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Freshwater amphipods from Madagascar with description of a new family, three new genera and six new species (Crustacea, Amphipoda)

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Abstract
Sampling the freshwater-inhabitants of different localities in Madagascar yielded three new genera and six new species of Amphipoda of the superfamily Crangonyctoidea, showing how little known this zone has been until now. A new family is erected.

Key words: Freshwater amphipods, Madagascar, taxonomy, Davidia n. gen., Davidia spinicaudata n. sp., Dussartiella aurifex n. sp., Libertinia n. gen., Libertinia latibasis n. sp., Libertinia longitelson n. sp., Reinhardia n. gen., Reinhardia dimorpha n. sp., Sandro spinidactylus n. sp., Sandro starmuehlneri (Ruffo, 1960), Austroniphargidae new fam.

Introduction
Only three species of freshwater amphipods have been described from the island of Madagascar until now: Austrohiphargus bryophilus (Monod, 1925), Sandro starmuehlneri (Ruffo, 1960) and Dussartiella madagascar Ruffo, 1979. The taxonomic situation of the first two genera has changed since their description, and the position within the freshwater families is in discussion until now.

During the months July to December 2001 Reinhard Gerecke and Tom Goldschmidt travelled through Madagascar collecting freshwater animals of many different groups, but mainly mites, their special interest. Springs and running water habitats were visited and checked by hand netting. Catches were tipped out into white pans and animals were picked out immediately. Later the whole material from this expedition was sorted to various taxonomic levels and sent to specialists (Goldschmidt & Gerecke, 2003). Sorting of the collected specimens revealed numbers of amphipods which were sent to the Verona Museum.

Material and methods
The habitus of the amphipods was studied in 70% alcohol or glycerine under a dissecting microscope and slides were prepared using Faure’s medium. Body parts were drawn with pencil using a Wild microscope with a camera lucida (drawing tube). The inking of the pencil drawings was done partly by hand, partly using a Wacom tablet and the program Illustrator. All the examined material from the present study is deposited at the Museo Civico di Storia Naturale di Verona (Italy).

Abbreviations in taxonomical description, sample sites as well as figures
A1, 2 = antenna 1, 2; acc. = accessory; art = article; asl = above sea level; Cx = coxal plate; Ep = epimeral plate; flag = flagellum; Gn1, 2 = gnathopod 1, 2; LL = lower lip (= labium); Md = mandible; mS/cm = milliSiemens per centimeter; Mx1, 2 = maxilla 1, 2; Mxp = maxillipeds; P3-7 = peraeopod 3-7; ped = peduncle; Pl = pleopod; T = telson; U1-3 = uropod 1-3; UL = upper lip (= labrum); Us = urosome
Systematics

For a discussion on the position of the three new genera described in this paper among the extant Malagasy freshwater amphipod genera, see the chapter on phylogenetic relationships.

Davidia nov. gen.

Included species: Davidia spinicaudata n. sp.

Diagnostic characters

Antenna 1 accessory flagellum reduced to 1 article; antenna 2 article 1 of peduncle broad, rounded. Mouthparts basic; labium without inner lobes. Gnathopods 1-2 similar in shape, but not size, carpus ventrally not or scarcely lobed. Pereopods 3-7 with robust setae only, basis of pereopod 7 without postero-distal lobe. Pleopods inner ramus reduced to 1 article. Epimeral plates with locking apparatus on internal face. Urosome segments fused.

Uropods 1, 2 normal, uropod 3 without endopodite, exopodite of only 1 elongate article, bearing robust setae. Telson entire, with distal robust setae only, laterally with penicillate setae.

Type species

Davidia spinicaudata n. sp.

Etymology

In gratitude for the noble private financial support by David R. Cook, Paradise Valley, Arizona.

Davidia spinicaudata n. sp.

Figs 1-4

Holotype

Female, with oostegites, 5 mm, 3 slides. Madagascar 024, 14.08.2001 Ionilahy (Fianarantsoa), Andriampanijiy area, spring 1 at left margin of Riv. Aliithaha, Asiaha, 220 m, 21° 42’ S, 47° 37’ E, 22.1°C, 0.130 mS/cm; Gerecke & Goldschmidt leg. MVRCr 7001-7004.

Paratype

Male, 3 mm. Same locality. Glycerine.

Additional material

10 specimens in alcohol, same locality.

Type locality

Madagascar, spring in Andriampanijiy area.

Description

Female 5 mm.

Head without eyes. Antennae. A1 peduncle not elongate, without robust setae but with few distal setae, ratio of articles 1-3 = 1: 0.6: 0.5; flagellum reaching about 2/3 of body length, with 16 articles, with short distal setae only, accessory flagellum reduced, of 1 article, length about 2/3 of the first article of main flagellum, with 3 short apical setae; A2 half to 2/3 of A1, article 1 of peduncle broad and rounded, article 2 with long gland cone, ratio of articles 4:5 = 1:1, flagellum with 12 articles, each with few short setae.

Mouthparts. Labrum (= upper lip) distally rounded. Mandible incisor 4- toothed, lacinia mobilis 4 (or 3)-toothed, followed by 5 rakers, with brush of setae, molar robust, triturative, with a long seta, palp elongate, article 2 with 1 or 2 long setae on disto-interior margin, article 3 with 2-3 long apical E-setae and 5-8 D-setae on inner margin. Labium (= lower lip) large, without inner lobes. Maxillae: Mx 1 outer lobe with 5 multidentate spine-teeth, the more interior one ending in a 7-toothed comb, inner lobe narrower than outer, with many short setulae and 1-2 apical long setae, palp with 5-7 distal robust setae apically; left and right palp different, the left one shows 7 elongate apical setae, the right one a slender seta and 6 triangular robust setae. Mx 2 inner elongate lobe similar to outer lobe, with long setae distally and short ones on inner margin, outer lobe with two rows of long distal setae and many short setae on inner margin. Maxilliped palp elongate, with a long and thin claw on dactylus.

Peraeon. Gnathopods. Gn 1 coxa subrectangular, with 6 small robust setae on distal margin, basis wide, with 4 short and one long setae on posterior margin and 3-5 long ones on anterior margin, carpus subpiri-form, posteriorly rounded, with 4-5 postero-distal and 2 antero-distal setae, propodus suboval, longer than carpus, with posterior margin little pubescent, anterior margin with a small sub-medial seta, palmar margin of a group of robust setae + 3 long setae, with diagonal facial row of 3 setae, dactylus elongate with 2 setae on disto-interior margin, preceding the elongate nail, 1 seta on the external margin. Gn 2 very similar to Gn 1, coxa 2 subrectangular with 3 robust setae on distal margin.

Pereopods. P 3-4 generally similar, coxae subrectangular, wider than high, ventral margin with many short
Fig. 1. Davidia spinicaudata n. gen. n. sp.: antennae and mouthparts.
Fig. 2. *Davidia spinicaudata* n. gen. n. sp.: maxilliped and gnathopods.
Fig. 3. *Davidia spinicaudata* n. gen. n. sp.: pereopods.
Fig. 4. *Davidia spinicaudata* n. gen. n. sp.: pleopods with retinacola of different shapes and reduced inner rami, fused urosome segments, uropods and telson.
setae, dactylus not elongate. P 5 coxa anteriorly lobed with marginal setae of different length, basis suboval, both anterior and posterior margins setose, without postero-distal lobe; merus, carpus and propodus with groups of short robust setae only, without fine ones, dactylus strong, not elongate, nail very short. P 6 similar to P 5 but distinctly longer, anterior lobe of coxa reduced, posterior lobe with 3 long slender setae, P 7 as long as P 6, coxa with 3-4 long slender setae, basis posterior margin convex with 7 strong setae, anterior margin with 4 groups of setae.

Pleon. Epimeral plates with internal locking apparatus and some robust setae on inferior margin (which can be lacking). Ep 2 postero-distal corner almost rectangular, Ep 3 postero-distal corner subrectangular. Pleopods with 2 retinacula, with inner ramus reduced to 1 article, outer ramus normally developed, with 7-10 articles.

Urosome segments fused, with 1-2 dorsal robust setae marking the first urosomite and 2 dorsal robust setae marking the limit of urosomite 2. Uropods. U 1-2 normal, outer ramus shorter than inner one, rami armed with 4-6 distal and many strong marginal robust setae. U 3 without inner ramus, outer ramus uniarticulate bearing several sets (3 inner and 1 outer) of very strong robust setae, distally with 4-6 robust setae, ratio peduncle to outer ramus = 0.82: 1.

Telson entire, subtrapezoidal, longer than broad (ratio 1: 0.75), distal margin convex, with 4+4 distolateral strong robust setae and mid-lateral penicillate ones.

Gills pedunculate, on segments 2-7, oostegites on segments 2-5, broad, with short marginal setae. Sternal gills absent.

Sexual dimorphism
Male, 3 mm in length, very similar to female, without dimorphic characters. No calceoli found.

Ecology
Until now known only from 220 m above sea level.

Dussartiella Ruflo 1979
Dussartiella n. gen. Ruflo 1979: 428

Included species: Dussartiella madegassa Ruflo, 1979, Dussartiella aurifex n. sp.

Diagnostic characters
Eyes absent, body elongate, coxae short, coxa 4 not excavate. Antenna 1 accessory flagellum biarticulate, the second one rudimentary. Mouthparts: Labium without inner lobes. Mandible palp uniarticulate with one distal spine-like plumose seta. Maxilla 1 asymmetrical, the right one ordinary, the left one with palp reduced to one short article. Maxilla 2 inner lobe lacking diagonal setal row. Gnathopods subequal in size and shape. Pereopods basis not widened. Pleopods inner ramus reduced to a single article. Urosome segments not fused. Uropod 3 inner ramus small, scale-like, outer ramus biarticulate, the second one short. Telson entire, distally emarginate, longer than broad. Gills pedunculate, on segments 2-7. Sternal gills not observed.

Type species
Dussartiella madegassa Ruflo, 1979

Dussartiella aurifex n. sp.
(Figs 5-7)

Holotype
Male 3 mm, 3 slides. Madagascar 113a, 09.10.2001 Ankaratra (Antananarivo), Reserve Manjakatompo, lower riparian spring near road to Lac Froid, 1700 m, 19° 19’ S, 47° 25’ E, 16.4°C. 0.001 mS/cm; Gerecke & Goldschmidt leg. MVRCr. 7005-7007.

Type locality
Ankaratra (Antananarivo), Madagascar.

Etymology
Dedicated to Tom Goldschmidt, the second collector of this expedition; “aurifex” is the Latin translation of his surname, used as a noun in apposition.

Description
? Male 3 mm.

Head without eyes. Antennae. A 1 peduncle not elongate, ratio of articles 1-3 = 1: 0.55: 0.48, article 1 of peduncle with 1 submedial robust seta and a distal seta, articles 2-3 with few short setae; flagellum with 13 articles, each with short distal setae, articles 3-12 with a single aesthetasc, accessory flagellum biarticulate, the first one as long as the first article of main flagellum and the second one about 1/3 of the second article of the main flagellum. A 2 half as long as A 1; article 1 of peduncle broad and rounded, ratio of articles 4:5 = 1: 0.83, flagellum with 6 articles, each with short distal setae.

Mouthparts. Labrum (= upper lip) normal, distally rounded. Mandible incisor 6-toothed, lacinia mobilis toothed, followed by 4-5 rakers, with distal brush of setae, molar robust, triturative, with a short seta, palp re-
Fig. 5. *Dusartiella aurifex* n. sp.: antennae, mouthparts.
Fig. 6. *Dussartiella aurifex* n. sp.: gnathopods, peraeopods.
Fig. 7. *Dussartella aurifex* n. sp.: epimeral plates, pleopods with reduced inner ramus, separated urosome segments, uropods, telson.
duced, uniarticulate, ending with a long spine-like seta (which could be a second article). Labium large without distinct inner lobes. Maxillae. Mx 1 asymmetrical: the right one with outer lobe bearing 6 multidentate spine-teeth and 1 slender seta, the more interior spine-tooth ending in a 8-toothed comb, inner lobe narrower than outer, with 2 long apical setae, palp with 6 distal triangular setae; other maxilla similar except for the strong reduction of the palp, distally with only 1 seta. Mx 2 lobes of equal length, inner lobe with a single row of long distal setae, outer lobe with two rows of long distal setae. Both Mx 1 and 2 pubescent, bearing long setulae. Maxilliped palp elongate.

Peraeon. Gnathopods. Gn 1 coxa subquadrate, with 2 small robust setae on distal margin, basis wide, with 1 long seta on anterior margin, propodus suboval, longer than carpus, with posterior margin weakly pubescent, anterior margin with 1 sub-medial and 4 distal setae, palmar margin with 4-5 robust setae, palmar corner defined by 2 strong and bifid robust setae, posterior margin with group of 4+2 strong setae, additional 2 rows of 5 and 2 setae; dactylus elongate with 1 spiniform process and 3 short and strong setae on interior margin, preceding the elongate nail, 1 seta on the posterior margin. Gn 2: coxa 2 rounded with 2 small robust setae on distal margin, basis wide with 3 setae; propodus suboval, very similar to Gn 1, much longer than carpus, with posterior margin pubescent, anterior margin with 2-3 sub-medial and 5 distal setae, palmar margin with 6 short setae, palmar corner defined by 2 strong and bifid robust setae and 2+1 long setae, additionally 3 rows of 5 and 3 setae; dactylus elongate with 3 short and strong setae on disto-interior margin, preceding the elongate nail, 1 seta on the posterior margin.

Peraeopods. P 3-4 sub-similar, with robust setae only, coxae subrectangular and wide, posterior margin with 2 short robust setae, dactylus not elongate, ratio propodus : dactylus = 1 : 0.3. P 5 coxa lobed anteriorly with 3-4 marginal robust setae, basis suboval, both anterior and posterior margins with short robust setae. P 6 similar to P 5 but distinctly longer, anterior lobe of coxa reduced, posterior lobe with 4 long and thin robust setae, basis posterior margin convex with 7 robust setae, anterior margin with 4 robust setae. P 7 similar to P 6, coxa with 3 marginal setae, basis as long as in P 6, posterior margin convex with 8 robust setae, anterior margin with 5 longer setae.

Pleon. Pleonites with robust setae on posterior and dorso-lateral margins. Epimeral plates with robust setae on posterior margins, Ep 2-3 postero-distal corner almost rounded. Pleopods with 2 retinacula, inner ramus reduced to 1 article, outer ramus short, with 6-8 articles.

Urosome segments free, with 3-4 dorsolateral robust setae on each side. Uropods. U 1 with outer ramus scarcely shorter than inner one, peduncle armed with 3 robust setae on each margin, 1 laterally, 3 on the dorso-mesial margin and 5 on the dorso-lateral margin, rami armed with 2 lateral robust setae and 3 distal ones. U 2 shorter than U 1, armed with 2 strong robust setae on peduncle, rami with 1-2 lateral and 3-5 distal robust setae. U 3 peduncle with 2 little submedial seta and 2+2 distal robust setae, shorter than outer ramus. Outer ramus biarticulate, first article with several groups (3 inner and 4 outer) of robust setae, second article shorter (ratio 0.18 :1) with 3 short subapical setae, inner ramus much shorter than outer one (ratio 0.12 :1), with 1 apical robust seta.

Telson entire, subrectangular, longer than broad (ratio 1: 0.7), produced distal margin weakly emarginate, a pair of strong robust setae distolaterally.

Gills pedunculate, on segments 2-7. Oostegites not observed. Sternal gills absent.

Sexual dimorphism
Unknown.

Remarks
Differs from the only other species Dussartiella madegassa Ruffo, 1979 (the only other species of the genus, which is not included in Barnard & Barnard, 1983) in the shorter and broader propodus of both gnathopods and the much broader and shorter basis articles of P5-7 (in Dussartiella madegassa ratio length to width is about 4, in the new species between 2 and 3).

Ecology
Until now known from 1700 m above sea level.

Libertinia n. gen.

Included species
Libertinia latibasis n. sp., Libertinia longitelson n. sp.

Diagnostic characters
Antenna 1 accessory flagellum biarticulate, article 1 distinctly longer than the second; antenna 2 article 1 of peduncle broad and rounded. Mouthparts: mandibular palp article 3 with 3 long distal E-setae only. Gnathopods 1-2 similar, carpus lobed posteriorly, densely beset
with scales; propodus palm with short setae, posterior margin with scales. Pereopods 3-7 with robust setae only; basis of pereopod 7 with postero-distal lobe. Epimeral plates: locking apparatus on internal face in one species present, in the other not clearly seen. Urosome segments fused. Uropods 1-2 not modified in males. Telson entire, distally emarginate. Sternal gills absent.

**Type species**

*Liberinia latibasis* n. sp.

**Etymology**

In honour of Angelo Libertini (Venezia), who plays a different instrument in amphipod research by application of karyological characters.

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**Libertinia latibasis** n. sp.

(Figs 8-10)

**Holotype**

♂ Male 2 mm, Madagascar 091: 23.09.2001 Ambohimahavelona (Tulear), rheocrenes W of school complex, 50 m, 23° 26'S, 43° 53'E, 25.6°C, 1.240 mS/cm; Gerecke & Goldschmidt leg. MVRCr 7008-7010.

**Paratypes**

1 specimen sex (?) in alcohol, MVRCr, same locality.

**Additional material in alcohol:**

- 1 spec. 2 mm, Madagascar 091: 23.09.2001 Ambohimahavelona (Tulear), rheocrenes W of school complex, 50 m, 23° 26'S, 43° 53'E, 25.6°C, 1.240 mS/cm; Gerecke & Goldschmidt leg.
- 1 spec. 2 mm, Madagascar 068: 08.09.2001 Andohahela (Tulear), Fenoevo, first spring N, 700 m; Gerecke & Goldschmidt leg.
- 1 spec. 2.5 mm Madagascar 069: 09.09.2001 Andohahela (Tulear), Isaka, W stream at the S National park border, 200 m asl., 19.2 °C, 0.091 mS/cm; interstitial; Gerecke & Goldschmidt leg.

**Type locality**

Ambohimahavelona (Tulear), Madagascar.

**Etymology**

Referring to the wide (Latin latus) basis of the pereopods.

**Description**

Male? 2 mm

**Head** without eyes. **Antennae.** A1 peduncle not elongate, with distal setae on article 1 and small robust setae on 2nd and 3rd article, ratio of articles 1: 0.75: 0.7; flagellum with 10 articles, with short distal setae, articles 3-9 each with 1 distal aesthetasc, accessory flagellum biarticulate, longer than first article of primary flagellum. A 2 2/3 length of A 1; article 1 of peduncle broad and rounded, article 2 with short gland cone, ratio of articles 3-5= 1: 0.93 : 0.42, flagellum with 5 articles, with few short setae.

**Mouthparts.** **Labrum (= upper lip) suboval, distally rounded. Mandible incisor 6-toothed, lacinia mobilis 4-toothed, followed by 4 setulose rakers, with brush of setae, molar robust, triturative, with one long seta, palp elongate, ratio of articles =0.52: 1: 0.66, article 2 with 1 short submedial seta and 1 long seta on distal margin, article 3 with 3 long apical E- setae only. *Labium* large without distinct inner lobes. *Maxillae.* Mxl outer lobe with 5-7 multidentate spine-teeth, inner lobe narrower than outer, with 2 apical long setae, palp asymmetrical, with 3-6 distal strong robust setae. Mx 2 inner lobe similar to outer one, with many long distal elongate setae and pubescent margins. *Maxilliped* palp elongate, distally densely pubescent.

**Peraeon.** **Gnathopods.** Gn 1 coxa subquadrate with 1 small robust seta on anterodistal margin and 1 on ventral margin, basis widened, with 2 long setae on posterior margin, carpus subtriangular, with long setae distally, produced into narrowly rounded ventral pubescent lobe, propodus subtriangular, longer than twice the carpus, anterior margin with 2 distal setae, posterior margin with blunt corner, with pubescence on palmar margin, defined by 4 setae, with 5-6 isolated setae on the inner side, 3 strong robust setae near the corner, anterior margin with 2 distal setae, dactylus with 1 seta on anterior margin and 2 distal setae, nail longer than remaining dactylus. Gn 2 coxa subrectangular, with 1 small robust seta on antero-distal margin and 1 on ventral margin, basis elongate with 1 medial and 1 distal seta, carpus elongate, produced into large rounded posterior pubescent lobe, tongue-like (ratio length : breadth=0.5: 1) with long marginal setae, propodus stout and subtriangular, with a posterior pubescent prominence, palmar margin defined by a small robust seta and 3 strong robust setae, 2 submedial setae on outer margin and nail as long as remaining dactylus.

**Pereopods.** P 3-4 generally similar, armed with short robust setae, coxa 3-4 subquadrate, ventral margin with 1-3 thin setae, dactylus not elongate with 1 submedial anterior robust seta, nail short.

P 5-7 with robust setae only. P 5 coxa large, ante-
Fig. 8. Libertinia latibasis n. gen. n. sp.: antennae, mouthparts, gnathopods.
Fig. 9. Libertinia latibasis n. gen. n. sp.: peracopods.
Fig. 10. Libertinia latibasis n. gen. n. sp.: pleopods, fused urosome segments, uropods, telson.
riorly lobed with 2 marginal robust setae, basis wide, suboval, both anterior and posterior margin with short robust setae, ischium, carpus and propodus armed with robust setae only. P 6 similar to P 5 but somewhat longer, anterior lobe of coxa reduced, posterior lobe with 1 thin seta. P 7 similar to P 5-6, coxa with 1 thin seta, basis scarcely longer than in P 5-6 and narrower.

**Pleon. Pleopods** generally similar and reduced, with equal rami, peduncle broad, as long as rami and bearing 2 retinacula each, rami with 6-7 articles each. Locking apparatus on inner side of epimeral plates not clearly seen.

**Urosome** segments fused, with 1-2 dorsolateral robust setae on each side of urosomite 1 and 2. **Uropods.** U 1 with outer ramus shorter than inner one, peduncle armed with 2 rows of 4-5 marginal robust setae, rami armed with 3-4 strong distal robust setae, inner ramus with 3 lateral robust setae. U 2 shorter than U 1, peduncle armed with strong robust setae, rami with distal strong robust setae and only inner ramus with 2 lateral robust setae. U 3 peduncle with 4 distal robust setae, ratio peduncle to outer ramus = 0.56: 1. First article of outer ramus with several sets of robust setae + 4 distal robust setae, second article with 1-2 submedial setae only. Small inner ramus (ratio outer to inner ramus = 1: 0.22), with 1 distal robust seta.

**Telson** entire, subrectangular, longer than broad (ratio 1: 0.82), apical margin slightly emarginate and armed with 1+1 distolateral strong robust setae and 2+2 distolateral slender setae.

**Gills** pedunculate, on segments 2-6, oostegites not observed.

**Sexual dimorphism.**

Unknown.

**Ecology**

Interstitial, from 50-950 m above sea level.

**Libertinia longitelson** n. sp.

(Figs 11-12)

**Holotype**

Female ovigerous, 2 mm. Madagascar 074c, 11.09.2001 Andohahela (Tulear), Isaka, stream 360 m, 18.8°C, 0.088 mS/cm; interstitial, 25° 00’S, 46° 59’E, 23.2°C, 0.154 mS/cm; Gerecke & Goldschmidt leg. MVRCr 7011-7013.

**Paratype**

1 specimen, ? sex, 3 mm (3 slides MVRCr 7014-7016). 1 specimen, ? sex, 2 mm, in glycerine (MVRCr 7017), same locality.

**Additional material in alcohol:**

- 20 spec. 2-2.5 mm, locality like that of types.
- 1 spec. 2.5 mm Madagascar 048c, 25.08.2001 Betroka (Tulear), right affl. of Riv. Mangoky about 1 km NE village, 830 m, 22.3° C, 0.139 mS/cm; riparian spring, Gerecke & Goldschmidt leg.
- 3 spec. Madagascar 063, 07.09.2001 Andohahela (Tulear), Isaka, stream exp. W 1 km N from the village, 250 m, 19.7°C, 0.136 mS/cm; Gerecke & Goldschmidt leg.
- 1 spec. 2.5 mm Madagascar 079, 13.09.2001 Dauphin (Tulear), Mandena, QMM area, swamp with Sphagnum at left border of river Amendano (1 km downstream roadbridge), 10 m asl; 21.4° C, 0.290 mS/cm; Gerecke & Goldschmidt leg.
- 1 spec. 2.5 mm Madagascar 082, 14.09.2001 Dauphin (Tulear), Mandena, QMM area, swamp with Sphagnum near road from pepinerie to coastal lake, 5 m asl; Gerecke & Goldschmidt leg.

**Type locality**

Andohahela (Tulear), Madagascar.

**Etymology**

Referring to the relatively long (Latin longus) telson.

**Description**

Female 2 mm. **Head** without eyes. **Antennae.** A 1 peduncle not elongate, with submedial ventral robust seta on article 1 and small robust setae on 2nd and 3rd article, ratio of articles 1-3 = 1: 0.75: 0.7; flagellum with 12 articles, with short distal setae, articles 5-11 each with 1 distal aesthetasc, accessory flagellum reaching the distal margin of the 1st article of the main flagellum, biarticulate. A 2 as long as half of A 1; article 1 of peduncle broad and rounded, flagellum with 6 articles, with few short distal setae.

**Mouthparts**

**Labrum** (= upper lip) rounded distally. **Mandible** incisor 4-5-toothed, lacinia mobilis 4-toothed, followed by 3-4 setulose rakers, molar robust, triturative, with a long seta; palp elongate, right and left side symmetrical, ratio of articles 1-3 = 0.53: 0.85: 1, article 1-2 without setae, article 3 with 3 apical long E-setae only. **Labium** large without distinct inner lobes. **Maxillae.** Mx1 outer lobe with 6-7 multidentate spine-teeth, inner lobe narrower than outer, with 2 apical long setae, palp asym-
Fig. 11. Libertinia longitelson n. gen. n. sp.: antennae, mouthparts, gnathopods.
Fig. 12. Libertinia longitelson n. gen. n. sp.: peraeopods, epimeral plates, fused urosome segments, uropods, telson.
metrical with 4-6 distal robust setae. Mx 2 inner lobe similar to outer one, on outer lobe 2 distal rows of setae, inner lobe with pubescent margin.

**Peraeon. Gnathopods**

Gn 1 coxa subrectangular, with 1 small robust seta on anterodistal margin, basis widened, with 1 long seta on posterior margin and 1 on anterior margin, carpus subpiriform with 2 strong distal and 1 submedial seta posteriorly and 1-2 on anterior margin, produced into a ventral (scarcely pubescent) small lobe with 2 apical strong setae; propodus stout and subtrapezoidal, longer than carpus, with 2 distal setae, posterior margin with a short pubescent protuberance defining the palmar margin with 3 strong robust setae, 3 small short setae along palmar margin, 1 on the inner facial side and 1 long seta on the outer side, anterior margin with 1 submedial seta; dactylus with 1 seta on anterior margin, nail longer than dactylus and reaching the protubrance of the propodus. Gn 2 coxa subrectangular, with 3 small robust setae on inferior margin, basis elongate with 1 medial and 1 distal seta on posterior margin, merus pubescent on posterior side, carpus broader than long, with 2 setae on dorso-distal margin and 5-7 on distal margin, produced into large rounded ventral pubescent lobe (ratio length: breadth= 0.82 :1), propodus subtrapezoidal, with a prominent posterior pubescent protuberance defining the palmar margin; palmar margin with 3 robust setae (2 on inner and 1 on outer face) which are apically bifid, and 2 slender setae, 4 short simple setae along palmar margin, 1 submedial seta on the inner side and 3-4 distal setae, anterior margin with 1 submedial seta; dactylus with 1 submedial seta anteriorly and long nail.

**Peraeopods**

P 3-4 generally similar, armed with robust setae only, coxae 3-4 subrectangular, inferior margin with 2-3 thin robust setae, dactylus not elongate with 1-2 submedial robust setae on inner margin.

P 5-7 with robust setae only, basis subrectangular, with posterodistal pronounced corner. P 5 coxa large and anteriorly lobed, with 1 marginal robust seta, dactylus with a small distal seta and a very short nail. P 6 similar to P 5 but longer, coxa reduced with 3 marginal robust setae, dactylus with a very short nail. P 7 similar to P 5, 6 but slightly shorter than P 6, coxa with 2 thin postero-marginal robust setae, dactylus with a very short nail.

**Pleon**

**Epimeral plates** with robust setae on inferior margin, Ep 2-3 with postero-distal corner rounded. **Pleopods** relatively short with 2 rami normally developed, with 5-6 articles and 2 retinacula each. Locking apparatus on inner side of epimeral plates not clear.

**Urosome** segments fused, with 1-2 dorsolateral robust setae on each side of the urosomite 1 and 2. **Uropods.** U 1 with equal rami, peduncle longer than rami, armed with 1 row of 3 marginal robust setae and 1 distal robust seta, rami armed with 2-3 lateral robust setae and 2-3 strong distal robust setae. U 2 shorter than U 1, peduncle armed with 2 lateral and 1 distal strong robust setae, outer ramus shorter than inner one, rami with 2 lateral robust setae and 1-2 distal ones.

U 3 peduncle with 4 distal robust setae, ratio of peduncle to outer ramus = 0.5: 1, with very small inner ramus (ratio outer to inner = 1 : 0.1), with 1 distal seta, first article of outer ramus with sets of 1-2 robust setae, 2x 2 distal robust setae and 1 seta, second article with 2 fine setae.

**Telson** entire, elongate, subrectangular, longer than broad (ratio 1: 0.5), apical margin V-shaped incised (17%-32% of telson length) and only armed with 2+2 distolateral strong setae.

**Gills** pedunculate, on segments 2-6. **Oostegites** of the same size of gills, on segments 2-5, carrying one oval egg.

**Sexual dimorphism**

Unknown.

**Remarks**

The difference of *L. latibasis* and *L. longitelson* is mainly (as the specific names already indicate) in the shape of the basis of P5-7 and the shape of the telson (in the latter species longer and distally V-shaped incised). In *L. latibasis* the Mxp shows a scaly area at the basis of the dactylus not seen in *L. longitelson*.

**Ecology**

5-830 m above sea level.

**Reinhardia** n. gen.

Included species: *Reinhardia dimorpha* n. sp.

**Diagnostic characters**

Antenna 1 flagellum with aesthetascs. Antenna 1 with accessory flagellum reduced, monoarticular; antenna 2 article 1 of peduncle broad, rounded. Mouthparts: labium without inner lobes, palp of maxilla 1 asymmetrical, normal or reduced to 1 article. Gnathopods 1-2 similar, carpus ventrally scarcely lobed,
pubescent, propodus with a diagonal row of elongate spines. Pereopods 3-7 with robust setae only, basis of pereopod 7 without postero-distal lobe. Pleopods with 2 rami equal in length. Epimeral plates with locking apparatus on internal face. Urosome segments not fused. Uropods 1-2 modified in male; uropod 3 with inner ramus reduced, outer ramus elongate with 2 articles. Telson entire, distally convex without any depression or emargination medially, subrectangular. Sternal gills absent.

**Etymology**
In honour of Reinhard Gerecke, unusually skilful collector of amphipods from remote habitats and dear friend.

**Type species**
*Reinhardia dimorpha* n. sp.

*Reinhardia dimorpha* n. sp. (Figs 13-16)

**Holotype**
Male, 5 mm. Madagascar 156, 18.11. 2001, Joffreville (M. d’Ambre, Antsiranana), rheocrene at right affl. R.de Manques in Reserve Fontenay, 610 m, 12° 42’ S, 49° 37’ E, 21.2° C, 0.025 mS/cm; Gerecke & Goldschmidt leg. MVRCr 7018-7019.

**Paratype**
Female, 4.5 mm (MVRCr 7021-7023), same locality.

**Additional material**
- About 20 specimens in alcohol, same locality. 2 males in glycerine (MVRCr 7020).
- ? 1 juv. 2.5 mm in bad condition. Madagascar 165, 21.11.2001 Joffreville (M.d’Ambre, Antsiranana), R.Antomboka downstr. large cascade, interstitium, 850 m, 20.0°C, 0.020 mS/cm; Gerecke & Goldschmidt leg.

**Type locality**
Joffreville, Madagascar.

**Etymology**
Adjective dimorphus, -a, -um; latinised from Greek (“morphé” = shape and “di” or “dyo” = two), stressing the sexual dimorphism of this species.

**Description**
Male, length 5 mm.

*Head* without eyes. *Antennae*. A 1, peduncle without robust setae, with few distal setae on articles 2-3, ratio of articles 1: 0.7: 0.7; flagellum reaching about 1/3 of body length, with 17 articles, with short distal setae, articles 5-16 each with 1 distal short aesthetasc, accessory flagellum very reduced, uniarticulate, shorter than article 1 of main flagellum. A 2 as long as 2/3 of A 1: article 1 of peduncle broad and rounded, article 2 with long gland cone, ratio of articles 3-5: 0.3: 1:1, flagellum with 8 articles, with few short setae.

*Mouthparts. Labrum (= upper lip) normal, distally rounded. Left mandible incisor 6-toothed, lacinia mobilis 5-toothed, followed by 2 rakers, with brush of setae, molar robust, triturative, with a long seta, palp elongate, ratio of articles = 0.6: 1: 0.85, article 2 with 4 long setae on disto-interior margin, article 3 with 3 long apical E-setae and 10-11 elongate D-setae on inner margin. Labium (= lower lip) large without distinct inner lobes. Maxillae. Mx 1 asymmetrical, right one outer lobe with 6-8 multidentate robust setae, inner lobe narrower than outer, with 2 apical long setae, palp with 3-4 distal strong robust setae; in the other one we can observe the reduction of the palp, represented only by a small stump. Mx 2 inner lobe similar to outer lobe, with long distal setae and pubescent margins. Maxiliped palp elongate.

*Peraeon*

*Gnathopods. Gn 1 coxa subrectangular, with 3-4 small robust setae on anterior and 1 longer on inferior margin; basis wide with 3 long and thin robust setae on posterior margin; carpus triangular with strong setae on ventral margin, pubescent, shortly lobed; propodus stout, suboval, longer than carpus, ventral margin pubescent, palmar margin without defining setae, submedial diagonal row of strong setae on the inner side and a row of strong setae apically bifid on the outer side, anterior margin with 1 medial seta and 3 distal setae; dactylus with 1 seta on anterior margin, nail elongate. Gn 2 coxa suboval, with 4 small robust setae on anterior and 1 longer on inferior margin; basis elongate, only with distal setae; carpus elongate, with strong setae on posteriorly pubescent margin, shortly lobed and 1 strong robust seta on disto-anterior margin; propodus stout and subtrapezoidal, with 6 distal setae, palmar margin with 5 strong setae, corner defined by 1 slender seta and 1 strong robust seta apically bifid, submedial diagonal row of strong facial setae on the inner side and a row of strong setae apically bifid on the outer side, dactylus with 1 submedial anterior seta and long nail.

*Peraeopods. P 3-4 generally similar, armed only with robust setae, coxa 3 subrectangular, coxa 4 sub-
Fig. 13. *Reinhardia dimorpha* n. gen. n. sp.: antennae, mouthparts.
Fig. 14. Reinhardia dimorpha n. gen. n. sp.: maxilliped, gnathopods, epimeral plates.
Fig. 15. *Reinhardia dimorpha* n. gen. n. sp.: peraeopods, epimeral plates, pleopods.
Fig. 16. *Reinhardia dimorpha* n. gen. n. sp.: urosome segments, uropods, telson.
quadrate, posteriorly feebly excavate, anterior margin with 3 short robust setae, inferior margin with 1 thin robust seta, dactylus not elongate, with 1 submedial anterior robust seta. P 5-7 with robust setae, basis without postero-distal lobe, dactylus strong with short nail. P 5 coxa anteriorly lobed with 1 marginal robust seta, basis subrectangular, both anterior and posterior margins with short robust setae, many strong setae on distal margin of carpus and propodus. P 6 similar to P 5 but distinctly longer, anterior lobe of coxa reduced, posterior lobe with 1 thin robust seta. P 7 similar to P 5, coxa with 1 thin robust seta, basis scarcely longer than in P 5-6.

Pleon

Epimeral plates, rounded without robust setae on ventral margin, with 3 small setae on posterior margin of Ep 3 only. Pleopods with equal rami normally developed, with 6 articles and 2 retinacula.

Urosome segments not fused, with 1 dorsal and 1 lateral robust seta on each side of the urosomite 1 and 2. Uropods. U 1 peduncle on the ventral side with a protuberance armed with strong robust setae and 2 protuberant modified robust setae, curved and apically bifid, hook-like.

U 2 peduncle normal with 2 lateral robust setae, but rami very short (half length of peduncle), with 1 lateral and 2 distal robust setae. U 3 ratio peduncle to outer ramus = 0.45 :1, peduncle with 1 little submedial seta and 6 distal robust setae.

Inner ramus small (ratio outer to inner ramus = 1: 0.16), first article of outer ramus with several sets (2 inner and 2 outer) of very strong robust setae + 6 distal setae, second article with 3 very small distal setae only.

Telson entire, subrectangular, longer than broad (ratio 1: 0.88), distal margin convex, with 1+1 distolateral strong robust setae.

Gills pedunculate, on segments 2-6.

Sexual dimorphism

Female similar to male but uropod 1 and 2 normal with outer ramus scarcely shorter than inner one. Oostegites not observed.

Ecology

610-850 m above sea level.

Sandro Karaman & Barnard, 1979


Included specie

Sandro starmuehleri (Ruffo, 1960), Sandro spinidactylus n. sp.

Diagnostic characters

Urosomites fused. Eyes absent. Antenna 1 accessory flagellum monoarticulate. Antenna 2 ordinary, but first article grossly swollen. Mouthparts basic, rich setae on mandibular palp mostly near apex (E-setae, + some D-setae). Labium with inner lobes well marked. Maxillae with medial setation, Mx 1 asymmetrical, IP triangular. Both plates of Maxilliped medium. Coxae elongate, Cx 4 posteriorly excavate. Gnathopods medium, subsimilar in size and shape, carpus strongly lobed, propodus trapezium-shaped, apically widening, palmar corner weakly oblique to rectangular. Peraeopods 5-7 similar, of medium length, basis expanded. Uropods 1, 2 rami subequal or slightly different; U 3 peduncle with long apicolateral lobe, outer ramus elongate, article 2 short, inner ramus subquadrate. Telson longer than wide, nearly totally cleft. Sternal gills absent.

Type species

Austro niphargus starmuehleri Ruffo, 1960

Sandro spinidactylus n. sp.

(Figs 17-19)

Holotype

Female 7 mm. Madagascar 029, 15.08.2001 Ionilahy (Fianarantsoa), Riv. Avatamboka ca. 1 km NW from the village, 210 m, 21° 42’ S, 47° 37’ E, 21.2° C, 0.077 mS/cm; Gerecke & Goldschmidt leg. MSVCr 7031-7037.

Paratype

Male 6 mm (MSVCr 7024-7030). Same locality.

Additional material in alcohol

- 1 male 6 mm: type locality.
- 2 juv. 4-5 mm. Madagascar 022, 12. 08. 2001, Ionilahy (Fianarantsoa), spring stream in area Marosaro (S from river Ionilahy), 300 masl., 21.0 ° C, 0.061 mS/cm; Gerecke & Goldschmidt leg.
- 9 males 5.5-6 mm, 9 females 5-6 mm: Madagascar 024, 14. 08. 2001, Ionilahy (Fianarantsoa, area Andriampanjy, spring at left margin of Riv. Asiaha, 220 m, 22,1 ° C, 0.130 mS/cm; Gerecke & Goldschmidt leg.
- 9 ad. 5-7 mm, 15 juv. 2-4 mm: Madagascar 030, 16. 08. 2001, Ionilahy (Fianarantsoa), Vodraindry, source in primary forest exp. W, 400 m asl., 19.8 ° C, 0.081 mS/cm; Gerecke & Goldschmidt leg.
- 1 fem. 7 mm, 17 ad. 5-6 mm, 13 juv. 3-4 mm:
Madagascar 025, 14. 08. 2001, Ionilahy (Fianarantsoa), area Andriampanijy, spring 2 at left margin of Riv. Asiaha, 220 m, 22,1 ° C, 0.101 mS/cm; Gerecke & Goldschmidt leg.

Type locality
Ionilahy (Fianarantsoa), Riv. Avatarambo, Madagascar.

Etymology
The specific name is in reference to the spinose inner margin of the dactylus of the peraeopods 5-7.

Description
Female ovigerous (with 15 eggs), 7 mm length.

Head without eyes. Lateral lobes scarcely prominent, rounded. Antennae. A 1 shorter than 1/2 body, ratio peduncle articles 1-3 = 1 : 0.9 : 0.6, articles with groups of short setae, without robust setae, flagellum of 16 articles, each of them with distal tufts of 2-3 setae shorter than article length; accessory flagellum uniarticulate, short. A 2 shorter than A 1, peduncle article 1 wide, round, article 2 with gland cone reaching the end of article 3, flagellum of 6 elongate articles, each of them with distal tufts of 2-6 setae shorter than article length; accessory flagellum uniarticulate, short. A 2 shorter than A 1, peduncle article 1 wide, round, article 2 with gland cone reaching the end of article 3, flagellum of 6 elongate articles, each of them with distal tufts of 2-6 setae. Mouthparts. Labium asymmetrical, left incisor 5- toothed, right 3- toothed, lacinia mobilis 3- toothed (right bifurcate), followed by 5 plumose rakers, molar robust, triturative with a long plumose seta; palp right and left symmetrical, with shorter D- and many long E- setae. Labium with distinct inner lobe. Maxillae. Mx 1 asymmetrical, outer lobe of right one with 6 strong spine- teeth, the 3 exterior unidentate, and 3 interior multidentate ones; inner lobe narrower than outer, setose on inner margin with 2 apical elongate setae. Palp of left Mx 1 article 2 with 3 distal strong conical robust setae, palp of right Mx 1 with 4 shorter robust setae and 1 long interior seta. Mx 2 outer lobe wider than inner, lobes with elongate setae in two rows, inner lobe with setation on inner margin. Maxilliped. Outer plate with 7 strong spine-teeth, apically with slender setae; inner plate apically beset with 10-12 slender setae.

Gnathopods. Gn1 coxa subrectangular, ratio length to width = 1 : 0.54, with 4 robust setae on posterior margin and 6 setae on distal margin; basis elongate, posterior margin with a row of 5 long setae, anterior margin with 6 subdistal short setae; carpus with ventral wide scaly lobe; propodus subtrapezoidal with a disto-ventral scaly area, palmar margin defined by a group of 4 setae (2 on inner face, 2 on outer one), palmar corner nearly rectangular; dactylus as long as palmar margin, with a long nail. Gn 2: coxa subrectangular; basis elongate with 3 posterior long setae and 5 anterior short setae; carpus ventrally with wide scaly lobe; propodus piriform with a distoventral scaly area, palmar margin defined with few short setae. Coxa 3 subrectangular, similar to coxa 1, coxa 4 quadruplicate with a posterior deep excavation. Coxa 5 with anterior short lobe, coxa 6 with posterior lobe reduced, coxa 7 without posterior lobe.

Peraeopods. P 3-4 dactylus with nail as long as half basal part, with 2 internal robust setae and one external one. P 5-7 basis with a rounded postero-distal lobe; dactylus with nail short, about 1/3 length of basal part of dactylus, with 4 robust setae on inner margin (in younger specimens sometimes only 2-3). P 7 basis suboval, anterior margin with 6 strong bifid robust setae, posterior margin weakly serrate, with 15 short robust setae, carpus elongate with marginal robust setae only, propodus as long as carpus, with 4-5 setae on posterior margin and with 5 groups of short robust setae anteriorly.

Pleon. Epimeral plates with locking apparatus on inner face, postero-distal corner subrectangular and feebly pointed, ventral margin with 3 robust setae on Ep 1-2 and with 2 robust setae on Ep 3. Pleopods 1-3 rami elongate, subequal in length, with 2 distal retinacula with 3 hooks.

Urosomites fused, every segment marked by a dorsal couple of 2 robust setae. Uropods. U 1-2 ordinary, outer ramus shorter than inner one, normally spinose. U 3 peduncle half length of outer ramus, outer ramus of 2 articles, article 1 with 3-4 groups of setae on inner margin, and 4 groups of robust setae on outer margin, article 2 reduced, with 3 distal short setae. Inner ramus reduced to leaf-shaped ramus, ratio inner to outer ramus = 1 : 4.

Telson laminar, elongate, deeply cleft, divided into 2 lobes with 3 short distal setae and 4 subdistal strong robust setae on every lobe.

Sexual dimorphism
Male 6 mm length. Distinguished from female by larger gnathopods 1-2, with ventral lobes of carpus linguiform, disto-ventrally scaly area on propodus less wide, limited to palmar corner, which is wider than rectangular. The difference of the length of rami U 1, 2 is more pronounced than in females. U 3 peduncle with elongate and pointed process on outer margin, lengthwise excavate, provided with short robust setae, like a mandible with teeth.

Remarks
Differences from Sandro starmuehlneri (Ruffo, 1960) are: S. st. is 3 mm long and pale, S. sp. 6-7 mm and brown pigmented; gnathopods subsimilar (S. st.) versus different (S. sp.), paraeopod dactylus with one robust seta (S. st.) versus with 4 robust setae on inner margin (S. sp.), P 7 basis in male with minute disto-
Fig. 17. *Sandro spinidactylus* n. sp.: head with antennae, mouthparts.
Fig. 18. *Sandro spinidactylus* n. sp.: gnathopods, peraeopods.
Fig. 19. *Sandro spinidactylus* n. sp.: epimeral plates with locking apparatus, pleopods, uropods, telson.
posterior lobe, inferior half of posterior margin straight and ending by blunt angle, continued by a rounded margin in S. st. (versus disto-posterior lobe more pronounced, posterior margin regularly rounded in S. sp.), U 1, 2 subsimilar in length (S. st.) versus slightly different (more visible in males) (S. sp.), shape of peduncular prolongation on U 3 male acute and beset with robust setae in S. sp., smooth and rounded in S. st.

**Ecology**

210-400 m above sea level.

*Sandro starmuehlneri* (Ruffo, 1960)

*Austroniphargus starmuehlneri* Ruffo, 1960:

63-69 figs 1, 2

**Material examined in alcohol**

- 2 spec. 3 mm: Madagascar 027, 15.08.2001 Iohnilahy (Fianarantsoa), small stream crossing the railroad E from the village, 200 m, 19.9°C, 0.083 mS/cm; Gerecke & Goldschmidt leg.

- 5 spec. 3 mm: Madagascar 031, 18.08.2001, Madiorano (Fianarantsoa), stream crossing the railroad at km 51.2 (W tunnel 18), 650 m asl., 15.9°C, 0.027 mS/cm; Gerecke & Goldschmidt leg.

- 2 spec. 3 mm: Madagascar 035, 21.08.2001, Ranomena (Fianarantsoa), stream NW from the 1.07 km railway-tunnel, 950 m asl., 14.8 °C, 0.029 mS/cm; Gerecke & Goldschmidt leg.

- 2 spec. 3 mm: Madagascar 038, 20.08.2001, Andrambovato (Fianarantsoa), stream 3 km E from the village upstream from the cascade, 900 m asl., 0.050 mS/cm; Gerecke & Goldschmidt leg.

- 16 males, females 2.5-3 mm: Madagascar 039, 20.08.2001, Andrambovato (Fianarantsoa), spring at left margin of the stream 3 km from the village (upstream from the cascade), 900 m asl., 17.3 °C, 0.050 mS/cm; Gerecke & Goldschmidt leg.

- 23 males, females 3 mm, juven. 2 mm: Madagascar 040, 21.08.2001, Ranomena (Fianarantsoa), spring at right margin of the stream NW from the 1.07 km railway-tunnel, 950 m asl., 14.7 °C, 0.027 mS/cm; Gerecke & Goldschmidt leg.

**Remarks**

Characters correspond perfectly to the original description (cf. also remarks section at *Sandro spinidactylus* above).

**Ecology**

200-950 m above sea level.

Key to the 9 freshwater species found in Madagascar

1a. Telson deeply cleft or until distal third of length emarginate ........................................ .......................... 3

-1b. Telson not as above ........................................ .......................... 2

2a. Telson entire, distally convex ...................................... 6

-2b. Telson with shallow excavation (about 1/10 of length)........................................ .......................... 7

3a. Gn 2 palmar corner rectangular ..................................... 4

-3b. Gn 2 palmar corner wider or rounded. .......................... 5

4a. Gn 1, 2 propodus with different shape, in female palm clearly shorter than remaining posterior margin; P 5-7 of adults dactylus inner margin with 4 robust setae. .......................... *Sandro spinidactylus* n. sp.

-4b. Gn 1, 2 propodus similar, palm about as long as remaining posterior margin; P 5-7 dactylus inner margin with 1 robust seta. .......................... *Sandro starmuehlneri* (Ruffo, 1960)

5a. Telson with 2 strong marginal robust setae; pleopods with unequal rami.......................... *Austroniphargus bryophilus* (Monod, 1925)

-5b. Telson with 1 marginal thin seta; pleopods with equal rami .......................... *Libertinia longitelson* n. g. n. sp.

6a. Pleopods with one ramus lost, U3 endopodite lost, telson on distal margin many robust setae .......................... *Davidia spinicaudata* n. g. n. sp.

-6b. Pleopods with subequal rami, U3 with small endopodite, T distally with one robust seta on each corner .......................... *Reinhardia dimorpha* n. g. n. sp.

7a. Pleopods with equal rami; U3 ramus less than twice as long as peduncle .......................... *Libertinia latibasis* n. g. n. sp.

-7b. Pleopods one ramus reduced; U3 ramus at least twice as long as peduncle .......................... 8

8a. U2 rami unequal .......................... *Dussartiella aurifex* n. sp.

-8b. U2 rami equal .......................... *Dussartiella madegassa* Ruffo, 1979

**Phylogenetic relationships**

After erecting the Crangonyctoidea in 1973, Bousfield (1977: p. 300) listed the following components of this superfamily: the *Phreatogammarus* complex, Paramelitidae Bousfield, 1977, Neoniphargidae Bousfield, 1977 and Crangonyctidae Bousfield, 1973. Separate from this superfamily are the Niphargoidea Karaman,
1962, containing the Niphargidae Karaman, 1962, the Pseudoniphargus-Allocrangonyx group, and the Austrocrangonyx group.

In their monograph of the Gammaridea Barnard & Barnard, 1983 (p. 63) describe the "austroniphargids" of Madagascar (with the genera Austrocrangonyx Monod, 1925, and Sandro Barnard & Karaman 1979) as "comprising a microcosmos of evolution showing easy transformations by the tendency of losing the inner lobes of the lower lip, the D-setae on the mandible palp, or the reduction of the pleopods". (What is the plesiomorphic condition of the inner lobes of the labium? They are lacking in most basic crangonyctoidean families. So is the loss of the inner lobes here a primary or secondary loss?). For Barnard & Barnard the austroniphargids "might be descendents of crangonyctoids" by having equal-sized gnathopods. They lack, however, sternal gills and coxal gill 7, so that "their affinities must be sought in more sophisticated studies' (op. cit., p.63).

These authors give no formal higher rank to the austroniphargids than the generic ones, and no clear attribution to any higher taxon.

According to Barnard & Barnard (loc. cit.) austroniphargids lack palmar combs on the gnathopods, as well as supernumerary setae on the peraeopodal dactyli, "but these trends are already complete in various Palearctic species". However, in the present paper we present a new taxon, Sandro spinidactylus, which clearly does not fit this definition and which seems to be a more plesiomorphic member of the austroniphargid group.

Williams & Barnard (1988) removed from the Neoniphargidae the previously included genera Protocrangonyx Nicholls, 1926, Eoniphargus Uéno, 1955, Indoniphargus Straskraba, 1967, and Giniphargus Karaman & Barnard, 1979, and redefined the family based on the following genera: Neoniphargus Stebbing, 1899 and the new genera Tasniphargus, Wesniphargus, and Yulia, all Australian. Bradbury & Williams (1997) added further newly coined Australian genera: Jaspitorus, Neocrypta and Wombeyanus. Thus all presently valid members of the Neoniphargidae are exclusively known from Australia, including Tasmania.

At present, the genera Austrocrangonyx and Sandro officially still belong to the Crangonyctoidea and the Neoniphargidae Bousfield, 1977, even though already Williams & Barnard (1988, p. 8) had already stated: "...in our view, Austrocrangonyx is so different as to merit separate family status; the differences between it and other neoniphargids are greater than those between the Paramelitidae and Neoniphargidae”. On p. 9 of the same paper Austrocrangonyx and Sandro are listed as 'austroniphargids’ within the crangonyctoids, but then on p. 114 the authors tentatively propose the two genera to be placed within the newly coined, also Australian, family Perthisidae, together with Perthia Straskraba, 1964.

In their monograph of “The families and genera of marine Amphipoda, except marine gammaroids” Barnard & Karaman (1991, p. 49, fig 16) most unexpectedly add at the end of their “diagrammatic key to families” also an overview of the crangonyctoids (NB not Crangonyctoidea); besides the Neoniphargidae, the Perthisidae and the “allocrangonyctids” there is also a box for the “Austrocrangonygidae”, to our knowledge the first time this family name has been published. However, there is no explaining text to this plate, and in the explanation of fig. 16 on p. 57 the family name is never repeated. Again Martin and Davis (2001) did not recognize this family name in the accepted gammaridean families. The situation does not change when Väinölä et al. 2008 use “Austroniphargidae” in their Table 1 and 2 on p. 244-46 and in the text on Afrotopics (p. 251), but again without explaining or defining this taxon: the name must remain a nomen nudum until now. The same authors place in their Fig. 3 the label "Aus” on the island of Madagascar, and explain this abbreviation with “Austrocrganonyctidae”, another nomen nudum and most probably only a lapsus calami, as the genus Austrocrangonyx was proposed by Barnard & Barnard (1983: 422) but assumed to be strictly Australian in distribution (see their maps 6, 7). In Williams & Barnard (1988: 45, on Australian freshwater amphipods) this genus Austrocrangonyx is strangely enough attributed to Barnard & Karaman (sic!) and is included, along with most Australian crangonyctoideans, within the family Paramelitidae Bousfield 1977. As one can easily see, the situation in the literature is quite confusing.

Here we present, in addition to the already known Austrocrangonyx and Sandro, three new genera from Madagascar: Davidia, Libertinia and Reinhardia. We took 35 characters (see Fig. 20) and applied them to 15 species (see matrix in Fig. 21). Besides the cited three new genera cited, also a new species of Sandro was collected (closely related with Libertinia) as well as a new species of Dussartella (actually still member of Paracrangonyctidae Bousfield, 1982). In the matrix we added further Austrocrangonyx Monod, 1925, Neocrypta Bradbury & Williams, 1997 and Neoniphargus Stebbing, 1899 (actually belonging to Neoniphargidae, see above), Niphargus Schioedte, 1849 (belonging to Niphargidae Bousfield, 1977), Perthisa Straskraba, 1964 (belonging to Perthisidae Williams & Barnard, 1988), two species of Synurella Wrzesniowski, 1877 (belonging
<table>
<thead>
<tr>
<th>Characters</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Antenna 1 flagel./ped. ratio</td>
<td>&lt;1</td>
<td>1-2</td>
<td>&gt;2</td>
</tr>
<tr>
<td>2 Antenna 2 flagel./ped. ratio</td>
<td>&lt;0,4</td>
<td>0,4-0,8</td>
<td>&gt;0,8</td>
</tr>
<tr>
<td>3 Antenna 2 article 1 of peduncle</td>
<td>not round, relatively short</td>
<td>rounded and very expanded</td>
<td></td>
</tr>
<tr>
<td>4 Mandible palp</td>
<td>normal</td>
<td>reduced</td>
<td></td>
</tr>
<tr>
<td>5 C-D setae on art 3 of Md palp</td>
<td>absent</td>
<td>present</td>
<td></td>
</tr>
<tr>
<td>6 Labium inner lobes</td>
<td>absent</td>
<td>present</td>
<td></td>
</tr>
<tr>
<td>7 Maxilla 1 right and left palp</td>
<td>subequal</td>
<td>different</td>
<td>reduced</td>
</tr>
<tr>
<td>8 Gnathopod 1 carpus</td>
<td>not lobed</td>
<td>lobed</td>
<td></td>
</tr>
<tr>
<td>9 Gnathopod 1 palmar margin</td>
<td>not defined</td>
<td>defined</td>
<td></td>
</tr>
<tr>
<td>10 Gnathopod 1 palmar corner</td>
<td>&gt; 120°</td>
<td>equal or &lt; 120°</td>
<td></td>
</tr>
<tr>
<td>11 Dactylus of gnathopod 1</td>
<td>not reaching palmar corner</td>
<td>reaching the palmar corner</td>
<td></td>
</tr>
<tr>
<td>12 Gnathopod 2 carpus</td>
<td>not lobed</td>
<td>lobed</td>
<td></td>
</tr>
<tr>
<td>13 Gnathopod 2 palmar margin</td>
<td>not defined</td>
<td>defined</td>
<td></td>
</tr>
<tr>
<td>14 Gnathopod 2 palmar corner</td>
<td>&gt; 120°</td>
<td>equal or &lt; 120°</td>
<td></td>
</tr>
<tr>
<td>15 Dactylus of gnathopod 2</td>
<td>not reaching the palmar corner</td>
<td>reaching palmar corner</td>
<td></td>
</tr>
<tr>
<td>16 Gnathopods 1-2 palm robust setae</td>
<td>lacking</td>
<td>with strong bifid robust setae</td>
<td></td>
</tr>
<tr>
<td>17 Comparison size propodus Gn1:Gn2</td>
<td>subequal</td>
<td>distinctly different</td>
<td></td>
</tr>
<tr>
<td>18 Width of pereopods 6-7 basis</td>
<td>narrow</td>
<td>middle sized</td>
<td>wide</td>
</tr>
<tr>
<td>19 Sternal gills</td>
<td>absent</td>
<td>present</td>
<td></td>
</tr>
<tr>
<td>20 Ep 1-3 locking apparatus</td>
<td>absent</td>
<td>present on inner face</td>
<td></td>
</tr>
<tr>
<td>21 Pleopods rami</td>
<td>both rami normal</td>
<td>internal rami reduced</td>
<td></td>
</tr>
<tr>
<td>22 ratio pleopods outer ramus/peduncle</td>
<td>outer ramus ≤ peduncle</td>
<td>outer ramus &gt; peduncle</td>
<td></td>
</tr>
<tr>
<td>23 Robust setae U1 preceding peduncle</td>
<td>lacking</td>
<td>present</td>
<td></td>
</tr>
<tr>
<td>24 Urosomites</td>
<td>not fused</td>
<td>fused</td>
<td></td>
</tr>
<tr>
<td>25 Robust setae on urosomites</td>
<td>dorsoposteriorly present</td>
<td>absent</td>
<td></td>
</tr>
<tr>
<td>26 Uropod 1 sexual dimorphism</td>
<td>absent</td>
<td>present</td>
<td></td>
</tr>
<tr>
<td>27 Uropod 2 sexual dimorphism</td>
<td>absent</td>
<td>present</td>
<td></td>
</tr>
<tr>
<td>28 Uropod 3 sexual dimorphism</td>
<td>absent</td>
<td>present</td>
<td></td>
</tr>
<tr>
<td>29 Uropod 3 endopodite</td>
<td>present</td>
<td>absent</td>
<td></td>
</tr>
<tr>
<td>30 Uropod 3 ratio exopodite/peduncle</td>
<td>&lt;2,5</td>
<td>&gt;2,5</td>
<td></td>
</tr>
<tr>
<td>31 Nr arts exopodite of uropod 3</td>
<td>only with 1 article</td>
<td>with 2 articles</td>
<td></td>
</tr>
<tr>
<td>32 Telson distal margin</td>
<td>straight or convex</td>
<td>feebly incavate</td>
<td>two lobes</td>
</tr>
<tr>
<td>33 Telson width</td>
<td>wide (width/length≥1)</td>
<td>narrow (width/length&lt;1)</td>
<td></td>
</tr>
<tr>
<td>34 Dorsal telson setation</td>
<td>present</td>
<td>absent</td>
<td></td>
</tr>
<tr>
<td>35 Lateral telson setation</td>
<td>present</td>
<td>absent</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 20. Table with characters and their states.
to Crangonyctidae Bousfield, 1973), and used Gammarus Fabricius, 1775 (Gammaridae Latreille, 1802) as outgroup. For an illustrated character overview, see Figs 22-27.

The programs MacClade 4.06 (Maddison & Maddison, 2003) and PAUP 4.0B.10 (Swofford, 2002) were applied. Using 15 taxa and 35 characters a heuristic analysis with Gammarus elvirae as an outgroup-species was chosen with all characters of type „unordered“ and with equal weight.

While Libertinia was closely related to Austroniphargus and Sandro (both with more plesiomorphic character states), Davidia as well as Reinhardia were clearly more distant. They both have C- and D-setae on the mandible palp, while in Sandro, Austroniphargus and Libertinia they are absent. While Sandro has an inner lobe on the labium, all others lack it (see Fig. 23). Sandro, Libertinia and Austroniphargus have a lobed Gn1 carpus, while Davidia and Reinhardia have it only rounded (Fig. 25). The first three genera have the Gn1 palmar margin defined, Davidia and Reinhardia less or undefined. Gn2 carpus is not lobed in Davidia and Reinhardia, while it is lobed in all other genera. The urosomites are fused in Sandro, Libertinia, Austroniphargus and Davidia (as well as Synurella species), but free in Reinhardia (like in Dussartiella, Neocrypta and Neoniphargus). Like Synurella also Davidia has only one article on U 3 outer ramus, while in all other here included genera there are two articles. The telson is distally convex in Davidia and Reinhardia, it is emarginate to deeply cleft in Sandro, Libertinia and Austroniphargus (Fig. 26, 27).

A newly reported character state is the locking apparatus on the inner side of the epimeral plates (see Sandro spinidactylus Fig. 19); this is shared by Davidia, Reinhardia, Sandro and partly also by Libertinia, but until now not reported from Austroniphargus. The locking apparatus on the epimeral plates together with the fused urosomites reinforce the posterior part of the body and may be an advantage for a still unknown way of life (some of them but not all reported from the interstitium).

The situation of Dussartiella within the family Paracrangonyctidae Bousfield is still questionable: according to Fenwick 2001 in his review of Paracrangonyx it should belong elsewhere. In Grosso, Peralta & Ruffo, 2006:75 it is written: "...the inclusion of Dussartiella in a suprageneric group is problematic", in their cladistic analysis (mainly about species which are close to or included in the Paracrangonyctidae) it comes out more or less among the bogidiellids, while Koenemann & Holsinger 1999: 787 throw it out of the Bogidiellidae.
Fig. 22. Antennae in Austroniphargidae and Dussartiella. Comparison of the length of A1 peduncle article 1 with article 2.
Fig. 23. Mouthparts in Austroniphargidae. In the mandible palp article 2 is shorter, longer or equal to article 3; maxillae are setose or naked on the inner margin, labium has or has not inner lobes.
Fig. 24. Mouthparts in Austroniphargidae and Dussartiella. Mandible palp ordinary or reduced, palp of maxilla 1 ordinary or reduced.
Fig. 25. Gnathopods in Austroniphargidae and Dussartiella. Carpus of Gn1, Gn2 is lobate or rounded.
Fig. 26. Pleopods, uropods and telson of Austroniphargidae. Rami are equal or unequal, in U3 the peduncle can have a distal spur, telson is distally deeply cleft, or more or less emarginate.
Fig. 27. Pleopods, uropods and telson of Austroniphargidae and Dussartiella. Rami in pleopods and uropods are subequal or not, they are sexually dimorphic or not, the telson ist distally concave or emarginate.
Fig. 28. Map of the island of Madagascar with 9 localities where freshwater species were collected until now:

(1) Austroniphargus bryophilus; (2) Dussartiella madagassa; (3) Sandro starmuehlneri; (4) Davidia spinicaudata; (5) Dussartiella aurifex; (6) Libertinia latibasis; (7) Libertinia longitelson; (8) Reinhardia dimorpha; (9) Sandro spinidactylus.
Choosing only 35 characters certainly may have neglected other important ones. There have already been many discussions about the relationships within the crangonyctoids in the past and it is not our aim to redescribe the superfAMILY here, rather to describe the probable position of the new taxa by analyzing certain characters, and to show that they fall into two separate groups.

Thus we describe herein three new genera from Madagascar and erect formally the new family Austroniphargidae for the “crangonyctoid” members living in Madagascar, already for so long postulated by many different authors:

Austroniphargidae new family

Type genus Austroniphargus Monod, 1925

Including at the moment: Austroniphargus, Sandro, Libertinia, Davidia, Reinhardia.

Diagnosis for the genus-group Austroniphargus, Sandro, Libertinia.

Sternal gills absent. Mandible palp without C- and D-setae. Gn1, 2 alike, large, carpus lobed, palmar margin defined, palmar spines simple. Urosomites fused; uropod 3 length of rami very different. (Locking apparatus on the inner side of epimeral plates present in Sandro and partly observed in Libertinia, not known in Austroniphargus). Telson emarginate to cleft.

Relationship

Barnard & Barnard 1983: 63 underline some similarities to Eriopisa Stebbing, 1890 or Eriopisella Chevreux, 1920 (they “might have crawled out of the sea onto Madagascar”), but a “somewhat more parsimonious morphological relationship focuses on the Palearctic Niphargid group composed of Niphargus, Niphargellus, Pseudoniphargus and other genera.” They resemble the Niphargids in the enlarged gnathopods, reduced setation of the maxillae and more densely spinose telson apices, but differ in the fused urosomites and the lobate carpus on the gnathopods. (In the niphargid genus Carinurella Sket, 1971 an urosomal stabilisation is achieved not by fusion, but by the enlarged first segment which is dominant over the reduced other two segments following). Barnard & Barnard (loc. cit.) summarize their discussion about possible ancestors: “The size equality of gnathopods is foreign to any marine Melitoid ancestor that could be hypothesized, thereby leaving the impression that Austroniphargids might be descendents of Crangonyctoids... But Austroniphargids have lost ... Crangonyctoid markers: sternal gills, densely packed bifid palmar spines on the gnathopods..., so that their affinities must be sought in more sophisticated studies.”

Diagnosis of the genus-group Davidia and Reinhardia.

Sternal gills lacking. Mandible palp with C- and D-setae; Gn 1, 2 carpus unlobed, palmar margin undefined. Locking apparatus on the inner side of the epi- meral plates. (Urosomites are fused in Davidia, but not in Reinhardia). Telson is entire and distally convex.

Relationship

Members of this group differ from other Austroniphargidae in the more plesiomorphic mandible palp characters (but reduction of maxillar palp in Reinhardia), less specialized gnathopods and the entire and distally convex telson.

General characters of Austroniphargidae

Eyeless, non-calceolate crangonyctoideans endemic to Madagascar. Posterior body parts (pleon, urosome) reinforced by locking apparatus or trend to fusion. Lateral cephalic lobe pronounced, A1> A2, accessory flagellum with 1-2 articles. Labium lacking inner lobes (exception: Sandro). In mandible palp article 1 trend to elongation, article 3 setation reduced, trend to E-setae only; molar strong. Maxilla 1 palp typically with 2 articles, can be reduced. Maxilla 2 inner plate with 1-2 “facial” setae near inner margin. Maxilliped plates moderately developed, palp stout. Coxal plates 1-4 medium, deepening posteriorly. Gnathopods subsimilar, strongly to moderately subchelate; dactylus with elongate nail (= unguis). Peraeopods 5-7 basis narrowing distally, tendency to reduction of distinct posterodistal lobe, dactylus regular. Uropods trending to sexual dimorphism; uropod 3 par- viramous, outer ramus terminal article distinct or lacking. Telson flappable, apically convex, concave, notched or variously cleft. Brood plates large, broad, marginal setae medium. Coxal gills present on pereaeopods 2-6, not always on P 7, pleated. Sternal gills lacking.

Has Madagascar been colonized only once (the ancestral progenitor penetrating surface fresh water sometime after Madagascar was separated from Africa)? Did Dusarttiella arrive on its own, is it an earlier invader? At the moment we have far too few data to answer these questions. Further new taxa are almost certainly to turn up during further exploration (e.g. members of the Indian family Kotumsaridae Messouli, Holsinger and Reddy 2007 ?) and these will most probably re-order the present temporary classification.
Survey of non-marine amphipods from Madagascar

At the end of this paper we want to give a chronological overview to the localities of the few amphipods found on the big island Madagascar outside the marine environment. The list below contains 15 species from freshwater, brackish or even terrestrial habitats, while the map on Fig. 28 shows only the type-localities of the 9 freshwater species, indicated by the numbers 1-9. The numbers 1-3 are citations in the literature, the numbers 4-9 (in the map with the locality name and sample number) are species presented in this paper.

A) Freshwater species

Austroniphargidae

*Austroniphargus bryophilus* (Monod, 1925)
*Niphargopsis bryophilus* Monod, 1925: 41, figs 1-3
*Niphargopsis bryophilus var. petiti* Monod, 1925: 47
*Austroniphargus bryophilus* Ruffo, 1958: 35-36

**Type locality (1).** 22°11’ S, 46°56’ E: Andringitra, 2600 m, »jusqu’au sommet de la Montagne« = near the top of the mountain. Barnard & Karaman 1983: 2600m altitude, forest streams, probably normally hypogean; Ruffo 1958: Cirque Boby, 2500m 22°11’ S, 46°56’ E

?Paracrangonyctidae

*Dussartiella madegassa* Ruffo, 1979
Ruffo, 1979: 431-437, figs 4-7

**Type locality (2).** 19°00’ S, 47°50’ E: “piccola sor- gente nelle vicinanze del lago artificiale di Mantasoa presso Manjakandriana 40 km a est di Antananarivo (Tananarive) nel Madagascar centrale” = small well-spring near the artificial lake of Mantasoa near Manjakandriana 40 km E of Antananarivo (Tananarive). B. Dussart (the collector):”sortie d’eau miniscule, mi-source, mi-suintement à flanc de pente rocheuse plus ou moins latéritisée representant la zone de mar- nage du réservoir de Mantasoa. A l’époque de la récolte le lac de Mantasoa était plusieurs mètres au dessous de sa côté maximale. La minisource sortait de terre peu au dessous de cette dernière côté maximale. L’eau qui sou- dait du sol constituait d’abord une toute petite vasque encombrée d’algues (diatomées, algues filamenteuses) habituelles au niveau de tels suintements, puis dévalait jusqu’au lac en un petit ruisseau (débit approximatis estimé: 8 à 10 l à l’heure.”

= Tiny water source, half well, half seepage at the declivity of a rocky slope more or less transformed in a laterite and forming the feeding zone of the Mantasoa reservoir. At the time of the collection the water level of Mantasoa lake was several meters below its maximal position. This tiny source had its origin just below this maximal level. The water trickling from the soil first formed a very little bowl filled by algae (diatoms, filamentous algae) which is normal at such trickles, and then flowed down to the lake as a small streamlet (estimated about 8-10 l per hour).

Austroniphargidae

*Sandro starmuehlneri* (Ruffo, 1960)
*Austroniphargus starmuehlneri* Ruffo 1960: 65-69, figs 1, 2
*Sandro starmuehlneri* Karaman & Barnard, 1979: 141

**Type locality (3).** 21°32’ S, 47°26’ E: Torrentello Andrambovato, 15 km W of Ampamaherana (SE of Madagascar) "sulla linea ferroviaria Fianarantsoa-Manakara" = along the railway-route Fianarantsoa-Manakara.

*Davidia spinicaudata* n. gen. n. sp.

**Type locality (4).** 21°42’ S, 47°37’ E: Ionilahy (Fian- arantsoa), area Andriampanjijy, spring 1 at left margin of River Asiaha, 220 m.

?Paracrangonyctidae

*Dussartiella aurifex* n. sp.

**Type locality (5).** 19°19’S, 47°25’ E. Ankaratra (An- tananarivo), Reserve Manjakatompo, lower spring near affluent of station piscicole upstr. road to Lac Froid, 1700 m, 16.4°C.

Austroniphargidae

*Libertinia latibasis* n. sp.

**Type locality (6).** 23°26’ S, 43°53’ E. Ambohima- havelona (Tuléar), rheocrenes West of school complex, 50 m, 25.6°C.

Additional material at 20°, 23° and 24° S, 46-47° E.
Libertinia longitelson n. sp.

Type locality. (7). 25°00' S, 46°59' E. Andohahela (Tulear), Isaka, stream crossing at km 32, 18.8°C.

Additional material at 18-23°S, 46-47°E.

Reinhardia dimorpha n. gen. n. sp.

Type locality. (8). 12°42' S, 49°37' E. Joffreville (M. d'Ambre, Ansiranana), rheocrene at right affl. R. de Manques in Reserve Fontenay, 610 m, 21.2°C.

Sandro spinidactylus n. sp.

Type locality. (9). 21°42' S, 47°37'E. Ionilahy (Fianarantsoa), Riv. Avatamboka ca. 1 km NW from the village, 210 m, 21.2°C.

B) Species from brackish water or terrestrial habitat

Aoridae

Grandidierella megnae (Giles, 1888)

Grandidierella bonnieri Stebbing, 1908: 120-123, pl. 6; Ruffo, 1958: 52, 58-59, fig. 9


Type locality. Soalara (Tulear) St. Augustin 30m SE from Tulear, “acque salmastre“ = brackish water 23°35' S, 43°42' E; Manjakatompca 19°19' S, 47°25' E, 85 km S of Tananarive = Antananarivo, “sotto pietre nel suolo umido” = under stones in humid ground; Lago Itasy, ca 100 km E of Tananarive 19°03' S, 46°47' E, Altopiano del Madagascar centrale, sotto pietre nel terreno umido = plateau of Central Madagascar, under stones in humid ground. Ambalahaona 60 km E of Tananarive 18°55' S, 47°53' E.

Grandidierella cf. bonnieri: Mitsamiouli, brackish water (Ruffo 1960: 64)

Grandidierella mahafalenis Coutière, 1904

Coutière, 1904: 11, 19 figs

Ruffo, 1958: 53, 55-59, figs 7, 8

Type locality. Lac Tsimanampetsotsa 24°07' S, 43°45' E, saline lake.

Melitidae

Melita nitidula Ruffo, 1958

Ruffo, 1958: 36 figs 1,2

Type locality. 23°35' S, 43°42' E; Soalara (Tulear) torrente St. Augustin (30 km SE from Tulear) „prima dello sbocco in mare, acque salmastre“ = near the estuary, in brackish water. (Ledoyer in his Faune de Madagascar doubts that this locality was very brackish).

Talitridae

Orchestia ancheidos (Barnard K.H., 1916)

Talorchestia ancheidos Barnard K.H., 1916: 221-222, pl. 27, figs 35-36

Orchestia ancheidos Ruffo, 1958: 43-46, figs 3, 4

Madagassan material cited from Lac Tsimanampetsotsa 24°07' S, 43°45' E, saline lake, and Itampolo 24°41 S, 43°56' E.

Type locality. West and east coasts of the Cape Peninsula, South Africa.

Photidae

Photis distinguenda Ruffo, 1955

Ruffo, 1955: 195-199, figs 1, 2

Type locality. E of Madagascar, estuary of Anove 16°37' S, 49°47' E, collected with a plankton net on a ferry boat. Salinity variable, brackish.

Talitridae

Talitrus pacificus Hurley, 1955

Hurley, 1955: 155-156, fig. 3

Ruffo, 1958: 41-42

Ruffo, 1958: Perinet 18°56' S, 48°24' E, Betampo- na 19°13' S, 48°50' E, Manjabe (there are many localities with the same name), Sandrakely near Ifanadiana- Ranomafana 21°07' S, 47°38' E, Maroantsetra 15°26' S, 49°43' E, Montagne d'Ambre 12°32' S, 49°10' E, Fort Dauphin 25°01' S, 46°59' E.

Ruffo, 1960: Soalara (Tulear) 23°35' S, 43°42 E.

Remarks: Talitrus pacificus Hurley is currently cited as junior synonym of Talitroides topitotum (Burt). But chances that either name is correct are minimal.
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References


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