

**METIS REDUCTA n. sp. and LAUBIERIA TERCERA n. sp.
(HARPACTICOIDA, METIDAE)
FROM THE SOUTHERN COAST
OF PAPUA NEW GUINEA***

by

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Contribution no. 246.

SUMMARY

Metis reducta n. sp. and *Laubieria tercera* n. sp. (Harpacticoida, Metidae) collected off Motupore Island (southern coast of Papua New Guinea) are described. The description of a male specimen of *L. tercera* n. sp. allows the extension of the generic diagnosis. A key to the three known species of the genus *Laubieria* SOYER is presented.

Key-words : Metidae, *Metis reducta*, *Laubieria tercera*, male characteristics.

INTRODUCTION

The harpacticoid family Metidae assembles two genera : *Metis* PHILIPPI, 1843 and *Laubieria* SOYER, 1966 unifying five and two species, respectively. Recently, MIELKE (1989) discussed at length the problems in species discrimination within the genus *Metis*. The poor quality of original descriptions and various erroneous identifications in the past have made three species out of five difficult to recognize. However, the reduced segmentation of the P1 of the herein described *M. reducta* n. sp., distinguishes it clearly from all other known members of the genus.

The two species of the genus *Laubieria* SOYER, 1966 presently (*L. corallicola* SOYER, 1966 and *L. secunda* WELLS, 1967) were described on the basis of female specimens only. The discovery of a male of *L. tercera* n. sp. allows for extending the generic diagnosis. A key to the species of *Laubieria* is given to facilitate future determinations.

MATERIAL AND METHODS

The sample yielding the here described animals was collected by scraping of the upper layer of the sediments and was fixed in the field with a buffered formaldehyde solution. The animals were stored in 75 % neutralized ethylalcohol after being picked out. The dissected parts were mounted in glycerine, the coverglass sealed with nail polish. Slides are deposited in the Invertebrate collections of the « Koninklijk Belgisch Instituut voor Natuurwetenschappen ».

Drawings were made with the aid of a camera lucida, on a light microscope equipped with phase contrast. Terminology and abbreviations are according to LANG (1965) and MIELKE (1989).

SYSTEMATICS

genus *Laubieria* SOYER, 1966

Diagnosis — Metidae ; genital somite fused ventrally only ; copulatory pore situated near the fusion line of the somites ; rostrum large, blunt with slender sensillae ; antennule six-segmented with aesthetascs on third and ultimate segments ; exopodite of antenna obsolete, represented as a spiniform seta ; mandible with cylindrical palp ; maxillule with arthrite having sharply bent spines and a slender seta ; coxa, basis and rami obsolete, represented as a minute palp bearing a single seta ; maxilla with endites represented as setae ; basis extended ; maxillipeds not fused, one-segmented, each bearing three setae ; rami of P1 — P4 three-segmented lacking outer spines on one or two segments ; both fifth legs fused, forming a single median plate, bearing one seta and one spine on both sides ; without an exopodal segment.

Sexual dimorphism : antennule sub-chirocer, six-segmented and bearing aesthetascs on third, fourth and ultimate segments ; P5 with longer inner spines ; P6 symmetrical.

The genus comprises : *Laubieria corallicola* SOYER, 1966 (type-species), *L. secunda* WELLS, 1967 and *L. tercera* n. sp.

Key to the species

1. — Third exopodal segments P3 and P4 with 5 setae/spines, in all ; first exopodal segments P3 and P4 without outer spine : 2
 - Third exopodal segment P3 and P4 with 6 setae/spines, in all ; first exopodal segments P3 and P4 with outer spine : *L. corallicola*
2. — Median exopodal segment P2 without inner seta ; inner spine of female P5 short, about 20 % of the outer seta : *L. tercera*
 - Median exopodal segment P2 with inner seta ; inner spine of female P5 long, about 75 % of the outer seta : *L. secunda*

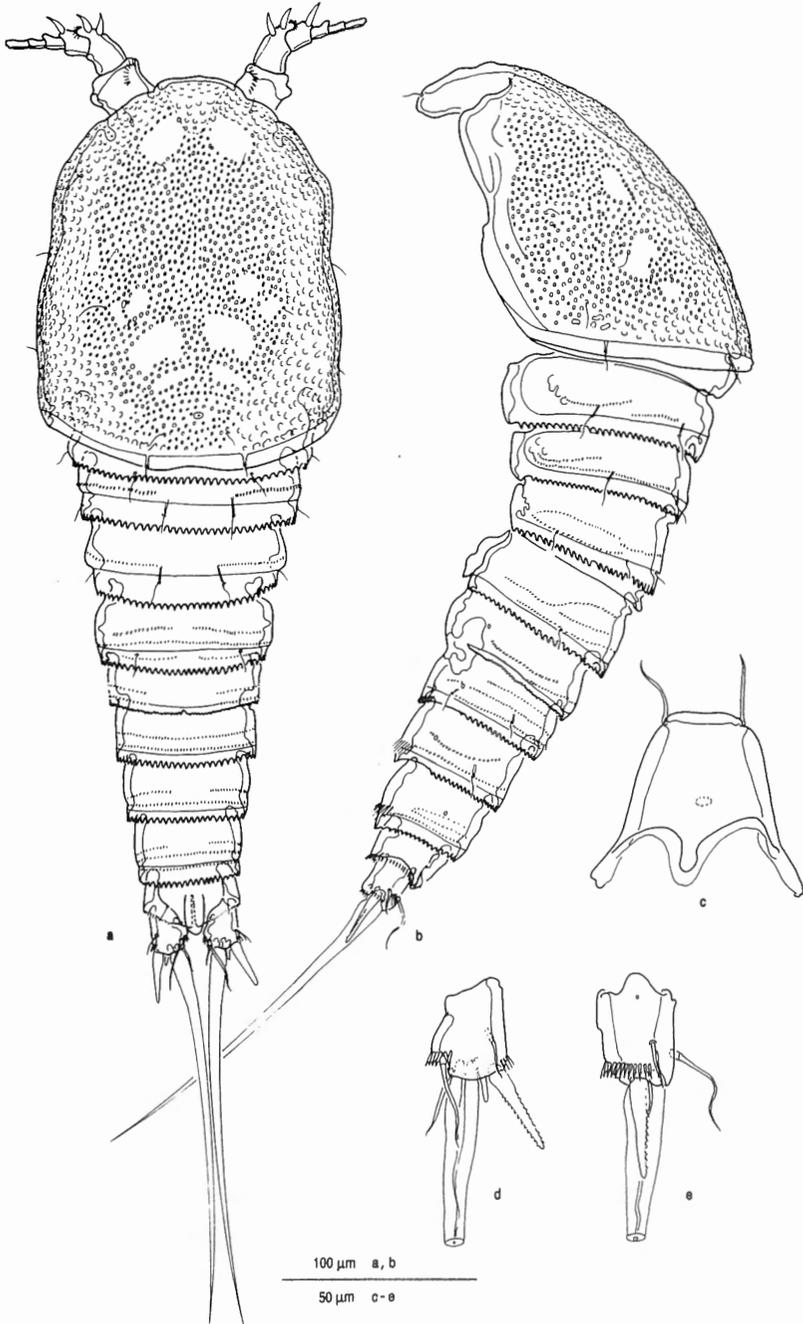


Fig. 1. — *Laubieria tercera* n. sp. : a, habitus of the female, dorsal view ; b, idem, lateral view ; c, rostrum, ventral view ; d, right furcal ramus, dorsal view ; e, left furcal ramus, lateral view.

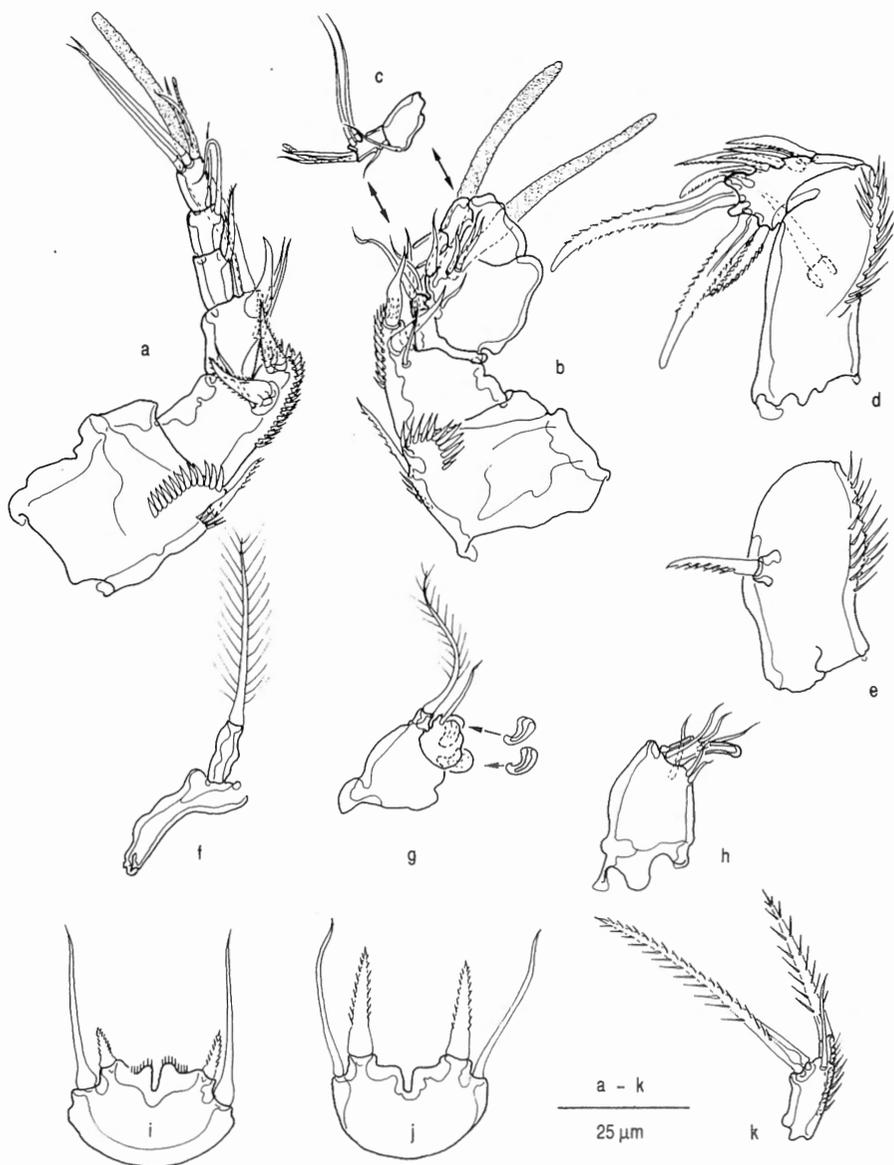


Fig. 2. — *Laubieria tercera* n. sp. : a, female antennule ; b, male antennule ; c, ultimate segments of male antennule ; d, antenna, inner view ; e, allobasis of antenna, outer view ; f, mandible ; g, maxillule ; h, maxilla ; i, female P5 ; j, male P5 ; k, maxilliped.

Lauberia tercera n. sp.

Type material. Holotype, one female dissected on two slides, labeled COP 3411 A and B; allotype, one dissected male, mounted on two slides, labeled COP 3418 A and B.

Type locality. Papua New Guinea, Capital District, Motupore Island. Upper layer of sediments at -1 m (during high tide) near the northern end of the island (east of the, locally called, « sand spit »). Leg. F. Fiers, November 22, 1986, field no. PNG 86-85.

Etymology. *Lauberia tercera* n. sp. is the third species described in the genus. The specific name refers to it.

Description

Female : habitus (Fig. 1a and b) typically *Metis*-shaped with obviously large cephalothorax and bent in lateral view; length, including furcal rami, 460 μ m; cephalothorax, in dorsal view, slightly shorter than half the body length, with nearly parallel lateral margins, curved towards the rostrum in the anterior quarter; lateral margins of body somites tapering towards the anal one; genital double-somite fused ventrally only.

Integumental structures : surface of the cephalothorax densely pitted, except for a symmetrical pattern of smooth dorsal areas; posterior margin of the cephalothorax smooth; integument of the other somites furnished with few rows of minute spinules dorsally and laterally; postero-dorsal and lateral margins of the somites with an incised hyaline frill; ventral surface of the genital and abdominal somites with few rows of minute spinules and with a median row of long spinules near the posterior margin of the second somite; hyaline frills along the ventral margins of the abdominal somites more slender than dorsally, unincised; ventral surface of the anal somite with a deep triangular sinus (Fig. 4a); anal operculum narrow, rounded distally and smooth.

Furcal rami (Fig. 1d and e) about 1.5 times as long as wide; outer margin straight, the inner one distinctly convex in the second half; proximal lateral seta, arising beyond the middle of the ramus and somewhat dorso-laterally implanted; distal lateral seta spiniform, about as long as the ramus and arising from the outer distal edge; dorsal seta, articulating on a single basal part and implanted close to the inner distal edge; outer principal seta highly reduced and blunt; inner principal seta long, smooth and considerably thickened in the proximal parts of the stem; inner distal seta slender, not as long as the supporting ramus. Rostrum (Fig. 1c) large, ventrally directed and fused with the cephalothorax; lateral margins slightly concave; distal margin with two sensillae and straight.

Antennule (Fig. 2a) six-segmented, with principal aesthetasc arising from the third segment; first segment robust, having a comb of large spinules on the dorsal surface and a single seta; second segment strongly extended distally into a rounded process, furnished with strong spinules anteriorly and bearing two armed spines and

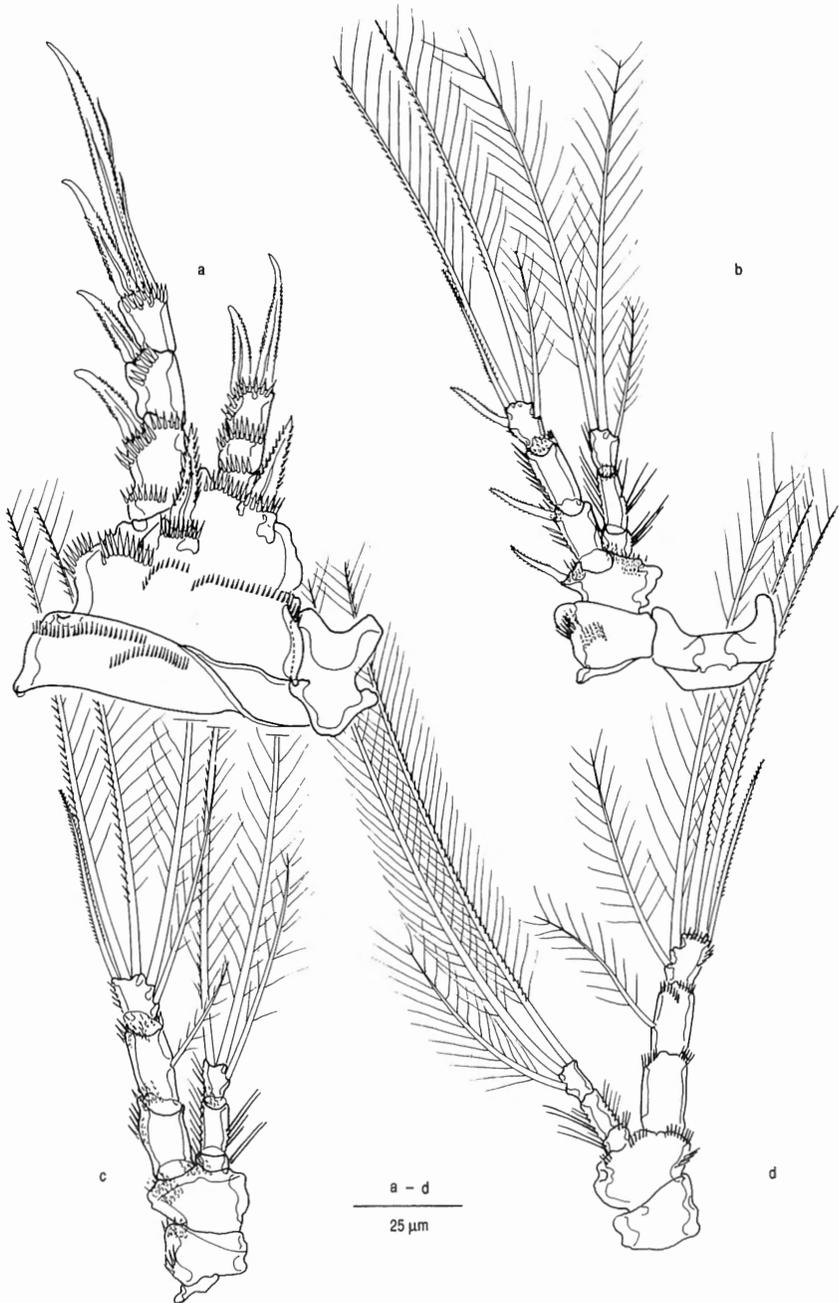


Fig. 3. — *Laubieria tercera* n. sp. : a, P1 ; b, P2 ; c, P3 ; d, P4 (all drawn from the female specimen ; a and d in anterior view, b and c in posterior view).

a slender seta on the dorsal surface ; aesthetasc accompanied by three setae and one thick, smooth spine ; fourth and fifth segments each with a single seta ; ultimate segment bearing a lateral seta, two sub-apical setae, articulating on a basal part, and apically, two fused setae, accompanied by a small aesthetasc.

Antenna (Fig. 2d) with allobasis ; exopodite represented as a strong, armed seta arising from a small cylindrical process (Fig. 2e) ; endopodal segment with five spines and a slender seta along the lateral margin ; distal endopodal margin with three robust, armed spines.

Mandible (Fig. 2f) slender and fragile, having two teeth on the gnathobasis and a one-segmented palp, bearing a single feathered seta.

Maxillule (Fig. 2g) with two blunt, curved spines and a slender seta on the arthrite ; coxa, basis and rami extremely reduced ; maxillary palp cylindrical, bearing a long feathered seta.

Maxilla (Fig. 2h) with three setae on the syncoxa ; basis produced into a curved blunt process, furnished with three setae : two medio-distally and one proximally.

Maxilliped (Fig. 2k) represented as a small cylindrical appendage, nearly twice as long as wide, bearing three setae : two spinulose and one slender and smooth ; outer margin of the segment furnished with spinules.

P1 (Fig. 3a) with a robust appearance ; all segments strongly sclerotized ; coxae and basis with several rows of fragile spinules ; intercoxal plate with curved distal margin ; outer and inner spine of the basis stout and armed ; exopodite and endopodite three-segmented ; all segments set with spinules ; outer exopodal spines armed medially but smooth apically ; setal formula as in Table I.

TABLE I

Setal formula of Laubieria tercera n. sp.

	P1	P2	P3	P4
Exo	0-0-022	0-0-122	0-1-221	0-1-221
End	0-0-020	0-0-120	0-0-120	0-0-120

P2 — P4 (Fig. 3b-d, respectively) : praecoxae small, represented as a slender wedge-shaped structure below the coxae ; coxae and bases with strong margins ; basis of P2 with an outer spine, of P3 and P4 without ; exopodites and endopodites three-segmented ; first exopodal segment of P2 with an outer spine ; first and second exopodal segments in P3 and P4 without an outer spine ; inner margins of the endopodal segments set with some long and slender spinules, without inner setae on the proximal and median segments ; setal formula as in Table I.

Both fifth pair of legs (Fig. 2i) fused together, forming a median plate ; distal margin of the P5-complex deeply incised medially showing a tuft of minute spinules

on two small extensions near the incision; outer seta smooth, about five times as long as the inner spine.

Male: habitus (Fig. 4c) resembling closely that of the female but with narrower abdomen; length, 380 μm .

Dorsal integumental structures as in the female; ventral surface of the abdominal segments with a median pattern of stronger spinules, the posteriormost being the longest.

Antennule (Fig. 2b and c) six-segmented, sub-chirocer; first and second segments shorter than in the female but with an identical ornamentation and setae; third segment small, protruded and bearing one aesthetasc and three setae; fourth segment robust, bearing five setae and an aesthetasc; upper surface showing a transverse distinct ridge in the distal half, reaching from the anteriorly directed margin towards the posteriorly directed one but terminates at small distance of the latter; ultimate segments as in the female.

Mouthparts and P1 — P4 as in the female; P5 (Fig. 2j) resembling that of the female showing however considerably longer inner spines — about $2/3$ of the setae — and lacking the median tuft of spinules.

P6 (Fig. 4b) symmetrical, without setae or spines on the outer margins.

Discussion

Within the genus, *Laubieria tercera* n. sp. is most closely related to *L. secunda*. Indeed, both congeners share the highly reduced setal formula without outer spines on the proximal and median exopodal segments of P3 and P4. These features clearly distinguish both species from *L. corallicola* which bears outer spines on the proximal exopodal segments in these legs.

L. tercera n. sp. can easily be distinguished from its closest relative by the chaetotaxy of the second leg which lacks an inner seta on the median exopodal segment and by the relative lengths of the armature elements on the female P5.

At first sight, *L. tercera* n. sp. could be distinguished from *L. secunda* because of the absence of setae on the inner margins of the first and second endopodal segments of P2 — P4 in the former. However, the exact nature of the inner endopodal setae as shown by WELLS (1967) for *L. secunda* needs reconsideration. By their position and fragility they resemble remarkably the slender spinules found on the endopodites of *L. tercera* n. sp.

If these endopodal setae in *L. secunda* turn out to be spinules, the generic designation of *L. secunda* and *L. tercera* n. sp. can seriously be questioned. Indeed, absence of outer exopodal spines, a rather rare phenomenon within harpacticoids, clearly represents an important evolutionary novelty. Considering the three known species of the genus *Laubieria*, *L. corallicola* differs strongly from the other species by the presence of outer exopodal spines on the proximal segments, the setae on the inner margin of the proximal endopodal podomeres and the large sharp process on the female P5. It seems not unlikely that *L. corallicola* is a representative

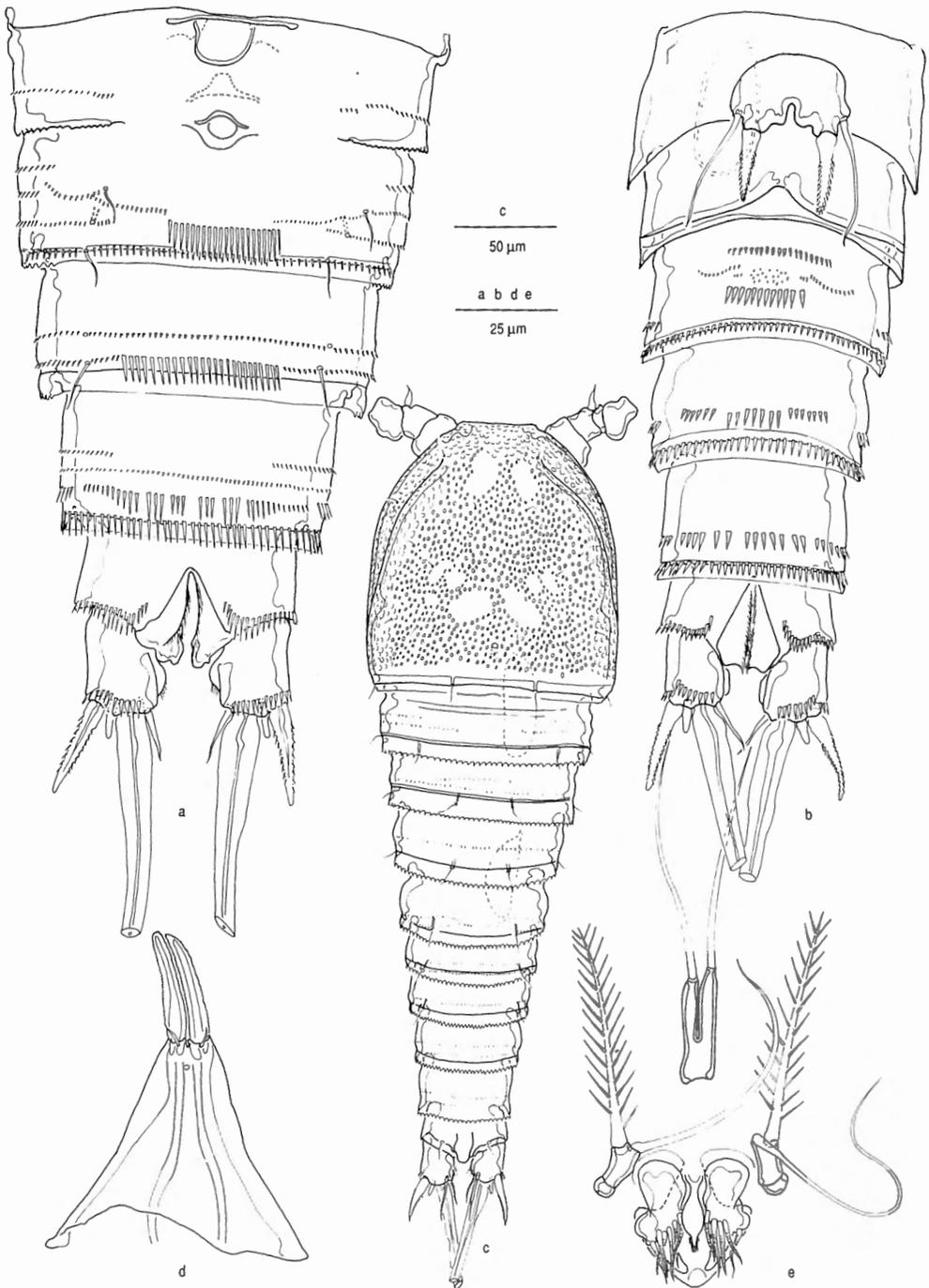


Fig. 4. — *Laubieria tercera* n. sp. : a, female abdomen in ventral view ; b, male abdomen, including P5-bearing somite, in ventral view ; c, male habitus in dorsal view ; *Metis reducta* n. sp. : d, rostrum in ventral view ; e, mouthparts *in situ*.

of a branch phylogenetically situated between the genus *Metis* and the two *Laubieria*-species now known from the Indian Ocean.

genus *Metis* PHILIPPI, 1843

Metis reducta n. sp.

Type material. Holotype, one dissected male, mounted on three slides and labeled COP 3420 A,B and C; paratypes : one dissected female juvenile (copepodid V), mounted on two slides (COP 3419 A and B) and 2 males, 1 female C V and 3 C IV preserved in alcohol (COP 3421).

Type locality. Found in the same sample containing *Laubieria tercera* n. sp.

Etymology. The specific name (Latin : *reductus*) refers to the reduced segmentation of the P1 endopodite.

Description

Male (holotype) : habitus typically Metidae-shaped (Fig. 5a) ; length, measured in lateral view, from the tip of the rostrum towards the distal margin of the furcal rami : 490 μ m ; length of cephalothorax about half the body-length ; lateral margins of the body somites tapering towards the anal segment, in dorsal view ; anal operculum rather wide having a distinct convex distal median part.

Integumental structures : surface of cephalothorax and body somites smooth ; thoracic somites without ornamentation along the posterior margins ; posterior margin of abdominal somites set with a row of minute spinules dorsally, and with long strong spinules laterally and ventrally (Fig. 5c) ; hyaline frill of the somites minutely incised.

Rostrum (Fig. 4d) articulating with the cephalothorax and strongly ventrally directed ; lateral margins steep ; rostral tip with two long and strong, curved spine-like structures furnished with lateral strips of hyaline serrated membrane ; two minute sensillae situated ventrally, near the implantation of the curved appendages.

Furcal rami (Fig. 5b) as long as wide ; dorsal seta, articulating on a single basal part, arising near the inner margin ; distal lateral seta spiniform, about 3.5 times as long as the ramus ; proximal lateral seta absent ; outer principal seta slender, 1.5 times as long as the ramus ; inner principal seta typically swollen and as long as the body length ; inner apical seta smooth, slightly longer than the ramus ; surface set with spinules on the distal outer edge and ventrally, along the distal margin (Fig. 5b- c).

Antennule (Fig. 7c and d) seven-segmented resembling closely that of *M. galapagoensis* MIELKE (1989) ; differing only in the ornamentation of the first segment and in the larger shape of the extension on the second segment.

Antenna (Fig. 6c) with a remarkably short allobasis, slightly longer than wide ; surface of coxa and allobasis smooth, except for a few spinules in the upper half

of the anteriorly directed margin ; exopodite represented as a small spiniform seta ; endopodite with six spines (two of them smooth) and several rows of spinules.

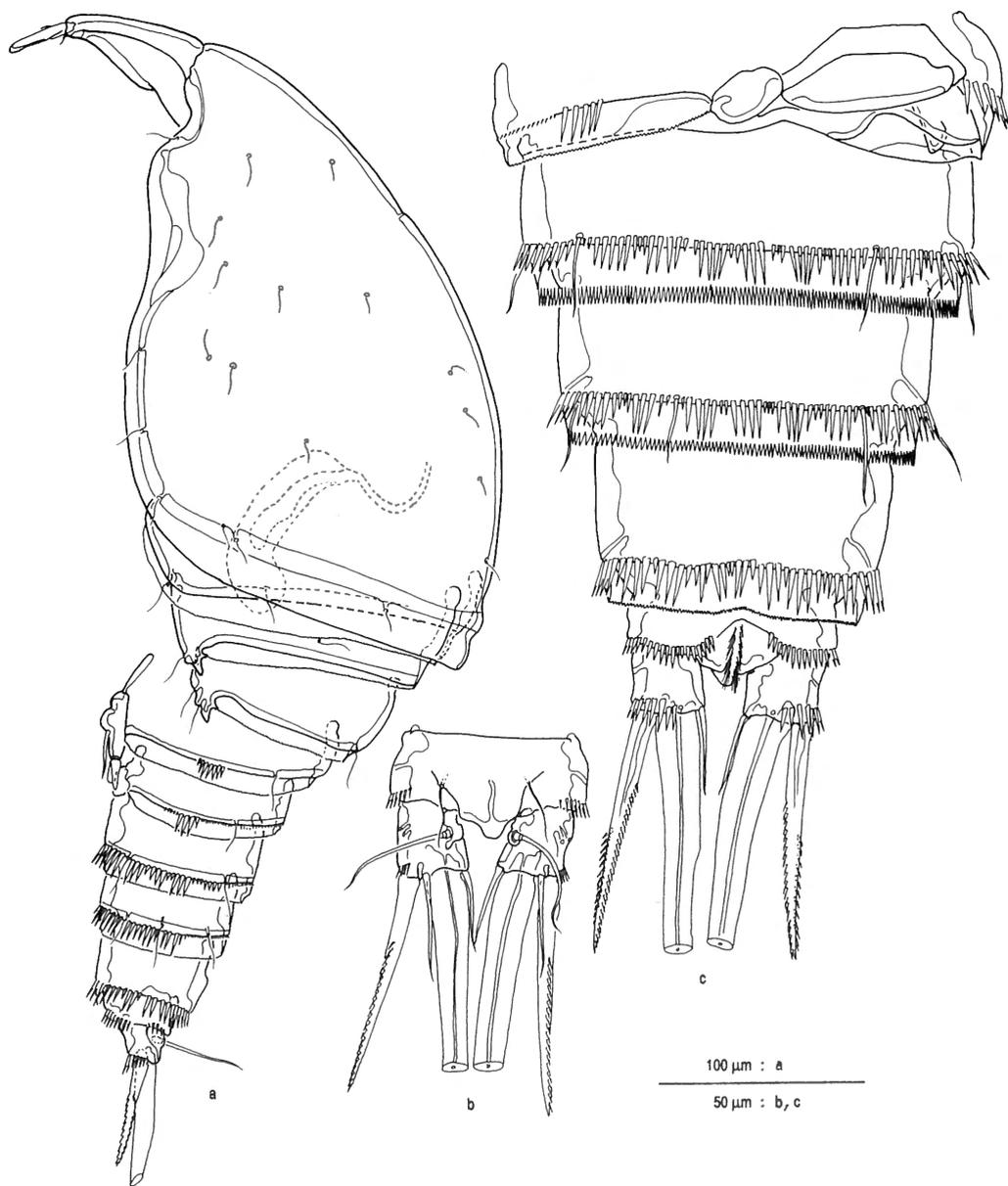


Fig. 5. — *Metis reducta* n. sp. : a, male habitus in lateral view ; b, anal segment in dorsal view ; c, male abdomen in ventral view.

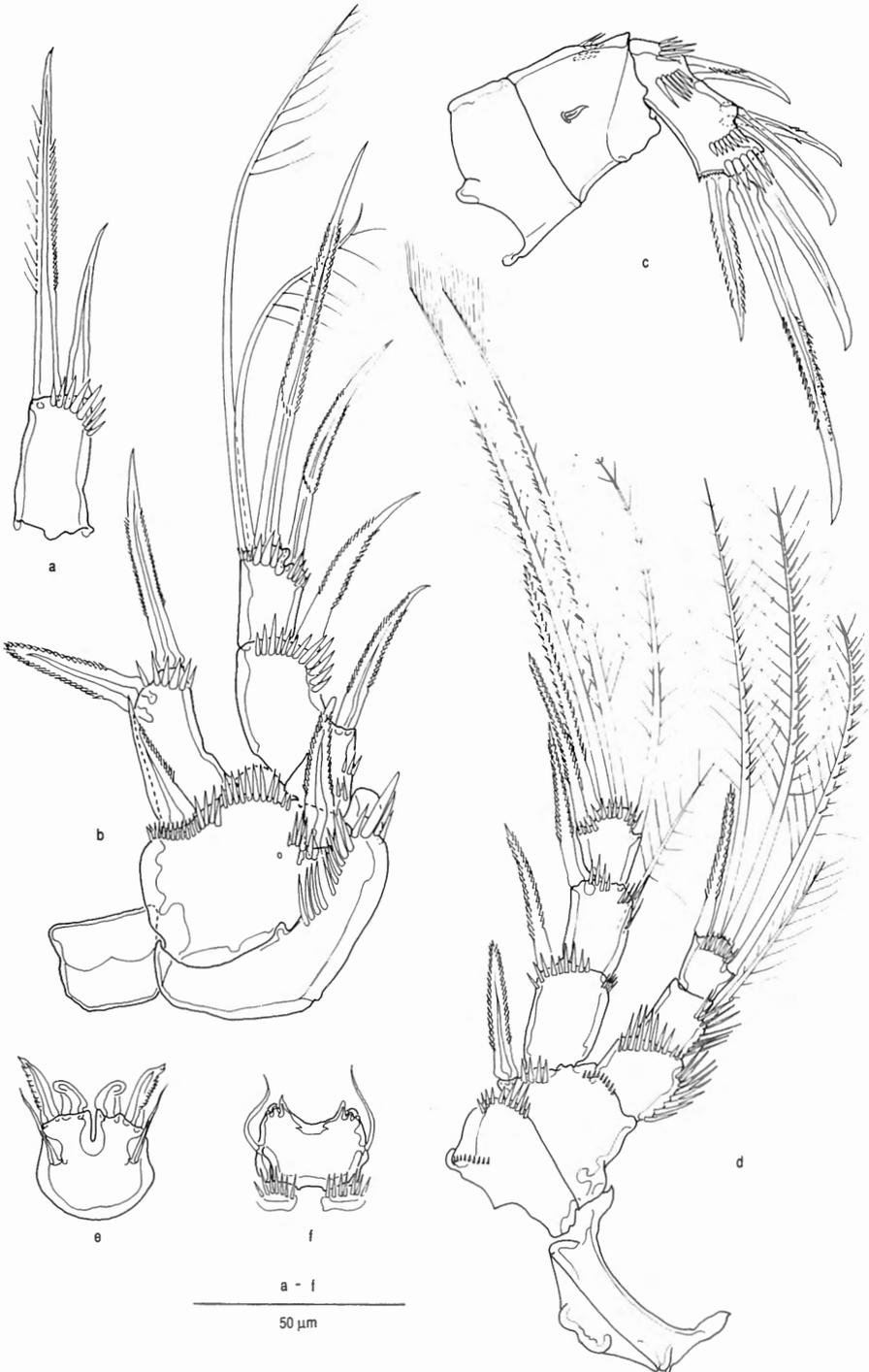


Fig. 6. — *Metis reducta* n. sp. : a, endopodite P1 of female copepodid V; b, male P1; c, antenna; d, male P2; e, male P5; f, P5 of female copepodid V.

Mouthparts (Fig. 4e) typically reduced and identical with those of *M. galapagoensis* except for the shorter maxillipedal branches showing no trace of an apical subdivision (Fig. 4e).

P1 (Fig. 6b) strongly sclerotized; coxa and basis set with rigid spinules; basis with armed inner and outer spine; exopodite three-segmented; proximal segment rather small; terminal exopodal segment with four appendages; endopodite one-segmented with, two armed spines, apically; setal formula as in Table II.

TABLE II

Setal formula of Metis reducta n. sp.

	P1	P2	P3	P4
Exo	0-0-022	0-1-122	0-1-222	0-0-222
End	020	0-1-121	1-0-220	1-0-220

P2-P4 (Fig. 6d, 7a and b, respectively): prae-coxae small, with smooth surfaces; coxae and bases furnished with a few rows of spinules; basis of P2 with an outer spine, without in P3 and P4; exopodal and endopodal rami three-segmented; exopodal segments with outer spines; apical setae on the ultimate endopodal segments plumose and spinulose; setal formula as in Table II.

P5 (Fig. 6e) represented as a single median plate with a deep incision in the middle of the apical margin, strongly sclerotized; outer setae distinctly swollen in the proximal half (keel-shaped); four apical appendages: outer ones armed, about twice as long as the curved, thick inner ones.

P6 (Fig. 5c) remarkable asymmetrical; right leg medially situated and nearly circular, left one slightly shorter than half the diameter of the somite, long ovoid and covering a strongly folded region; armature on neither leg.

Female fifth copepodid: habitus typical; body with nine somites; abdominal somites much more tapering than in the male; fifth leg-bearing somite (145 μm) as wide as the length of the abdomen; length, measured laterally, 560 μm ; integumental structures of body segments, rostrum and furcal rami as in the male.

Antennule (Fig. 7e) five-segmented with robust first segment and extended second one; one aesthetasc arising from a distinct socle on the third segment and one aesthetasc implanted on the apical margin of the ultimate segment; integumental structures of the first and second segments as in the male.

P1 (Fig. 6a) with protopodite and exopodite as in the male; outer endopodal spine smooth, half as long as the inner one and smooth; inner spine armed with slender spinules; general appearance of the endopodal spines obviously more slender than in the male P1.

P2 — P4 as in the male, slightly less sclerotized.

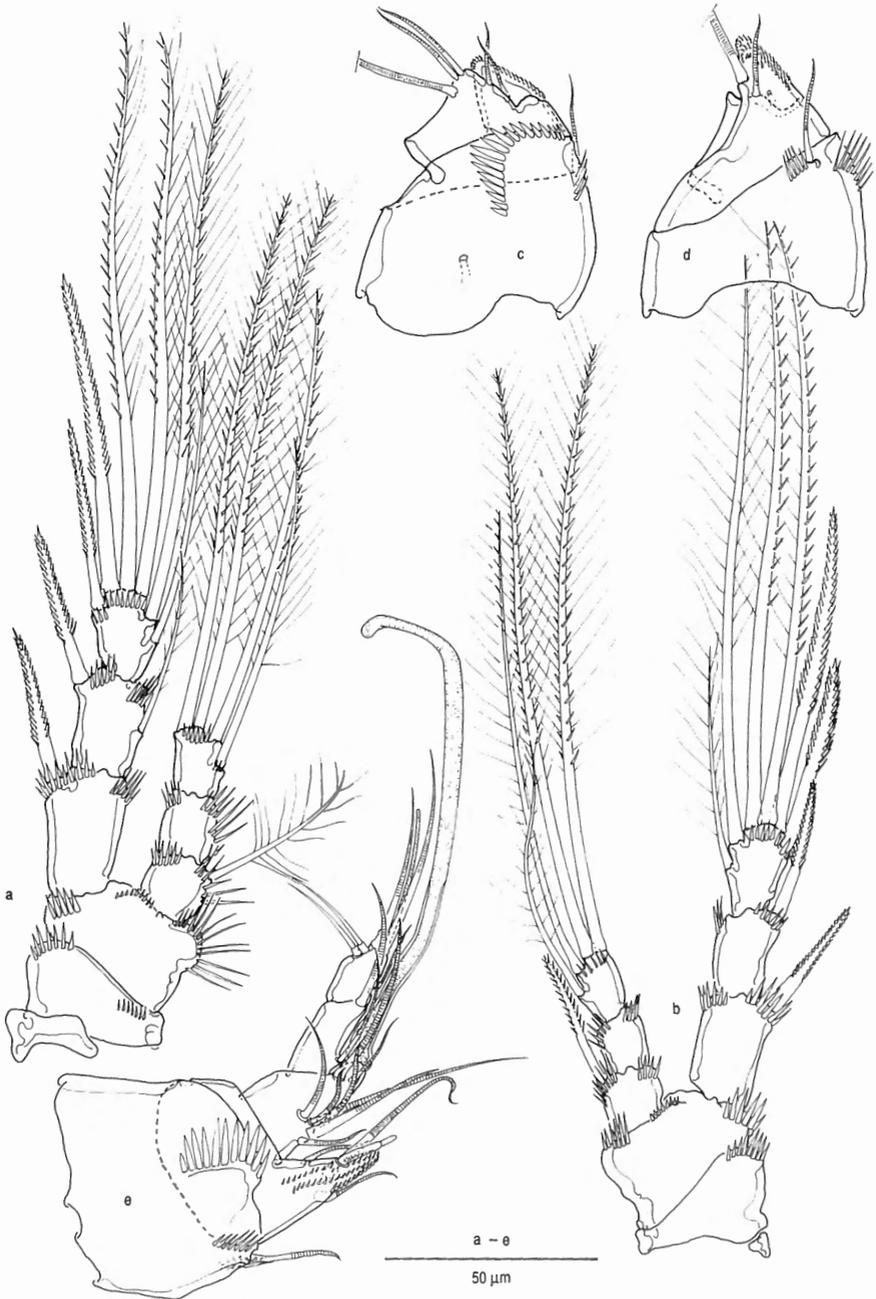


Fig. 7. — *Metis reducta* n. sp. : a, male P3 ; b, male P4 ; c ; first and second segments of male antennule, ventral view ; d, idem, dorsal view ; e, antennule of female copepodid V.

P5 (Fig. 6f) represented as a median plate with a concave anterior margin; outer setae slender, implanted halfway the lateral margin; three small apical structures, with a hyaline appearance, on both sides, the inner one sharp, the median and outer ones small and blunt.

Discussion

Although only adult males were encountered in the sample, the difference — i.e. the one-segmented endopodite in P1 — between the *M. reducta* n. sp. and the five other members of the genus is obvious. Notwithstanding the female of *M. reducta* n. sp. is known from the fifth copepodid morphology only, it seems beyond doubt that the adult stage shows this species' specific feature. In general, the fifth copepodid stage possesses legs with the adult ramal segmentation (FERRARI, 1988). Moulting to the adult stage does not affect the general morphology of the leg except for the ornamentation of the setae/spines and podomeres. Therefore, it seems highly possible that the adult female of *M. reducta* n. sp. has a one-segmented P1 endopodite as in the male.

REFERENCES

- FERRARI, F. D. (1988) — Developmental patterns in numbers of ramal segments of post-maxillipedal legs. *Crustaceana*, **54** : 256-293.
- LANG, K. (1965) — Copepoda Harpacticoidea from the Californian Pacific Coast. *Kungl. Svens. Vetensk. Akad.*, **10** : 1-566.
- MIELKE, W. (1989) — Interstitielle Fauna von Galapagos. XXXVII. Metidae (Harpacticoidea). *Microfauna Marina*, **5** : 173-188.
- WELLS, J.B.J. (1967) — The Littoral Copepoda (Crustacea) of Inhaca Island, Mozambique. *Trans. Roy. Soc. Edin.*, **67** (7) : 189-358.