

STUDIES ON INDIAN COPEPODS 10. DESCRIPTION
OF *PARAPELTIDIUM NICHOLLSI* SP N., *PORCELLI-
LIDIUM UNICUS* SP N. AND *ECHINOLAOPHONTE
TROPICA* SP N OBTAINED FROM THE SOUTH
EAST COAST OF INDIA*

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(With 3 text-figures)

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I—INTRODUCTION

The present communication contains the description of three new species of harpacticoids. They are all associated with various algae living in the littoral areas of the Gulf of Mannar and the Palk Bay. No attempt was made to identify the algae since monospecific algal colonies are not generally found in the area. During the several visits to the littoral areas, algae were hand-picked and washed into large beakers. Often the washed out organisms were brought alive to the laboratory for examination. Mostly samples were preserved in 5% formalin immediately after collection. The different species were later sorted out under a binocular microscope. Of the three species dealt with in this paper, *Parapeltidium nichollsi* was represented by a few specimens only, while the other species are abundantly gathered.

I am thankful to Dr. S. Jones, Director, Central Marine Fisheries Research Institute for his encouragements and guidance during the course of this study. My deep gratitude is also due to Dr. A. G. Nicholls of Australia who kindly went through and criticised the systematic parts of this series of study on Indian copepods.

II—SYSTEMATIC ACCOUNT

Parapeltidium nichollsi sp. n.

Material examined.—Six adult females and five adult males of this species were collected from washings of littoral weeds from the Palk Bay at Mandapam on 19th July, 1960. The holotype, allotype and paratypes are deposited in the Reference Collection Museum of the Central Marine Fisheries Research Institute and bear the register numbers J. 673/16, J. 674/16 and J. 675/16 respectively.

Descriptive notes—Female.—Body ovoid, very stout, dead specimens always being as sketched (Text-fig. 1, A & B); apparently six segments; abdomen more or less hidden from dorsal view. First segment widest part of body, only a little less than length of rest of body. Mid-dorsal areas of all segments elevated to moderately sized crests; margins as well as median crests highly chitinised with a beautiful violet tinge. Abdomen 2-segmented, completely covered from dorsal view. Caudal ramus short, twice as long as wide, each ramus carrying one marginal and five apical spine-like setae.

Antennule 7-segmented, very short. First and second segments subequal; third and fourth segments much smaller, each bearing fairly long aesthetascs. Last three segments very small, all carrying a good number of setae except the sixth which has only two setae. Small sensory filaments also distributed on segments. Relative lengths of constituting segments given as below:—

1	2	3	4	5	6	7
35.2	29.0	14.0	7.5	3.4	2.5	8.4

Antenna (Text-fig. 1, C) 3-segmented with a very rudimentary exopod attached to middle of second joint, and with a number of sensory filaments. Mandible and maxilliped resemble those of *P. cristatum* Nicholls. Maxillule and maxilla as in figure (Text-fig. 1, D).

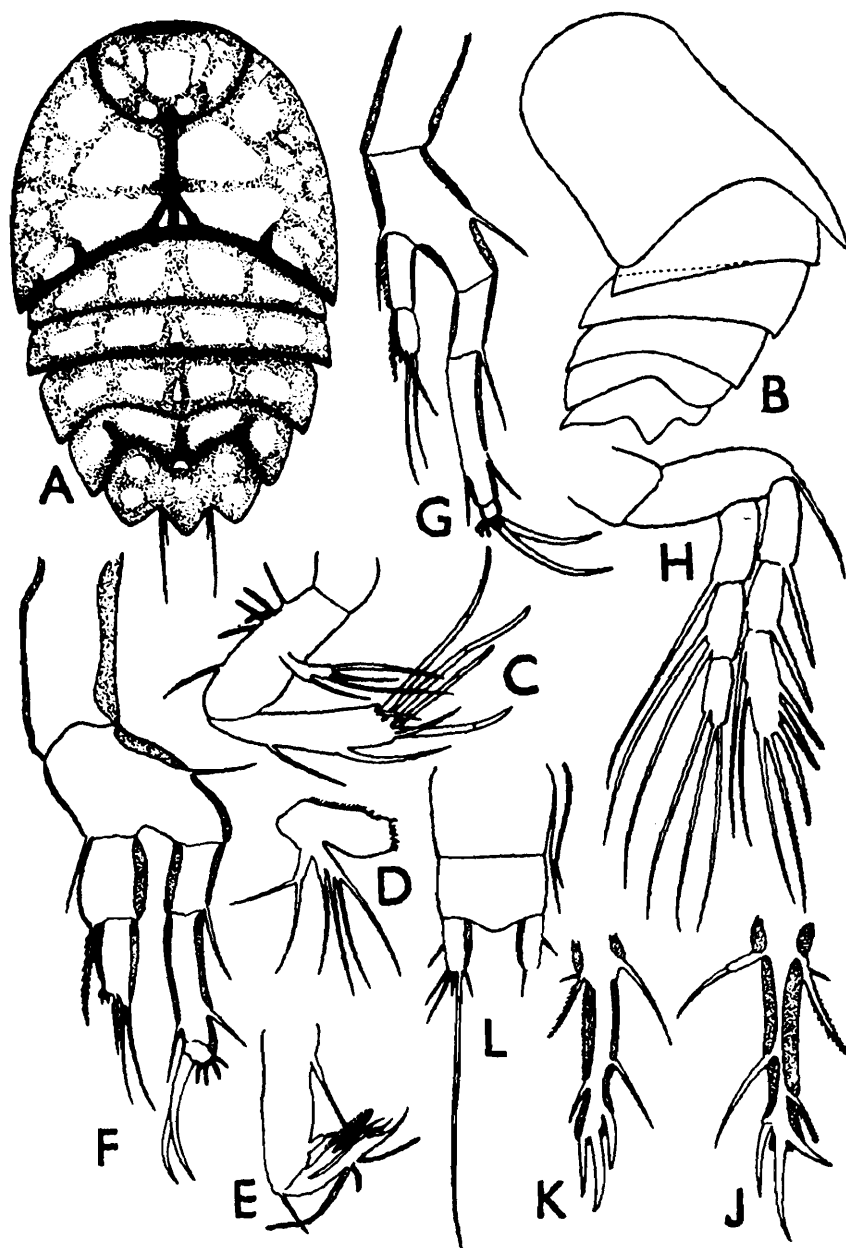
First legs (Text-fig. 1, F) exopod 3-segmented; endopod 2-segmented. Protopod segments long; second segment bearing a seta on outer mid-length and a seta on inner distal angle. Basal exopod segment with a seta on distal inner angle; middle exopod segment with two spines, one on either side, both in distal part; terminal exopod segment provided with two long stout spines and four sensory appendages. Basal segment in endopod carries an inner seta in distal angle; distal segment carries two apical spines and one inner spine; three sensory appendages near the base of latter. Next three pairs of legs (Text-fig. 1, H, J) typical of the genus. Fifth leg (Text-fig. 1, J) 1-segmented. Basal part corresponding to proximal segment of genus *Peltidium* carries, as in that genus, a broad-based seta on outer side. On inner side it carries a spine and seta. Distal part of fifth leg with two spines on outer, two apical and one on inner margin. Fifth legs highly chitinised. Size, 1.35 mm.

Male.—Differs from female in structure of antennule, first pair of legs and also in presence of a sixth pair of legs.

Antennule 7-segmented, with following relative lengths:

1	2	3	4	5	6	7	
30.0	30.0	13.6	8.2	6.4	3.6	8.2	= 100

Segments rather stout and bear larger number of setae than in female. Third and fourth segments, as in female, carry aesthetascs. Protopod segments as well as two rami of first pair of legs (Text-fig. 1, G) much narrower; but with same number of setae and spines as in female, excepting the inner marginal spine of distal endopod segment which is longer and thinner than that of female. Sixth pair



TEXT-FIG. 1 *Prapeltidium nichollsi* sp. n. A. Female dorsal view; B. Female lateral view; C. Female antenna; D. Female maxillulae; E. Female maxilla; F. Female first leg; G. Male first leg; H. Female second leg; J. Female fifth leg; K. Male fifth leg; L. Male sixth leg with urosome.

of legs present; parallel to lateral margins of urosomal segments. (Text-fig. 1, L). Each leg consists of a long, flat strip with two apical setae. Sixth leg just exceeds posterior margin of first urosomal segment. Size, male 1.15 mm.

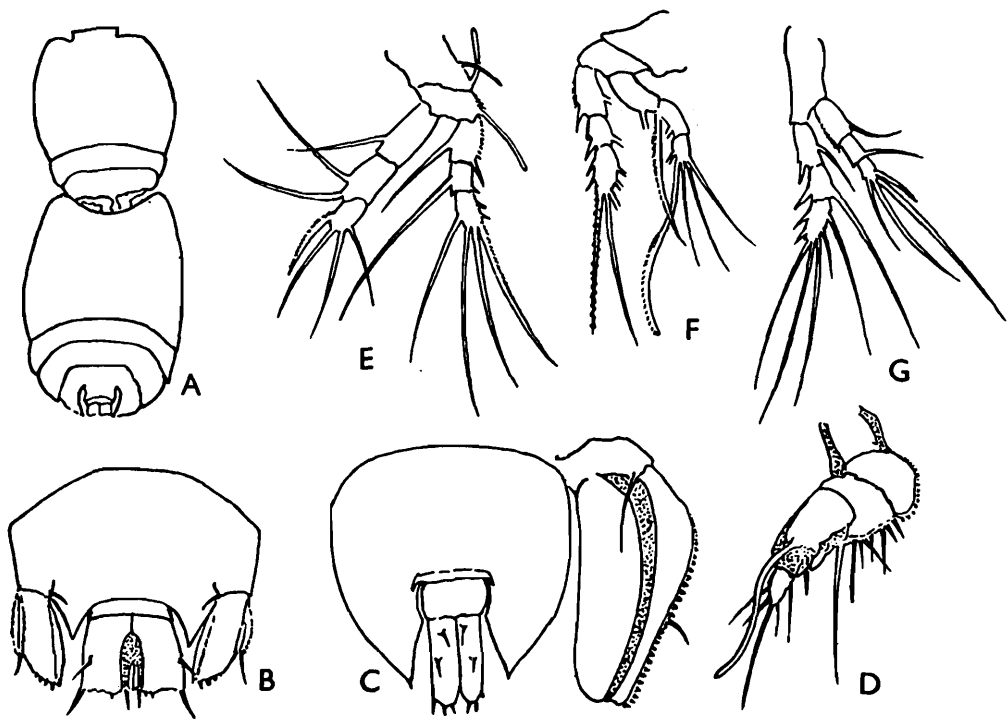
The present species is named after Dr. A. G. Nicholls of Australia whose contributions to the knowledge of the copepod fauna of the Indo-Pacific are valuable.

Porcellidium unicus sp. n.

Material examined.—About two hundred female and one hundred and fifty male specimens of this copepod were obtained from the washings of algae off Vedalai, in the Gulf of Mannar on 16th July, 1960. Holotype, allotype and paratypes are deposited in the Reference Collection Museum of the Central Marine Fisheries Research Institute and bear the registered numbers J. 732/18, J. 749/18 and J. 750/18 respectively.

Descriptive notes—Female.—The yellow colour of this species, bright in life and immediately after killing and faint after a few days of formalin preservation is very peculiar.

Body (Text-fig. 2, A.) elongate, ovate, typically of porcellidiid type with a squared rostrum at anterior side. Ratio of length and breadth of body 1.5:1.0. Second segment as broad as first, but other body segments smoothly narrowed down to posterior side. Genital segment (Text-fig. 2, C) expanded backwards, the expansion reaching three-fourth length of caudal rami. Each such expansion sharply tapers and terminates in a fine spinule. Abdominal segment very short, inserted



TEXT-FIG. 2. *Porcellidium unicus* sp. n. A. Male and young female in paired condition; B. Male urosome with fifth leg; C. Female urosome fifth leg; D. Male antennule; E. Female second leg; F. Female third leg; G. Female fourth leg.

between genital segment and caudal rami. Anterior margin bordered by chitinous band with a stout backwardly directed spine on either end. Caudal rami thin and cylindrical, carrying three setae terminally and two setae ventrally. Antennule, antenna, mandible, maxillule, maxilla, maxilliped and first pairs of legs typical of genus. Next three pairs of legs (Text-fig. 2, E, F, G) remarkable in possessing only two external spines on terminal exopod segments. Ornamentation of three pairs of legs given as 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
P2	0	A	0	A	1	0	2	0	1	2	1	1	I	1	I	2	2	II
P3	0	0	0	0	1	0	2	0	2	2	1	1	I	1	I	3	2	II
P4	0	0	0	0	1	0	I	0	I	2	1	1	I	1	I	3	2	II

Inner setae on terminal segment of second endopod, proximal seta on second segment of third endopod, and terminal seta of terminal segment of same leg modified as in other species of this genus. Inner distal margins of these setae carry a number of sharp bristles giving it a comb-like appearance. Inner setae on second and third segments of fourth endopod modified into spine-like structures with bristles on margins. Fifth leg (Text-fig. 2, C) 2-segmented, rather hexagonal. First segment short, bearing one seta. Distal segment with a pronounced calciferous ridge, running along its entire length, dividing it into two halves. Outer margin of distal segment carries a number of spinules of entire posterior two-third of its length, this spinular area divisible into more or less equal halves by a seta. A number of fine sensory hairs also present on outer margin of distal segment. Size, 0.75 mm.

Male.—General shape of body (Text-fig. 2, A) identical to female, but anterior margin of first prosomal segment highly concave. Posterior end of fifth copepodite female fits very well into this concavity of male. Antennule (Text-fig. 2, D) geniculate and apparently 5-segmented. Fourth segment with an aesthetascope. Segments highly shortened, their margins calcified. Margins of second segment with numerous bristles. Fifth leg very small, 2-segmented. First segment devoid of any seta or spine. Second segment pentagonal, outer margin divisible into proximal and distal halves, former bordered by a thick ridge carrying numerous fine bristles. Distal part with one seta in its proximal part, and three spines in its distal part; margins of these spines not fringed as in other species. In urosome (Text-fig. 2, B) genital and anal segments quite short; former just exceeds anterior margin of latter. Caudal rami short, squarish with three setae on posterior margin and one on ventral face. The sides of rami calcified. Size 0.63 mm.

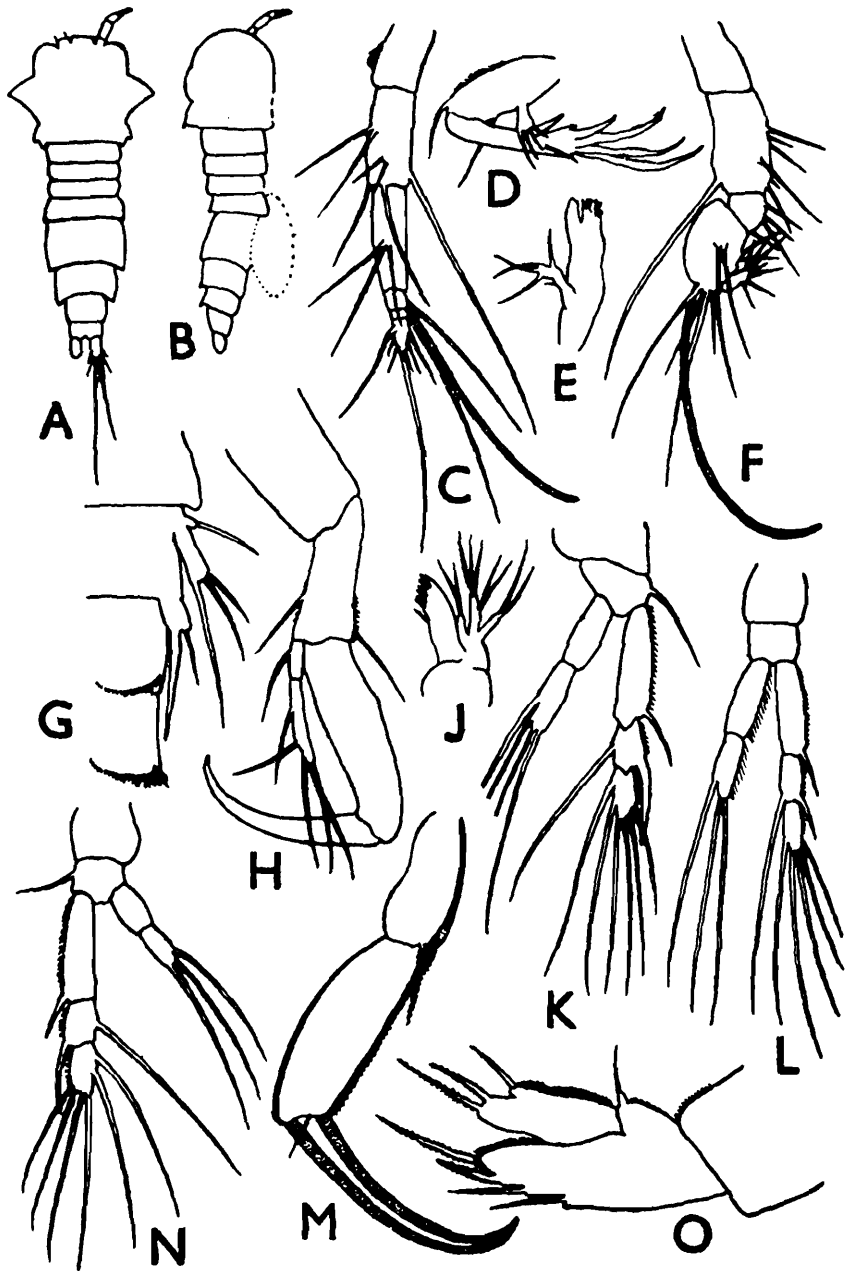
Echinolaophonte tropica sp. n.

Material examined.—Numerous specimens of both sexes of this copepod were collected from the Gulf of Mannar on 3rd July, 1960, from weed washings. The holotype, allotype and paratypes are deposited in the Reference Collection Museum of the Central Marine Fisheries Research Institute and bear the register numbers J. 680/17, J. 681/17 and J. 682/17 respectively.

Descriptive notes. Female.—Cephalosome with (Text-fig. 3, A, B) a tripartite division, anterior, posterior and an intervening middle region with lateral wings. Four pedigerous segments besides cephalosome; first three more or less of equal dimensions, the last one larger than others. Genital segment quite large, much wider than long. Abdominal segments, diminish both in length and width

towards posterior side. Caudal ramus less than twice as long as wide, bearing six setae, two of which much longer than others, and widened in proximal region. In lateral view, posterodorsal margins of cephalosome produced into spines. Similar spine-like projections also noticed in some of prosomal and urosomal segments.

Antennule (Text-fig. 3, C) 6-segmented, fourth segment bearing a fairly long aesthetask. Proportionate lengths of the constituting segments as follows:



TEXT-FIG. 3. *Echinolaophonte tropica* sp. n. A. Female dorsal view; B. Female lateral view; C. Female antennule; D. Female antenna; E. Female mandible; F. Male antennule; G. Male urosome showing fifth and sixth legs; H. Female first leg; J. Female maxillulae; K. Female third leg; L. Female second leg; M. Female maxilliped; N. Female fourth leg; O. Female fifth leg.

1	2	3	4	5	6	
19.2	29.8	31.2	7.1	2.8	9.9	= 100

Antenna (Text-fig. 3, D) 2-segmented; exopod 1-segmented, very

short, with four setae and borne on outer margin of basal antennal segment ; latter bears two setae, one each on its distal outer and inner corners. Second antennal segment bears four apical, one subapical spines, and a small seta in inner distal region ; all spines with a bent appearance, and with serrated medial areas. Mandible (Text-fig. 3, E) quite normal with a masticatory blade and 1-segmented palp. Maxillule (Text-fig. 3, J) and maxilla typical of genus. Terminal claw as Maxilliped characteristically incurved, with setae at distal margins of first and second segments moderately developed. Inner margins of second segment finely ciliated.

In first pair of legs (Text-fig. 3, H) both endopod and exopod biramous ; endopod quite well-developed, basal segment bearing one seta and second segment bearing one terminal claw and an accessory seta. Exopod very fragile, just exceeding half length of basal endopod segment. Five setae on the distal segment, three apical and two outer ; proximal segment bears an outer seta. Basal segment devoid of any seta in Protopod ; proximal segment has a seta on each margin. Ornamentation of swimming legs 2-4 as follows (Text-fig. 3, K, L and N).

	Protopod				Endopod					Exopod						
	1		2		1		2		st	1		2		3		
	si	sc	si	se	si	se	si	se	st	si	se	si	se	si	st	se
P2	0	0	0	1	0	0	2	2	1	0	I	1	I	2	2	II
P3	0	0	0	1	0	0	1	2	0	0	I	1	I	1	2	II
P4	0	0	0	1	0	0	1	2	0	0	I	1	I	2	2	II

Fifth leg (Text-fig. 3, O) very similar to that of other representatives of genus. Proximal segment, quite large, its inner projection reaching almost whole length of distal segment and with a single seta on outer, and four setae on inner margin. Distal segment bears three setae on outer side. Size 0.85-0.95 mm.

Male.—Sexually dimorphic, with modifications in antennule, third, fourth, fifth and sixth legs and urosome. Antennule (Text-fig. 3, F) geniculate apparently 5-segmented. As in female aesthetask borne on the much swollen, thick margined fourth segment. Terminal segment short narrow, but with a large number of setae along its margins. Exopod of third leg very powerfully developed with all joints considerably thickened ; spine very coarse and setae of inner edge short, spiniform. Endopod of third leg of usual structure. Exopod in fourth leg much coarser than in female, setae of inner edge spiniferous. Fifth leg (Text-fig. 3, G) much different from female. Each leg is rectangular in shape ; basal segment indicated by a broad-based seta ; distal segment with unequal seta at apex. Sixth leg also rectangular carrying at its apex two setae, one strong and spine-like. An additional segment in urosome (Text-fig. 3, G) ; genital segment not as large as in female. Size 0.65 — 0.75 mm.

III—SUMMARY

Three new species of harpacticoid copepods, *Parapeltidium nicholli*, *Porcellidium unicus* and *Echinolaophonte tropica* obtained

from the south-east coast of India are described in detail. All the species are represented by both the sexes, and in all cases the usual sexual dimorphism is well expressed. It is further found that the new porcellidiid obtained is very peculiar in that the ornamentation of the swimming legs is unique for the genus.