

A Review of the Parasitic Copepods of Fish recorded from Ceylon with Descriptions of Additional Forms

BY

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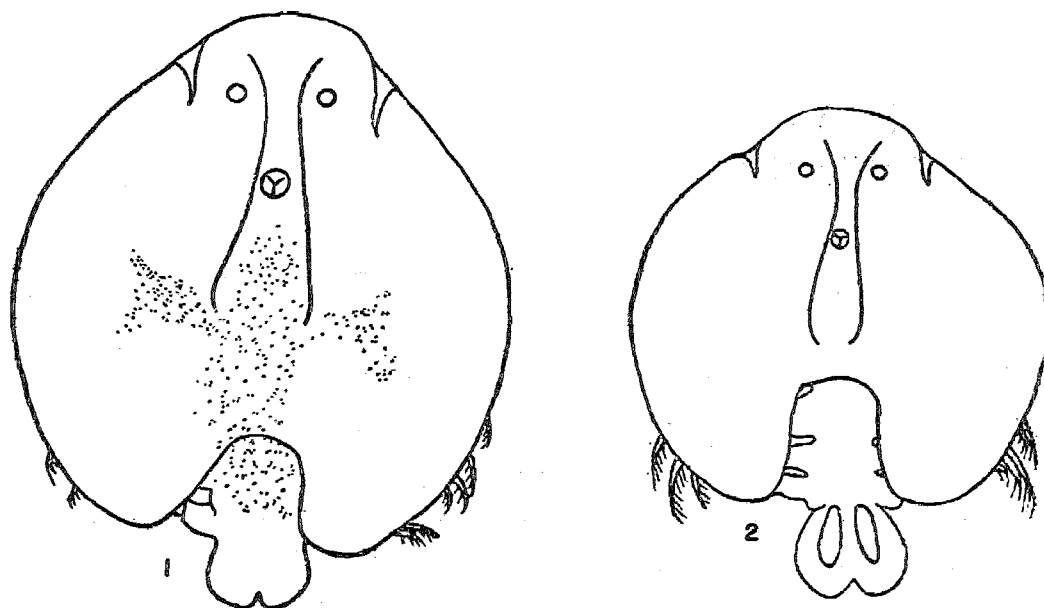
THE beginning of our knowledge of the copepods parasitic on fish from Ceylon is due to Bassett-Smith (1898 *a*) who, in a paper on "Further New Parasitic Copepods found on Fish in the Indo-Tropical Region", included seven species collected at Trincomalee and Colombo. Later in the same year, in a paper on "Some New or Rare Parasitic Copepods from the Indo-Tropical Region", he (Bassett-Smith, 1898 *b*) included three more species from Ceylon. Soon after, more of these parasites were obtained from Ceylon during Herdmann's investigation of the Pearl Banks. From this collection, one lot consisting of eleven species was described by Thompson and Scott (1903) and a second lot consisting of seven species was described by Wilson (1906). At that stage the number of species recorded from Ceylon made up to a total of twenty-eight; and there the matter rested for another quarter of a century until, quite by chance, while collecting marine animals on a reef, I came across a newly dead half-beak with a lernaeid parasite projecting from its body. Since then, in a number of occasional papers (Kirtisinghe, 1932-35, 1937, 1950, 1956, 1960) I have described thirty-eight more species of parasitic copepods from Ceylon. However, my collection included many more species which were put aside for later attention. In the present paper, while dealing with those forms in my collection which I have not recorded or described earlier, I have put together all the known forms of parasitic copepods of fish from Ceylon. This has given me the opportunity of carrying out such revision as has become necessary of my own earlier work as well as of the earlier work of the other authors in this field. A list of the host fishes with their respective parasitic copepods is also provided. Types of new species, at present in the author's private collection, will be deposited in the Fisheries Department, Colombo, Ceylon.

Family ARGULIDAE

ARGULUS Muller

Argulus nativus Kirtisinghe

Argulus nativus Kirtisinghe, 1959, pp. 253-256, figs



Figs. 1, 2. *Argulus nativus* Kirtisinghe. 1, female; 2, male.

Occurrence. On the outer surface of the body of *Promicrops lanceolatus* (Bloch), off Ambalangoda, on the south west coast.

Distribution. Not recorded elsewhere.

Female (Fig. 1). Cephalothorax subcircular, slightly longer than wide; anterolateral sinuses shallow; posterior lobes rounded, reaching to base of abdomen; posterior sinus leaving only the last two thoracic segments visible in dorsal view; no distinct respiratory areas. Abdomen short, cleft less than a fourth of its length. Dorsal surface partly pigmented. Total length 5.8 mm..

Male (Fig. 2). Cephalothorax more nearly circular than in female, its posterior sinus leaving the last three thoracic segments visible in dorsal view. Abdominal lobes more oval than in female. Dorsal surface unpigmented. Total length 4.7 mm..

Remarks. Although *A. nativus* is the only indigenous argulid recorded from this region, mention must be made of the presence of an introduced species. *A. foliaceus* Linn. (Fig. 3), which lives on the external surface of the body and on the gills of a large number of fresh water fish and tadpoles from almost all over Europe, has been brought over to Ceylon with the mirror carp and trout that were stocked in the lakes and streams in and around Nuwara Eliya. The specimen figured was obtained on the outer surface of the body of a mirror carp from the lake in Nuwara Eliya.

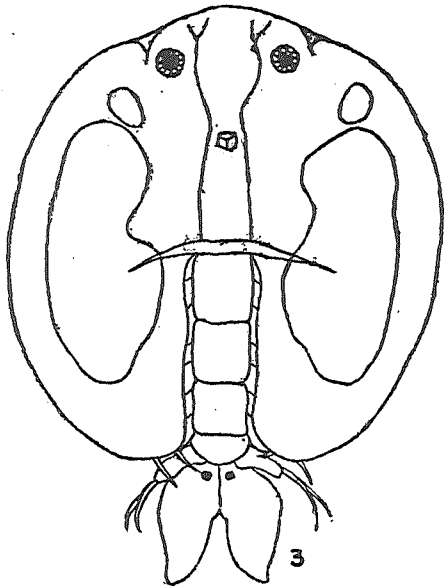


Fig. 3. *Argulus foliaceus* Linn.. Female.

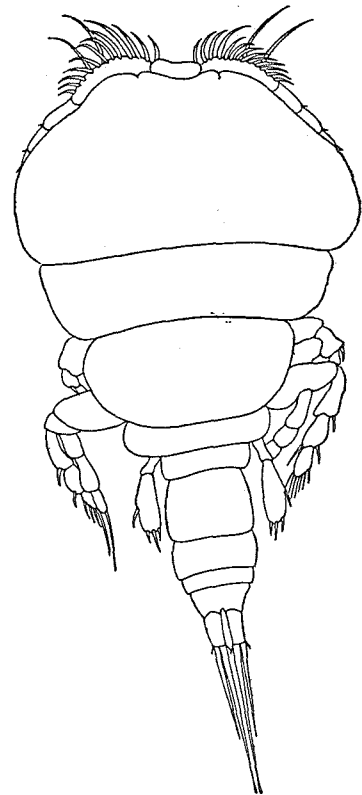


Fig. 4. *Bomolochus unicirrus* Richiardi. Female.

Family BOMOLOCHIDAE

BOMOLOCHUS Nordmann

Bomolochus unicirrus Richiardi

Bomolochus unicirrus Richiardi, 1879, *Processi verbali Soc. Tosc. Sci. Natur.*; Brian 1902, pp. 3-6. pl. 1, figs. 1-8.; 1924, pp. 9-11, fig. 5; Thompson and Scott, 1903, p. 293.

Bomolochus tumidus Shiino, 1957, pp. 417-422, figs. 3 and 4.

Occurrence. In the gill chamber of *Centriscus scutatus* Linn. on the Pearl Banks (Thompson and Scott). I have obtained a few female specimens from the gills of *Tylosurus leiurus* (Bleeker) at Hikkaduwa, on the south west coast.

Distribution. The species type was described by Richiardi from the Mediterranean (host unrecorded); the species also occurs in the branchial cavity of *Lichia vadiago* off Mauritania (Brian) and on the gills and inner surface of the operculum of *Cololabis saira* off Owase, Japan (Shiino).

Female (Fig. 4). Cephalothorax semi-elliptical, wider than long. Second to fifth thoracic segments narrowing progressively backwards; third thoracic segment longer than second and overlapping the fourth segment which may, in its turn, overlap the fifth. Genital segment comparatively long. Abdomen narrowing gradually backwards, second abdominal segment the shortest. Basal joint of first antenna with two long setae in addition to the anterior fringe of setae. Caudal rami tipped with two long setae, the inner of which is nearly twice as long as the outer. Length of body 1.9 mm.

Male. Not known.

Remarks. The only character by which Shiino distinguishes his *B. tumidus* from *B. unicirrus* is the union of the fifth and sixth segments in the former. However, his figure of this region in *B. tumidus* shows a well marked constriction between these two segments. It does not seem to provide a strong enough basis for making out a separate species.

Bomolochus scomberesocis Kroyer

Bomolochus scomberesocis Kroyer, 1863, pp. 217-219. Thompson and Scott, 1903, p. 293.

Bomolochus denticulatus Bassett-Smith, 1898 a, pp. 78-80, pl.3, fig. 1.

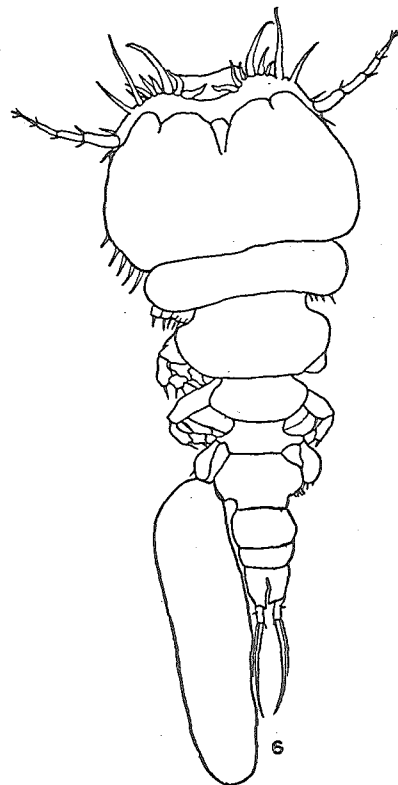
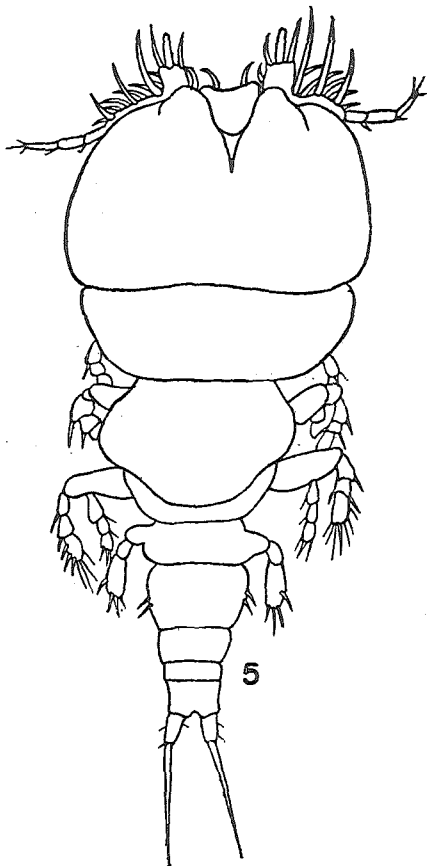


Fig. 5. *Bomolochus scomberesocis* Kroyer. Female.

Fig. 6. *Bomolochus megaceros* Heller. Female

Occurrence. On the gills of *Selaroides leptolepis* (Cuvier) off Aripu (Thompson and Scott); in the gill cavity of *Sphyraena jello* Cuvier at Trincomalee and at Colombo, and on the gills of *Hemirhamphus far* at Trincomalee (Bassett-Smith). I too have obtained several female specimens from the gills of *Sphyraena jello* bought in the Colombo market.

Distribution. The species type was obtained by Kroyer in the Atlantic, host unrecorded.

Female (Fig. 5). Cephalothorax semi-elliptical. Second thoracic segment nearly as wide as the cephalothorax; third thoracic segment narrower but longer than second, bulging dorsally and overlapping the narrow fourth segment. Middle abdominal segment the shortest. Caudal rami tipped with a single long seta. On each side of the central fossa of the cephalothorax is an anterior projection bearing three setaceous horns, the middle horn of which is blunter than the lateral horns. Total length 2.2 mm..

Male. Not known.

Remarks. The reasons given by Bassett-Smith for separating this form into a different species are not significant. I have retained it in Kroyer's species as Thompson and Scott have done.

Bomolochus megaceros Heller

Bomolochus megaceros Heller, 1865, pp. 153-157, pl. 13, fig. 2; Bassett-Smith, 1898 b, pp. 358-359, pl. 10, fig. 1; Gnanamutthu, 1949, pp. 359-362, figs. 1-6.

Occurrence. On the gills of *Parastromateus niger* (Bloch) at Colombo (Bassett-Smith). I too have obtained female specimens of this parasite on the gills of the same host fish bought in the Colombo market.

Distribution. On the gills of *Parastromateus niger* in the Indian Ocean (Heller), at Baluchistan and at Bombay (Bassett-Smith) and at Madras (Gnanamuthu); on *Atule djedaba* at Aden (Bassett-Smith).

Female (Fig. 6). Cephalothorax semi-elliptical, wider than long. Free thoracic segments narrowing gradually backwards, third segment longer than the second and the fourth. Genital segment slightly wider than long. Second abdominal segment shorter than the other two abdominal segments. Caudal rami tipped with two setae, the inner of which is much longer than the outer. Basal joint of first antenna furnished with an anterior row of 12-13 setae and three other more enlarged setae. Total length 3.4 mm..

Male. Known only from a single specimen described by Bassett-Smith. According to him the cephalothorax is elongate and there are only two short, free thoracic segments. The enlarged genital segment is oval and the abdomen consists of only two segments. The second maxilliped is very large and powerful. Total length 1 mm.. (Male not seen. Description from Bassett-Smith).

Remarks. The "male" of this form described by Gnanamuthu, very different from the description and figure by Bassett-Smith, is merely a young female.

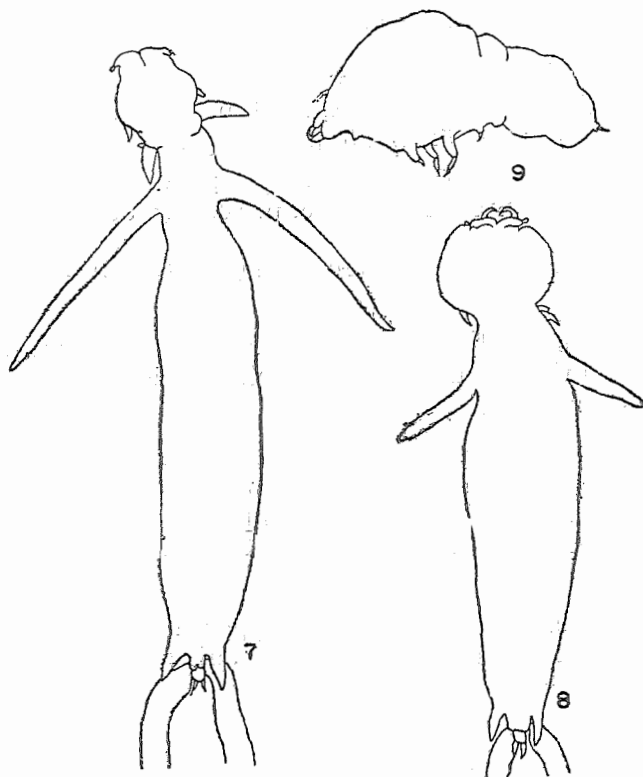
Family CHONDRACANTHIDAE

CHONDRACANTHUS Delaroche

Chondracanthus alatus Heller

Chondracanthus alatus Heller, 1865, pp. 231-232, pl. 23, fig. 3; Bassett-Smith, 1898, p. 14; Kirtisinghe, 1956, p. 20

Protochondracanthus psettodis Kirtisinghe, 1950, p. 85, figs. 44-51.



Figs. 7-9. *Chondracanthus alatus* Heller. 7, female; 8, juvenile female; 9, male.

Occurrence. On the gill filaments of *Psettodes erumei* (Bloch) bought in the Colombo market.

Distribution. On *Hippoglossus nolako* off Singapore (Heller) and on *Psettodes erumei* off Bombay (Bassett-Smith).

Female (Figs. 7, 8). Head oval, longer than wide with a short median dorsal suture anteriorly and a pair of postero-lateral cephalic barbs. Thoracic region, marked off from the head by a slight constriction, narrower than the head and bearing a pair of long, postero-laterally directed processes with tapering ends. Trunk cylindrical, wider than thorax, with a pair of short conical processes at the posterior corners of the genital segment. Abdomen small, one-segmented, carrying a pair of conical caudal rami of about the same length as the abdomen. Length 7 mm..

Male (Fig. 9). Body pyriform. Thoracic region incompletely segmented. Abdomen of a single segment bearing a pair of conical caudal rami. Length 0.3 mm..

ACANTHOCHONDRIA Oakley

Acanthochondria cynoglottidis (Thompson and Scott)

Chondracanthus cynoglottidis Thompson and Scott, 1903, p. 294, fig. 1

Acanthochondria cynoglottidis Oakley, 1930, p. 186

Occurrence. In the nasal caecum of *Cynoglossus puncticeps* (Richardson) and of *C. brachycephalus* Bleeker on the Pearl Banks off Ceylon (Thompson and Scott).

Distribution. Not recorded elsewhere.

Female. Head rounded, as wide as the widest part of the body. Latter narrow for about a third of its length from the front end when it expands at the genital segment. Abdomen small, one-segmented, caudal rami small and tapering. Length 4.65mm.. (Not seen. Description from Thompson and Scott).

Male. Not known.

Acanthochondria cornuta (Muller)

Lernaea cornuta Muller, 1777, p. 124, pl. 33, fig. 1

Chondracanthus cornutus Thompson and Scott, 1903, p. 294; Scott, T. and A. 1913, p. 168, pl. 47, figs. 1 and 2, pl. 52, fig. 5, pl. 53, figs. 1-9

Acanthochondria cornuta Oakley, 1930, p. 189, fig. 3; Van Oorde-de Lint and Schuurmans Stekhoven, 1936, p. 109, fig. 53.

Occurrence. On the gills of *Cynoglossus macrolepidotus* (Bleeker) on the Pearl Banks (Thompson and Scott).

Distribution. On the gills of several species of *Pleuronectes*, *Rhombus*, and *Lepidorhombus* in the North Sea, English Channel and the Atlantic coast of N. America (Scott, T. and A.; Van Oorde-de Lint and Schuurmans Stekhoven).

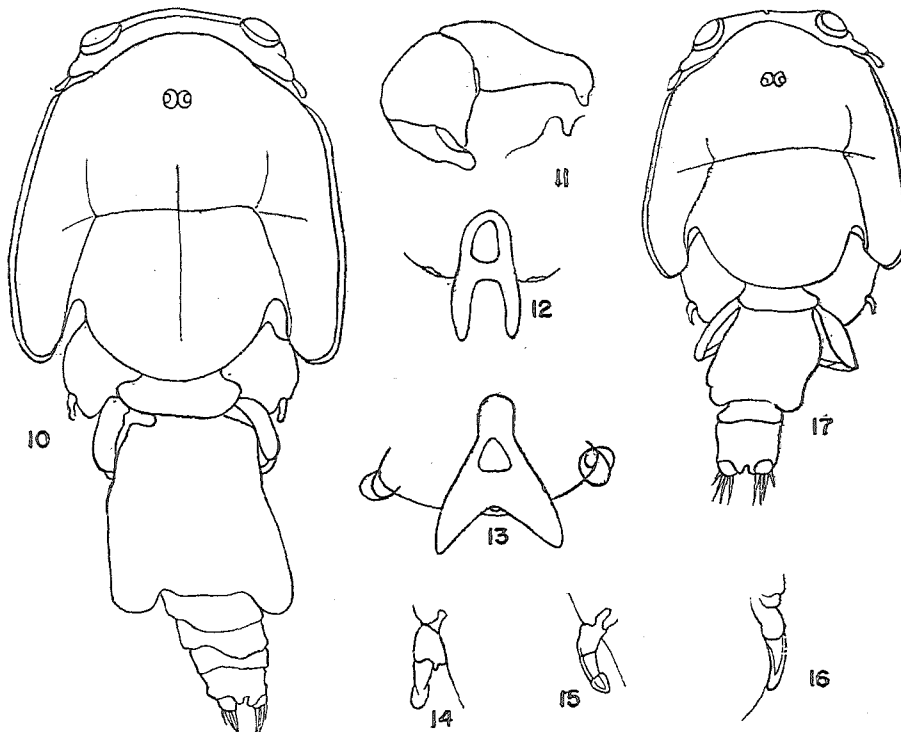
Female. Head ovate, somewhat longer than broad, thorax narrow. Genital segment wider than head, moderately elongated, flattened, and usually with a constriction dividing it into subequal portions; postero-lateral corners of the genital segment produced backwards into narrow processes. Abdomen very small, of two segments, and rather shorter than the lateral processes of the genital segment. Total length 6 mm..

Male. Cephalothorax considerably enlarged and apparently unsegmented, arched dorsally. Abdomen composed of three or four segments. Caudal rami small. Length 0.5 mm..

(Not seen. Description from Scott, T. and A.)

Family CALIGIDAE

CALIGUS Muller

Caligus coryphaenae Steenstrup and Lütken

Figs. 10-17. *Caligus coryphaenae* Steenstrup and Lutken. Female. 10, entire animal; 11, first maxilla; 12, sternal furca of juvenile female; 13, sternal furca of adult female. 14-16, claw on third leg; 17, juvenile female.

- Caligus coryphaenae* Steenstrup and Lütken, 1961, p. 20, pl. 4, fig. 7; Brian 1935, p. 202 fig. 19; Heegaard, 1949, p. 241, figs. 6-10; Barnard, 1955, p. 256, fig. 88 a-d; Shiino, 1959b, pp. 2-8, figs. 1 and 2; Kurian, 1961, pp. 68-70, figs. 16-24
- Caligus aliuncus* Wilson, 1905, p. 576, pl. 9; and 1935, p. 330; Causey, 1953, p. 8
- Caligus elongatus* Heegaard, 1943a, p. 11, figs. 21-31
- Caligus tesserafer* Shiino, 1952, p. 89, fig. 5
- Caligus bengoensis* Scott, T. 1895, p. 30, pl. 14, fig. 19
- Caligus euthynnus* Kurian 1961, pp. 63-67, figs. 1-15
- Caligus alveolaris* Heegaard, 1962, pp. 156-157, figs. 37-44

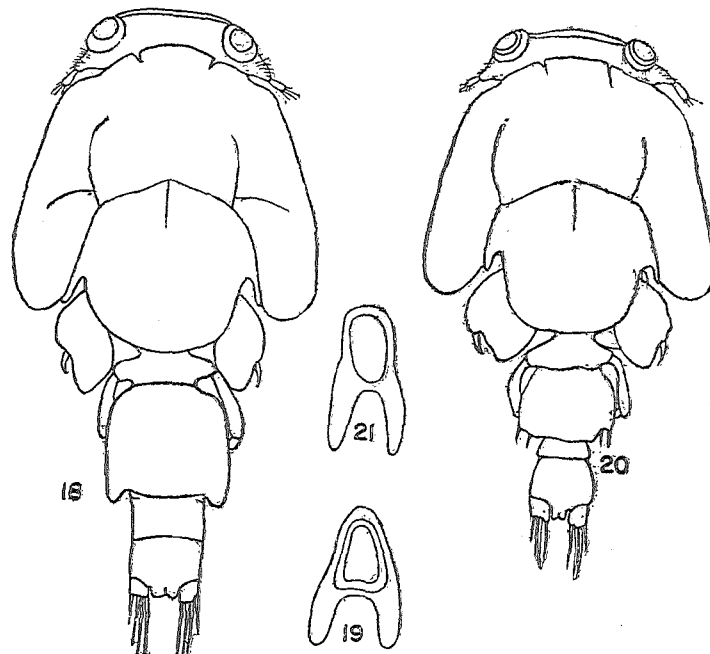
Occurrence. One adult female and one juvenile female on the outer surface of the body of *Katsuwonus pelamis* (Linn.) and one juvenile female and three males on the outer surface of the body of a carangid off Hikkaduwa on the south west coast.

Distribution. On *Katsuwonus pelamis*, *Coryphaena hippurus* and *Euthynnus lineatus* in the Pacific (Shiino, Heegaard), on *Neothynnus albacora* and *Euthynnus affinis* in the Indian Ocean (Shiino, Kurian), on *Euthynnus alleteratus* off North Queensland, Australia (Heegaard), in the Mediterranean (Brian) and on *Coryphaena hippurus* and *Euthynnus alleteratus* in the Atlantic (Steenstrup and Lutken, Wilson).

Female (Figs. 10-19). Lunules hemispherical. Cephalothorax longer than wide, a little more or less than half the entire length; median lobe much more than a third of the width of the cephalothorax projecting a little beyond the posterior level of the lateral lobes. Free thoracic segment short and broad. Genital segment quadrangular, with short postero-lateral lobes. Abdomen of two to four segments. Caudal rami short, scarcely extending beyond the bilobed tip of the abdomen. Length 7 mm..

Male (Figs. 20, 21). Cephalothorax as in female but more than half the entire length. Genital segment nearly square with the fifth and sixth legs clearly visible at its postero-lateral corners. Abdomen of two segments, proximal segment shorter than the terminal. Length 4 mm..

Remarks. Since Heegaard (1949) and Shiino (1959 b) discussed the synonymy of *Caligus coryphaenae* Steenstrup and Lütken, two other forms bearing strong resemblances to this species have been described as new species by Kurian (1961) and by Heegaard (1962). The variable characters



Figs. 18-21. *Caligus coryphaenae* Steenstrup and Lutken. 18, female; 19, sternal furca of female; 20, male; 21, sternal furca of male.

among all these forms appear to be the number of abdominal segments, the presence or absence of the first maxilla, the shape of the sternal furca and the shape of the claw on the exopodite of the third thoracic leg. The half dozen specimens in my collection provide some evidence on these four points.

There can be no doubt that that the two specimens from *Katsuwonus pelamis*, though both of them are slightly mutilated in the hind body region, are an adult and a juvenile form of the female of *Caligus coryphaenae*. The juvenile form has only two abdominal segments while the adult has four. Wilson (1935) found that his *Caligus aliuncus* of a length of 5mm. had only three abdominal segments while those of a length of 7.6 mm. had four segments in the abdomen. Heegaard (1949) and Barnard (1955) gave the number of abdominal segments in *C. coryphaenae* as two, three or four.

The first maxilla (Fig. 11) is in a reduced state in the adult while it is indistinguishable in the juvenile. Wilson (1935) also stated that the first maxillae are "really present but so minute as to escape detection." The figures (12, 13, 21) of the sternal furca show its change in shape from the juvenile to the adult female and male. That the shape of the claw on the third leg changes from the pointed to the spatulate type is proved by fig. 15 which is a drawing of a spatulate claw that was accidentally damaged in handling. It shows that the pointed claw becomes spatulate with growth, by the deposition of chitinous material on the outside.

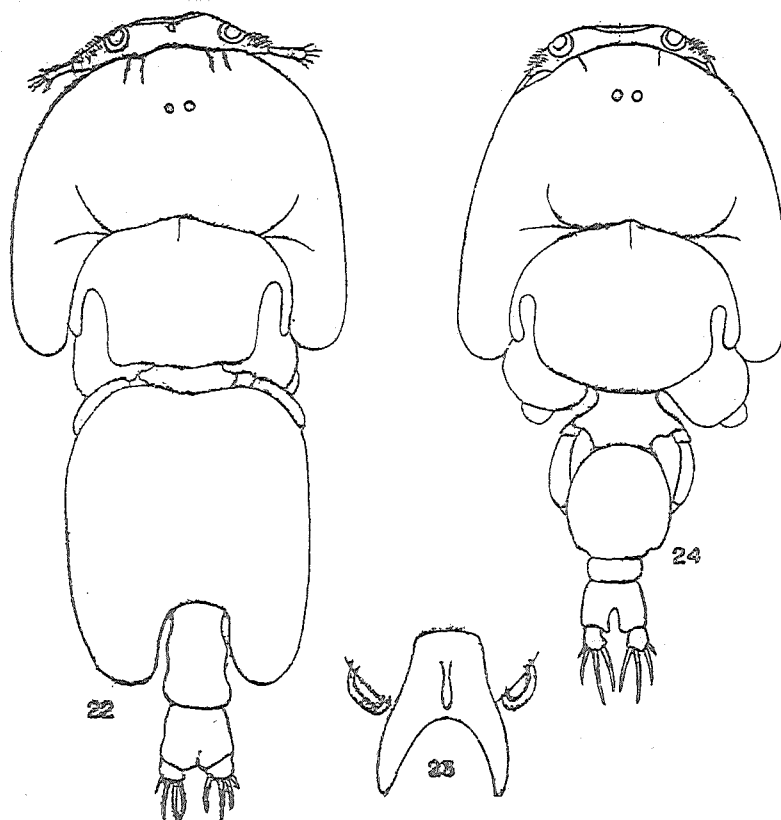
Where the male (fig. 20) is known it shows no great variation from the central type.

Caligus infestans Heller

Caligus infestans Heller, 1865, pp. 167-169 pl. 14, figs. 3 and 4; Nunes-Ruivo and Fourmanoir 1956, pp. 69-71, fig. 1.

Caligus sphyraenae Nunes-Ruivo and Fourmanoir, 1956, pp. 71-73, figs. 2 and 3.

Caligus maculatus Heegaard, 1962, pp. 157-158, figs. 45-53



Figs. 22-24. *Caligus infestans* Heller. 22, female; 23, sternal furca of female; 24, male.

Occurrence. On the gills of *Cybium commersoni* (Lacepede) off Mullaitivu on the north-east coast and off Panadura on the west coast.

Distribution. On the gills of *Scomber* sp. in the Indian Ocean (Heller) and on the walls of the branchial cavity and on the skin of *Cybium commersoni* and *Sphyaena picuda* Bloch off Madagascar (Nunes-Ruivo and Fourmanoir).

Female (Figs 22, 23). Cephalothorax slightly more or less than half the entire length; lunules moderate; median lobe more than half the width of the cephalothorax, extending beyond the posterior level of the lateral lobes. Genital segment flask-shaped, with well developed postero-lateral lobes in the adults. Abdomen of two segments, proximal segment slightly the longer. Total length 6.5 mm..

Male (Fig. 24). Cephalothorax as in female but more than half the entire length. Genital segment oval. Abdomen a little shorter than the genital segment, two-segmented, proximal segment short and ring-like. Total length 4 mm..

Remarks. From the figure of the male of *C. sphyraenae* Nunes-Ruivo and Fourmanoir given by these authors there is no doubt that this species is identical with *C. insfestans* Heller. Such differences as are shown between the females of these two species in regard to the shape of the genital segment and the sternal furca are due to the immature condition of the female specimens from which *C. sphyraenae* was described.

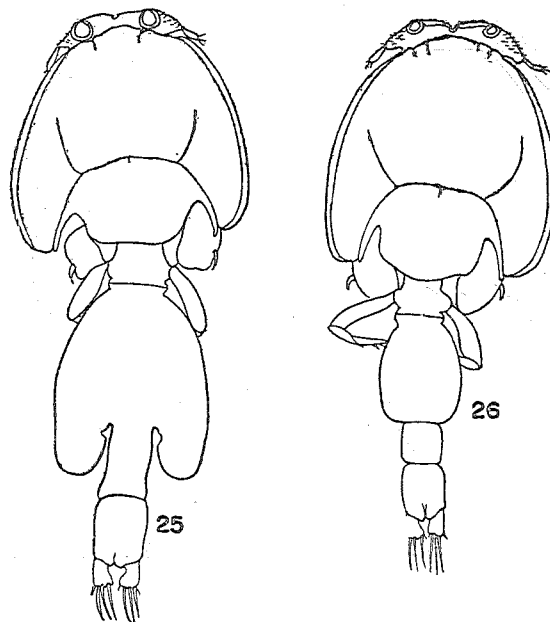
Caligus productus Dana

Caligus productus Dana, 1852, p. 1354, pl. 94, fig. 4; Steentrup and Lutken, 1861, p. 357 pl. 3, fig. 6. Kroyer, 1863, p. 138, pl. 3, fig. 4 a-i; Brian, 1906, p. 42; Shino, 1959b, pp. 14-20, figs. 6-8.

Caligus monacanthi Kroyer, 1863, p. 133, pl. 3, fig. 2 a-e; Wilson, 1937, p. 244, fig. 6.

Caligus lobatus Wilson, 1935, p. 1, figs. 1-10.

Caligus Katuwo Yamaguti, 1936, pp. 6-8, pl. 4, fig. 55, pl. 5, figs. 56-58; Shino, 1954a p. 246, fig. 1; Nunes-Ruivo, 1954, p. 11, pl. 1, fig. b, pl. 2, fig. b.



Figs. 25, 26. *Caligus productus* Dana. 25, female; 26, male.

Occurrence. In the gill chamber of *Coryphaena hippurus* Linn., *Katsuwonus pelamis* (Linn.) and *Euthynnus affinis* (Cantor) off Hikkaduwa.

Distribution. On *Katsuwonus pelamis*, *Coryphaena hippurus*, *Auxis thazard*, *Neothynnus albacora* in the Pacific (Shiino, Yamaguti); *Chrysophrys aurata* in the Mediterranean (Brian); on *Katsuwonus pelamis*, *Sphyræna barracuda*, *Coryphaena hippurus* in the Atlantic (Dana, Wilson, Steenstrup and Lutken).

Female (Fig. 25). Cephalothorax semi-elliptical, slightly longer than wide, less than half the entire length; lunules almost spherical; median lobe half the width of the cephalothorax, scarcely projecting beyond the posterior level of the lateral lobes. Genital segment flask-shaped, with well developed postero-lateral lobes. Abdomen of two nearly equal segments. Total length 5 mm..

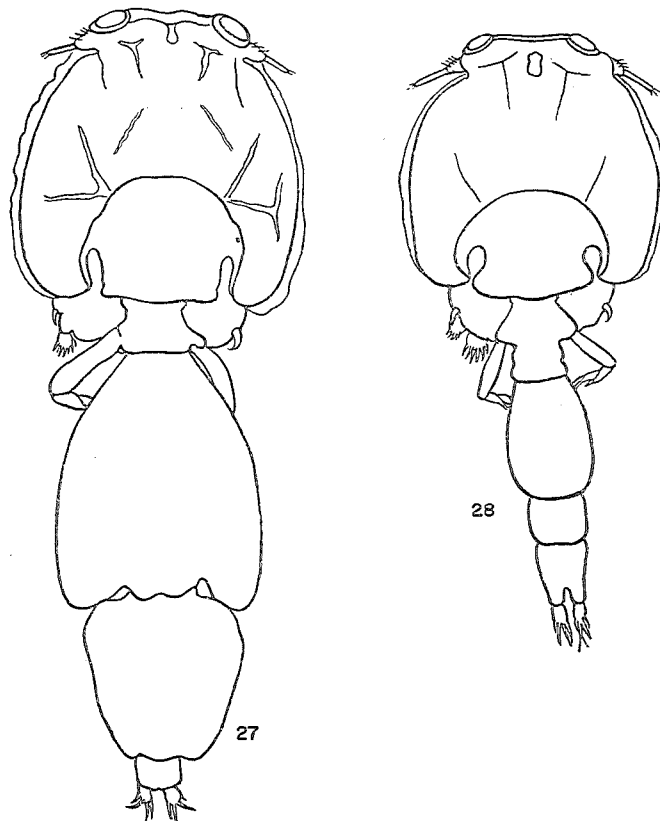
Male (Fig. 26). Cephalothorax as in the female but about half the entire length. Genital segment barrel-shaped. Abdomen of two segments, proximal segment a little shorter than the distal. Total length 4.4 mm..

Remarks. This record extends the known distribution of the species from the Pacific, Atlantic and Mediterranean Oceans into the Indian Ocean.

Caligus constrictus Heller

Caligus constrictus Heller, 1865, pp. 175-176, pl. 15, fig. 5; Kirtisinghe, 1956, pp. 14-15, figs. 1-4; Pillai, 1961, pp. 93-96, fig. 4.

Midias carangis Rangnekar, 1956, pp. 49-52, figs.



Figs. 27, 28. *Caligus constrictus* Heller. 27, female; 28, male.

Occurrence. On the roof of the mouth cavity of several carangid species and on the gills of *Alectis indica* (Ruppell) bought in the Colombo market.

Distribution. On the gills of *Stromateus* sp. in the Indian Ocean (Heller); on the gills of *Carangoides chrysophrys* (Cuvier) off Bombay (Rangnekar); on the roof of the mouth cavity of *Carangoides malabaricus* (Bloch) off Trivandrum, South India (Pillai).

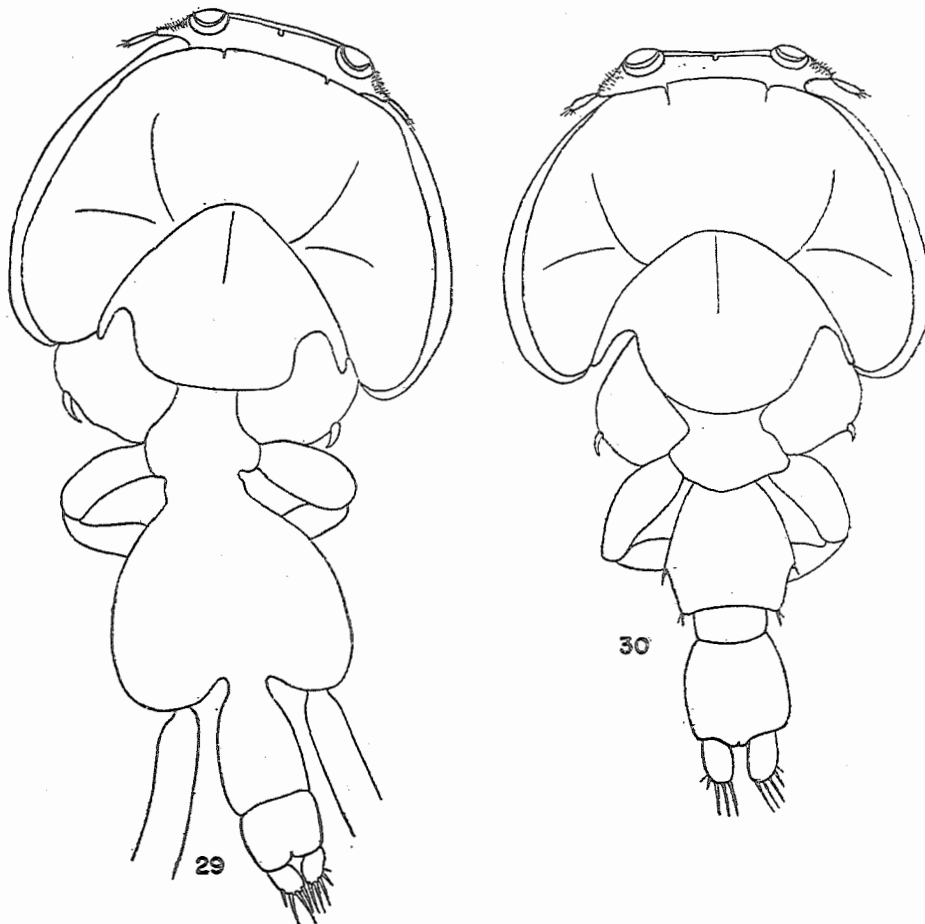
Female (Fig. 27). Cephalothorax longer than wide, much less than half the entire length; lunules hemispherical; median lobe about half the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Genital segment flask-shaped, not quite as long as the cephalothorax, with short postero-lateral lobes. Abdomen of two segments, proximal segment broad, more than four times as long as the short distal segment. Total length 6 mm..

Male (Fig. 28). Cephalothorax as in female but a little longer in proportion to the rest of the body. Free thoracic segment longer than in the female, with annular constrictions. Genital segment ovate. Abdomen about as long as the genital segment, two-segmented, proximal segment a little shorter than the distal. Total length 5 mm..

Remarks. The fact that this species was established by Heller from the male only has made its subsequent identification a matter of some difficulty. In parasitic copepods with dimorphic sexes it is not easy to recognize female specimens when the species is known from the male only and to recognize male specimens when the species is known from the female only. I believe that Wilson's (1937, 1937 a) identification of some female specimens as those of *Caligus constrictus* is at fault; likewise the more recent identification of Shiino, again of some female specimens only, as belonging to this species. I was more fortunate in that my collections contained both sexes and therefore sure of my identification. Recently Pillai (1961) has found that I was correct.

Caligus robustus Bassett-Smith

Caligus robustus Bassett-Smith, 1898b, pp. 361-363, pl. 11, figs. 1 and 2; Wilson, 1913, p. 273, pl. 28; Brian, 1924, p. 15; Bere, 1936, p. 582.



Figs. 29, 30. *Caligus robustus* Bassett-Smith. 29, female; 30, male.

Occurrence. On the inner surface of the operculum and on the gill arches of *Neolithynnus macropterus* (Schlegel), *Selar mate* (Cuvier) and *Atule djedeba* at Trinomalee (Bassett-Smith). I have obtained it in the branchial cavity of *Caranx melampygus* Cuvier bought in the Colombo market.

Distribution. On *Megalaspis cordyli* off Aden (Bassett-Smith); on *Bathystoma remator* and *Carnax crysos* off Jamaica (Wislon), on *Caranx hippos* off Mauritania (Brian); on *Paratractus crysos* and *Caranx hippos* in the gulf of Mexico (Bere).

Female (Fig. 29). Cephalothorax semi-elliptical, wider than long, less than half the entire length; lunules hemispherical; median lobe about half the width of the cephalothorax, scarcely projecting beyond the posterior level of the lateral lobes. Genital segment sac-like, with distinct postero-lateral lobes. Abdomen about as long as the genital segment, two-segmented, proximal segment longer than the distal. Total length 10 mm.

Male (Fig. 30). Cephalothorax as in the female but about half the entire length. Genital segment with fifth and sixth legs showing as spines on its lateral margins and postero-lateral corners. Abdomen two-segmented, proximal segment shorter and narrower than the distal segment. Total length 5 mm.

Caligus diaphanus Nordmann

Caligus diaphanus, Kroyer, 1863, p. 79, pl. 7, fig. 5; Thompson and Scott, 1903, p. 293; Brian, 1906, p. 43, and 1924, pp. 15-16; Scott, T. and A. 1913, p. 60, pl. 17; van Oorde-de Lint and Schuurmans Stekhoven, 1936, p. 135, fig. 97

Caligus multispinosus (not Shen), Pillai, 1961, pp. 89-91, fig. 2

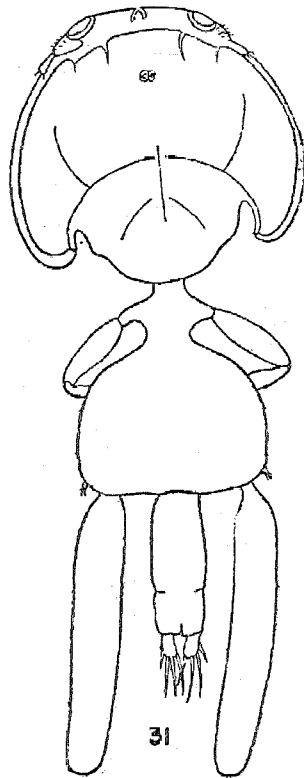


Fig. 31. *Caligus diaphanus* Nordmann. Female.

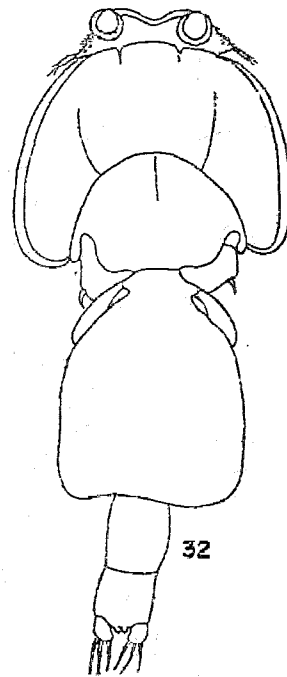


Fig. 32. *Caligus epinepheli* Yamaguti. Female.

Occurrence. On *Autisthes puta* (Cuvier) on the Pearl Banks (Thompson and Scott); I have obtained it in the mouth cavity of *Lates Calcurifer* (Bloch) bought in the Colombo market.

Distribution. On *Trigla* spp. in the North Sea and around the British Isles (Scott) on *Trigla* spp. and on *Solea vulgaris* off Mauritania (Brian), on *Pampus argenteus* at Trivandrum (Pillai).

Female (Fig. 31). Cephalothorax as long as broad, less than half the entire length; lunules hemispherical; median lobe about half the width of the cephalothorax, projecting a little beyond the posterior level of the lateral lobes. Free thoracic segment narrow. Genital segment sac-shaped. Abdomen about as long as the genital segment, two-segmented, proximal segment longer than the distal. Total length 3.4 mm..

Male. Cephalothorax as in female, but more than half the entire length. Genital segment barrel-shaped. Abdomen of two segments, proximal segment the shorter. Total length 2 mm..

Remarks. Brian (1924) has expressed the opinion that *Caligus torpedinis* Heller is probably a synonym of *C. diaphanus*.

Caligus epinepheli Yamaguti

Caligus epinepheli Yamaguti, 1936, pp. 4-5, pl. 3, figs. 27-30.

Caligus cossackii (not Bassett-Smith), Rangnekar and Murti, 1959, pp. 78-81, fig..

Occurrence. In the mouth cavity of *Chorinemus* sp. off Hikkaduwa.

Distribution. On the gills of *Drepane punctata* off Bombay (Rangnekar and Murti), of *Epinephelus septemfasciatus* at Kuki and of *E. akara* at Tarumi, Japan (Yamaguti).

Female (Fig. 32). Cephalothorax as long as broad, less than half the entire length; lunules spherical; median lobe about half the width of the cephalothorax, projecting but little beyond the posterior level of the lateral lobes. Free thoracic segment short. Genital segment flask-shaped, postero-lateral lobes hardly developed. Abdomen shorter than the genital segment, two-segmented, proximal segment slightly longer than the distal. Total length 4.8 mm..

Male. Cephalothorax as in female but about half the entire length. Genital segment oval. Abdomen of two, nearly equal segments. Total length 4.1 mm.. (Male not seen; description according to Rangnekar and Murti)

Remarks. Yamaguti observed that *Caligus epinepheli* closely resembles *C. mutabilis* Wilson. It also closely resembles *C. cossackii* Bassett-Smith but is distinguishable by the character of the first thoracic leg which in *C. epinepheli* bears a rudimentary endopodite, bifid terminal claws on the third joint and is without the three usual setose hairs on the posterior margin of this joint.

Caligus cossackii Bassett-Smith

Caligus cossackii Bassett-Smith, 1898 a, pp. 85-86. pl. 4, fig. 3; Heegaard, 1943 a, pp. 5-8 fig. 12; Barnard, 1955, p. 248, fig. 8 e.

Caligus indicus Pillai, 1961, p. 102-103, fig. 9.

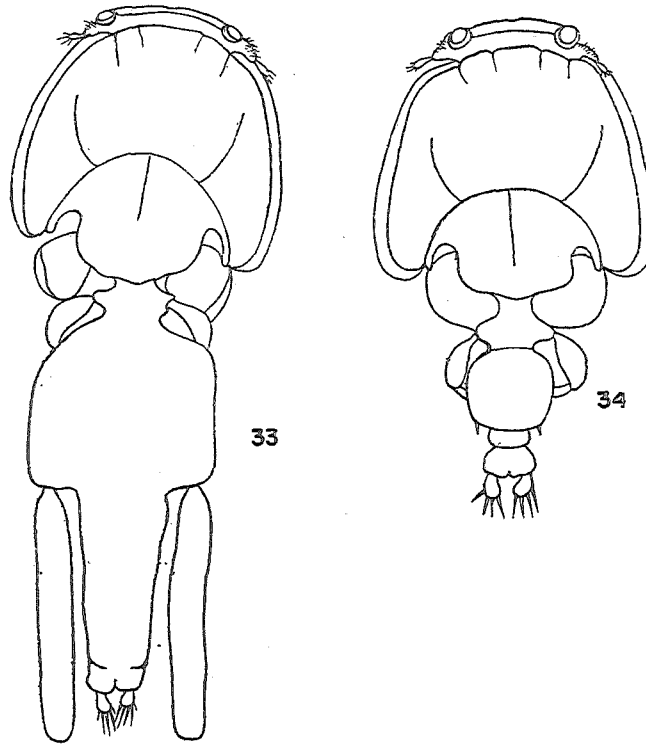
Occurrence. In the branchial cavity of *Rhabdosargus sarba* (Forsk.) off Colombo (Bassett-Smith).

Distribution. In the branchial cavity of *Rhabdosargus sarba* off Bundar Abbas, in the Persian Gulf (Bassett-Smith); on the gills of *Acanthopagrus berda* (Forsk.) off Madagascar (Heegaard, Barnard); on the inner surface of the operculum of *Trachinotus blochi* (Lacepede) off Vishingom, South India (Pillai).

Female. Cephalothorax about as long as wide, less than half the entire length; lunules spherical; median lobe about half the width of the cephalothorax, scarcely projecting beyond the posterior level of the lateral lobes. Free thoracic segment short. Genital segment flask-shaped, with short postero-lateral lobes, only a little shorter than the cephalothorax. Abdomen two-segmented, segments of nearly equal lengths. Total length 6 mm..

Male. Cephalothorax as in female, but nearly half the entire length. Genital segment elongated oval, with anterior and posterior annulations. Second maxilliped with a double crowned tubercle on inner border. Total length 2.2 mm..

(Not seen. Description according to other authors).

Caligus cybii Bassett-Smith*Caligus cybii* Bassett-Smith, 1898, p. 6, pl. 2, fig. 3.*Caligus brevisoris* (not Shen), Pillai, 1961, pp. 87-89, fig. 1.Figs. 33, 34. *Caligus cybii* Bassett-Smith. 33, female ; 34, male.

Occurrence. In the branchial chamber of *Cybium commersoni* (Lacepade) bought in the Colombo market.

Distribution. In the branchial chamber of *Indocybium lineolatum* (Cuvier) off Bombay (Bassett-Smith); on the inner surface of the operculum of *Indocybium guttatum* (Bloch and Schneider) off Vishingom (Pillai).

Female (Fig. 33). Cephalothorax semi-elliptical, about as long as wide, much less than half the entire length; lunules not quite hemispherical; median lobe half the width of the cephalothorax, projecting a little beyond the posterior level of the lateral lobes. Free thoracic segment short. Genital segment squarish, with rounded shoulders. Abdomen clearly longer than the genital segment, two-segmented, proximal segment stout and long, distal segment very short. Total length 5.5 mm..

Male (Fig. 34). Cephalothorax as in female but more than half the entire length. Genital segment nearly circular. Abdomen not quite as long as the genital segment, two-segmented, proximal segment narrower and shorter than the distal. Terminal claw of second antenna with two prongs. Total length 3.4 mm..

Caligus arii Bassett-Smith*Caligus arii* Bassett-Smith, 1898 a, pp. 82-83, pl. 4, fig. 1.

Occurrence. On the roof of the mouth cavity and in the gill chamber of *Arius acutirostris* off Trincomalee (Bassett-Smith).

Distribution. Not recorded elsewhere.

Female. Cephalothorax nearly circular, less than half the entire length; lunules spherical; median lobe less than half the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Genital segment flask-shaped, with well developed postero-lateral lobes. Abdomen long, of two segments, distal segment very short. Anal laminae reduced to short papillae. Total length 6 mm.. (Not seen. Description according to Bassett-Smith).

Male. Not known.

Caligus longicaudus Bassett-Smith

Caligus longicaudus Bassett-Smith 1898, pp. 8-9, pl. 4, figs. 1 & 2,



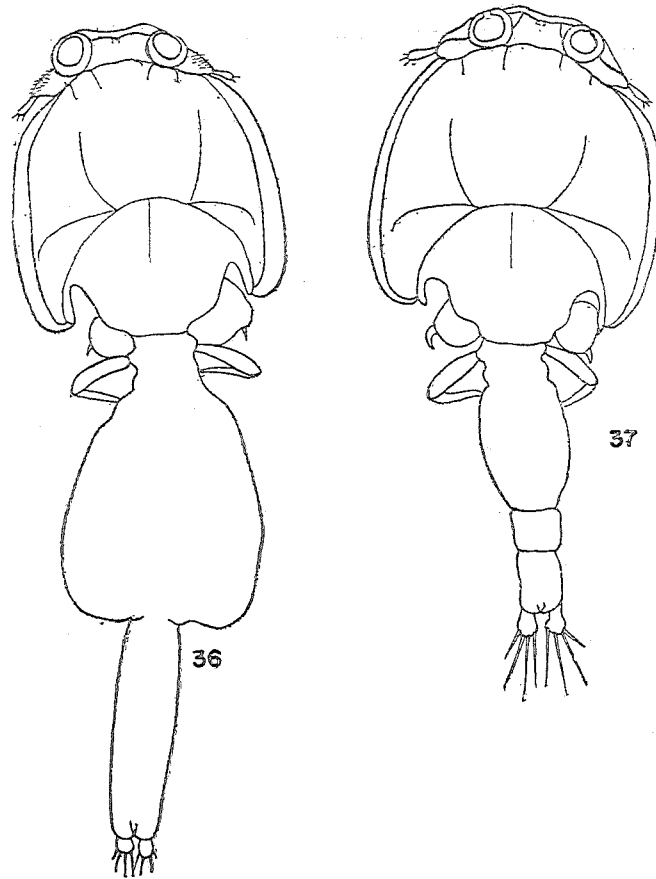
Fig. 35. *Caligus longicaudus* Bassett-Smith Female.

Occurrence. In the branchial cavity of *Chirocentrus dorab* (Forsk.) bought in the Colombo market.

Distribution. On *Trichiurus haumela* and *Chirocentrus dorab* off Bombay (Bassett-Smith)

Female. (Fig 35). Cephalothorax nearly circular, much less than half the entire length; lunules hemispherical; median lobe more than half the width of the cephalothorax, projecting slightly beyond the posterior level of the lateral lobes. Genital segment sac-like with short postero-lateral lobes. Abdomen almost as long as the cephalothorax, two-segmented, distal segment much shorter and narrower than the proximal segment. Total length 5.4 mm..

Male. Two abdominal segments more nearly equal (Bassett-Smith). (Male not seen).

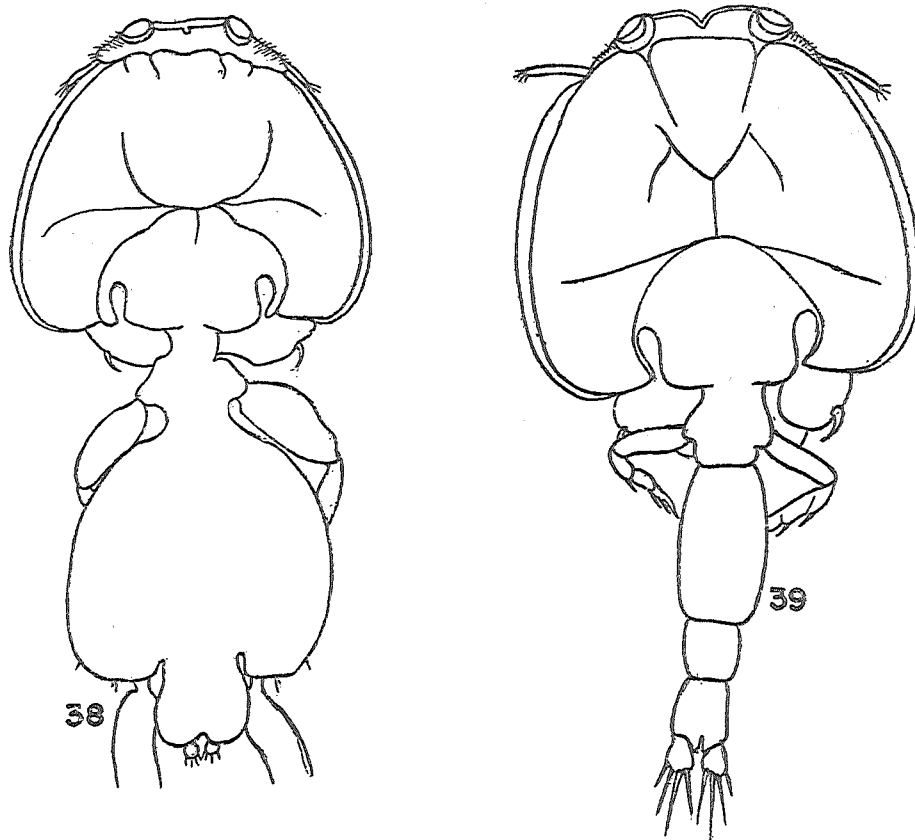
Caligus dakari Van Beneden*Caligus dakari* Van Beneden, 1892, p. 243, pl. 5, figs. 1-4*Caligus arii* (not Bassett-Smith) Barnard, 1955, p. 248, fig. 10 a, bFigs. 36, 37. *Caligus dakari* Van Beneden. 36, female; 37, male.

Occurrence. In the gill chamber of *Arius* sp. bought in the Colombo market.

Distribution. On *Arius dussumieri* off South Africa (Barnard).

Female (Fig. 36). Cephalothorax less than half the entire length; lunules spherical; median lobe more than half the width of the cephalothorax, projecting but little beyond the posterior level of the lateral lobes. Genital segment flask-shaped, with slightly developed postero-lateral lobes. Abdomen of a single, long, cylindrical segment, nearly as long as the genital segment. Total length 4.6. mm..

Male (Fig. 37). Cephalothorax as in female but half the entire length. An annular constriction between the free thoracic segment and the barrel-shaped genital segment. Abdomen nearly as long as the genital segment, two-segmented, proximal segment shorter than the distal. Total length 3.5 mm..

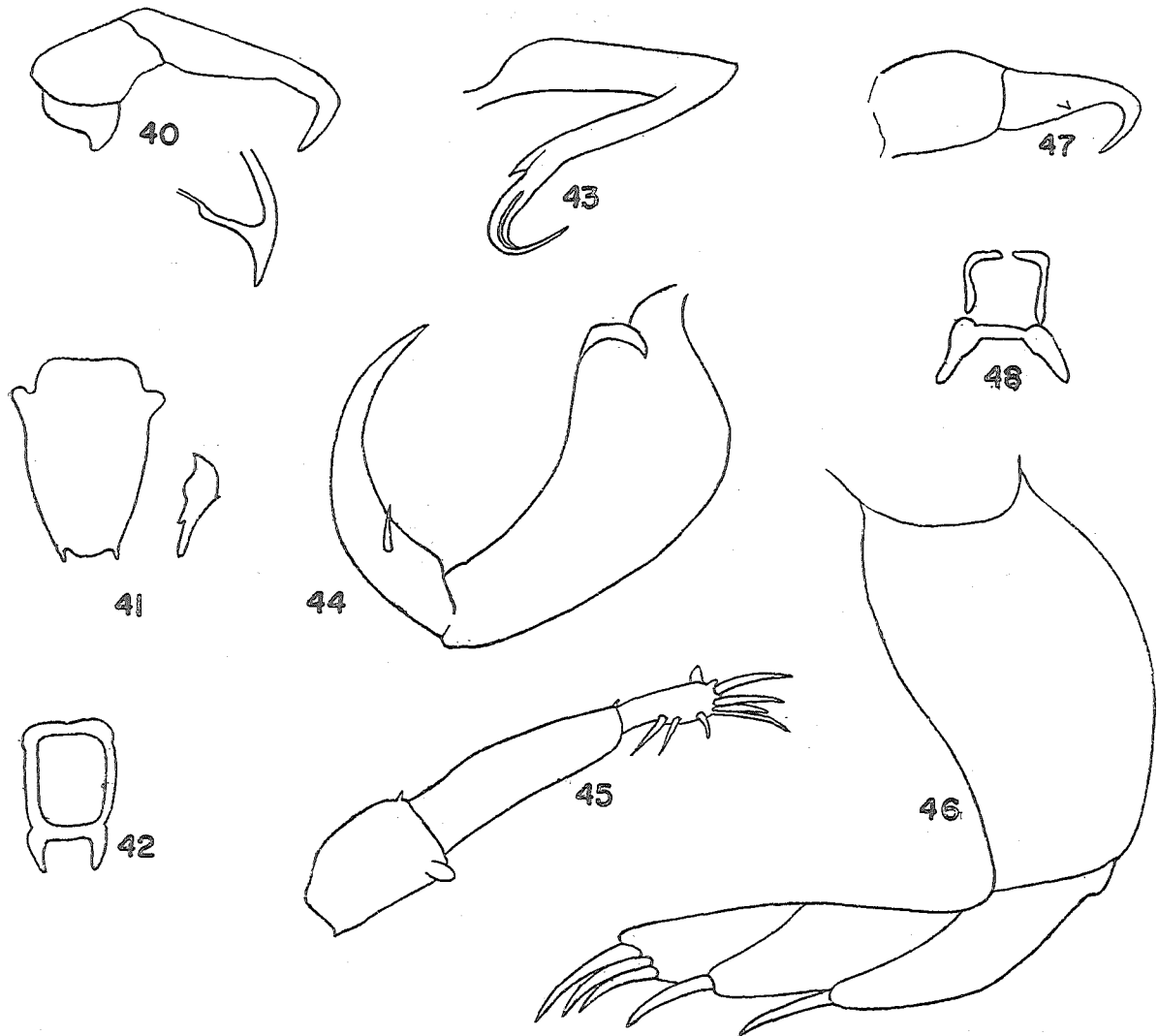
Caligus platurus n. sp.Figs. 38, 39. *Caligus platurus* n. sp.. 38, female ; 39, male.

Occurrence. In the branchial chamber of *Caranx melampygyus* Cuvier and of *Caranx* sp. off Hikkaduwa. Numerous specimens were obtained of both sexes.

Female (Fig. 38). Cephalothorax semi-elliptical, narrowed in front, less than half the entire length ; lunules moderate ; median lobe about a third of the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Free thoracic segment narrow. Genital segment ovate, with short postero-lateral lobes. Abdomen of a single segment with convex lateral margins. Anal laminae small, each lamina with four small setae, three of which are close together on the inner side while the fourth seta is on the outer side, a little separated from the rest. Terminal hook of the second antenna long. Second maxilla carries a short inner branch. First maxilliped has an inner lobe and second maxilliped has a small spine on its terminal claw and a ridged groove on its basal joint. Sternal furca with large rectangular base and two very small rami. Basal joint of first leg with a vestigial endopodite. Fourth leg stout, four jointed, with the usual five spines. Total length 4 mm..

Male (Fig. 39). Cephalothorax as in female but almost half the entire length. Genital segment not wider than the free thoracic segment, barrel-shaped. Abdomen about as long as the genital segment, two-segmented, proximal segment a little shorter than the distal. Terminal hook of second antenna not as long as in female and carrying an accessory spine. Sternal furca with a squarish base and rami directed outwards more than in female. Other appendages as in female. Total length 3 mm..

Remarks. In respect of the genital segment and abdomen this new species resembles *Caligus minimus* Otto. In the latter the cephalothorax and anal laminae are quite different and the male too is not at all like that of the present species.



Figs. 40-48. *Caligus platurus* n. sp.. 40-46, female. 40, second antenna and first maxilla; 41, mouth cone and second maxilla; 42, sternal furca; 43, first maxilliped; 44, second maxilliped; 45, first leg; 46, fourth leg. 47-48, male. 47, second antenna; 48, sternal furca.

Caligus curtus Muller

Caligus curtus Muller, 1785, p. 130, pl. 21, fig. 1; Wilson, 1905, pp. 578-582, pl. 10; Scott, T. and A. 1913, p. 45, pl. 24, figs. 1 and 2; Van Oorde-de Lint and Schuurmans Stekhoven, 1936, p. 128, fig. 89; Heegaard, 1945, p. 5.

Caligus mulleri Leach, 1816, p. 405, pl. 20

Caligus bicuspidatus Nordmann, 1832, p. 28

Caligus diaphanus (not Nordmann) Baird, 1850, p. 269, pl. 32, fig. 1

Caligus aeglefini Kroyer, 1863, p. 89, pl. 7, fig. 3 a-f

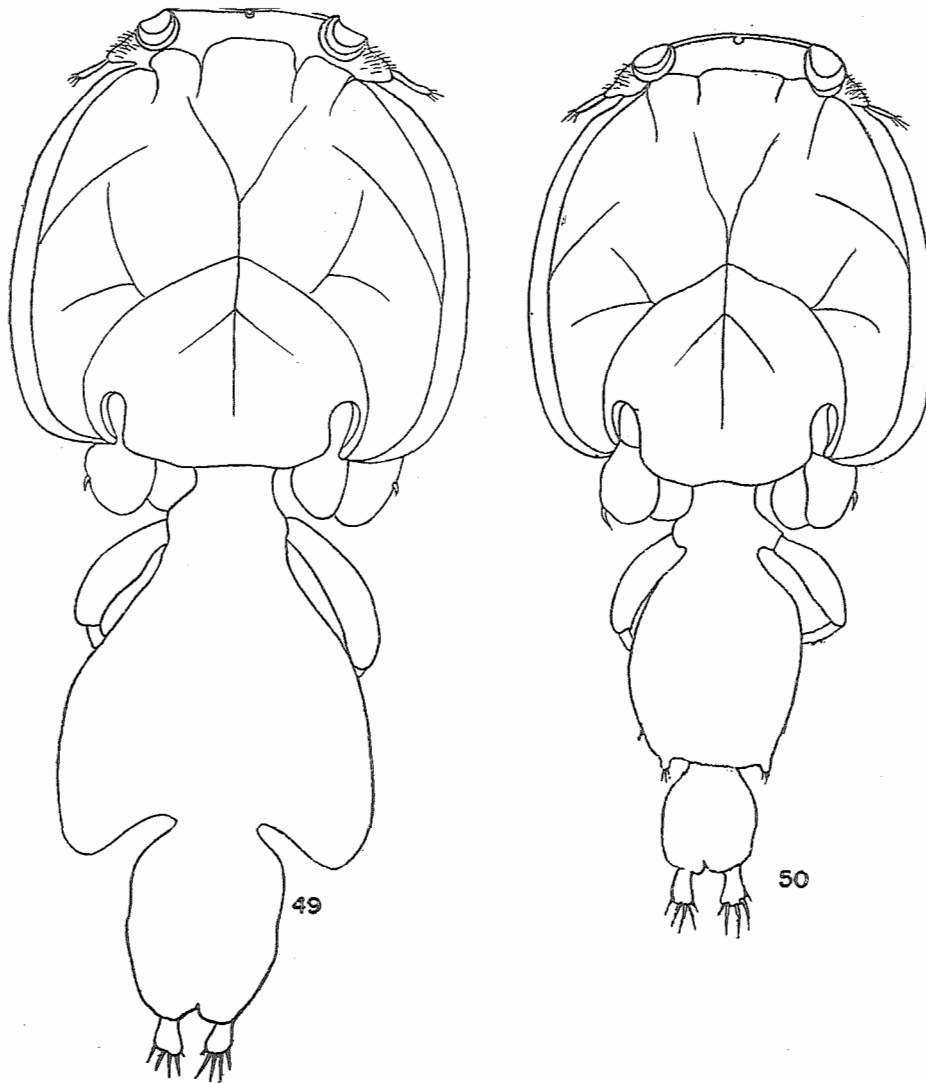
Occurrence. In the branchial chamber of *Pristipomoides typus* Bleeker bought in the Colombo market.

Distribution. On various host fish, especially gadoids, in the North Atlantic (Heegaard), round the British Isles (Scott, Baird), and off the east coast of North America (Wilson).

Female (Fig. 49). Cephalothorax semi-elliptical, longer than wide, a little less than half the entire length; lunules moderate; median lobe about half the width of the cephalothorax, projecting but little beyond the posterior level of the lateral lobes. Genital segment sac-shaped with postero-lateral lobes. Abdomen short, of a single segment, with convex lateral margins. Total length 5.5 mm..

Male (Fig. 50). Cephalothorax as in female but more than half the entire length. Genital segment barrel-shaped, fifth and sixth legs visible at its postero-ateral corners. Abdomen of a single segment, shorter than the genital segment, with convex lateral margins. Total length 4.7 mm..

Remarks. As is only to be expected, the specimens from these waters are markedly smaller than those described from colder waters.



Figs. 49-50. *Caligus curtus* Muller. 49, female; 50, male.

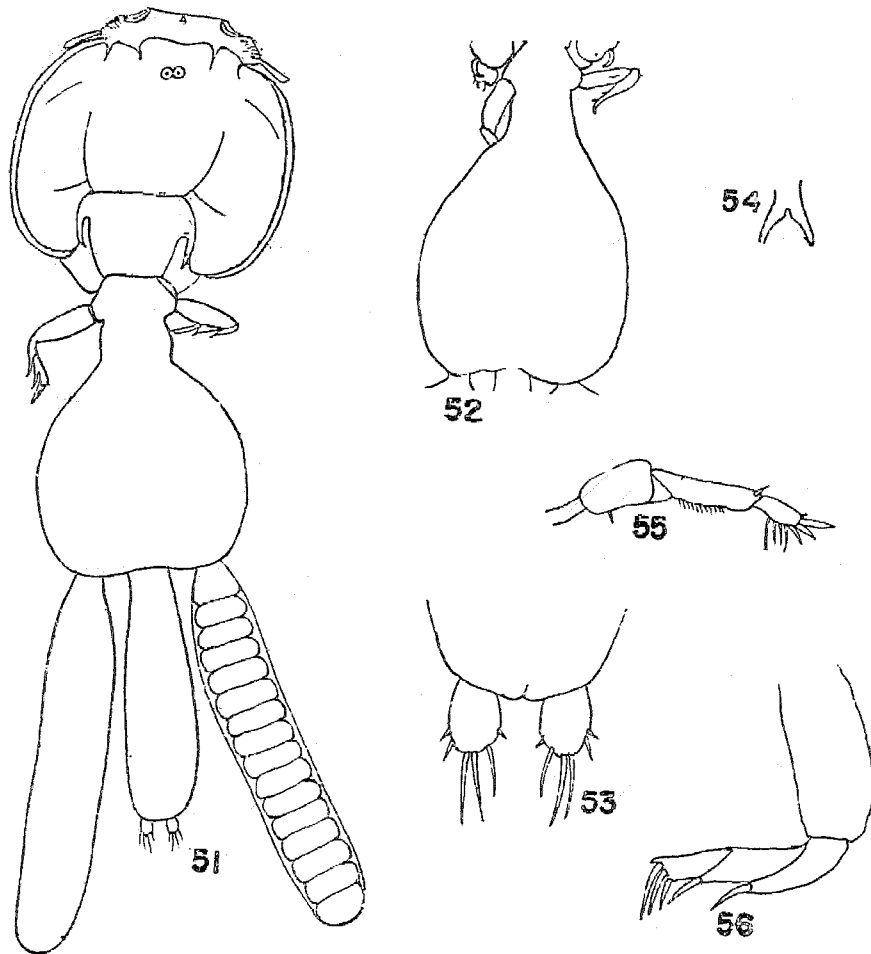
Caligus clavatus n. sp.

Occurrence. This new species is described from a collection of 10 mature females from the mouth cavity of *Sphyraens obtusata* Cuvier bought in the Colombo market.

Female (Figs. 51-56). Cephalothorax nearly circular, about a third in the entire length; lunules shallow; median lobe about one third the width of the cephalothorax, projecting slightly beyond the posterior margin of the lateral lobes. Free thoracic segment about as wide as the median lobe of the cephalothorax, not clearly marked off from the genital segment. Latter sac-like; in some specimens (fig. 52) the neck of the sac is longer than in others. Abdomen of a single club-shaped segment, about as long as the genital segment. Anal laminae small (fig. 53), each lamina furnished with three long terminal setae, a shorter lateral seta on outer margin; and a pair of minute setae on either side. Sternal furca small, with a pair of tapering divergent rami on a narrow base (fig. 54). Fourth leg four jointed with the usual five spines on the last three joints. Total length from 3.4 to 4 mm..

Male. Not found

Remarks. This new species, named from its club-shaped abdomen, has some superficial resemblance to *Caligus dussumieri* Rangnekar (1957), due to the shape of the genital segment and the long abdomen of a single segment. The two species, however, are otherwise clearly different.



Figs. 51-56. *Caligus clavatus* n. sp. . Female. 51, entire animal; 52, genital segment; 53, anal laminae; 54, sternal furca; 55, first leg; 56, fourth leg.

Caligus benedeni Bassett-Smith

Caligus (Sciuenophilus) benedeni Bassett-Smith, 1898, pp. 9-10. pl. 4, fig. 3

Caligus benedeni Thompson and Scott, 1903, p. 294; Capart, 1941, p. 172

Sciuenophilus benedeni Bere, 1936, p. 587.

Occurrence. In the gill chamber of *Johnius diacanthus* (Lacepede) from Palk Strait (Thompson and Scott).

Distribution. On the gills of *Johnius diacanthus* off Bombay (Bassett-Smith); on *Larimus fasciatus* in the Gulf of Mexico (Bere); on *Johnius hololepidotus* and on *J. angolensis* off West Africa (Capart).

Female. Cephalothorax nearly circular; lunules very small. Free thoracic segment short and narrow. Genital segment longer than wide, larger than the cephalothorax. Abdomen long, of a single segment, constricted anteriorly. Total length 6mm..

Male. Not known.

(Not seen; included on the authority of Thompson and Scott. Description from Bassett-Smith).

Caligus longicervicis Gnanamuthu

Caligus longicervicis Gnanamuthu, 1950, pp. 115-116, pl. 3

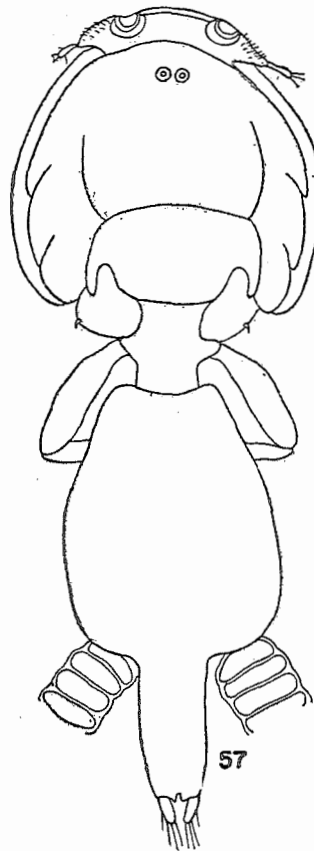


Fig. 57 *Caligus longicervicis* Gnanamuthu. Female.

Occurrence. In the branchial chamber of *Trichiurus savalla* Cuvier off Hikkaduwa.

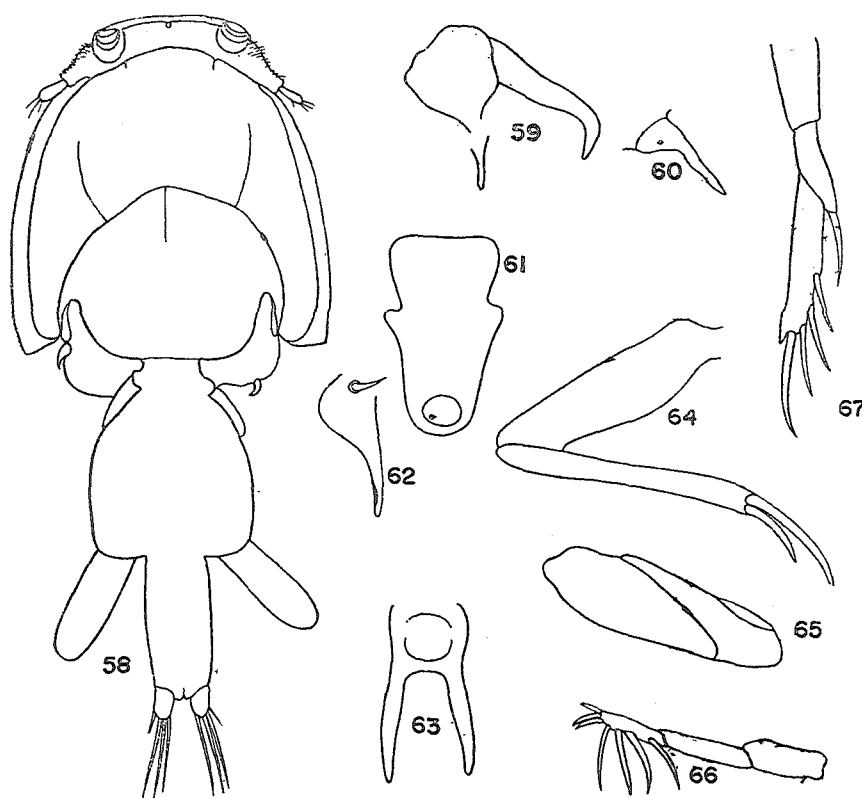
Distribution. In the mouth and branchial cavities of *Trichiurus kaumela* (Forsk.) off Madras (Gnanamuthu).

Female (Fig. 57). Cephalothorax about as long as broad, much less than half the entire length; lunules moderate; median lobe nearly half the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Free thoracic segment comparatively long. Genital segment flask-shaped, nearly as long as the cephalothorax. Abdomen of a single long segment. Total length 4.1 mm..

Male. Cephalothorax as in female, not quite half the entire length. Free thoracic segment long, with annular constrictions anterior and posterior to the bases of the fourth legs. Genital segment oval, only a little longer than the preceding segment. Abdomen of two, nearly equal segments. Total length 2.6mm.. (Male not seen ; description according to Gnanamuthu).

Caligus acutus new name

Caligus affinis (not Heller) Kurian, 1961, pp. 71-72, figs. 37-45.



Figs. 58-67. *Caligus acutus* (Kurian). Female. 58, entire animal; 59, second antenna; 60, first maxilla; 61, mouth cone; 62, second maxilla; 63, sternal furca; 64, first maxilliped; 65, second maxilliped; 66, first leg; 67, fourth leg.

Occurrence. On the outer body surface of a flatfish and in the gill chamber of *Gasterin lineatus* (Linn.) bought in the Colombo market.

Distribution. On the outer body surface of *Eythynnus affinis* (Cantor) off Kerala, S. India (Kurian)

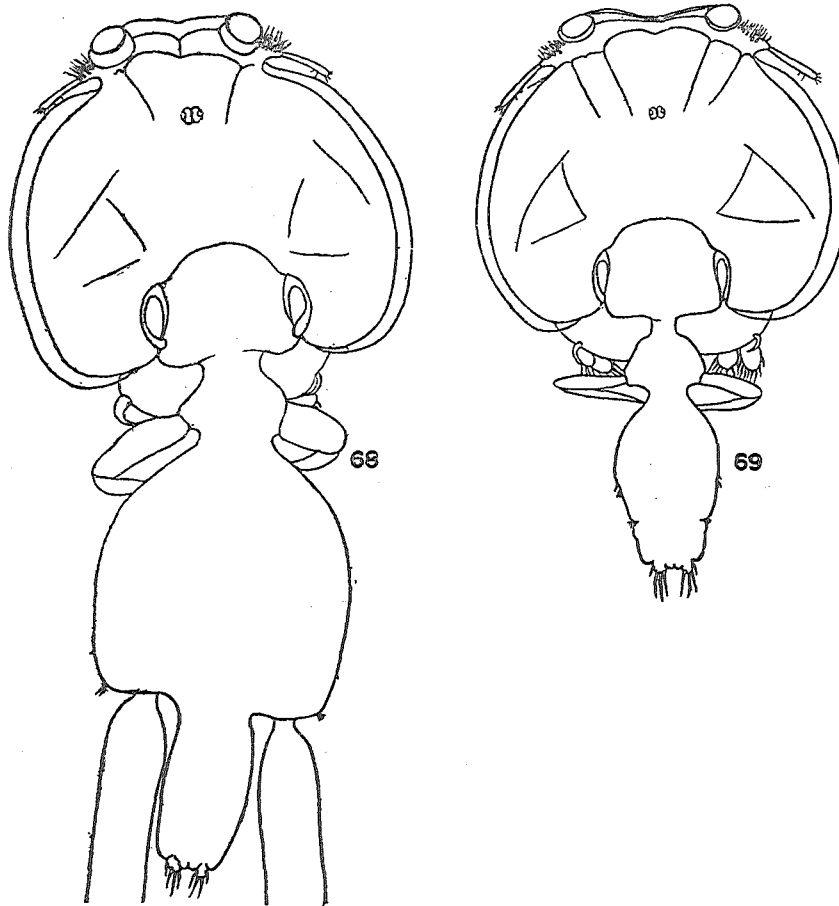
Female (Figs. 58—67). Cephalothorax semi-elliptical, almost half the entire length; lunules moderate; median lobe more than half the width of the cephalothorax, projecting but little beyond the posterior level of the lateral lobes. Free thoracic segment short, not clearly separated from the genital segment. Latter flask-shaped. Abdomen of a single segment, as long as the genital segment. Anal laminae longer than broad, tipped with three long terminal setae and with a shorter lateral seta. Total length 4.1 mm..

Male. Not known.

Remarks. A characteristic feature of this species is the long, pointed nature of the second antennary hooks, the maxillary hooks, the furcal rami and the spines of the fourth leg. On the other hand, the egg strings are unusually short. The proposed new specific name *acutus*, signifying the pointed nature of the above mentioned appendages, replaces the specific name *affinis*, under which it was originally described by Kurian, as this name is preoccupied by *C. affinis* Heller, 1866.

Caligus tenax Heller

Caligus tenax Heller, 1865, pp. 172-173, pl. 15, fig. 3; Bassett-Smith, 1898b, pp. 363-364, pl. 11, fig. 3; Wilson, 1913, p. 208, pl. 26, pl. 29, figs. 99-101; Kirtisinghe, 1937, pp. 437-439, figs. 15-29



Figs. 68, 69. *Caligus tenax* Heller. 68, female; 69, male.

Occurrence. On the gills of several species of carangids off Ceylon (Bassett-Smith, Kirtisinghe).

Distribution. On the gills of *Caranx hippos* off Brazil (Heller); on the gills of *Caranx hippos* and *C. crysos* off the West Indies (Wilson).

Female (Fig. 68). Cephalothorax nearly circular, less than half the entire length; lunules moderate; median lobe about a third of the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Free thoracic segment about as wide as long. Genital segment acorn-shaped, about two thirds as long as the cephalothorax. Abdomen of a single segment, more than half as long as the genital segment. Total length 4.5 mm..

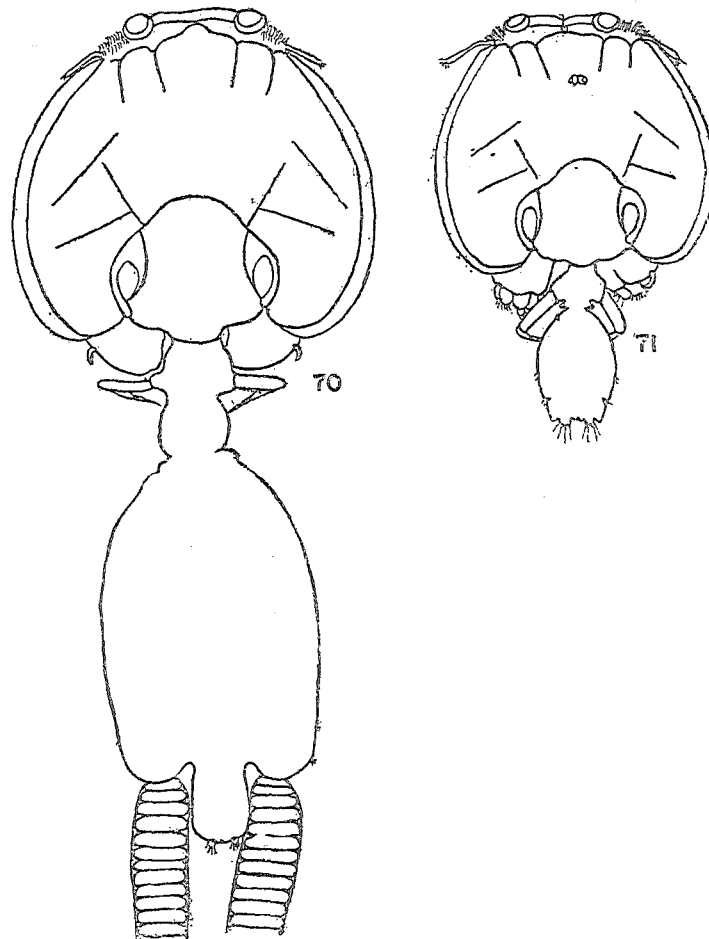
Male (Fig. 69). Cephalothorax as in the female but just over half the total length. Free thoracic segment narrowed in front. Genital segment flask-shaped, separated by a pair of lateral notches from the short, single-segmented abdomen. Total length 3 mm..

Caligus confusus (Wilson), Pillai.

Caligus constrictus (not Heller) Wilson, 1937a, p. 25, pl. 3, figs. 3 a-i: (not Heller) Shiino, 1959a, p. 285, figs. 9-10.

Caligus alalongae (not Kroyer) Kirtisinghe, 1937, pp. 435-437, figs. 1-4; (not Kroyer) Yamaguti, 1954, pp. 379-381, pl. 2, fig. 19, pl. 3, fig. 21.

Caligus confusus Pillai, 1961, p. 104, fig. 10.



Figs. 70, 71. *Caligus confusus* (Wilson). 70, female; 71, male.

Occurrence. In the branchial chamber of several species of carangids off Negombo, Colombo and Hikkaduwa.

Distribution. In the mouth cavity of *Caranx hippos*, *Elagatis bipinnulatus* and *Coryphaena hippurus* off Panama and the Galapagos (Wilson); on the gills of *Elagatis* sp. and *Caranx* sp. off Macassar., Celebes (Yamaguti); on *Seriola* sp. from the East Pacific (Shiino); on the gill arches of *Caranx sansun* (Forsk.) off Trivandrum, South India (Pillai).

Female (Fig. 70). Cephalothorax nearly circular, less than half the entire length; lunules moderate; median lobe about a third of the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Free thoracic segment narrow, often with one or two annular constrictions. Genital segment nearly as long as the cephalothorax, flask-shaped or more rectangular with squarish shoulders. Abdomen of a single segment, much shorter than the genital segment. Anal laminae minute. Total length 4.5 mm..

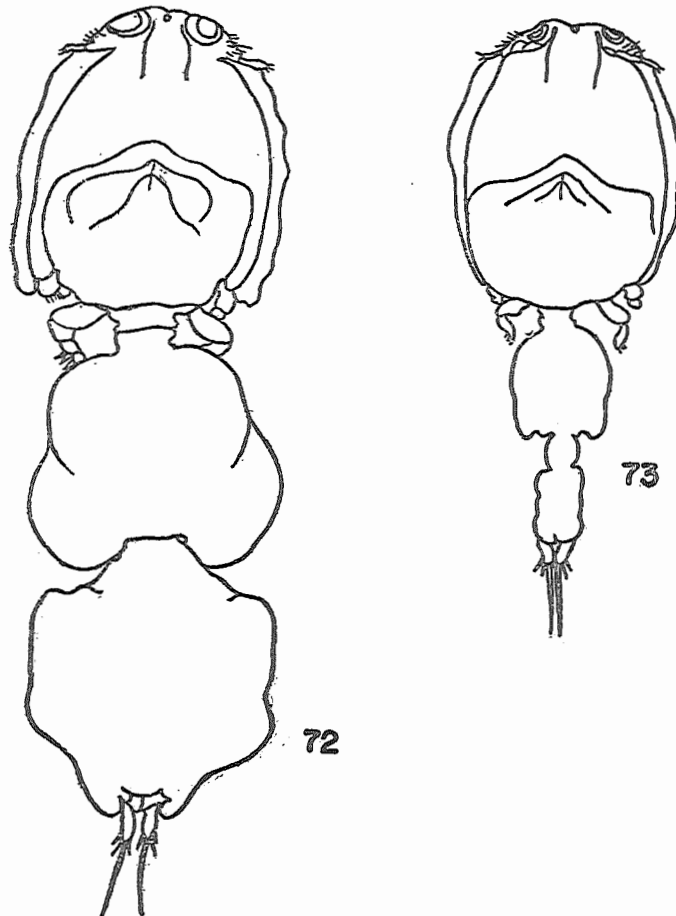
Male (Fig 71). Cephalothorax as in female but more than half the entire length. Free thoracic segment short with an annular constriction behind the base of the fourth legs. Genital segment flask-shaped. Abdomen of a single segment only slightly narrower than the genital segment. Total length 2.3 mm..

PARAPETALUS Steenstrup & Lutken

Parapetalus hirsutus (Bassett-Smith)

Caligus hirsutus Bassett-Smith, 1898, pp. 6-7, pl. 3, figs. 1 and 2; Shen 1957, pp. 373-374, pl.8.

Parapetalus hirsutus Wilson, 1912, pp. 239-240, pl. 33, figs. 28-35; Kirtisinghe, 1950, p. 77; figs. 1-4; Pillai, 1962, pp. 288-290, fig. 1.



Figs. 72, 73. *Parapetalus hirsutus* Steenstrup and Lutken. 72, female; 73, male.

Occurrence. On the inner surface of the operculum of *Eleutheronema tetradactylum* (Shaw) bought in the Colombo market.

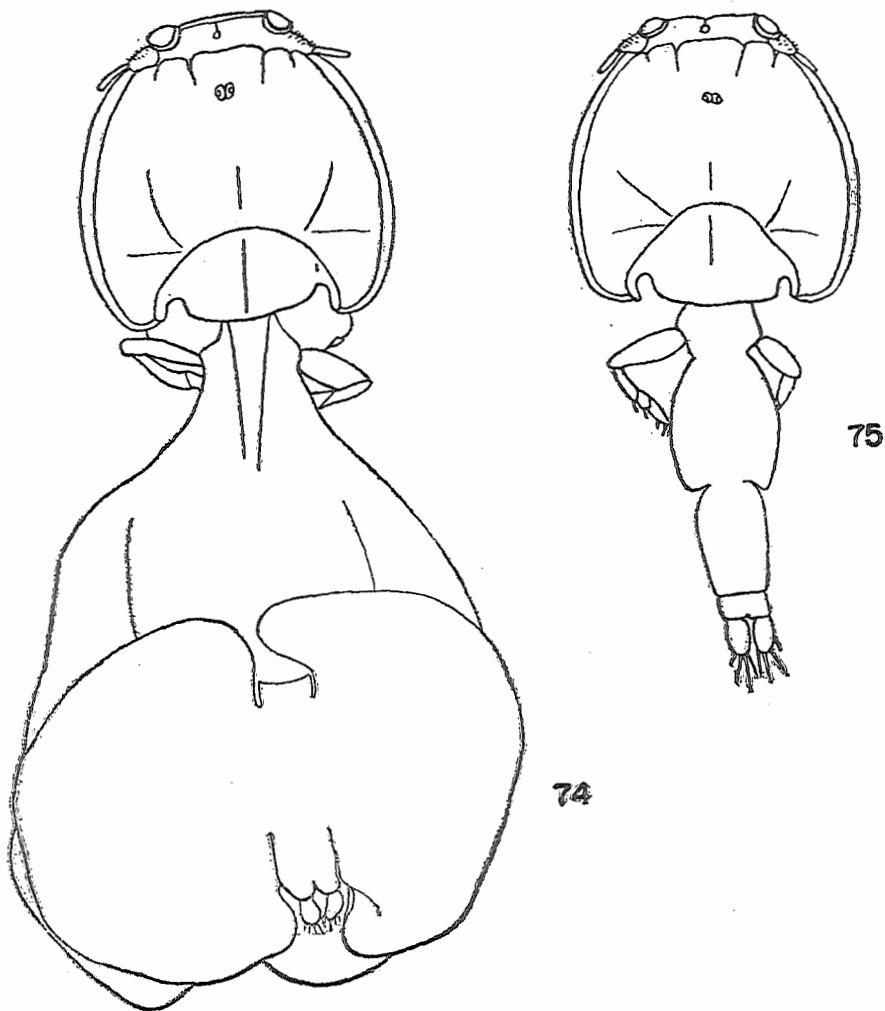
Distribution. On *Eleutheronema tetradactylum* off Batavia (Wilson), off China (Shen), of Bombay (Bassett-Smith); on *Polynemus plebius* off Trivandrum (Pillai).

Female. (Fig. 72). Cephalothorax longer than wide less than half the entire length; lunules moderate; median lobe more than half the width of the cephalothorax, projecting a little beyond the posterior level of the lateral lobes. Genital segment nearly circular, dorsally convex, posterolaterally produced into rounded lobes which overlap the anterior end of the abdomen. Abdomen indistinctly of two segments, the longer distal segment much widened until it is an elongated oval. Anal laminae longer than wide. Total length 6 mm..

Male (Fig. 73). Cephalothorax as in female but about half the entire length. Genital segment flask-shaped. Abdomen two segmented, proximal segment shorter than the distal. Total length 4 mm..

Parapetalus occidentalis Wilson

Parapetalus occidentalis Wilson, 1908, p. 606, p l. 53; Causey 1955, p. 6; Pillai, 1962, p. 293, fig. 3.



Figs. 74, 75. *Parapetalus occidentalis* Wilson. 74, female; 75, male.

Occurrence. On the gills of *Rachycentron canadus* (Linn.) bought in the Colombo market.

Distribution. On *Rachycentron canadus* off Trivandrum and on *Johnius* sp. off Vishingom (Pillai); on *Johnius* spp. off North Carolina and Louisiana (Wilson, Causey).

Female (Fig. 74). Cephalothorax semi-elliptical, longer than wide, about a third of the entire length; lunules moderate; median lobe about half the width of the cephalothorax not projecting beyond the posterior level of the lateral lobes. Fourth thoracic segment not completely marked off from the genital segment. Genital segment narrow in front, broad behind, postero-laterally produced into wing-like expansions which extend back beyond the hind end of the body. Abdomen of two segments, proximal segment the longer and produced laterally into inflated expansions lying dorsal to the wings of the genital segment but not extending quite as far back as the former. Anal laminae oval. Total length 6 mm..

Male (Fig 75). Cephalothorax as in female but less than half the entire length. Genital segment flask-shaped. Abdomen a little longer than genital segment, two-segmented, proximal segment much longer than the distal. Total length 4mm..

MIDIAS Wilson

Midias lobodes Wilson

Midias lobodes Wilson, 1911, pp. 626-628, pl. 65, and 1913, p. 225.; Causey 1953, p. 11; Shiino, 1958, pp. 98-105, figs. 1-3.

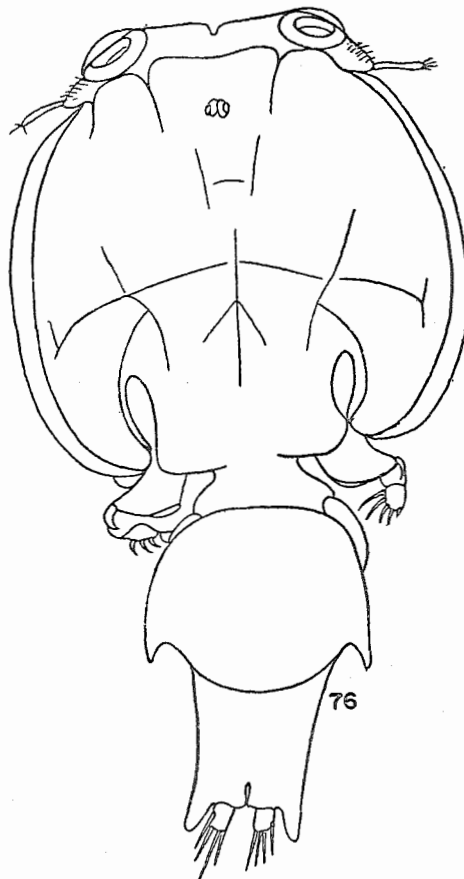


Fig. 76. *Midias lobodes* Wilson. Male.

Occurrence. On the outer surface of the body of *Sphyraena* sp. off Hikkaduwa.

Distribution. On the outer surface of the body of *Sphyraena barracuda* in the Indian Ocean (Shiino), off the Dry Tortugas, Florida and Jamaica (Wilson) and off Texas (Causey).

Female. Cephalothorax nearly circular, much less than half the entire length; Lunules moderate; median lobe about half the width of the cephalothorax not projecting beyond the posterior level of the lateral lobes. Free thoracic segment nearly as wide as the median lobe of the cephalothorax. Genital segment trapezoidal, narrow in front, about two-thirds as long as the cephalothorax. Abdomen two-segmented, only slightly shorter than the genital segment, proximal segment longer than the distal, laterally expanded into dorsally curving lobes; distal segment squarish with postero-lateral processes covered with tiny tubercles. Anal laminae as long as the postero-lateral processes of abdomen, each lamina with four plumose setae. Total length 10 mm.. (Female not seen; description from Shiino).

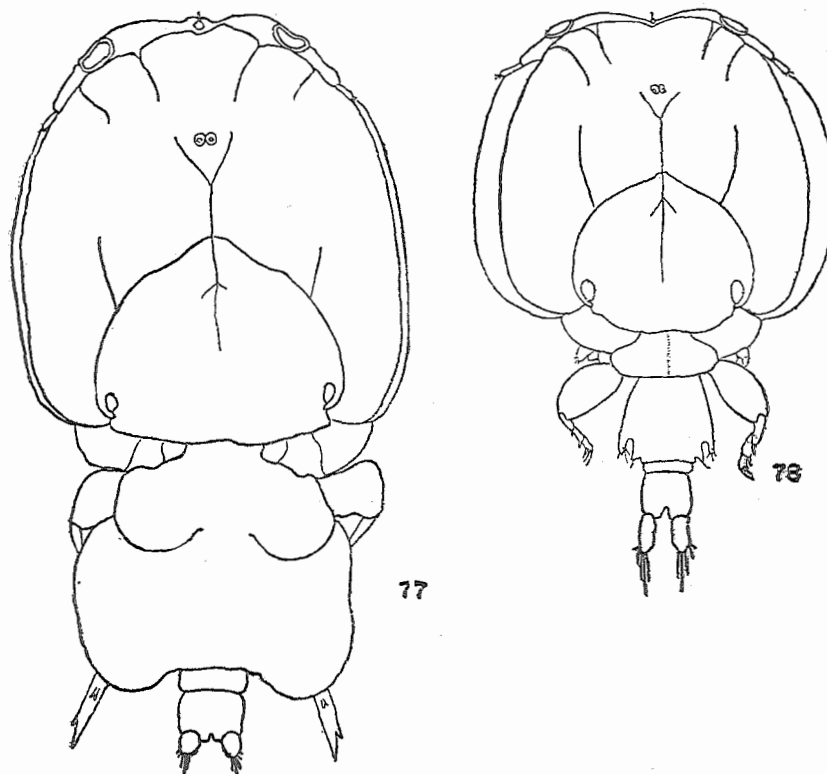
Male (Fig. 76). Cephalothorax as in female but little more than half the entire length. Genital segment with convex lateral margins produced postero-laterally into hook-like processes. Abdomen of a single segment with postero-lateral processes as in female. Total length 6.2 mm..

Remarks. *Caligus cornutus* Heegaard (1962) from the outer surface of the body of *Sphyraena jello* (?) in Australian waters is clearly a *Midias* sp. which, but for differences in the shape of the sternal furca and first maxilla as figured by Heegaard, might well be a male of *Midias lobodes* Wilson.

TUXOPHORUS Wilson

Tuxophorus wilsoni Kirtisinghe

Tuxophorus wilsoni Kirtisinghe, 1937, pp. 445-448, figs. 74-78; Pillai, 1961, pp. 122-123, fig. 20.



Figs. 77, 78. *Tuxophorus wilsoni* Kirtisinghe. 77, female; 78, male.

Occurrence. On the outer surface of the body of *Chorinemus* sp. off Hikkaduwa.

Distribution. On the outer surface of the body of *Chorinemus lysan* off Trivandrum (Pillai).

Female (Fig. 77). Cephalothorax semi-elliptical, longer than wide, more than half the entire length; lunules moderate; median lobe about half the width of the cephalothorax and projecting but little beyond the posterior level of the lateral lobes. Dorsal plates on free thoracic segment overlapping the anterior part of genital segment. Latter quadrangular, wider than long with rounded postero-lateral lobes. Abdomen short of two-segments, distal segment the longer. Fifth leg a strong spine directed obliquely backwards. Total length 4 mm..

Male (Fig. 78). Cephalothorax as in female but more than half the entire length. Free thoracic segment with faintly separated dorsal plates. Genital segment trapezoidal, narrower anteriorly, fifth and sixth legs visible at its postero-lateral corners. Total length 3 mm..

Tuxophorus cybii Nunes-Ruivo and Fourmanoir

Tuxophorus cybii Nunes-Ruivo and Fourmanoir, 1956, pp. 76-78, fig.

Tuxophorus solandri Kurian, 1961, pp. 72-75, figs. 25-36.

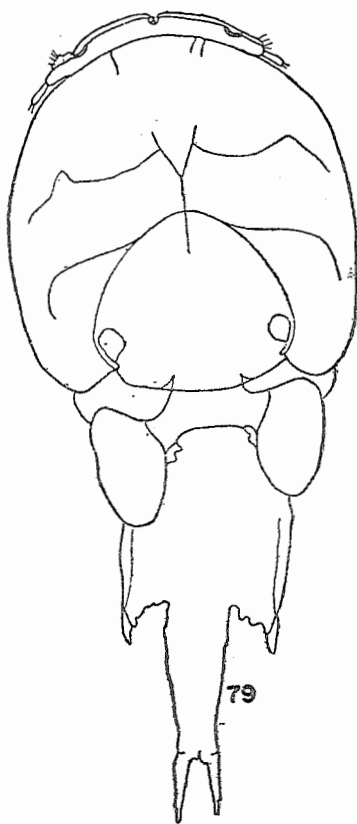


Fig. 79. *Tuxophorus cybii* Nunes-Ruivo and Fourmanoir. Female.

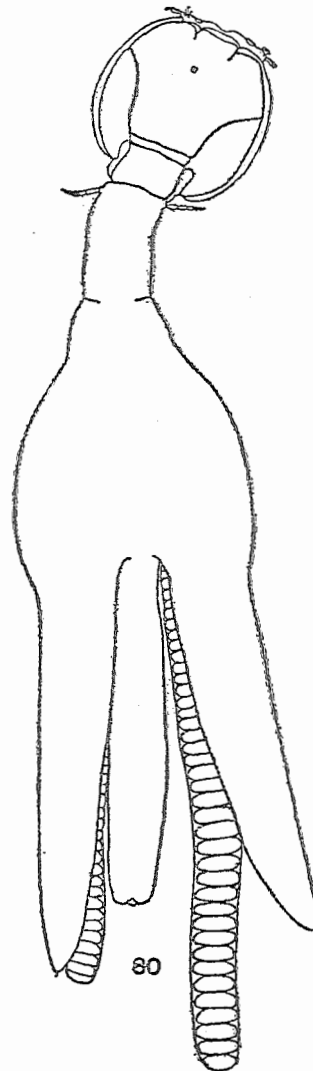


Fig. 80. *Caligodes laciniatus* (Kroyer). Female.

Occurrence. On the outer surface of the body of *Cybium commersoni* (Lacepede) off Hikkaduwa.

Distribution. On the gills of *Cybium commersoni* off Madagascar (Nunes-Ruivo and Fourmanoir); on the surface of the body of *Acanthocybium solandri* off Kerala, India (Kurian).

Female (Fig. 79). Cephalothorax semi-elliptical, longer than wide, a little less than half the entire length; lunules shallow; median lobe about half the width of the cephalothorax, scarcely projecting beyond the posterior level of the lateral lobes. Dorsal plates on free thorax segment longer than wide, their posterior ends overlapping the shoulders of the genital segment. Latter flask-shaped, about as long as wide with stout spines at the postero-lateral corners. Abdomen of a single long segment, narrowing posteriorly. Anal rami in the form of stout processes with terminal spines. Total length 8.5 mm..

Male. Not known.

CALIGODES Heller

Caligodes laciniatus (Kroyer)

Sciaenophilus laciniatus Kroyer, 1863, p. 153, pl. 8, fig. 3.

Caligodes Laciniatus Heller, 1865, 180; Kirtisinghe, 1937, pp. 439-441, figs. 30-40; Capart, 1963, p. 654; Rangnekar, 1959, pp. 49-51, fig. 3; Pillai, 1961, p. 114, fig. 15.

Occurrence. In the mouth cavity of *Tylosurus strongylurus* (van Hasselt) and of *T. leiurus* (Bleeker) off Hikkaduwa.

Distribution. On *Tylosurus crocodylus* from West Africa (Capart); on *T. contrainii* off Italy (Brian); on *Belone* sp. in the Indian Ocean (Kroyer, Heller); on *T. strongylurus* off Bombay (Rangnekar); on *T. crocodylus* and *Ablennes hians* off South India (Pillai).

Female (Fig. 80). Cephalothorax circular and very small in comparison to the rest of the animal; lunules shallow. Fourth thoracic segment passing imperceptibly into the genital segment which is sac-like, narrow in front, becoming much swollen behind and produced at its posterior corners into laminate processes, each process tipped with a spine. Abdomen cylindrical, of one segment as long, more or less, as the processes of the genital segment. Anal laminae minute. Total length 7.7 mm..

Male. Not known.

PARECHETUS Pillai

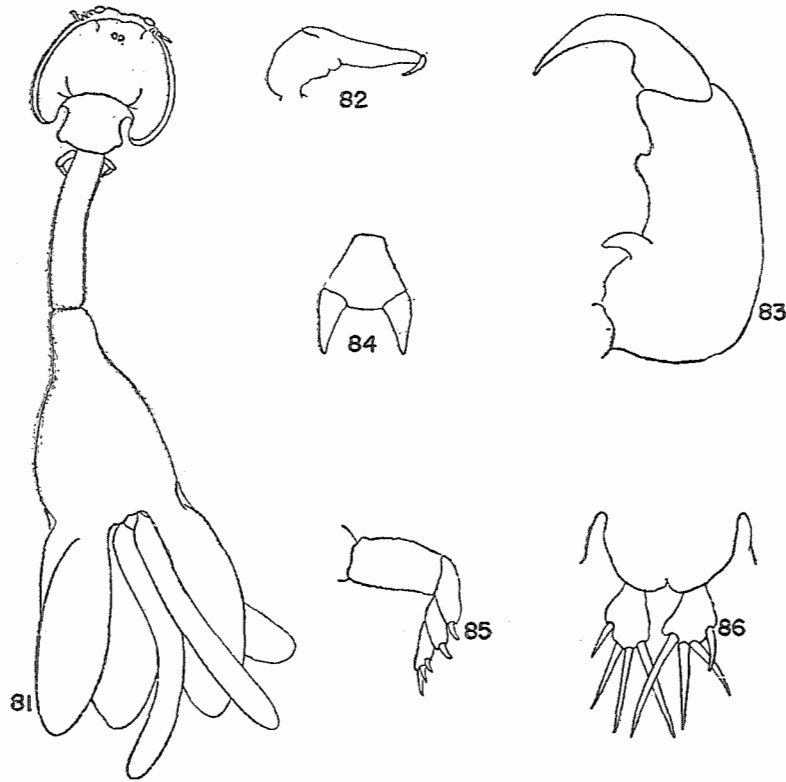
Parechetus constrictus n.sp.

Occurrence. Four female specimens were attached to the mucous membrane of the floor of the buccal cavity, on either side of the tongue, of *Caranx melampygus* Cuvier bought in the Colombo Market. Two of the specimens were still without egg-strings. The most mature specimen of the four is made the type of this new species.

Female (Fig. 81). Cephalothorax as in *Caligus* but very small. Fourth thoracic segment extending a long way back as the cylindrical neck, separated behind by a well marked constriction from the genital segment. Latter sac-shaped, its anterior end cylindrical end separated from the neck by the constriction mentioned above. The broader hind margin of the genital segment produced into a pair of wings at the sides. Dorso-medially the genital segment is continuous with the abdomen the sides of which are also produced into a pair of wings, of nearly the same size as the postero-lateral wings of the genital segment, leaving only the very hind end of the abdomen free. Each anal lamina carries four plumose setae. The egg-strings extend a little way beyond the posterior ends of the wings. Length of cephalothorax 1 mm., of neck 1.3 mm., genital segment and petaloid processes 3.5 mm.. Total length 5.8 mm..

Male. Not known.

Remarks. Pillai (1961, 1962) created the genus *Parechetus* with *Caligodes carangis* Bassett-Smith as the type species. The new species described and figured here agrees with the type species in the characters of this genus. Apart from minor details of the appendages, *P. constrictus* is readily distinguished from *P. carangis* (Bassett-Smith) by the shorter neck of the former and the definite constriction which marks off its neck from the genital segment.



Figs. 81-86. *Parechetus constrictus* n. sp. . Female. 81, entire animal ; 82, second antenna ; 83, second maxilliped ; 84, sternal furca ; 85, fourth leg ; 86, anal laminae.

SYNESTIUS Steenstrup and Lutken

Synestius caliginus Steenstrup and Lutken

Synestius caliginus Steenstrup and Lutken, 1861, pp. 364-365, pl. 6, fig. 11 ; Heller, 1865, p. 179 ; Gnanamuthu, 1950a, pp. 253-258, figs. 1-3 ; Shen, 1957, pp. 356-387, pl. 11.

Occurrence. On the gills of *Parastromateus niger* (Bleeker) bought in the Colombo market.

Distribution. On *Parastromateus niger* off South India (Steenstrup and Lutken) ; on *Pampus argenteus* in the Indian Ocean (Heller) ; on *Parastromateus niger* off Madras (Gnanamuthu) ; on *Stromatoides sinensis* off China (Shen).

Female (Fig. 87). Cephalothorax circular, less than a third of the entire length. Genital segment narrow anteriorly but broad and sac-like posteriorly, its postero-lateral corners produced on each side into a pair of processes of which one process is dorsal, cylindrical and long, the other is ventral, flattened and shorter than the former. Abdomen cigar-shaped, indistinctly two-segmented, proximal segment much shorter than the distal. Total length 4 mm..

Male. Cephalothorax as in female, but less than half the entire length. Genital segment flask-shaped. Abdomen about as long as the genital segment, two-segmented, proximal segment the shorter. Total length 3.5 mm.. (Male not seen. Description from Gnanamuthu).

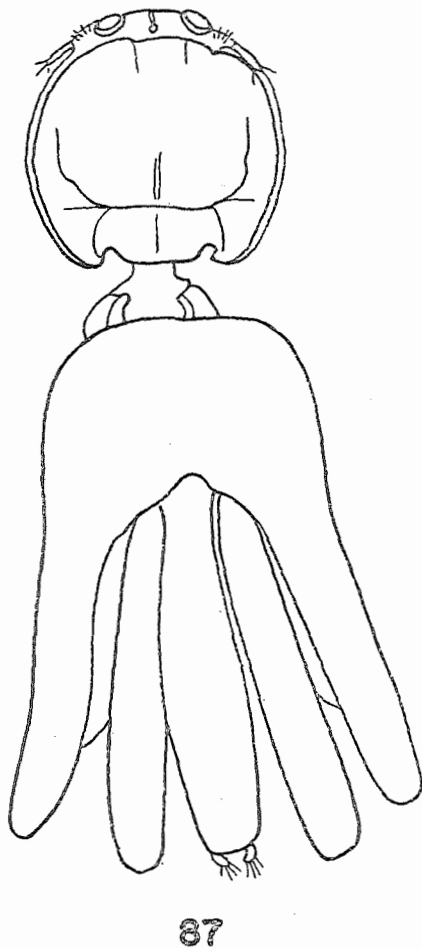


Fig. 87. *Synestius caliginus* Steenstrup and Lutken. Female.

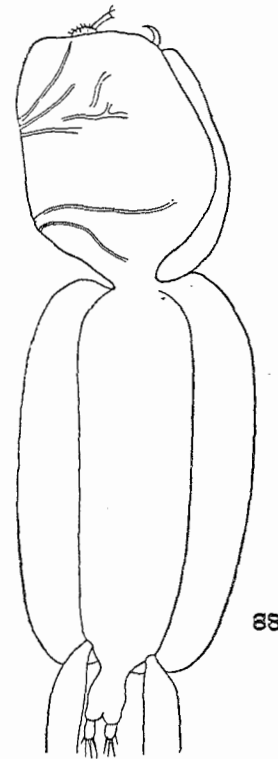


Fig. 88. *Hermilius longicornis* Bassett-Smith. Female.

HERMILIUS Heller

Hermilius longicornis Bassett-Smith

Hermilius longicornis Bassett-Smith, 1898, a. pp. 80-82, pl. 3, fig. 2

Hermilius pyriventris (not Heller), Pillai, 1961, pp. 123-125, fig. 21

Occurrence. On the gills of *Arius acutirostris* at Trincomalee (Bassett-Smith); I have also found it on the gills of an *Arius* sp. bought in the Colombo market.

Distribution. On the gills of an *Arius* sp. off Trivandrum. (Pillai).

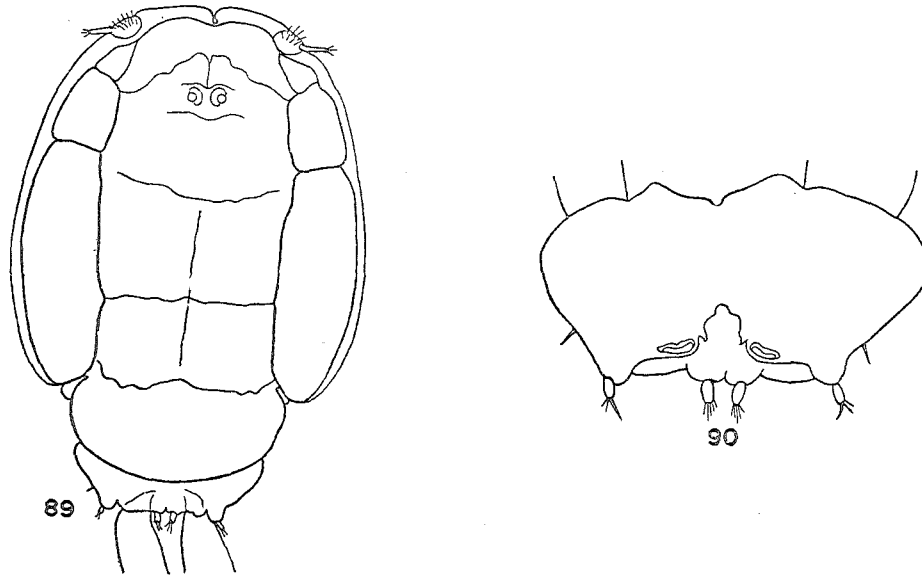
Female (Fig. 88). Cephalothorax less than half the entire length its margins turned strongly downwards, its dorsal surface marked by chitinoid grooves which give it a characteristic appearance. Genital segment much longer than cephalothorax of an elongated oval shape, sides often flattened. Abdomen small, of a single segment. Anal laminae longer than wide. Total length 5.5 mm..

Male. Not known.

Remarks. Although Pillai included his specimens in Heller's species *H. pyriventris* he has subsequently informed me, in a private communication, that they belong to *H. longicornis* Bassett-Smith. Pillai's figures of the appendages etc. are evidence enough of the distinctness of these two species notwithstanding Barnard's (1955) surmise that they are probably synonymous. My figure (Fig. 88) shows the cephalothorax from the right side and the genital segment and abdomen from the ventral side, the specimen having been fixed in this twisted position.

EIRGOS Bere*Eirgos plataxus* (Rangnekar)

Mappates plataxus Rangnekar, 1958, pp. 303-308, figs. 1 and 2.



Figs. 89, 90. *Eirgos plataxus* (Rangnekar). Female. 89, entire animal; 90, ventral view of genital segment abdomen and anal laminae.

Occurrence. On the gills of *Platax teira* (Forsk.) bought in the Colombo market.

Distribution. On the gills of *Platax teira* off Bombay (Rangnekar).

Female (Fig. 89). Cephalothorax oval, longer than wide, more than half the entire length; median lobe about half the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Third thoracic segment with a semilunar dorsal plate extending over the fourth thoracic segment and over the anterior half of the genital segment. Latter wider than long, bearing the reduced fifth and sixth legs at its postero-lateral borders. Abdomen reduced to a short lobe bearing the anal rami. Total length 3 mm..

Male. Not known.

Remarks. Rangnekar created a new genus *Mappates* to accommodate this species. However, no character of this species necessitates its being in a genus separate from *Eirgos* Bere. Contrary to Rangnekar's observation, the abdomen (fig. 90) of this species has but a single segment. Bere's figure of an immature female of *Eirgos anurus* shows the same general features as Rangnekar's species.

TREBIUS Kroyer*Trebius exilis* Wilson

Trebius exilis Wilson, 1906, p. 194, pl. 2, figs. 20-23.

Occurrence. On *Rhinoptera javanica* Muller and Henle on the Pearl Banks off Ceylon (Wilson).

Distribution. Not recorded elsewhere.

Female. Cephalothorax semi-elliptical, longer than wide. Third thoracic segment only a little wider than fourth but considerably shorter and projecting nearly its entire length beyond the posterior level of the lateral lobes of the cephalothorax. Genital segment elliptical, connected with the fourth thoracic segment by a narrow neck. Abdomen narrow, of a single segment. Anal laminae elongate. Total length 5.75 mm..

Male. Cephalothorax relatively longer than in female, about half the entire length. Thoracic segments wider than in female, fourth segment of the same width as the genital segment and only a trifle longer than the third segment. Genital segment barrel-shaped, not quite one-fifth of the entire length. Fifth and sixth legs visible dorsally, the former at about the middle of the lateral margins, the latter at the posterior corners of the genital segment. Abdomen, of two nearly equal segments, shorter than the genital segment. Anal laminae narrow, nearly as long as the abdomen. Total length 2.75 mm.. (Not seen. Description from Wilson).

ANURETES Heller

Anuretes perplexus Bassett-Smith

Anuretes perplexus Bassett-Smith, 1898a, pp. 89-91, pl. 5, fig. 3.

Occurrence. On *Lutianus* sp. off Trincomalee (Basset-Smith).

Distribution. Not recorded elsewhere.

Female. Cephalothorax rather wider than long, narrowed anteriorly. Median lobe a little more than a third of the width of the cephalothorax, projecting beyond the posterior level of the lateral lobes. Free thoracic segment very small. Genital segment almost round in outline except for a shallow posterior indentation. Abdomen not distinguishable. Anal laminae short. Total length 3 mm.. (Not seen. Description from Bassett-Smith.)

Male. Not known.

LEPEOPHTHEIRUS Nordmann

Lepeophtheirus aesopus Wilson,

Lepeophtheirus aesopus Wilson, 1906, p. 192, figs. 11-19.

Occurrence. On an unrecorded host fish from the Pearl Banks off Ceylon (Wilson).

Distribution. Not recorded elsewhere.

Female. Cephalothorax ovate, narrowed anteriorly, less than half the entire length; median lobe about a third of the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Free thoracic segment short but about as wide as the median lobe. Genital segment quadrate, two-thirds the size of the cephalothorax, a little wider anteriorly than posteriorly, with evenly rounded corners. Abdomen indistinctly three-segmented, less than half the length of the genital segment. Anal laminae three times as long as wide. Total length 5.75 mm. (Not seen. Description from Wilson.)

Male. Not known.

Lepeophtheirus gonistii Yamaguti

Lepeophtheirus gonistii Yamaguti, 1936, pp. 10-13, pl. 9, figs. 132-133. Shiino, 1959, pp. 343-346, fig. 5.

Occurrence. In the branchial cavity of *Promicrops lanceolatus* (Bloch) off Colombo.

Distribution. On the outer surface of the body and on the gills of *Gonistius zonatus* from the Pacific (Yamaguti); on the outer surface of the body of several different host fish including the above off Japan (Shiino).

Female (Fig. 91). Cephalothorax nearly as long as wide; median lobe about half the width of the cephalothorax projecting a trifle beyond the posterior level of the lateral lobes. Genital segment transversely oval, one and a half times as wide as long. Abdomen of a single short segment. In dorsal view, fifth and sixth legs visible at the postero-lateral margins of the genital segment as two short spines. Total length 5.4 mm.

Male. Cephalothorax as in female, but two-thirds the entire length. Genital segment barrel-shaped, fifth and sixth legs visible, in dorsal view, at its postero-lateral margins as small papillae, Abdomen, of a single short segment. Total length 3 mm. (Male not seen. Description from Yamaguti.)

Remarks. *Lepeophtheirus plectropomi* Nunes-Ruivo and Fourmanoir (1956), from the walls of the branchial cavity of *Plectropomus maculatus* off Madagascar, appears to be merely a variant of *L. gonistii* differing from the latter only by the much elongated third and fourth spines of the fourth leg as shown in the figure by the joint authors.

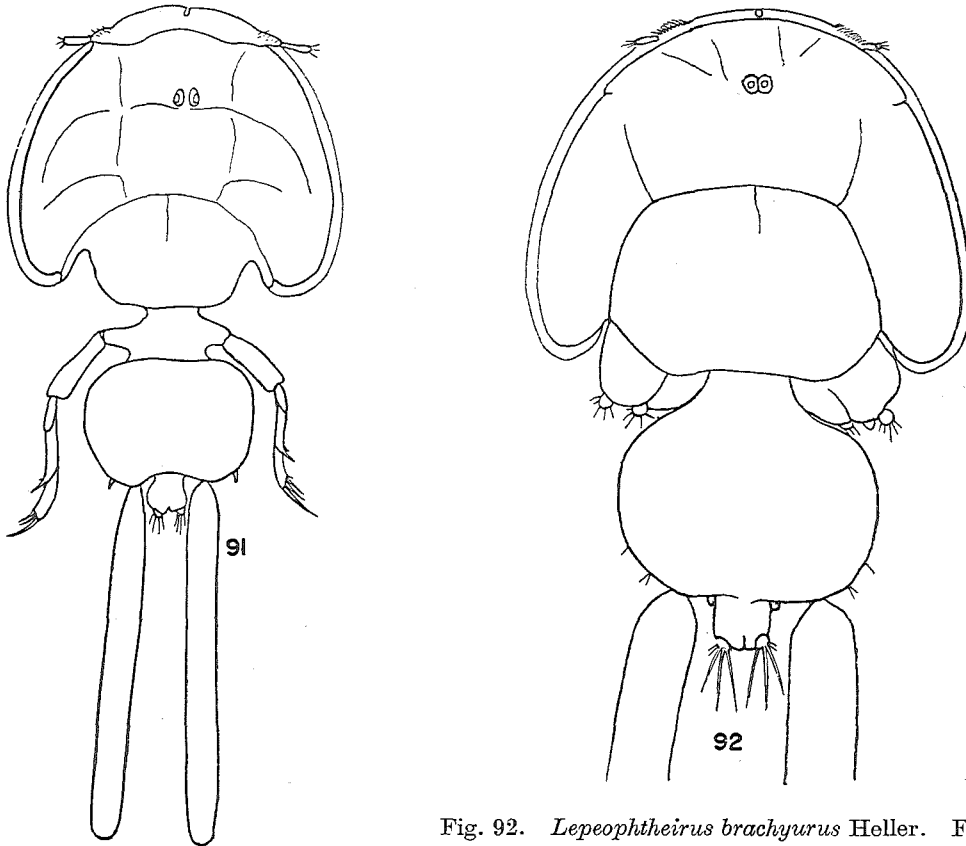


Fig. 92. *Lepeophtheirus brachyurus* Heller. Female.

Fig. 91. *Lepeophtheirus gonistii* Yamaguti. Female.

Lepeophtheirus brachyurus Heller

Lepeophtheirus brachyurus Heller, 1865, pp. 185-186, pl. 16, fig. 4; Wilson, 1906, pp. 190-192, pl. 1, figs. 1-10; Barnard, 1948, p. 248 and 1955, p. 253, fig. 12, c, d.

Occurrence. On the gills of *Arothron stellatus* (Bloch) (= *Tetrodon stellatus* Bloch and Schneider) on the Pearl Banks off Ceylon (Wilson). Through the courtesy of Mr. Langston Pereira, I have obtained numerous females of this species found infesting the outer surface of the skin and the gills of *Arothron reticulatus* (Bloch) in a tank of the "Panocean" aquarium at Colombo. The infestation was so heavy that it apparently brought about the death of the Blowfish.

Female (Fig. 92). Cephalothorax narrowed anteriorly, slightly wider than long, more than half the entire length; median lobe more than half the width of the cephalothorax, projecting a little beyond the posterior level of the lateral lobes. Free thoracic segment very short and covered over by the median lobe of the cephalothorax. Genital segment transversely elliptical, one-third wider than long with evenly rounded sides and nearly straight posterior margin. Abdomen short, one-segmented. Anal laminae papillate. Total length 4.5 mm..

Male. Not known.

Remarks. The specimens obtained by me from *Arothron reticulatus* do not exceed 3 mm. in length (exclusive of the egg-strings). They are, therefore, smaller than Heller's specimens which were 4 mm. and Wilson's specimens which were 4.5 mm. in length. Wilson's figure of the fourth leg is inaccurate. It is figured well by Heller. In living specimens the white background colour is marked by fine reticulations of black pigment. This pigment is lost with preservation in alcohol so that, as described by Wilson, the colour becomes completely white.

Lepeophtheirus longipalpus Bassett-Smith

Lepeophtheirus longipalpus Bassett-Smith, 1898 a, pp. 83-89, pl. 5, fig. 2.

Occurrence. On the gills of *Arius acutirostris* off Trincomalee (Bassett-Smith).

Distribution. Not recorded elsewhere.

Female. Cephalothorax oval, longer than broad. Median lobe more than a third of the width of the cephalothorax, not projecting beyond the posterior level of the lateral lobes. Free thoracic segment about as long as broad, with a posterior annulation. Genital segment flask-shaped, with small postero-lateral lobes. Abdomen long and cylindrical, of two segments, the proximal segment being much longer than the distal. Sternal furca large and prominent with broad base bearing a pair of long, blunt, almost parallel rami. Length 7 mm.. (Not seen. Description from Bassett-Smith).

Male. Not known.

Remarks. Thompson and Scott (1903) identified *Lepeophtheirus thompsoni* Baird on *Arius venosus* Cuvier and Valenciennes from the Pearl Banks of Ceylon. *L. longipalpus* has a superficial resemblance to *L. thompsoni* and it is quite possible that Thompson and Scott were mistaken in their specific identification of the Ceylonese specimens. There is no way of checking this as they give neither description nor figures of these specimens.

Lepeophtheirus rotundriventris Bassett-Smith

Lepeophtheirus rotundriventris Bassett-Smith, 1898a, pp. 86-88, pl. 5, fig. 1.

Occurrence. In the gill chamber of *Lutianus* sp. off Hikkaduwa.

Distribution. In the gill chamber of *Serranus* sp. in the Persian Gulf (Bassett-Smith).

Female (Fig. 93). Cephalothorax about as long as wide, half the entire length; median lobe a little less than half the width of the cephalothorax, projecting a little beyond the posterior level of the lateral lobes. Free thoracic segment narrow. Genital segment transversely oval. Abdomen of a single segment. Anal laminae papillate. Total length 3.9 mm..

Male. Cephalothorax as in female but more than two-thirds the entire length. Genital segment wider than long, with postero-lateral lobes giving it a crescentic shape. Abdomen of a single segment, narrowed anteriorly. Total length 4 mm.. (Male not seen. Description from Bassett-Smith).

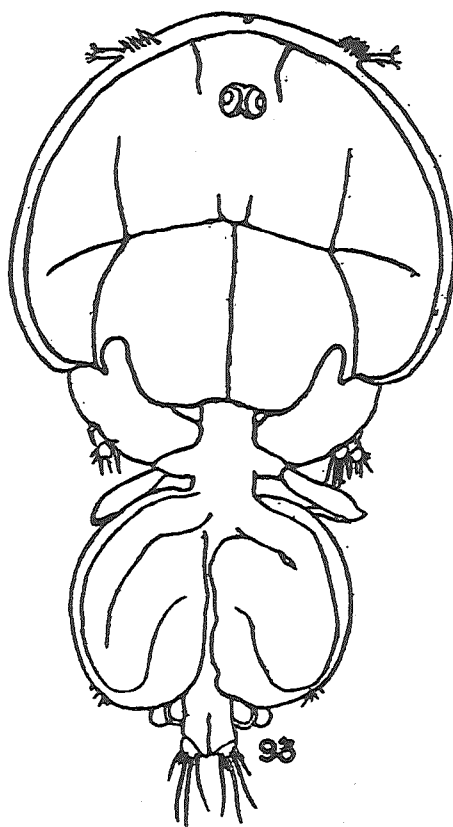


Fig. 93. *Lepeophtheirus rotundiventris* Bassett-Smith. Female.

Lepeophtheirus spinifer Kirtisinghe

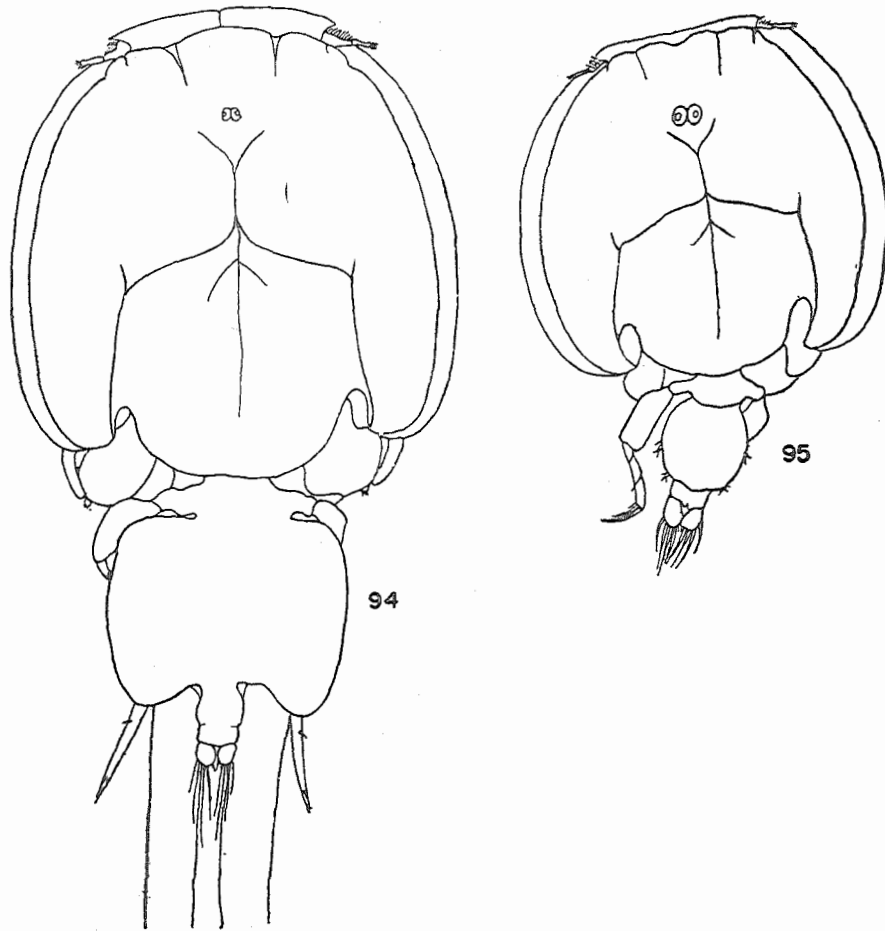
Lepeophtheirus spinifer Kirtisinghe, 1937, p. 441, figs. 41-58 ; Rangnekar, 1959, p. 51, fig. 4
Pillai, 1961, pp. 128-129, fig. 23.

Occurrence. On the outer surface of the body of *Chorinemus* sp. off Hikkaduwa.

Distribution. On the outer surface of the body of *Rachycentron canadus* off Bombay (Rangnekar) ; on the outer surface of the body of the same host off Trivandrum and on the outer surface of the body of *Chorinemus tala* off Vishingom, South India (Pillai).

Female (Fig. 94). Cephalothorax elliptical, longer than wide, more than half the entire length ; median lobe about half the width of the cephalothorax, projecting slightly beyond the posterior level of the lateral lobes. Free thoracic segment short and wide. Genital segment quadrangular, with distinct postero-lateral lobes. Abdomen half the length of the genital segment, two-segmented, proximal segment longer than the distal. Anal laminae as long as distal abdominal segment. Fifth legs as long stout spines extending backwards beyond the anal laminae. Total length 4 mm..

Male (fig. 95). Cephalothorax about two-thirds the entire length. Genital segment barrel-shaped. Abdomen of a single short segment. Total length 2.5 mm..



Figs. 94, 95. *Lepeophtheirus spinifer* Kirtisinghe. 94. female ; 95, male.

ALBION Kroyer

Alebion megacephalus Kirtisinghe

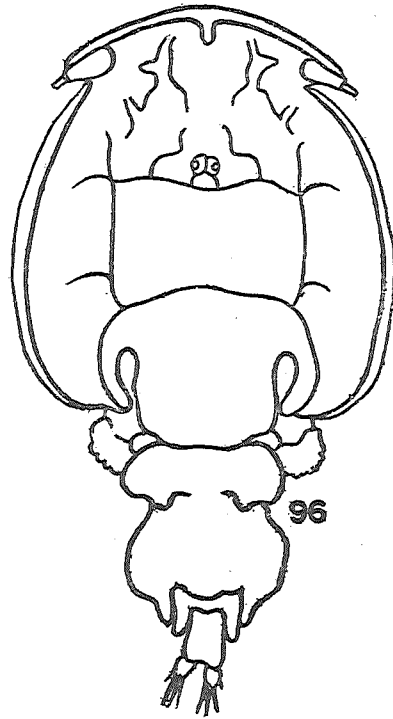
Alebion megacephalus Kirtisinghe, 1956, pp. 15-17, figs. 5-8.

Occurrence. On the outer surface of the body of a carcharinid shark off Hikkaduwa.

Distribution. Not recorded elsewhere.

Female (Fig. 96). Cephalothorax oval, longer than wide ; median lobe about a third of the width of the cephalothorax, projecting a little beyond the posterior level of the lateral lobes. Free thoracic segment about as wide as the median lobe of the cephalothorax, its dorsal plates semi-circular with small posterior lobes overlapping the front part of the genital segment. Genital segment as wide as the free thoracic segment and about twice as long, its lateral margins convex and unarmed with spines but its posterior processes with spines along the inner margin and tip. Abdomen two-segmented, basal segment much shorter than the distal, with postero-lateral processes extending on either side of the latter to half way along its length. Total length 5 mm..

Male. Not known..



96. *Alebion megacephalus* Kirtisinghe. Female.

PANDARUS Leach

Pandarus niger Kirtisinghe

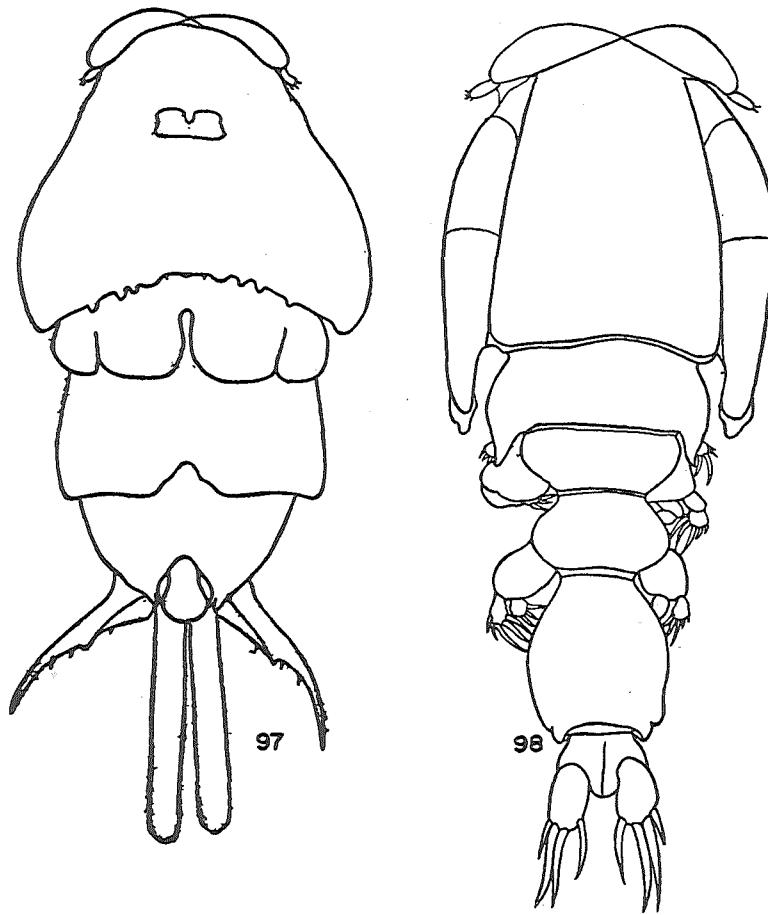
Pandarus niger Kirtisinghe, 1950, pp. 83-84, Figs. 13-28.

Occurrence. On the outer surface of the body of a carcharinid shark off Hikkaduwa.

Distribution. Not recorded elsewhere.

Female (Fig. 97). Cephalothorax triangular, narrow anteriorly broadening posteriorly to twice its width at the front end, its posterior margin toothed. Dorsal plates of the second segment extending to the posterior level of the plates on the third segment. Plates of the third segment wider than those of the second, separated from each other by a deep median incision. Plates of the fourth segment fused to form a single rectangular plate overlapping more than half the genital segment. Dorsal plates of the genital segment produced posteriorly into slightly bifid lobes on either side of the abdominal plate. Anal laminae large, pointed, divergent processes with two or three spines on inner margin. Dorsal plate of sixth segment longer than wide, narrowed anteriorly, with concave lateral margins and rounded posterior margin. Total length 6.5 mm..

Male (Fig. 98). Cephalothorax about as wide as long, a little more than one-third the entire length, its posterior margin serrated. Second thoracic segment wide, with pointed postero-lateral processes. Third and fourth segments gradually decreasing in size from that of the second segment. Genital segment flask-shaped. Abdomen indistinctly two-segmented, proximal segment very short. Anal laminae broadly oval, each lamina with four non-plumose setae. Total length 5 mm..



Figs. 97, 98. *Pandarus niger* Kirtisinghe. 97, female; 98, male.

PSEUDOPANDARUS Kirtisinghe

Pseudopandarus gracilis Kirtisinghe

Pseudopandarus gracilis Kirtisinghe, 1950, p. 84, figs. 29-35.

Occurrence. On the outer surface of the body of a "large dogfish".

Distribution. Not recorded elsewhere.

Female (Fig. 99). Cephalothorax semi-elliptical, a little less than one-third the entire length its lateral lobes produced posteriorly into triangular projections. Dorsal plates of the second thoracic segment triangular; those of the third segment broad, covering about half the dorsal plate of the fourth segment. Dorsal plate of latter about as wide as the cephalothorax, its posterior margin with small symmetrical lobes. Dorsal plate of the genital segment elongate, narrowing a little posteriorly, its hinder margin produced into three prominent lobes, one median elongate oval lobe and two lateral triangular lobes. Abdomen visible only ventrally as a single large segment bearing two broad anal laminae, each lamina with five non-plumose setae. Total length 4 mm..

Male. Not known.

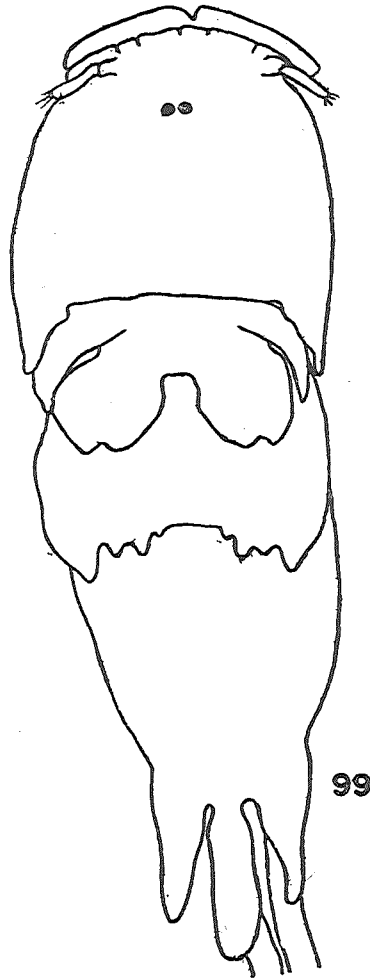


Fig. 99. *Pseudopandarus gracilis* Kirtisinghe. Female.

DISSONUS Wilson

Dissonus spinifer Wilson

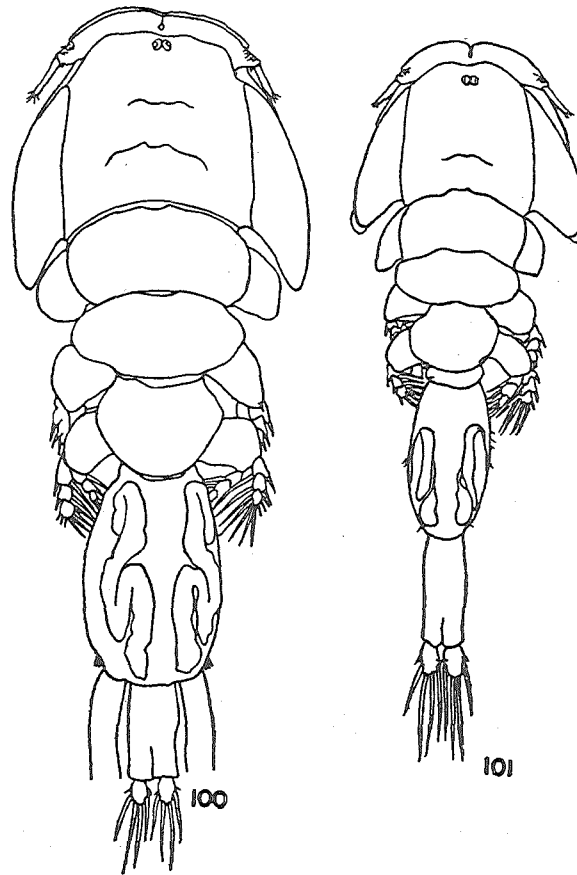
Dissonus spinifer Wilson, 1906, p.198, pl. 3, figs 34-37 and 1907, p. 717, pl. 20, figs, 71-72.

Occurrence. On an unrecorded host from the Pearl Banks off Ceylon (Wilson).

Distribution. Not recorded elsewhere.

Female. Cephalothorax semi-lunar, twice as wide as long. Second to fourth thoracic segments gradually diminishing in size backwards. Genital segment quadrangular. Entire ventral surface of the genital segment covered with stout scattered spines which point diagonally backwards. Abdomen of a single segment, less than half the length of the genital segment. Anal laminae oblong, each lamina with four large plumose setae. Total length 3 mm..

Male. Cephalothorax as in female. Genital segment elongate, barrel-shaped Abdomen not as wide as in female. Total length 3 mm.. (Not seen. Description from Wilson.)

Dissonus furcatus Kirtisinghe*Dissonus furcatus* Kirtisinghe, 1950, p. 77, figs. 8-12Figs. 100, 101. *Dissonus furcatus* Kirtisinghe. 100, female; 101, male.

Occurrence. On the gill lamellae of an orectolobid shark.

Distribution. Not recorded elsewhere.

Female (Fig. 100). Cephalothorax semi-lunar, broader than long. Second and third thoracic segments of the same width as the median lobe of the cephalothorax. Lateral plates of segment not quite as wide as the lateral lobes of the cephalothorax. Fourth thoracic segment narrower but longer than either of the preceding segments. Genital segment barrel-shaped, its ventral surface furnished with bifurcated spines scattered in an arc almost confined to the anterior third of the segment. Abdomen of one segment about two-thirds the length of the genital segment and much longer than broad. Anal laminae oval. Total length 5.5 mm.

Male (Fig. 101). General appearance like that of the female but more slender. Abdomen comparatively longer and anal laminae larger than in the female. The bifurcated spines on the ventral side of the genital segment scattered in an arc occupying almost the anterior half of the segment. Total length 4.5 mm.

GLOIOPOTES Steensturp and Lutken*Gloiopotes longicaudatus* (Marukawa)

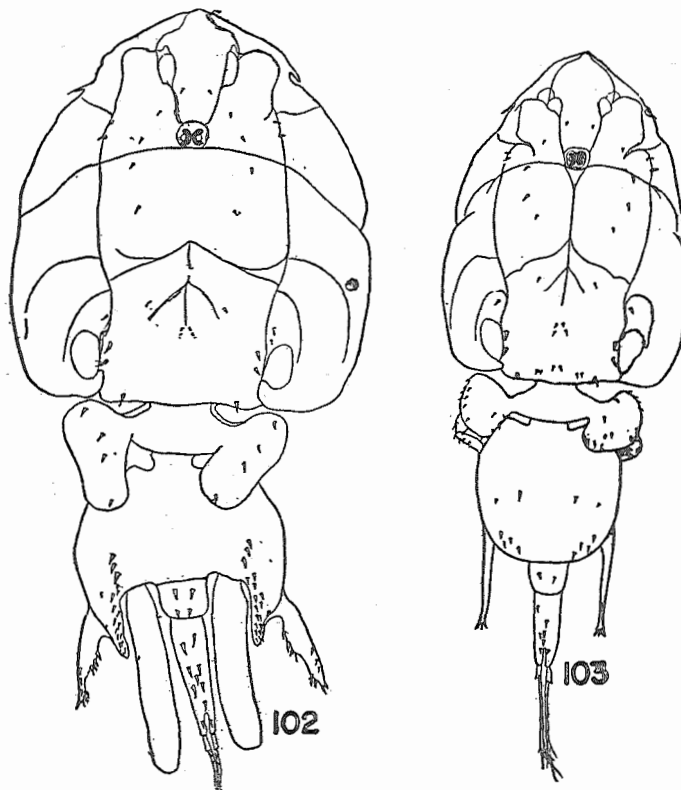
Caligus longicaudatus Marukawa, 1925, p. 1243, fig. 2396, and 1947, p. 927, fig. 2654

Gloiopotes sp. Yamaguti, 1936a, p. 4, pl. 2, fig. 20, pl. 3, figs. 21–25

Gloiopotes watsoni Kirtisinghe, 1934, pp. 167–173, figs. 1–17

Gloiopotes zeugopteri Rao, 1951, pp. 248–255, figs. 1–15

Gloiopotes longicaudatus Shiino, 1954, p. 284, figs. 1–2 ; 1958, p. 105; 1959, pp. 348–349 Heegaard, 1962, p. 174, figs. 1–17



Figs. 102, 103. *Gloiopotes longicaudatus* (Marukawa). 102, female ; 103, male.

Occurrence. On the outer surface of the body of *Histiophorus gladius* (Broussonnet) off Hikkaduwa and *Makaira indica* (Cuvier) off Negombo.

Distribution. On *Xiphias zeugopteri* off the east coast of South India (Rao) ; on *Makaira mazara* in the Indian Ocean (Shiino) ; on *Tetrapturus mitsukurii* and *Xiphias gladius* off the pacific coast of Japan (Yamaguti, Shiino) ; on *Marlina zelandica* and *Istiompax australis* in Australian waters (Heegaard).

Female (Fig. 102). Cephalothorax about half the entire length, a trifle longer than broad; median lobe a little less than half the width of the cephalothorax, its posterior margin almost straight and in line with the posterior level of the lateral lobes. Free thoracic segment short, bearing kidney-shaped dorsal plates which overlap the genital segment antero-laterally. Genital segment more than half the width of the cephalothorax, joined to the the fourth segment by a narrow neck and with slight shoulders and convex lateral margins and bearing prominent postero-lateral lobes whose styli-form processes project obliquely backwards. Abdomen two-segmented, proximal segment short, distal segment much longer and tapering posteriorly. Anal rami about half the length of the distal abdominal segment and broader for the proximal third of their length. Total length 9.5 mm..

Male (Fig. 103). Cephalothorax as in female. Dorsal plates of fourth segment somewhat triangular. Genital segment rounded, its styliform processes extending backwards almost parallel with the abdomen to about half way along the second abdominal segment. Anal rami a little longer than the second abdominal segment. Total length 8.5mm..

Remarks. When the Ceylonese specimens were described as a distinct species I was not aware of the Japanese specimens described by Marukawa under the genus *Caligus*. The accounts by Yamaguti and Shiino have shown me that the Ceylonese specimens must also belong to *Gloiopotes longicaudatus* (Marukawa). The specimens from the Australian waters described by Heegaard serve to show the range of variation within this species which infests the swordfish, sailfish and marlins from the Indian and Pacific Oceans and the more southern waters around Australia.

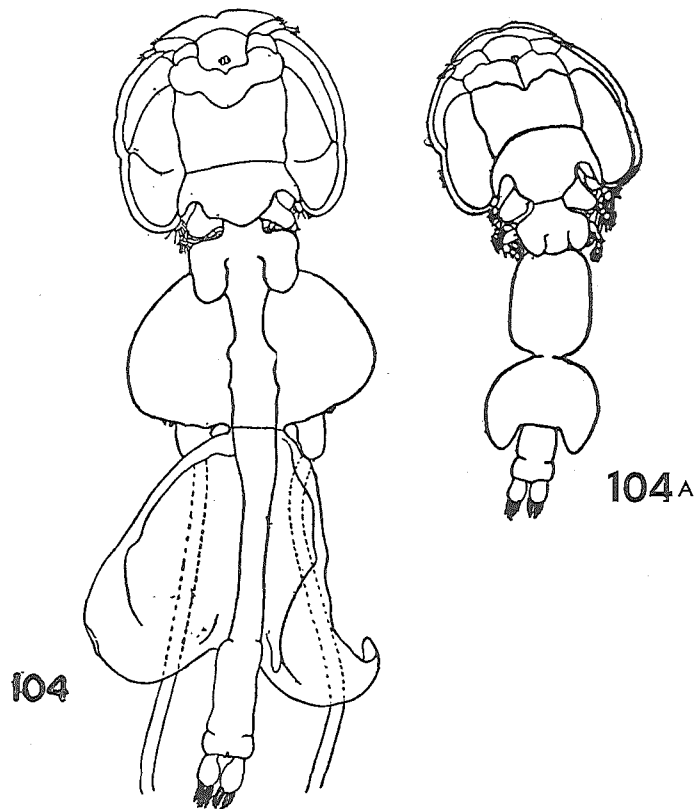
EURYPHORUS Milne-Edwards

Euryphorus nympa Steenstrup and Lutken

Euryphorus nympa Steenstrup and Lutken, 1861, p. 365, pl. 6, fig. 12; Shiino, 1954, p. 284, figs. 5-6 and 1959, p. 350

Euryphorus coryphaenae Kroyer, 1863, p. 161, pl. 10, fig. 4

Euryphorus nordmanni (not Milne - Edwards) Kirtisinghe, 1937, pp. 445-448, figs. 74-87



Figs. 104, 104A. *Euryphorus nympa* Steenstrup and Lutken. 104, female; 104A, male.

Occurrence. In the branchial chamber of *Coryphaena hippurus* Linn. off Hikkaduwa.

Distribution. On *Lampugus punctulatus* in the Atlantic Ocean (Steenstrup and Lutken); on *Coryphaena hippurus* off Japan (Shiino).