

ON A COLLECTION OF PLANKTONIC DECAPODA (PENAEIDEA) FROM THE SOUTH WEST COAST OF INDIA

M. J. GEORGE & V. T. PAULINOSE,
Indian Ocean Biological Centre, National Institute of Oceanography, Cochin-18,

ABSTRACT

Planktonic decapoda belonging to the tribe Penaeidea sorted out from collections made during two cruises on the vessel 'Blue Fin' off Cochin, Alleppey and Quilon are described. The species *Lucifer typus* is reported for the first time from the Arabian Sea. Acanthosoma stage of *Sergestes crassus*, mastigopus stage of *Sergestes orientalis*, mysis stages of *Trachypenaeus curvirostris*, *Parapenaeopsis styliifera* and *Parapenaeus investigatoris* and protozoeca stage 3 of *Solenocera crassicornis* are described for the first time.

INTRODUCTION

The present contribution deals with the Decapod larvae (Penaeidea) sorted out from the plankton collections made during two cruises conducted in the fishing-cum-training vessel "Blue Fin" under a joint project of National Institute of Oceanography and Central Institute of Fisheries Operatives off Cochin, Alleppey and Quilon coasts in depths ranging upto 1000 metres. The samples were collected in vertical hauls from 200 metres or less to surface. In the context of the various decapod species constituting the local inshore fishery as well as some of the caridean prawns increasingly coming into the commercial fishery from the deeper waters of the continental slope off the south west coast of India, the study of the decapod larvae is highly pertinent. Although the importance of these studies has been fully demonstrated by the extensive works of Gurney (1924, 1927, 1937, 1942) followed by Williamson (1967, 1970), Heegaard (1966, 1969) and others, this has attracted comparatively lesser attention in India. Menon (1933, 1937, 1940) did some pioneering works on the decapod larvae of the east coast of India from the Madras plankton. Later (1952) he studied the development of a penaeid species from the south west coast of India also. Pillai (1955) described some decapod larvae occurring in the plankton of the Trivandrum coast. Sankoli (1967), Shenoy (1967), Mohamed *et al.* (1968) among others dealt with developmental stages of some of the decapod crustaceans occurring along the west coast of India. So a series of plankton samples collected in the Indian Ocean Biological Centre was utilised to make a study of the various

larval forms occurring in these waters and the Penaeidean decapoda are dealt with in the present report.

TRIBE PENAEIDEA

Family *Sergestidae*

Subfamily *Sergestinae*

Sergestes crassus Hansen

Gurney & Lebour, 1940: 24-27, Figs. 15-19 (Larval stages)

Material: St. No. 5A. 25-2-1970.

1 specimen, acanthosoma -1, 2.8 mm (Fig.1).

The single specimen of acanthosoma stage I to hand resembles so well with the figures and descriptions given by Gurney & Lebour (1940) from Bermuda waters of the same stage of *S. crassus* that there is no hesitation to identify the specimen as belonging to that species. Rostrum which is spiny extends a little beyond the antennular peduncle; the antero-inferior margin of the carapace with 9 spinules posterior to the lateral spine.

This is the first record of this larval stage from outside Bermuda waters.

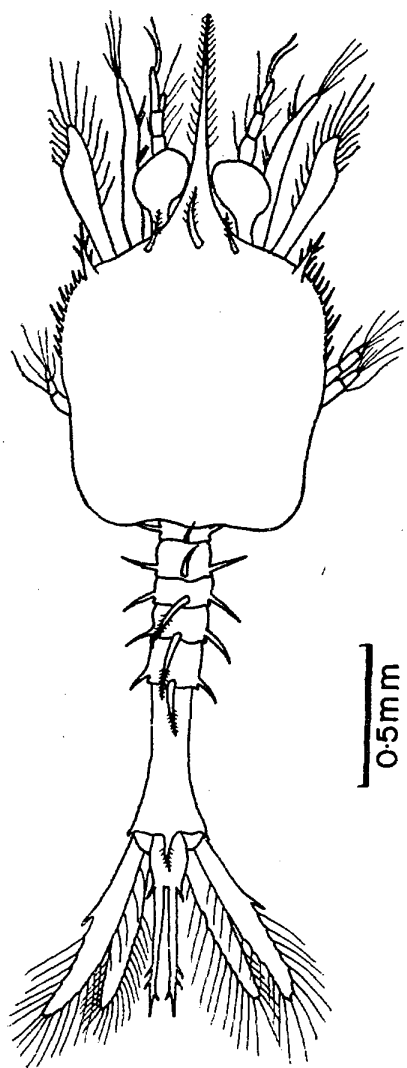
Sergestes orientalis Hansen

Hansen, 1919: 22-26, Plate II, Fig.2 (larval stages)

Menon, 1940: 11-13, Fig.33 (acanthosoma)

Material: St. No. 5B. 25-2-1970.

1 specimen, mastigopus stage, 4.8 mm (Fig. 2).

Fig. 1. *Sergestes crassus*—acanthosoma I.

Gurney and Lebour (1940) described *S. edwardsi* as the only species with the acanthosoma with median ventral abdominal spines on somites 1 to 5. According to Hansen (1919) *S. orientalis* and *S. edwardsi* are very closely allied species, although he does not mention the median ventral abdominal spines in *S. orientalis*. Menon (1940) described acanthosoma stage II of *S. orientalis* from the Madras coast and he noticed the presence of the median ventral spines on abdominal somites. The present specimen, an early mastigopus stage also possesses the median ventral abdominal spines on segments 1 to 5 and is identified as belonging to *S. orientalis*. The number of spines and other

characters of the carapace agree with the description given by Hansen (1919). This is the first record of the mastigopus stage from the Arabian Sea. The species is known to have a wide distribution in the Indo-Pacific.

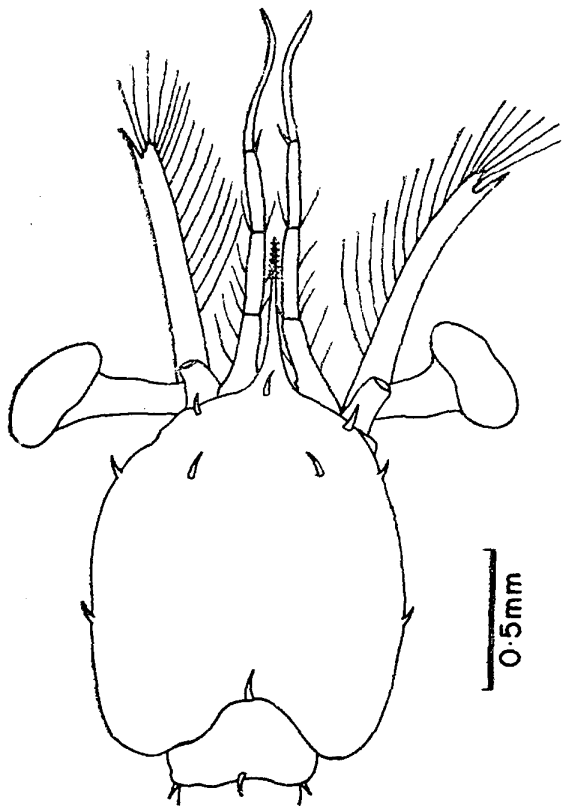
Acetes erythraeus Nobili

Menon, 1933: 3-17, pt. I-III, Figs. 1-40 (larval stages)

Material: St. No. 1 24-2-1970.

1 specimen, Protozoa III.

The specimen of protozoa stage III is quite in agreement with the description and figures of Menon (1933) and differs from the same stage larva of *A. cochinensis* described by Rao (1970) from more or less the same locality of the present collection, in the presence of 6 pairs of spines on the telson. As Menon's description of the larval stage of the species is from Madras coast this is the first time this larva is reported from the west coast of India. The adults have been recorded from Trivandrum coast by Kurien (1954).

Fig. 2. *Sergestes orientalis*—mastigopus

Acetes cochinensis Rao

Rao 1970: 298-320, Figs. 1-10 (adult and larval stages)

Material: St. No. 9. 25-2-1970.
3 juvenile specimens, 5.6-6.0 mm.

This species has been recently described from Cochin waters by Rao (1970) and the specimens to hand are in agreement with his descriptions.

Subfamily *Luciferinae**Lucifer typus* H. Milne Edwards

Hansen, 1919: 53-55, Pl. 4, Figs. 6 a-k (adult)
Williamson 1966: 33; 1970:4 (1 young male).

Material: St. No. 11. 25-2-1970.
1 male and 1 female (Figs. 3 a-c)

Lucifer hanseni Nobili

Hansen 1919: 63-65, Pl. V, Fig. 4 a-o.

Menon 1940: 7-8; Figs. 13-22 (larval stages)

Material: Numerous specimens of larval stages, juveniles and adults from most of the stations.

This is a common species met with in these waters and the larvae as described by Menon (1940) commonly occur in these waters.

Family *Penaeidae*Subfamily *Penaeinae**Penaeus indicus* Milne Edwards

Menon 1937: 2-5, Figs. 1-14 (Protozoa stages)

Material: St. No. 1. 24-2-1970.
1 specimen, Protozoa II.

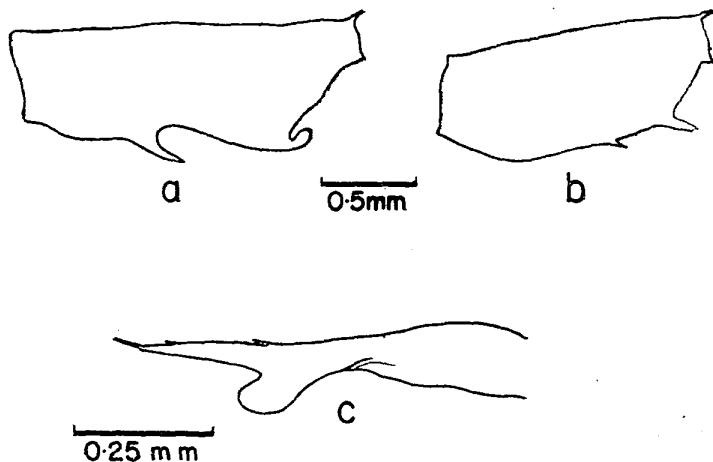


Fig. 3. *Lucifer typus*—a. 6th abdominal segment in male.
b. 6th abdominal segment in female. c. telson of male

According to Hansen (1919), the Copenhagen Museum possesses specimens of this species from the Bay of Bengal (Galathea), Manila and from other places. Williamson (1969 and 1970) recorded the species from Israel waters and Red Sea respectively. This is the first record of the species from the Arabian Sea, thus establishing a continuity of distribution through these waters.

As shown in Fig. 3 the curved swollen posterior spine on the 6th abdominal segment in the male is prominently seen. As figured by Hansen (1919) the posterior margin of the ventral protuberance on the telson is quite remote from the tip. Posterolateral spine on the exopod of uropod is almost at the tip.

The presence of a supraorbital spine with a small spinule on its lateral margin (Menon 1937) is the most important character by which protozoa, stage II of this species could be identified. This character is quite clear in the specimen to hand. The spines on the telson number 7+7. Menon has reported this stage larva from the east coast of India. Hence this is the first report from the west coast.

Mohamed *et al.* 1968: 489-91, Fig. 1 (postlarva-1)

Material: St. No. 11 and 19 B. 25-2-1970 and 9-4-1970.

2 specimens, postlarva 3, 8 mm length.

Rostrum with 4 teeth, anterior-most being very small, exceeding the eye slightly; hepatic spine well developed. Telson spines same as on postlarva I described by Mohamed *et al.* (1968). Peropods without exopodites. Pleopods uniramous and decreasing in length from 1st to 5th pair.

Metapenaeus dobsoni (Miers)

Menon 1952: 80-93, Figs. 1-60 (larval stages)

Mohamed *et al.* 1968: 496-97 (postlarva-1)

Material: St. No. 24. 10-4-1970.

1 specimen, Postlarva-1, 3.1 mm.

The specimen to hand agrees well with the descriptions given by Menon (1952) and Mohamed *et al.* (1968).

Trachypenaeus curvirostris? (Stimpson)

Pearson 1939: 39-53 (larval stages of *Trachypenaeus constrictus*)

Cook 1965: 437-47 (key to larvae).

Kirkegaard 1969: 15-25 (larval stages of *Trachypenaeus fulvus*)

In assigning few mysis stages in the present collection to the genus *Trachypenaeus*, the key for identification of mysis stages given by Cook (1965) and other publications on larvae of various genera and species have been used. The absence of hepatic spine on the carapace, presence of rostral spine, ventral antero-lateral spine and antennal spine on carapace from the first stage mysis onwards, the prominent median posterodorsal spine on the 5th abdominal somite, the spine formula of 8+8 on the telson, slight hump posterodorsally on the third abdominal somite, the absence of lateral spine on the 5th abdominal somite as well as posterodorsal median spine on 4th abdominal somite and the size of the early mysis stage in comparison with other species are important characters by which, by a process of elimination these mysis stages have been ascribed to the genus *Trachypenaeus*. The only species of the genus fairly common in the waters of the south west coast of India (George, 1971) is *T. curvirostris* (Stimpson). Hence these mysis stages may be tentatively assigned to this species. Pearson (1939) described the larval stages including two mysis stages of *T. constrictus* from the South Atlantic. Kirkegaard (1969) reported the larvae of *T. fulvus* from Australian waters. The larval stages of this genus is recorded for the first time from Indian waters.

Material:

Mysis stage I - 1 specimen 3.2 mm - St. No. 8. 25.2.1970.

" " II - 3 specimens 3.7-4.2 mm - St. No. 10. 25-2-1970 and St. No. 22 & 25. 10.4.1970.

" " III - 1 specimen 4.8 mm. - St. No. 20 A. 10.4.1970 Figs. (4, 5).

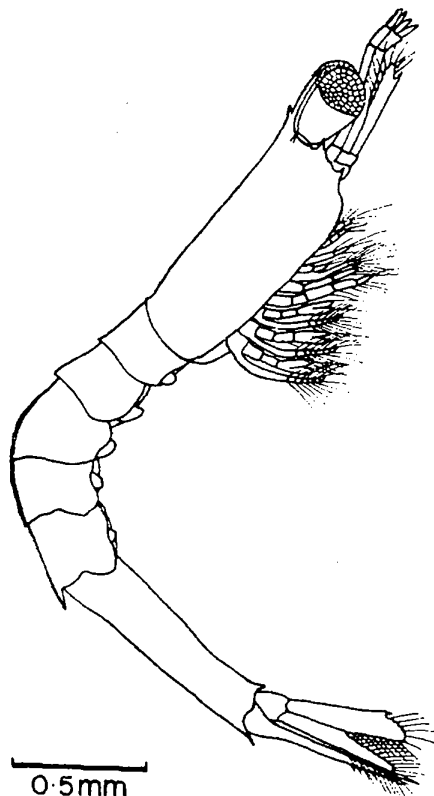


Fig. 4. *Trachypenaeus curvirostris*—mysis I.

The development of the pleopods indicate the three stages, absent or rudimentary buds in stage I, small and unsegmented in stage II and segmented but only uniramous in stage III. The size of these stages compares well with the stages of *T. constrictus* described by Pearson (1939). But the mysis stages of *T. fulvus* reported by Kirkegaard (1969) are much smaller than the present specimens, probably due to the comparatively smaller size of the adults in the case of *T. fulvus*. The rostrum has 1 tooth in stage I, 2 in stage II and 3 in stage III (Fig. 5a, b, c). On the carapace hepatic spine absent; minute supraorbital spine and pterygostomial spine present in all the 3 stages; Kirke-

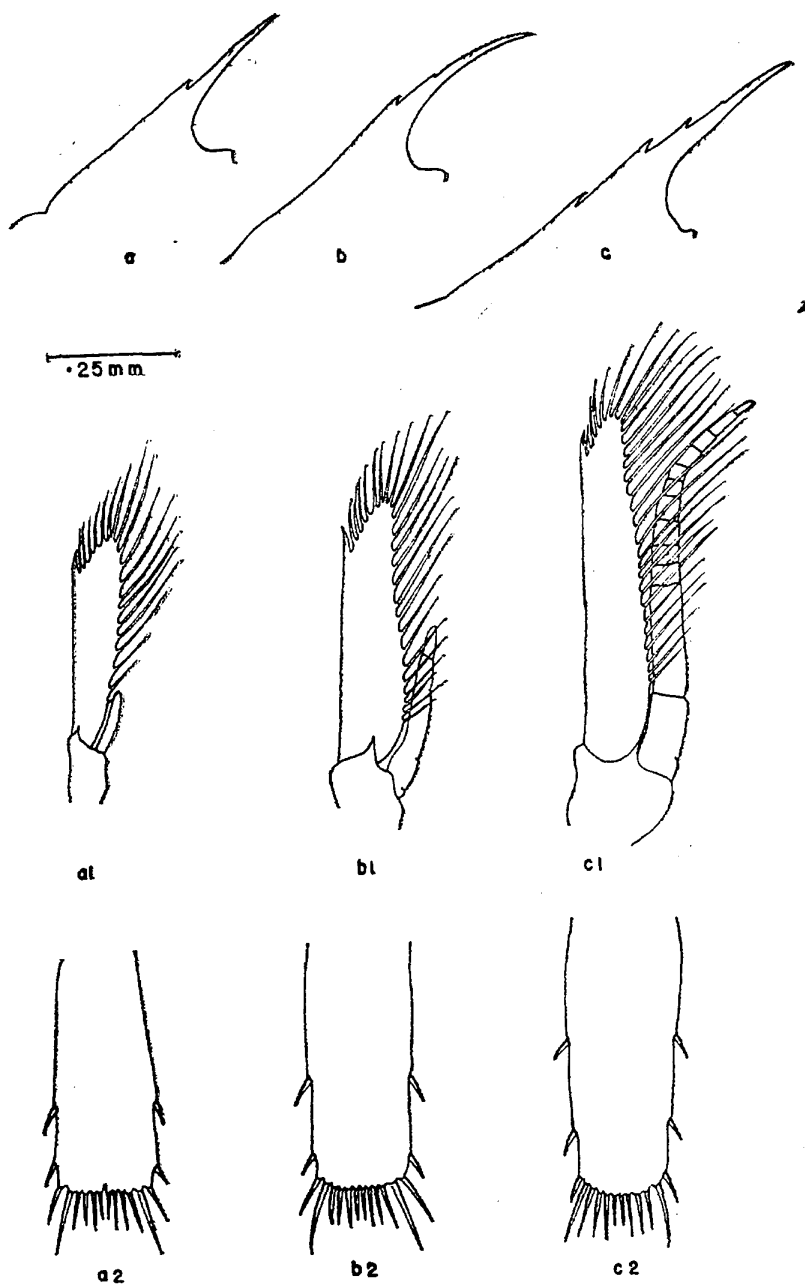


Fig. 5. *Trachypenaeus curvirostris*—a - c². rostrum, antenna and telson of mysis I - III respectively

gaard (1969) mentioned an acute antennal angle in all the stages of *T. fulvus*. However, in this species the antennal spine is seen distinctly in all the three mysis stages. The development of the antenna through the stages is figured. (Fig. 5a¹, b¹, c¹). As in *T. fulvus* there are neither lateral spines on any of the abdominal somites nor dor-

somedian spine on 4th abdominal somite. The third abdominal somite has a slight dorsal hump-like carination giving characteristic bend shape to the abdomen. Telson spine formula 8+8 in all stages (Fig. 5a₂, b₂, c₂). The appendages are quite similar to that of *T. fulvus* with slight differences in the number of setae on some.

The mysis stages of the Australian species *T. fulvus* described by Kirkegaard (1969) differs from the same stage of the American species *T. constrictus* reported by Pearson (1939) in the absence of supraorbital spines on the carapace and dorsomedian spine on the fourth and posterolateral spines on the fifth abdominal somites. The present series agrees with *T. constrictus* in the presence of supraorbital spines but differs from it in the other two characters in which it is similar to *T. fulvus*. The pterygostomial spine on the carapace is found in all the three species.

Parapenaeus investigatoris? Alcock & Anderson Heldt 1938: 165-175 (larval stages of *Parapenaeus longirostris*).

Pearson 1939: 54-60 (larval stages of *Parapenaeus longirostris*).

Subrahmanyam 1971: 25C-51 (mysis stages of *Parapenaeus* sp.)

Material: St. No. 18A. 9-4-1970.

1 specimen, Mysis stage III, 7.2 mm (Fig.6).

Lateral spines present on 5th and 6th abdominal somites. Pleopods are present as buds. The distinguishing characters by which the mysis of this genus could be easily identified are the long rostrum and the elongated median dorsal spine on the third abdominal somite.

The present specimen resembles the mysis of the Atlantic species *P. longirostris* described by Heldt (1938) and Pearson (1939). But it differs from it in size, in the number of rostral teeth and the nature of median dorsal spine on the third abdominal segment. The two species which are so far recorded from the west coast of India are *P. longipes* and *P. investigatoris* (George, 1969). Out of these the former is recorded from shallower waters while the latter from deeper waters. Also in the adult, *P. longipes* is characterised by absence of branchiostegal spine. The collection of the mysis stage from a deeper station at a sonic depth of 1005 m as well as presence of branchiostegal spine in the mysis point to the fact that the mysis may be that of *P. investigatoris*. Hence it

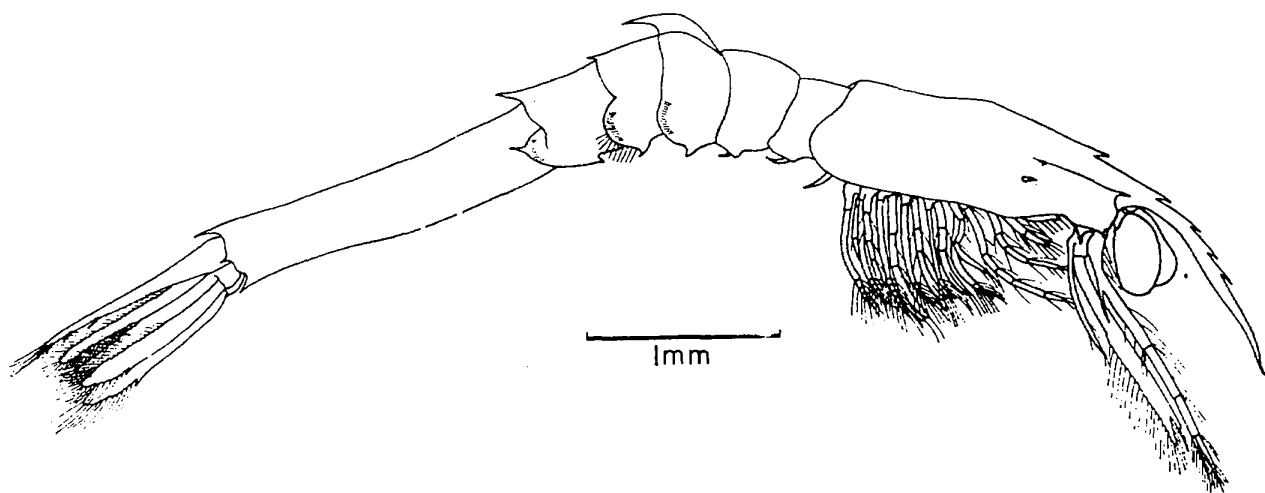


Fig. 6. *Parapenaeus investigatoris* ? — mysis III

Rostrum very long and decurved extending much further than the eye, beyond the second segment of the antennular peduncle; with 4+1 dorsal teeth. Hepatic, supra orbital and branchiostegal spines present on carapace. Dorsal spine on 3rd abdominal segment prominent, triangular, being broad at the base, followed by shorter dorsal spines on 4th and 5th somites. Ventral spines present on anterior 3 abdominal somites. Pleura of the abdominal somites with pointed spines.

is tentatively identified as belonging to that species. This is the first record of the mysis of the species from these waters.

Parapenaeopsis stylifera (H. Milne Edwards)

Mohamed *et al.* 1968: 496-98, Fig. 5 (postlarva 1)

Material: St. No. 14, 8-4-1970.

2 specimens, Mysis I, 1.6, 1.8 mm; 3 specimens, Mysis II, 2.5-2.6 mm (Fig. 7 a-c).

In size these mysis stages are comparable to the zoea stages 1 and 2 of *Metapenaeus dobsoni* described by Menon (1952), although slightly smaller. But there are some distinctive characters which show that these belong to another species. In mysis stage I the rostrum is quite long extending to tip of the eye. On the carapace antennal spine and pterygostomial spine present; a distinct supraorbital spine also present; hepatic spine absent. The median dorsal spines on 5th and 6th abdominal somites very prominent; posterior margin of telson with a deep cleft and 8+8 spines. Exopod of the uropod possesses a distinct spine on the posterolateral margin. Pleopods absent.

Mysis stage 2 has a rostrum extending slightly beyond tip of eye upto the 1st segment of the

antennular peduncle and without teeth, unlike 1 tooth in *M. dobsoni* at this stage. Antennal spine, pterygostomial spine and supraorbital spine present. Hepatic spine also present in this stage but very minute. Median dorsal spine on 5th abdominal somite quite prominent as in previous stage. Slight notch persists in the posterior margin of the telson which has spine formula of 8+8 (Fig. 7c, b). Exopod of uropod with posterolateral spine. Pleopods just beginning to appear as small buds.

In the matter of size and various other features like prominent median dorsal spine on 5th abdominal somite, the presence of supraorbital spine and externodistal spine on the exopod of the uropod, telson spine formula of 8+8 etc. by

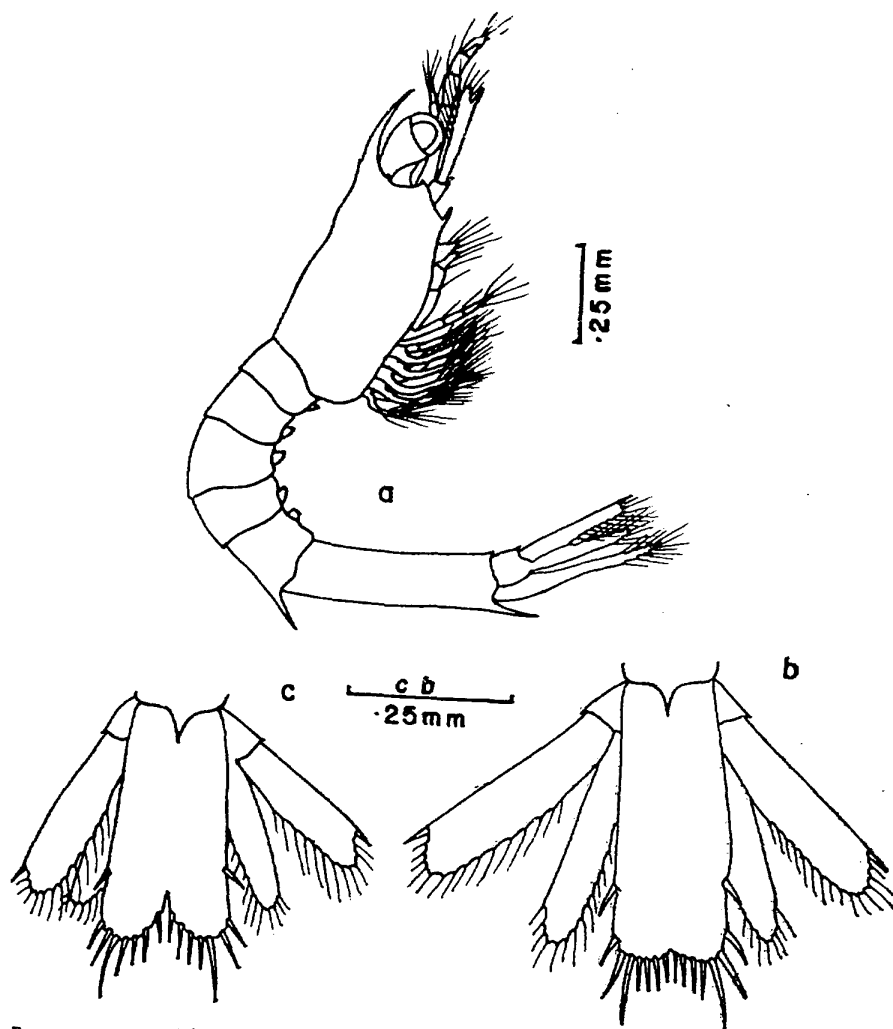


Fig. 7. *Parapenaeopsis stylifera* a. mysis II. b. uropod and telson of mysis II. c. uropod and telson of mysis I.

a process of elimination it is clear that these stages do not belong to any of the genera described so far from these waters. While they agree with the same stages of *M. dobsoni* in size they do not conform to some of the generic characters of the genus *Metapenaeus*, like, for instance, the telson spine formula of 8+8 in present specimens while it is 7+7 in *Metapenaeus*. Incidentally Menon (1952) has recorded 8+8 spines in the telson of his mysis 1 of *M. dobsoni*. Evidently he has confused with the same stage of another species, because in his own descriptions he recorded 7+7 spines both in the previous stage protozoa III as well as the next stage mysis 2 and it is quite improbable that the spines suddenly disappear in one particular stage and reappear in the next stage. The commonest species in the inshore waters of this coast is *Parapenaeopsis stylifera* and it grows to a similar size as *M. dobsoni* in the adult stage. Therefore these stages may be tentatively assigned to this species. This is the first report about these stages of the genus *Parapenaeopsis*.

Subfamily Solenocerinae

Solenocera crassicornis H. Milne Edwards

Menon 1940: 3-6, Figs. 1-11 (Mysis stage)

Material: St. No. 21. 9-4-1970.

1 specimen, Mysis stage I.

The available specimen is an early mysis stage of *Solenocera*, with the characteristic spiny nature of the carapace and abdomen. In most respects the specimen is similar to the mysis stage I of *S. crassicornis* described by Menon (1940). However, some of the characters like outer antennular flagellum with only 4 aesthetes instead of 8 in Menon's specimen, antennal flagellum without any seta and nature of spines on the carapace indicate that the present specimen is an earlier stage to that of Menon's specimen. So it is probable that the present specimen is mysis stage I and the stage recorded by Menon only mysis stage II of *S. crassicornis*. Since the previous record is from Madras waters, this is the first record of the larva from the west coast. This is the commonest species of *Solenocera* on the Indian coast since *S. indica* has been synonymised with this species by Muthu and George (1971).

Cheung 1963: 422-24, Figs. 8,9 (Protozoa of *Solenocera subnuda*)

Heegaard 1966: 89-93, Figs. 181-192 (Protozoa of *Solenocera* sp. larva *barbata*)

Material: St. No. 11. 8-4-1970 and St. No. 22. 9-4-1970.

2 specimens, Protozoa III, 3.3 mm and 3.5 mm (Fig. 8).

The surface of the carapace is covered with very minute spinules and the margin fringed with

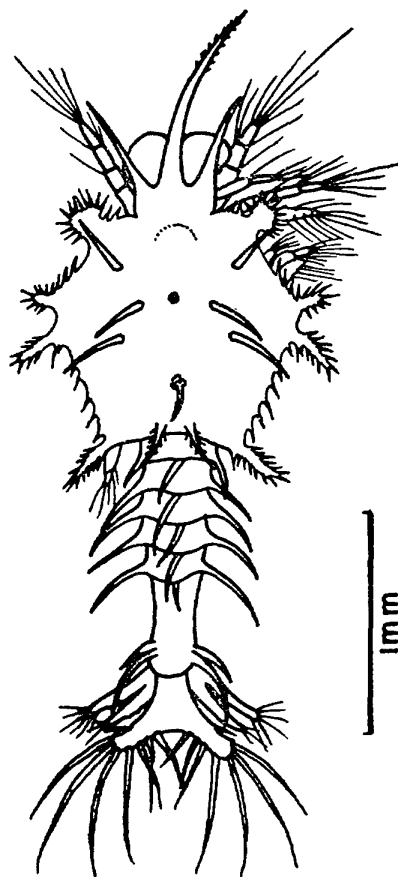


Fig. 8: *Solenocera crassicornis* — Protozoa III.

five pairs of barbed lappets. Between the first and the second lappets the margin is serrated posteriorly with 3 serrations and between the third and fourth with 11 serrations. Each abdominal somite has one median dorsal and a pair of lateral spines which are quite prominent. The bifurcate telson has a spine formula of 8+8. The exopods and endopods of the uropods are finger-shaped

and tipped with 6 and 3 small setae respectively. In most of the characters the specimens agree with the descriptions of the older substage third protozoa of *S. subnuda* described by Cheung (1963) and the third protozoa of *Solenocera* sp. larva *barbata* described by Heegaard (1966). But in the number of serrations on the margin of the carapace in between the 3rd and 4th lappets the present protozoa differs from both and in the spine formula of the telson it differs from *S. subnuda*, which has only 7+7 spines. As the specimens have been obtained from more or less the same locality from which the mysis stage I of *S. crassicornis* was obtained in the present collections, this may be assigned to the same species. If so, as the larval characters also do not agree, this gives additional strength to the view that *S. subnuda* and *S. crassicornis* (as *S. indica*) are distinct species and not synonyms, unlike the suggestion made by Cheung (1963) and the synonymy established by Kunju (1970).

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