OCCASIONAL PAPER NO. 121

Records of the Zoological Survey of India

A collection of Cumacea from the South West and South East coasts of India

A. Radha Debi
C. V. Kurian

Zoological Survey of India

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A COLLECTION OF CUMACEA FROM THE SOUTH WEST AND SOUTH EAST COASTS OF INDIA

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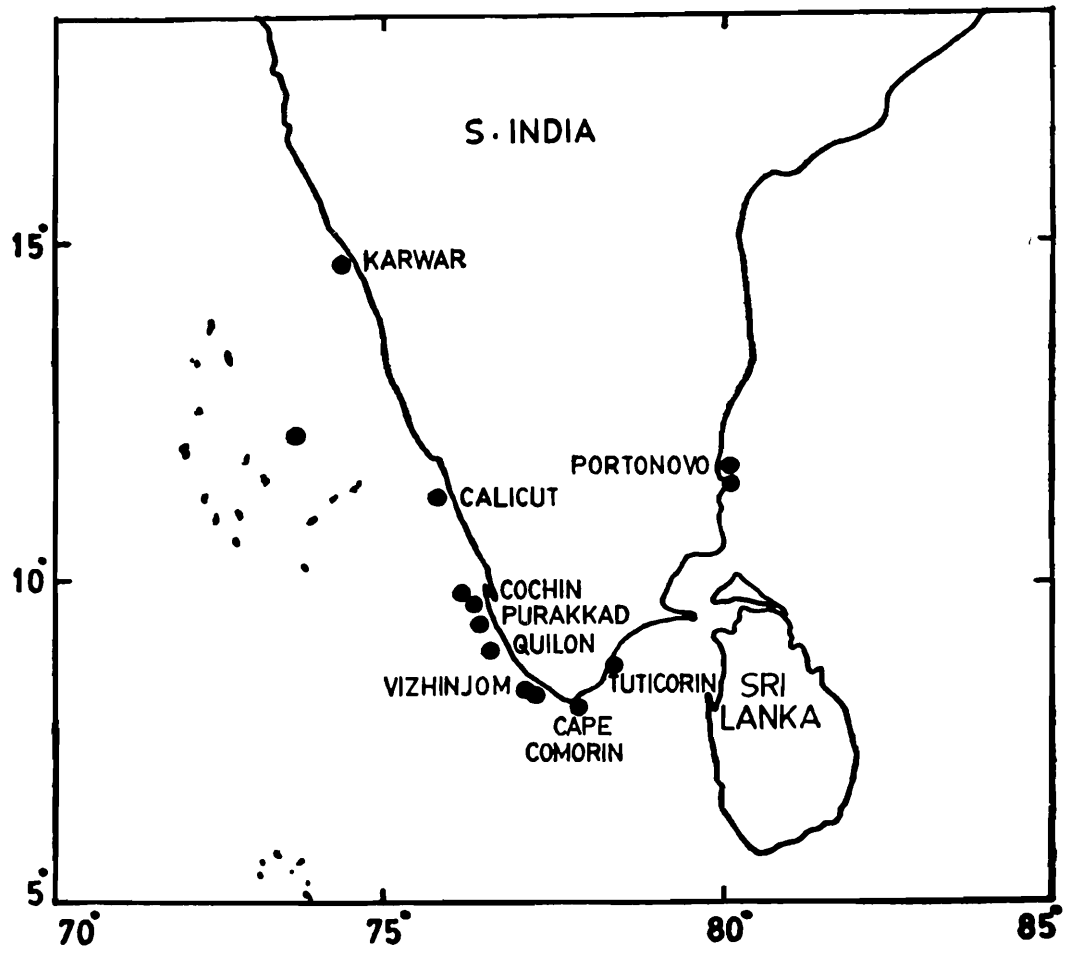
INTRODUCTION

The Cumacea dealt with in this paper are mostly from collections obtained from Karwar, Calicut, Cochin, Purakkad, Quilon, Vizhinjom, Cape Comorin, Tuticorin and Portonovo coasts during 1975-1983 (Map-1). A few specimens obtained earlier are also included. These form both benthic and planktonic species. The intertidal sandy ground of Portonovo showed the maximum abundance of Cumacea along the S. East Coast, while Vizhinjom-Trivandrum region showed the maximum



Map 1-showing the stations along the Indian Coasts from where Cumacea specimens were collected. ● ● Stations.

distribution along the S. West Coast. It is also noted that family Bodotriidae predominated in almost all collections. *Gigacuma halei*, *Eocuma taprobanica*, *Iphinoe brevipes*, and *I. pigmenta* were the most common species along the S. West Coast, while *Bodotria Platybasis* was observed in abundance at Portonovo. During the present investigation

● ● Part of the Ph. D. thesis for which degree was awarded by Cochin University to A Radha Devi.

33 species were observed of which 15 are recorded here for the first time, 4 are described as new species. All labelled specimens are deposited in the Zoological Survey of India, Calcutta. The above work was carried out in the Pelagic Fisheries Laboratory of CMFRI, Cochin as a part of the Scheme sanctioned by ICAR. The authors are thankful to the Director, CMFRI, for providing necessary facilities for carrying out the investigations.

The following is a list of species :

Family BODOTRIIDAE

Sub family VAUNTHOMSONIINAE

Heterocuma africana Zimmer
Heterocuma armata Kurian
Heterocuma andamani Kurian
Gigacuma halei Kurian

Sub family BODOTRIINAE

Eocuma taprobanica Calman
Eocuma stellifera Calman
Eocuma lata Calman
Eocuma sanguinea Kurian & Radha
Bodotria pulchella (Sars)
Bodotria sublevis Calman
Bodotria pulex (Zimmer)
Bodotria similis Calman
Bodotria siamensis Calman
Bodotria platybasis Radha & Kurian
Bodotria biocellata sp. nov.
Bodotria cochinensis sp. nov.
Cyclaspis herdmani Calman
Cyclaspis uniplicata Calman
Cyclaspis strigilis Hale
Cyclaspis cretata Hale
Cyclaspis juxta Hale
Iphinoe brevipes Hansen
Iphinoe calmani Fage
Iphinoe serrata Norman
Iphinoe inermis Sars
Iphinoe pigmenta Kurian
Iphinoe macrobrachium Calman

Family NANNASTACIDAE

Nannastacus lepturus Calman
Cumella laevis Calman
Campylaspis minor Hale
Campylaspis minuta sp. nov.
Campylaspis robusta sp. nov.

Family DIASTYLIDAE

Paradiastylis culicoides Kemp.

Genus **Heterocuma** Miers

Heterocuma africana Zimmer

1921 *Heterocuma africana*, Zimmer, *Mitt. Zool. Mus. Naturk. Berlin*, **10, 1, pp. 129-131, figs. 25-27.**

1954 *Heterocuma africana*, **Kurian, *Rec. Indian* Mus., 52, parts 2-4, pp. 294-296, fig. 7.**

Locality : Cape Comorin, 18m, Bongo net, 8.7.1975, 1 ♀ 4mm ; Tuticorin, 10m, 15.11.1975, 1 ♀ 4.8mm ; Portonovo, 20m, May-June 1970, 2 ♀ ♀ 9-9. 5mm.

Female : Resembles *H. africana* described by Kurian.

Slight difference noticed only in the armature of the uropods. Peduncle slightly longer than the last telsonic somite (equal to telsonic somite, Zimmer 1921 and shorter, Kurian 1954). Peduncle with sixteen spines on the inner margin compared to twelve described by Kurian and seven by Zimmer. Endopod two jointed, second joint slightly longer than the first which has eleven spines, second with nine marginal spines and three apical spines. Exopod slightly longer than endopod with numerous long setae on inner margin and free end.

Distribution : West Africa, Andamans, Ross Islands.

Heterocuma armata Kurian

1954 **Heterocuma *armata*, Kurian, *Rec. Indian* Mus., 52, parts 2-4, pp. 296-298, fig. 8.**

***Locality*: Portonovo, 20m, May-June 1970, 1 ♀ 4mm, 1 ♂ 4.9mm.**

Female. Closely resembles the type specimen. The only difference noticed is that the first pedigerous segment is very distinct here and not as short as in the type. The distal lobe of the basis of the third maxilliped does not show a logitudianal ridge with teeth as described in ***H. armata* Kurian.**

Male (Figs. 1 & 2) Male of this species has not been recorded before and .so its description is given here. Carapace less than one-fourth of the total length. Lateral margin of carapace not serrated, flagellum of the second antenna reaches upto the last pleon somite.

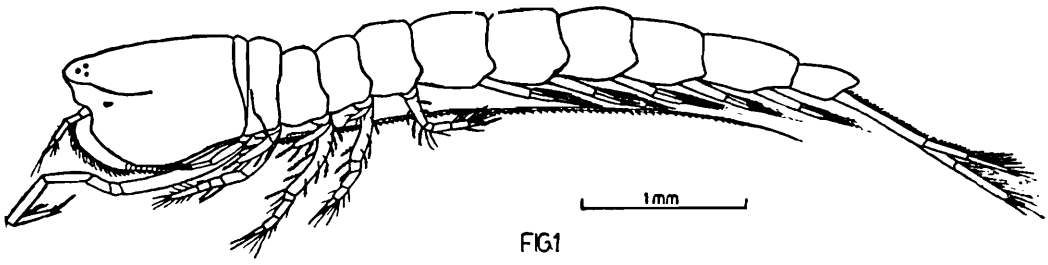


Fig. I *Heterocuma armata* Kurian : Male

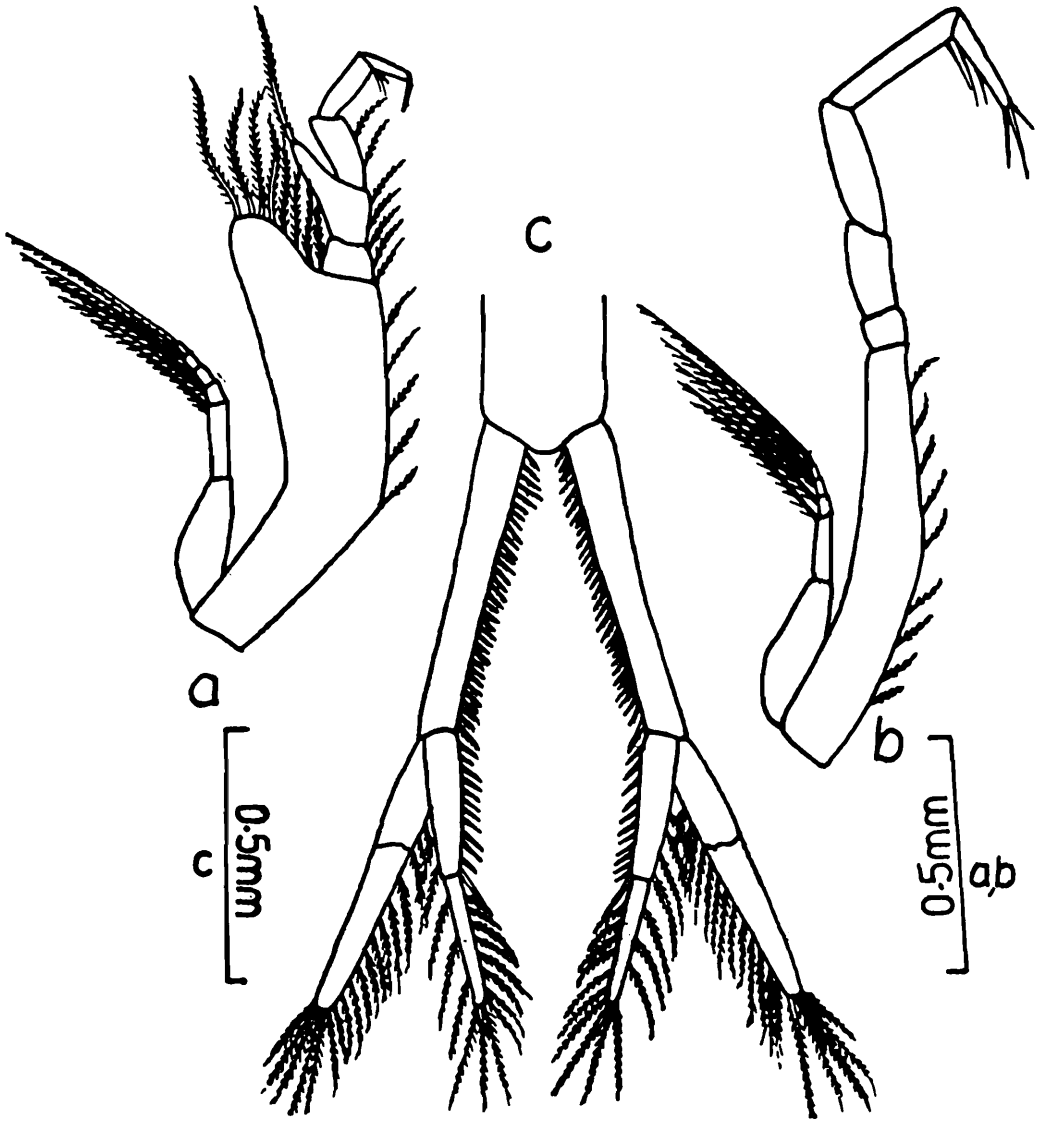


FIG. 2

Fig. 2 *Heterocuma armata* Kurian : Male.
a. Third maxilliped b. First peraeopod c. Uropod

Basis of third maxilliped without stout teeth on the lateral ridges. Basis of first peraeopod shorter than the rest of the segments combined

together, serrated on its inner margin and with short plumose setae. Second peraeopod with basis shorter than the other segments combined together, ischium indistinct, merus with a long stout spine which reaches to about half the length of dactylus ; carpus also with a short stout spine which reaches beyond propodus ; dactylus longer than carpus and propodus combined, with numerous spines on both sides and terminal region. Peraeopods 3-5 similar in structure ; third and fourth with rudimentary exopods.

Last pleon segment three-fourths the fifth, not produced in between the uropods. Peduncle with thirty three plumose spines, closely arranged. Endopod two-jointed, first slightly longer than second, with twelve spines, the last one long and stout. The second joint with seven plumose setae on its inner margin, three on its terminal region and six on the external margins. Exopod slightly longer than endopod, with thirteen plumose setae on the inner margin and five on the terminal part ; no setae on the external margin.

Distribution. Off Puri, Orissa ; Madras.

Heterocuma andamani Kurian

1954 *Heterocuma andamani*, Kurian, *Rec. Indian Mus.*, 52, parts 2-4, pp. 290-294, figs. 5-6.

Locality : Vizhinjom, Open Sea, 20m, 25.2.1982, 1 ♀ 5.2mm.

Female. Carapace smooth with distinct dorso-median carina in the anterior half, which becomes faint towards distal half. Eye pigmented with numerous lenses (three in Kurian's type ovigerous female). Antero-lateral angle of carapace acute and bears a sharp tooth as in the type. A dorso-median carina extends from the first pedigerous somite to the last pleon somite. Basis of third maxilliped with plumose setae on the distal lobe at the summit and inner margin.

Peduncle of uropod, slightly shorter than exopod, but longer than endopod, with twelve short spines on the inner margin. First joint of endopod slightly shorter than second, with seven spines on the inner margin and a long and stout terminal spine ; second joint with six spines and three long unequal terminal spines and setae on the external margin (12 spines in the first, numerous in the second joint—Kurian). Exopod with nine or ten long setae on the inner margin and four long unequal terminal spines.

Distribution. Andaman Islands.

Genus **Gigacuma** Kurian

Gigacuma halei Kurian

1951 *Gigacuma halei* Kurian, *Bull. Centr. Res. Inst. Univ. Travancore*, (C), 2, 1, pp 102-105, pl. 2-4, figs. 25-43.

1954 *Gigacuma halei*, Kurian, *Rec. Indian Mus.*, 52, parts 2-4, p. 290.

Locality : Vizhinjom, St. No. 145, 24m, dredge collection, 24-4-1959, 11 ♀ ♀ 6.8-9.5mm ; Vizhinjom Bay 15m, surface plankton, 5-11-1980, 1 ♀ 8.2mm ; 30.9.1981, 4 ♀ ♀ 2.5-5.6mm ; 29-7-1982, 1 ♀ 3.2mm : 15.11.198?, 2 ♀ ♀ 6mm ; Vizhinjom, open sea, 20m, surface plankton, 10-11-1981, 1 immature ♀ 2.8mm ; 25-2-1982, 1 immature ♀ 8mm.

Female. Closely agrees with type. Difference is noticed only in the number of spines and setae on the uropods. Peduncle of uropod with thirteen long and short spines. Outer border of the first joint of the endopod of uropod with sixteen to seventeen spines. Inner margin of the exopod with thirteen and outer border with fifteen plumose setae. The spines on the peduncle, the endopod and the outer edge of the exopod are having bifid apices.

Distribution. Trivandrum, Vizhinjom, Cape Comorin, 24-30m, Off puri, Orissa 8-9m.

Genus **Eocuma** Marcusen

Eocuma taprobanica Calman

1904. *Eocuma taprobanica*, Calman, *Ceylon Pearl Oyster Fish. suppl. Rep.* 12, p. 161, pl. 1, 2, figs. 1-28.

1913 *Eocuma taprobanicum* Stebbing, *Das Tierreich*, 39, p. 20.

1951 *Eocuma taprobanicum*, Kurian, *Bull, Centr. Res. Inst. Univ. Travancore*, (c), 2, 1, pp. 94-95.

1954 *Eocuma taprobanicum*, Kurian, *Rec. Indian Mus.* 52, parts 2-4, pp. 284-285.

Locality : Cochin, 18m, Bongo net, 12-7-1975, 1 ♀ 2.4mm ; Off Cochin, 20 & 25m, 26-9-1981, 17 ♀ ♀ (1 ovigerous) 2.4-4.5mm, 4 ♂ ♂ 4-5mm ; Purakkad, 12m, 1 ♀ 7mm ; Trivandrum, 1945, 1 immature ♂ 4mm ; Vizhinjom, 1945, 13 ♀ ♀ (4 ovigerous) 3-4 9mm.

Ovigerous female : Carapace one-third of the body. Reticulate texture of the carapace prominent ; third pedigerous segment much wider than its length, the fourth and fifth alike. (Third and fourth somites are reduced above to narrow transverse bars, Calman 1907). Abdomen slender. Basis of first peraeopod broad, merus of the second peraeopod with stout spine which reaches beyond the carpus.

Peduncle of uropod with three plumose setae and a spinule, endopod with eleven plumose setae and two spinules, exopod with six plumose setae.

Male. Basis of first peraeopod little produced and this projection possesses a plumose seta terminally, second peraeopod is the shortest. Abdomen slightly broader than that of female. Peduncle of uropod with thickly packed plumose setae, endopod and exopod sub-equal, endopod with numerous plumose setae and spinules arranged in two layers ; exopod with plumose setae on both the margins.

Eocuma taprobanica is very common in Trivandrum and Vizhinjom coasts. It has a maximum intensity in the Trivandrum region between 24-30m depth during January to April.

Distribution. Gulf of Manaar 12-18m, Travancore Coast 24-30m, Andamans 4-10m, Orissa Coast.

Eocuma stellifera Calman

1907 *Eocuma stellifera,* Calman, *Trans. Zool. Soc. London,* 18, 1 p. 20, figs. 13-17.
1913 *Eocuma stelliferum,* Stebbing, *Das Tierreich.* 39, pp. 21-22.

Locality : Purakkad (Kerala Coast) 12m, 1 ♀ 5.1mm.

Female. Lateral cornua stout and incurved at its tip, lateral carina well marked. Medio-lateral carina present in the posterior end of the carapace more or less narrowed. Carapace covered with thickly packed stellate spots characteristic of this species. First peraeopod long, with a marked distal process in the second joint directed inwards ; propodus little longer than carpus. Second peraeopod short, Telsonic somite slightly longer than fifth pleon somite. Peduncle two-thirds the sub-equal rami.

Distribution. Gulf of Siam, 15-28m.

Eocuma lata Calman

1907 *Eocuma lata,* Calman, *Trans. Zool. Soc. London,* 18, 1, pp. 22-23, pl. 6, figs. 7-12.
1913 *Eocuma latum,* Stebbing, *Das Tierreich,* 39, p. 22.
1951 *Eocuma latum,* Kurian, *Bull. Centr. Res. Inst. Univ. Travancore,* (c), 2, 1, pp. 96-97.
1954 *Eocuma latum,* Kurian, *Rec. Indian Mus.,* 52, parts 2-4, pp. 285-287, fig. 3.
1958 *Eocuma lata,* Gamo, *Zool. Mag.,* Tokyo, 67, 12, pp. 383-385 fig. 1.

Locality : Off Cochin, 10m, plankton, 16-1-1982, 1 immature ♀ 2mm, 15m, 22-3-1982, 1 ♀ 2.7mm, 30m, 16-7-1982, 2 ♀ ♀ 3-4mm ; Portonovo, 20m, May-June 1970, 3 ♀ ♀ 5.3-8.5 mm.

Female. Carapace with well marked lateral carinae. Lateral cornua well developed and the tips directed forwards. Pseudorostral lobes distinctly rounded. Antero-lateral tooth not visible or very short and the region between the pseudorostral lobe and lateral cornua nearly

straight (triangular tooth, Calman 1907, rounded knob-like projection, Kurian 1954). Median carina slightly developed. The surface of the carapace with reticulate texture.

Basis of first peraeopod shorter than the combined length of the remaining segments, the terminal process projects forward and produced to a long plumose seta , propodus slightly longer than carpus. Second peraeopod shorter than third. Abdominal segments cylindrical ; telsonic somite only slightly shorter than the previous segment.

Uropods show differences from the type description, peduncle one-third the sub-equal exopod and endopod with four or five plumose setae, endopod with nine plumose setae and three spinules, exopod with three short plumose setae, ends more or less blunt, with a swelling near its terminal region.

Distribution. Gulf of Siam 10-20m, Trivandrum 24m ;
Hatusima, Off yosihama, Japan 20m.

Eocuma sanguinea Kurian & Radha

1983 *Eocuma sanguinea*, Kurian & Radha
Selected Papers on Crustacea, Trivandrum, pp. 149-153, Figs. 1, 2.

Locality : Vizhinjom (Lat.8°22'N, Long 76°56'E), benthos (grab collection), fine sandy deposit, 28m, 13-4-1983, 1 ♀ 12.8mm.

Female. Deep red in colour, carapace very broad, flattened and less than one-third the length of the animal and with numerous oblique striae.

This species resembles *E. striata* sp. nov. from Visakhapatnam (Ph. D. Thesis, Radhadevi, 1983) in the nature of carapace, third maxilliped and first and second peraeopods ; but differs in the nature of other peraeopods and uropods. The resemblance of the carapace is also superficial for there is marked difference in the propotionate length and also in the structure.

Genus **Bodotria** Goodsir

Bodotria pulchella (Sars)

1878-79 *Cuma pulchella*, Sars, *Arch. Math. Naturvid* Kristiania, 1878, 3, p. 485, 4, p. 24.
1907 *Bodotria pulchella*, Calman, *Bull. Mus. Hist. Nat. Paris*, 13, p. 116, fig. 1.
1951 *Bodotria pulchella*, Fage, *Fauna, de France*, 54, *Paris*, pp. 34-35, figs. 27-28

Locality : Karwar, 10m, 27-10-1975, 1 ♀ (ovi) 1.5mm ; Calicut 20m, 15-7-1975, 1 ♂ 2.2mm ; Cochin, 13m, 12-7-1975, 23 ♂ ♂ 2.1-2.2mm, 12 ♀ ♀ (10 ovi.) 1.7-1.9mm, 15m, 26.9.1981, 2 ♂ ♂ 2.1mm, Quilon, 15m 10-7-1975, 3 ♀ ♀ (1 ovi.) 1.7-1.9mm.

Male. Carapace short, two pairs of logitudinal carinae on the carapace, free at the anterior end but joined at the posterior end. Basis of second peraeopod slender and curved with serrations on the concave side ; retroverted teeth not visible. Peduncle of uropod with ten short serrated spines and four or five short plumose setae arranged in two rows on the posterior half. Exopod and endopod sub-equal, less than half or half as long as the peduncle, first joint of endopod longer & broader than the second, with eight spines, second with only two unequal terminal spines. Exopod with three or four plumose setae on the inner margin and three unequal terminal spines.

Ovigerous female. Resembles the male. Difference noticed only in the armature of uropods. Peduncle without any spines & setae. Endopod, more than half as long as peduncle, with two spines on the distal part of the first joint.

Distribution. Mediterranean, Bay of Naples, Scotland, England.

Bodotria sublevis Calman

1907 *Bodotria sublevis*, Calman, *Trans. Zool. Soc. London*, 18, 1 p. 3, pl, 1, figs. 1-3.
1913 *Bodotria, sublevis*, Stebbing, *Das Tterreich*, 39, p. 25.
1951 *Bodotria sublevis*, Kurian, *Bull. Centr. Res. Inst. Univ. Travancore*, (c), 2, 1, pp. 80-81.

Locality : Off Cochin, 15m, plankton, 16-7-1982, I ♀ 1.5mm.

Female. Carapace granular, eye distinct with corneal lenses. Basis of third maxilliped longer than the other segments combined together and is expanded distally, Basis of first peraeopod as long as the other segments combined together ; carpus longer than merus and propodus, dactylus slender. Exopod and endopod of uropod sub-equal ; first joint of endopod twice as long as the second, with two long spines terminally and two or three spinules on the margin ; second joint with two unequal terminal spines and a spinule in the margin (Six and four spinules in the first and second joints respectively, Kurian 1951 and five and two, Calman 1907). Exopod with three or four setae on the inner margin and two unequal terminal spines.

Distribution. Gulf of Siam, Trivandrum.

Bodotria pulex (Zimmer)

1903 *Cuma pulex*, Zimmer, *Zool, Jb.* (*Syst.*) 18, p. 166, *tf.* A-C.
1913 *Bodotria pulex*, Stebbing, *Das Tierretch*, 39, pp. 26-27.
1967 *Bodotria pulex*, Harada, *Jap. J. Zool.* 15, 3, pp. 224-226.

Locality : Vizhinjom, plankton, 25-4-1959, 2 ♂ ♂ 2.5mm.

Male. Very closely resembles the specimen from off Shimoda,

(Japan). Pseudorostrum very short, dorso-median carina very distinct on the carapace, thoracic somites and first five pleon somites. Free pedigerous segments with well developed lateral ridges. Carapace shorter than one-fourth of the total length. The basipodite of the first peraeopod longer than the other segments combined together, furnished with a clump of spines on its inner middle part ; carpus broad and longer than merus or propodus, but not as much as described by Harada. Peduncle of uropod with its inner border fringed with a series of long setae on its whole length and another series of short spines on its distal two-thirds. Exopod and endopod sub-equal, three-fourths the peduncle, endopod with thirteen inner marginal spines and two unequal terminal spines. Exopod with seven or eight long setae and two terminal spines.

Distribution. Enosima, Shimoda (Japan).

Bodotria similis Calman

1907 *Bodotria similis*, Calman, *Trans. Zool. Soc. London*, 18, 1 p. 4, pl. 1, figs. 4-9.
1951 *Bodotria silmilis*, Kurian, *Bull. Centr. Res. Inst. Univ. Travancore* (c), 2, 1, pp. 81-82.
1954. *Bodotria similis*, Kurian, *Rec. Indian Mus.*, 52, parts 2-4, p. 276.
1962. *Bodotria similis*, Gamo, *Publ. seto. Mar. Biol. Lab.*, 10, 2, pp. 156-161, figs. 3-5.

Locality : Vizhinjom, 25-4-1959, 4 ♂ ♂ 2.5-2.7mm, Vizhinjom bay, 15m, surface plankton, 30-9-1981, 29-4-1982, 4 immature ♂ ♂ 1.6-2mm.

Male. Closely resembles the previous records. Carapace broad, one-third of the total length. Ocular lobe large with distinct corneal lenses. Median carina of carapace not prominent, but clear in pedigerous and pleon segments except in the last pleon segment. A well marked lateral carina on either side of the carapace which continues upto the last pedigerous segment. A well marked lateral carina on either side of the carapace which continues upto the last pedigerous segment. First pedigerous segment indicated by a suture (Kurian 1951). Peduncle of uropod of mature male with eight spines and four plumose setae and that of immature male devoid of spines and setae, but highly serrated. Exopod and endopod of uropod sub-equal, endopod with nine or ten spines and exopod with three plumose setae.

Distribution. Gulf of Siam 12-20m, Trivandrum and Cape Comorin 26-30m, Japan.

Bodotria siamensis Calman

1907 *Bodotria siamensis*, Calman, *Trans. Zool. Soc. London*, **18**, 1, p. 5, pl. 1. figs. 10-15.

1913 *Bodotria siamensis*, Stebbing, *Das Tierreich* 39, pp. 27-28.

Locality : Karwar estuary, benthos, November 1982, 2♀♀ (ovigerous) 2.4 & 2.5mm, 2 immature ♂♂ 1.7-1.8mm ; Cochin, 18m, Bongo net, 12-7-1975, 1♀ (ovigerous) 2.1mm ; Portonovo, 20m, intertidal sand, May-June 1970, 1♂ (immature) 2.2mm.

Female. Resembles the type description. The antero-lateral tooth indistinct. Basis of first peraeopod broad and little shorter than the rest of the joints combined together. Peduncle of uropod twice as long as the telsonic somite. Exopod and endopod sub-equal, three-fourths the peduncle, endopod with nine spines on the inner margin and a long and stout terminal spine (slender terminal spine-Calman) ; exopod with four or five plumose setae on the inner margin.

Distribution : Gulf of Siam.

Bodotria platybasis Radha & Kurian

1981 *Bodotria platybasis*, Radha & Kurian, *Bull. Dept. Mar, Sci. Univ. Cochin*, **12**, 1, pp. 23-28 figs. 1-2.

Locality : Portonovo, intertidal fine sand, 12-8-1975, 7.2.1978, 24-2-1978, 6-3-1979, 10-3-1980, 25-3-1980, 20-1-1981, 22-1-1981, 23-1-1981, 140♀♀ ; (numerous ovigerous) & 14 immature ♂♂ January-December 1980, 2017 ♀♀ (numerous ovi.) 13 immature ♂♂, 27-2-1982, 12♀♀ ; Length : 1.6-2.5mm.

Ovigerous female. Resembles *B. parva* Calman.

Pseudorostrum short and blunt, antero-lateral tooth rounded as in *B. parva*,

B. Platybasis is found in large numbers in the intertidal sandy ground at Portonovo. The occurence of this species was at its maximum in September. It is usually observed in association with the mysis *Gastrosaccus stmulans.*

Bodotria biocellata sp. nov.

Locality : Off Cochin, plankton, 1979, 22♀♀ 0.9-1.3mm, 1 immatu e ♂ 1.5mm.

Female. (1·3mm) Figs. 3 & 4). Body short, carapace less than one third the total length of the body, with oblique rows of granules. Eye distinct with ten corneal lenses. First pedigerous segment short,

second very large and prominent with two large dark red coloured spots dorsally one on either side of the mid-dorsal line.

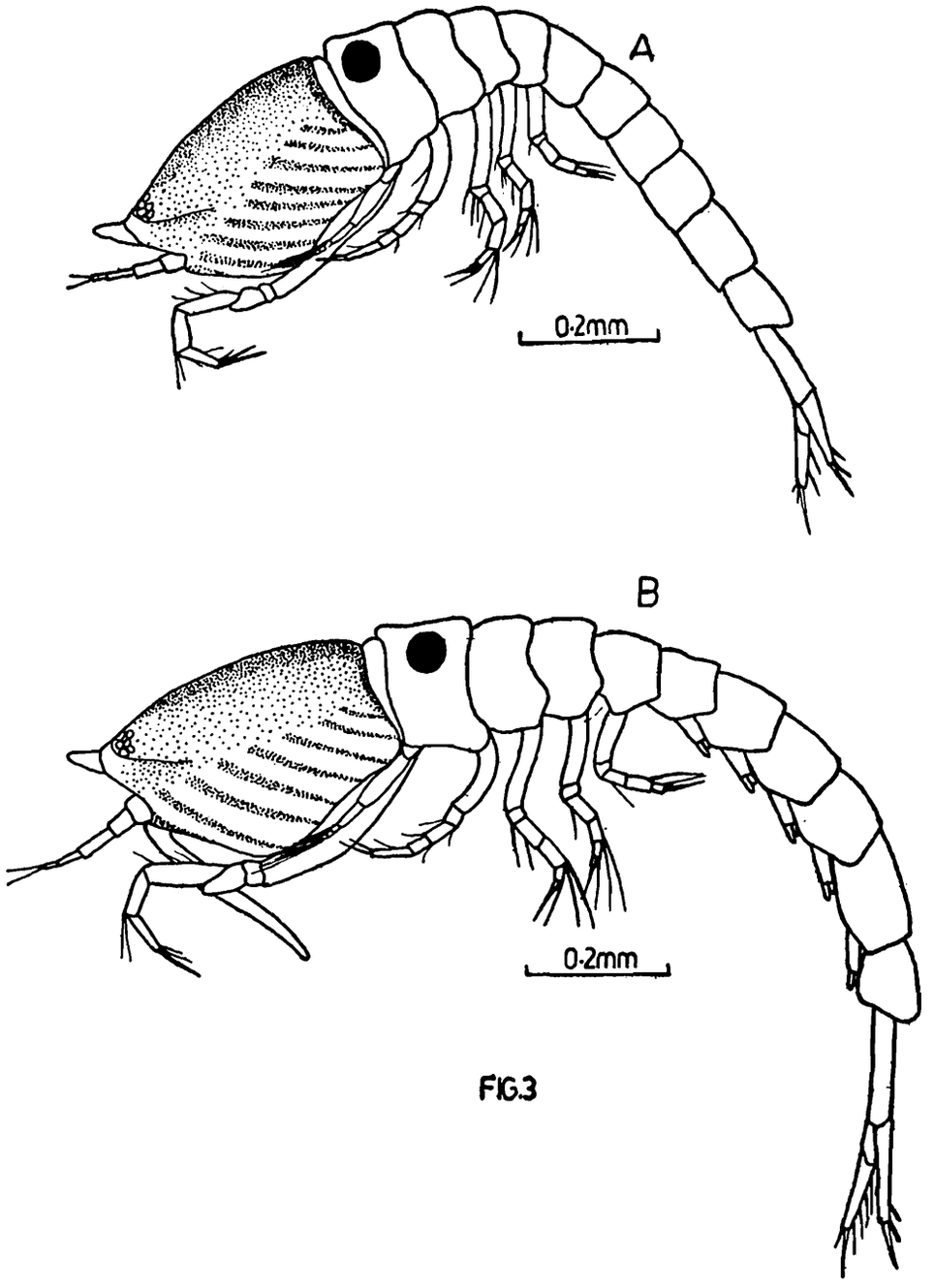


FIG.3

Fig. 3 A. *Bodotria biocellata* sp. nov. Female
B. *Bodotria biocellata* sp. nov. Immatute Male

Basis of third maxilliped broad, longer than the rest of the segments combined together ; it is produced to a short lobe with two long plumose setae terminally ; carpus longer than merus or propodus, with four short setae on the inner margin.

Basis of first peraeopod shorter than the other segments combined together ; carpus about twice as long as merus, with three thin setae on the inner margin ; dactylus slightly longer than propodus.

Second peraeopod with short basis, carpus longer than merus or propodus, but shorter than propodus and dactylus combined together.

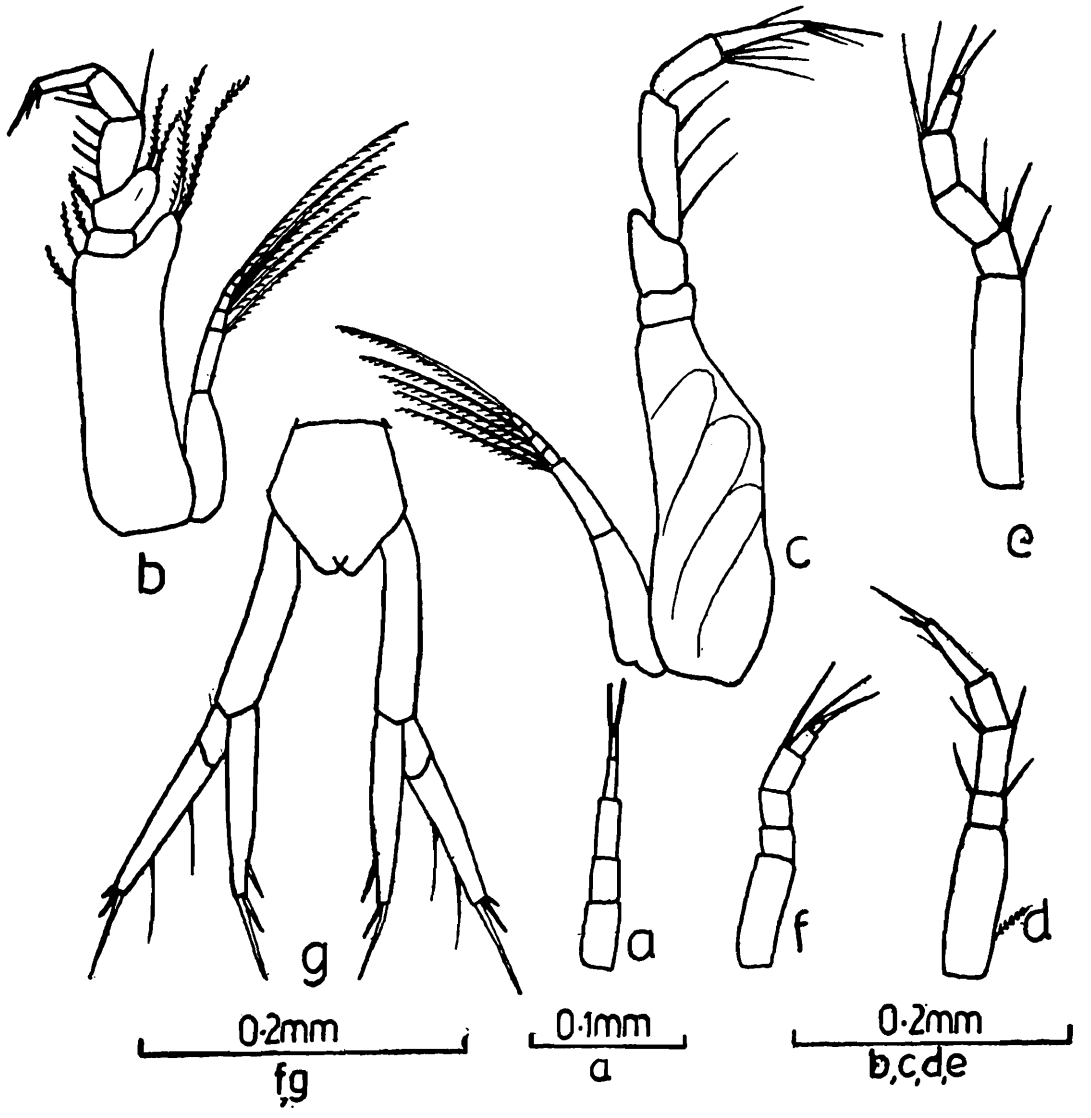


FIG.4

Fig. 4 *Bodotria biocellata* sp. nov. Female
a. First antenna b. Third maxilliped c. First peraeopod d. Second peraeopod e. Third peraeopod f. Fifth peraeopod g. Uropod

Third and fourth peraeopods similar in structure ; basis of third peraeopod as long as the other segments combined together ; merus and carpus subequal in length. Fifth peraeopod short.

Peduncle of uropod without spines or setae ; exopod sub-equal in length to peduncle and slightly longer than endopod ; exopod with two setae on the inner margin and endopod with two unequal terminal spines and an inner spine slightly away from the terminal region.

This species resembles *B. platybasis* Radha & Kurian collected from Portonovo in the shape of the body, presence of broad basis for the third maxilliped and first peraeopod and in the nature of the uropods, but it differs in having two characteristic dark red spots on the dorsal side of

the second pedigerous segment, oblique rows of the granules on the carapace and in the presence of clearly visible first pedigerous segment.

An immature male specimen, 1.5mm in length is also present, which closely resembles the female specimen.

Type specimen. Deposited in the Zoological Survey of India, Calcutta.

Bodotria cochinensis sp. nov.

Locality : Ras-R/75/12, St. No. 49, Cochin 12-7-1975, 13-0m. 2 ovigerous ♀ ♀ 1.5 & 1.7mm.

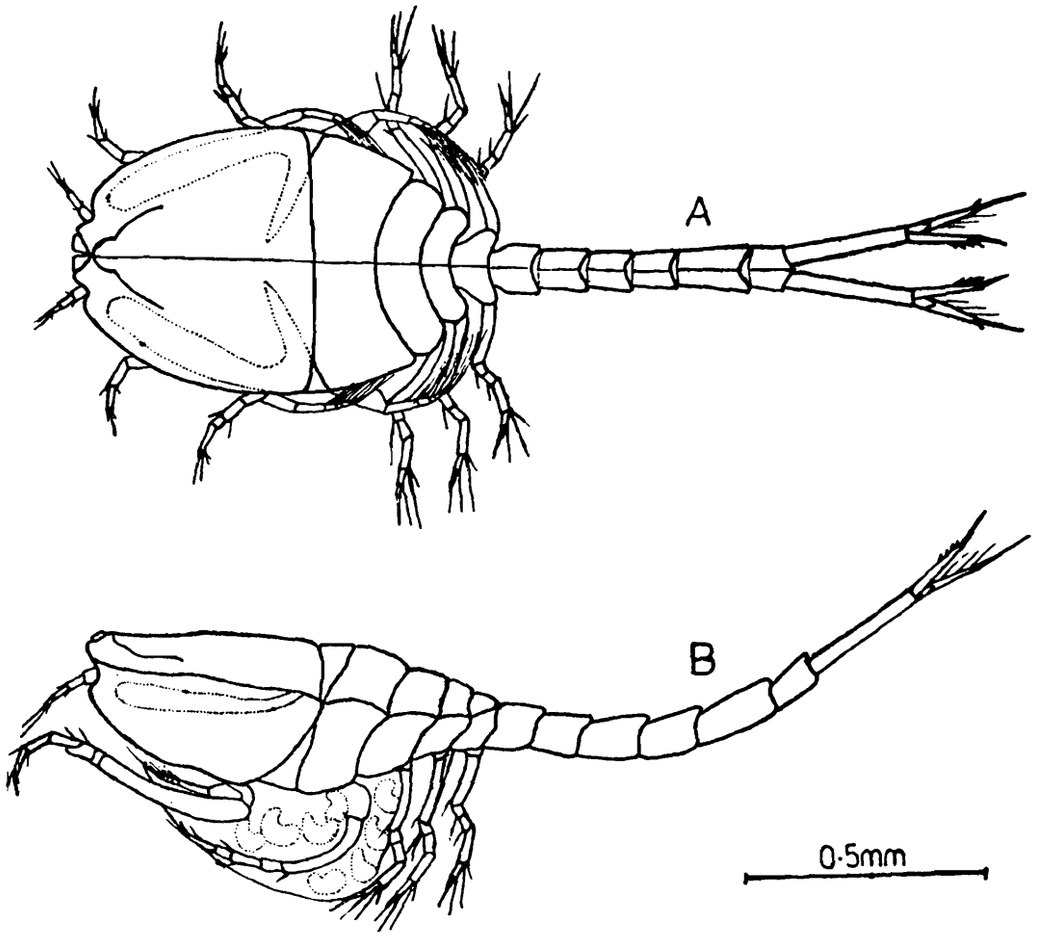


FIG.5

Fig. 5 *Bodotria cochinensis* sp. nov. Ovigerous female
A. Dorsal View B. Lateral View

Female (ovigerous) (Figs. 5 & 6). The animal possesses a well-developed brood pouch having embryos. The carapace is almost ovoid in shape as seen from above and widest distally. It is provided with small reticulate sculpture with a fine pitted background. The dorsal surface is almost flattened and devoid of hairs or spines. A faint dorso-median carina on the carapace extends upto the end of the last segment

of pleon. On each side of the carapace there is a lengthy groove which reaches the posterior end and curves towards the mid-dorsal region. A lateral carina which begins from the anterior region of the carapace extends upto the end of the last pedigerous segment. The carapace is one-third of the total length of the animal and its width is equal to its

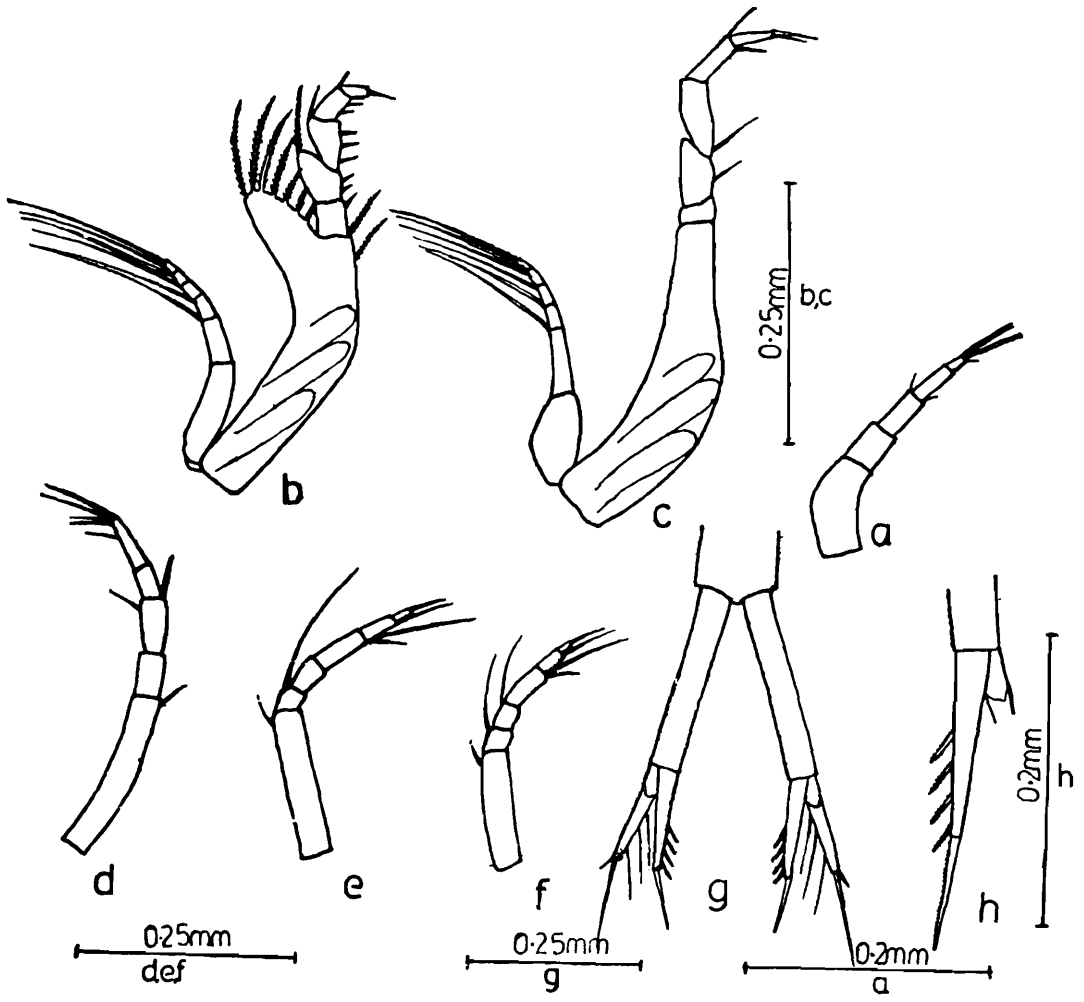


FIG.6

Fig. 6 *Bodotria cochinensis* sp. nov. Ovigerous female
a. First antenna b. Third Maxilliped c. First peraeopod d. Second peraeopod e. Third peraeopod f. Fifth peraeopod g. Uropod h. Endopod (enlarged)

length. The antennal notch is slightly concave. The ocular lobe is rather small, semicircular in shape, reaches the apex of the pseudorostrum. The pseudorostrum is sinuated in the middle portion as seen from above.

The combined length of the thoracic segments is less than that of the carapace. The dorsum of the first free thoracic segment is almost concealed, where as the sides are exposed. The second segment is very large and its widest breadth is as much as that of the carapace. The third to fifth segments are successively narrowed.

The abdomen is shorter than the cephalothorax, the fifth segment is the longest, sixth about three fourths as long as the fifth.

The first segment of the peduncle of the antennule is broad, and longer than the combined length of the second and third segments. The second segment is shorter than the third. The main flagellum is two-segmented ; the distal segment is furnished with two sub-equal aesthetascs. The accessory flagellum is very minute.

Basis of third maxilliped broad, longer than the other segments combined together. It is prolongated terminally and provided with three plumose setae on the apical portion of the prolongation and four on the inner border ; merus also has a terminal seta on the external side, carpus little longer than merus, with three short setae on the inner margin.

Basis of first peraeopod little longer than the remaining segments combined together. Posterior portion of the basis is broad and anterior portion is narrowed ; ischium very short, less than half of the merus ; carpus longer than merus or propodus, with a slender seta on the inner border ; propodus, nearly equal to the dactylus, with two apical setae.

Basis of second peraeopod little shorter than the rest of the segments combined together ; carpus slightly longer than merus and bears a strong spine on the external distal part and a seta on the inner margin ; propodus only half of the carpus ; dactylus nearly twice as long as the propodus, with two long and two short spines.

Basis of third peraeopod slightly shorter than the other segments combined together. Ischium produced to a very long seta on the external distal part which extends upto the level of propodus ; carpus longer than merus or propodus, with two unequal terminal setae ; propodus also has a terminal seta ; dactylus very short. Fourth peraeopod similar to that of the third, but the basis is slightly longer than that of third.

Basis of fifth peraeopod little shorter than the remaining segments combined together ; ischium and merus more or less sub-equal and each bears a long slender seta in the external terminal part.

The peduncle of uropod is rather long and slender and two and a half times as long as the last abdominal segment. It bears very slight serrations on the inner border. The exopod and endopod sub-equal, only half of the peduncle. Endopod single jointed with four serrated spines located on the posterior part and a long terminal serrated spine. Exopod has three plumose hairs on the inner border and two unequal spines on the distal end.

The present specimen agrees with *Bodotria ovalis* Gamo (1965) from Japan in the presence of a flattened carapace, expanded dorso-lateral margin of the carapace, very large second pedigerous segment, strong lateral carina and in the nature of the peduncle of uropod. These resemblances are only superficial and a careful study of the appendages and the proportionate lengths of the carapace, free thorax and abdomen show that it is quite distinct from the allied Japanese form. Carapace is one-third of the total length of the animal in *B. ovalis* Gamo, whereas it is one-fourth in the present species. The carinae of the pedigerous segments and first three abdominal segments have more or less smooth dorsal margin. There is marked difference in the nature of the third maxilliped. Basis is more flattened and longer than the remaining segments combined together in the present specimen where as it is slender and twice as long as the other segments combined in *B. ovalis*. Differences are also noticed in the nature and proportionate length of the bases of second to fifth peraeopods. The bases of the peraeopods 2-5 bear plumose hairs on their inner margins in *B. ovalis* which are completely lacking in the present species. Endopod has seven spines on the inner border and there are two teeth on its distal end in the case of *B. ovalis*. In the present specimen there are only four spines.

Moreover, the present species which is represented only by ovigerous female specimens is very small having a maximum length of 1.7mm compared to the 4.2mm length for *B. ovalis* Gamo (Ovigerous female)

Type specimen : Deposited in the Zoological Survey of India, Calcutta.

Genus **Cyclaspis** Sars

Cyclaspis herdmani Calman

1904 *Cyclaspis herdmani*, Calman, *Ceylon Pearl Oyster Fish.* Suppl. Rep. *London*, **12**, pp. 171-172 pls. 3, 4, figs. 56-66.

1913 *Cyclaspis herdmani*, Stebbing, *Das Tierreich*, 39, p. 32.

1954 *Cyclaspis herdmani*, Kurian, *Rec. Indian Mus.* **52**, parts 2-4, pp. 279-280.

Locality : Vizhinjom bay, surface plankton, 15m, 1/2m net, 30-9-'981, 1 immature ♂ 3.3mm, 4 ♂ ♂ 2.2-2.6mm.

Immature male. Carapace with pitted appearance, one-third the total length. Eye-lobe prominent with corneal lenses indistinctly defined. Inner margin of the basis of second peraeopod provided with fine teeth through out the margin. Peduncle of uropod, subequal to exopod and endopod, with nine spines, exopod with three or four plumose setae.

Female. Carapace less than one-third of the total length. Last

telsonic somite produced in between the uropods, exopod slightly longer than endopod, with three plumose setae ; endopod with four short spines arranged in the middle margin.

Distribution : Gulf of Manaar, Andaman Islands.

Cyclaspis uniplicata Calman

1907 *Cyclaspis uniplicata,* Calman, *Trans. Zool. Soc. London,* **18, 1, p. 13, pl. 4, figs. 1-20.**

1954 *Cyclaspis uniplicata,* Kurian, *Rec. Indian Mus.,* **52,** parts 2-4, pp. 278-279.

Locality : Vizhinjom, 24m, St. No. 145, 25-4-1959, 1 ♀ 3.7mm (immature).

Female (immature). Resembles the original description of immature female by Calman. Single tooth on the carapace at the base of eye-lobe very distinct. First pedigerous somite distinct dorsally as a narrow band. Peduncle of uropod slightly shorter than exopod, without any setae, spines or serrations. Endopod little shorter than exopod (as long as exopod, Kurian 1954) with nine spines on the median margin and tapers to a sharp point. Exopod with three spines on the inner margin and an apical spine.

Distribution : Gulf of Siam, 10-20m, Andaman Islands.

Cyclaspis strigilis Hale

1944 *Cyclaspis strigilis,* Hale, *Rec. S. Austral. Mus.,* 3, pp. 83-86, figs. 11-14.

1951 *Cyclaspis strigilis,* Kurian, *Bull. Centr. Res. Inst. Univ. Travancore,* (c), 2, 1, pp. 89-90.

Locality : Vizhinjom bay, surface plankton, 15m, 1/2m net, 29-7-1982, 4 ♀ ♀ (2 immature) 1.2-2.5mm.

Female. Closely resembles the type. Carapace one-third of the total length with numerous oblique striae on the sides. A faint dorso-median carina extends upto the last pleon somite ; dorsal edge of the carapace arched. Peduncle of uropod, slightly shorter than the sub-equal exopod and endopod, without any spines or setae. Endopod with five spines on the proximal end, leaving the distal fourth of the ramus without spines ; exopod with three or four short plumose setae on the proximal inner margin. (twelve in endoped and six tiny incisions in the inner margin of the exopod in the type specimen).

Distribution : Queensland, Trivandrum.

Cyclaspis cretata Hale

1944 *Cyclaspis cretata,* Hale, *Rec. S. Austral. Mus.,* 8, 1, pp. 91-95, figs. 19-20.

1954 *Cyclaspis cretata,* Kurian, *Rec. Indian Mus.* 52, parts 2-4 p. 280.

Locality : Vizhinjom, open sea, surface plankton, 20m, 1/2m net, 30-9-1981, 2 ♂ ♂ 4-4.1mm.

Male. Closely resembles type description. Carapace less than one-third of the total length of animal. Pseudorostral lobes barely meeting in front of the eye lobe which is wide with nine lenses, the middle three are very dark and larger than the lateral pale ones. The four exposed pedigerous somites together constitute half of the carapace (more than half-Hale, less than half-Kurian). Fifth pleon somite swollen at its anterior portion and tapers to the rear end, dorsal notch on the telsonic somite is deep.

Peduncle of uropod more than twice as long as telsonic somite with nineteen plumose setae through out its length and seven slender spines towards the distal part. Exopod of uropod slightly longer than endopod, but shorter than peduncle, with five plumose setae on the inner margin, endopod with four proximal spines on the inner margin followed by a row of fifteen shorter and stouter spines. Both the rami with the apex acutc.

Distribution. New S. Wales, S. Australia, Andaman Islands.

Cyclaspis juxta Hale

1948 *Cyclaspis juxta* Hale, *Rec. S. Austral. Mus.*, 9, 1, pp. 6-9, figs. 3, 4.

Locality : Vizhinjom bay, surface plankton, 15m, 29-7-1982, 1 ♂ 4.1mm, 1 ovigerous ♀ 4.1mm.

Male. Carapace with dorsal edge only slightly arched. On each side of the carapace there is a narrow depression. A thin median longitudinal carina reaches upto the last telsonic somite. Sides of the carapace marked with *numerous* oblique striae which give a resemblance to *Cyclaspis strigilis* Hale. No such striae are seen in the type description. Basis of first peraeopod longer than the remaining segments combined together, carpus shorter than propodus with four setae on the margin, dactylus with four setae on the margin and three or four terminal setae. Telsonic somite with a strong dorsal notch.

Peduncle of uropod with twenty one plumose setae and thirteen serrated spines on the inner margin. Endopod of uropod bears six slender serrated spines on the proximal part followed by sixteen shorter and stouter spines leaving the distal fourth of the ramus unarmed ; exopod with nine plumose setae on the proximal half of the inner margin.

Ovigerous female. Ocular lenses shorter than that of male. Nature of carapace as in male, pleon sub-equal in length to carapace and

pedigerous somites together. Peduncle of uropod with two short plumose setae towards the distal portion, endopod shorter than exopod, with eight short and stout spines near the proximal end : the distal fourth of the ramus without spines, exopod with four plumose setae on the proximal inner margin.

Distribution : W. Australia.

Genus **Iphinoe** Bate

Iphinoe brevipes Hansen

1895 *Iphinoe brevipes*, Hansen, *Ergeb. der. Plankton Exped.*, 2, p. 54, pl. 6, figs. 5-5L.
1913 *Iphinoe brevipes*, Stebbing, *Das Tierreich*, 39, p. 45.
1951 *Iphinoe brevipes*, Kurian, *Bull. Cent. Res. Inst. Univ. Travancore*, (c) 2, 1, p. 87.

Locality : Vizhinjom, 24m, Dredge collection, 25-4-1959, 5 ♂ ♂ 4.5-5mm, 5 ♀ ♀ 4.8-5.8mm, 13.4.1983, 4 ♂ ♂ 5-6mm, 6 ♀ ♀ (2 ovigerous) 4.6-7.5mm Vizhinjom Bay, 15m, surface plankton, 25.9.1980, 1 ♀ 8mm, 21-1-81, 12-2-81, 26-2-81, 26-3-81, 29-12-81, 7-1-82, 25-2-82, 27-2-82, 19-4-82, 29-7-82, 16 ♂ ♂ 5.3-6mm, 8 ♀ ♀ (1 ovi.) 3-7.3mm ; Vizhinjom, open sea, 20m, surface plankton, 8-1-81, 21-1-81, 22-1-81, 26-3-81, 2-1-82, 25-2-82, 4-3-82, 11-3-82, 25-3-82, 28-2-83, 14-2-83, 872 ♂ ♂ 4.5-6.3mm, 34 ♀ ♀ (12 ovigerous) 3-7.2mm, Vizhinjom open sea 30m, surface plankton, 22-1-81, 26-2-81, 26-3-81, 14-5-81, 29-12-81, 2-1-82, 21-1-82, 25-2-82, 4-3-82, 5-4-82, 243 ♂ ♂ 4.7-6.3mm, 14 ♀ ♀ (2 ovigerous) 3-6.8mm, Portonovo, 20m, May-June 1970, 4 ♀ ♀ 4.5-5.8mm.

Male. Carapace slender, twice as long as its width, antero-lateral margin provided with nine teeth. Mid-dorsal teeth indistinct. Eye lobe broad, lenses indistinct. Basis of third maxilliped more than twice as long as other segments combined together. Second peraeopod shorter than third, basis broad with plumose setae, ischium indistinct, merus with a stout terminal spine. Pleon longer than cephalothorax, fifth pleon somite narrow at its posterior part. Peduncle of uropod, slightly longer than sub-equal exopod and endopod with numerous spines through out its inner margin arranged in two or three rows posteriorly ; four plumose setae towards the distal part. First joint of endopod half of second, little longer than broad, with five or six spines. A long setae at its external distal part reaching more than three quarters of the narrow second joint which has eight spines successively longer to the terminal spine. Exopod with eleven long plumose setae on the inner margin, with four or five very long terminal spines

Females closely resemble the males in many of the characters. The only difference noted is that the teeth (13-18) on the antero-lateral margin of the carapace are more distinct than in male.

I. brevipes is a common species along the Trivandrum Coast, Vizhinjom bay and Vizhinjom open sea within 15-30m depth. Very often males are seen in large numbers from January-April ; 10-20 post-larvae were observed in some of the ovigerous females.

Distribution. Gulf of Guinea, Great Fish Bay, S. Africa, Trivandrum, Vizhinjom.

Iphinoe calmani Fage

1945 *Iphinoe calmani*, Fage, *Arch. zool. exp. gen.*, 84, 3, p. 189, figs. 15-19.
1954 *Iphinoe calmani*, Kurian, *Rec. Indian Mus.*, 52, 2-4. pp. 276-277, figs. 1a & b.

Locality : Laccadives, 5 ♂ ♂ 4.1-4.5mm, 2 ♀ ♀ (ovigerous) 3.2-4.2mm ; Cochin, 10m, plankton, 16-1-1982, 1 ♂ 4mm, 4 ♀ ♀ 2.4-3.5mm, 15m, 20-2-82, 3 ♂ ♂ 3.2-3.8mm and 1 ♀ 2.8mm, 15m, 28-1-1983, 3 ♂ ♂ 4.5-5mm ; Vizhinjom bay, 15m, surface plankton, 7-8-1981, 1 ♂ 4.3mm.

Male. Cephalothorax more than three-fourths the pleon ; no teeth on carapace. In the specimens obtained from Cochin, the base of the first peraeopods have strong spines in the outer margin. Peduncle of uropod, less than twice as long as endopod and exopod with numerous spines and two or three rows of short plumose setae in the posterior region. First joint of endopod with four short and four long spines ; the second with seven spines. Exopod with six or seven plumose setae on the inner margin and seven setae externally, with four long apical setae.

Ovigerous female. Nine prominent teeth on the carapace ; the first two large and separated from rest by a wide space. Eye lenses clearly visible. Peduncle of uropod, with lesser number of spines when compared to male, endopod slightly longer than exopod, first joint less than half of the second, with four spines, second joint slender with ten spines and three terminal setae.

Distribution. Annam, Andaman Islands.

Iphinoe serrata Norman

1867 *Iphinoe serrata*, Norman, *Rep. Brit. Ass. Sci*, 36, p. 201.
1951 *Iphinoe serrata*, Fage, *Faune de France*, 54, Paris, pp. 49-52, figs. 43-45.
1955 *Iphinoe serrata*, Jones, *Discovery Rep.* 27, p. 287.

Locality : Portonovo, Intertidal sand, November, 1980, 2 ♀ ♀ 4-4.5mm.

Famale. Carapace twice as long as high, median carina with twelve strong forward pointing teeth successively larger to the front. Basis of third maxilliped with distal process reaching upto the merus and

fringed with long plumose setae on median margin and terminally. Basis of first peraeopod shorter than the other segments combined together and without denticulation on margin (Sars). Second peraeopod as long as third. Peduncle of uropod, slightly longer than the unequal exopod and endopod, with fourteen long spines ; endopod little shorter than exopod ; first joint with three short and a long apical spine ; second with nine marginal spines and three long terminal setae ; exopod broad with many plumose setae on median margin of second joint and round the apex.

Distribution : British Islands, Mediterranean, Bay of Naples.

Iphinoe inermis Sars

1878 *Iphinoe inermis*, Sars, *Arch. Math. Naturvid Kristiania*, 1878, 3, p. 508.
1951 *Iphinoe inermis*, Fage, *Faune de France*, 54, Paris, p. 46, fig. 39.
1955 *Iphinoe inermis* Jones, *Discovery Rep.* 27, p. 287.

Locality : Calicut, 0-20m, Bongo net, 15-7-1975, 1 ♀ 3mm ; Off Cochin, 0-15m, 26-9-1981, 1 ♂ 3.8mm & 5 ♀ ♀ 2.5-3.5mm.

Male. Closely resembles the type description. Peduncle of uropod longer than sub-equal exopod and endopod with numerous spines and plumose setae arranged in two rows. First joint of endopod of uropod with four spines and four spinules, second slender and longer than first, with three short spines on the proximal part, five long spines on the distal part and one on the external margin. Exopod with seven plumose setae on the inner margin and five long terminal plumose setae on the flattened edge of exopod. Four setae on the external margin of exopod.

Famale. Peduncle of uropod with only a single row of spines, without any plumose setae. The first joint of endopod with four spines, intermediate spinules absent.

Distribution : Goletta, Mediterranean.

Iphinoe pigmenta Kurian

1961 *Iphinoe pigmenta*, Kurian, *Bull. Centr. Res. Inst.* Trivandrum 8, pp. 59-60, figs. 10-14.

Locality : Off Cochin, plankton, 1979, 81 ♀ ♀ (64 ovigerous) 1.4-3.4mm, 9 ♂ ♂ (immature) 1.4-1.7mm.

Type description of this species is based on an ovigerous female specimen, 2.3mm long. In the present collection there are a number of ovigerous females which have a maximum length of 3.4mm. Male of this species has not yet been described, and here a few immature males are represented in the collection. Some additional facts observed

in the ovigerous female and the description of immature male are given below.

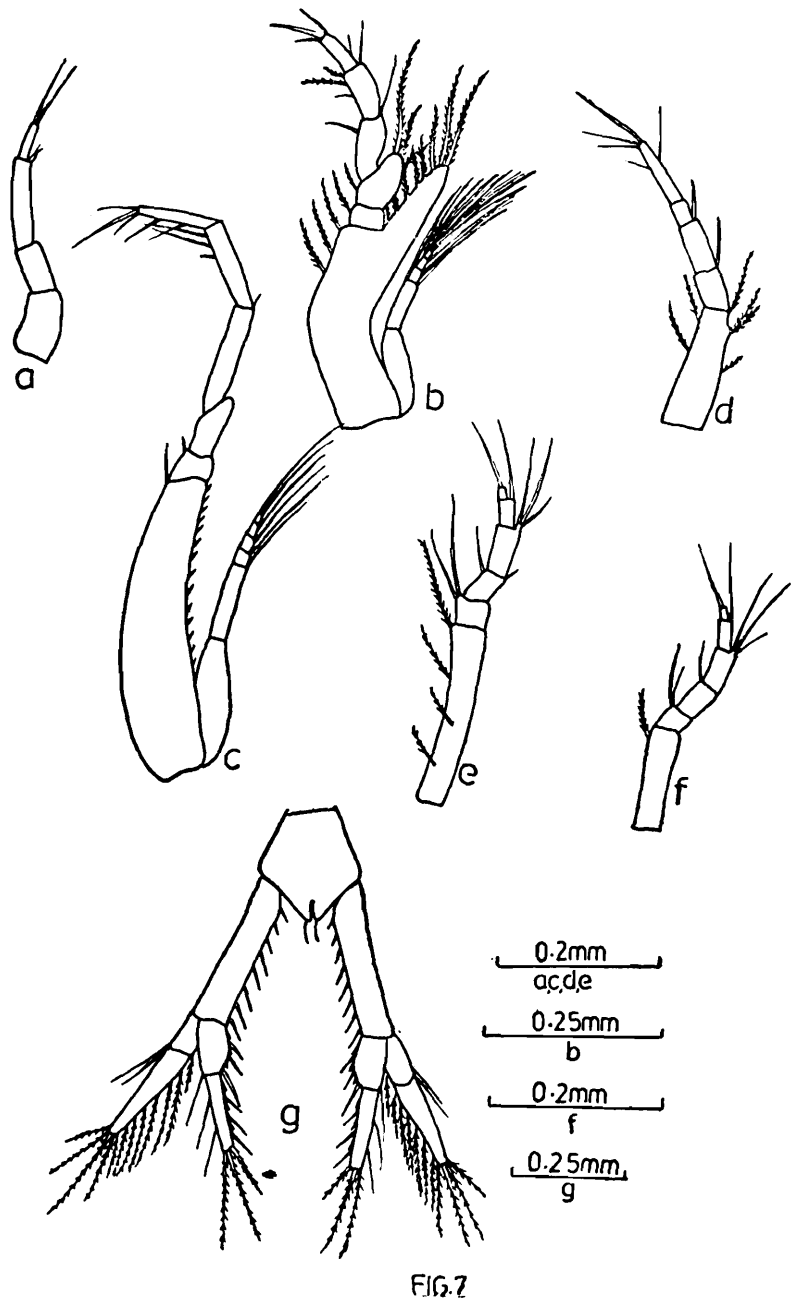


FIG.7

Fig. 7 *Iphinoe pigmenta* Kurian : Ovigerous female

a. First antenna b. Third maxilliped c. First peraeopod
d. Second peraeopod e. Third peraeopod f. Fifth peraeopod
g. Uropod

Ovigerous female (Fig. 7) Carapace with dark patches of chromatophores and 9-11 forwardly directed teeth on the dorsal side in the anterior two-thirds, antero-lateral border with 12 teeth which are progressively smaller towards the hinder part

Third segment of first antennal peduncle nearly twice as long as the second ; main flagellum without segmentation, with two aesthatacs ; accessory flagellum very minute.

Distal process of broad basis of third maxilliped reaches upto the level of merus which is also expanded distally.

Basis of first peraeopod slightly broad in the proximal part, the external margin bears mumerous teeth throughout its length ; carpus longer than propodus which is subequal in length to dactylus.

Basis of second peraeopod shorter than the rest of the segments combined together, with plumose setae on margins distally ; merus with a seta terminally ; carpus with a stout spine ; dactylus sub-equal to the combined length of carpus and propodus.

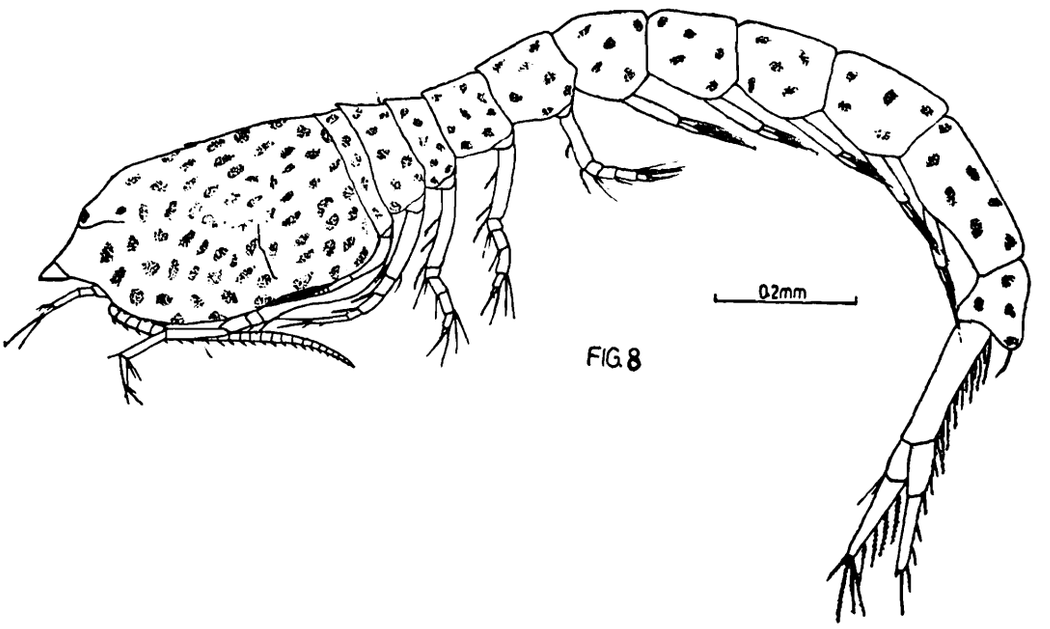


Fig. 8 *Iphinoe pigmenta* Kurian : Immature male

Basis of third peraeopod longer than the other segments combined together, with plumose setae on the inner margin ; ischium with two long and stout terminal setae.

Pleon, half of the total length of the animal, segments long and cylindrical. Telsonic somite half of the fifth pleon somite and produced in between the uropods. Peduncle of uropod twice as long as telsonic somite, with eight spines, spines towards the posterior part of the peduncle larger. Exopod and endopod of uropod closely agree with the type description ; the only difference noticed is that in between the spines on the inner margin of endopod there are short tubercles.

In some specimens examined there were 10-24 matured ova.

Immature male (Figs. 8 & 9) Length 1.7mm. Pseudorostrum very short, carapace with thin dorso-median carina extending upto the fifth pleon somite. There is a mid-dorsal tooth on the carapace projecting forward. (In some specimens 5 or 6 teeth were observed) Flagellum of

second antenna not fully developed. Second pedigerous segment not as large as in female.

Basis of third maxilliped as long as the other segments combined together.

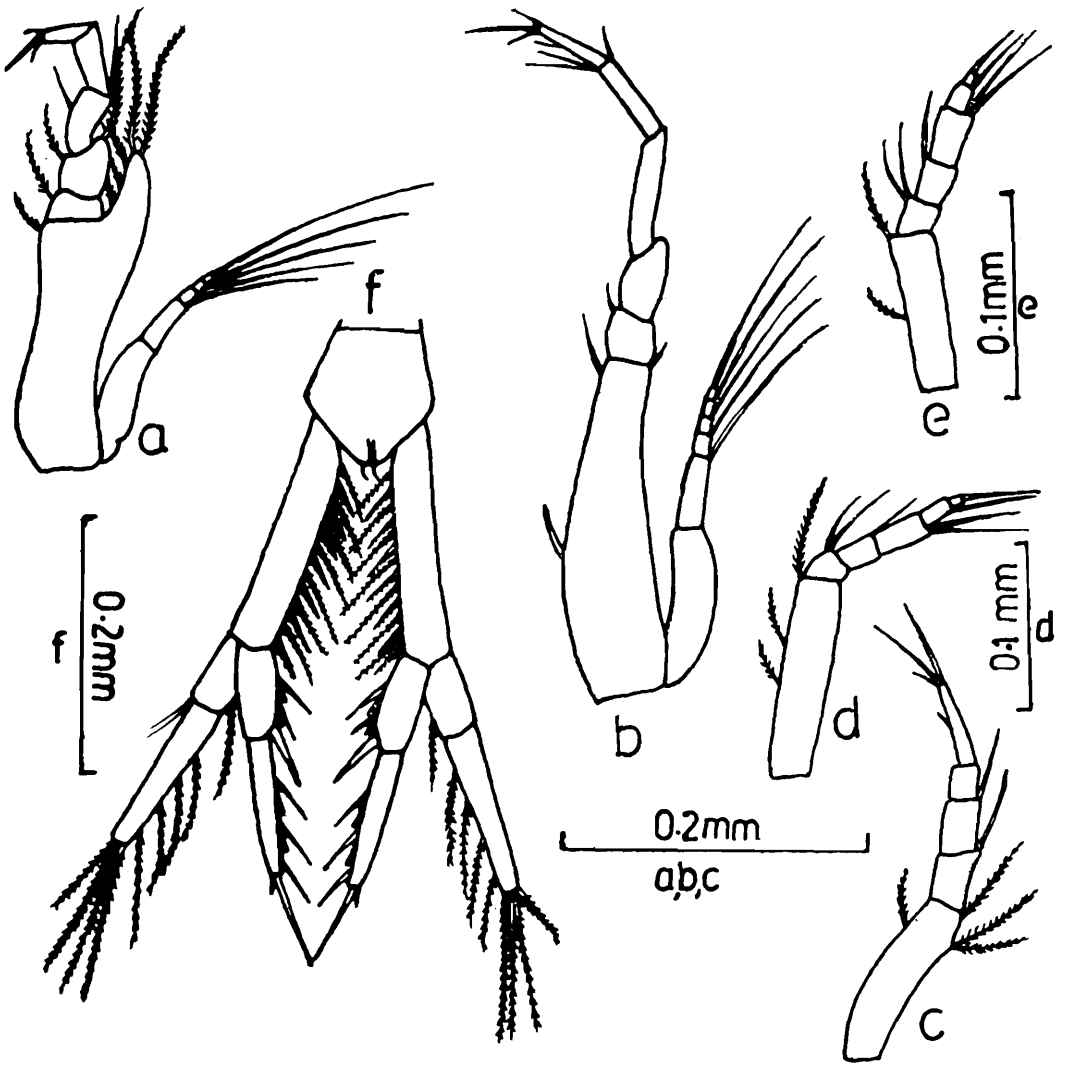


FIG.9

Fig. 9 *Iphinoe pigmenta* Kurian : immature male
a. Third maxilliped b. First peraeopod c. Second peraeopod
d. Third peraeopod e. Fifth peraeopod f. Uropod

Basis of first peraeopod shorter than the rest of the segments combined together ; external margin without teeth, a spine is present at its inner margin. Peraeopods 2-5 similar to that of female.

Peduncle of uropod more than twice as long as the last pleon somite, with seven plumose spines and seven plumose setae. Exopod and endopod sub-equal and as long as peduncle. First joint of endopod three-fourths of the second joint, with three stout spines on the inner margin ; second joint also with three spines on the inner margin and a terminal seta. Exopod with five plumose setae on the inner margin and four at the distal end.

The species has been previously recorded only from backwaters in Kerala. The present record of immature and ovigerous specimens from the open sea Off Cochin reveals the capacity of the species to survive in wide ranges of salinity.

Distribution : Veli lake, Cochin backwaters

Iphinoe macrobrachium Calman

1904 *Iphinoe mac rachium*, Calman, *Ceylon Pearl Oyster Fish. Rept.* 12, p. 173, Pl. 4, figs. 72-75.

1955 *Iphinoe macrobrachium*, Jones, *Discovery Rep.*, 27, p. 287.

Locality : Vizhinjom, St. No. 145,25-4-1959, 7 ♀ ♀ (4 ovigerous) 2.5-4mm.

Female (Fig. 10) Calman's description of this species is based on an immature specimen and hence certain details observed in the adult female are included here.

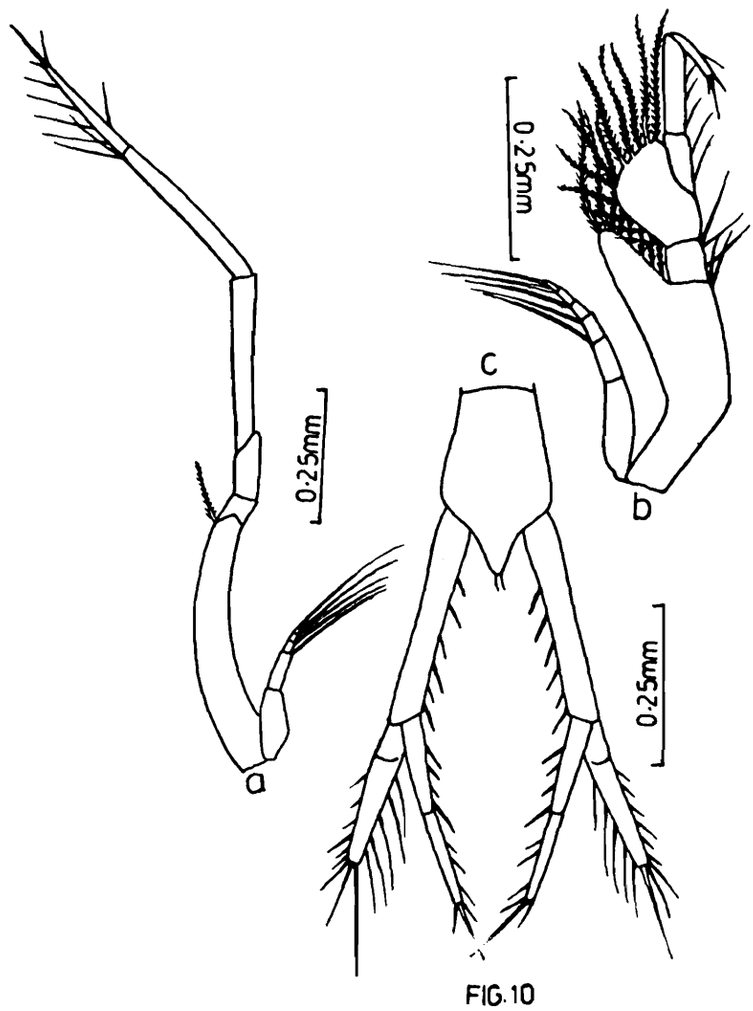


FIG. 10

Fig. 10 *Iphinoe macrobrachium* Calman : Female
a. First peraeopod b. Third maxilliped c. Uropod

Carapace comparatively short, stout, and granular. Pseudorostrum

little upturned. Dorsal carina distinct upto last pleon somite. Eye lenses clearly visible. First antennal peduncle three-segmented ; the third being the longest. Basis of third maxilliped broad and shorter than the other segments combined together, produced terminally with two long plumose setae at its apex and three or five short plumose setae on the inner margin, merus expanded into a broad lobe, with numerous plumose setae on its outer margin, propodus much longer than carpus.

First peraeopod very long and slender ; basis less than half the length of the remaining segments combined together, ischium very short carpus and propodus sub-equal, carpus with two setae terminally ; dactylus slender. Second peraeopod with numerous setae on its margins, dactylus longer than the carpus and propodus combined together, with five unequal terminal setae at its apex and three or four marginal setae.

Abdominal segments long ; fifth pleon somite the longest ; telsonic somite well produced in between the uropods. Peduncle of uropod with six spines on the inner margin, endopod longer than exopod, three-fourths the peduncle, two-jointed and two joints sub-equal (proximal joint nearly half as long again as the distal segment-Calman). The proximal joint with four spines ; the terminal one being the longest ; distal joint slightly narrower, with three marginal and three unequal terminal spines. Exopod with five setae on the inner margin and four long terminal spines ; five setae present on the external margin.

Calman's immature specimen has a close resemblance to *I. crassipes* Hansen. But the adult specimens of *I. macrobrachium*, obtained from the Vizhinjom coast show that it is a distinct species having many dissimilarities in the nature of the maxilliped, peraeopod and uropod when compared to *I. crassipes* Hansen.

Distribution : Gulf of Manaar, Cheval Paar, Kondatchi Paar.

Genus **Nannastacus** Bate

Nannastacus lepturus Calman

1911 *Nannastacus lepturus*, Calman, *Trans. Zool. Soc. London*, **18, 4, pp. 341, 352, figs, 1-3.**

1913 *Nannastacus lepturus*, Calman, *Das Tierreich*, 39, p. 171.

Locality : Vizhinjom, Plankton, 25-4-1959, 1 ♂ 1.5mm.

Male. Closely resembles the type specimen. Pseudorostrum short, eye prominent. First pedigerous segment visible. Pleon segments

cylindrical. Fifth pleon somite longest, but not twice as long as the telsonic somite. Peduncle of uropod longer than exopod or endopod, with five inner marginal spines towards the posterior half and a long terminal spine.

Exopod about four-fifths of the endopod and bears a terminal spine of its own length.

Distribution : Suez Canal.

Genus **Cumella** Sars

Cumella laevis, Calman

1911 *Cumella laevis*, Calman, *Trans. Zool. Soc. London*, 18, 4, p. 350 pl. 32, figs 25-27.

1913 *Cumella laevis*, Stebbing, *Das Tierreich*, 39, p. 182.

Locality : Vizhinjom Open sea, 20m, 25-2-1982, 1 ♀ (ovigerous) 1.5mm.

Ovigerous female. Resembles the type. Pseudorostral lobes long and upturned. Eye lobe rounded with pigmented lenses. Carapace more than one-third of the total length. Basis of first and second peraeopods inflated, 3-5 peraeopods slender. Peduncle of uropod less than twice as long as the last pleon somite ; rami sub-equal, more than three-fourths the peduncle ; endopod with four marginal spines increasing in length distally and a long terminal spine.

Distribution : Gulf of Siam.

Genus **Campylaspis** Sars

Campylaspis minor Hale

1945 *Campylaspis minor*, Hale, *Rec. S. Austral. Mus.*, 8, 2, pp. 197-199, figs. 35-36.

1951 *Campylaspis minor*, Kurian, *Bull. Centr. Res. Inst. Univ. Travancore*, (c), 2, 1 pp. 110-111.

Locality : Vizhinjom, St. No. 145, 25-4-1959, 1 ♀ 1.6mm.

Female : Closely agrees with type description. Carapace as wide as long and void in shape, with faint reticulate pattern and well marked lateral folds at the sides. Eye lenses clearly visible. Uropods longer than the last three pleon somites combined together ; peduncle twice as long as the telsonic somite, without spines or setae ; endopod with two marginal spines and two unequal terminal spines.

Distribution : Queensland : Moreton Bay, Trivandrum.

Campylaspis minuta sp. nov.

Locality : Vellar estuary, benthos, 2/3-10-1982, 14♀ ♀ (11 ovigerous) 0.7-1.3mm.

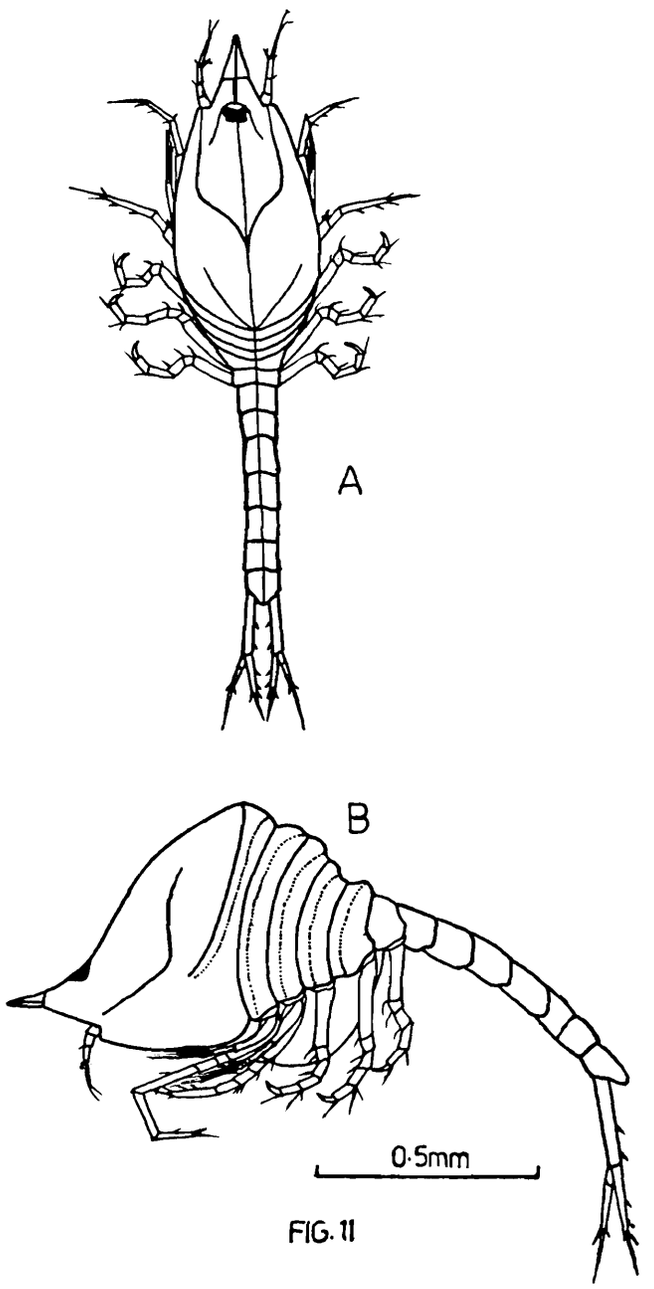


Fig. 11 *Campylaspis minuta* sp. nov. Ovigerous female
A. Dorsal view B. Lateral view

Ovigerous female (Figs. 11 & 12) Body short, anterior part highly dilated. Carpace granular, one-third the total length of the body. Pseudorostral lobes short, truncated anteriorly, meeting for a distance equal to the length of ocular lobe, which is broad with very distint dark lenses. A curved carina present on each side, running from the antennal notch to the dorsal region of the carapace. Carapace bears a prominent but thin dorso-median carina, which does not extend to the pedigerous

and pleon segments. In the distal part of the carapace a transverse carina beginning from the dorsal side extends side ways and ends blindly.

All five pedigerous segments distinct, broad and elevated dorsally.

Pleon short, fifth somite the longest with a constriction in the middle region, which gives the apperance of two separate segments ; telsonic somite half of fifth pleon somite and produced in between the uropods.

First segment of the first antennal peduncle longer than second, second and third segments subequal. Main flagellum two-segmented and accessory flagellum single segmented and very small.

Basis of third maxilliped broad and subequal to rest of the segments combined together, with two long plumose setae terminally ;

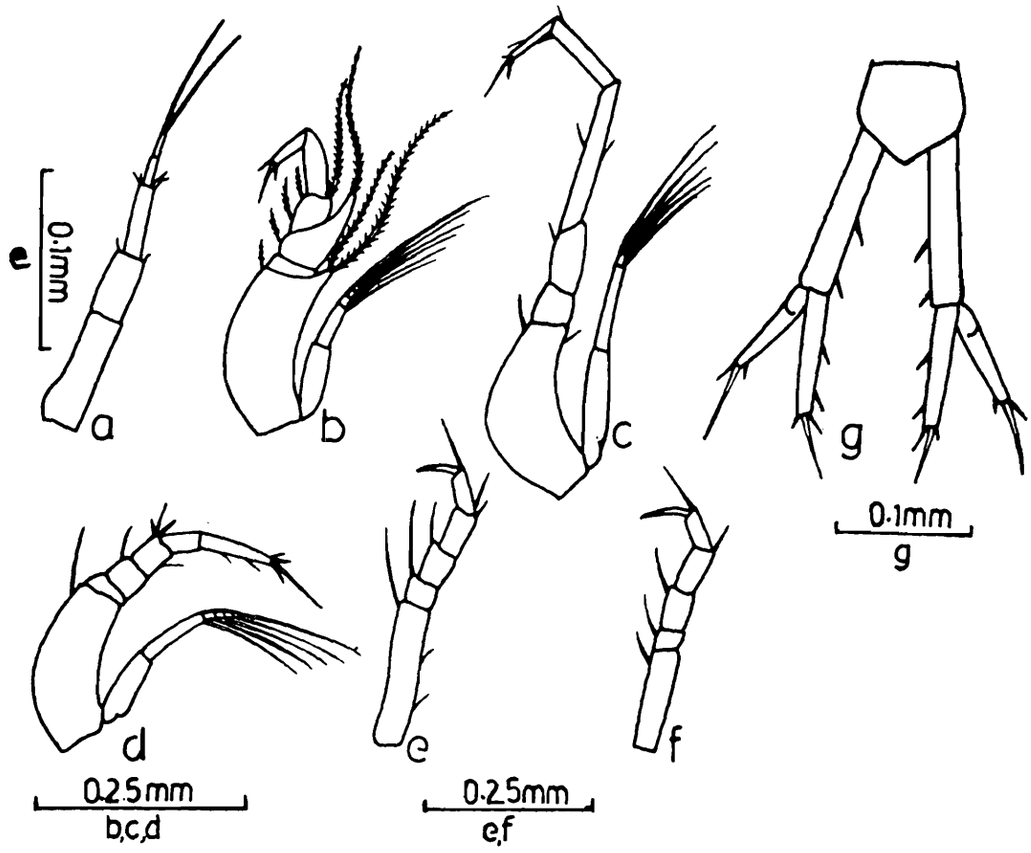


FIG.12

Fig. 12 *Campylaspis minuta* sp. nov. Ovigerous female
a. First antenna b. Third maxilliped c. First peraeopod
d. Second peraeopod e. Third peraeopod f. Fifth peraeopod
g. Uropod

ischium very short, merus prolonged terminally beyond the level of carpus with a long plumose seta ; carpus shorter than propodus, also with a long plumose seta terminally.

Basis of first peraeopod only half or less than half of total length of other segments combined together ; carpus long, twice as long as merus ; propodus longer than merus.

Basis of second peraeopod broad and shorter than the remaining segments combined together, merus and carpus subequal ; carpus with three spines terminally, dactylus twice as long as propodus, with four unequal terminal spines and two marginal spines.

Basis of third peraeopod shorter than rest of the segments combined together, basis, ischium and merus each with a terminal seta and carpus with two, carpus and propodus subequal in length, dactylus very short. Fourth peraeopod similar to third, but slightly longer.

Fifth peraeopod similar to the third and fourth peraeopods, but shorter.

Peduncle of uropod twice as long as telsonic somite, with two short spines on inner margin ; one in the middle and other towards the distal part. Endopod three-fourths the peduncle, with two short marginal spines and three unequal terminal spines and a very short spine on the inner distal margin.

The present species is represented only by female specimens and these can be distinguished from all other species of the genus by the very small size of the body, the nature of eye lobe and lenses, the curved and transverse carinae on the carapace, the long first peraeopod and constricted nature of the fifth pleon somite. The only other small species known is *C. minor* Hale, the females of which measure 1.2-1.4mm. But it can be easily distinguished by the well marked lateral groove-like depression on the side of the carapace, which is absent in the present species. There are also marked differences in the nature of peraeopods and uropods.

Type Specimen : Deposited in the Zoological Survey of India, Calcutta.

Campylaspis robusta sp. nov.

Locality : Off Cochin, Plankton, 1979, 1 ♀ 1.1mm.

Female. (Fig. 13). Carapace half of the total length of the body ; pseudorostral lobes elongated. A broad lateral furrow on each side of the carapace margined above by a distinct carina. There are patches of dark pigments in these furrows which extend well into the posterior half. A carina originates from the posterior region of each furrow and ends near the middle of the carapace. Ocular lobe distinct ; lenses not clear.

Third segment of the peduncle of first antenna short, main flagellum two—segmented and accessory flagellum very short.

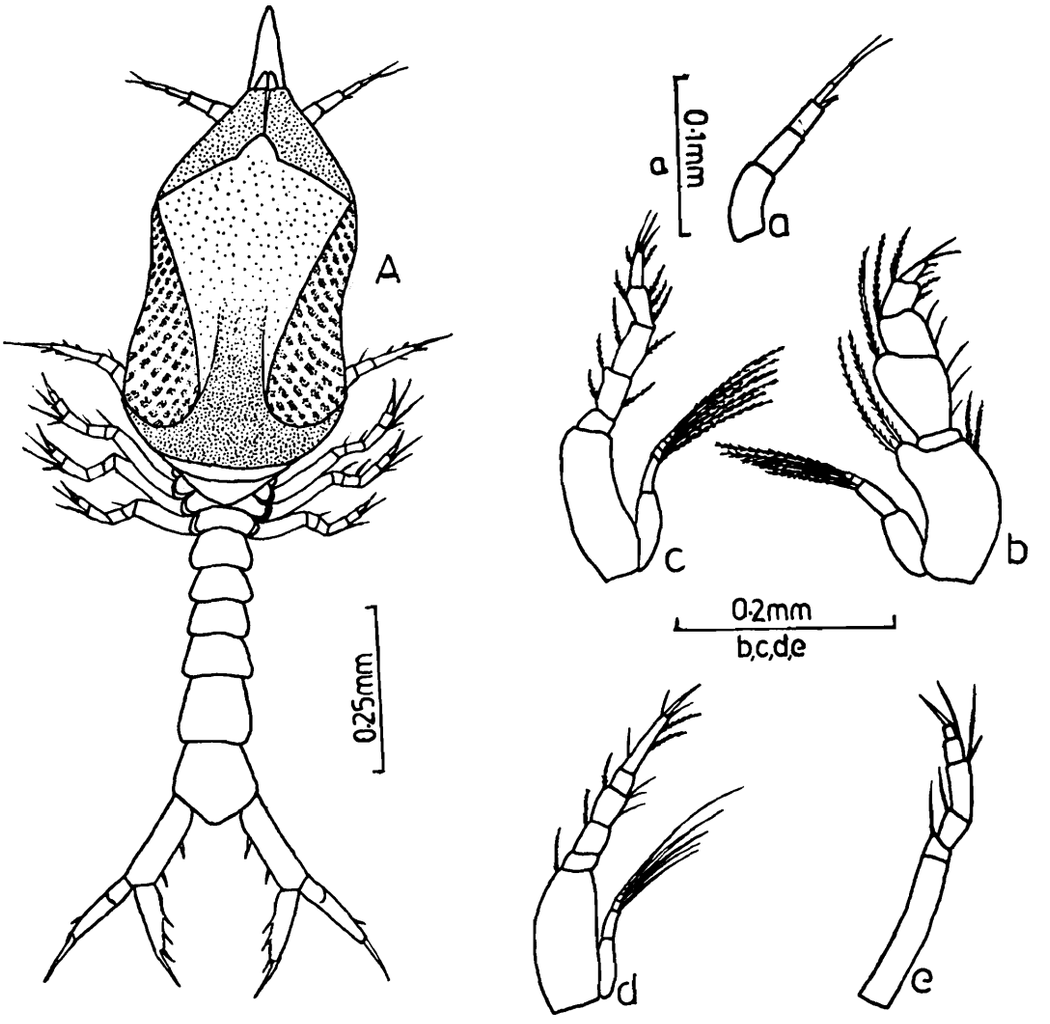


FIG.13

Fig. 13 A. ***Campylaspis robusta*** **sp. nov. Female**
a. First antenna b. Third maxilliped c. First peraeopod
d. Second peraeopod e. Third peraeopod

Third maxilliped wide ; basis about four-fifths as long as rest of limb, with two terminal plumose setae ; merus wide distally with a terminal plumose seta ; carpus and propodus also broad, each with an external marginal plumose seta ; dactylus short.

Basis of first peraeopod shorter than rest of limb ; carpus little longer than merus ; propodus and dactylus subequal in length.

Second peraeopod with broad basis, shorter than rest of the limb ; dactylus long, tapering towards the distal end, thrice as long as propodus.

First four pleon segments short ; fifth and sixth broader than the previous segments.

Peduncle of uropod slightly longer than the telsonic somite, with two slender spines on the inner margin, endopod of uropod three-fourths the peduncle ; its inner margin highly serrated with two marginal spines and two unequal terminal spines ; exopod slightly longer than endopod, with a long terminal spine.

This species agrees with *C. latidactyla* Hale in the presence of a deep and broad furrow on each side of the carapace. But there is difference in the nature of the furrow which is margined above and below with a fold in *C. latidactyla*, where as in the present species the furrow is margined above by a distinct carina. *C. robusta* also resembles *C. minor* Hale in the nature of the third maxilliped and the peraeopods, but differs in the nature of carapace and uropods. This species can be easily distinguished from all other allied species by the presence of a carina originating from the posterior region of each furrow which runs towards the middle of the carapace and by the dark patches of pigments present in the furrows.

Type specimen : Deposited in the Zoological Survey of India, Calcutta.

Genus **Paradiastylis** Calman

Paradiastylis culicoides Kemp.

1916 *Paradiastylis culicoides*, Kemp, *Mem. Indian Mus.*, 5, 4, pp. 398-402, figs. 3-5.

1951 *Paradiastylis culicoides*, Kurian, *Bull. Centr. Res. Inst. Univ. Travancore*, (c), 2, 1, pp. 106-107.

1954. *Paradiastylis culicoides*, Kurian, *Rec. Indian Mus.* 2-4, p. 305.

Locality : Off Cochin, Plankton, 10m, 2-4-1982, 5 ♀ ♀ (3 Ovi.) 1.9-2.2mm, 3 ♂ ♂ (immature) 1.5-1.6mm, 30m, 1 ovigerous ♀ 2.1mm, 30m, 5-3-1982, 1 ovigerous ♀ 2mm, 15m, 22-3-1982, 1 ♀ 2mm, Vizhinjom, dredge collection, 24m, 25-4-1959, 1 ♂ 2.5mm, Portonovo, intertidal sand, November, 1980, 2 ♀ ♀ 2.1-2.4mm.

Ovigerous female. Carapace without any distinct oblique lateral ridge as in type description. Short hairs are seen on the surface of the carapace, which is slightly uneven and there is a short longitudinal ridge in the mid-dorsal region. Third and fourth pedigerous segments combined together. Telson two-thirds the length of peduncle, peduncle more than twice as long as the telsonic somite, (thrice, Kemp) with 8-11 spines on the inner margin. Uropods closely resemble as in the type. The brood pouch revealed 12-16 eggs.

Male. Peduncle of uropod with sixteen spines, first joint of endopod with eight spines, second with three and third with two spines. Exopod little shorter than endopod, without spines or setae on the margin; terminal spines present.

Distribution : Chilka lake 2-4m, Trivandrum 30m.

SUMMARY

Our knowledge about the Cumacean fauna of Indian Coasts is limited, except for the works of Calman (1904), Kemp (1916) and Kurian (1951, 1954, 1961, 1965 Radha & Kurian 1981, 1982, Kurian & Radha 1983). The Indian Coasts have been a neglected region as far as the cumacean studies are concerned, compared to the other areas of the world. The present paper gives more informations on these minute crustaceans collected from the Indian Coasts.

Out of the thirty three species obtained during the present investigation fifteen are recorded from here for the first time, of which 4 are described as new species. The family Bodotriidae is well represented along the Indian Coasts with the species belonging to the genera *Heterocuma*, *Gigacuma*, *Eocuma*, *Bodotria*, *Cyclaspis* and *Iphinoe*. Most of them are benthic and vary in length from 0.7mm to 14.2mm. The largest species from the Indian coasts is *Gigacuma halei* Kurian, a common species from Vizhinjom, which attains 15-20mm in length.

It is noted that along the S.W Coast, Vizhinjom coast with a bottom deposit composed of fine sand mixed with a small percentage of silt and calcareous fragments is most suitable for Cumacea. *Iphinoe brevipes* is observed abundant in the plankton collections off Vizhinjom, especially from January to March. The Cumacea is abundant off Cochin also.

Along the East Coast, the intertidal sandy ground of Portonovo, shows the maximum abundance of Cumacea. *Bodotria Platybasis* is a common species which is present through out the year except in November, the maximum being in September. It usually occurs in association with the mysis *Gastrosaccus simulans*.

Though the cumaceans are essentially marine, some of them can survive in the estuarine condition also. *Paradiastylis culicoides* and *Iphinoe pigmenta* can tolerate a wide range of salinity.

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