

The Genus *Mungava* HARDING, 1962 (Crustacea: Ostracoda) from Indo-Pacific brackish waters, with the description of two new species*

by Karel WOUTERS

Abstract

Mungava munda HARDING, type-species of the genus *Mungava*, and two new species, *M. papuensis* sp. nov. and *M. intermedia* sp. nov. are described and figured. A short supplementary description is given for *M. marthapuriae* KEYSER and *M. riseri* MADDOCKS on the basis of their paratypes. The genus diagnosis is extended. The interspecific differences and the distribution of the actually known species of the genus *Mungava* are discussed.

Key-words: Ostracoda, *Mungava*, Indo-Pacific, brackish water fauna.

Résumé

Mungava munda HARDING, espèce-type du genre *Mungava* et deux nouvelles espèces, *M. papuensis* sp. nov. et *M. intermedia* sp. nov. sont décrites et figurées. Une description supplémentaire, basée sur les paratypes, de *M. marthapuriae* KEYSER et *M. riseri* MADDOCKS est donnée. La diagnose du genre est complétée. Les différences interspécifiques et la distribution des cinq espèces actuelles sont discutées.

Mots-clefs: Ostracoda, *Mungava*, Indo-Pacifique, faune d'eau saumâtre.

Introduction

Up till now three species belonging to the genus *Mungava* HARDING have been described by HARDING (1962), KEYSER (1975) and MADDOCKS (1979).

Material from Papua New Guinea yielded a fourth and a fifth species and material from Rennell Island and the Comoros allowed a redescription of *M. munda*, the type-species. A comparative morphological study of these five species throws a new light on some particular characteristics, and allows a better understanding of the interspecific differences.

Comparison with other Thalassocypridinae illustrates the remarkable and very distinct systematical position of the genus *Mungava*.

The collections are deposited in the Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels.

Systematics

Family Paracyprididae SARS, 1923

Subfamily Thalassocypridinae

HARTMANN & PURI, 1974

Genus *Mungava* HARDING, 1962

Type-species:

Mungava munda HARDING, 1962.

Diagnosis (extended): medium-sized bean-shaped valves; second segment of male antenna with distal chitinous protuberances; very elongate male clasping organ; furca with one long posterior seta; furcal attachment with two ventral branches; antero-ventral knob-like thickening on left valve inner lamella.

Mungava munda HARDING, 1962
(Figs. 1 -21)

Material:

Solomon Islands, Rennell Island (coll. T. WOLFF), Lake Tegano, Loc.: Niupani (Stat. 34), 1 female specimen (deposited in the Zoologisk Museum Copenhagen); Loc.: Hutuna (Stat. 35), 1 male specimen (deposited in Kon. Belg. Inst. Natuurwet., Brussels, n° O.C. 1238).

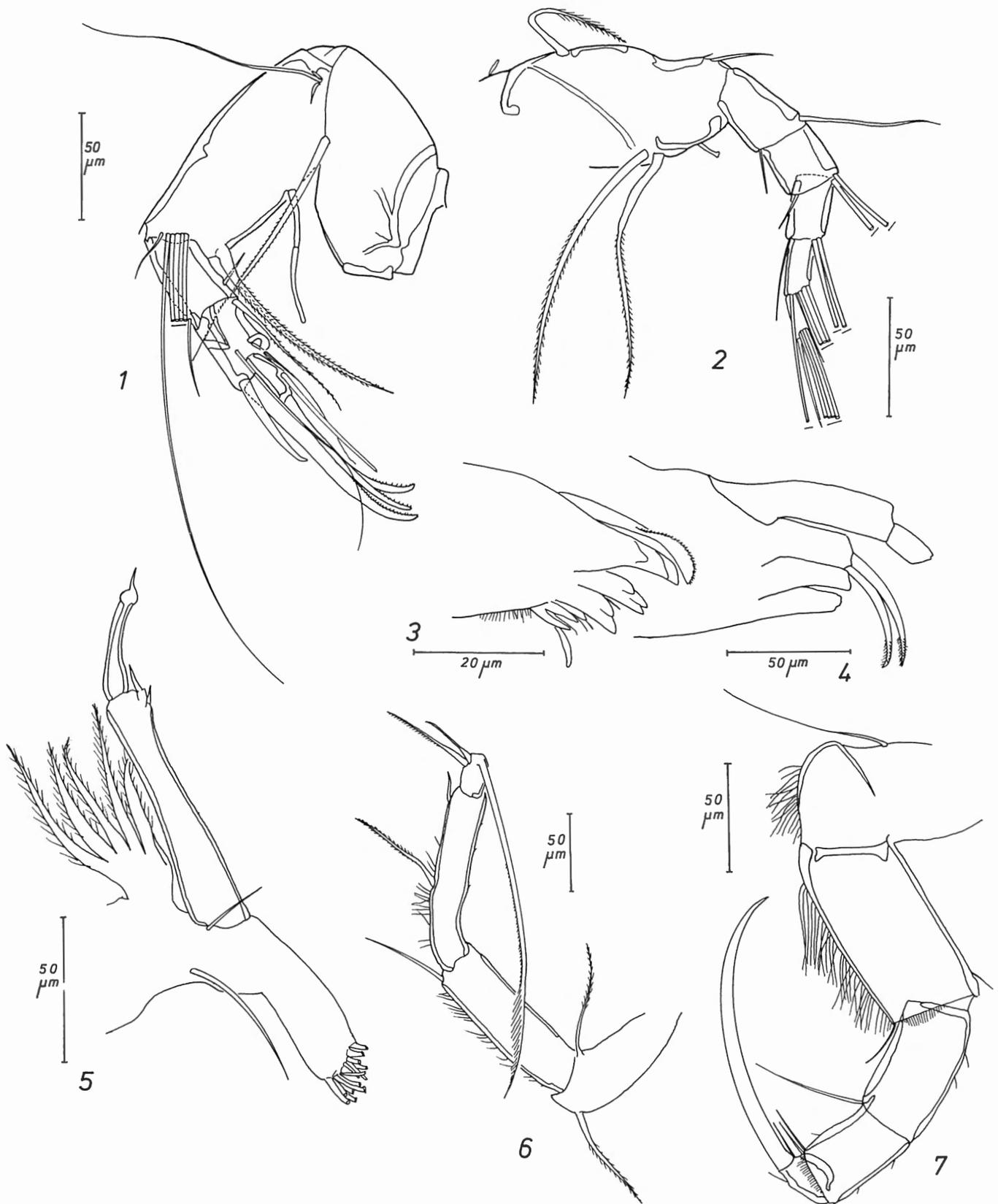
The Comoro Islands, Grande Comore, Lac Salé S. of Mitsamiouli: 5 dissected females and one dissected male (O.C. 1231 - 1236) and 10 specimens preserved in alcohol (O.C. 1240 and O.C. 1241).

Papua New Guinea, Madang Province, Old river bed at Awar, 1 dissected male (O.C. 1237).

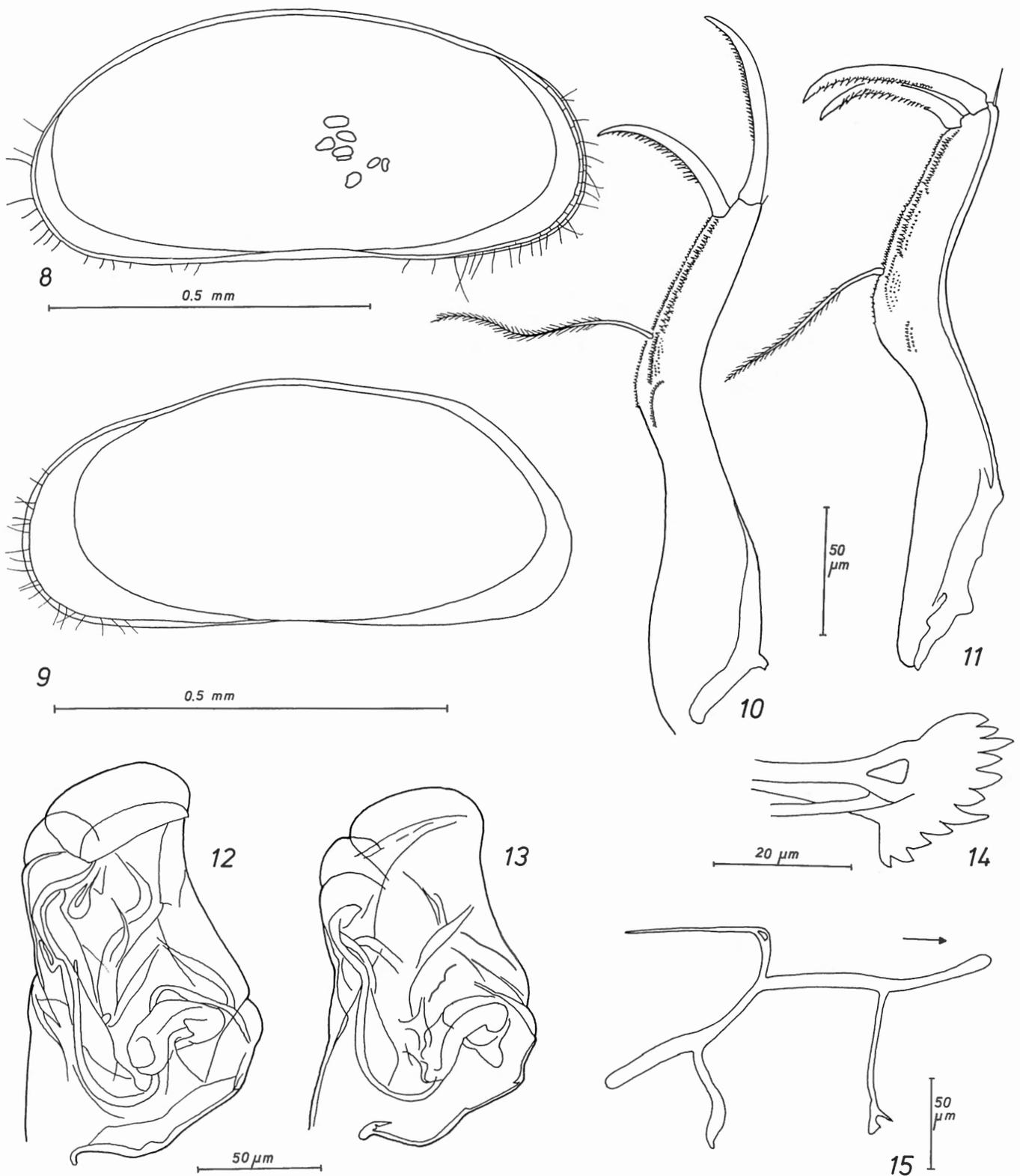
DESCRIPTION

Valves: very elongate, bean-shaped and thin-shelled; anterior and posterior margins evenly rounded; maximal height situated in the middle; ventral margin slightly concave; spindle-shaped in dorsal view, with pointed anterior extremity and somewhat rounded posterior extremity; left valve overlapping right one; rather narrow inner lamella; large vestibulum with

* Contribution n° 152, Leopold III Biological Station, Laing Island.

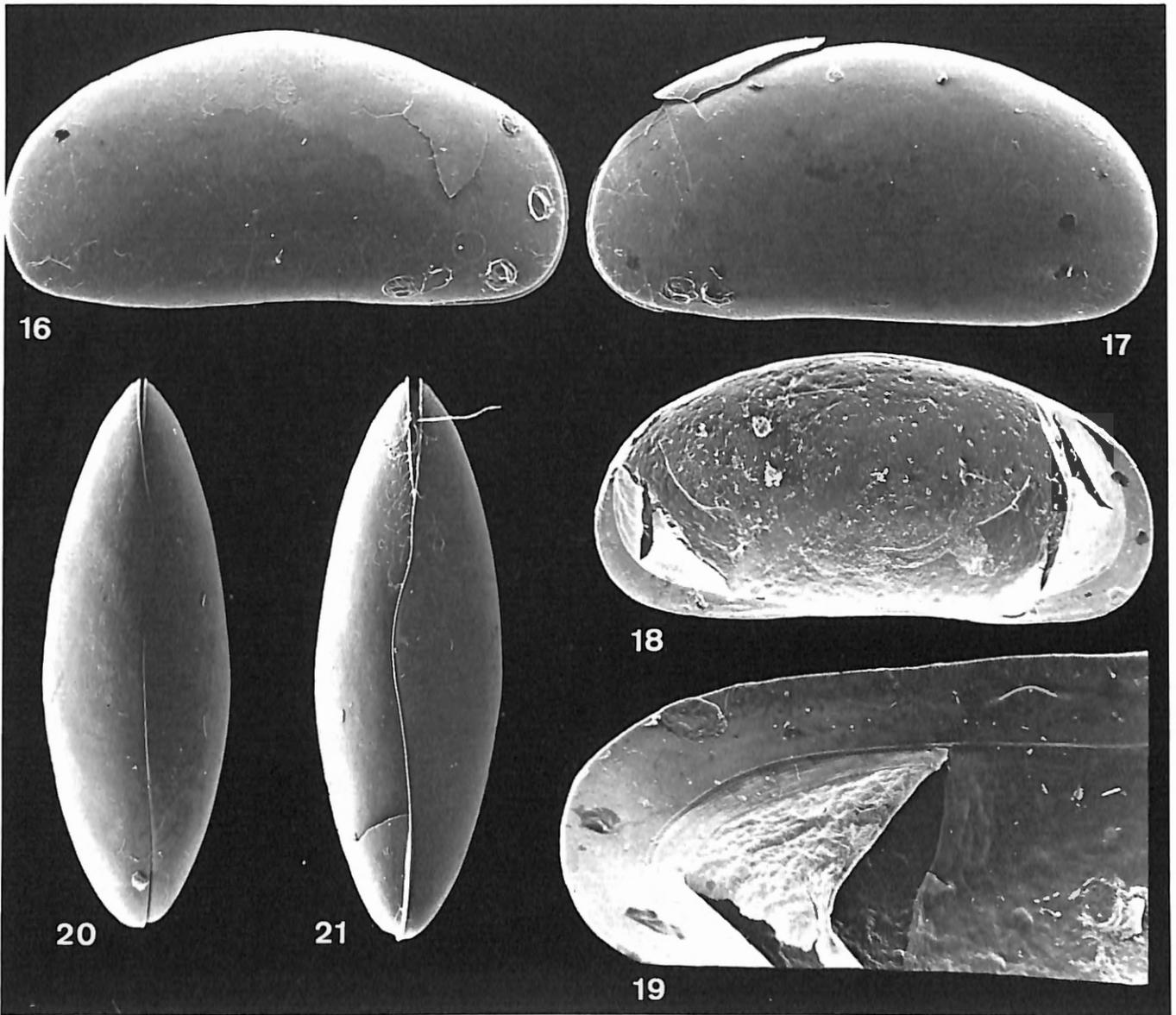


Figs. 1-7. *Mungava munda* HARDING, 1962, The Comoros, Grande Comore, Lac Salé, S. of Mitsiamouli.
 1. Antenna, male (O.C.1231). 2. Antennula, male (O.C.1231). 3. Mandible, male (O.C.1231). 4. Maxillule, female (O.C.1233). 5. Maxilla (P1), male (O.C.1231). 6. Cleaning limb (P3), male (O.C.1231). 7. Walking leg (P2), male (O.C.1231).



Figs. 8-15. *Mungava munda* HARDING, 1962.

8. Left valve, female, internal view (O.C.1233), The Comoros, Grande Comore, Lac Salé. 9. Right valve, male, decalcified and slightly deformed, internal view (O.C.1238), Rennell Island, Lake Tegano, Hutuna. 10. Furca, male (O.C.1231), The Comoros, Grande Comore, Lac Salé. 11. Furca, male (Zoologisk Museum Copenhagen), Rennell Island, Lake Tegano, Niupani. 12. Male copulatory organ (O.C.1231), The Comoros, Grande Comore, Lac Salé. 13. Male copulatory organ (O.C.1238), Rennell Island, Lake Tegano, Hutuna. 14. Rake-like process (Zoologisk Museum Copenhagen), Rennell Island, Lake Tegano, Niupani. 15. Furcal attachment (Zoologisk Museum Copenhagen), Rennell Island, Lake Tegano, Niupani.



Figs. 16-21. *Mungava munda* HARDING, 1962, *The Comoros, Grande Comore, Lac Salé*.
 16. Right valve, female, external view, $100\times$ (O.C.1232). 17. left valve, female, external view, $100\times$ (O.C.1232).
 18. Left valve, female, internal view, $100\times$ (O.C.1233). 19. Left valve, female, dorso-lateral internal view (inclined), $220\times$ (O.C.1233). 20. Carapace, female, dorsal view, $100\times$ (O.C.1239). 21. Carapace, female, dorsal view, $100\times$ (O.C.1239).

narrow zone of conrescence; short and straight marginal pore canals; antero-ventral knob-like thickening on the inner lamella of the left valve, without inner list; very weakly developed postero-ventral thickening, without inner list; muscle scar pattern: see fig. 8; valve surface completely smooth.

Antennula: seven-segmented; segment ratios (in micrometer): 97: 28: 32: 23: 28: 25: 16. First segment large and broad, bearing a dorsal and two long ventral setae; second segment with a short dorso-distal seta and a ventral tube-like projection; third segment with long dorso-distal and short ventro-distal setae; fourth and fifth segments each with a short ventro-distal seta and two very long dorso-distal setae; sixth segment

with five distal setae: one short and four long swimming setae; seventh segment with five setae: two very long and one medium-sized swimming setae, one short and one very short seta.

Antenna: protopodite with a long distal seta and a slender long exopodite; endopodite four-segmented in males and three-segmented in females; segment ratios (male): 99: 39: 39: 28. First segment of endopodite with five long and one short swimming setae; Y-aesthetasc long and slender, with a median suture; second and third segments fused in females; second segment with distal chitinous, very complicated protuberances in males; third segment with one short claw and two stout claws in males and two long and one

slightly shorter in females; ultimate segment with one claw.

Mandible: palp four-segmented; segment ratios: 46: 18: 48: 21; molar teeth bifid of trifold; vibratory plate of palp with 7 long and one short feathered setae.

Maxillule: with a two-segmented elongate palp and with two large, distally serrate Zahnborsten on the third lobe; vibratory plate with 20 normal Strahlen and 6 mouthward directed Strahlen.

Maxilla (P1): epipodite with five long and one short feathered setae; male endopodite modified into a clasping apparatus with a long first segment and a slender, long and almost straight terminal claw; vibratory plate with one short and five long setae.

Walking leg (P2): five-segmented; long and strong terminal claw; length-ratios of second to fifth segment and claw: 87 (S2): 57 (S3): 39 (S4): 18 (S5): 106 (Cl.); second segment strongly hirsute ventrally; fourth segment with two distal setae; fifth segment with claw and two setae.

Cleaning limb (P3) consisting of four segments, proto-podite and three endopodite segments; length-ratios of endopodite segments: 101: 106: 28; terminal segment slightly longer than broad, and with two short setae and one long reflexed, somewhat curved seta; the latter with terminal setules arranged in a comb-like pattern.

Furca large and somewhat S-shaped. The furca is S-shaped in both sexes but somewhat less in females than in males. One large posterior seta and two large serrate terminal claws; posterior part of distal half of shaft with numerous spinules arranged in comb-like rows.

Furcal attachment rather complex, with irregular central axis, bearing one dorsal and two ventral branches; dorsal branch strongly curved in posterior direction and slightly broadened near the bending point; anterior ventral branch straight, posterior ventral branch somewhat S-shaped.

Copulatory appendage with two lobes, a small semicircular dorsal one and a larger ventral one with flattened distal margin.

Rake-like process fairly large, with eleven large subtriangular teeth. Zenkers organ with five rosettes and a spherically enlarged entrance.

Dimensions

Holotype: length 0.70 mm, height 0.325 mm (after HARDING, 1962).

Specimens from the Comoros: length 0.77 - 0.86 mm; height 0.33 - 0.39 mm.

Specimen from Papua New Guinea: length 0.70 mm, height 0.32 mm.

OCCURRENCE

Mungava munda was originally described by HARDING (1962) from Lake Tegano (= Te-Nggano), Rennell Island, Solomon Islands, salinity 4.56‰. New

material from Lage Tegano, collected during the Danish Rennell Expedition, 1965 and sent to me for further study by Dr. Torben WOLFF in 1986, yielded a few additional specimens of *Mungava munda*.

Station 34, Lake Tegano, Niupani, stomach content of *Eleotris fusca*, April 1st, 1965.

Station 35, Lake Tegano, Hutuna, stomach content of *Eleotris fusca*, April 2nd, 1965.

More information on the Danish Rennell Expedition 1965 can be found in the publication of WOLFF (1968).

M. munda occurs also in the Lac Salé, S. of Mitsamiouli, Grande Comore, The Comoro Islands. It was collected by the "Expédition Karthala '81, Groupe Plongée", Mr. J.L. KENNES, on 28 July 1981. The salinity of the Lac Salé is unknown to me.

Finally, one male specimen was found in the old river bed of the River Awar at Awar, Madang Province, N. Papua New Guinea. Leg.: K. WOUTERS, 27 May 1982. The salinity was 28‰ when the sample was collected at high tide. However, the salinity of the old river bed of the River Awar is changing with the tides, and salinity fluctuations are probably considerable.

There is no difference between *M. munda* from Rennell Island, Papua New Guinea and the Comoros, except for the dimensions: specimens from the Comoros are markedly larger than those from the two other localities.

AFFINITIES AND DIFFERENCES

M. munda can be easily distinguished from *M. papuensis* and *M. intermedia* by the S-shaped furca, the low number of teeth on the rake-like process, the simple morphology of the antero-ventral branch of the furcal attachment and by the absence of an inner list on the anterior inner lamella of the left valve.

M. marthapuriae has a slightly curved furca, a rake-like process with 22 teeth and a different male copulatory appendage.

M. riseri shows some resemblance to *M. munda*, but differs by the morphology of the male copulatory appendage and by the broader segments of the walking leg (P2).

Mungava papuensis sp. nov. (Figs. 22 - 35)

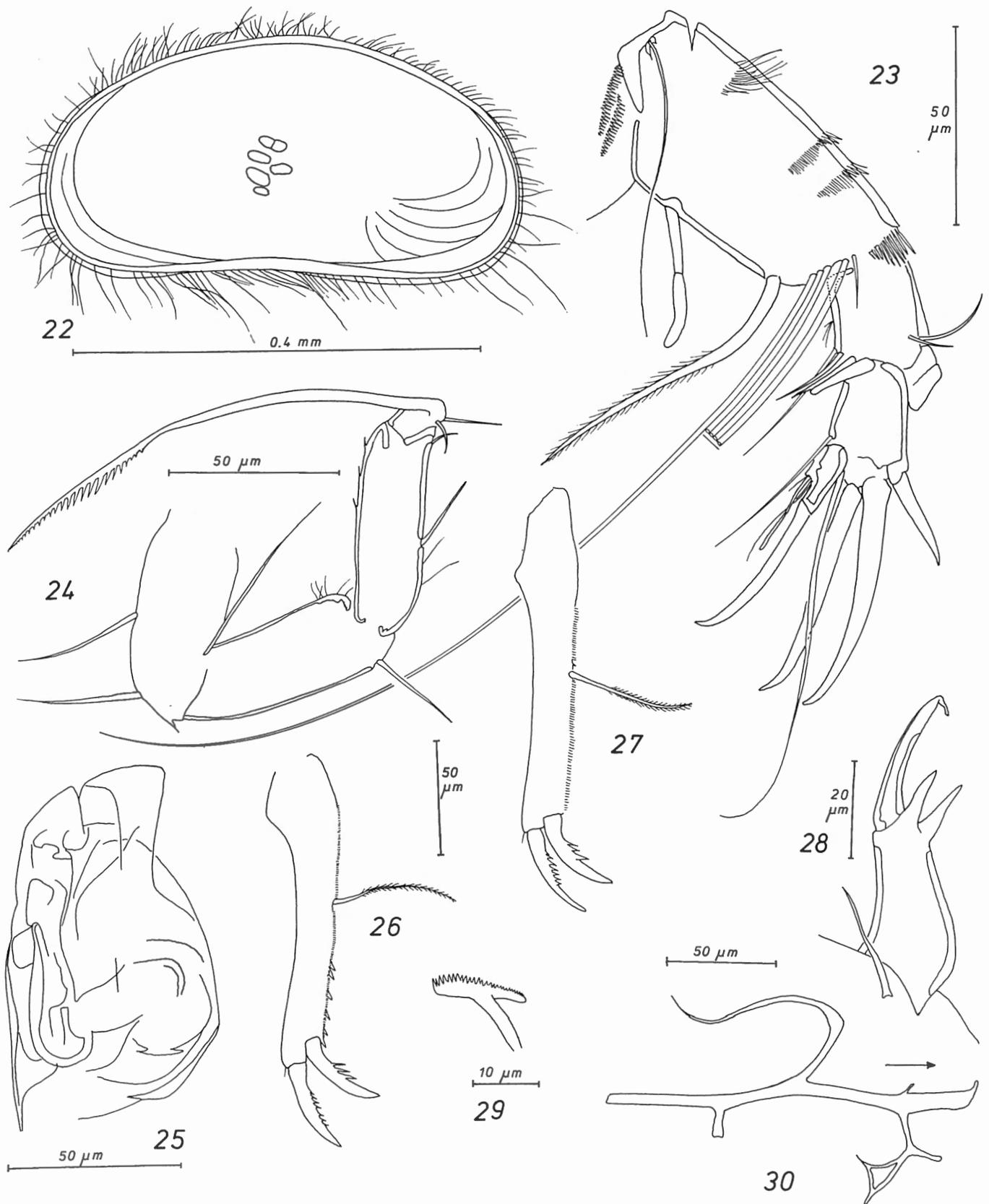
Derivation of name: after Papua New Guinea.

Type-locality: Papua New Guinea, Madang Province, Hansa Bay, Laing Island, in the small southern mangrove area (4° 10' 20" S, 144° 52' 20" E).

Holotype: a dissected male with valves (O.C. 1242a) and soft parts (O.C. 1242b).

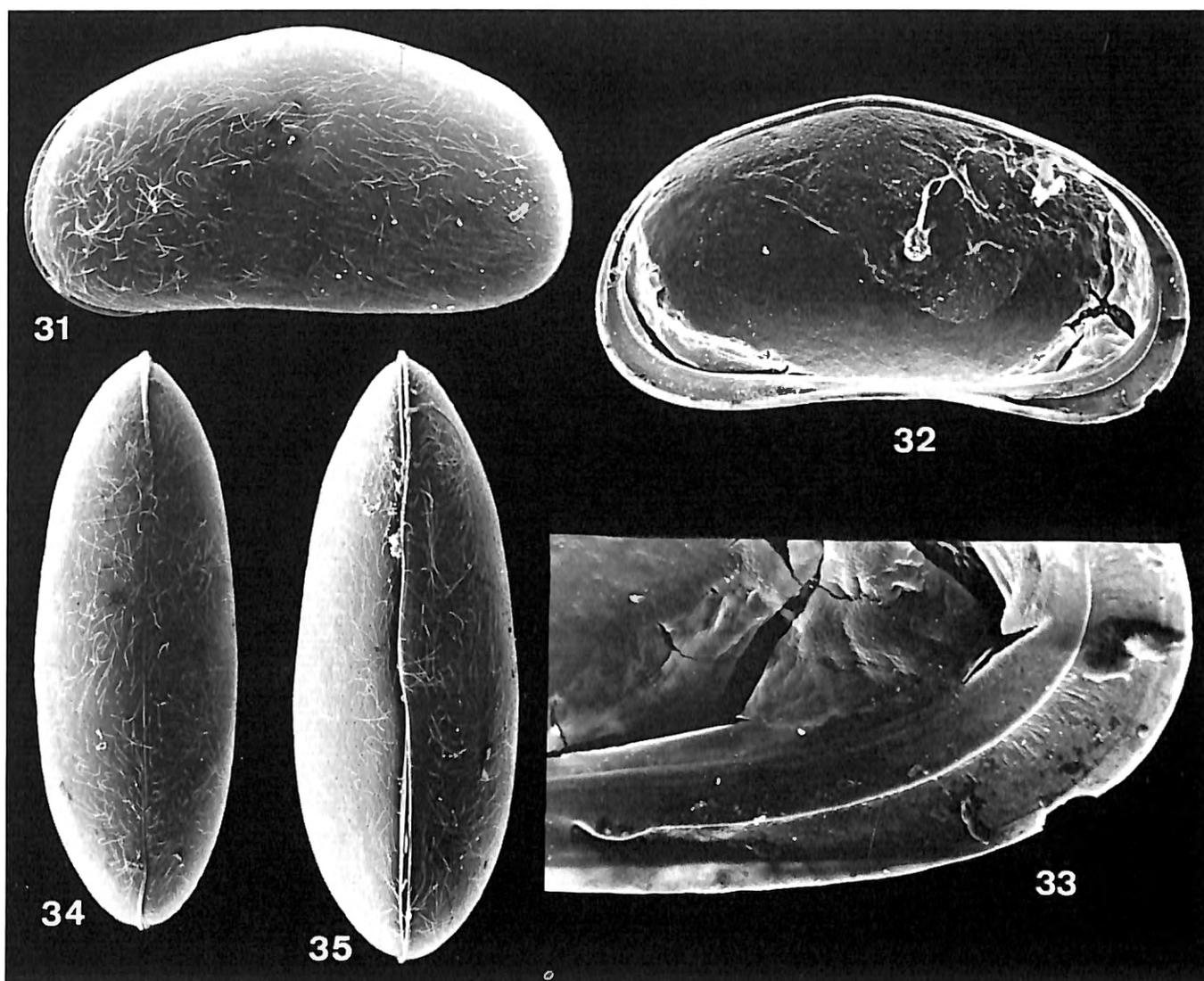
Allotype: a dissected female, with valves (O.C. 1243a) and soft parts (O.C. 1243b).

Paratypes: 11 dissected specimens (3 males and 8 females) (O.C. 1244-1254); 2 gold coated specimens (O.C. 1255-1256) and 90 specimens preserved in alcohol (O.C. 1257-1258).



Figs. 22-30. *Mungava papuensis* sp. nov., Papua New Guinea, Laing Island.

22. Right valve, male, internal view, holotype. 23. Antenna, male, holotype. 24. Cleaning limb (P3), male, holotype. 25. Male copulatory appendage, holotype. 26. Left furca, male, holotype. 27. Right furca, male, holotype. 28. Male clasp organ, holotype. 29. Rake-like process, female, allotype. 30. Furcal attachment, female, allotype.



Figs. 31-35. *Mungava papuensis* sp. nov., Papua New Guinea, Laing Island.

31. Left valve, male, external view, paratype, $165 \times$ (O.C.1244). 32. Left valve, female, internal view, paratype, $165 \times$ (O.C.1251). 33. Left valve, female, internal view of antero-ventral part, paratype, $520 \times$ (O.C.1251). 34. Carapace, male, dorsal view, paratype, $165 \times$ (O.C.1255). 35. Carapace, female, ventral view, paratype, $165 \times$ (O.C.1256).

DESCRIPTION

Valves: medium-sized; anterior and posterior margins evenly rounded; point of maximal height near the middle, and weakly angular; ventral margin slightly concave; carapace elongate ovate in dorsal view with nearly parallel margins; left valve overlapping right one; inner lamella narrow, with large vestibulum and very narrow zone of concrescence; marginal pore canals short and straight. Inner lamella of left valve with a striking inner list and with a knob-like antero-ventral thickening; inner list present on the posterior inner lamella of the left valve, but less developed and also with a knob-like thickening; muscle scar pattern: see fig. 22. Valve surface completely smooth, but covered with numerous long, simple hairs.

Antennula: seven-segmented; segment-ratios: 62: 16: 18: 14: 14: 12: 12; first segment very broad with a hook-shaped dorsal and two large ventral setae; second segment very short, with tube-like projection; fourth to seventh segment with very long natatory setae.

Antenna: exopodite very slender and as long as the first endopodital segment; endopodite four-segmented in males and three-segmented in females; segment-ratios (male): 81: 30: 30: 18. First segment of endopodite with five very long and one very short swimming setae; second segment with large dorso-distal chitinous protuberance; fourth segment inserted on the ventro-lateral side of the third segment. Three large and one short terminal claws in males; short claw somewhat longer in females. Four comb-like

rows of spinules on the dorsal half of the first segment. Mandible: palp probably four-segmented; divisions between segments very indistinct; terminal segment twice as long as broad; large molar teeth, often trifold or bifid; respiratory plate with seven (eight?) Strahlen. Maxillule with a two-segmented elongate palp; terminal segment slightly longer than wide; two relatively small Zahnborsten on the third lobe; vibratory plate with six mouthward directed Strahlen.

Maxilla (P1): epipodite with one short and four long feathered setae; male endopodite modified into a clasping organ, with a slightly curved segment, which is less elongate than in other *Mungava*-species; first segment with two stout distal spines; terminal claw slightly curved.

Walking leg (P2): five-segmented, with a long and strong curved terminal claw; length-ratios of second to fifth segments and claw: 69 (S2): 35 (S3): 25 (S4): 21 (S5): 71 (Cl.); second segment very weakly hirsute ventrally.

Cleaning limb (P3): four-segmented; length ratios of endopodite segments: 62: 56: 16. Two short, and one long reflexed seta.

Furca relatively small and almost straight; one long posterior, medially inserted seta and two stout serrate terminal claws; posterior margin with very short spinules, and distal part of posterior margin often with larger triangular teeth. The number of teeth is variable and ranges from 0 to 18. In most cases the left and right furca do not have the same number of teeth (e.g. the left furca of the holotype is furnished with 6 postero-distal teeth and the right furca has no teeth at all). Furcal attachment very complex, with nearly straight central axis, bearing one strongly curved dorsal branch and two ventral branches; postero-ventral branch short; antero-ventral branch complex, with a distal triangular widening.

Copulatory appendage of male with two lobes, a sub-triangular dorsal one and a larger ventral one with an almost straight distal margin.

Rake-like process very small, with about thirty sharp minute teeth.

Zenkers organ with five rosettes and a spherically enlarged entrance.

Dimensions:

Holotype: length 0.48 mm; height 0.24 mm.

Paratypes: length 0.48-0.53 mm; height 0.22-0.27 mm.

OCCURRENCE

M. papuensis sp. nov. is only known from the type-locality: the small southern mangrove area of Laing Island. This area was sampled at two occasions: on 26 April 1982, $t^{\circ} = 27^{\circ}\text{C}$, sal.: 4‰, 22 specimens, leg.: K. WOUTERS (Station 3007), and on 20 June 1982, $t^{\circ} = 27^{\circ}\text{C}$, sal.: 35‰, 81 specimens, leg.: K. WOUTERS (Station 3387).

AFFINITIES AND DIFFERENCES

M. papuensis sp. nov. is related to *M. intermedia* sp. nov., but differs from the latter by the morphology of the male clasping organ. In *M. papuensis* this organ is broad and relatively short, with two very large and strong distal spines. In *M. intermedia* the clasping organ is long and slender, with short distal spines. Furthermore, both species can be easily distinguished on the basis of the morphology of the male copulatory appendage.

M. papuensis differs from *M. munda*, *M. riseri* and *M. marthapuriae* by the presence of an inner list on the left valve inner lamella, by the high number and the small dimensions of the teeth on the rake-like process and by the presence of a triangular widening on the distal part of the antero-ventral branch of the furcal attachment. See also under "Discussion"!

Mungava intermedia sp. nov. (Figs. 36 - 51)

Derivation of name: from Latin *intermedius*, because of the intermediate position of the species.

Type-locality: Papua New Guinea, Madang Province, Hansa Bay, Laing Island, in the small southern mangrove area (4° 10' 20" S, 144° 52' 20" E).

Holotype: a dissected male, with valves (O.C. 1259a) and soft parts (O.C. 1259b).

Allotype: a dissected female, with valves (O.C. 1260a) and soft parts (O.C. 1260b), from the Village of Watam, in the mangrove swamps of the mouth of the River Sepik, N. Papua New Guinea, East Sepik Province.

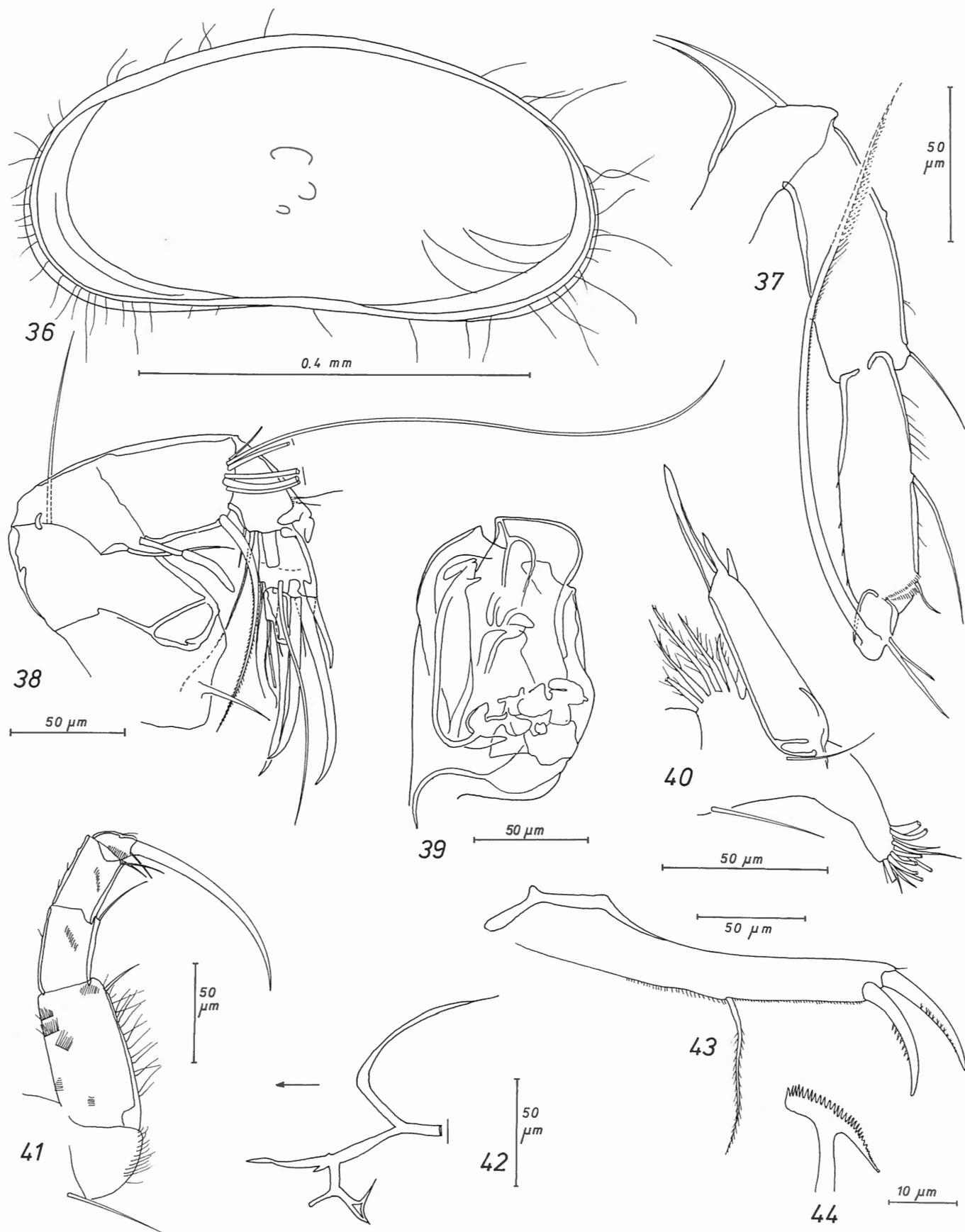
DESCRIPTION

Valves: more oblong than in *M. papuensis*, but less than in *M. munda*; dorsal margin gently arched; point of maximal height near the middle; ventral margin nearly straight. Carapace in dorsal view subovate with pointed anterior extremity; left valve overlapping right one.

Inner lamella narrow; large vestibulum, narrow zone of concrescence; short and straight marginal pore canals; anterior inner lamella of left valve with a striking inner list, and a distal (= antero-ventrally situated) knob-like thickening; posterior inner lamella with less conspicuous inner list, but with a knob-like thickening.

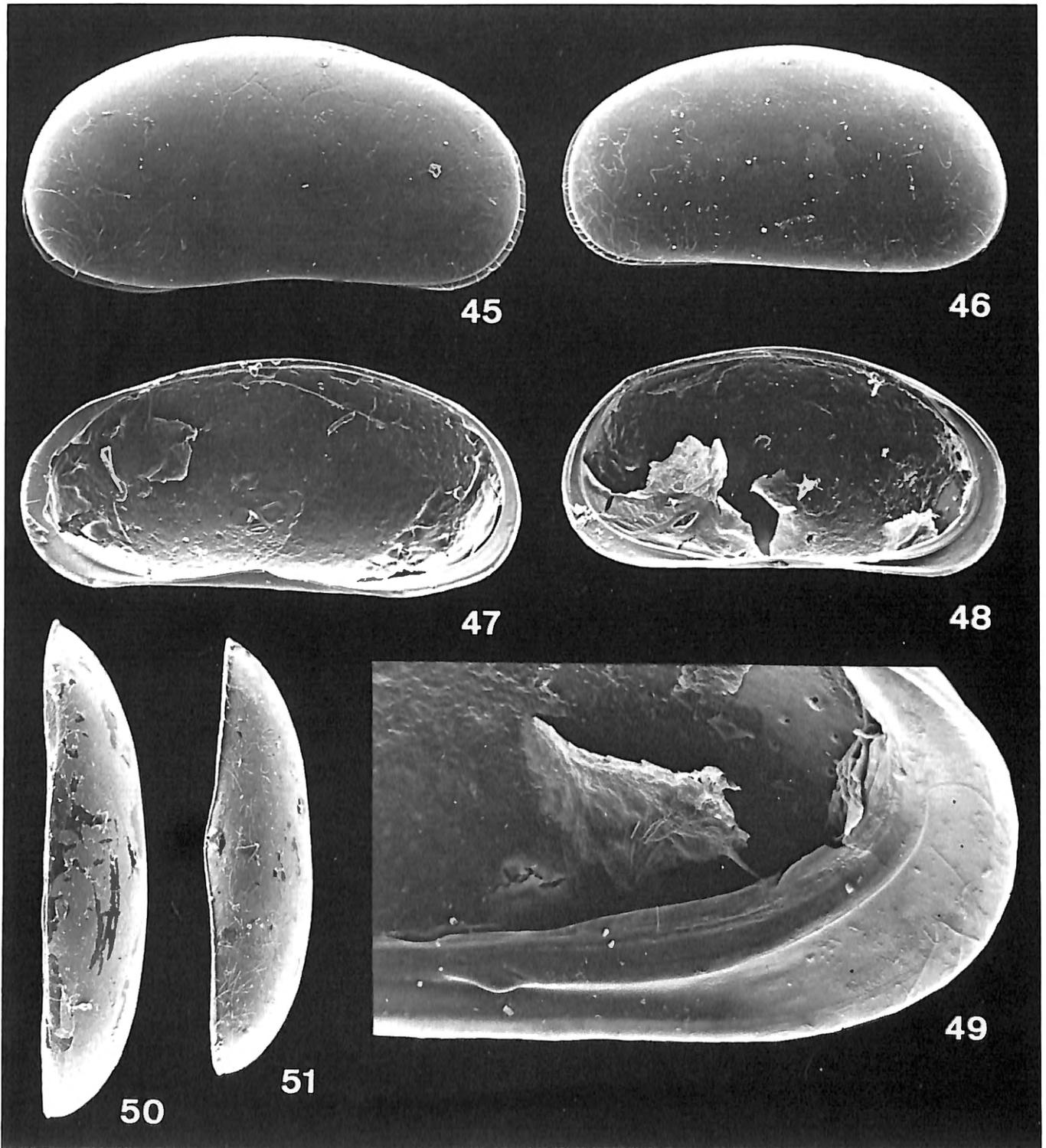
Valve surface completely smooth; anterior, ventral and posterior areas with moderately long hairs.

Antennula: seven-segmented; segment ratios: 94: 25: 23: 21: 18: 16: 12; first segment large and elongate, not very broad; two large ventral setae and a perpendicularly bent dorsal one; second and third segments with short dorso-distal setae; other segments with very long swimming setae.



Figs. 36-44. *Mungava intermedia* sp. nov., Papua New Guinea.

36. Right valve, male, internal view, holotype. 37. Cleaning limb (P3), male, holotype. 38. Antenna, male, holotype. 39. Male copulatory appendage, holotype. 40. Maxilla (P1), male, holotype. 41. Walking leg (P2), male, holotype. 42. Furcal attachment, female, allotype. 43. Furca, male, holotype. 44. Rake-like process, male, holotype.



Figs. 45-51. *Mungava intermedia* sp. nov., Papua New Guinea.

45. Right valve, male, external view, allotype, 130 \times . Left valve, male, external view, holotype, 130 \times . 47. Right valve, female, internal view, allotype, 130 \times . 48. Left valve, male, internal view, holotype, 130 \times . 49. Left valve, male, internal view of antero-ventral part, holotype, 380 \times . 50. Right valve, female, dorsal view, allotype, 130 \times . 51. Left valve, male, ventral view, holotype, 130 \times .

Antenna: exopodite slender, as long as the first endopodite segment; endopodite four-segmented in males, and three-segmented in females; segment-ratios (male): 92: 32: 30: 21; first endopodite segment with one very short and five long swimming setae, reaching beyond the tips of the terminal claws; second segment of male with striking dorso-distal protuberance; third segment bearing two long and one short terminal claws (in males and females); fourth segment inserted on the ventro-distal edge of the third segment; last segment slender, with a stout terminal claw.

Mandible: palp four-segmented; last segment slender, three times as long as wide; setation as in *M. munda*; molar teeth slender and bifid or trifid; ventro-distal margin set with hairs; vibratory plate with six (seven?) Strahlen.

Maxillule: with a two-segmented elongate palp; terminal segment somewhat longer than wide; L/W-ratio: 35: 23; third lobe with two large Zahnborsten, with small distal setules; vibratory plate with about 20 normal and 6 mouthward directed Strahlen.

Maxilla (P1): epipodite with five long feathered setae; male endopodite modified into a two-segmented clasping organ consisting of an oblong first segment and a second slender and somewhat shorter segment (the clasping "claw"); two heavy spines on the ventro-distal margin of the first segment.

Walking leg (P2): five-segmented, with a long and strong terminal claw; length-ratios of second to fifth segments and claw: 69 (S2): 41 (S3): 32 (S4): 16 (S5): 97 (Cl.); second segment weakly hirsute ventrally, and with some very fine comb-like hairy structures on the segments.

Cleaning limb (P3): four-segmented; length ratios of segments: 87: 92: 23. Two short and one long and reflexed seta.

Furca: almost straight; two large serrate claws; one long posterior seta; posterior margin weakly hirsute. Furcal attachment: complex, with a triangular widening of the distal part of the antero-ventral branch. Copulatory appendage with two lobes: a pointed dorsal one and a ventral one with flattened distal margin. Rake-like process small, with about thirty minute and sharp teeth.

Zenkers organ as in *M. munda*.

Dimensions:

Holotype: length 0.58 mm, height 0.28 mm;

Allotype: length 0.66 mm, height 0.31 mm.

OCCURRENCE

M. intermedia sp. nov. was found at two localities in Papua New Guinea: Madang Province, Laing Island, southern mangrove area, salinity: 10‰, temperature: 27°C; leg.: K. WOUTERS, 26 April 1982 (Station 3008).

East Sepik Province, Watam, in the Mangrove swamps of the mouth of the River Sepik; found in mud from

oysters, collected by local fishermen on May 2nd, 1982; coll. K. WOUTERS; salinity unknown, but certainly brackish environment.

AFFINITIES AND DIFFERENCES

As already mentioned higher, *M. intermedia* can be easily distinguished from *M. papuensis* by its slender first segment of the male clasping organ and by the morphology of the male copulatory appendage.

M. intermedia differs from *M. munda*, *M. marthapuriae* and *M. riseri* by the presence of an inner list on the left valve inner lamella, by the presence of a triangular widening on the furcal attachment and by the high number and small dimensions of the teeth on the rake-like organ.

For the sake of completeness, the two other known species of the genus *Mungava* are briefly dealt with.

Mungava marthapuriae KEYSER, 1975 (Figs. 52 - 53)

Medium-sized valves; furca slightly curved; long and slender endopodite of the male maxilla; rake-like process rather large, with 22 teeth; furcal attachment with a simple, long antero-ventral branch (i.e. without triangular widening).

The left valve of a paratype (K 30337d, coll. Z.I.M., Hamburg) shows an antero-ventral knob-like thickening, without an inner list on the left valve inner lamella.

The species is only known from the type-locality: North-River, Everglades National Park, Florida.

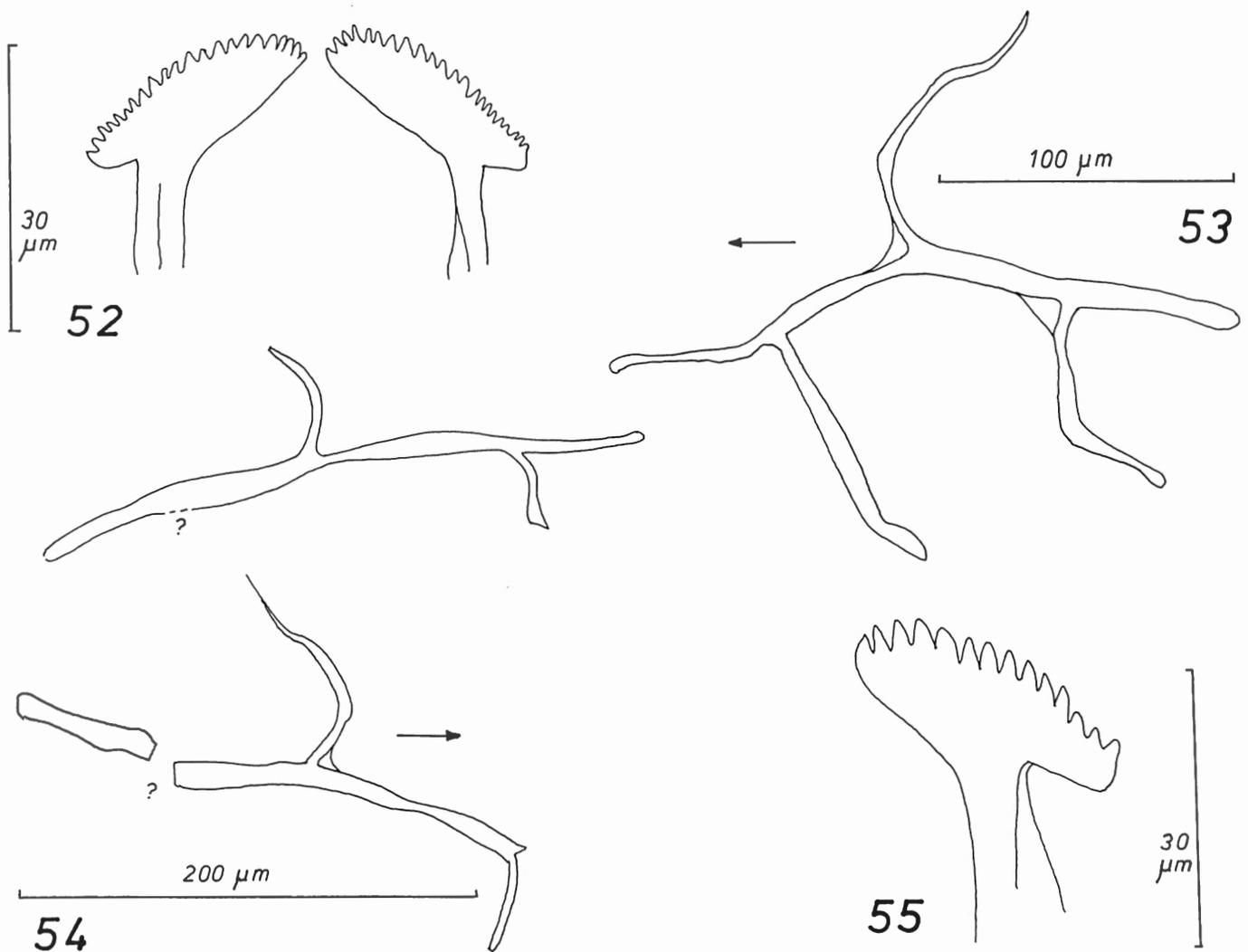
Mungava riseri MADDOCKS, 1979 (Figs. 54 - 55)

Large, oblong valves; furca S-shaped; endopodite of male maxilla (P1) very long and slender; rake-like process large, with 14 strong, subtriangular teeth; furcal attachment resembling that of *M. munda*, although its morphology is difficult to observe on the male paratype (n° 1033, coll. Z.I.M., Hamburg) which I had at my disposal. The left valve of the same paratype shows a knob-like thickening, without an inner list on the left valve inner lamella.

The species is known from Boynton Beach, Florida and Galeeta Island, Panama Canal Zone (type-locality), attached on amphinomid annelid worms (MADDOCKS, 1979).

Discussion

When compared with other genera of the subfamily Thalassocypridinae, the genus *Mungava* shows some remarkable and unique characteristics: (1) a very long and slender male clasping organ, (2) second segment



Figs. 52-53. *Mungava marthapuriae* KEYSER, 1975, female, paratype, Florida, K 30337, coll. Z.I.M. Hamburg.
52. Rake-like process. 53. Furcal attachment.

Figs. 54-55. *Mungava riseri* MADDOCKS, 1979, male, paratype, specimen 1033, Galeeta Island, Panama Canal Zone, K 30494a, coll. Z.I.M., Hamburg.
54. Furcal attachments, incomplete and broken. 55. Rake-like process.

of male antenna with distal protuberances (called protuberance X by MADDOCKS, 1979), (3) furca with a single long posterior seta; (4) furcal attachment with two ventral branches and (5) antero-ventral knob-like thickening on the left valve inner lamella. The combination of these characteristics can be considered as generic diagnosis of the genus *Mungava*.

However, if one looks carefully at some morphological features of the different species, it becomes obvious that the genus *Mungava* is a less homogeneous genus than it appears to be at first sight.

The genus *Mungava* can be divided in two groups: group 1 with *M. papuensis* and *M. intermedia* and group 2 with *M. munda*, *M. marthapuriae* and *M. riseri*.

The first group is characterised by a straight or slightly curved furca, a small rake-like process with a high

number of teeth (about 30), a furcal attachment with a triangular antero-ventral widening and a left valve inner lamella with a distinct inner list. The second group is characterised by an S-shaped furca, a large rake-like process with a relatively low number of teeth (11 in *M. munda*, 14 in *M. riseri* and 22 in *M. marthapuriae*), a furcal attachment without triangular antero-ventral widening and a left valve inner lamella without an inner list.

Both groups show the five higher mentioned diagnostic characteristics. From all this it results that the genus *Mungava* may probably be divided in two genera (or subgenera), corresponding to the two groups. It is decided, however, not to create a new genus or subgenus in the present paper by way of precaution because the discovery of new species can still bring new evidence, certainly in a genus of

the poorly understood subfamily Thalassocypridinae. If we compare the species of the genus *Mungava* with other Thalassocypridinae, it can be inferred that *M. papuensis* is the most primitive species, with a relatively short male clasping organ and a straight furca. Whether the triangular widening of the furcal attachment is a plesiomorphic or an apomorphic characteristic is difficult to decide. The morphology of the furcal attachment (with two ventral branches) is very different from other Thalassocypridinae, where the attachment is rather simple (without ventral branches, e.g. *Dolerocypria*, *Paracypria*, *Thalassocypria*). *M. intermedia* is most closely related to *M. papuensis*, but it has a long male clasping organ. Both species have an inner list on the left valve inner lamella. For some characteristics *M. marthapuriae* has an intermediate position (number of teeth on the rake-like process, slightly curved furca). For other characteristics it belongs to the second group. *M. munda* and *M. riseri* are closely related. They share some apomorphic characteristics: a very long male clasping organ and a S-shaped furca.

At least for some characteristics, the genus *Mungava* seems to represent an evolutionary transformation series as defined by WILEY (1981, p. 9, 152).

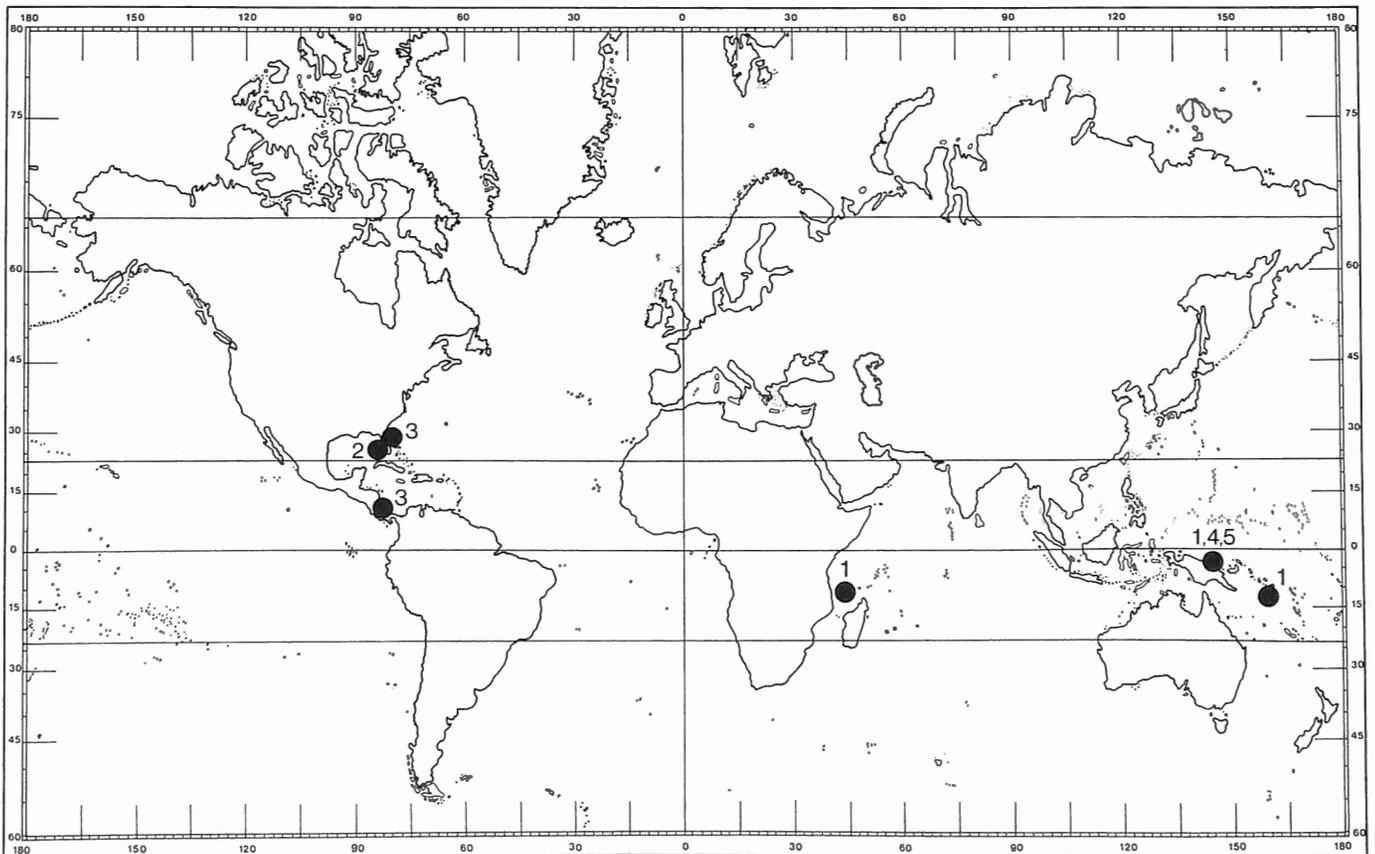
As already mentioned by KEYSER (1975, p. 275) the genus *Mungava* seems to be restricted to tropical areas, and he suggests that it is either a global circum-tropical genus, a point of view which is accepted by MCKENZIE (1980, p. 514) or a genus with a West-Atlantic - Indo-Pacific distribution.

The discovery of *M. munda* in the Comoros, and of two new species of the genus in Papua New Guinea certainly confirms the Indo-Pacific distribution (Fig. 56). Whether the genus *Mungava* is also an East-Atlantic genus still has to be demonstrated. Two recent studies on West-African brackish ostracods from Senegal and Zaire by CARBONNEL (1982) and BABINOT & KOYOUNTZAKIS (1986) do not point into this direction. In both areas the genus *Mungava* seems to be absent.

The distribution of the genus *Mungava* is comparable to that of the harpacticoid copepod *Darcythompsonia inopinata* SMIRNOV, 1934, occurring in brackish water of the Indo-Pacific, the Bahamas, the Caribbean and the N.E. coast of S. America. Up to now this species has not been found along the West African and West American coasts (FIERS, 1986 and pers. comm.). In Papua New Guinea, *Darcythompsonia inopinata* occurs together with *M. papuensis* and *M. intermedia*.

Fig. 56. Distribution of *Mungava*-species.

1. *M. munda* HARDING. 2. *M. marthapuriae* KEYSER. 3. *M. riseri* MADDOCKS. 4. *M. papuensis* sp. nov. 5. *M. intermedia* sp. nov.



Among the ostracods, the genus *Dolerocypria* has a comparable distribution (WOUTERS, 1987).

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