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Harpacticoid copepods associated with *Spartina alterniflora* culms from the marshes of Cocodrie, Louisiana (Crustacea, Copepoda)

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Summary

Seven harpacticoid copepods have been found living on the lower parts of *Spartina alterniflora* culms, from Cocodrie marshes in Louisiana (U.S.A.). This contribution deals exclusively with the systematics of these species. *Mesochra wolskii* JAKUBISIAK is redescribed and a new key to the species of the genus is given. *M. neotropica* JAKOBI is allocated to the genus *Amphibiperita* n. gen. and is redescribed and discussed in detail. A new laophontid species, *F. mangalis* n. sp. is described and placed together with *Laophonte chathamensis* SARS in the genus *Folioquinpes* n. gen. Some amendations on the description of *Schizopera knabeni* LANG are given and the peculiar shape of the furcal setae of *Nannopus palustris* BRADY is illustrated.

Key-words : Louisiana estuary, *Spartina alterniflora*, harpacticoid associates.

Résumé

Sept copépodes harpacticoïdes ont été découverts sur les parties inférieures des tiges de *Spartina alterniflora*, dans les marais de Cocodrie en Louisiane (E.-U.). La présente contribution traite exclusivement de la systématique de ces espèces. *Mesochra wolskii* JAKUBISIAK est redécrite et une nouvelle clé des espèces appartenant au genre est donnée. *M. neotropica* JAKOBI est attribué au genre *Amphibiperita* n. gen.; elle est redécrite et discutée de façon détaillée. Une nouvelle espèce de laophontides, *F. mangalis* n. sp., est décrite et attribuée avec *Laophonte chathamensis* SARS au genre *Folioquinpes* n. gen. Quelques corrections sont apportées à la description de *Schizopera knabeni* LANG, et la forme très particulière des soies furcales de *Nannopus palustris* BRADY est dessinée.

Mots-clés : estuaire de Louisiane, *Spartina alterniflora*, harpacticoïdes associés.

Introduction

In 1987 one of the authors (Ph. RUTLEDGE) instituted a year long study of the meiofauna inhabiting culms of *Spartina alterniflora* in a Louisiana marsh. The study area was located adjacent to the LUMCON (Louisiane Universities Marine Consortium) Marine Education Center at Cocodrie (90°40' Long. 29°15' Lat.) Louisiana, U.S.A. The marsh in this area is characterized by low salinity (5-20 ‰) and low amplitude-wind driven tides. *Spartina* along tidal stream banks is typically covered to a varying degree with epiphytic algae often extending above the water line. BURKE (1876) had examined the macrofauna inhabiting *Spartina* in a nearby area, finding animals living under the outer sheath above the water level among the epiphytic cover.

We found harpacticoids inhabiting parts of the *Spartina* culm well above the water level. *Leptocaris brevicornis* is particularly adept at this supra-littoral existence, being found over 30 cm above the water surface. The epiphytic algae on the culms appear to retain moisture facilitating the survival of harpacticoids.

The present study deals with the systematics of the species found in this peculiar habitat. Besides some amendations on the description of *Schizopera knabeni* and the variability of *Nannopus palustris*, redescriptions are given for *Mesochra wolskii* and *M. neotropica*. Because of the marked features of the latter, *M. neotropica* is allocated to the herein erected genus *Amphibiperita* n. gen.

Furthermore *Folioquinpes mangalis* n. gen., n. sp. is described. This species has been found on the *Spartina*-stems from Louisiana but also on the roots of mangrove trees along the southern and northern coast of Papua New Guinea. The genus *Folioquinpes* n. gen. comprises the here described species and *Laophonte chathamensis*, formerly designated to the genus *Onychocamptus* by LANG (1948).

Material and methods

Spartina culms were collected by clipping them at the sediment surface and gently lifting them out of the water. Preliminary samples showed that the resident harpacticoids were adequately retained on the culm if the clipping and the removal was done with care. The culms were then cut into 3 cm-sections which were referenced as to their height above or below the water at the current tide stage. Each section was preserved in a 10 % formaline solution. Ten such stems from along the stream edge were collected each month for a full year. In the laboratory the stem sections were washed over a 500 µm sieve, and crushed so as to release all meiofauna. Harpacticoids were collected on a 65 µm sieve.

All the specimens mentioned in the present work were collected in Louisiana (U.S.A.). However, studying the Laophontidae from a wide range of localities, one of the

authors (F. FIERS) found *Folioquinpes mangalis* n. gen., n. sp. in samples from Papua New Guinea. Since the type-collection was established and the drawings were finished before studying the Louisiana material, type-locality and type-series of *F. mangalis* n. gen., n. sp. were chosen from Papua New Guinea.
Additional material of *Mesochra wolskii*, deposited in the collections of the B.M.N.H., London and in the collections of the K.B.I.N., Brussels, has been compared with the specimens studied in the present contribution.
Dissected specimens are mounted in lactophenol, preserved ones are stored in 75 % ethylalcohol (buffered). All the specimens are deposited in the collections of the Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels (I.G. 27482 for the Louisiana materials). The original collection comprised small vials, each containing a 3 cm long part of a culm. The animals, collected on each part, were stored in separate vials, labeled with the position on the culm and registrated with a COP number. A reference collection of the species is deposited in the collections of the Department of Zoology and Physiology of the Louisiane State University.
Terminology, abbreviations and family division of the Harpacticoida used herein are according to LANG (1948, 1965) except for the morphology of the mandible (see MIELKE, 1984) and the maxilliped (see BOXSHALL, 1985). Drawings are made with the aid of a camera lucida.

Systematics

Family DARCYTHOMPSONIIDAE
Leptocaris brevicornis (VON DOUWE, 1904)

Material :
16 females, 24 males and 9 juveniles, in alcohol (COP 2976, 2978, 2985, 2988, 2993, 2995, 2998, 2308) and 1 female and 1 male dissected (COP 2311a, b, c, 2312 a, b).

Family DIOSACCIDAE
Schizopera knabeni LANG, 1965

*Material :*8 females, 1 male and 3 juveniles preserved in alcohol (COP 2973, 2989, 2999, 2307), 2 females and 1 male dissected (COP 2314a, b; 2315a, b; 2316a, b).

Comments :
The specimens at hand resemble the original description of *S. knabeni* in nearly all aspects. Some details omitted in the original description and some differences between the Californian and Louisiana specimens are dealt with.
The body length of the Louisiana specimens is about 100 µm smaller than the average length LANG (1965) mentioned for his specimens (0.6 mm). The length of the female specimens averages from 485 to 530 µm (n=10), that of the male varies from 500 to 530 µm (n=6).
The integument of the cephalothorax is smooth, but the integument of each somite has at least one transversal row of minute spinules (Fig. 1a). The spinules on the ventral side of the second and third abdominal somites are markedly longer than the dorsal ones (Fig. 1b). Moreover, each somite, including the cephalothorax, shows a transparent, finely incised hyaline frill. The frill of the prae-anal segment overlaps the anal segment almost entirely and shows a distinct convex medio-dorsal part.
One female specimen has been found with five spines on the baseoendopodite of the left P_5 (Fig. 1d). The P_5 of the Louisiana specimens differs also from the original description in the more spiniform shape of the inner spines on the baseoendopodite and the setulose appearance of the distal seta of the exopodite.
The male has an eight-segmented haplocer antennule, bearing the major aesthetasc on the thickened fourth segment (Fig. 1e). A second aesthetasc is implanted on the apical margin of the ultimate segment and is fused near its implantation with two slender setae. This second aesthetasc is present on the last segment of the female antennule as well. LANG (1965, Fig. 182b) omitted this aesthetasc in the descriptions of both *S. knabeni* and *S. californica*. However, personal examination of some other *Schizopera* species revealed that the presence of an aesthetasc on the ultimate antennular segment is common and is probably even a general feature in the genus.
The transformed inner spinule of the P_1 basis is, in the specimens at hand, blunt and appears to be much more robustly developed than in the californian specimens (Fig. 1g). The inner margin, which normally shows a rather sharp extension, is much less transformed in the specimens studied.
LANG (1965) argued in the original description of the species that the sixth pair of legs were absent. He probably alluded to the absence of setae on this appendage. In the male specimens at hand and in other species of the genus examined, this typical male appendage was always present, the male P_5 (Fig. 1c) consists of two smooth ovate plates without setae on the edges. The right plate is slightly larger than the left one. The male P_6 is often omitted in descriptions of *Schizopera* species. The shape of the male P_6 as described here for *S. knabeni*, seems to be the same in all the members of the genus but the presence and morphology of the P_6 in related genera is not clear at all. However the morphology of this appendage may turn out to be important in the discussion of the systematic relationships of the genera within the Diosaccidae. Actually, the proposed relationships (LANG, 1948; WELLS & RAO, 1976; WELLS *et al.*, 1982) are based mainly on the modifications of the exopodite of the male P_3 and the morphology of the antenna. The shape and chaetotaxy of the P_6 and the modification of it in the several diosaccid genera, can bring new evidences in this discussion.

Family AMEIRIDAE
Nitocra lacustris SCHMANKEVITSCH, 1875

Material :
22 females, 8 males and 5 juveniles in alcohol (COP

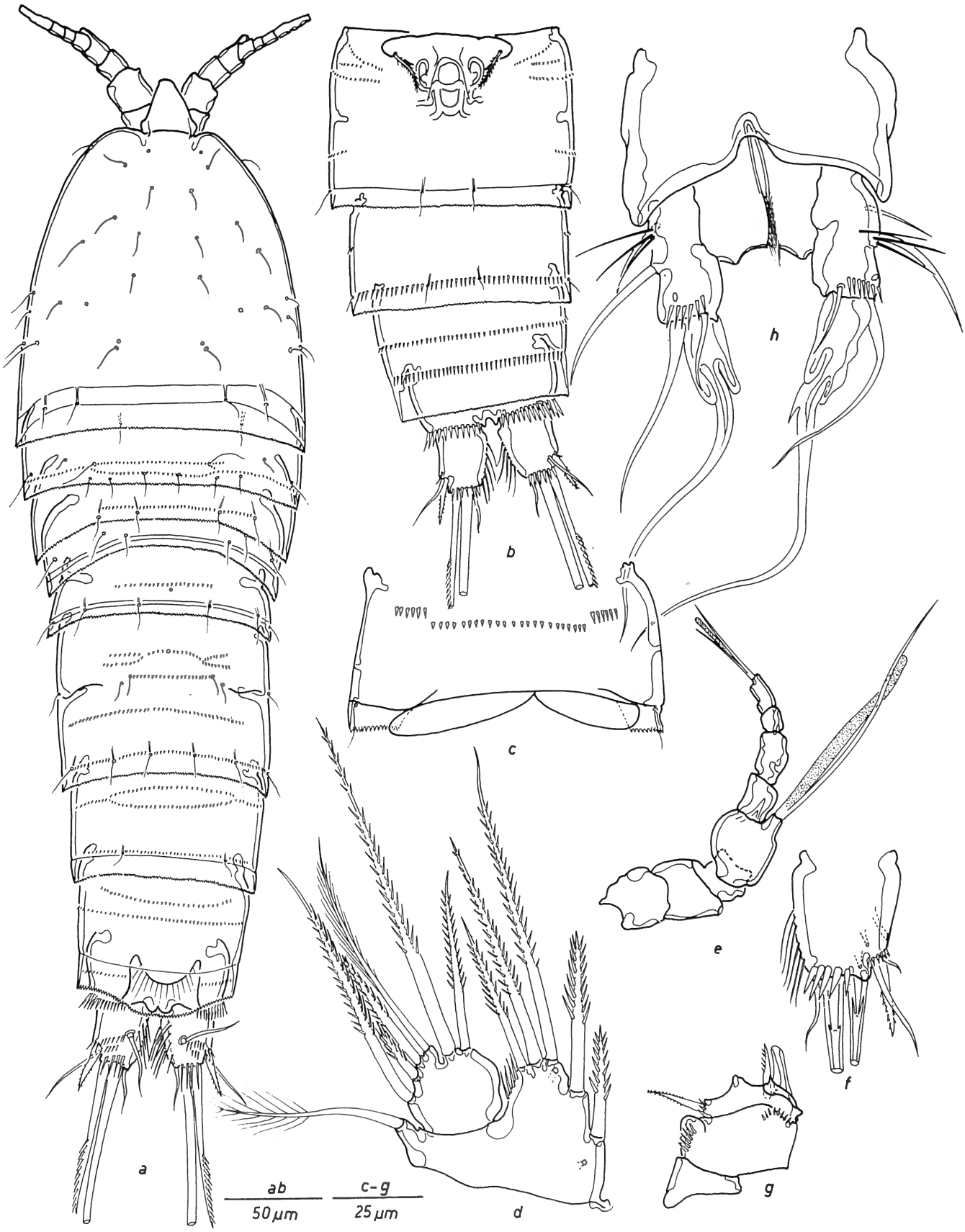


Fig. 1. - Schizopera knabeni : *a. Habitus of the female ; b. Female abdomen in ventral view ; c. Male sixth somite and* P_6*, in ventral view ; d. Aberrant female* P_5*; e. Male antennule ; f. Furcal ramus, in ventral view ; G. Protopodite of male* P_1*;* Nannopus palustris : *h. Anal segment and furcal rami in ventral view.*

2977, 2982, 2990, 2300, 2305, 2309) and 1 dissected female (COP 2313 a, b, c).

Family CANTHOCAMPTIDAE

Mesochra wolskii JAKUBISIAK, 1933

Material :

Three females (COP 2965, 2967, 2970), 2 males (COP 2966, 2968) and 1 copepodid I (COP 2969) dissected. 45 females (10 ovigerous), 17 males and 33 juveniles preserved in alcohol (COP 2960 - COP 2964, COP 2975, 2983).

Additional material examined :

— India, Madras : Vellar River estuary near Porto Novo. Leg. A.D. McIntyre, January-February 1966. Det. J.B.J. WELLS (in WELLS, 1971) and part of the collection of the B.M.N.H., London. Reg. No. 1969.5.30.12.

— Egypt, Fayoum region : Qarun Lake, S.E.-tip. Washings of aquatic vegetation. Cond. 32.800 µsiemens. Leg. L. TRIEST, S. El KHANAGRY & B. DIWAN, 23 May 1986. Collections of the K.B.I.N., Brussels, COP 2956, 2971.

— Egypt, Fayoum region : Qarun Lake, about 6 km W. of Shakshouk. Ezbet El Saida, on the road to Qarum village. Shallow pools (± 10 cm deep) separated from the lake. Washings of aquatic vegetation. Cond. 42.300 µsiemens. Leg. L. TRIEST, S. El KHANAGRY & B. DIWAN, 25 May 1986. Collections of the K.B.I.N., Brussels, COP 2972.

Description :

Female : habitus fusiform compressed; length, including rostrum and furcal rami, 365 to 410 µm (n=10); greatest width near the posterior margin of the cephalothorax; lateral margins of thoracic segments smoothly tapering posteriad; length of cephalothorax about one third of the entire body length; abdomen about half as long as the body.

Integumental structures (Fig. 2a, b, c) : all somites except the fifth leg bearing one, with a incised hyaline frill; frill of the fourth thoracic segment less wide than the frill of the other segments; integument of cephalothorax and thoracic somites smooth except for some spinules along the margin near the pleural region; first genital segment without ornamentations; second genital segment dorsal and lateral row of spinules, interrupted medio-dorsal; ventral surface with a short row of spinules on both sides and situated near the posterior margin; second abdominal segment with spinules along the postero-lateral margin and along the entire ventro-dorsal margin; prae-anal segment with two parallel rows of a few spinules on the lateral margin and two short rows of spinules medio-ventral; anal segment with a spinulose anal sinus and set with small spinules along the edge of the anal operculum and along the posterior margins.

Furcal rami nearly as long as wide; dorsal seta articulating on two basal parts and arising near the inner margin; lateral setae implanted in the distal half of the outer margin; inner apical seta, longer than the ramus and implanted on a small extension of the inner distal edge; all setae smooth except for the spinulose principal apical setae; each ramus furnished, dorsally. and ventrally, with spinules along the distal margin, near the implantation of the lateral setae and near the implantation of the dorsal seta.

Antennule (Fig. 3e) six-segmented with major aesthetasc on the third segment; first segment with two parallel rows of long and stout spinules; second and third segment each with one feathered seta; all other setae smooth; last segment with an aesthetasc, fused with two setae near the implantation, and arising from the apical margin.

Antenna (Fig. 3h) allobasis with a fine ridge near the implantation of the exopodite; inner margin of the allobasis with two setae : proximal one feathered, distal one small and smooth; endopodal segment bearing laterally two spines and a seta and apically three spines and three setae, one of them minute and fused with the outer spine.

Mandible, maxillule, maxilla and maxilliped identical with these illustrated by BODIN (1972) for *M. pontica*.

P_1 (Fig. 3d) : coxa and basis with strong spinules on the surfaces and along the margins; intercoxal plate with some minute spinules on the rounded edges; inner and outer spine of the basis strongly armed; exopodite three-segmented, bearing a distinct seta on the inner margin of the median segment; endopodite two-segmented; first endopodal segment about 1.3 times as long as the entire exopodite and having a seta implanted near the middle of the inner margin; second endopodal segment, twice as long as wide, bearing a claw, a geniculated seta and a small smooth seta.

P_2-P_4 (Fig. 3d, c, b, respectively) : surfaces of basis and coxae largely smooth; intercoxal plates as in P_1, but spinules somewhat stouter; endopodites two-segmented, exopodites three-segmented; last exopodal segments with two outer spines; chaetotaxy in table I; subdistal inner seta of the last exopodal segment of P_4 set with stout setules along one side of the stem.

P_5 (Fig. 4c) : exopodite fused with the baseoendopodite, bearing five setae; apical and outer proximal one spinulose, other setae smooth; seta implanted above the proxi-

Table I :
Chaetotaxy of Mesochra wolskii *JAKUBISIAK.*

	P_1	P_2	P_3	P_4	♀ P_5	♂ P_5 *
Exo	0-1-022	0-1-122	0-1-222	0-1-222	5	4
End	1-111	1-221	0-221	0-221	5	2

* Rami obsolete but clearly recognizable.

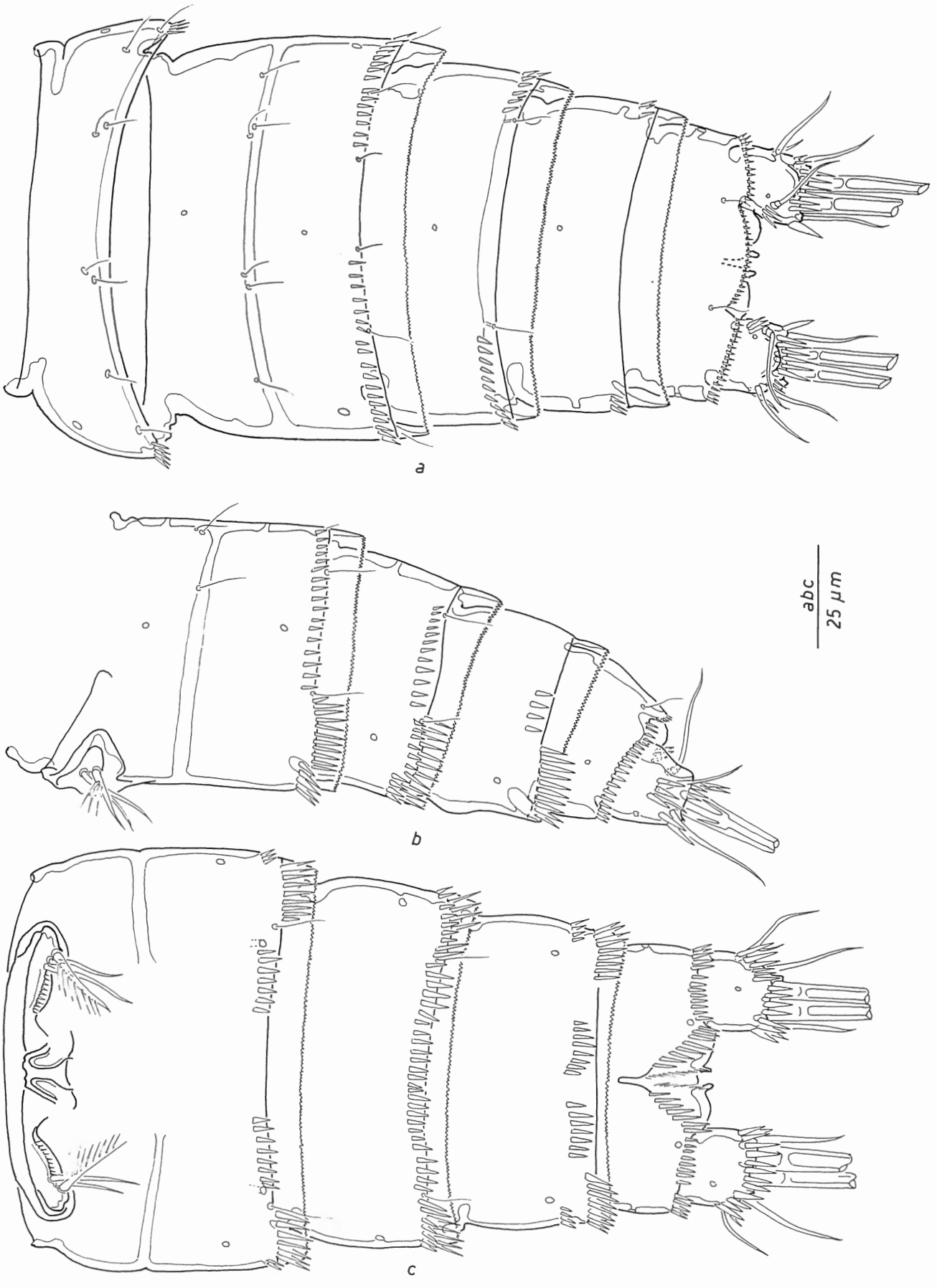
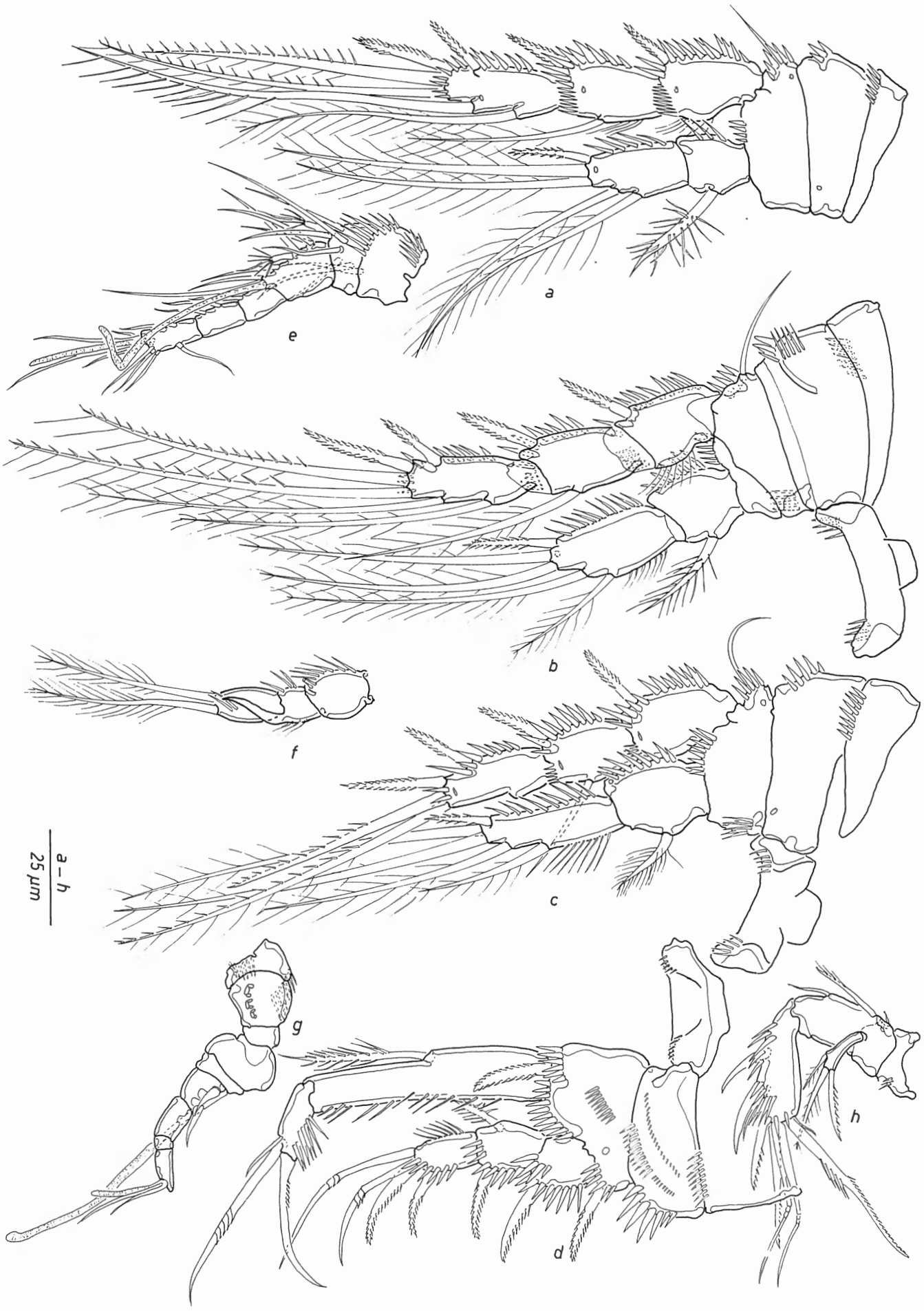


Fig. 2. - Mesochra wolskii : *a. Female abdomen in dorsal view; b. Idem, in lateral view; c. Idem, in ventral view.*


a
e
b
f
c
g
d
h
a – h
25 µm

mal one very small, reaching not beyond the spinules furnishing the margin; baseoendopodite with five spinulose setae; inner proximal setae spinulose along one side of the system and of equal length.

Male : habitus (Fig. 4a) as in the female but with a markedly slender abdomen and separate genital and first abdominal segment. Integumental structures as in the female except for the additional row of spinules along the posterodorsal margin of the genital segment and the continuous row of spinules along the posteroventral margin of the first abdominal segment (Fig. 4d).

Antennule (Fig. 3g) eight-segmented, sub-chirocer, bearing the aesthetascs on the fourth and the ultimate segments respectively; first segment less long than in the female.

P_3 (Fig. 3f) : protopodite and exopodite as in the female; endopodite three-segmented with a curved apophysis, reaching nearly to the apical margin of the third segment; first and second segment without setae, third segment with two apical ones.

P_5 (Fig. 4b) represented as a transverse plate on the fifth leg bearing segment; endopodal and exopodal lobes distinct, bearing two and sic setae respectively; endopodal setae and apical exopodal seta rigid and unarmed.

P_6 (Fig. 4d) : assymetrical; right leg distinct and ovate, being half as long as diameter of the segment; left leg small, only half as long as the right one; each leg without setae.

Remarks :

Mesochra wolskii seems to be most closely related to *M. rostrata* GURNEY (1927) and *M. lindbergi* PETKOVSKI (1964). These three species share the reduced chaetotaxy of the exopodites (two spines on the ultimate segments), the two-segmented endopodite in P_1 and the fused exopodite of the P_5. However, *M. wolskii* can easily be distinguished from its two congeners by the presence of an inner seta on the median exopodal segment of the P_1 and the presence of two setae on the inner margin of the second endopodal segment of the P_2.

M. wolskii, originally described from Matanzas laguna, Cuba (JAKUBISIAK, 1933), has been reported since from the Vellar Estuary, near Porto Novo, India (WELLS, 1971) only. Re-examination of the latter and comparison with specimens from Lake Fayum (Egypt) revealed no significant differences between the specimens of those widespread localities. Although the type-material of this species could not be studied, little doubt remains that the specimens at hand are conspecific with *M. wolskii.*

HAMOND (1971) uses the number of segments and the implantation of the major aesthetasc on the antennule as major discriminating features in his key to the species. However, descriptions and illustrations of this appendage of some species may be wrong. The antennule of *Mesochra* arises from a strongly sclerified socle which, in dorsal view, is very obvious. It appears that this particular structure has been interpreted as the first antennular segment in some descriptions. For example, *M. rostrata* is distinguished from *M. lindbergi* by the presence of a seven-segmented antennule, bearing the aesthetasc on the fourth segment. But, re-examination of the co-type of *M. rostrata* clearly revealed that the antennule of this species is only six-segmented with the aesthetasc on the third segment. Moreover, the number of segments beyond the aesthetasc bearing segment may be variable and articulation between the ultimate segments is often difficult to observe. Therefore, species discrimination using the number of antennular segments should be avoided.

Since HAMOND's revision of the genus, five more species were added : *M. hinumaensis* KIKUCHI, 1972; *M. schmidti* MIELKE, 1974; *M. bodini* KUNZ, 1975 and *M. pallaresi* SOYER, 1977. MIELKE (1974) described *Mesochra* sp. which resembles closely *Canthocamptus parvus* T. SCOTT, 1898. This unique male specimen displays such distinct features regarding the chaetotaxy and sexual dimorphism that it is included in the present key.

HAMOND (1971) claims that the chaetotaxy and particularly the number of outer spines on the last exopodal segments of *M. quadrispinosa* cannot be extrapolated from table 2 in SHEN & TAI (1965). However, although the notation used in the description of this animal is rather bizarre, the presence of three outer spines on the ultimate exopodal segments of P_2-P_4 is obvious. The first column in Table 2 (SHEN & TAI, *op. cit.* : p. 131) represents the outer margin of the exopodites. The second column mentions the setae along the inner margins of the proximal and median segments and the total number of setae on the third segment. Consequently, *M. quadrispoinosa* appears only once in the following key.

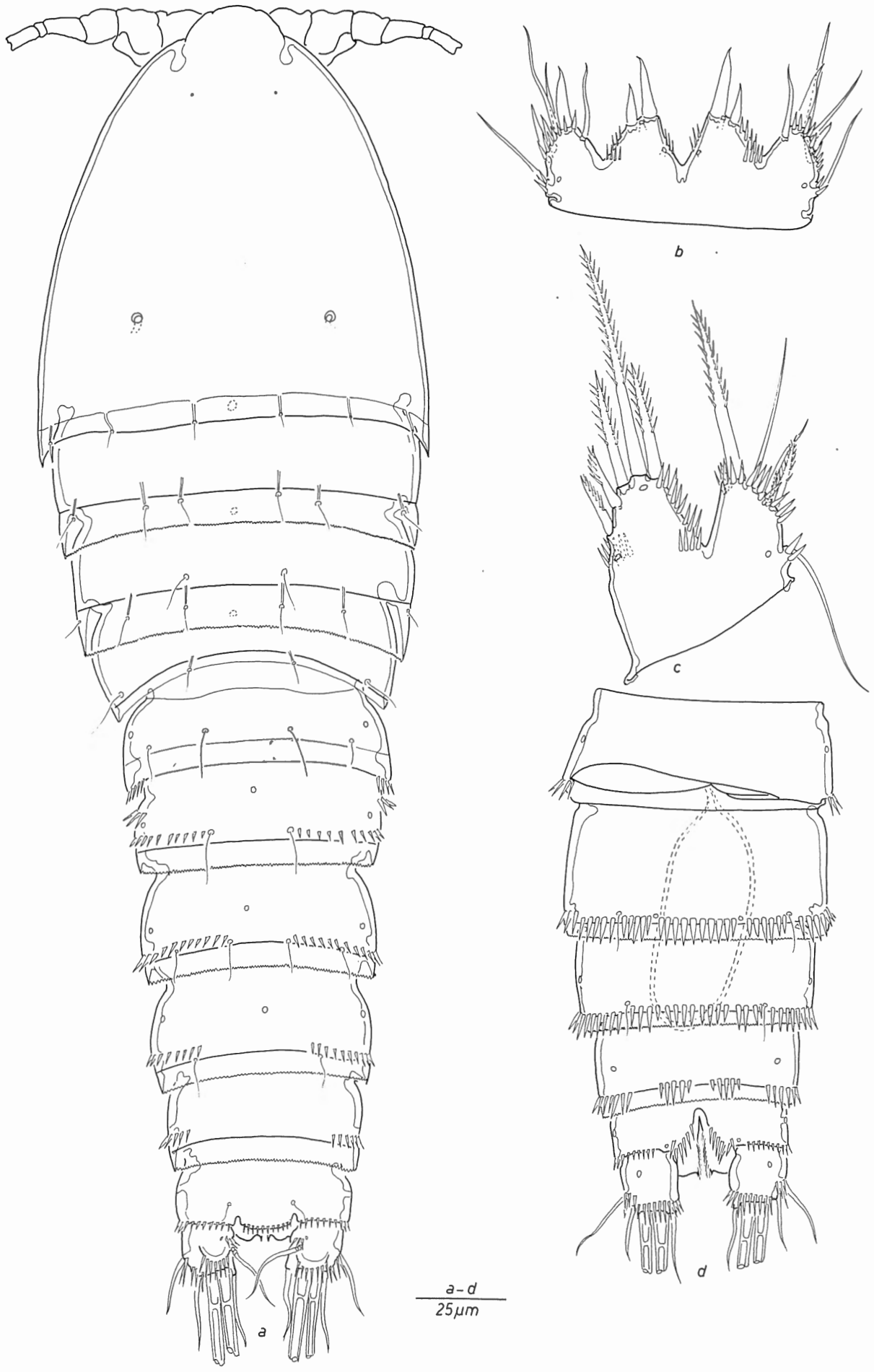
M. neotropica is allocated to the genus *Amphibiperita* n. gen. (see below) and is thus excluded from the key to the species of the genus *Mesochra.*

Key to the species

Notes :

* Unless explicitly stated, the characteristics used in the present key distinguish females as well as males.
* The quotation "spine formula" refers to the number of spines on the ultimate exopodal segments of respectively P_2, P_3 and P_4.
* *M. bodini* has a variable spine formula in the P_4 but seems to display normally three outer spines.
* The following species are omitted : *M. provazeki* VAN DOUWE, 1907; *M. pygmaea* CLAUS of NICHOLLS (1941); *Mesochra* sp. cfr *heldti* MONARD of MARGALEF (1953); *M. rapiens* (SCHMEIL of POR (1960); *M. heldti* MONARD ? of BODIN, 1972 and *Mesochra* sp. of HAMOND (1971).

◁ Fig. 3. - Mesochra wolskii : *a. P_4; b. P_3; c. P_2; d. P_1; e. Female antennule; f. Endopodite P_3 of the male; g. Male antennule; h. Antenna.*


a
b
c
d
a-d
25µm

1 - P_1 endopodite three-segmented; spine formula, 333 : . . 15
- P_1 endopodite three-segmented; spine formula, 222 : . 12
- P_1 endopodite three-segmented; spine formula, 332 : . . 2
- P_1 endopodite two-segmented; spine formula, 333 : . . 11
- P_1 endopodite two-segmented; spine formula, 222 : . . 3

2 - Furcal rami 3.5 times as long as wide; endopodite of the male P_3 two-segmented : . . . . . *M. inconspicua*
- Furcal rami less long than wide; endopodite of male P_3 three-segmented : . . . . . *Mesochra* sp. MIELKE

3 - P_5 exopodite fused with baseoendopodite : 4
- P_5 exopodite articulating with baseoendopodite : . . . 6

4 - Median exopodal segment P_1 with inner seta; inner seta on first endopodal segment P_1 arising in the middle of the segment : . . . . . *M. wolskii*
- Median exopodal segment P_1 without inner seta; inner seta on first endopodal segment P_1 arising in distal half of the segment : 5

5 - Proximal endopodal segments P_2 and P_3 without an inner seta in the female; proximal endopodal segment P_1 at least four times as long as the distal one : . . . . . *M. rostrata*
- Proximal endopodal segments P_2 and P_3 with an inner seta in the female; proximal endopodal segment P_1 only 2.5 times as long as the distal one : . . . *M. lindbergi*

6 - Proximal endopodal segments of P_2 and P_3 without an inner seta : . . . . . *M. suifunensis*
- Proximal endopodal segments of P_2 and P_3 with an inner seta : 7

7 - Baseoendopodite P_5 of the female with six setae : . . . . . *M. aestuarii*
- Baseoendopodite P_5 of the female with four or five setae : 8

8 - Ultimate exopodal segment P_3 with one inner seta : . . . . . *M. dulcicola*
- Ultimate exopodal segment P_3 with two inner setae : . . 9

9 - P_5 exopodite of female with four setae, of the male with six setae : . . . . . *M. meridionalis*
- P_5 exopodite of female and male (if known) with five setae : 10

10 - Inner baseoendopodal setae of female P_5 as long as the subdistal one; male unknown : . . . . . *M. sewelli*
- Inner baseoendopodal setae of female P_5 much shorter than subdistal one and spiniform : . . . . . *P. parva*

11 - Baseoendopodal of female P_5 with five setae; median exopodal segment P_1 without inner seta : . . *M. timsae*
- Baseoendopodite of female P_5 with six setae; median exopodal segment P_1 with an inner seta : . . . *M lilljeborgi*

12 - Ultimate exopodal segments of P_2 and P_3 with one and two inner setae : 13
- Ultimate exopodal segments of P_2 and P_3 without inner setae : . . . . . *M. reducta*

13 - Distal endopodal segments with two, four and five setae respectively; exopodite P_1 as long as the distal endopodal segment : . . . . . *M. anomala*
- These characteristics not combined : 14

14 - First endopodal segment P_1 longer than exopodite; distal endopodal segments P_2-P_4 with four, five and five setae in all; proximal endopodal segment of male P_3 without inner seta : . . . . . *M. schmidti*
- First endopodal segment P_1 as long as exopodite; distal endopodal segments P_2-P_4 with five, six and five setae in all; proximal endopodal segment of male P_3 with inner seta : . . . . . *M. baylyi*

15 - First endopodal segment of P_1 much smaller than the exopodite, reaching slightly beyond the second exopodal segment, at the most : 16
- First endopodal segment at least as long as the entire exopodite : 21

16 - Endopodites P_2-P_4 with four setae on the distal segment; female baseoendopodite P_5 with four setae : . . 17
- Endopodites P_2-P_4 with at least five setae on the distal segments; female baseoendopodite P_5 with six setae : 18

17 - Exopodite P_5 of the female fused, bearing five setae; exopodite P_5 of the male with a long inner seta : . . . . . *M. hinumaensis*
- Exopodite P_5 of the female free, bearing four setae; exopodite P_5 of the male with a short inner seta : . . . . . *M. quadrispinosa*

18 - First endopodal segment P_1 as long as the successive segments : . . . . . *M. mexicana*
- First endopodal segment P_1 much longer than the successive ones : 19

19 - Second endopodal segment P_2 nearly four times as long as wide and twice as long as the proximal segment : . . . . . *M. armoricana*
- Second endopodal segment P_2 twice as long as wide and 1.5 times as long as the proximal one : 20

20 - First endopodal segment reaching just beyond the articulation between second and third exopodal segment; endopodite P_3 of male two-segmented : . . . *M. heldti*
- First endopodal segment reaching almost to the apical margin of the third exopodal segment; endopodite P_3 of male three-segmented : . . . . . *M. rapiens*

21 - First endopodal segment P_1 at the most 1.5 times as long as the entire exopodite : 22
- First endopodal segment P_1 nearly twice as long as the entire exopodite : . . . . . *M. nana*

22 - Endopodite P_3 with six setae in all; P_5 baseoendopodite and exopodite in the female with five setae : . . . 23
- Endopodite P_3 with five setae at the most; other characteristics not combined : 24

23 - Sub-distal outer seta of female exopodite P_5 setiform, twice as long as the two outermost setae : . . . . . *M. xenopoda*
- Sub-distal outer seta spiniform and as long as the outer one; median outer spine dwarfed : . . . . *M. pontica*

24 - Second endopodal segment P_1 without an inner seta : 25
- Second endopodal segment P_1 with an inner seta : . . 26

25 - Aesthetasc A_1 implanted on the third segment; inner seta on first endopodal segment P_1 arising almost subdistally : . . . . . *M. pestai*
- Aesthetasc A_1 implanted on the fourth segment; inner seta on thge first endopodal segment P_1 arising in the middle of the distal half : . . . . . *M. flava*

26 - Second endopodal segment P_2 with five setae : . . 27
- Second endopodal segment P_2 with four setae : . . . . . *M. arenicola*

◁ Fig. 4. - Mesochra wolskii : *a. Habitus of the male; b. Male P_5; c. Female P_5; d. Male abdomen in ventral view.*

27 - First endopodal segment P_1 between 1.25-1.30 times as long as the exopodite : 28
- First endopodal segment P_1 1.1 times as long as the exopodite : . . . . . *M. pallaresi*

28 - Last exopodal segment P_2 with one inner seta : . . 29
- Last exopodal segment P_2 with two inner setae : . . . . . *M. paranaensis*

29 - Median exopodal segment P_1 with a distinct seta, feathered along the stem : . . . . . *M. alaskana*
- Median exopodal segment P_1 without an inner seta; if present then very small and smooth : 30

30 - Female P_5 and male P_5 with two equal inner baseoendopodal setae; exopodite P_5 with a dwarfed outer seta : 31
- Female P_5 and male P_5 with two unequal inner baseoendopodal setae; exopodite P_5 with normal outer setae : . . . . . *M. stellfeldi*

31 - Rostrum with distinctly protruded tip; outer spines on the last exopodal segments normal; endopodite P_3 of male with apophysis : . . . . . *M. pygmaea*
- Rostrum blunt; proximal outer spines of the last exopodal segments minute; endopodite P_3 of the male without apophysis : . . . . . *M. bodini*

Genus **Amphibiperita** n. gen.

Diagnosis :

Body prehensile fusiform, slightly depressed; rostrum prominent, articulating with the cephalothorax; antennule six- or seven-segmented, setae smooth; antenna with allobasis, exopodite absent; mandibular palp minute with basis and endopodite; the former without, the latter with three apical setae; maxilla with two endites; maxilliped prehensile, without a seta on first endopodal segment; P_1 with a three-segmented exopodite and a two-segmented prehensile endopodite; P_2-P_4 with three-segmented exopodites and two-segmented endopodites; ultimate endopodal segments with two outer spines; P_5 with a large endopodal lobe, bearing six setae; exopodite small, fused (?) or articulating on the baseoendopodite, bearing four setae; genital field distinctly separated in an anterior and posterior part; the latter connected with an invagination of the posteroventral margin of the somite.

Sexual dimorphism : body prehensile fusiform depressed; rostrum more slender; antennule sub-chirocer; endopodite P_3 two-segmented with a long sinusoid apophysis, arising from proximal part of inner margin of the second segment; inner lateral setae of second segment absent; exopodite P_4 with a robust proximal segment bearing a long stout outer spine and reaching beyond the distal margin of the third segment; outer exopodal spines larger than in the female but smooth; second endopodal segment P_4 with a short, but more rigid, outer fused with the opposite, forming a transverse plate and bearing three exopodal and three endopodal setae; P_6 present, without setae.

Etymology :

The generic name is a conjunction of the words *amphi* (Greek, meaning both), *bi* (Latin, twice) and *peritus* (Latin, skilled) and refers to the particular habitat on the intertidal roots of *Spartina*. The gender is feminine.

Type-species :

Mesochra neotropica Jakobi, 1956, here designated.

Discussion :

The sole species of the genus, previously described from the mangrove area of Cananeia (Brazil), has been designated to the genus *Mesochra* by Jakobi (1956). In his critical evaluation of the genus *Mesochra*, Hamond (1971) maintained *M. neotropica* in the genus as did both Wells (1976) and Bodin 1089). Wells (1976, p. 135), apparently misled by the discrepancies in the original description, coded for an exopodite on the antenna and for only one inner seta on the third exopodal segments of the legs. However, Jakobi (1956, p. 163) clearly stated that the exopodal segment on the antenna is wanting and mentioned two inner setae on the ultimate exopodal segments in the table (p. 169) as well as in the illustrations of certain legs (fig. 3, p. 162).

In spite of some discrepancies between text, illustrations and the tabular representation of the chaetotaxy in the concise original description of *M. neotropica*, the unique characteristics of this species are obvious. Beside the markedly developed sexual dimorphic features in P_4, *M. neotropica* cannot remain in the genus *Mesochra* because of the absence of an exopodite in the antenna, the reduced mandibular palp, the chaetotaxy of the endopodites and the remarkable shape of the genital field in the female.

As far as known, all the species of *Mesochra* have an exopodite on the antenna and bear always an outer spine on the second endopodal segment of P_1-P_4. The reduction of the antennular ramus and the reduction of the outer subdistal endopodal setae in *Amphibiperita* n. gen. are undoubtedly evolutionary novelties which clearly distinguish the genus from *Mesochra*. However, the morphology of typical sex-dependent structures is much more important in the definition of the present genus.

Sexual dimorphism of the P_4 has been observed in several species of the genus *Mesochra*. The modifications of the exopodite P_4 in *A. neotropica* are however unique. The robust proximal segment, bearing the remarkably long and smooth outer spine, and the dwarfed median segment are sexual transformations which are in no way comparable with the minor differences between the exopodite P_4 in the males and females in some *Mesochra* species. Moreover, sexual dimorphism of the P_4 in *Mesochra* occurs almost exclusively on the endopodite (absence of setae, or slender shape of the segments). The only differences found in the male endopodite P_4 of *A. neotropica* are the slightly longer dimensions of the second segment and the more rigid setules on the setae.

Also typical for the present genus is the male fifth leg which is represented as a large ovate plate lacking a clear distinctions of the endopodal and exopodal parts. In *Mesochra*, the P_5 of the males always show these two parts, although the exopodal ramus may be fused with the baseoendopodite in some species. The exopodite P_5 of *Amphibiperita* n. gen. is obsolete but its position is marked by the separate implantation of the three setae between the central group and the smooth outer seta of the (original) basis.

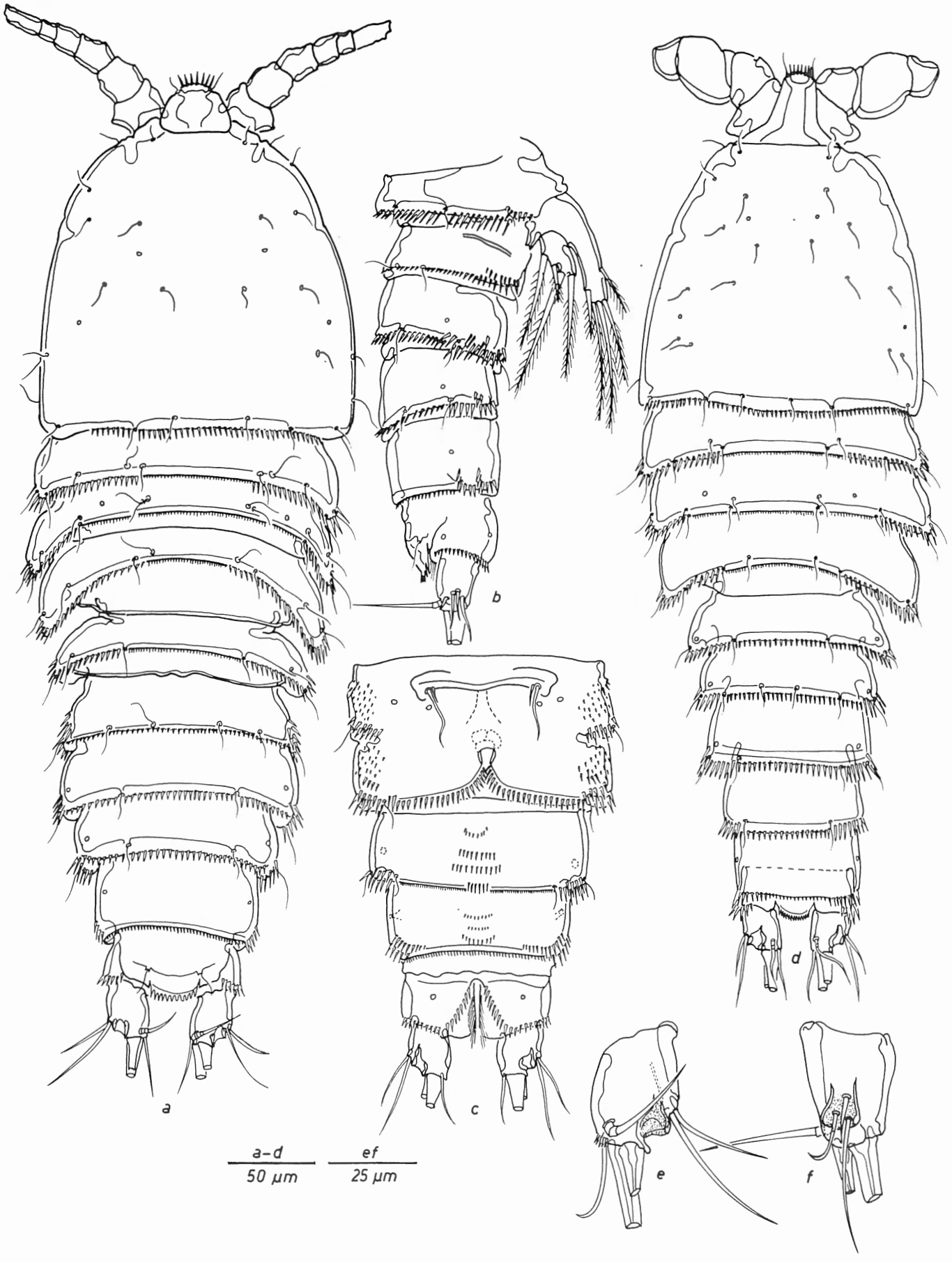


Fig. 5. - Amphibiperita neotropica : *a. Habitus of the female; b. Female abdomen in lateral view; c. Female abdomen in ventral view; d. Habitus of the male; e. Furcal ramus in dorsal view; f. Idem, in lateral view.*

Females of *Amphibiperita* n. gen., show an important characteristic in their genital field. In *Mesochra* females, the orifice of the recemptaculum seminis is situated close to the transversal ridge of the clasping organs, while females of *Amphibiperita* n. gen. have the orifice more near the middle of the ventral surface. Remarkable in this genus is the connection of the lateral margins of the orifice with a distinct invagination of the posteroventral margin of the (second) genital segment. Besides the external shape the internal morphology of the receptaculum of Amphibiperita n. gen. appears to be much more complex than that of *Mesochra*. The bulbus of the latter is rather short, forming the typical triangular structure in ventral view. In contrast, the bulbus of the receptaculum in *Amphibiperita* n. gen. is rather flat and laterally extended.

Amphibiperita neotropica (JAKOBI, 1956)

Material :
70 females, 36 males and 77 juveniles preserved in alcohol (COP 2986, 2987, 2991, 2996, 3000, 3004, 3017); 2 females (COP 3018a, b, 3019a, b), 2 males (COP 3020, 3021) and 6 juveniles (COP 3022-3027) dissected.

Description :
Female : length, including rostrum and furcal rami, 550 µm (530-580 µm, n=10); body slightly depressed (Fig. 5a); cephalothorax tapering smoothly anteriad; length of the cephalothorax about one third of the total body length; lateral margins of thorax parallel; fifth thoracic segment distinctly separated from the preceding segment; genital segments entirely fused, showing a strongly sclerified transverse inner band near the dorsal fusion line; anal segment slightly tapering posteriad; anal operculum set with teeth along the margin; anal sinus extending towards the articulation with the preceding abdominal segment.
Integumental structures : cephalothorax smooth; thoracic and abdominal segments clothed dorsally with an irregular pattern of minute spinules; posterior median margin of the cephalothorax spinulose; thoracic segments with larger spinules along the pleural margin and along the lateral margin of the tergites; dorsomedian part of the thoracic segments with considerably smaller spinules than laterally; posteriodorsal and lateral margins of the abdominal segments set with equal spinules; posteroventral marginof the genital segment with large spinules, of the second and third abdominal segment with small spinules; ventral surface of the abdominal segments with a median pattern of transversal spinulose rows; anal sinus spinulose; hyaline frills absent.
Furcal rami (Fig. 5e and 5f) almost 1.5 times as long as wide, having a straight outer margin and a convex inner one; dorsal seta implanted near the inner distal edge; lateral setae arising slightly beyond the middle; inner apical seta as long as the ramus; median apical setae implanted on the inner half of the apical margin; outer half of the apical margin forming a remarkable large cup-shaped pore orifice.
Rostrum (Fig. 6a) rather wide with steep lateral margins; surface smooth; rostral tip prominent and rounded, set with slender spinules between the rostral sensillae; pore-orifice, opening dorsally in the proximal region of the rostrum.
Antennule (Fig. 6k) six-segmented; first segment with a rigid inner margin and furnished with two rows of spinules; aesthetascs on segment four and furnished with two rows of spinules; aesthetascs on segment four and six, both fused with one or two setae near their implantation; all setae smooth; some setae on segments two, three and six articulating on a minute basal socle.
Antenna (Fig. 6j) with allobasis; inner seta implanted in the proximal half; exopodite absent; endopodal segment with two lateral spines, three apical ones and two apical, geniculating setae.
Mandible (Fig. 6h and 6i) : gnathobasis rigid and strongly sclerified; biting edge with multi-dented teeth, a slender seta and set with spinules near the implantation of the teeth; mandibular palp minute, two-segmented, bearing three smooth setae on the small terminal segment.
Maxillule (ig. 6e) : arthrite with seven teeth and a slender seta; surface with a transversal row of spinules; coxa and basis congruent, bearing respectively two and three setae; exopodal and endopodal rami obsolete and represented by (five) setae.
Maxilla (Fig. 6c) : syncoxa nearly rectangular, bearing two endites each with three setae; surface generally smooth except for a small tuft of spinules; basis hook-shaped, armed in the proximal half and bearing a single seta on the surface; endopodite obsolete, represented by three setae.
Maxilliped (Fig. 6d) prehensile; basis short, having a single setose seta; first endopodal segment ovate bearing the armed claw which carries a small seta; surface of basis and endopodal segment densely set with spinules.
P_1 (Fig. 7e) : prae-coxa, coxa and basis furnished with several rows of strong spinules; inner half of the basis prolonged, reaching the middle of the second exopodal segment; inner and outer spine of the basis strongly armed; exopodal three-segmented, bearing an inner seta on the median segment; first endopodal segment slightly curved in outer direction, furnished with long slender spinules along the entire inner margin and bearing a setose seta near the inner distal edge of the segment; second endopodal segment, slightly longer than wide, bearing a smooth claw and a spinulose seta terminally and a short smooth sub-distal inner seta.

Fig. 6. - Amphibiperita neotropica : *a. Female rostrum; b. Male rostrum; c. Maxilla; d. Maxilliped; e. Maxillule; f. Male antennule in ventral view; g. Idem, in dorsal view; h. Biting edge of the mandible; i. Mandible; j. Antenna; k. Female antennule in ventral view.* ▷

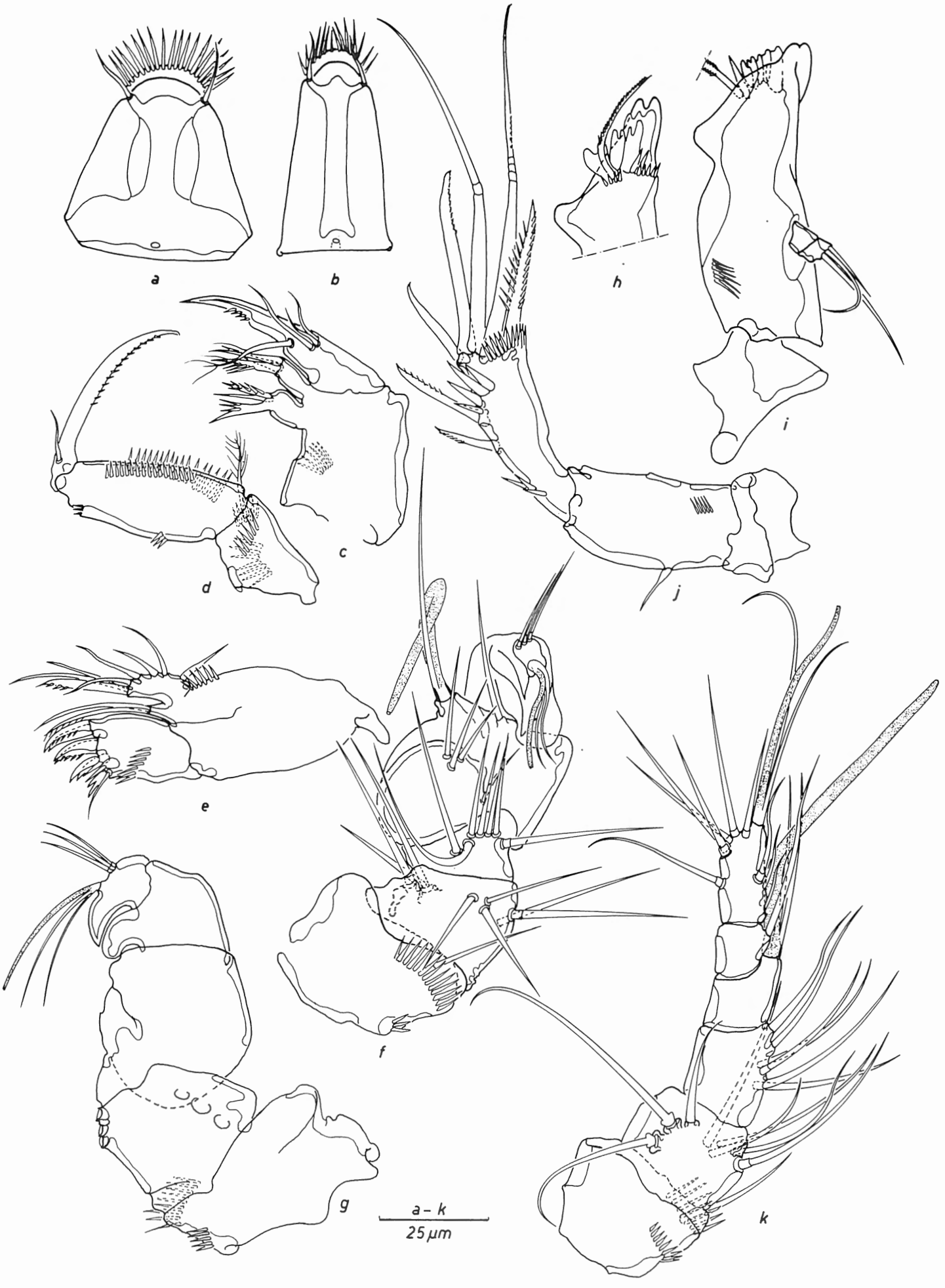

a
b
c
d
e
f
g
h
i
j
k
a - k
25 µm

Table II :
Chaetotaxy of Amphibiperita neotropica *(Jakobi).*

	P_1	P_2	P_3	P_4	♀ P_5	♂ P_5 *
Exo	0-1-022	0-1-122	0-1-222	0-1-222	4	3
End	1-120	1-120	0-220	0-120	6	3

* Rami obsolete but clearly recognizable.

P_2-P_4 (Fig. 7c, b, a, respectively) : prae-coxa, coxa and basis with spinules and nearly identical in the three legs; basis of P_2 with an outer spine, of P_3 and P_4 with a seta; exopodites three-segmented, endopodites two-segmented; setal formula in Table II; inner and apical exopodal setae setose except for the inner sub-distal seta of the P_4 which is pectinate in the distal half of the stem; endopodite P_2 reaching beyond the middle of the second exopodal segment, of P_3 to the middle and of P_4 to the articulation between the first and second exopodal segments; intercoxal plates (Fig. 7f) long and slender, with smooth surfaces.

P_5 (Fig. 8e) : baseoendopodite with a prominent endopodal lobe, reaching far beyond the exopodite and bearing six spinulose setae; exopodite rather small, less high than wide and bearing four spinulose setae.

Male : body (Fig. 5d) fusiform depressed with constriction at the fifth thoracic segment; length, including rostrum and furcal rami, 500 µm (490-520 µm, n=10); rostrum (Fig. 6b) much more slender than in the female, articulating with cephalothorax and furnished with long spinules along the prominent apical margin; integumental structures as in the female.

Antennule (Fig. 6f and 6g) six-segmented, sub-chirocer; first and second segment with strongly sclerified margins and more wide than in the female; fourth segment large, nearly ovate dorsally, irregular ventrally and bearing the aesthetasc; fifth and sixth segment with a large hook-shaped process on one side; sixth segment with an aesthetasc fused with two setae near their implantation.

Mouthparts, P_1 and P_2 as in the female.

P_3 (Fig. 8d) : protopodite and exopodite as in the female; endopodite two-segmented; proximal segment with a sharp extended outer distal edge; inner seta setulose; second segment bearing a long sigmoid apophysis, arising in the proximal part of the inner margin; apophysis reaching far beyond the distal margin of the supporting segment and slightly beyond the articulation between the second and third exopodal segments; inner setae absent; outer margin furnished with two tufts of spinules; apical setae present; anterior surface with a large tubular sub-distal pore.

P_4 (Fig. 7d and 8c) : protopodite as in the female; exopodite with a remarkable robust proximal segment, as high as the entire length of the endopodite and furnished with strong spinules along the outer and apical margins and near the middle of the inner side; outer spine of proximal segment implanted parallel with the axis of the ramus, very robust but smooth, and reaching far beyond the distal margin of the ultimate exopodal segment; second exopodal segment rather compact, length only half as the length in the female P_4; outer spine strong and smooth; third segment resembling the female third segment closely, bearing an inner sub-distal pectinate seta but having smooth outer spines; endopodite as in the female, except for the shorter distalmost seta, furnished with slightly stronger setules.

P_5 (Fig. 8f) : opposite legs fused with one another, forming an entire ovate plate on the ventral side of the fifth thoracic segment; endopodal and exopodal lobes vestigial, each represented by three spiniform setae; apical margin of the plate set with some rows of small spinules; surface smooth.

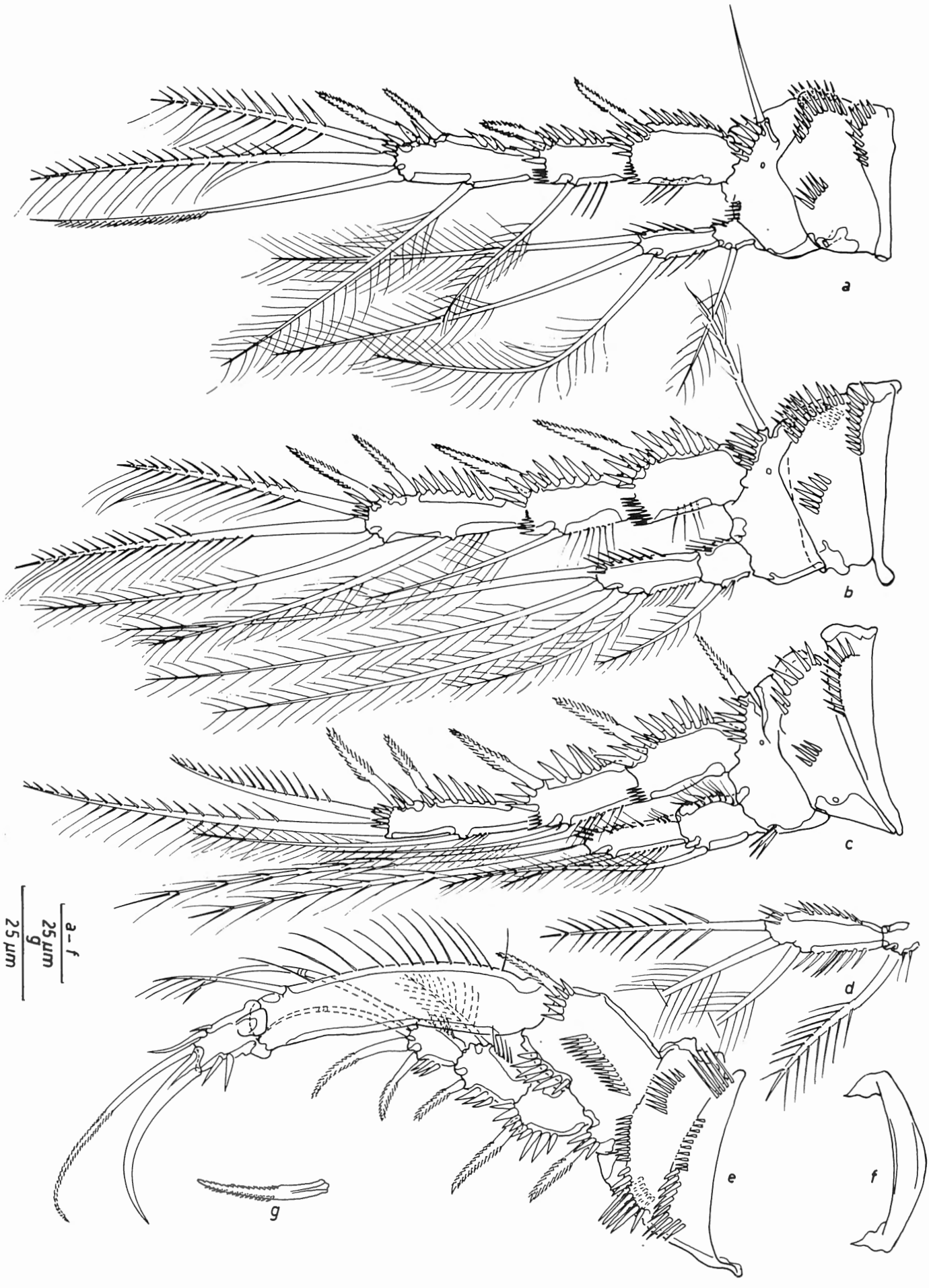
P_6 (Fig. 8b) almost symmetrical; represented as a convex plate furnished with spinules near the outer edge but without setae.

Comments :

Comparing the Louisiana specimens with the original description of *A. neotropica,* several differences can be noticed. A careful evaluation of these shows however that they are of less importance, probably resulting from variability and incorrect observations.

In the original description, Jakobi (1956) mentions a seven-segmented antennule, bearing an aesthetasc on the fourth segment. In the same sentence the author even speaks of the eighth segment, which is apparently a slip of the pen. It seems reasonable to consider that the brazilian specimens bear a seven-segmented antennule while those from Louisiana have only six clearly defined segments in this appendage. In both cases however, the major aesthetasc arises from the fourth segment. Variability of the number of segments in the antennule, and especially of the number of segments beyond the aesthetasc is frequently observed in numerous other harpacticoid groups. Consequently, the difference in segmentation of the antennule in *A. neotropica* from the two localities is regarded here as intraspecific variability of this species.

Fig. 7. - Amphibiperita neotropica : *a. P_4; b. P_3; c. P_2; d. Endopodite P_4 of the male; e. P_1; f. Intercoxal plate; g. Inner spine of the basis of the male P_1.* ▷


a
b
c
d
e
f
g
a – f
25 µm
g
25 µm

More important however is the chaetotaxy of the legs. As far as can be judged from the description, P_1, P_2 and P_4 appear to be identical in the specimens from both localities. Even the remarkable modification of the male P_4 seems to be identical in the brazilian and the specimens at hand. The P_3 however, shows at first sight several marked differences. The original description of *A. neotropica* comprises only an illustration of the male P_3. In many aspects, the illustrated leg corresponds with the male P_3 in the specimens studied herein. However, the P_3 illustrated in JAKOBI (1956) lacks an inner seta on the second exopodal segment whereas the setal formula in the table clearly mentions the presence of such seta. The setal formula mentioned in the table indicates an outer sub-apical seta on the second endopodal segment of the leg in question. Louisiana specimens always exhibit an inner seta on the second exopodal segment of P_3 but lack an outer seta on the second endopodal segment. It seems reasonable to consider those differences as a result of incorrect observations since both the P_2 and P_4 exhibit an inner seta on the second exopodal segments and lack an outer seta in the endopodites.

JAKOBI (1956) also states that the setal formula of *A. neotropica* is nearly identical with the formula of *Mesochra meridionalis* SARS. As discussed above, the absence of an outer sub-apical seta/spine in the endopodites is a major generic feature of *Amphibiperita* n. gen., differentiating clearly *Mesochra neotropica* from all other *Mesochra* species.

Another marked difference between the specimens from both localities is the articulation of the exopodite of the P_5. In the brazilian specimens the exopodite is fused with the baseoendopodite while all the specimens examined herein exhibit a distinct articulation between the baseoendopodite and the exopodite. All other aspects — shape of the rami, proportional lengths and number of the setae — are identical but the rigidity of the exopodal integument may have obscured the articulation in the single female specimen JAKOBI (1956) has seen. Fused exopodites in the P_5 are often observed in the closely related genus *Mesochra* and are considered as species specific. Some species such as *M. lilljeborgi* (see GURNEY, 1932), may bear fused as well as articulated exopodites in the female P_5. The observed difference of the P_5 between the Louisiana-specimens and the original description of *A. neotropica* may result from an inadequate observation or from intraspecific variability.

Despite the above commented differences between the original description and the specimens studied herein, the Louisiana specimens are considered as conspecific with *M. neotropica*. The discrepancies between text and illustrations in the original description still make it rather difficult to form an adequate image of this species. If however, future research permits re-examination of the type-series or permits a study on new material from Brazil, conceivable doubts may be finally cleared up.

Family CLETODIDAE
Nannopus palustris BRADY, 1880

Material :
One female preserved in alcohol (COP 2981).

Remarks :
COULL and FLEEGER (1977) distinguished two types of furcal rami in a population of *N. palustris* from South Carolina. 70 % of the females have furcal rami with a long outer apical seta and a thickened proximal part of the inner apical seta. The other females display on their furcal rami a very small outer apical seta and a notch on the proximal part of the inner apical seta. The sole specimen at hand has remarkable lobe-shaped extensions on the proximal part of the stem of the inner apical seta. The left seta also has a distinct notch while the right one lacks such modification. The outer apical seta is long, reaching far beyond the notches on the inner apical seta (Fig. 1h).

Family LAOPHONTIDAE
Genus **Folioquinpes** n. gen.

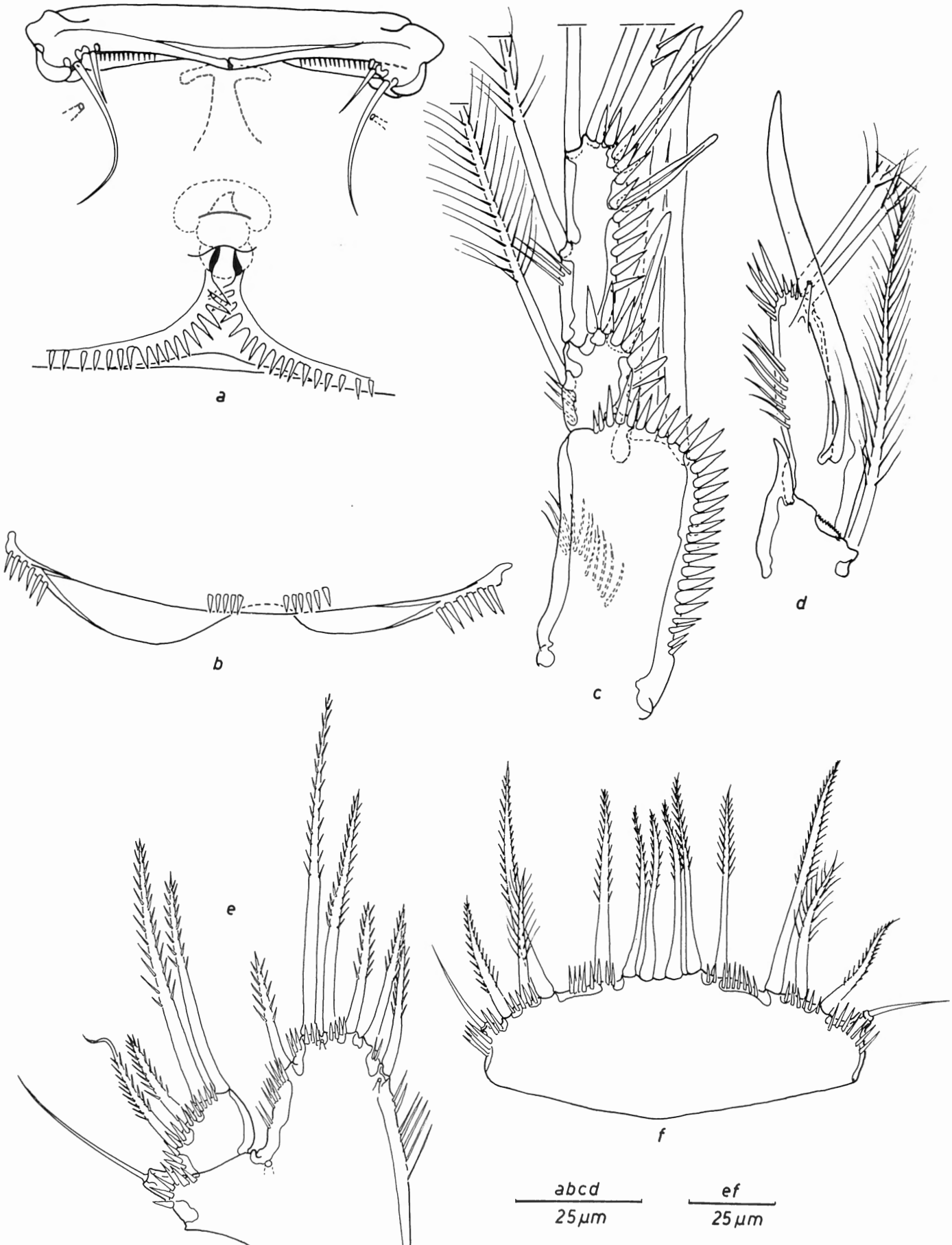
Diagnosis :
Body depressed; furcal rami long and cylindrical; rostrum prominent with spinules between the sensillae; antennule four- or five-segmented; antenna with a well developed exopodite, bearing four setae; P_1 with a two-segmented exopodite; exopodites P_2-P_4 three-segmented, endopodites two-segmented; distal exopodal segment of P_4 with three outer spines; chaetotaxy of the legs in table III; P_5 with a large ovate exopodite reaching far beyond the baseoendopodite and bearing three or four setae, the apicalmost thickened; baseoendopodite with two or three setae.
Sexual dimorphism : body not constricted; antennule six- or seven-segmented, sub-chirocer; exopodites P_2-P_4 with somewhat stronger outer spines; segments not modified; endopodites as in the female; P_5 represented as a small sub-quadrate exopodite, fused with the somite and bearing two or three setae.

Type species :
Folioquinpes mangalis n. sp., here designated.

Etymology :
The generic name is composed of the Latin words *folium* (leaf), *quinque* (five) and *pes* (leg) referring to the foliaceous shape of the fifth leg in the species of this genus. The gender is masculine.

Discussion :
When LANG (1948) published his revision of the family Laophontidae, he clearly demonstrated the generic importance of sexual dimorphism in the exopodites of the natato-

Fig. 8. - Amphibiperita neotropica : *a. Female genital field; b. P_6 of the male; c. Exopodite P_4 of the male; d. Endopodite P_3 of the male; e. Female P_5; f. Male P_5.* ▷


a
b
c
d
e
f
abcd
25 µm
ef
25 µm

rial legs. However, many laophontids at that time were known from the females only. In other cases male characteristics were only fragmentarily mentioned without illustrations or detailed descriptions. Therefore, LANG (1948, p. 1340) clearly stated that his sub-division of the genera in species groups was a temporary solution.

Based on the available information, LANG (1948) divided the genus *Onychocamptus* in three groups but accepted (LANG, 1965) the separate generic status of his *horrida*- and *kliee*-group as respectively *Echinolaophonte* NICHOLS (1941) and *Klieonychocamptus* NOODT (1958). Today only four species remain in the genus *Onychocamptus*, namely : *O. mohammed, O. bengalensis, O. talipes* and *O. chathamensis*. A fifth species, *O. besnardi*, has been described by JAKOBI (1954) but the specificity of this species remains doubtful and it is probably conspecific with *O. mohammed*.

At first sight, the here described species, *F. mangalis* should be included in the genus *Onychocamptus*. The shape of the P_1, chaetotaxy of the P_5 in male and female and the short (four-segmented) antennule are characteristics typical for the species of *Onychocamptus*. *F. mangalis* n. sp. however, exhibits no sexual dimorphism neither in the exopodites of the legs nor in the endopodite of P_3. This strongly contrasts with all the known species of the genus *Onychocamptus* (except *O. chathamensis*) which are characterized in the male by the presence of distinctly rigid exopodal segments and by the presence of a three-segmented endopodite P_3, bearing a sharp apophysis on the median segment. It is clear that such differences cannot be ignored and exclude *F. mangalis* n. sp. from the genus *Onychocamptus*.

As mentioned above, *O. chathamensis* is the only species in the genus *Onychocamptus* which lacks sexual dimorphism in the P_3 of the male. This species, originally described from the Chatham Islands (SARS, 1905), has been reported from South Africa (RUHE, 1914) and from Calcutta, India (SEWELL, 1924). More recently, MIELKE (1981) found a single female in the Galapagos, illustrated the P_5, but kept the specimen in an open nomenclature.

In the original description of *L. chathamensis*, SARS (1904) provided a sketchy illustration of the male P_5 and stated that the exopodites were somewhat more strongly sclerified in the male. The three setae on the baseoendopodite of the female P_5, the shape of the P_1 and the short antennule, apparently misled LANG (1948) who allocated *L. chathamensis* to the genus *Onychocamptus*.

Fortunately, several specimens of *O. chathamensis* were studied by one of the authors (F. FIERS) in the course of a revision of the family Laophontidae. It appeared that the species exhibits no sexual dimorphism in the legs and therefore cannot be considered as a member of the genus *Onychocamptus*.

The here described *F. mangalis* n. sp. and *L. chathamensis* are obviously closely related. Their female P_5 with a large foliaceous exopodite, having a reduced chaetotaxy and the above mentioned absence of sexual dimorphic features in the males are unique within the family. Therefore both species are placed in the herein newly erected genus *Folioquinpes* n. gen.

Folioquinpes mangalis n. sp.

Type-material :

Holotype : one female dissected and mounted on three slides (COP 2324a, b, c); allotype : one male dissected and mounted on one slide (COP 2325); Paratypes : 3 males, 1 female and 1 Cop IV, preserved in alcohol (COP 2323).

Etymology :

The specific name refers to the habitat of the species.

Figures :

Holotype : Fig. 9a, b, d-h; allotype : Fig. 9c, i.

Material :

— Papua New Guinea, Capital District, Motupore Island (southern coast, type-locality) : mangrove area along the northern shore of the island. Hand collected small algae growing on the roots of the trees. Leg. F. FIERS, 26 November 1986 (field # PNG 86-86, I.G. 27.213). Two females, four males and one juvenile.

— Papua New Guinea, East Sepik Province, Watam : delta of the Sepik River (northern coast). Washings of oysters collected on the roots of the mangrove trees. Leg. K. WOUTERS, 2 May 1982 (field # 82-8057, I.G. 26.528).

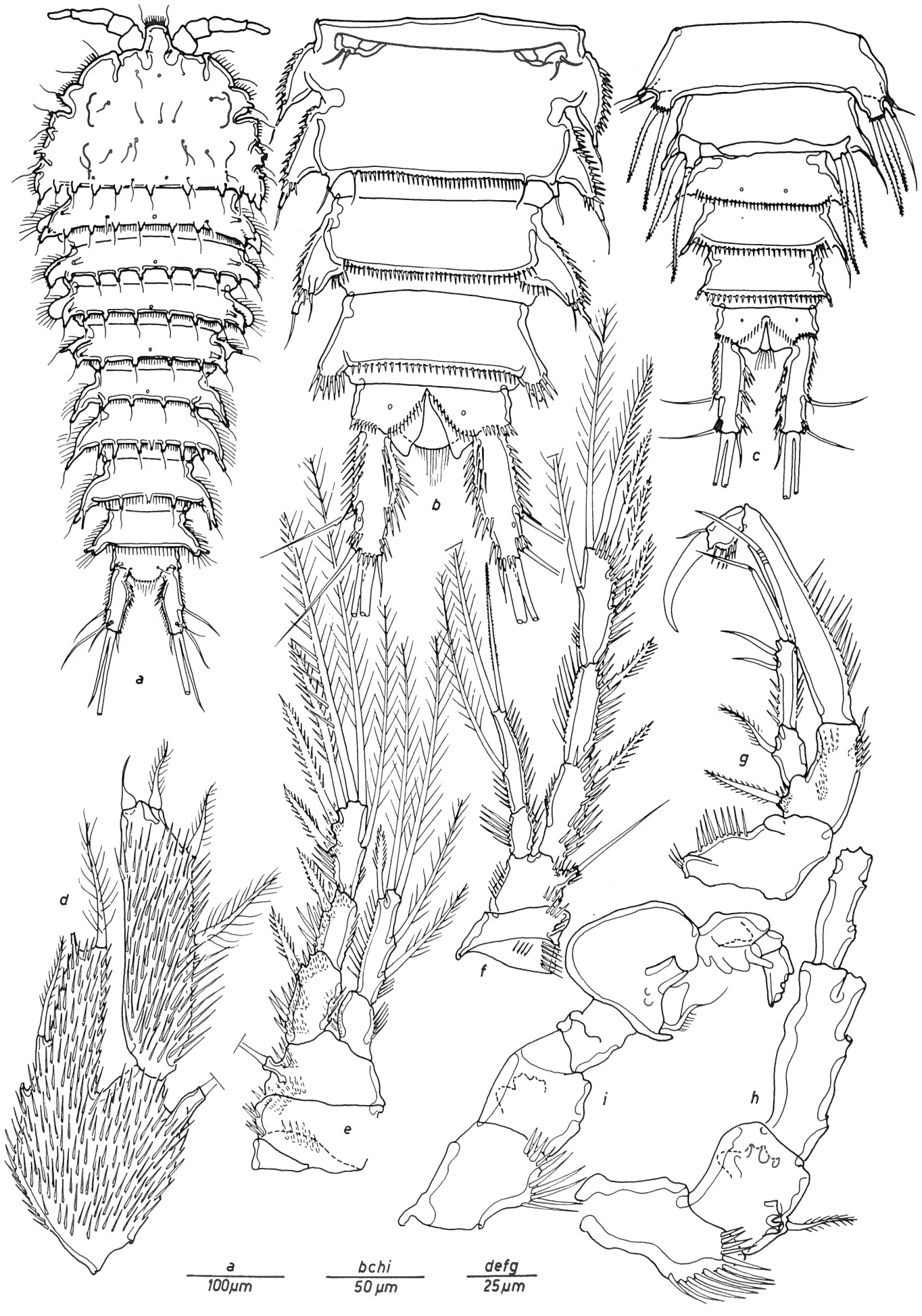
— Louisiana : (U.S.A.) : 28 females, 28 males and 5 juveniles preserved in alcohol (COP 2974, 2980, 2984, 2992, 2997, 3003, 3028).

Description :

Female (holotype) : habitus (Fig. 9a, b) : body strongly depressed; cephalothorax with loose lateral margins and tapering strongly towards the rostrum; thoracic, genital and abdominal segments laterally extended in a conical process, bearing long tubes; anal segment with almost parallel margins; sensillae on the posterior margin of the somites and along the lateral margin of the cephalothorax implanted on a distinct bottle-shaped socle; anal operculum rounded; length, including rostrum and furcal rami, 600 µm; largest width at the posterior margin of the cephalothorax and the first free thoracic segment.

Integumental structures; integument of all somites covered with a dense irregular pattern of long spinules; lateral margins of the cephalothorax, thoracic and abdominal segments furnished with coarser spinules than on the cephalo-

Fig. 9. - Folioquinpes mangalis : *a. Habitus of the female; b. Female abdomen in ventral view; c. Male abdomen in ventral view; d. Female P_5; e. P_3; f. P_2; g. P_1; h. Female antennule; i. Male antennule.* ▷


a
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defg
25µm

thorax; posterior margin of the cephalothorax and the first genital segment smooth, of the other somites spinulose; ventral surface of the genital segments smooth; anal operculum with small but distinct teeth over the entire distal margin.
Rostrum : strongly prominent, having almost parallel-sided margins; rostral tip not protruded, convex and bearing long spinules; integument with mintue spinules.
Furcal rami nearly 3.5 times as long as wide; inner margin convex in the anterior third; outer margin straight; lateral setae widely spaced; anteriormost seta implanted close to the middle of the outer margin, posteriormost one implanted near the outer distal edge; dorsal seta implanted sub-apically; outer apical seta fused with the principal one and longer than the supporting ramus; inner apical seta short; integument of the rami spinulose with coarser spinules arranged in transversal rows on the inner margin.
Antennule (Fig. 9h) four-segmented; first segment with a convex inner margin and furnished with long spinules; second segment with a thickening near the implantation of the outer setae; third segment composed of the original third and fourth segment and bearing the aesthetasc; integument of all segments densely spinulose.
Antenna with a well developed exopodite bearing four long spinulose setae and with a seta on the allobasis.
Other mouthparts as in *Laophonte cornuta*.
P_1 (Fig. 9g) : prae-coxa not seen; coxa very wide proximally; outer margin tapering in distal direction and bearing strong spinules; basis with spinules on the surface, along the inner margin and near the implantation of the outer seta; exopodite implanted in the middle of the outer margin of the basis and two-segmented; distal exopodal segment with three outer spines and two apical geniculated setae, all smooth; endopodite slender, bearing spinules on the inner margin of the first segment and on the outer margin of the second one; endopodal claw smooth.
P_2-P_4 (Fig. 9e, f) : general appearance as in *F. chathamensis*; prae-coxae present and bearing a transversal row of spinules; coxae with spinules on the surface and along the outer margin; exopodites strongly armed along the outer margins of the segments, inner margins setulose; endopodal segments with spinules along the inner and outer margins; outer sub-distal seta of the P_3 and P_4 spinulose; chaetotaxy in table III.
P_5 (Fig. 9d) : baseoendopodite with a slender endopodal process and bearing a lateral seta and a distal one; inner margin with two large pores, having sclerified margins; exopodite ovate, bearing four setae, the distalmost thickened and smooth; anterior surface of the P_5 entirely furnished with long spinules (much more than figured) but with a smooth posterior surface.
Male (allotype) : habitus (Fig. 9c) : not constricted; length 400 µm; genital segments free; integumental structures and organs as in the female; surface of the abdominal segments smooth.
Antennule (Fig. 9i) : seven-segmented and sub-chirocer; first and second segment as in the female; fifth segment with three hyaline processes and a sharp sclerified process on the dorsal surface.
P_1-P_4 as in the female except for somewhat stronger armed outer spines.
P_5 (Fig. 9c) : baseoendopodite absent and only represented by the outer seta; exopodite sub-quadrate, fused with the supporting segment; and bearing two spinulose setae.
P_6 (Fig. 9c) : both rami sub-quadrate, fused with the supporting segment and bearing two spinulose setae.

Variability :
The female paratype bears one seta on the middle exopodal segment of the P_3. In the male (allotype) the left P_3 exopodite has a setal formula as in the holotype but bears an additional seta on the middle segment of the opposite side.

Discussion :
F. mangalis n. sp. differs in several features from the *F. chathamensis* (Sars). The most important differences are the strongly depressed body-shape, the shape of the furcal rami and the shape and chaetotaxy of the P_5 exopodite in males and females.
F. mangalis n. sp. can also be distinguished from its congener by the chaetotaxy of the legs. In *F. mangalis* n. sp. the middle exopodal segment of the P_4 lacks an inner seta. This is partially also true for the P_3, but this leg shows a rather variable setal formula as can be seen in the female paratype and the allotype. In contrast with the exopodite of the P_3, the chaetotaxy of the endopodite is an important discriminating feature between both species. In *F. mangalis* n. sp. the inner margin of the second segment of this ramus has two setae instead of three as in *F. chathamensis*.

Table III :
Chaetotaxy of the species of Folioquinpes *n. gen.*

	P_2		P_3		P_4	
	Exo	End	Exo	End	Exo	End
F. chathamensis	0-1-123	0-220	0-1-123	0-321	0-1-123	0-120
F. mangalis	0-1-123	0-220	0-0,1-123	0-221	0-0-123	0-120

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