

PROCEEDINGS
SYMPOSIUM ON CRUSTACEA

HELD AT
ERNAKULAM
FROM JANUARY 12 TO 15, 1965

PART I



SYMPOSIUM SERIES 2

MARINE BIOLOGICAL ASSOCIATION OF INDIA
MARINE FISHERIES P.O., MANDAPAM CAMP
INDIA

DESCRIPTION OF TWO SPECIES OF CYCLOPOID COPEPODS, *PSEUDANTHESSIUS ANORMALUS* N. SP. AND *P. BREVICAUDA* N. SP.*

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ABSTRACT

The genus *Pseudanthessius* contains twenty-two species. Two additional species, *P. anormalus* n. sp. and *P. brevicauda* n. sp. are described in the present communication.

The most salient features of *P. anormalus* n. sp. are given below: (i) Genital segment is slightly broader than long, the narrow posterior division being very short compared to the anterior broad division. (ii) Caudal ramus is slightly broader than long and is distinctly shorter than last urosomal segment. (iii) Endopod of fourth leg is slightly swollen in the proximal half but does not display any notch or knob. (iv) Fifth leg consists of a very highly reduced spine seen only from the ventral side and two unequal setae, one of which is jointed at base.

P. brevicauda n. sp. is diagnosed as follows: (i) First prosomal segment is very large and broader than long. (ii) Second and third segments gradually diminish both in length and width and produced backwards at their postero-lateral corners. (iii) Last prosomal segment is short and overlapped partly by the preceding segment. (iv) Caudal ramus is very short, length and width being subequal. (v) Cephalosomal appendages are stoutly built, especially maxillule and maxilla. (vi) The endopod of fourth leg is half as long as exopod. Its inner margin is broken by notches, one at one-third and the other at two-third lengths. (vii) Fifth leg consists of a spindle-shaped spine and two setae. (viii) The proximal half of genital segment is broad and its width is only a little less than the length of the segment.

ACCORDING to the original definition of Claus (1889) the genus *Pseudanthessius* is characterised by the rudimentary condition of the last pair of legs. The reduction of the endopod of the fourth leg and the weak development of some of the mouth parts were recognised by some of the later authors (see Sars, 1917). The last two features, however, were noticed in varying degrees in some related genera also, leading to ambiguity as to the clear distinctions of the genus. Stock *et al.* (1964) in a recent review say that *Pseudanthessius* represents those lichomolgids in which the maxilla and the female maxilliped are weakly armed; the endopod of fourth leg is unimerous and bears two elements only, both terminal; and fifth leg lacks a free segment.

The genus *Pseudanthessius* comprises twenty-two species. The present communication contains two new species bringing the total to twenty-four. *Pseudanthessius anormalus* n. sp. and *P. brevicauda* n. sp. are close to *P. pectinifer* (Stock *et al.*). These three species have the caudal rami as wide as long. The other members of the genus *Pseudanthessius* have their caudal rami at least twice as long as broad. The differences between *pectinifer*, *anormalus* and *brevicauda* are presented in Table I.

The three species also differ in their host preferences. *P. pectinifer* is obtained from the washings of the sea biscuit, *Clypeaster rosaceus* in shallow water; *P. anormalus* from sponge washings; and *P. brevicauda* from the washings of littoral weeds. However, no specificity of hosts has been established.

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TABLE I

Structural differences between Pseudanthessius pectinifer, P. anormalus and P. brevicauda

<i>P. pectinifer</i>	<i>P. anormalus</i>	<i>P. brevicauda</i>
First prosomal segment longer than broad.	First prosomal segment broader than long.	First prosomal segment as long as broad.
Distal segment of maxilliped as large as the proximal with an obtuse terminal complex.	Distal segment of maxilliped half the size of the proximal segment with sharp but small spines.	Similar to <i>P. anormalus</i> .
Endopod of fourth leg is of approximately the same width throughout, with the exception of a small spinous construction near the middle of each side.	Endopod of fourth leg is slightly smaller in the proximal half, but does not display any notch or knob.	The inner margin of fourth endopod is broken by notches, one at one-third and the other at two-third lengths.
Fifth leg is represented by two setae and a smoothly elongated spine.	Fifth leg consists of a very highly reduced spine seen only from the ventral side and two unequal setae, one of which is jointed at base.	Fifth leg consists of a spindle-shaped spine and two fragile setae.

Pseudanthessius anormalus n. sp.

Material examined: Twenty-five females of this copepod were gathered from the sponge washings at the Gulf of Mannar on 19th October 1960. Holotype female and paratypes are deposited in the Reference Collection Museum of the Central Marine Fisheries Research Institute, Mandapam Camp, and bear the register numbers J. 763/26 and J. 764/26 respectively.

Descriptive notes: The specific name of this form is derived from the structure of the fifth pair of legs, caudal rami and the genital segment. These structures are found to show great deviations from what is generally observed for other species of this genus.

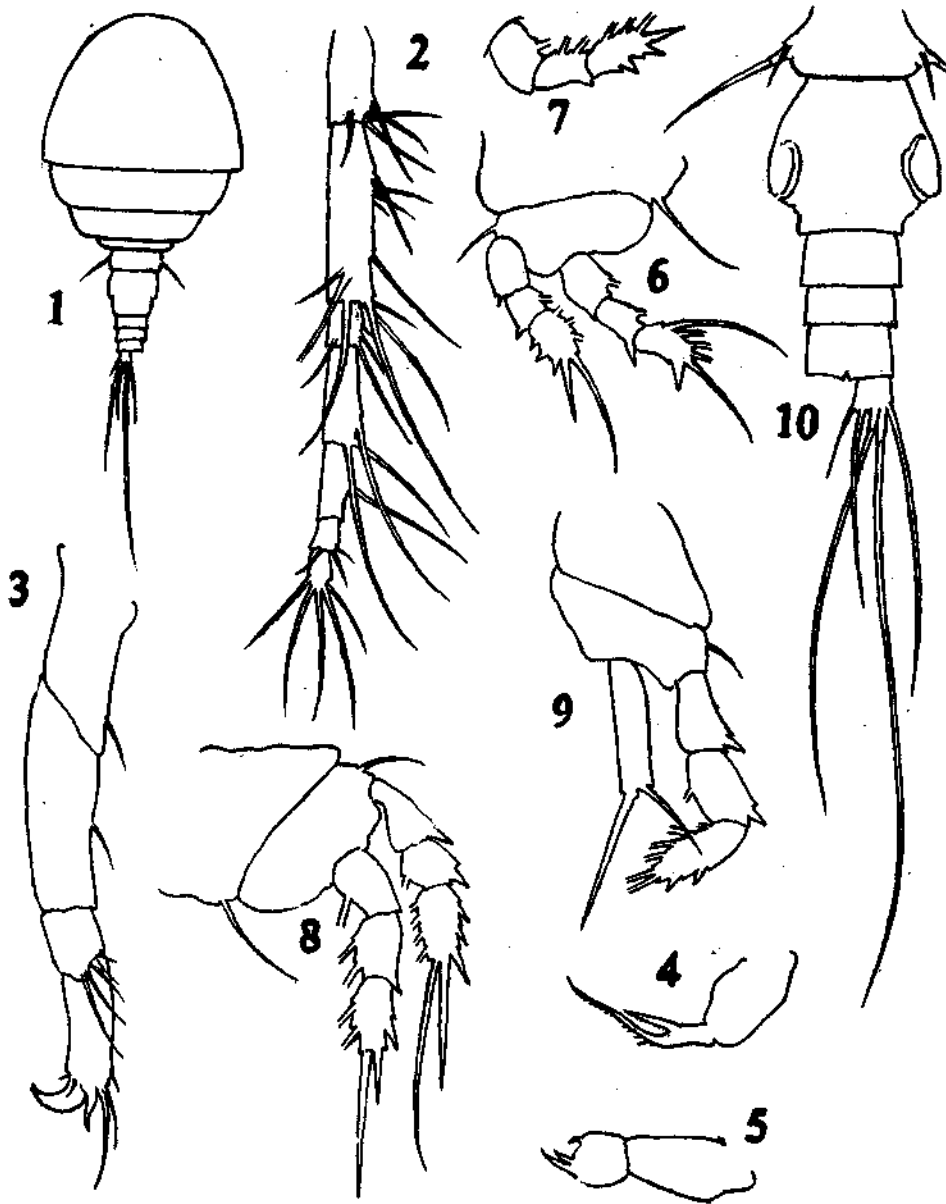
FEMALE: Prosome (Fig. 1) is broadly oval, cephalosome contributing more than half the total. Posterior margin of cephalosome is the widest part of body, next three free metasomal segments diminishing in length and width successively backwards. Urosome (Fig. 10) is 5-segmented, first segment bearing the fifth pair of legs. Genital segment is very broad and its length exceeds that of the abdominal segments combined. The narrower posterior division of the genital segment is very short compared to the broad anterior part. Caudal rami are peculiar. They are hardly as long as broad and are distinctly shorter than the last abdominal segment. Caudal setae are fairly long, the middle two setae being jointed near their base.

Antennule (Fig. 2) is 7-segmented, segments showing the following relative lengths:

1	2	3	4	5	6	7
16.5	30.7	8.0	17.0	14.2	6.8	6.8 = 100

Antenna (Fig. 3) is 4-segmented, terminal segment bearing two spines and a few setae. First and second segments are each with a single small seta and the third with two setae and several hairs. Mandible and maxillule show little peculiarities. In the maxilla (Fig. 4) both the terminal lappet and the process just behind it carry spinules on their anterior margin. Maxilliped (Fig. 5) is

apparently 2-segmented, the first segment is naked, the second carries one seta in the middle of its posterior margin and two stout spines on its innermost part (actual apex of the appendage).



FIGS. 1-10. *Pseudanthessius anormalus* n. sp. Female: (1) Dorsal view; (2) Antennule; (3) Antenna; (4) Maxilla; (5) Maxilliped; (6) First leg; (7) Second endopod; (8) Third leg; (9) Fourth leg; (10) Urosome with fifth legs.

Swimming legs (Figs. 6-8) are, on the whole, typical of the genus. The 1-segmented endopod of the fourth leg (Fig. 9) is slightly swollen in the proximal region, but no knob or notch is

present. The second endopod segment of first, second and third legs is produced at its outer distal angle into a beak-like structure. The following is the ornamentation of the swimming legs:

	Protopod						Endopod						Exopod					
	1		2		1		2		3		1		2		3			
	Si	Se	Si	Se	Si	Se	Si	Se	Si	St	Se	Si	Se	Si	Se	Si	St	Se
P ₁	1	0	0	1	1	0	1	0	4	1	I	0	I	1	I	4	I	III
P ₂	..	1	0	0	1	1	0	2	0	3	I	II	0	I	1	I	5	I
P ₃	..	1	0	0	1	1	0	2	0	2	I	II	0	I	1	I	5	I
P ₄	..	1	0	0	1					II			0	I	1	I	5	I

Fifth legs are rather modified; the spine is very much reduced and is seen only if observed ventrally; on the upper and lower sides of this reduced spine are borne two setae, the much longer lower one being jointed at base. Size: 0.75 mm.

MALE: Unknown.

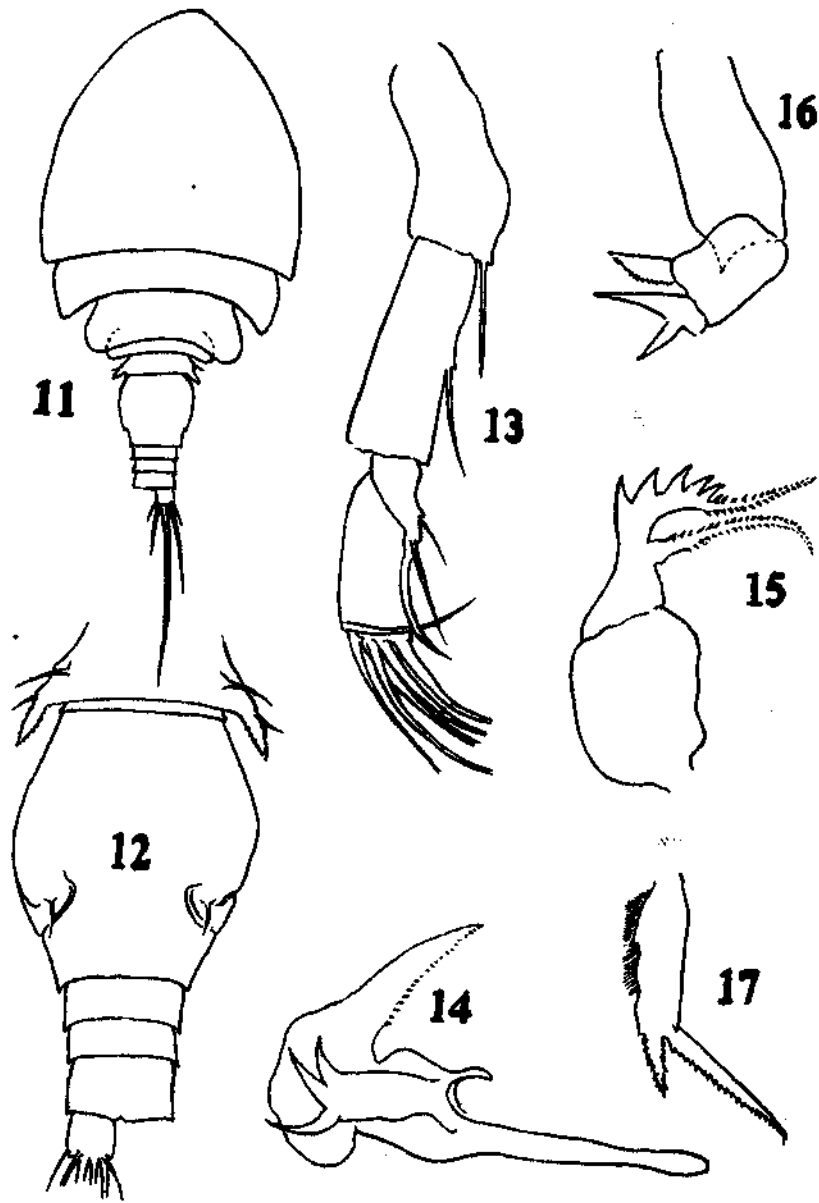
Pseudanthessius brevicanda n. sp.

Material examined: Four females of this copepod were obtained from washings of the littoral weeds from the Gulf of Mannar on 3rd November 1960. Holotype and paratypes are deposited in the Reference Collection Museum of the Central Marine Fisheries Research Institute, Mandapam Camp, and bear the register numbers J. 765/27 and J. 769/27 respectively.

Descriptive notes: The specific name of this species has reference to the very short caudal rami.

FEMALE: Prosome (Fig. 11) is large and ovoid and very distinctly demarcated from the urosome. First pedigerous segment is fused with the cephalosome and the combined cephalothorax is broader than long; it is the widest part of the prosome. The next two segments diminish gradually both in length and width. The postero-lateral corners of both these segments are prolonged backwards. The last prosomal segment is very small and is partly overlapped by the preceding segment. The first urosomal segment (Fig. 12) is normal. The genital segment is swollen in the anterior half but the demarcation between the two parts is not very pronounced. Guarding the genital apertures there is a pair of sharp spines. The next three urosomal segments are small and their combined length is just half that of the genital segment. Caudal ramus is short, nearly as long as broad.

Antennule is 7-jointed and similar to that of the preceding species. Antenna (Fig. 13), mandible, maxillule (Fig. 14), maxilla (Fig. 15) and maxilliped (Fig. 16) are as illustrated. They do not show many peculiarities except that they are stoutly built. In the antenna the third segment is exceedingly short. Mandible has a chitinous rod-like process extending postero-laterally; the distal end of the process shows fine denticulation. The terminal spines of the maxillule are strong and broad-based. In the maxilla the teeth on the apical lash are very strong, somewhat like those in species of *Macrochiron*.



FIGS. 11-17. *Pseudanthessius brevicauda* n. sp. Female; (11) Dorsal view; (12) Urosome with fifth legs; (13) Antenna; (14) Mandible and maxillule; (15) Maxilla; (16) Maxilliped; (17) Fourth endopod.

Ornamentation of the swimming legs is presented below:

	Protopod						Endopod						Exopod					
	1		2		1		2		3		1		2		3			
	Si	Se	Si	Se	Si	Se	Si	Se	Si	St	Se	Si	Se	Si	Se	Si	St	Se
P ₁	1	0	0	1	1	0	1	0	4	1	I	0	I	1	I	4	I	III
P ₂	1	0	0	1	1	0	2	0	3	I	II	0	I	I	I	5	I	III
P ₃	1	0	0	1	1	0	2	0	2	I	II	0	I	I	I	5	I	III
P ₄	1	0	0	1II.....							0	I	1	I	5	I	II

The fourth endopod (Fig. 17) is half the length of the exopod. Its inner margin shows two breaks at equal distances, both accompanied by notches. The first two-thirds of the length of the inner margin are lined with fine setae. Fifth leg consists of a graceful spindle-shaped spine serrated along both margins and two short setae. One of the setae is close to the base of the spine while the other is a little removed. Size: 1.13 mm.

MALE: Unknown.

DIAGNOSTIC CHARACTERS OF *P. anormalus* AND *P. brevicauda*

The more salient features of *P. anormalus* n. sp. are given below: (i) Genital segment is slightly broader than long, the narrow posterior division being very short compared to the anterior broad division. (ii) Caudal ramus is slightly broader than long and is distinctly shorter than the last urosomal segment. (iii) Endopod of the fourth leg is slightly swollen in the proximal half but has no notch or knob. (iv) Fifth leg consists of a highly reduced spine seen only from the ventral side and two unequal setae, one of which is jointed at base.

P. brevicauda n. sp. is diagnosed as follows: (i) First prosomal segment is very large and broader than long. (ii) Second and third segments gradually diminish both in length and width and are produced backwards at their postero-lateral corners. (iii) Last prosomal segment is short and partly overlapped by the preceding segment. (iv) Caudal ramus is very short, as long as broad. (v) Cephalosomal appendages, especially maxillule and maxilla, are robust. (vi) The endopod of the fourth leg is half as long as exopod. Its inner margin is broken by two notches placed at equal distances. (vii) Fifth leg consists of a spindle-shaped spine and two setae. (viii) The proximal half of the genital segment is broad and its width is only a little less than the length of the segment.

ACKNOWLEDGEMENTS

The specimens described above were obtained from the South-east Coast of India while working at the Central Marine Fisheries Research Institute, Mandapam Camp. I wish to extend my sincere thanks to Dr. S. Jones, Director, for his unfailing encouragement and guidance throughout the course of study at the Institute. I also wish to express my gratitude to Dr. S. Z. Qasim, Assistant Director, International Biological Programme, Ernakulam, for his continued interest in the work and many helpful suggestions.

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