishes of the family Diodontidae are of no commercial importance. These fishes are occasionally caught as by catch in the commercial catches.

### Family MONACANTHIDAE

#### Leather jackets

(Fig. 118)

Body fusiform, deep and compressed covered by smooth to rough shagreen like skin consisting of minute to small scales armed with 1 to many fine spinules. Mouth small, terminal with pointed teeth not fused together. Gill openings a short vertical to oblique slit anterior to or above pectoral fin base. Two dorsal fin spines, the first large and generally

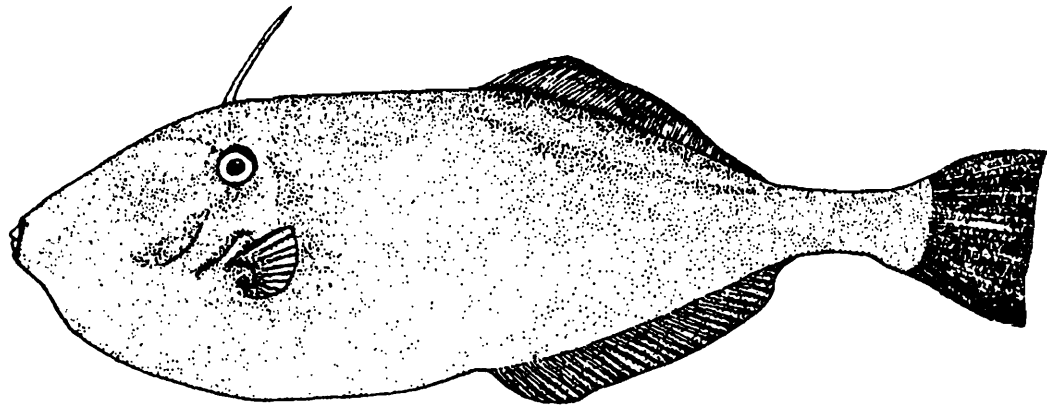


Fig. 118 : *Alutera monoceros* (Linnaeus)

armed with downward curving barbs; the second spine very small and capable of locking the first in an upright position. Pelvic fins very small or absent. Pelvis usually capable of vertical movement giving rise to a vertical flap. Caudal peduncle sometimes armed with conspicuous spines, elongate bristles or a dense patch of the bristles. Caudal fin rounded or truncate.

#### Species known to occur in Andhra Pradesh

*Alutera monoceros* (Linnaeus) (Unicorn leather jacket) (55 cm TL)

*Interest to fisheries* : Leather jackets are of little commercial importance. *A.monoceros* is reported to be excellent eating when skinned. These fishes are occasionally caught as by catch in the commercial bottom trawls.

### Family OSTRACIIDAE

#### Boxfishes, Cowfishes

(Fig. 119)

Body elongate, almost completely covered in a bony shell or carapace formed of enlarged, thickened scale plates, generally hexagonal in shape and firmly sutured to one another. The

carapace has openings for mouth, eyes, gill slits, pectoral, dorsal and anal fins and for the flexible caudal peduncle, and is either triangular in cross section, rectangular or pentangular. Scale plates sometimes have surface granulations and in some species these are enlarged into conspicuous carapace spine above eye or along ventrolateral or dorsal angles of body. Gill openings short, ventral to oblique slits before pectoral fin. Mouth small, terminal with fleshy lips. Spinous dorsal fin absent, most dorsal, anal and pectoral fins with branched rays. Pelvic fins absent. Lateral line not prominent. Caudal fin long.

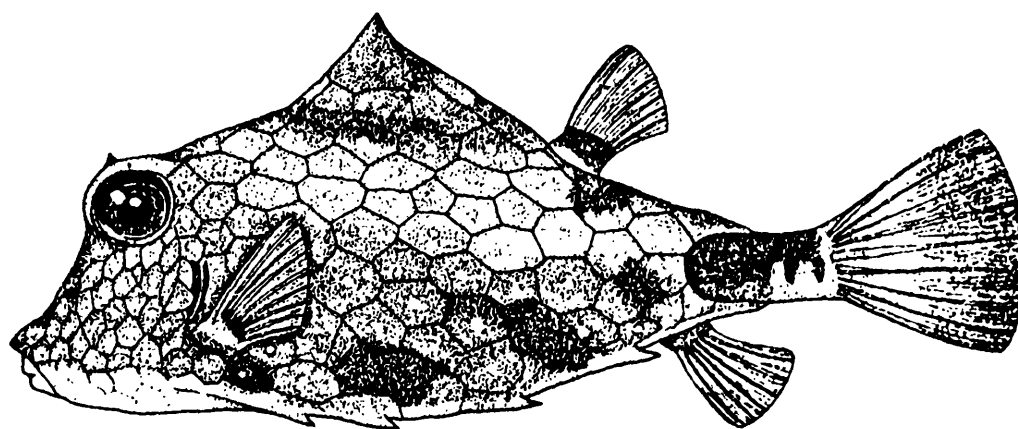


Fig. 119 : *Tetrosomus gibbosus* (Linnaeus)

#### Species known to occur in Andhra Pradesh

*Tetrosomus gibbosus* (Linnaeus) (Hunchback boxfish) (30 cm TL)

*Interest to fisheries* : The fishes of the family Ostraciidae have no commercial importance. They are usually considered as trashfish and not consumed because many species are reported to have poisonous substance in their flesh. These fishes are caught as by catch in the commercial bottom trawls.

#### Family TETRAODONTIDAE

##### Pufferfish, Blowfishes

(Fig. 120)

Body naked or with only short prickles. Heavy blunt body capable of rapid inflation by intake of water (or air). Jaws modified in form a beak of 4 heavy, powerful teeth, 2 above and 2 below. Gill openings simple slits anterior to pectoral fins. Eyes located high on head. Pelvic fins absent. Dorsal and anal fins inserted far posteriorly, consisting no spines, but each with 7 to 15 soft rays. Caudal fin truncate, rounded or emarginate to somewhat lunate. Lateral lines, when present often indistinct forming an interconnecting pattern on the sides of head and body.

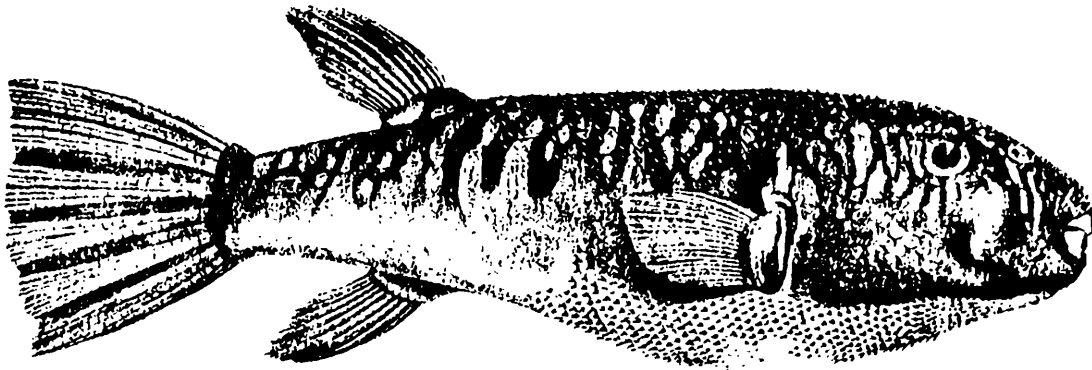


Fig. 120 : *Sphoeroides oblongus* (Bloch)

### Species known to occur in Andhra Pradesh

1. *Arothron reticularis* (Bloch and Schneider) (Reticulated pufferfish) (Kappa)
2. *Canthigaster margarita* (Ruppell) (Ocellated toby)
3. *Chelonodon patoca* (Hamilton-Buchanan) (Shaggy fishing frog)
4. *Lagocephalus lunaris* (Bloch and Schneider) (Rough backed blowfish) (Kappa, Koorawah)
5. *Sphoeroides oblongus* (Bloch)

### Key to the species

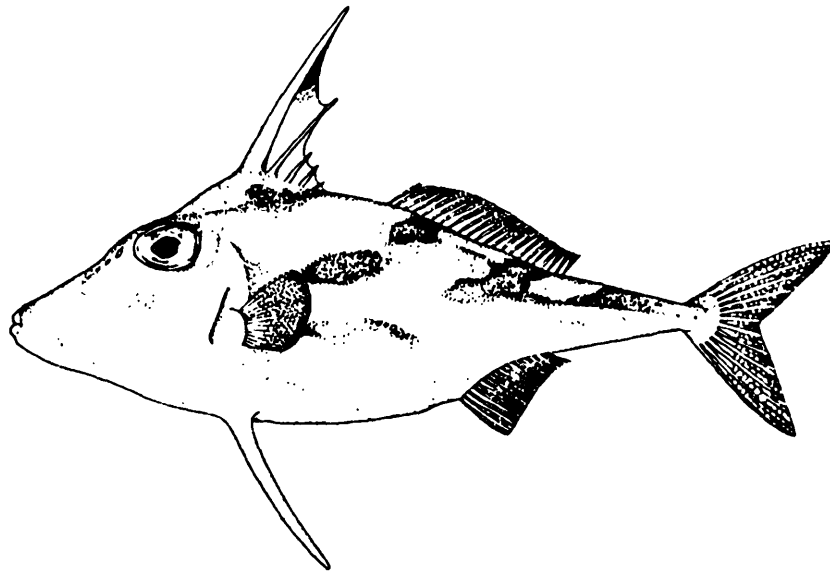
- 1a. Nostrils minute, barely visible without aid of magnification. Dorsal surface posterior to eyes distinctly keeled ..... *Canthigaster margarita*
- 1b. Nostrils easily visible without magnification. Dorsal surface posterior to eyes almost smooth, without a distinct keel ..... 2
- 2a. Nostril an upright sac with two openings ..... 3
- 2b. Nostril either an upraised cup with two fleshy lobes or a solid bifid tentacle ..... 4
- 3a. A single lateral line on side of body ..... *Sphoeroides oblongus*
- 3b. Two lateral line on side of body ..... *Lagocephalus lunaris*
- 4a. A single lateral line on side of body ..... *Arothron reticularis*
- 4b. Two lateral lines, the upper joining the lower in the region above or behind the anal fin ..... *Chelonodon patoca*

*Interest to fisheries* : The pufferfishes have no commercial value. These fishes are occasionally caught as a by catch in the commercial catches.

*Remarks* : The viscera and skin of many pufferfishes contain poisonous substance, therefore, these fishes are avoided for consumption. However, the effect of this poison on other marine animals is not fully known but its toxicity to terrestrial animals is well known.

**Family TRIACANTHIDAE**  
**Tripodfishes, Triplespines**  
 (Fig. 121)

Body compressed and deep with numerous scales not individually visible with naked eyes. Each scale with upright spinules. Gill openings a short vertical slit anterior to pectoral fins. Mouth small and generally terminal. Dorsal fin spines 6 (generally 5 visible only, the 6th being very small) and 20 to 26 soft rays. Anal fin rays 13 to 22. Pelvic fins represented by a large spine which is movably articulated with anterior end of pelvis and capable of being locked erect by a flange of the pelvis. Caudal fin deeply forked. Caudal peduncle distinctly tapered. Lateral line not prominent.



**Fig. 121** : *Pseudotriacanthus strigilifer* (Cantor)

**Species known to occur in Andhra Pradesh**

1. *Pseudotriacanthus strigilifer* (Cantor) (Long-spines tripod fish)
2. *Triacanthus biaculeatus* (Bloch) (Short-nosed tripod fish)

**Key to the species**

- Scale covered ventral surface of pelvis almost as wide anteriorly as posteriorly, not distinctly tapered to a point. Length of second dorsal fin spine not greater than half the length of first dorsal spine..... *T. biaculeatus* (30 cm TL)

- Scale covered ventral surface of pelvis wider anteriorly than posteriorly, distinctly tapered to a point. Length of second dorsal fin spine more than half the length of first dorsal spine ..... *P. strigilifer* (25 cm TL)

*Interest to fisheries* : Tripodfishes are of no commercial value, they are caught as a by catch in the commercial bottom trawls.

### SUMMARY

Andhra Pradesh lying on the banks of the Bay of Bengal of the east coast of India has a rich fish and fisheries resources. The present work shows a total number of 580 species belonging to 292 genera, 121 families and 27 orders of marine and estuarine fish fauna are known to available in this state. A brief descriptions of all the families along with key to the species, genera and families are furnished in the present work. English and Telugu common names of the fishes found in this state are provided. The maximum total length (TL) or standard length (SL) and fork length (FL) are also furnished along the names of the species in their respective keys.

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