

SOME NEW INTERSTITIAL HARPACTICOID COPEPODS FROM ANDHRA COAST, INDIA

by

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Résumé

Quelques Copépodes Harpacticoïdes interstitiels nouveaux de la côte d'Andhra, Golfe du Bengale.

L'auteur décrit cinq espèces nouvelles de Copépodes Harpacticoïdes interstitiels, récoltés pendant l'hiver 1968, dans les sables intertidaux de la côte d'Andhra. Ce sont *Hastigerella bengalensis* sp. nov., *Baculopsylla similis* gen. et sp. nov., *Paraleptomesochra wellsi* sp. nov., *Parapseudoleptomesochra* (?) *reductus* sp. nov. and *Sicameira langi* sp. nov.

Introduction

The investigation of interstitial fauna in the beach sands of Waltair coast during the years 1960-1963, has revealed the occurrence of several species of harpacticoid copepods in the intertidal zone (Chandrasekhara Rao, 1967; Chandrasekhara Rao and Ganapati, 1968, 1969 a, b). During a brief faunistic survey of the Andhra coast undertaken by the Zoological Survey of India in November-December 1968, the author had an opportunity of a further study of the intertidal sands on Waltair coast and its environs. Five previously undescribed species of Copepoda encountered in the collections are described in the present paper.

The copepods were collected by washing sand samples with sea water and examined in fresh condition. All the measurements were made with a calibrated eye piece micrometer and the drawings with the use of a camera lucida. The length of specimens was measured between the base of rostrum and the distal edge of anal segment. Specimens of all species, including holotypes, have been deposited with the Zoological Survey of India, Calcutta.

The temperature in the habitat varied from 26°C to 30°C, while the salinity of interstitial water ranged between 28 and 32 p. 1000. The following terminology is used in the text to express the approximate limits of mean grain size of the texture of substrate.

Fine sand: less than 200 μ m. Medium sand: 200-500 μ m. Coarse sand: more than 500 μ m. Fine shell gravel: less than 500 μ m.

FAMILY ECTINOSOMIDAE Sars, 1903

Genus *HASTIGERELLA* Nicholls, 1935*Hastigerella bengalensis* sp. nov. (Fig. 1).

Material

2 ♀♀ (1 ovigerous) specimens collected by the author on 28 November 1968, in coarse sand 20 cm below surface between low and half-tide levels, intertidal zone, Waltair Beach (Lat. 17°42'10"N and Long. 83°20'20"E), Andhra Pradesh, India.

Holotype: ♀, Regd. No. Z S. I. C 980/2.

Description

Female: length 552 μm and 536 μm . Body cylindrical, without demarcation between metasome and urosome; slightly tapers posteriorly. Rostrum prominent, digitiform and defined at base. Cephalosome rectangular and as long as the first two metasome segments united. First three urosome segments longer than those of the metasome. Genital segment with suture, represented by a dorso-lateral strip of chitin. Ovisac single, with five eggs one behind the other. Last segment totally cleft, without anal operculum. Body without surface ornamentation. Posterior edge of all somites, except the last, with a finely divided hyaline frill. Posterior edge of last segment bare.

Caudal ramus longer than broad, with a stout terminal spine and three setae, the middle one being well developed. Outer distal corner with a small seta.

Antennule elongate, six-segmented, terminal segment being the longest. Fourth and terminal segments bear an aesthete each.

Antenna with a distinct basis. First endopod segment bare. Second segment with spinules on outer edge, two inner and five terminal setae. Exopod two-segmented, each with a terminal seta.

Mandible with cutting edge tetradentate. Coxa-basis elongate, with a terminal seta. Endopod elongate, shorter than coxa-basis, with two inner and four apical setae. Exopod small, with three setae.

Maxillule with pre-coxal arthrite bearing three apical spines. Coxa and basis confluent, with two terminal setae. Exopod and endopod represented by two and three setae respectively.

Maxilla with syncoxa bearing two minute endites, each carrying one and two setae respectively. Basis with a small plumose spine at the base on the inner side. Endopod minute, with two long terminal claws and three setae.

Maxilliped elongate and thin. Basis bare. First endopod segment with inner marginal setules. Second segment with one inner and two terminal setae.

P1-P4 with coxa bare. Basis with an outer seta. Both rami three-segmented, endopod being longer than exopod. Segments elongate, with spinulose outer edge. Exopod of P2-P4 with two, one and three hastate setae respectively. Setal formula as below.

	Exp.			Enp.		
P1	0	0	022	1	1	120
P2	0	1	122	1	1	120
P3	0	0	122	1	1	120
P4	1	1	122	1	1	120

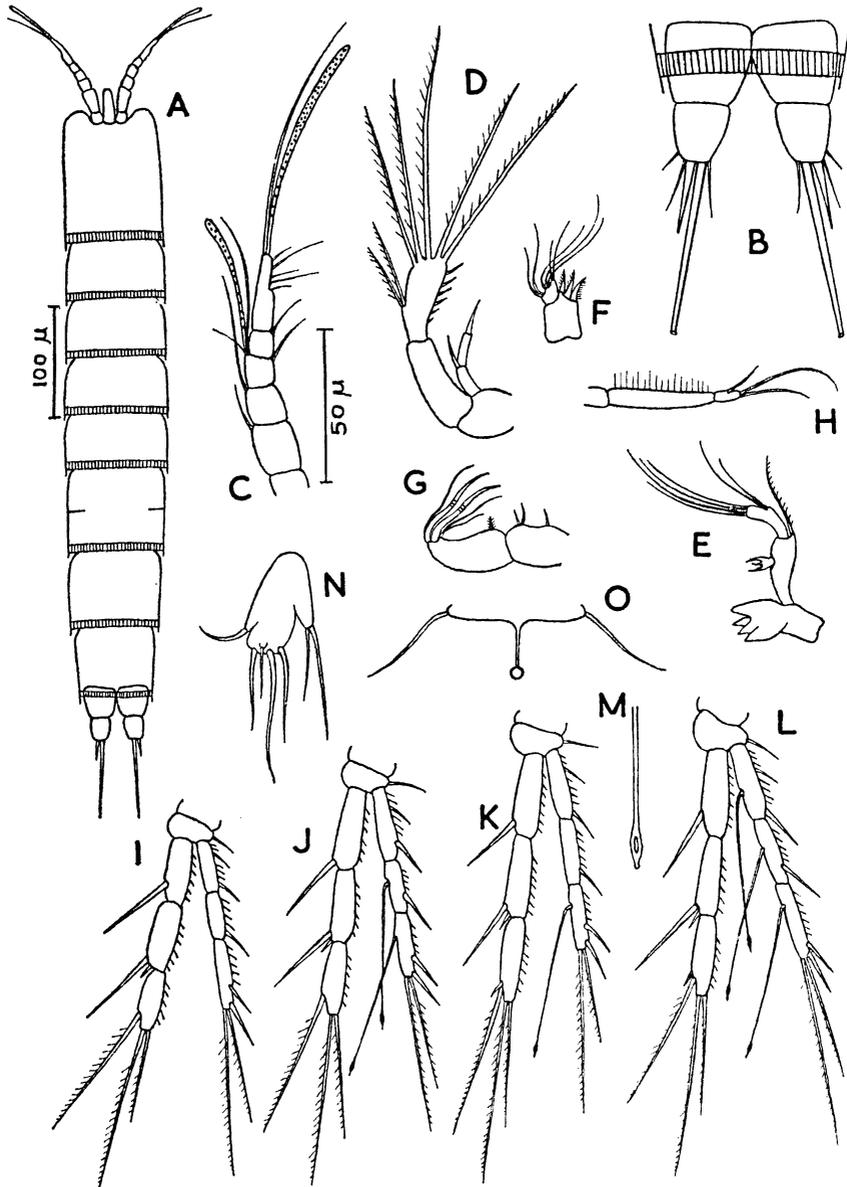


FIG. 1

Hastigerella bengalensis sp. nov., female.

A: adult, dorsal; B: caudal furca, dorsal; C: antennule; D: antenna; E: mandible; F: maxillule; G: maxilla; H: maxilliped; I: P₁; J: P₂; K: P₃; L: P₄; M: has-tate seta, distal; N: P₆; O: genital field.

P5 with both rami totally confluent, but showing a cleft between the inner expansion of basendopod and exopod. Inner expansion of basendopod with two terminal setae. Outer expansion with a seta. Exopod with three terminal setae and an accessory seta near the distal end.

Genital field as figured.

Male: unknown.

Remarks

The genus *Hastigerella* has been redefined by Lang (1965, p. 10). Among the known species, the new species approaches *H. palpilabra* Nicholls, 1935, in the structure and armature of body appendages. However, differences between the two species are seen in the armature of caudal ramus, antennule, exopod of antenna, distribution of hastate setae on P1-P4 and the structure of P5 in female.

FAMILY DIOSACCIDAE Sars, 1906

Genus *BALUCOPSYLLA* nov.

The generic diagnosis coincides with the following description of its sole and type species and must, therefore, be considered preliminary.

Balucopsylla similis sp. nov. (Figs 2-3).

Material

6 ♂♂ and 5 ♀♀ (1 ovigerous) specimens collected by the author on 28 November 1968, in coarse sand with fine shell gravel and little detritus 10-20 cm below surface between low and half-tide levels, intertidal zone, Waltair Beach (Lat. 17°44'50"N and Long. 83°21'06"E), Andhra Pradesh, India. Holotype: ♀, Regd. No. Z.S.I. C 978/2. Paratype: ♂, Regd. No. Z.S.I. C 979/2.

Description

Female: average length 572 μm (range 548-603 μm). Body cylindrical, about seven times as long as its width, without pronounced demarcation between metasome and urosome. Rostrum lanceolate, well developed, defined at base, reaches about half-way along the second segment of antennule and bears a dorso-median setule. Cephalosome rectangular and longer than the first two metasome segments combined. First three urosome segments longer than those of the metasome. Genital somite with an indistinct suture represented by a dorso-lateral strip of chitin. Ovisac paired. Anal operculum present. Body without surface ornamentation. Posterior edge of all somites, except the last, with a hyaline frill. Anal operculum bare.

Caudal ramus longer than broad, with a terminal spine and three setae, the middle one being very long. Outer distal corner with a stout seta. Distal half with a dorsal seta, jointed at the base.

Antennule elongate, eight-segmented, second segment the longest. Last four segments smaller than the first four. Fourth and terminal segments with an aesthete each.

Antenna with distinct basis. First endopod segment bare. Second segment with spinules and two spines on the inner edge. Distal edge with six spines and setae, four of which are geniculate. Exopod two-

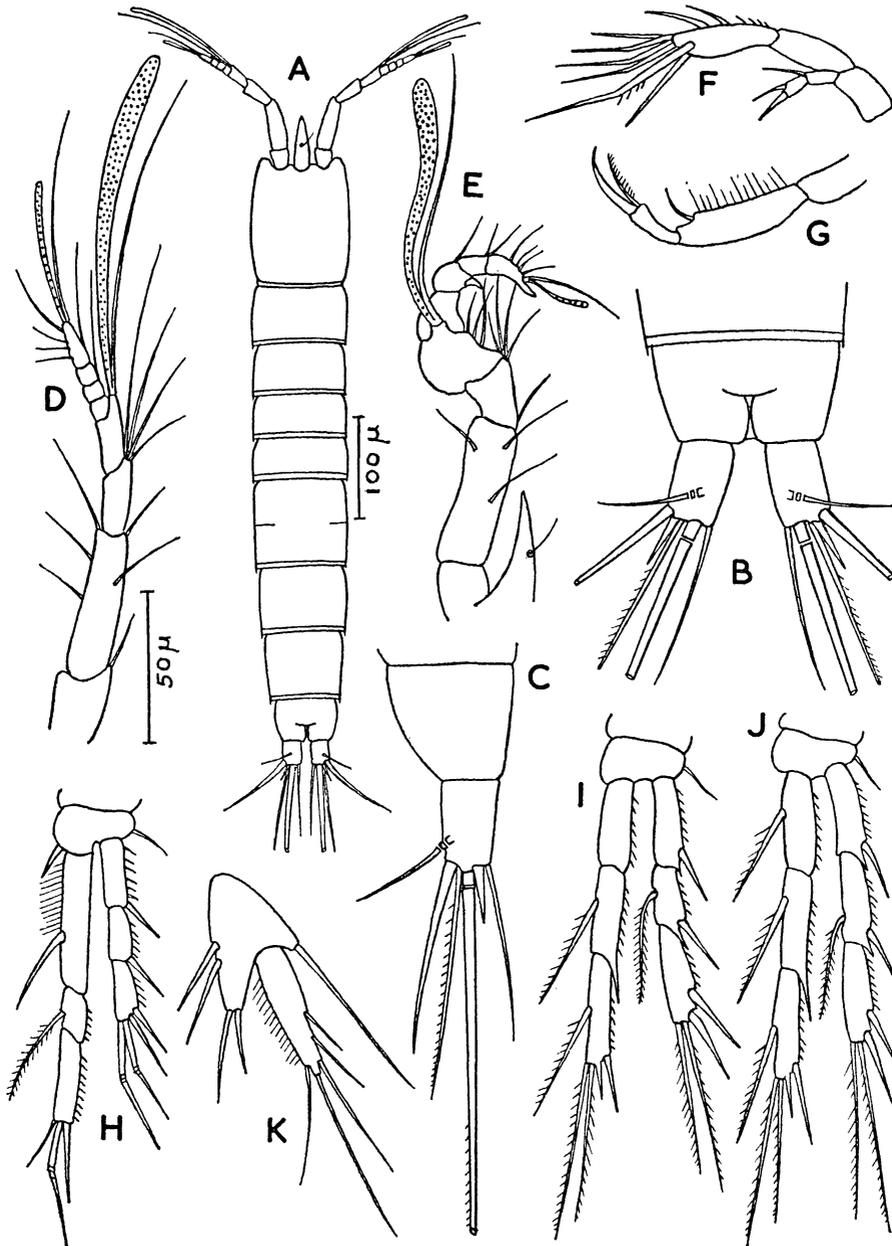


FIG. 2

Balucopsylla similis gen. et sp. nov.

A: ♀, dorsal; B: caudal furca, dorsal; C: caudal furca, lateral; D: ♀, antennule; E: ♂ antennule; F: antenna; G: maxilliped; H: ♀ P₁; I: ♀ P₂; J: ♀ P₃.

segmented. First segment with an apical seta. Second segment with an inner and a terminal setae.

Mandible with cutting edge complex. Coxa-basis large, with two terminal setae. Endopod one-segmented, elongate, with two inner and five terminal setae. Exopod a minute segment, with two apical setae.

Maxillule with pre-coxal arthrite bearing six terminal spines. Coxa small, with two apical setae. Basis elongate, reaching beyond the arthrite, with a terminal spine and a seta. Only one-segmented minute ramus seen, with two apical setae.

Maxilla with syncoxa bearing three endites, each carrying a seta. Basis with five unguiform spines. Endopod represented by a minute lobe bearing two setae.

Maxilliped with basis bare. First endopod segment with setules on inner edge and a seta on inner distal corner. Second segment prehensile upon the first segment, with a terminal seta and a claw.

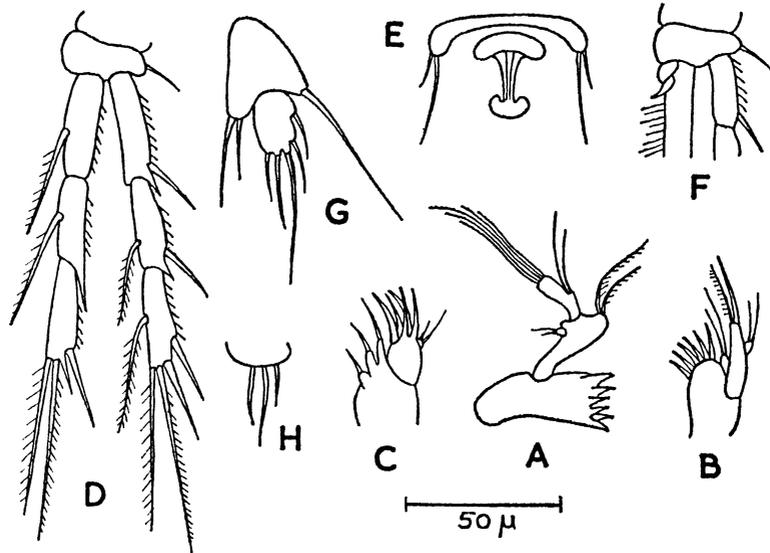


FIG. 3

Balucopsylla similis gen. et sp. nov.

A: mandible; B: maxillule; C: maxilla; D: ♀ P₄; E: ♀ genital field; F: ♂ P₄, proximal; G: ♂ P₆; H: ♂ P₆.

P₁ with coxa bare. Basis with an inner spine and an outer seta. Both rami three-segmented, exopod being longer than the first endopod segment. Exopod segments nearly equal, with spinulose outer edge. First and second segments with an outer spine. Third segment with two terminal geniculate setae and two outer spines. First endopod segment with setules and a distal seta on the inner edge. Second segment, shortest of the three, with spinules on the outer edge and a plumose seta on the inner edge. Third segment with spinulose outer edge; bearing three setae of varying length, the middle one being geniculate.

P₂-P₄ with coxa bare. Basis with an outer seta. Both rami three-segmented, with spinulose outer edge. Endopod slightly longer than exopod in P₂-P₃ and shorter in P₄. All segments elongate. Outer distal corner of second endopod segment acutely produced. Setal formula as below.

	Exp.			Enp.		
P ₂	0	1	022	0	1	121
P ₃	0	1	022	1	1	121
P ₄	0	1	122	1	1	021

P5 with distinct rami. Inner expansion of basendopod well developed, extending half-way along the exopod; with two inner and two terminal setae. Outer expansion with a long seta. Exopod elongate, about five times as long as its width, with setules on inner edge; bears five setae, second innermost being the longest.

Genital field as figured.

Male: average length 556 μm (range 527-590 μm). Differs from the female in the following characters. First two segments of abdomen distinct. Antennule chirocerate; sixth segment with a hook. P1 with basis bearing an inner spine modified as figured. P5 with distinct rami. Inner expansion of basendopod less developed, with two terminal setae. Exopod oval, twice longer than broad, with five setae. P6 each side distinct; a small plate with three setae.

Remarks

The systematic position of this new species is not clear. The nearest relationship seems to be the group of genera *Protopsammatopa* Geddes, 1968 - *Psammatopa* Pennak, 1942 - *Golfinella* Wilson, 1932, placed by Geddes (1968) in the family Diosaccidae and ranged near the genus *Schizopera* Sars, 1905, with which they share a reduced limb armature. But the new species does not fit into any of these genera while showing some of their characters. This cannot be *Protopsammatopa* as the endopod of P2 of the male is modified in that genus. However, the present species differs from the above group of genera in the three-segmented nature of the endopod of P1.

Although the structure and armature of several appendages of the present specimens closely resemble *Schizopera* (particularly *S. indica* Rao and Ganapati, 1969a), chief differences are seen in the secondary sexual characters of male. In view of these considerations, the present species is assigned to the new genus, *Balucopsylla*.

The generic name (gender neuter) is derived from the Sanskrit word *baluka* (sand) and the Greek word *psylla* (flea). The trivial name refers to the similar character it exhibits with *Schizopera indica*.

FAMILY AMEIRIDAE Monard, 1927

Genus *PARALEPTOMESOCHRA* Wells, 1967

Paraleptomesochra wellsii sp. nov. (Fig. 4).

Material

5 ♂♂, 12 ♀♀ (5 ovigerous) and 3 juvenile specimens collected by the author on 26 November 1968, in fine and medium sand 10-30 cm below surface near half-tide level, intertidal zone, Waltair Beach (Lat. 17°43'30"N and Long. 83°20'30"E), Andhra Pradesh, India. The species is highly thigmotactic. Holotype: ♀, Regd. No. Z.S.I. C 973/2. Paratype: ♂, Regd. No. Z.S.I. C 974/2.

The trivial name is coined in honour of Dr. J.B.J. Wells, University of Aberdeen, United Kingdom.

Description

Female: average length 312 μm (range 274-336 μm). Body cylindrical, without demarcation between metasome and urosome. Fourth thoracic segment slightly narrower than the preceding segments. Rostrum small, pointed and confluent with the cephalothorax; bears a dorso-medial setule. Cephalosome rectangular and nearly as long as the first two metasome

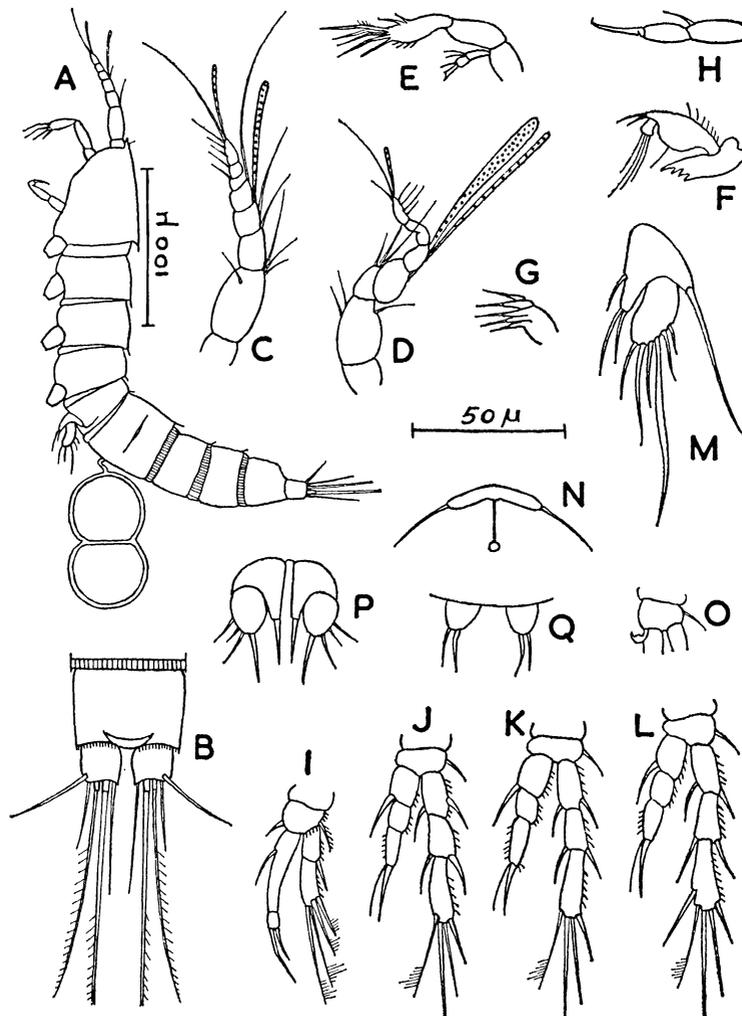


FIG. 4

Paraleptomesochra wellsi sp. nov.

A: ♀, lateral; B: caudal furca, dorsal; C: ♀ antennule; D: ♂ antennule; E: antenna; F: mandible; G: maxilla; H: maxilliped; I: ♀ P₁; J: ♀ P₂; K: ♀ P₃; L: ♀ P₄; M: ♀ P₅; N: ♀ genital field; O: ♂ P₃, proximal; P: ♂ 2P₅; Q: ♂ 2P₆.

segments united. Urosome slightly tapers posteriorly. Genital somite with suture indicated by a lateral strip of chitin. Ovisac single with two eggs, one behind the other. All somites, except the last, with dorso-medial spinules. Abdominal somites bear a hyaline frill deeply divided. Last

segment with spinules on posterior edge. Anal operculum reduced and bare.

Caudal ramus as long as broad. Four terminal setae, the middle two being well developed. A seta on dorsal surface, near the outer distal corner.

Antennule short, eight-segmented, second segment the longest. An aesthete on fourth and terminal segments.

Antenna with distinct basis. First endopod segment bare. Second segment with spinulose outer edge and two small spines on inner edge; distal edge with five terminal geniculate setae and a spine. Exopod two-segmented. First segment with two apical setae. Second segment half the length of the first, with a terminal seta and an expanded, bifid, hyaline structure.

Mandible with cutting edge tetridentate. Coxa-basis elongate, with an expanded outer edge bearing a seta, setules on inner edge and two terminal setae. Endopod of one segment, with four terminal setae. Exopod absent.

Maxillule indistinct.

Maxilla with syncoxa bearing three endites. Basis with a terminal seta. Endopod of one segment with one seta.

Maxilliped with elongate basis, bearing a distal spine on the inner side. First endopod segment bare. Second segment minute, with a claw prehensile upon the first segment.

P₁ with coxa bare. Basis with an outer seta and an inner spine; bears spinules on the outer edge. Both rami two-segmented, exopod being slightly shorter than the first endopod segment. Exopod segments equal, with spinulose outer edge. First segment with outer spine. Second segment with two outer spines and two terminal setae. First endopod segment five times as long as the second segment, with a proximal seta on the inner side. Second segment with two terminal setae, the inner one being geniculate and longer than the outer.

P₂-P₄ with coxa bare. Basis with an outer seta. Both rami three-segmented. Exopod segments with spinulose outer edge, elongate, terminal segment being the longest. Endopod slightly longer than the first two exopod segments united; outer edge of first two segments and inner edge of third segment spinulose; segments nearly of equal length, but the first is broader than the others. Setal formula as below.

	Exp.			Enp.		
P ₂	1	1	121	1	0	020
P ₃	1	1	121	1	0	020
P ₄	1	1	221	1	0	020

P₅ with distinct rami. Inner expansion of basendopod well developed, extending half-way down the exopod; bears one inner and two terminal setae. Outer expansion with a seta. Exopod elongate and oval, with six setae, the third outermost being the longest.

Genital field as figured.

Male: average length 298 μm (range 276-315 μm). Differs from the female in the following characters. First two abdominal segments distinct. Antennule seven-segmented and haplocerate; sixth segment partially divided by an indistinct suture. P₁ as in female, except for the modified inner spine on the basipodite. P₅ with distinct rami. Inner expansion of basendopod with one seta. Outer expansion bare. Exopod oval, with four setae of varying length. P₆ a plate on each side, with two setae.

Remarks

Wells (1967) erected the genus *Paraleptomesochra* to accommodate the species *P. minima* with the unique character of P₁ bearing a two-segmented exopod. The present species differs from the only known species *P. minima* in the following characters.

- (a) Caudal ramus only as long as broad, with five setae.
- (b) Endopod of mandible of one segment.
- (c) Basis of maxilliped with a spine.
- (d) Distal segment of endopod P₂-P₄ with setation 020.
- (e) Distal segment of exopod P₄ with setation 221.
- (f) P₅ ♂ with basendopod bearing one seta; exopod oval.
- (g) P₆ ♂ of one segment each side, articulated with the somite.

SPECIES INCERTAE SEDIS

Genus *PARAPSEUDOLEPTOMESOCHRA* Lang, 1965

Parapseudoleptomesochra (?) *reductus* sp. nov. (Fig. 5).

Material

1 ♂ and 3 ♀♀ specimens collected by the author on 4 December 1968, in fine and medium sand with little detritus 15 cm below surface between the low and half-tide levels, intertidal zone, Pudimadaka Beach (Lat.17°30'20" N and Long. 83°20'10"E), Andhra Pradesh, India. Holotype: ♀, Regd. No. Z.S.I. C 975/2. Paratype: ♂, Regd. No. Z.S.I. C 976/2.

Description

Female: average length 324 μm (range 316-342 μm). Body cylindrical, without clear demarcation between metasome and urosome. Rostrum small, pointed and confluent with the cephalothorax. Cephalosome rectangular and equal to the length of first three metasome segments combined. Genital somite without trace of segmental demarcation. Anal operculum present. Two dorsal acute projections on anal segment. Body segments without surface ornamentation. All somites, except the last, with a hyaline frill.

Caudal ramus longer than broad, with two terminal setae, the inner one being very long. One seta on the outer edge near distal corner. Two setae on dorsal side, with proximal part jointed in one and bulbous in the other.

Antennule elongate, eight-segmented, second segment the longest. Last four segments smaller than the first four. An aesthete on fourth and terminal segments.

Antenna with distinct basis. First endopod segment bare. Second segment with spinules on inner edge; six terminal setae and spines, three of which are geniculate. Exopod one-segmented, linear, with an inner and a terminal setae.

Mandible edge tridentate. Coxa-basis with three apical setae. Endopod with six setae. Exopod absent.

Maxillule with pre-coxal arthrite bearing several spines. Coxa with an inner seta and terminal part as an unguiform projection. Endopod represented by two setae.

Maxilla with syncoxa bearing one endite. Basis with two setae. Endopod represented by one seta.

Maxilliped with basis bare. First endopod segment with two inner spines and an oblique row of lateral spinules. Second segment a claw, prehensile upon the first segment, with two groups of two setules each on the inner side.

P₁ with coxa bare. Basis with an outer seta and an inner spine. Exopod three-segmented, endopod two-segmented. Endopod slightly longer than exopod. Exopod segments nearly equal. First two segments with

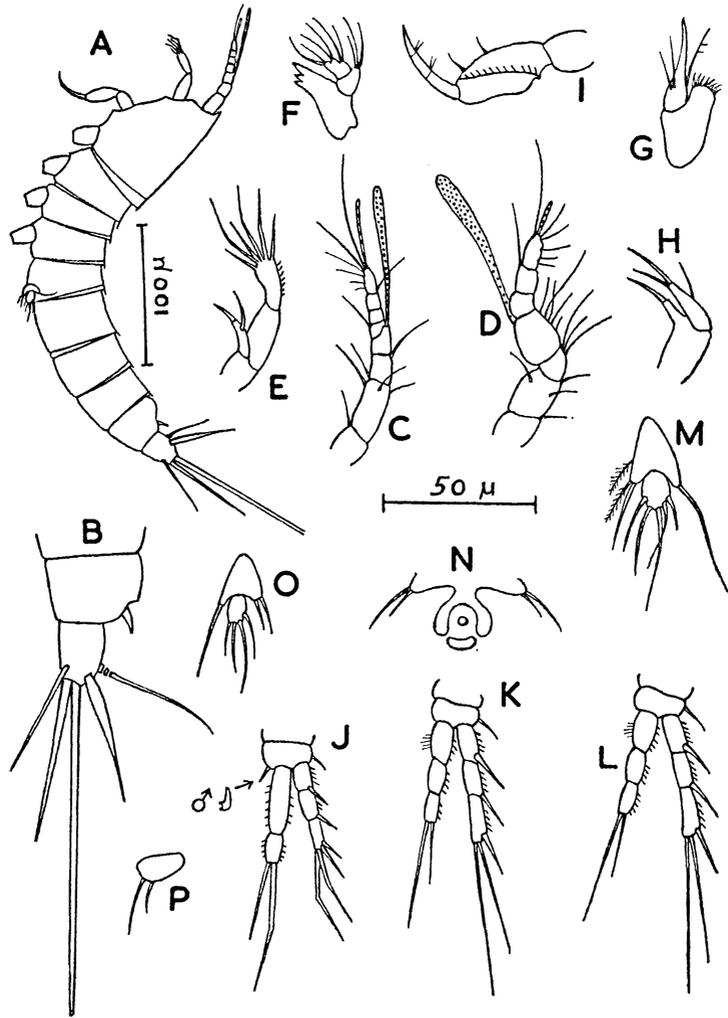


FIG. 5

Parapseudoleptomesochra (?) *reductus* sp. nov.

A: ♀, lateral; B: ♀ caudal furca, lateral; C: ♀ antennule; D: ♂ antennule; E: antenna; F: mandible; G: maxillule; H: maxilla; I: maxilliped; J: ♀ P₁; K: ♀ P₂; L: ♀ P₄; M: ♀ P₅; N: ♀ genital field; O: ♂ P₆; P: ♂ P₆.

spinulose outer edge and an outer spine each. Third segment with two outer spines and two terminal geniculate setae. Endopod prehensile, with spinules on outer and inner sides. First segment about two and half times longer than the second segment; bears no seta. Second segment with two terminal setae, the outer one being long and geniculate.

P_2 - P_4 with coxa bare. Basis with an outer seta. Both rami three-segmented, endopod reaching nearly to the middle of third exopod segment. Outer edges of all segments spinulose. Exopod segments equal. Endopod segments nearly equal in length but taper distally. Setal formula as below.

	Exp.			Enp.		
P_2 - P_4	0	0	021	0	0	020

P_5 with distinct rami. Inner expansion of basendopod less developed, with one inner and two terminal setae; the inner one and outer one of the two terminal setae plumose. Outer expansion with long seta. Exopod oval, with five setae of varying length.

Genital field as figured.

Male: length 292 μ m. Differs from the female in the following characters. First two abdominal segments distinct. Antennule seven-segmented, with an aesthete on the fourth and terminal segments. P_1 as in female except for the modified inner spine on the basipodite. P_5 of each side and rami distinct. Inner expansion of basendopod with two terminal setae. Outer expansion with a seta. Exopod oval, with four setae. P_5 of each side distinct and not confluent with the segment; a plate with two setae.

Remarks

Among the various genera of the family Ameiridae, the present specimens agree with several diagnostic features of the genus *Parapseudoleptomesochra* (Lang, 1965, p. 334; Wells, 1967, p. 297), but chiefly differ from it in the two-segmented nature of endopod of P_1 and the absence of an inner seta on middle endopod segment of P_2 - P_4 and distal exopod segment of P_4 . In view of these differences, I prefer to provisionally place the new species within the genus *Parapseudoleptomesochra*, until a further revision of the family Ameiridae is made. The present species further differs from both the known species *P. trisetosa* (Krishnaswamy, 1957) and *P. pristina* Wells, 1967, in mouth parts, anal segment with acute projections and the setation of caudal ramus and P_1 - P_4 .

The choice of trivial name is to indicate the reduced setation on walking legs.

Genus : *SICAMEIRA* Klie, 1950

Sicameira langi sp. nov. (Fig. 6).

Material

4 ♀♀ specimens collected by the author on 28 november 1968, in coarse sand with fine shell gravel 20 cm below surface between low and half-tide levels, intertidal zone, Waltair Beach, Lat. 17° 43' 30" N and Long. 83° 20' 30" E), Andhra Pradesh, India. Holotype: ♀, Regd. No. Z.S.I. C 977/2.

The species is named in honour of Dr. Karl Lang, University of Stockholm, Sweden.

Description

Female: average length 526 μm (range 510-542 μm). Body linear, without demarcation between metasome and urosome; slightly tapers to the posterior end. Fourth thoracic segment narrower than the preceding segments. Rostrum small, pointed and confluent with the cephalothorax.

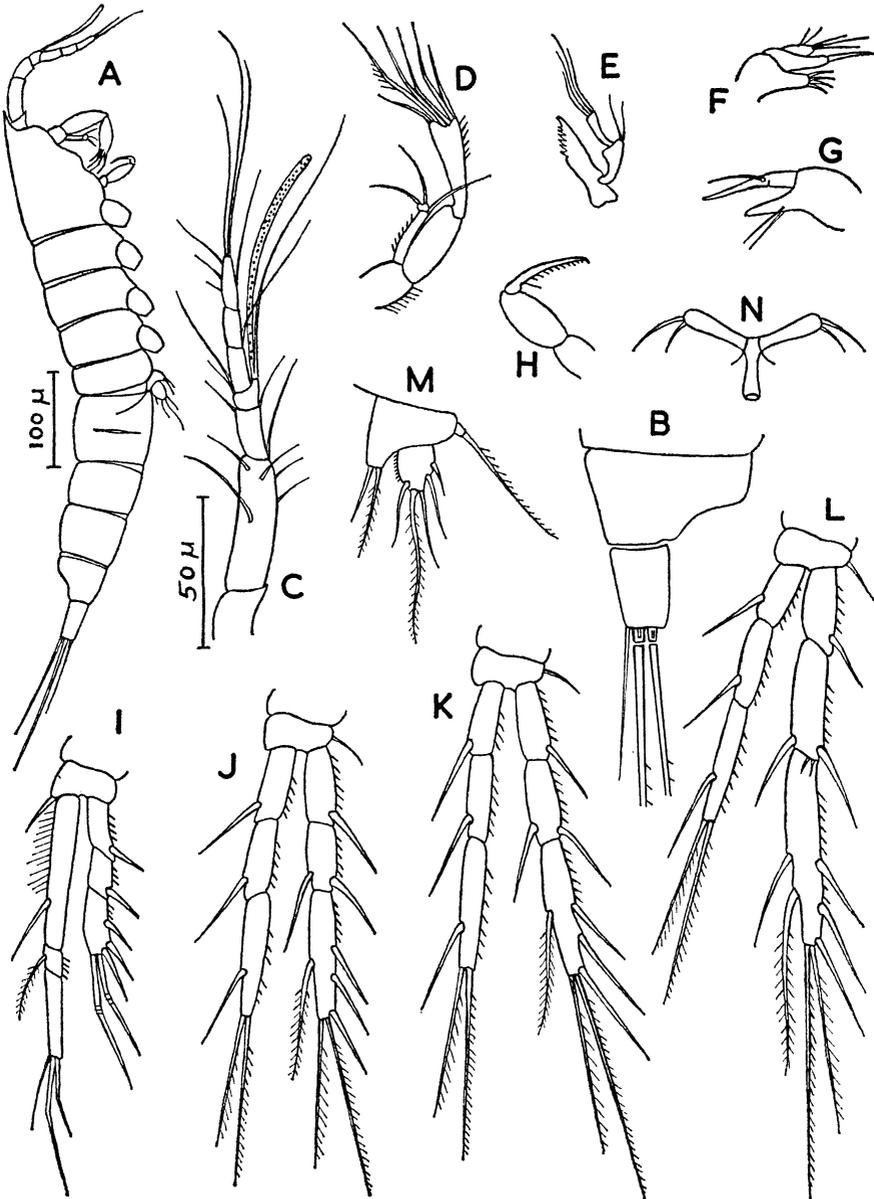


FIG. 6

Sicameira langi sp. nov., female.

A: adult, lateral; B: caudal furca, lateral; C: antennule; D: antenna; E: mandible; F: maxillule; G: maxilla; H: maxilliped; I: P₁; J: P₂; K: P₃; L: P₄; M: P₅; N: genital field.

Cephalosome rectangular and longer than the first two metasome segments united. Genital somite with suture indicated by a lateral chitinous strip. Anal operculum present. Body without distinct ornamentation. Anal operculum bare.

Caudal ramus nearly twice longer than broad, with three terminal setae, the middle one being very long.

Antennule elongate, seven-segmented, second segment the longest and fourth segment the shortest. An aesthete on fourth segment.

Antenna with distinct basis, bearing setules on the inner side. First endopod segment bare. Second segment with spinules on the inner side; six terminal setae, four of which are geniculate. Exopod two-segmented. First segment elongate, with an apical seta and spinules on outer side. Second segment very small, about eight times shorter than the first segment, with two terminal setae.

Mandible with pre-coxa styliform and cutting edge complex. Coxa-basis small, with two terminal setae. Endopod one-segmented, elongate, with four terminal setae. Exopod absent.

Maxillule with pre-coxal arthrite bearing four unguiform spines. Coxa with terminal part as unguiform projection. Basis with three terminal and two outer setae. Both rami not seen.

Maxilla with syncoxa of one endite bearing two proximal setae. Basis with a claw confluent with the segment. Endopod not seen.

Maxilliped with basis and first endopod segment bare. Second segment a claw prehensile upon the first segment; bears a small proximal setule and a row of spinules on the inner side.

P₁ with coxa bare. Basis with an inner spine. Both rami three-segmented, exopod being nearly as long as the first endopod segment. Exopod segments equal, with spinulose outer edge. First two segments with outer spine each; second segment lacks an inner seta. Third segment with three outer spines and two terminal geniculate setae. Endopod prehensile. First segment elongate, six times as long as broad, with inner edge bearing setules in the proximal half and a seta in the distal half. Second segment with an inner plumose seta and spinulose outer edge. Third segment thrice as long as the second, with three terminal setae, the outer two being geniculate.

P₂-P₄ with coxa bare. Basis with an outer seta. Both rami three-segmented; endopod being nearly as long as exopod in P₂-P₃, while reaching about half-way along the last exopod segment in P₄. Segments elongate, terminal segment being the longest. Outer edge of segments spinulose. Setal formula as below.

	Exp.			Enp.		
P ₂	0	1	123	1	1	120
P ₃	0	1	123	1	1	120
P ₄	0	1	223	1	1	120

P₅ with distinct rami. Inner expansion of basendopod reaches half-way along the exopod, with two apical setae, the outer one being longer and plumose. Outer expansion with a seta. Exopod oval, with spinulose inner edge and five setae, second innermost seta being the longest and plumose.

Genital field as figured.

Male: unknown.

Remarks

This genus contains two species: *S. leptoderma* Klie, 1950 and *S. gracilis* (A. Scott, 1896). The latter is placed in this genus and redescribed by Por (1964). Of the two known species, the present species is closely related to *S. gracilis*, but differs in the following characters.

- (a) Anal operculum bare, without curvature.
- (b) Caudal ramus only twice longer than broad, with three setae.
- (c) Seven - segmented antennule.
- (d) Distal segment of endopod P₃ with setation 120.
- (e) Distal segment of exopod P₂-P₃ with setation 123.
- (f) Second innermost seta of exopod P5 ♀ plumose.

Acknowledgements

I am grateful to Dr. A.P. Kapur, Director, Zoological Survey of India, Calcutta, for facilities and affording me opportunity to study interstitial fauna on Waltair coast and its environs. My grateful thanks are also due to Dr. J.B.J. Wells, University of Aberdeen, United Kingdom, for going through the manuscript.

Summary

The paper describes five new species of interstitial harpacticoid copepods collected in winter 1968 from the intertidal sands on Andhra coast (Bay of Bengal). They are *Hastigerella bengalensis* sp. nov., *Balucopsylla similis* gen. et sp. nov., *Parapseudoleptomesochra wellsi* sp. nov., *Parapseudoleptomesochra* (?) *reductus* sp. nov. and *Sicameira langi* sp. nov.

REFERENCES

- CHANDRASEKHARA RAO, G., 1967. — On the life-history of a new sand-dwelling copepod. *Crustaceana*, 10, pp. 129-136.
- CHANDRASEKHARA RAO, G. and GANAPATI, P.N., 1968. — The interstitial fauna inhabiting the beach sands of Waltair Coast. *Proc. nat. Inst. Sc. India*, 34, pp. 82-125.
- CHANDRASEKHARA RAO, G. and GANAPATI, P.N., 1969a. — Some new interstitial copepods from Waltair coast. *Proc. Ind. Acad. Sc.*, 69, pp. 1-14.
- CHANDRASEKHARA RAO, G. and GANAPATI, P.N., 1969b. — On some interstitial copepods from the beach sands of Waltair coast. *Proc. India Acad. Sc.*, 70, pp. 262-286.
- GEDDES, D.C., 1968. — *Protosammatopa norvegica*, a new genus and species of interstitial harpacticoid copepod from western Norway. *Sarsia*, 36, pp. 69-76.
- (1) KLIE, W., 1950. — Harpacticoida aus dem Bereich von Helgoland und der Kieler Bucht (Forsetzung). *Kieler Meeresforsch.*, 7, pp. 76-128.
- KRISHNASWAMY, S., 1957. — Two new psammophilous copepods from Madras. *Zool. Anz.*, 159, pp. 230-235.
- LANG, K., 1948. — *Monographie der Harpacticiden*. Lund, 2 Vol., I, 1683 pp.
- (1) LANG, K., 1965. — Copepoda Harpacticoida from the Californian Pacific coast. *K. Svenska Vetensk Akad. Handl.*, 10 (2), pp. 1-560.
- NICHOLLS, A.G., 1935. — Copepods from the interstitial fauna of sandy beach. *J. Mar. Biol. Ass. U.K.*, 20, pp. 379-405.
- PENNAK, R.W., 1942. — Harpacticoid copepods from some intertidal beaches near Woods Hole, Massachusetts. *Trans. Amer. Micr. Soc.*, 61, pp. 274-285.
- POR, F.D., 1964. — Les Harpacticoides (Crustacea, Copepoda) des fonds meubles du Skagerak. *Cah. Biol. Mar.*, 5, pp. 233-270.
- WELLS, J.B.J., 1967. — The littoral Copepoda (Crustacea) of Inhaca Island, Mozambique. *Trans. Roy. Soc. Edinb.*, 67, pp. 189-358.
- WILSON, C.B., 1932. — The copepods of the Woods Hole region, Massachusetts. *Bull. U.S. nat. Mus.*, 158, pp. 1-635.

(1) Not referred to in original.

Flössner, Dietrich: Krebstiere, Crustacea. Kiemen - und Blattfüsser, Branchiopoda. Fischläuse, Branchiura (Tierwelt Deutschlands, 60. Teil) (1).

Cet ouvrage traite essentiellement des Branchiopodes d'Allemagne, sans oublier les quelques espèces marines du groupe. Comme les autres volumes de la série, il commence par des généralités (26 pages) sur la morphologie, l'anatomie et la biologie de cette sous-classe de Crustacés. La seconde partie (370 pages) étudie en détail les différentes espèces. Pour chacune, sont fournies, d'abord d'abondantes références bibliographiques, puis la description précise des deux sexes, la répartition géographique dans le monde et en Allemagne et, enfin, des renseignements biologiques et écologiques très détaillés et fort intéressants. Le texte est accompagné de nombreuses figures, généralement bonnes, représentant les deux sexes et les caractères remarquables. Ces figures sont presque toutes originales et leur échelle est toujours très soigneusement indiquée, ce qui est trop rarement le cas dans ce genre de travail.

Nous trouvons ensuite une partie, évidemment beaucoup plus réduite (17 pages), traitant, selon le même plan général, des trois espèces allemandes de Branchiures.

L'ouvrage se termine par une copieuse bibliographie de 53 pages, arrêtée en 1971, et qui semble extrêmement complète. Contrairement à la regrettable habitude actuelle, l'auteur donne, non seulement la référence du périodique, mais aussi le titre complet de l'article, ce qui est souvent fort utile.

Ce volume sera très précieux pour les limnologues de la plus grande partie de l'Europe. Le fait qu'il soit écrit en allemand ne peut guère être considéré comme un inconvénient, la connaissance de cette langue étant indispensable aux limnologues. Son intérêt en biologie marine est évidemment plus restreint, mais il pourra fournir matière à d'utiles comparaisons.

Jacques de Frescheville.

(1) Iéna, Gustav Fisher 1972 - 501 pages, 201 figures, format 17 x 24. Prix broché: 101,50 M.