

TWO NEW PSEUDANTHESSIUS SPECIES (COPEPODA-LICHOMOLGIDAE) FROM THE MADRAS HARBOUR

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THE genus *Pseudanthessius* has been studied by several workers and was revised thrice. The third revision by Stock, Humes and Gooding (1963) included 22 species incorporated in a suitable key. Later, Humes (1966) and Humes and Ho (in press) added two more species. Some of these are the associates of echinoids, ophiuroids, annelids, flatworms and a nemertean while the remaining are found in the washings of unidentified invertebrates, dredged material, sea weed and plankton. Two more species described below are collected* from a crinoid and a tunicate from Madras harbour.

***Pseudanthessius madrasensis* n.sp.**

Material : 14 ovigerous females, 3 non-ovigerous females and 3 adult males collected from 10 hosts (crinoids) from Madras harbour on 26th March, 1964. Two females collected from 2 hosts on 14th May, 1964.

Types : One holotype (adult female) and one allotype (adult male) and 9 paratypes (ovigerous females) have been deposited in the National Collections of the Zoological Survey of India, Calcutta.

The adult female : Length of the body excluding caudal setae is 0.5 mm. and width 0.27 mm. The body (Fig. 1A) is robust with a globose cephalosome. The epimeral areas of the 3rd and 4th pedigerous segments are even. The urosome is half the length of the prosome. The first urosomal segment is small with two lateral prominences. Each prominence (Fig. 1B) is sub-divided into a large upper lobe and a small lower lobe. The genital segment is conical with diverging lateral margins. An ovisac of irregular shape is attached on either side and reaches about the level of the longest caudal seta. There are 3 post genital segments of which the first two are about equal while the third is the longest. The caudal rami are short bearing four terminal setae.

The antennule (Fig. 2F) is 7-segmented. The second segment is the longest and the terminal the shortest. The setal armature is 1, 6, 2, 3, 2, 2, 3, respectively, counting from proximal to distal segments.

The antenna (Fig. 2G) is 4-segmented of which the second is the longest and the third the shortest. The first segment bears one seta on its inner distal corner and the second segment bears another arising within the distal 1/3. The lateral margins of the 3rd segment are wavy and the protruded portion of this segment bears two

* Host not identified.

equal setae. The fourth segment converges distally ending in two subequal strongly recurved claws. Two equal setae are borne on the outer distal corner of this segment.

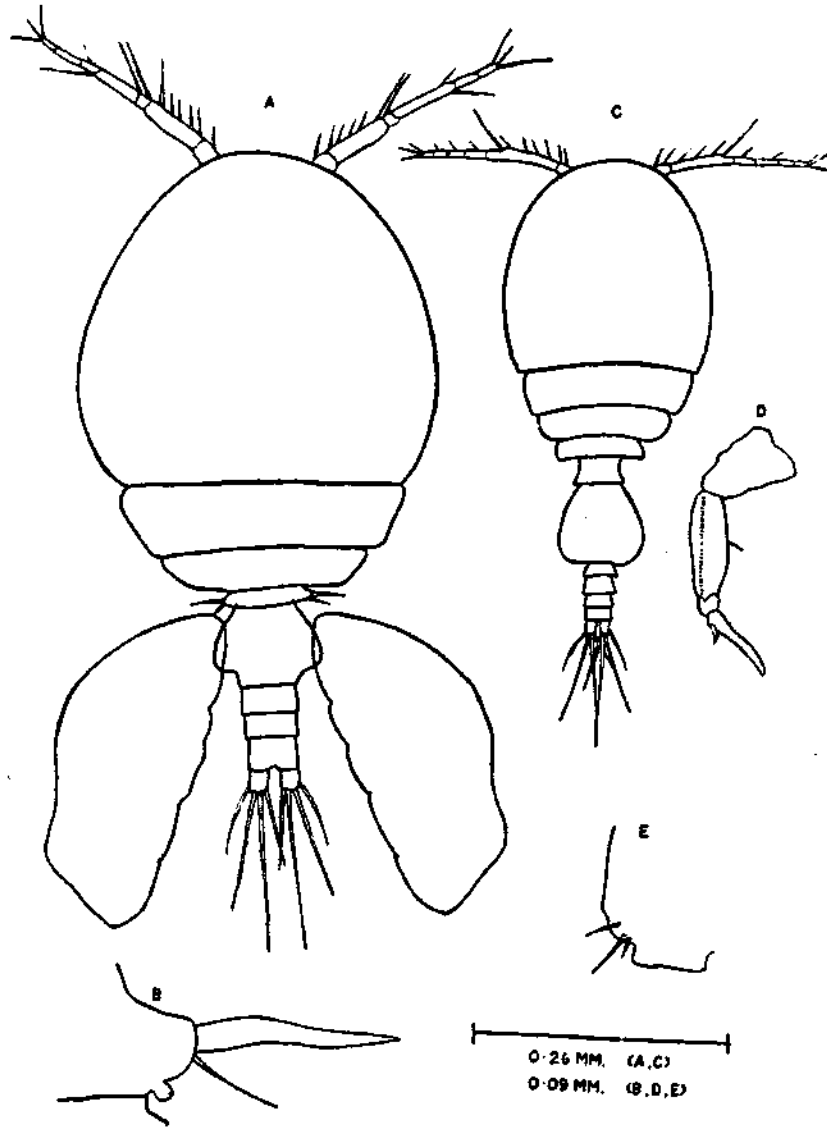


FIG. 1. *Pseudanthessius madrasensis* n. sp.

A. Adult female, B. 1st urosomal segment and 5th leg of female, C. Adult male, D. Male maxilliped, E. Male 6th leg.

The maxilla (Fig. 2I) is 2-segmented. The proximal segment is broad while the distal is narrow. The second segment bears a short lash terminally at the base of which are 3 short spinules. There is another seta with spinulose flange on the inner lateral margin.

The maxilliped (Fig. 2H) is 2-segmented. The second segment is smaller bearing two claw like processes.

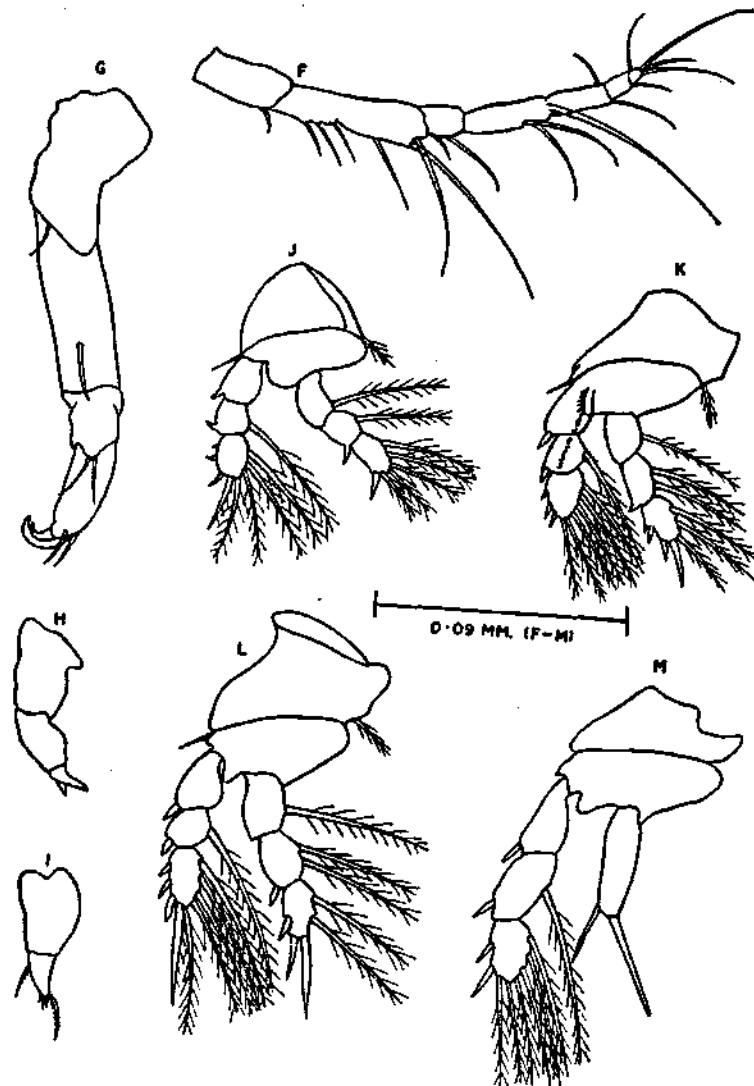


FIG. 2. *Pseudanthessius madrasensis* n. sp. (adult female)

F. Antennule, G. Antenna, H. Maxilliped, I. Maxilla, J-M. 1st to 4th legs.

The four swimming legs (Fig. 2J-M) each consists of a 2-segmented protopod (coxa and basis), a 3-segmented endopod (1-segmented in leg 4) and a 3-segmented exopod of approximately similar lengths. The distribution of articulated spines and setae are shown in Table 1. The articulated spines are all sheathed and the setae are all plumose except for that on the outer margin of the basis. A process situated terminally on each exopod may be regarded as either a long spine or a short

seta and is sheathed on its outer and plumose on its inner margin, as shown by asterisk in the table. In addition to these, the exopod of the second leg bears a long row of small spinules. The spines on the exopod of leg 1 are not articulate and project upwards. Similarly the spine on the 2nd endopod segment of leg 2 is not articulate but curved. The fifth legs (Fig. 1B) are represented by a strong spine. The spines on the 3rd exopod segment of leg 1 are small and curved upwards. The first and second segments of the exopod of leg 2 bear a row of denticles.

The adult male : The adult male (Fig. 1C) measures 0.37 mm. in length and 0.15 mm. in width. It is smaller than the female and differs in the structure of the genital segment, in the structure of the maxilliped (Fig. 1D) and in having an additional post-genital segment.

Remarks : In the key provided by Stock, Humes and Gooding (1963), the new species can be traced to couplet 5 in which the caudal ramus is about as long as wide as in *P. pectinifer*. The new species differs from *P. pectinifer* in the size and shape of the body, the genital segment, the first urosomal segment, in the armature of the antenna in the female. The setal formula generally agrees with *P. pectinifer* but for slight differences in the armature of the terminal setae and spines of the exopods. The first two segments of the exopod of the 2nd leg have a row of denticles in the new species.

Pseudanthessius minutus n.sp.

Material : 4 non-ovigerous adult females and 1 adult male, one immature male and one immature female collected from 7 tunicates in the Madras harbour on 26th March, 1964.

Types : One holotype non-ovigerous (adult female) and one immature female have been deposited in the National collections of the Zoological Survey of India, Calcutta.

Adult female : Length 0.65 mm. width 0.4 mm. The body (Fig. 3A) is robust with a wide globose cephalosome and short urosome. The epimeral areas of the first two metasomal segments are rounded. The third metasomal segment is short and becomes confluent with the first urosomal segment which is distinctly angular in lateral outline. The genital segment is moderately bulged and equals the combined length of the post genital segments. The caudal rami are short with five terminal setae of which the second (from inside) is the longest.

The antennule (Fig. 4C) is 7-segmented. The second segment is the longest and the terminal the shortest. The setal armature is 2, 7, 2, 3, 3, 1, 5 respectively, from 1st to 7th segment.

The antenna (Fig. 4F) is 4-segmented of which the second is the longest and the 3rd the shortest. The first segment bears one seta on its inner distal corner and the second segment bears one arising from the middle. The third is of somewhat triangular shape bearing one seta distally. The fourth segment is narrow distally bearing 2 subequal claws at its tip. One prominent seta arises from about the distal 1/3 of this segment.

The maxilla (Fig. 4J) is a single large segment with a tapering distal portion bearing a long lash. Two prominent spinules are present subterminally at about the origin of the lash.

The maxilliped (Fig. 41) possesses two well developed segments. The process representing a third segment or a claw is bifurcated into two subequal angular processes.

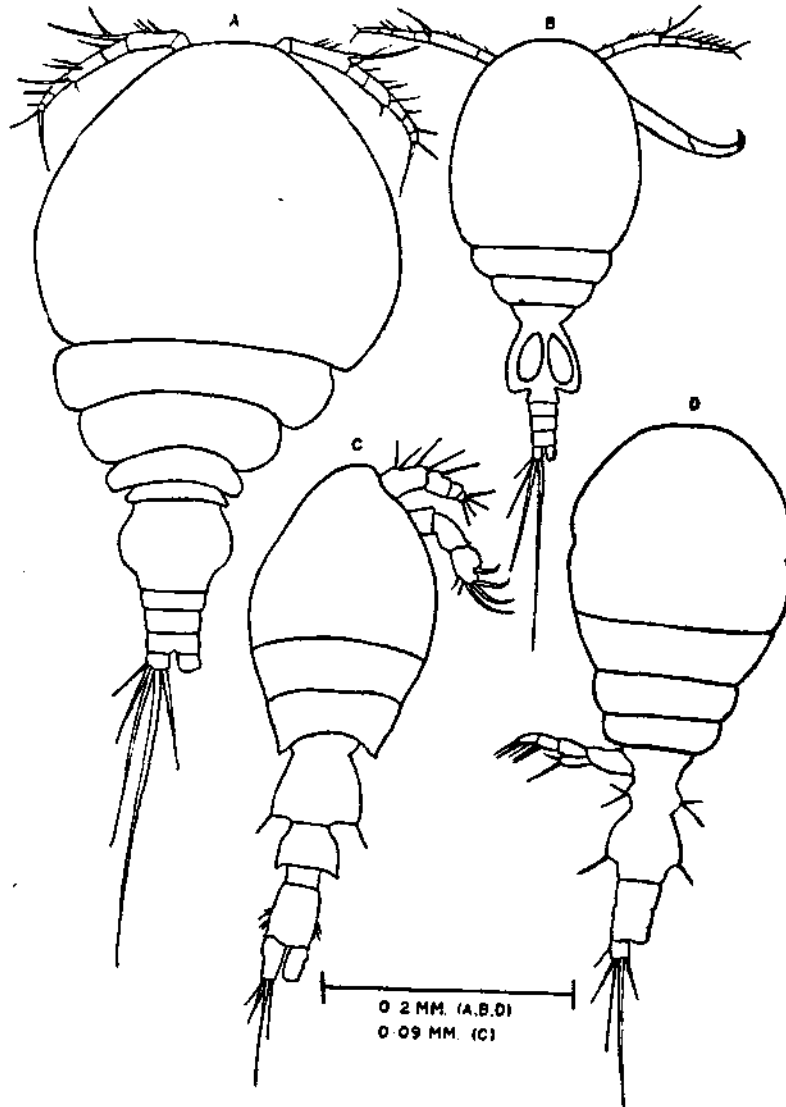


FIG. 3. *Pseudanthessius minutus* n.sp.

A. Adult female, B. Adult male, C. Immature male (copepodid II), D. Immature female (copepodid IV).

Of the four swimming legs, legs 2 to 4 have been studied. The 1st leg was lost during dissection and owing to lack of sufficient material it could not be studied. Each of leg 2 to 4 (Fig. 2L-N) consists of a 2-segmented protopod (coxa and basis), a three-segmented endopod and a 3-segmented exopod of similar lengths. The

distribution of articulated spines and setae is summarised in Table I. The articulated spines are all sheathed and the setae plumose.

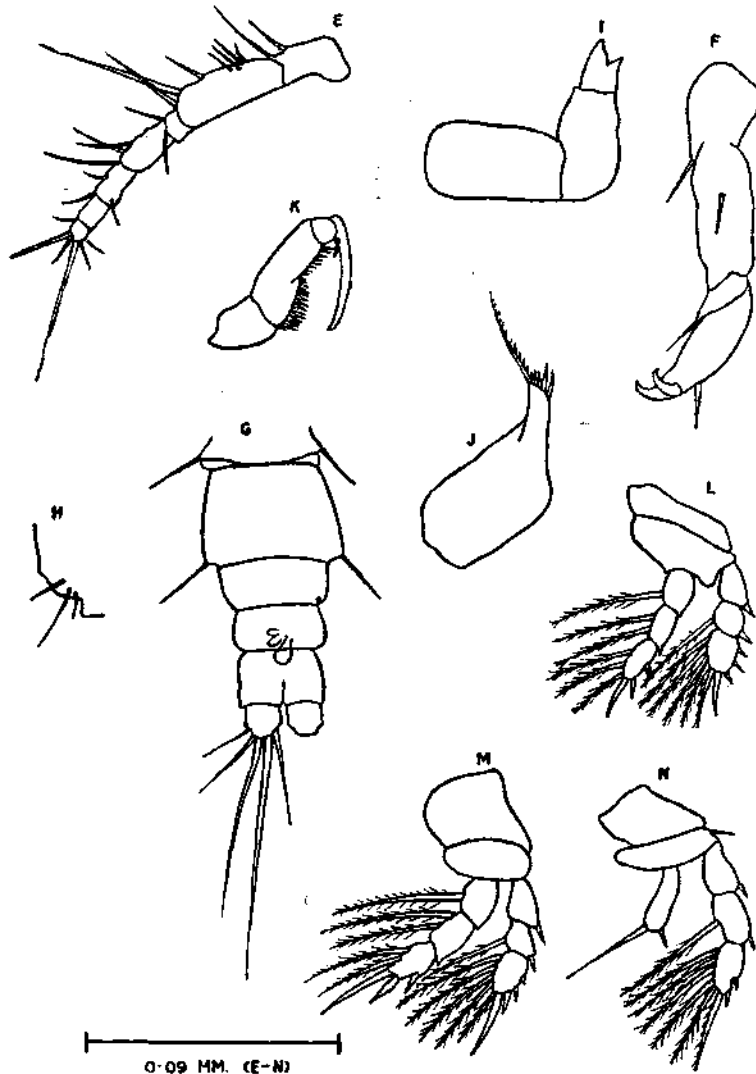


FIG. 4. *Pseudanthessius minutus* n.sp. (adult female)

E. Antennule, F. Antenna, G. Urosome, H. 6th legs, I. Maxilliped, J. Maxilla, K. Maxilliped of male, L-N. 2nd to 4th pair of legs.

The fifth pair of legs (Fig. 4G) are represented by a spine and a long thin seta arising from a protruded portion of the genital segment. The spine may have been lost during dissection and is not shown in the figures. The sixth pair of legs (Fig. 4H) are represented by 3 small unequal setae (of which the middle is the longest) which arise from the postero-lateral corner of the genital segment.

TABLE I
Pseudanthessius madrasensis n.sp.

| | Protopod | | | | Exopod | | | | | | Endopod | | | | | | | |
|--------------------------------------|----------|----|----|----|--------|----|----|----|----|-----|---------|----|----|----|----|----|----|----|
| | Si | Se | Si | Se | Si | Se | Si | Se | Si | St | Se | Si | Se | Si | Se | Si | St | Se |
| P1 | 1 | 0 | 0 | 1 | 0 | I | 1 | I | 4 | 1* | III | 1 | 0 | 1 | I | 3 | 2 | I |
| P2 | 1 | 0 | 0 | 1 | 0 | I | 1 | I | 4 | 2 | III | 1 | 0 | 2 | 0 | 3 | I | II |
| P3 | 1 | 0 | 0 | 1 | 0 | I | 1 | I | 4 | II* | III | 1 | 0 | 2 | 1 | 2 | II | I |
| P4 | 0 | 0 | 0 | 0 | 0 | I | 1 | I | 4 | 2 | II | — | — | — | — | — | I | I |
| <i>Pseudanthessius minutus</i> n.sp. | | | | | | | | | | | | | | | | | | |
| P2 | 0 | 0 | 0 | 0 | 0 | I | 1 | I | 4 | 2 | III | 1 | 0 | 2 | 0 | 3 | I | II |
| P3 | 0 | 0 | 0 | 0 | 0 | I | 1 | I | 5 | 1 | III | 1 | 0 | 2 | 0 | 2 | II | I |
| P4 | 0 | 0 | 1 | 0 | 0 | I | 1 | I | 5 | 1 | II | — | — | — | — | — | II | — |

[Articulated processes (spines and setae) on the swimming legs spines are denoted by Roman, setae by Arabic numerals. P1 - P4 : 1st - 4th swimming legs, Si, St and Se, inner; terminal and outer margins of segments. Numerals marked * include process intermediate between a spine and a seta.]

The adult male : The male (Fig. 3B) is smaller than female measuring 0.42 mm. in length and 0.2 mm. in width. It differs from the female in the shape of the genital segment, in the number of post genital segments and in the structure of the maxilliped. The maxilliped (Fig. 4K) is 3-segmented with a strong terminal claw. The second segment is ornamented with long spinules on its inner margin.

The copepod stages : Very little information is available on the copepodid stages of *Pseudanthessius* but for a brief reference on the copepodids III, IV and V of *P. pectinifer* by Stock, Humes and Gooding (1963). Two stages of *P. minutus* n. sp. collected from the same host have been described below.

The immature male : (Fig. 3C) The immature male measures 0.24 mm. in length and about 0.1 mm. in width. The prosome equals the length of the urosome. Two metasomal segments are developed of which the second possesses free lateral tergites. The genital segment has the same shape as in the adult male. There are three post genital segments and the first post genital segment resembles that of the genital segment but smaller. The second post genital segment is the smallest possessing parallel lateral margins. The third post genital segment is long possessing 3 spinules on right lateral margin and two groups of 2 spinules each on the left lateral margin. This segment becomes sub-divided later into 2 segments, thus making a total of 4 post genital segments in the adult. The caudal rami are longer than broad and possess 3 terminal setae. The sub-terminal setae are not yet developed.

Only the 3rd and 4th pairs of single segmented legs are developed. The antennule is 4-segmented with the first possessing 3 setae, the second 2 setae and the fourth 4 setae. The antenna is 3-segmented. The third segment is sub-divided with a proximal wider part bearing one curved seta and the distal portion bearing 2 long claws, one long seta and 2 short setae, as shown in the figure.

The structure of stage III described by Stock, Humes and Gooding (1963, p. 22) appears more advanced than the present stage in having 2 more antennular segments, in possessing biramous legs with 2-segmented rami for 1st to 3rd legs and single-segmented rami for leg 4. In other respects both are similar. It is therefore considered that the present form may belong to stage II and since this shows considerable difference in the structure of the urosome of stage V female described below (Fig. 1D), this is provisionally considered as belonging to male.

The immature female : The immature female (Fig. 3D) measures 0.5 mm. in length and 0.23 mm. in width. The prosome is more rounded in front and the segmentation of the body is nearly complete. The sutures demarcating the three post genital segments are not yet formed but the division is obvious as indicated by the lateral furrows. The fourth metasomal segment is short and from it the fully formed 4th leg, extends out laterally and develops horizontally. The first urosomal segment is distinct and separate with two lateral prominences, each bearing a thin spine and a seta, representing the 5th leg. The genital segment is of slightly different shape from the adult and the 6th legs are borne on the two lateral prominences.

This form generally agrees with the description of stage V described for *P. pectinifer* but the abdominal segments of copepodid V of the new species, though formed, are not clearly readable.

Remarks : *P. minutus* is closely allied to *P. madrasensis*. The differences are marked, however, in the shape of the cephalosome, and the genital segment in the

female. The position of the antennule in relation to the cephalosome as inclined upwards in *P. madrasensis* and inclined downwards in *P. minutus* is a consistent feature of difference. There are further differences in the setation of the antennule and the armature of the male maxilliped. Though the ornamentation of the swimming legs is similar in both species, in *P. minutus* however, the outer spines on the exopod of the leg 4 are remarkably smaller.

SUMMARY

Two species of *Pseudanthessius*, namely, *P. madrasensis* and *P. minutus* obtained from crinoids and tunicates respectively from Madras harbour have been described. The immature stages (copepodids II and IV) of *P. minutus* have been described and compared with those of *P. pectinifer*, which appears to be closest from among the described species.

REFERENCES

- HUMES, A. G. 1966. *Pseudanthessius procurrans* n. sp., a cyclopoid copepod associated with a cidarid echinoid in Madagascar. *Breviora*, no. 246 : 1-10.
- HUMES AND HO. New cyclopoid copepods associated with polychaete annelids in Madagascar. *Bull. Mus. Comp. Zool.* (In Press).
- STOCK, J. H., HUMES, A. G. AND GOODING, R. U. 1963. Copepoda associated with West Indian invertebrates IV. The genera *Octopicola*, *Pseudanthessius* and *Meomicola* (Cyclopoida, Lichomolgidae). *Studies Fauna Curacao and other Caribbean Islands*, 18 (77) : 1-74.