

GRANDIDIERELLA (AMPHIPODA, AORIDAE) FROM ANGOLA
WITH DESCRIPTION OF A NEW SPECIES

BY

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ABSTRACT

Grandidierella elongata Chevreux, 1925 and a new species of the same aorid genus, *G. ischienoplia* sp. nov., are described from samples collected in coastal shelf zones off Angola, in 2004. The genus *Grandidierella* is now represented in West and South Africa by nine species. *G. ischienoplia* sp. nov. is closest to *G. nyala* Griffiths, 1974.

ZUSAMMENFASSUNG

Grandidierella elongata Chevreux, 1925 und eine neue Amphipodenart dieser Gattung, *G. ischienoplia* sp. nov., werden von Proben der Küstenschelfzone von Angola beschrieben, die im Jahre 2004 gesammelt wurden. Die Gattung *Grandidierella*, wird nun in West- und Südafrika von neun Arten repräsentiert. *G. ischienoplia* sp. nov. ähnelt *G. nyala* Griffiths, 1974.

INTRODUCTION

The genus *Grandidierella* Coutière, 1904 currently contains nearly 40 species. An overview of 30 species and their references is given in Barnard & Karaman (1991). Afterwards, several new species were described (Morino & Dai, 1990; Myers, 1995, 1998; Ariyama, 1996, 2002; Hou & Li, 2002; Ren, 2006). The respective separation of *Neomicrodeutopus* Schellenberg, 1925, *Bigrandidierella* Karaman, 1985, and *Paragrandidierella* Ariyama, 2002 from the original genus were considered insufficiently defined (Barnard & Karaman, 1991; Ren, 2006) but are registered partly in the World Register of Marine Species (<http://www.marinespecies.org>). According to the literature, in the present paper we have (again) merged all into the genus *Grandidierella*. The following species

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are known from West and South Africa: *Grandidierella bonnieroides* (Stephensen, 1948) (see Griffiths, 1973, 1974b), *G. lutosa* K. H. Barnard, 1952 (see Griffiths, 1975), *G. nyala* (Griffiths, 1974), *G. lignorum* K. H. Barnard, 1935, *G. chelata* K. H. Barnard, 1951, *G. africana* Schellenberg, 1936 (in Schellenberg, 1925 as *G. megnae* (Giles)), *G. cabindae* (Schellenberg, 1925), and *G. elongata* Chevreux, 1925.

During a benthic investigation in the coastal shelf zones off Angola, about 200 specimens of the genus *Grandidierella* were collected. Most of them were identified as *G. elongata*. A few specimens differed from any known species of the genus, however, in some morphological features. We thus describe these as a new species, herein.

MATERIAL AND METHODS

Benthic organisms were collected with a grab from 19 to 117 m depth during a cruise of the R/V “Alexander von Humboldt” in 2004. Samples were fixed in 4% buffered formaldehyde-seawater solution and later sorted under a stereomicroscope. The animals were then preserved in 70% ethanol and later examined using a compound microscope with up to 800× magnification. The type material of the new species and material of *Grandidierella elongata* is deposited at the Collection “Systematische Zoologie am Museum für Naturkunde (ZMB)” in Berlin.

SYSTEMATIC PART

***Grandidierella ischienoplia* sp. nov. (figs. 1-2)**

Material examined. — Holotype: one male (2.2 mm, ZMB 27841, 1 slide ZMB 5005) (AHAB9, 121; South Atlantic, shelf coast off Angola; water depth 44 m, dredge sampling; 8°45.320'S 13°12.890'E; salinity at bottom 35.8 PSU, temperature at bottom 18.2°C, oxygen at bottom 1.58 ml/l; collected by S. Forster, 2 June 2004). Paratype: one male (ZMB 27842) data same as holotype (mounted on 6 slides, ZMB 5006-5011).

Description. — Holotype male: body length 2.2 mm. Body pale in ethanol, head anteriorly truncate; rostrum indistinct; eyes oval, black, medium size, ocular lobes anteriorly slightly produced, antenna 1 missing; antenna 2 short, segment 5 as long as segment 4; flagellum short, with 4 segments. Mandibular palp with 3 segments, segment 1 short, segment 2 longest; segment ratio 1 : 3 : 2; segment 3 with 5 long setae; molar large, lacinia mobilis present, spine row of three spines.

Coxae short, serially disconnected; coxal plate 1 rhomboid, produced anteriorly; plates 2-4 distally broader, rounded; plates 5-6 smaller, subrectangular; plate 7 distally rounded.

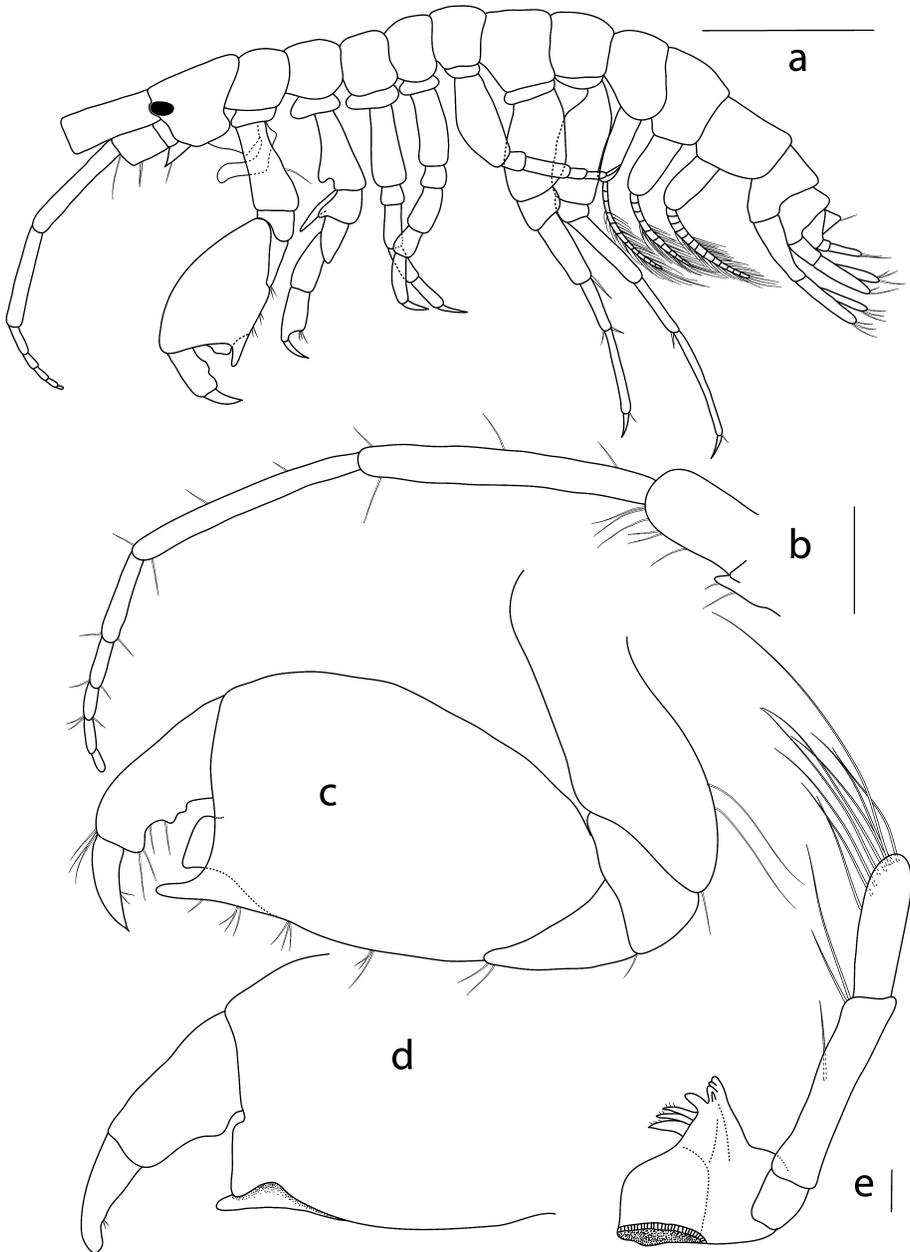


Fig. 1. *Grandidierella ischienoplia* sp. nov. from Angola. a, habitus male; b, antenna 2; c, right gnathopod 1 outer lateral view; d, right gnathopod 1 inner lateral view; e, right mandible with mandibular palp. Scale bars: a, 500 μm ; b, c, d, 200 μm ; and e, 50 μm .

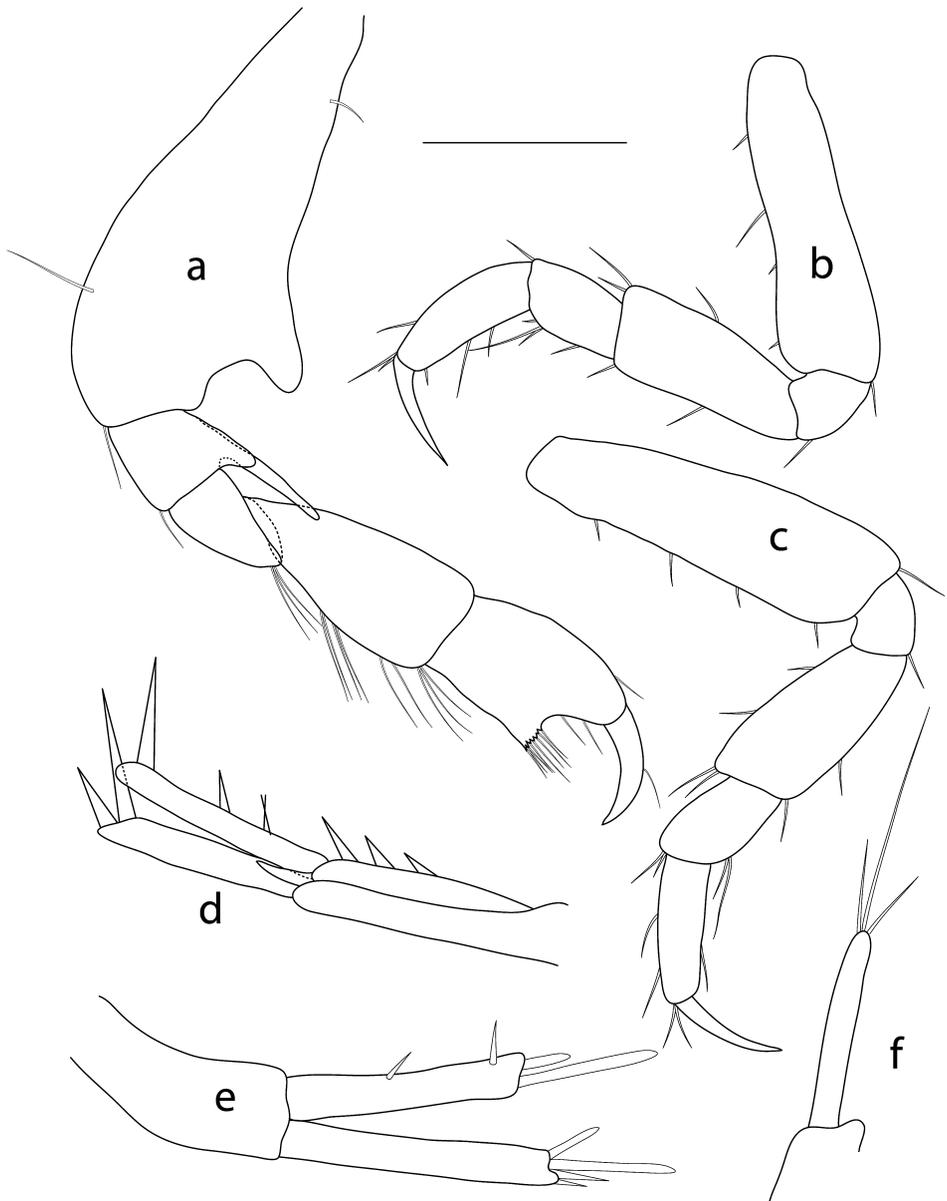


Fig. 2. *Grandidierella ischienoplia* sp. nov. from Angola. a, right gnathopod 2 outer lateral view; b, left pereopod 3 lateral view; c, left pereopod 4 lateral view; d, uropod 1 lateral view; e, uropod 2 lateral view; f, uropod 3 dorsal view. Scale bars: a-e, 200 μm ; f, 100 μm .

Gnathopod 1 large, powerful, complexly subchelate; basis wide, twice as long as broad, posterior margin rounded, with two long setae; ischium short; merus triangular, carpus subovoid, about 1.6 times as long as broad, postero-distally produced into two teeth, outer one large, pointed, inner tooth short and broad; propodus small, twice as long as broad, with several small bumps on posterior margin; dactylus strong, slightly shorter than propodus.

Gnathopod 2 slender, subchelate; basis distally dilated, outer margin anteriorly produced into a broad, rounded projection, posterior margin with 2 setae; ischium rectangular, anteriorly with two projections, outer projection broad, distally rounded, inner projection long and slender (eponymous feature), reaching end of merus, merus subtriangular, distal margin setose; carpus twice as long as broad, expanded distally, posterior margin setose; propodus as broad as carpus, about two-thirds length of carpus, palm transverse, defined by slightly acute posterior distal corner, antero-distally bulged, distal margin setose; dactylus slender, as long as palm.

Pereopods 3-5 similar to each other, about as long as gnathopod 2, segments slender, slightly setose, ischium shortest; dactylus slender, as long as propodus; pereopods 6-7 elongate, 1.5, respectively, 1.7 times as long as pereopod 5; basis twice as long as wide, basis of pereopod 7 posterior margin with plumose setae.

Pleonal epimeron 1 broadly rounded distally, epimera 2-3 subrectangular with rounded margins, somewhat lobed postero-distally. Uropods 1-2 biramous, rami equal; peduncle of uropod 1 slightly longer than rami, inner dorsal margin of peduncle with a row of 3 spines, distal end of peduncle with an inter-ramal process, dorsal margin of inner ramus with 2-3 spines, rami terminally strongly spinous. Peduncle of uropod 2 slightly shorter than rami, inner ramus on dorsal surface and terminally spinous. Uropod 3 uniramous, peduncle short, ramus about twice as long as peduncle, terminally setose; telson short, quadrangular, with two dorso-lateral projections, each projection with one short seta on each corner.

Female. — Unknown.

Etymology. — The specific name “*ischienoplia*” is a combination of the Greek ischion = ischium (segment of limb) and enoplus = armed: alluding to the strong projection of third segment of the male gnathopod 2. The Latin form of enoplus is enoplius. The name is used as an adjective.

Habitat. — On a bottom of silty sand, at 44 m depth.

Distribution. — Only known from the type locality.

Remarks. — This new species differs from all other species of *Grandidierella* in the shape of the ischium of the male gnathopod 2. *G. ischienoplia* sp. nov. is very close to *G. nyala* (Griffith, 1974) in the shape of male gnathopod 1, which has one strong, pointed and one short, broader tooth on the carpus. Both teeth are

close together in side view in *G. ischienoplia* sp. nov., but are clearly separated in *G. nyala* by a semicircular concavity (Griffith, 1974). Also, the anterior margins of the basis of gnathopod 2 and the basis of pereopod 1 of the latter species are crenulated, whereas they lack crenulations in *G. ischienoplia* sp. nov. Segment 3 of gnathopod 2 has only one short lobe in *G. nyala*, in contrast to two strong teeth in *G. ischienoplia* sp. nov.

Grandidierella elongata Chevreux, 1925 (figs. 3-5)

Grandidierella elongata Chevreux, 1925: 392, figs. 32-33; Reid, 1951: 268.

Material examined. — Shelf coast off Angola 47 ♂♂ and 74 ♀♀ (AHAB8, BE8; South Atlantic; 117 m depth; grab sampling; 17°0.988'S 11°27.478'E; salinity at bottom 35.4 PSU; temperature at bottom 13.8°C; oxygen at bottom 0.53 ml/l; collected by M. L. Zettler, 13 May 2004). Six ♂♂ and 6 ♀♀ [ZMB 2710]. Shelf coast off Angola 86 spms. (♂♂ and ♀♀) (AHAB9, 121; 44 m; dredge sampling; 8°45.320'S 13°12.890'E; 35.8 PSU; 18.2°C; oxygen 1.58 ml/l; collected by S. Forster, 2 June 2004) [author's collection]. Shelf coast off Angola, 2 ♂♂ (AHAB9, 78; 32 m; grab sampling; 5°12.006'S 11°57.981'E; 35.9 PSU; 18.5°C; oxygen 1.73 ml/l; collected by S. Forster, 27 May 2004) [author's collection]. Shelf coast off Angola, 1 ♂ and 1 ♀ (AHAB9, 45; 19 m; grab sampling; 12°5.273'S 13°42.047'E; 35.8 PSU; 18.1°C; oxygen 1.37 ml/l; collected by S. Forster, 23 May 2004) [author's collection]. Shelf coast off Angola, 1 ♂ (AHAB8, BE12; 37.6 m; grab sampling; 15°10.834'S 12°4.920'E; 35.6 PSU; 16.2°C; oxygen 0.88 ml/l; collected by M. L. Zettler, 17 May 2004) [author's collection].

Description. — Male. Body pale in ethanol; subcylindrical; rostrum indistinct; eyes oval, black, medium in size, ocular lobes anteriorly produced. Antenna 1 ratios of peduncular segments 1-3 are 2.7:2.3:1, segment 1 robust, primary flagellum with 13 articles, about as long as peduncle; accessory flagellum short, uniaarticulate. Antenna 2 peduncle stout, segment 5 as long as segment 4; flagellum short, with five segments.

Mandibular palp with 3 segments, segment 1 short, segment 2 longest and 3 times as long as segment 3, segment 2 and 3 with three and five long setae, respectively; maxilla 1 outer plate and palp segment 2 with apical spines; maxilla 2 medial margin of inner plate with an oblique row of setae; maxilliped inner and outer plate with marginal spines, ratios of palp segments 1-4 are 1:1.4:0.8:0.4.

Coxal plate 1 produced anteriorly; plates 2-4 subrectangular; plates 5-7 smaller; plates 1 and 2 largest.

Gnathopod 1 large, complexly subchelate; basis wide, twice as long as broad, posterior margin rounded with one long seta; ischium short; merus rectangular, posterodistal angle with a small projection; carpus subovoid, about 1.8 times as long as broad, posterior margin with two teeth, one large and one small; propodus small, twice as long as broad, proximally conspicuously concave and distally weakly concave; dactylus strong, about as long as propodus.

Gnathopod 2 slender, subchelate; basis elongate, slightly dilated distally, posterior margin with one plumose seta; merus rectangular, distal margin setose; carpus

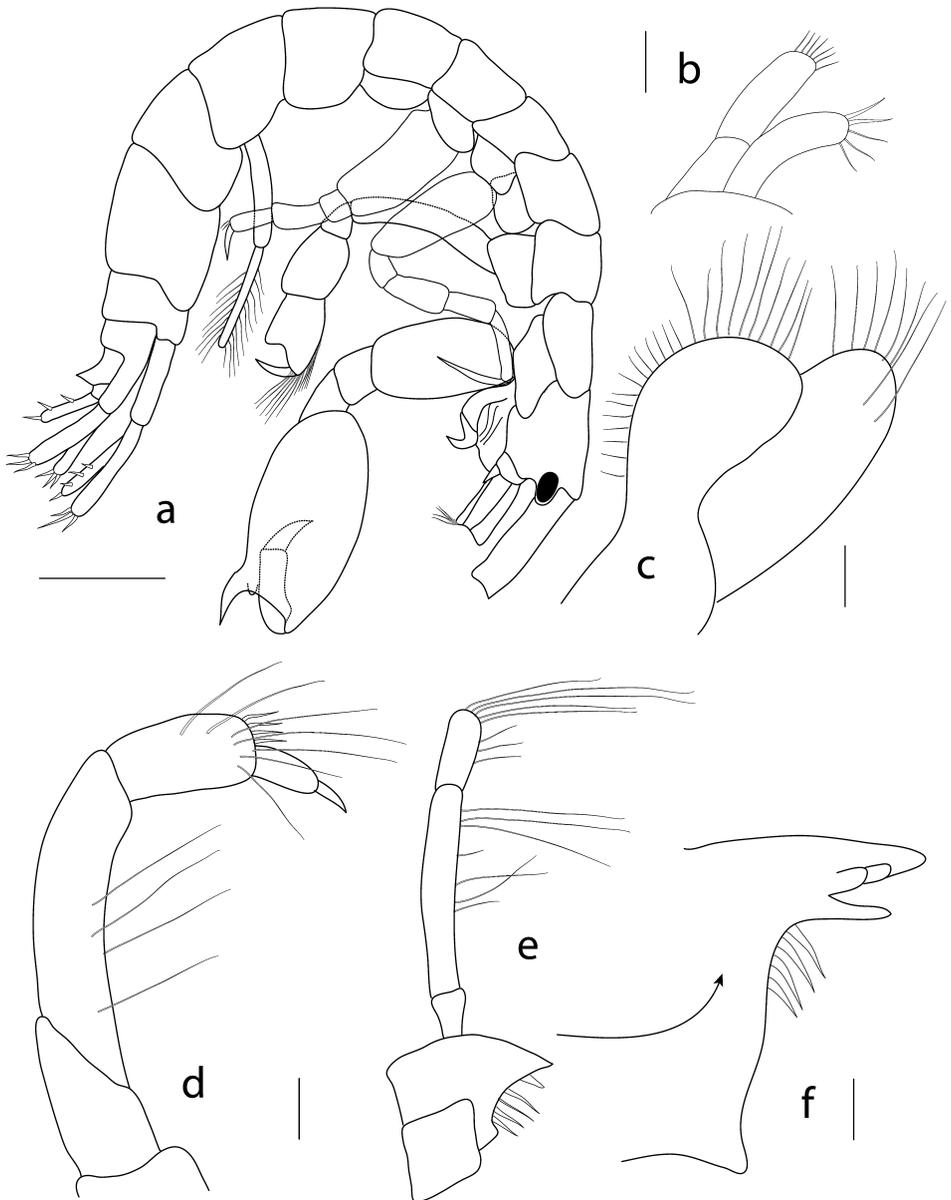


Fig. 3. *Grandidierella elongata* Chevreux, 1925 from Angola. a, habitus male; b, maxillae 1; c, maxillae 2; d, maxillipedal palp; e, f, left mandible with molar enlarged. Scale bars: a, 500 μm ; b, c, f, 25 μm ; d, e, 50 μm .

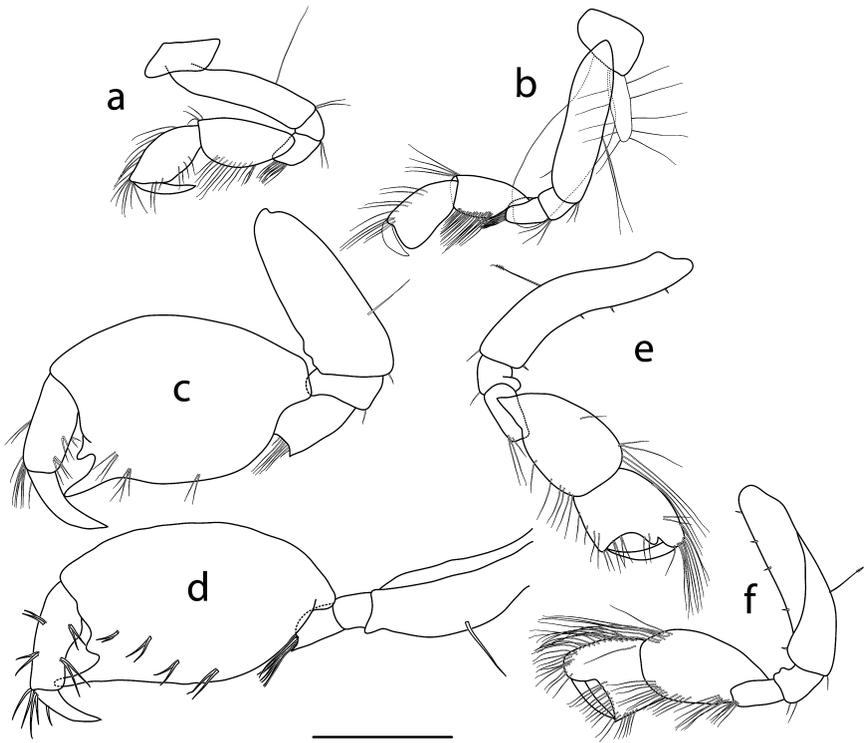


Fig. 4. *Grandidierella elongata* Chevreux, 1925 from Angola. a, female left gnathopod 1; b, female left gnathopod 2; c, male left gnathopod 1 outer lateral view; d, male right gnathopod 1 inner lateral view; e, male right gnathopod 2 outer lateral view; f, male right gnathopod 2 inner lateral view. Scale bar: 500 μm .

expanded medially, posterior margin setose, anterior distal margin with long setae; propodus as broad as carpus, about two thirds length of carpus, palm defined by slightly acute posterior distal corner and slightly blunt anterior distal corner with anterior prolongation, posterior margin about 0.6 times as long as anterior margin, margins setose; dactylus slender, as long as length of palm.

Pereopods 3-4 similar to each other, dactylus slender, as long as propodus; ischium shortest, pereopod 6 elongate, basis twice as long as wide, two short spines on anterior margin, merus with few spines at anterior and posterior margin and on posterodistal position, carpus and propodus with rows of marginal spines; pereopod 7 elongate, longer than pereopod 6, segments 3-6 similar to those of pereopod 6, basis with 25-30 long setae on posterior margin. Uropods 1-2 biramous, peduncle of uropod 1 slightly longer than rami, peduncle of uropod 2 slightly shorter than rami, dorsal margins of peduncles with rows of 4-5 spines, distal end of uropod 1 peduncle with a inter-ramal process with curved tip, rami on dorsal surfaces and distally spinous. Uropod 3 uniramous, peduncle short, ramus about

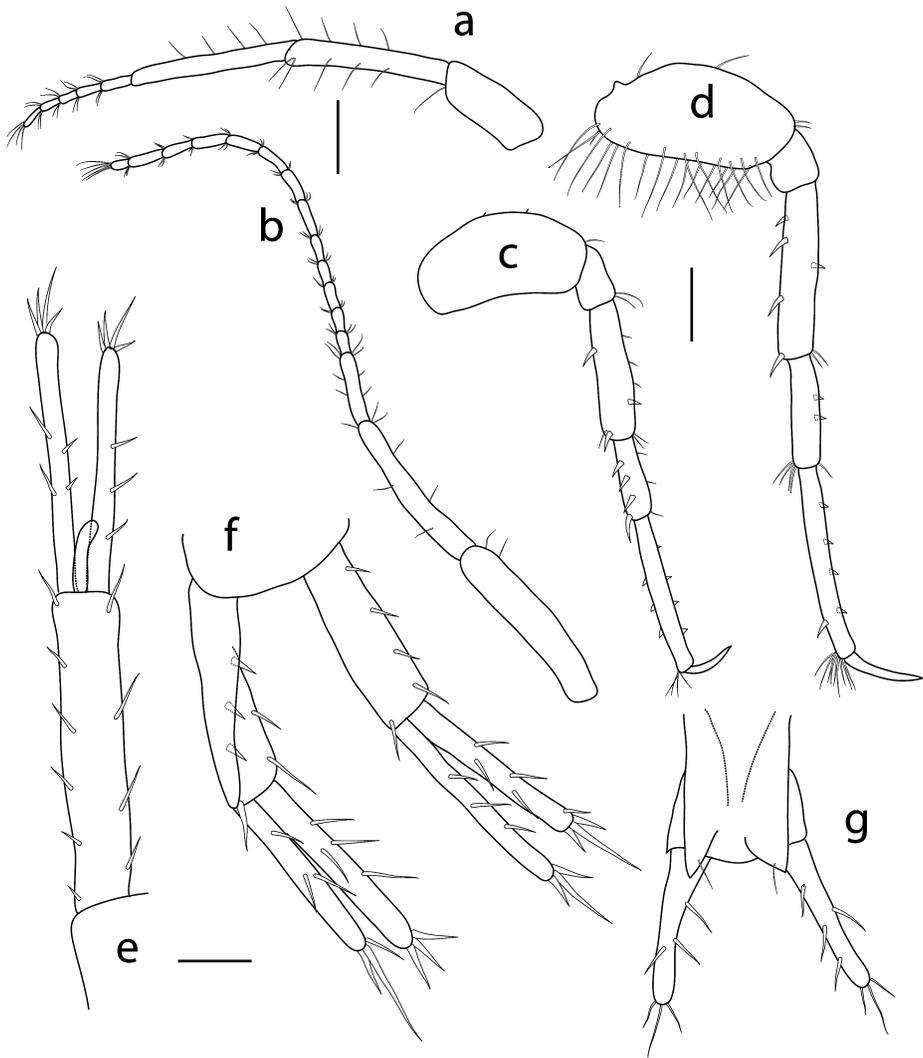


Fig. 5. *Grandidierella elongata* Chevreux, 1925 from Angola. a, antennae 1; b, antennae 2; c, right pereopod 6; d, right pereopod 7; e, uropod 1 dorsal view; f, uropods 2, dorsolateral view; g, telson with uropods 3 from dorsal. Scale bars: a-d, 200 μm ; e-g, 100 μm .

twice as long as peduncle, ramus on dorsal surface and distally spinous. Telson short, with two dorso-lateral projections, each projection with one short seta in ventral position.

Female. — Similar to male except for the following features. Gnathopod 1 smaller than that of male, subchelate; basis slender, 4 times as long as broad; merus without projection; carpus about 2.3 times as long as wide, medially widened; propodus subovoid, shorter than carpus, as wide as carpus, about 1.6 times as long

as wide, dactylus slender, longer than palm, slightly shorter than propodus, slightly serrate.

Gnathopod 2 similar to gnathopod 1; carpus slightly shorter than in gnathopod 1; propodus rectangular, proximally smaller than distally, palm transverse with palmar corner; dactylus slender, slightly serrate, as long as palm. Oostegites slender, short.

Habitat. — On a bottom of mud and silty sand; 19-117 m water depth; salinity 35-36 PSU.

Distribution. — Shelf off Angola, Togo, and Sahara from 17°S-27°N.

Remarks. — Since the first finding of 34 ♂♂♀♀ of this species on the coast of the Sahara in 1889-1890 (Chevreux, 1925), only Reid (1951) reported one male and one female from the coast off Togo (4°52'N 1°42'W, 23.i.1946) from a muddy sand bottom at 24 m depth. This is the third report of this species, and the first record south of the equator. The present specimens agree with the description given by Chevreux (1925). Yet, the following exceptions were observed: Antennae 1 with a flagellum of 13 segments (only 7 segments in Chevreux, 1925); antennae 2 with peduncle segment 4 not dilated proximally; antennae 2 with a flagellum of 5 segments versus only 3 in Chevreux (1925); and coxal plate 6 posteriorly not tooth-like projected.

REFERENCES

- ARIYAMA, H., 1996. Four species of the genus *Grandidierella* (Crustacea: Amphipoda: Aoridae) from Osaka Bay and the northern part of the Kii Channel, central Japan. *Publs Seto mar. biol. Lab.*, **37** (1-2): 167-191.
- —, 2002. *Paragrandidierella minima*, a new genus and species of Aoridae (Crustacea: Amphipoda) from Osaka Bay, central Japan. *Species Diversity*, **7**: 155-163.
- BARNARD, J. L. & G. S. KARAMAN, 1991. The families and genera of marine gammaridean Amphipoda (except marine gammaroids). *Rec. Australian Mus.*, (suppl.) **13**: 1-866.
- BARNARD, K. H., 1935. Report on some Amphipoda, Isopoda and Tanaidacea in the collections of the Indian Museum. *Rec. Indian Mus.*, **37**: 279-319.
- —, 1951. New records and descriptions of new species of isopods and amphipods from South Africa. *Ann. Mag. nat. Hist.*, (Zool., Bot., Geol.) **4**: 698-709.
- CHEVREUX, E., 1925. Voyage de la goélette Melita aux Canaries et au Sénégal 1889-1890. *Bull. Soc. zool. France*, **50**: 365-393.
- GRIFFITHS, C. L., 1973. The Amphipoda of South Africa, Part 2. The Gammaridea and Caprellidea of South West Africa south of 20°S. *Ann. South African Mus.*, **62** (6): 169-208.
- —, 1974. The Amphipoda of South Africa, Part 4. The Gammaridea and Caprellidea of the Cape Province east of Cape Agulhas. *Ann. South African Mus.*, **65** (9): 251-336.
- —, 1974b. The Amphipoda of South Africa, Part 3. The Gammaridea and Caprellidea of Natal. *Ann. South African Mus.*, **62** (7): 209-264.
- —, 1975. The Amphipoda of South Africa, Part 5. The Gammaridea and Caprellidea of the Cape Province west of Cape Agulhas. *Ann. South African Mus.*, **67** (5): 91-181.

- HOU, Z.-E. & S.-Q. LI, 2002. A new species of the genus *Grandidierella* from lake Chaohu, China. *Acta zootax. Sinica*, **27** (2): 225-234.
- MORINO, H. & A. DAI, 1990. Three amphipod species (Crustacea) from east China. *Publ. Itako hydrobiol. Stn.*, **4**: 7-27.
- MYERS, A. A., 1995. The Amphipoda (Crustacea) of Madang Lagoon: Aoridae, Isaeidae, Ischyroceridae and Neomegamphoidae. *Rec. Australian Mus., (suppl.)* **22**: 25-95.
- —, 1998. The Amphipoda (Crustacea) of New Caledonia: Aoridae. *Rec. Australian Mus.*, **50**: 187-210.
- REID, D. M., 1951. Report on the Amphipoda (Gammaridea and Caprellidea) of the coast of tropical West Africa. *Atlantide Rep.*, **2**: 190-291.
- REN, X., 2006. Crustacea: Amphipoda: Gammaridea (I). *Fauna Sinica, Invertebrata*, **41**: 1-588. (Science Press, Beijing).
- SHELLENBERG, A., 1925. Crustacea VIII: Amphipoda. In: W. MICHAELSEN (ed.), *Kenntnis der Meeresfauna Westafrikas*, **3** (4): 113-203. (Friedrichsen, Hamburg).
- —, 1936. Zwei neue Amphipoden des Stillen Ozeans und zwei Berichtigungen. *Zool. Anz.*, **116**: 153-156.