



Africorchestia a new genus of sand-hoppers (Crustacea: Amphipoda: Talitridae) from western Africa and south-western Europe

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Abstract

Africorchestia, a new genus of coastal sand-hoppers (Amphipoda, Talitridae), is described from western Africa and south-western Europe. *Africorchestia* includes five species: *A. fischeri* (H. Milne Edwards, 1830); *A. quadrispinosa* (K.H. Barnard, 1916); *A. skoogi* (Stebbing, 1922); *A. spinifera* (Mateus, 1962); and *A. tricornuta* (Shoemaker, 1920).

Key words: Crustacea, Amphipoda, Talitridae, Africa, Europe, taxonomy, new genus, *Africorchestia*

Introduction

Along the west coast of Africa and the south-western coast of Europe there is a group of striking sand-hoppers with sculptured pleosomes and setae on the dactyli of pereopods 6 and 7. Although known since H. Milne Edwards (1830) first described *Orchestia fischeri*, they have never been incorporated into a distinct genus. In this paper we describe the genus, *Africorchestia* **gen. nov.** and include five species, *Orchestia fischeri* H. Milne Edwards, 1830, *Talorchestia quadrispinosa* K.H. Barnard, 1916, *Talorchestia skoogi* Stebbing, 1922, *Talorchestia spinifera* (Mateus, 1962) and *Talorchestia tricornuta* Shoemaker, 1920. Although males are known for all species females have only been described for *A. skoogi* and *A. spinifera*. Consequently sexual dimorphism is incompletely known for the genus.

Orchestia fischeri

Amanieu & Salvat (1963) addressed the confusion surrounding *Orchestia fischeri* H. Milne Edwards, 1830, in relation to *Talorchestia quadrispinosa* K.H. Barnard, 1916 and *Talorchestia spinifera* (E. Mateus, 1962). H. Milne Edwards (1830) described *O. fischeri*, indicating a species with a dorsally sculptured pleosome, but he designated no types and did not indicate a type locality. Subsequently Guérin (1832) reported *O. fischeri* from the Bay of Kalamata, Greece, without figures and from the Cape of Good Hope, South Africa, with one figure (Guérin 1836). According to Amanieu & Salvat (1963), if there are any specimens from these collections they are in the Museo Nacional de Ciencias Naturales, Madrid, Spain. H. Milne Edwards (1840) gave a figure of *O. fischeri* that showed a pair of dorsal spines each on pleonites 1 and 2, but again he did not indicate a type locality. Lucas (1846) reported *O. fischeri* from Algeria living under the brown alga *Fucus* on the edge of the sea.

Chevreaux (1911) gave the distribution of *O. fischeri* as: Algeria (Lucas 1846); Bay of Kalamata, Gulf of Koron, Greece (Guérin 1832); Cadiz, Spain (Chevreaux 1911) and the Cape of Good Hope (Guérin 1836). K.H. Barnard (1916) indicated that the Guérin's (1836) record of *O. fischeri* from the Cape of Good Hope was actually *T. quadrispinosa* and Amanieu & Salvat (1963) indicated that the Chevreaux's (1911) report of *O. fischeri* from Cadiz was *T. spinifera*. Only the records of *O. fischeri* from the Bay of Kalamata and the coast of Algeria are left unresolved.

The species reported from the Bay of Kalamata, Greece (Guérin 1832) and from Algeria (Lucas 1846) are apparently misidentifications. Bellan-Santini & Krapp-Schickel (1993) did not report any species which could be attributed to *Africorchestia* in their monograph on the talitrid amphipods of the Mediterranean Sea. According to

Dr Koukouras, Aristoteleio University of Thessaloniki (pers. comm.), no species with spines on the pleosome (i.e., *Africorchestia*) occurs in Greece, the same is true for the Algerian coast (Bakalem & Dauvin 1995; Grimes *et al.* 2009) and the coast of Tunisia (Zakhama-Sraieb *et al.* 2009). The evidence indicates that *Africorchestia* is not present along the coasts of the Mediterranean Sea. However, at least the southern Mediterranean coast has rarely been collected for talitrids and the possibility that *Africorchestia* occurs there must still be considered.

Talitrids in western Africa

Africorchestia is a widespread genus found from Arcachon (44°40'N) in the Bay of Biscay, south to the Cape Peninsula (34°S) in South Africa (Figure 1).

Africorchestia spinifera (Mateus, 1962) is the northern-most species. It occurs from south-western France (about 45°N), through Portugal and Spain and along the Atlantic coast of Morocco to about 29°N. Whether this is the southern limit of the species is not known because no talitrids are reported along the coast of north-western Africa between Morocco (at 29°N) and the Democratic Republic of São Tomé and Príncipe (at 1°N). *Africorchestia tricornuta* (Shoemaker, 1920) has an apparent narrow distribution along the beaches of Angola and the Democratic Republic of the Congo (from 5° to 6°S) except for an anomalous record from about 1°N on the island of Príncipe (Mateus & Mateus 1966). *Africorchestia skoogi* (Stebbing, 1922) occurs in southern Angola (about 15°40'S) and along the coast of Namibia to about 20°S. In South Africa the southern-most species in the genus, *Africorchestia quadrispinosa* (K.H. Barnard, 1916), occurs from Walvis Bay in southern Namibia (22°S) to the Cape Peninsula (34°S).

Four species of *Africorchestia* are known from the west coast of Africa. Between Morocco and Namibia the only other coastal talitrid reported is '*Talorchestia*' *landanae* Schellenberg, 1925 from Angola, but it is too poorly described to place in a genus and is considered as a dubious species. As can be seen in Figure 1 large swaths of the western African coastline have not been explored for talitrid amphipods and representatives of *Africorchestia*, and other genera, probably occur there.

In Morocco four additional coastal talitrid species have been reported (Menioui & Bayed 1986): *Orchestia mediterranea* Costa, 1857; *Platorchestia platensis* (Krøyer, 1845); *Talitrus saltator* (Montagu, 1808); and *Pseudorchestoidea brito* (Stebbing, 1891). In south-western Africa there are at least six additional coastal species in other genera: *Eorchestia rectipalma* (K.H. Barnard, 1940) from Lüderitz Bay, Namibia to Western Cape; *Floresorchestia ancheidos* (K.H. Barnard, 1916); '*Orchestia*' *dassenensis* (K.H. Barnard, 1916); *Platorchestia platensis* (Krøyer, 1845) of Griffiths (1975); '*Talorchestia*' *capensis* (Dana, 1853) and '*Talorchestia*' *australis* K.H. Barnard, 1916 all occur on the Cape Peninsula. Three of these species are not well enough described to place in genera.

Material and Methods

The descriptions were generated from a DELTA database (Dallwitz 2005) to the talitrid genera and species of the world. The **bold** parts of the generic description are diagnostic characters which distinguish *Africorchestia* in at least two respects from every other taxon. Illustrations were made using the methods described in Coleman (2003, 2006, 2009). Types are held in the American Museum of Natural History, New York, USA (AMNH); the Instituto de Zoologia Augusto Nobre, Porto, Portugal (IZAN); the Museum für Naturkunde, Berlin, Germany (ZMB); and the South African Museum, Cape Town, Africa (SAM). Standard abbreviations on the plates are: G, gnathopod; P, pereopod; T, telson; U, uropod.

Africorchestia gen. nov.

Description. *Antenna* 2 peduncular articles narrow; with many large robust setae. *Mandible* left lacinia mobilis 5-dentate. *Maxilliped* palp article 2 distomedial lobe well developed, article 4 reduced, button-shaped. *Gnathopod 1* parachelate; posterior margin of carpus and propodus each with lobe covered in palmate setae in male, posterior margin of merus, carpus and propodus each without lobe covered in palmate setae in female; palm transverse in male. *Gnathopod 2* subchelate in male; mitten-shaped in female. *Pereopods 2–4* coxae as wide as deep. *Pereopods 3–7* cuspidate. *Pereopods 6–7* longer than pereopods 3–5, **with slender setae along posterior margin of dactyli**. *Pereopod 6* basis expanded in male. ***Pleonites 1–3* with dorsal sculpturing (spines or ridges) in males (absent**

in females where known). *Pleopods* all well developed. *Pleopod 1* peduncle with marginal robust setae. *Uropod 1* peduncle distolateral robust seta present; inner and outer rami with marginal robust setae. *Uropod 2* not sexually dimorphic; inner and outer rami with marginal robust setae. *Uropod 3* ramus longer than peduncle or subequal in length to peduncle. *Telson* with marginal and apical robust setae, with 3 to 6 robust setae per lobe.



FIGURE 1. Map of south-western Europe and western Africa showing the distribution of *Africorchestia* species (* indicates anomalous record of *A. tricornuta*).

Type species. *Orchestia spinifera* Mateus, 1962, original designation.

Included species. *Africorchestia* includes 5 species: *A. fischeri* (H. Milne Edwards, 1830); *A. quadrispinosa* (K.H. Barnard, 1916); *A. skoogi* (Stebbing, 1922); *A. spinifera* (Mateus, 1962); *A. tricornuta* (Shoemaker, 1920).

Remarks. *Africorchestia* appears to be most similar to *Americorchestia* Bousfield, 1991 and *Sardorchestia* Ruffo in Tafani *et al.*, 2004. *Americorchestia* and *Africorchestia* are similar in most characters including the male

parachelate first gnathopods and the characteristic third uropods with the ramus longer than the peduncle. They differ in the pleosome which is sculptured in *Africorchestia*, in pereopod 6 which is sexually dimorphic in *Africorchestia*, and in the dactyli of pereopods 6 and 7 which have slender setae along the posterior margin in *Africorchestia*.

Africorchestia is also very similar to *Sardorchestia*. They differ significantly in the dactyli of pereopods 6 and 7 with setae along the posterior margin in *Africorchestia* (absent in *Sardorchestia*); in pereopod 6 which is sexually dimorphic in *Africorchestia*; and pleonites 1–3 rugose or with spines (absent in *Sardorchestia*).

Americorchestia and *Sardorchestia* are very similar. In *Sardorchestia* the male gnathopod 2 propodus has a large posteroproximal thumb and there are more robust setae on the telson, but this character appears to be continuous between these genera. Based on the morphology *Americorchestia* and *Sardorchestia* could be synonymised and the Mediterranean species *Sardorchestia pelecaniformes* (Bellan-Santini & Ruffo, 1986) and *Talorchestia ugo- lini* Bellan-Santini & Ruffo, 1991 would both fall into *Americorchestia*.

Key to species of *Africorchestia*

1. Pleonite 1 without spines and/or ridges *A. tricornuta*
- Pleonite 1 with spines and/or ridges 2
2. Pleonite 2 with 2 well developed transverse ridges *A. skoogi*
- Pleonite 2 without mid-dorsal spines, with multiple dorsodistal spines 3
3. Pleonite 3 without dorsodistal spines *A. fischeri*
- Pleonite 3 with pair of vestigial dorsodistal spines *A. quadrispinosa*
- Pleonite 3 with pair of anterior pointed spines and posterodistal rounded posterodistal protrusions. *A. spinifera*

Africorchestia fischeri (H. Milne Edwards, 1830)

Orchestia Fischeri H. Milne-Edwards, 1830: 361. —H. Milne-Edwards, 1840: 19, pl. 29, fig. 4. —Della Valle, 1893: 497, pl. 57, fig. 56.

? *Orchestoidea Fischerii*. —Bate, 1862: 11, pl. 2, fig. 1. —Chevreux, 1911: 231 (in part). —Stebbing, 1906: 528 (in part). —Bulycheva, 1957: 135, pl. 50.

Not *Orchestia fischeri*. —Guerin, 1831. —Guerin, 1836. —Lucas, 1846.

Types. None designated.

Type locality. None designated.

Diagnosis. Based on male. *Gnathopod 2* propodus ovate, palm extremely acute, convex, extending about 70–75% of posterior margin, without rounded protuberance near dactylar hinge, with large distal sinus, robust setae along margin unknown, with large mid-palmar protuberance, posteroproximal corner without spine; dactylus length unknown. *Pereopods 6–7* longer than pereopods 3–5. *Pereopod 6* much longer than pereopod 7; basis grossly enlarged, subovate. *Pleonites 1–2* each with 2 dorsodistal spines. *Pleonite 3* without dorsal spines. *Uropod 3* ramus subequal in length to peduncle. *Telson* with marginal and apical robust setae, with more than 10 robust setae.

Remarks. Based on the one habitus illustration of *A. fischeri* (H. Milne Edwards, 1840) the species has a unique pleonite dorsal spine formula, a unique large mid-palmar protuberance on the male gnathopod 2 palm and an enlarged oval-shaped basis on the male pereopod 6 not shared with any other species of *Africorchestia*. These characteristics indicate a very distinctive species, however the lack of type material, the lack of a type locality and the lack of morphological detail in the habitus illustration makes *O. fischeri* a puzzling species.

Distribution. Not known.

Africorchestia quadrispinosa (K.H. Barnard, 1916)

(Fig. 2)

Orchestia Fischerii. —Guérin, 1846: pl. 26, fig. 3, and 1843. Explication des Planches, p. 22. (non H. Edwards, 1830 and 1840.)

Orchestoidea Fischerii. —Stebbing, 1910: 459 (in part).

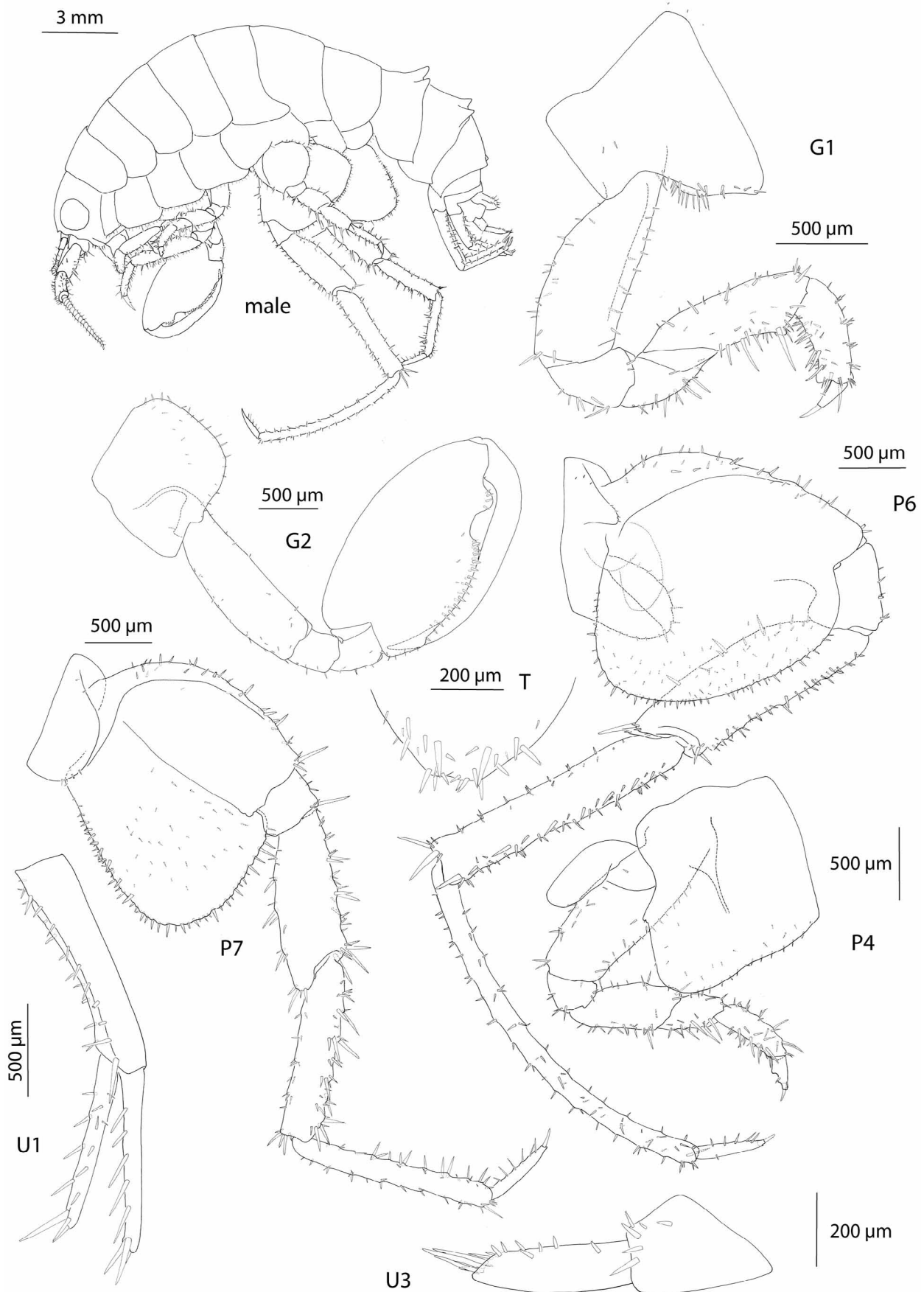


FIGURE 2. *Africorchestia quadrispinosa* (K.H. Barnard, 1916), habitus, male. Grosse Bucht, Namibia (after Coleman & Leistikow 2001).

Talorchestia quadrispinosa K.H. Barnard, 1916: 217, pl. 27, figs 29–32. —K.H. Barnard, 1940: 470, fig. 29. —Schellenberg, 1925: 159. —Penrith & Kensley, 1970: 205, 231, table 1 (ecology). —Griffiths, 1974: 204. —Griffiths, 1975: 171. —Coleman & Leistikow, 2001: 4, figs 7–11.

Types. Syntypes, males and females, SAM 1256, 1283, A2514, A 2875 (largest male, 22 mm).

Type locality. Dassen Island (~33°25'S 18°05'E) and east and west coast of Cape Peninsula (~34°10'S 18°20'E), South Africa.

Diagnosis. Based on male. *Gnathopod* 2 propodus ovate, palm extremely acute, convex, extending about 75% of posterior margin, with rounded protuberance near dactylar hinge, with large distal sinus, with two rows of robust setae along entire margin, posteroproximal corner without spine; dactylus slightly longer than palm. *Pereopods* 6–7 much longer than pereopods 3–5. *Pereopod* 6 much longer than pereopod 7; basis expanded posteriorly. *Pleonites* 1–2 each with pair of posterodistal spines. *Pleonite* 3 with paired vestigial posterodistal spines. *Uropod* 3 ramus longer than peduncle, 3.8 x as long as broad. *Telson* entire apically truncated with about 10 apical robust setae on each side.

Remarks. The geographic neighbors *Africorchestia quadrispinosa* and *A. skoogi* each have three dorsodistal spines on pleonite 1. They differ in the shape of male gnathopods 2 which is more ovate and does not have a posteroproximal spine on the propodus in *A. quadrispinosa*.

Distribution. *Namibia.* Walvis Bay, ~25°55'S 14°32'E (Schellenberg 1925); Lüderitz Bay, ~26°39'S 15°09'E (Schellenberg 1925; Penrith & Kensley 1970); Shearwater Bay (Griffiths 1974); Skeleton Coast, 21°38'38"S 13°55'17"E and 26°44'09"S 15°05'40"E (Coleman & Leistikow 2001); Orange River mouth, ~28°37'56.23"S 16°27'16.88"E (Griffiths 1974). *South Africa.* Cape Peninsula, (K.H. Barnard 1916).

Africorchestia skoogi (Stebbing, 1922)

(Fig. 3, 4)

Talorchestia skoogi Stebbing, 1922: 8, pl. 5. —Griffiths, 1976: 32, fig. 12. —Coleman & Leistikow, 2001: 2, figs 1–6.

Types. Neotype, male, ZMB 27 315.

Type locality. Skeleton Coast Park, Namibia (17°27'05"S 11°44'35"E).

Diagnosis. Based on male. *Gnathopod* 2 propodus subrectangular, palm extremely acute, slightly convex, extending along entire posterior margin, with rounded protuberance near dactylar hinge, with small distal sinus, with single row of robust setae along entire margin, with large posteroproximal proximal spine; dactylus slightly longer than palm. *Pereopods* 6–7 much longer than pereopods 3–5. *Pereopod* 6 longer than pereopod 7; basis broadly expanded posteriorly. *Pleonite* 1 with 1 posterodistal ridge with lobe-like protrusions on both sides. *Pleonite* 2 with 2 ridges, anterior ridge continuous, posterior ridge with lobe-like extensions similar to pleonite 1. *Pleonite* 3 with 2 ridges, anterior similar to that of pleonite 2, posterior ridge with lobe-like protrusions or continuous in some specimens. *Uropod* 3 ramus longer than peduncle, 5.6 x as long as broad. *Telson* entire, apically truncated, with about 10 apical robust setae on each side.

Remarks. See remarks under *A. quadrispinosa*.

Distribution. *Angola.* Cabo Negro, 15°40.6'S 11°55.6'E (Griffiths 1976); Tombwe, 15°48.1'S 11°50.9'E (as Port Alexander, Stebbing 1922). *Namibia.* Skeleton Coast Park, 17°27'05"S 11°44'35"E (Coleman & Leistikow 2001).

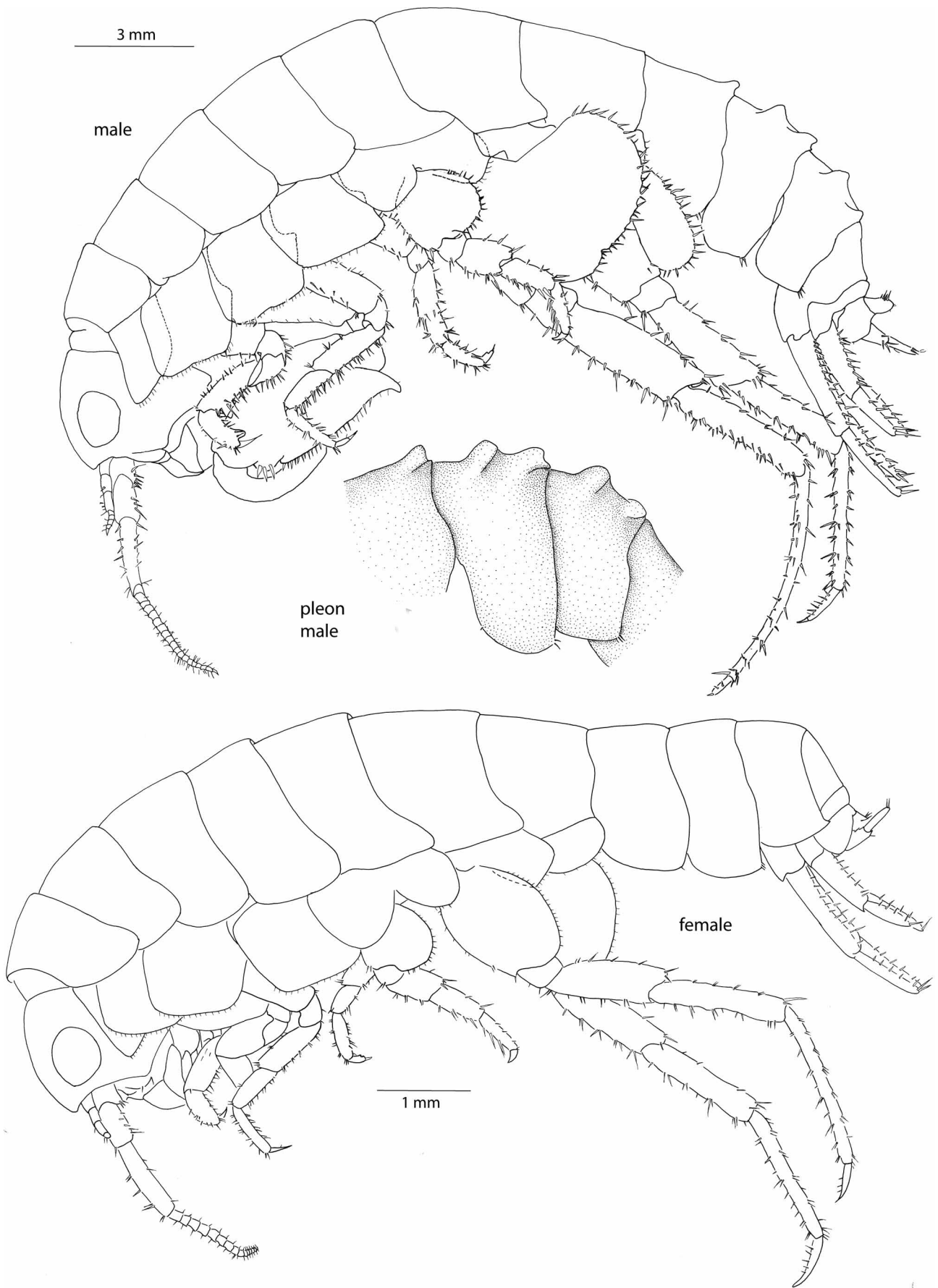


FIGURE 3. *Africorchestia skoogi* (Stebbing, 1922), habitus, male and female. Skeleton Coast, Namibia (after Coleman & Leistikow 2001).

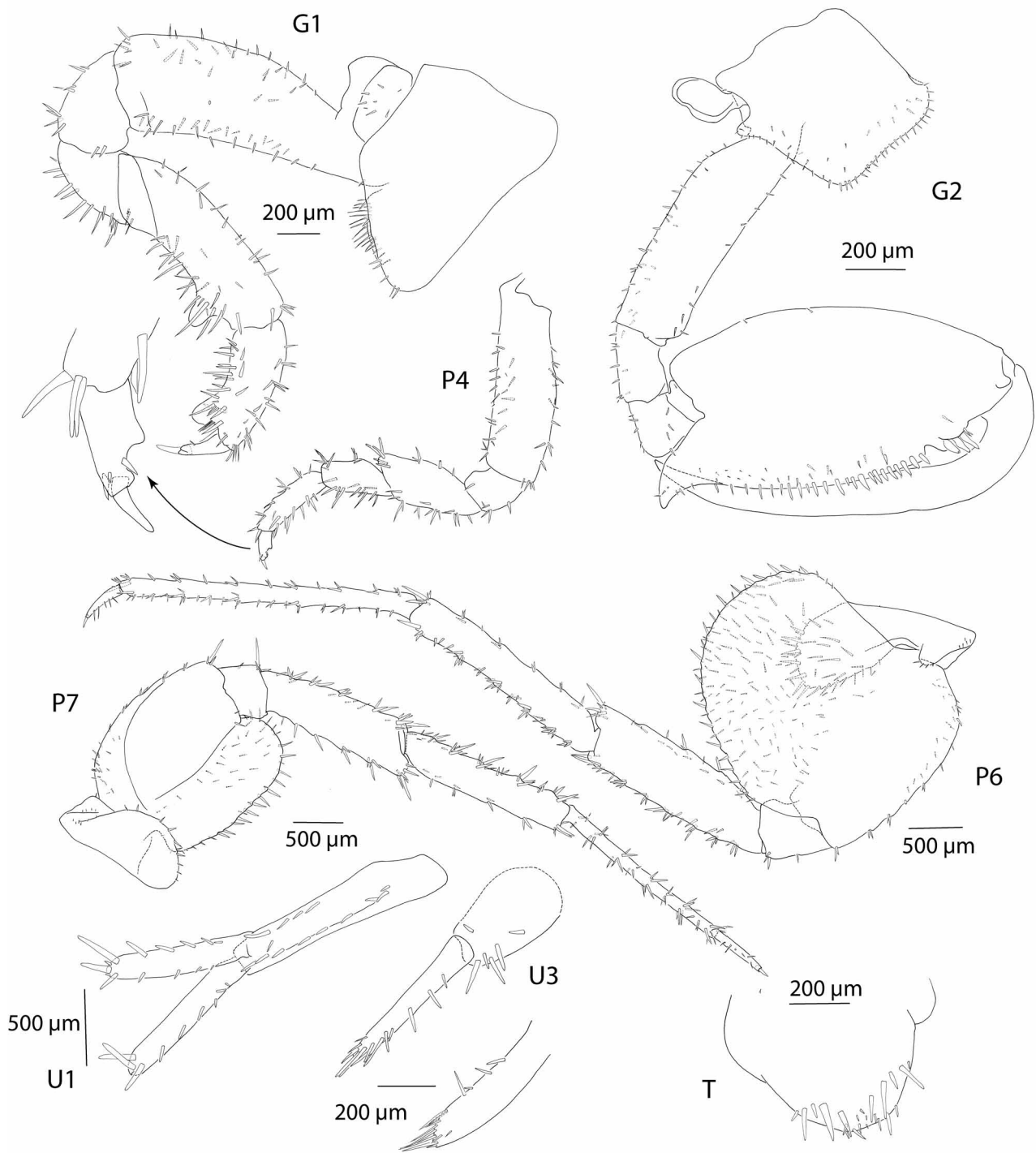


FIGURE 4. *Africorchestia skoogi* (Stebbing, 1922), male. Skeleton Coast, Namibia (after Coleman & Leistikow 2001).

***Africorchestia spinifera* (Mateus, 1962)**

(Figs 5, 6)

? *Orchestoidea fischeri*. —Chevreux, 1911: 231 (in part).

Orchestia spinifera Mateus, 1962: 10, figs 1–20. —Marques & Bellan-Santini, 1985: 332, 352, table 1.

Talorchestia spinifera. —Amanieu & Salvat, 1963: 69, fig. —El Kaim, 1963: 169. —Amanieu & Salvat, 1965: 59, figs 2–6.

—Marfin, 1983: 232, figs 2, 3. —Menioui & Bayed, 1986: 112.

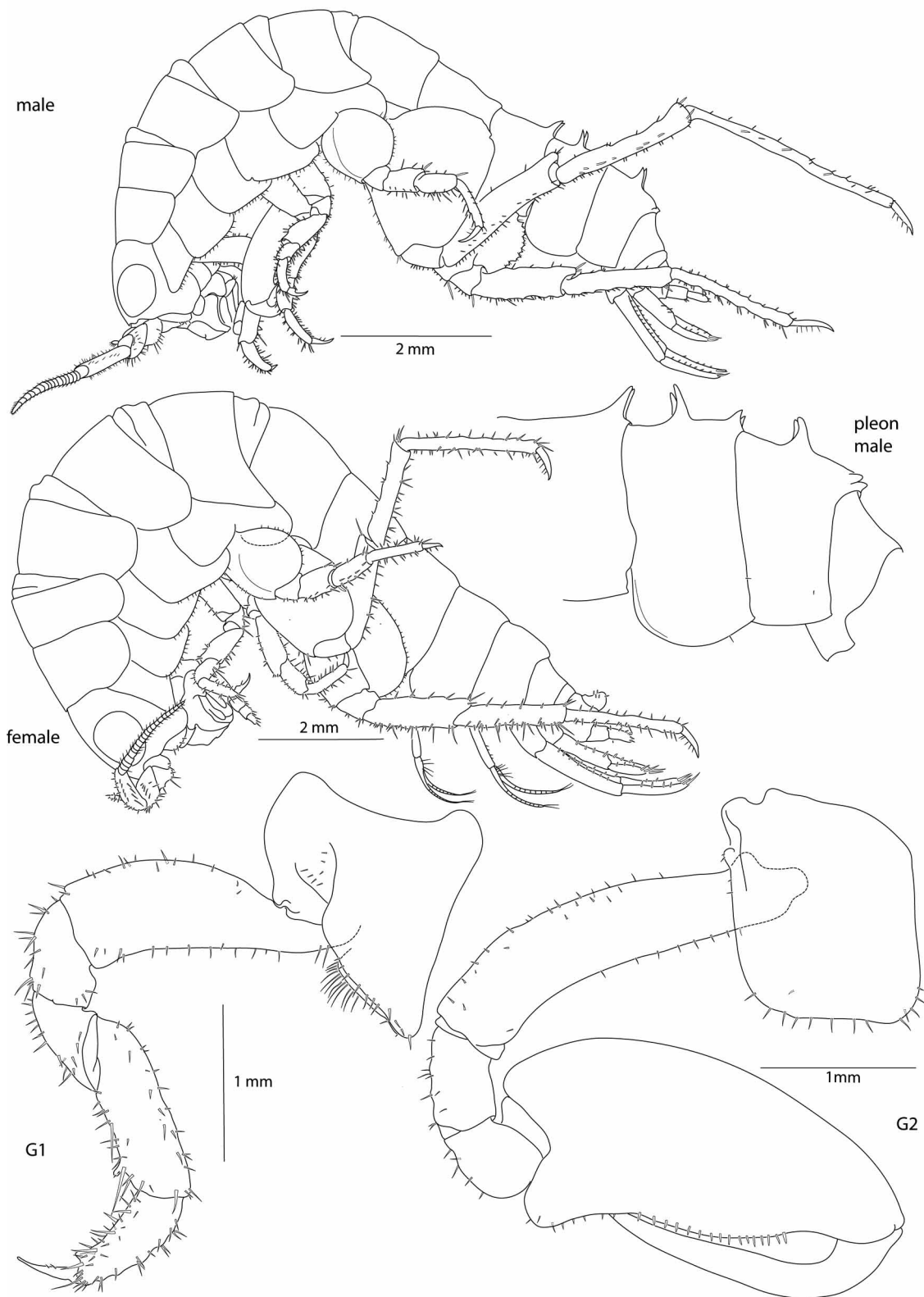


FIGURE 5. *Africorchestia spinifera* (Mateus, 1962), habitus, male and female. Oued Ghrifa, Asilah, Morocco.

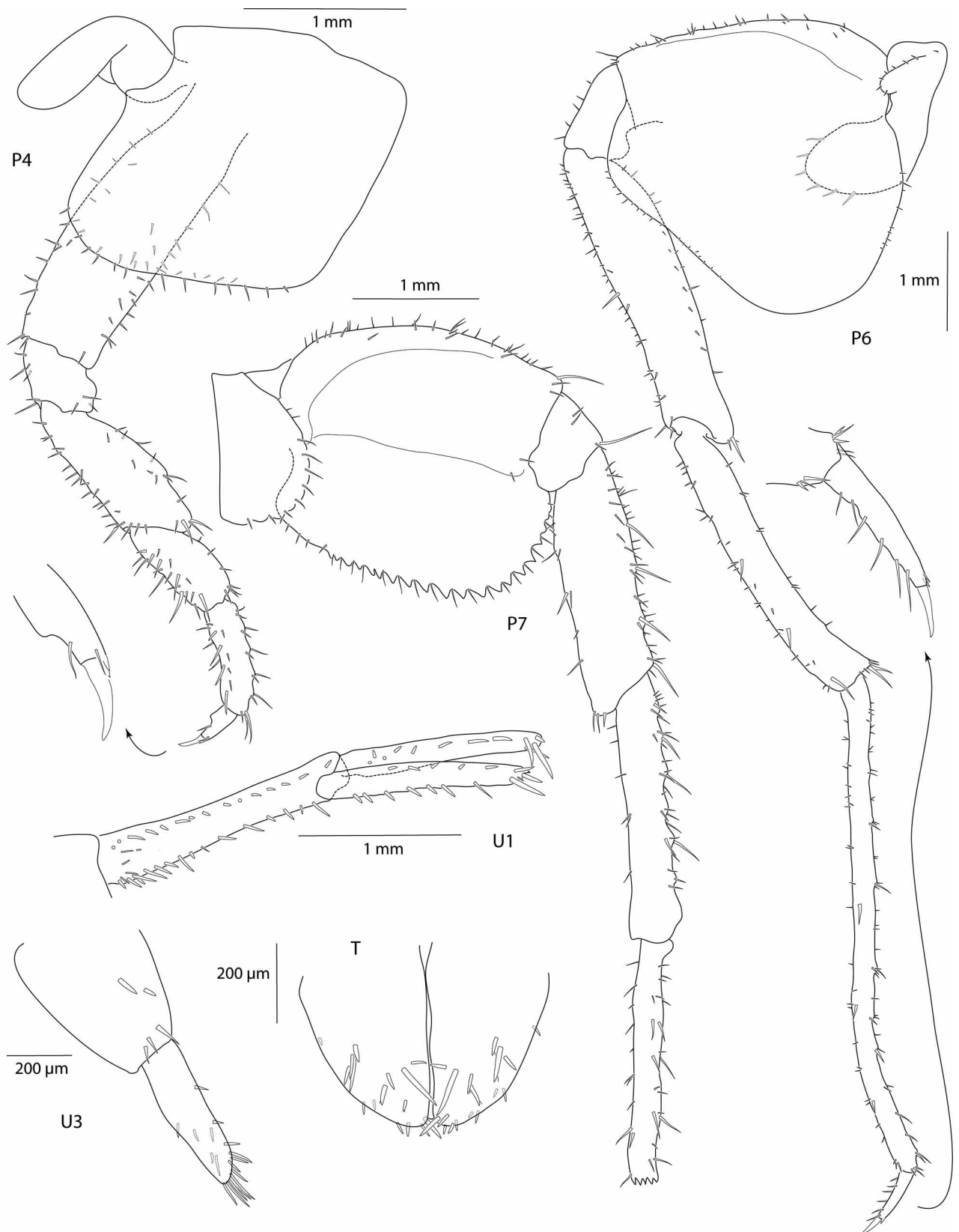


FIGURE 6. *Africorchestia spinifera* (Mateus, 1962), male. Oued Ghrifa, Asilah, Morocco.

Types. Holotype, male, 16 mm, IZAN 90. Paratypes: IZAN.

Type locality. Beaches of River Guadiana at Vila Real de Santo Antonio, Portugal (~37°10.9'N 7°24.2'W).

Diagnosis. Based on male. *Gnathopod 2* propodus ovate, palm extremely acute, subsigmoidal, extending about 75% along posterior margin, without rounded protuberance near dactylar hinge, with shallow distal notch, with two rows of robust setae along entire margin, without proximal tooth; dactylus subequal in length to palm. *Pereopods 6–7* much longer than pereopods 3–5. *Pereopod 6* longer than pereopod 7; basis expanded posteriorly. *Pleonite 1* with a pair of dorsodistal pointed spines. *Pleonite 2* with 2 pairs of dorsal pointed spines. *Pleonite 3* with 1 anterior pair of longer pointed spines and a pair of ridge-like posterodistal rounded protrusions. *Uropod 3* ramus subequal in length to peduncle, 3.3 x as long as broad. *Telson* entire apically notched with 11 apical robust setae on each side.

Remarks. Apparently *A. fischeri* and *A. spinifera* both have two dorsodistal spines on pleonite 1. They have very differently shaped male second gnathopods and in *A. fischeri* the basis of pereopod 6 is grossly enlarged and vertically ovate.

Distribution. *France.* Bay of Biscay: Isle aux Oiseaux, Arcachon, 44°42.1'N 1°10.5'W (El Kaim 1963); Arcachon, 44°39.6'N 1°8.6'W (Amanieu & Salvat 1965). *Morocco.* Estuaries of Oued Ghrifa, Asilah, ~35°31'N 06°00'W (current study); Bou Regreg, 34°2.3'N 6°49.9'W (El Kaim 1963; Amanieu & Salvat 1965; Meniou & Bayed 1986); Agadir, Massa, Sidi Ifni, 29°23'N 10°10.5'W (Marfin 1983). *Portugal.* River Guadiana, 37°10.2'N 7°22.8'W (Mateus 1962). *Spain.* Cadiz, 36°31.8'N 6°18.4'W (Chevreux 1911; Amanieu & Salvat 1983).

Africorchestia tricornuta (Shoemaker, 1920)

(Fig. 7)

Talorchestia tricornuta Shoemaker, 1920: 374, figs 4–6. —Schellenberg, 1939: 133, figs 21–28. —Mateus & Mateus, 1966: 183. —Coleman & Leistikow, 2001: 5, figs 12–17.

Types. Holotype, male, 11 mm, AMNH. Paratypes: female, 8 mm, AMNH; 48 specimens, AMNH.

Type locality. Banana, Democratic Republic of the Congo (~6°1'S 12°24'E) and Soyo (as Santo Antonia), Angola (~6°7'60"S 12°22'E).

Diagnosis. Based on male. *Gnathopod 2* propodus ovate, palm extremely acute, convex, extending along entire posterior margin, without distal sinus or protuberance, with one row of large robust setae halfway along margin, with palmar protuberance towards center, posteroproximal corner defined by 2 slightly curved spines; dactylus much longer than palm. *Pereopods 6–7* much longer than pereopods 3–5. *Pereopod 6* much longer than pereopod 7; basis enlarged, broadly expanded posteriorly. *Pleonite 1* without dorsal spines. *Pleonite 2* with pair of dorsodistal spines. *Pleonite 3* with 1 recurved mid-dorsal spine. *Uropod 3* ramus subequal in length to peduncle, 3.2 x as long as broad. *Telson* entire apically notched, with 5 lateral and apical robust setae on each side.

Remarks. *Africorchestia tricornuta* is the only species without dorsal spines on pleonite 1. It also has elaborate spines on the palm of gnathopod 2 not seen in other member of the genus. Mateus & Mateus (1966) attributed one damaged male, 8 mm in length, from the island of Príncipe to *A. tricornuta*. This is far north of the known distribution of the species.

Distribution. *Angola.* Landana, Cabinda, ~5°13'S 12°08'25"E (Schellenberg, 1939; Coleman & Leistikow 2001); Soyo, Bengo, ~6°8'S 12°22'E (as Santo Antonio, Shoemaker, 1920). *Democratic Republic of the Congo.* Banana, ~6°1'S 12°24'E (Shoemaker 1920); Banana, Muanda (Schellenberg 1939). *Democratic Republic of São Tomé and Príncipe.* Príncipe: Praia Pequena, ~1°38'N 7°27'E (Mateus & Mateus, 1966).

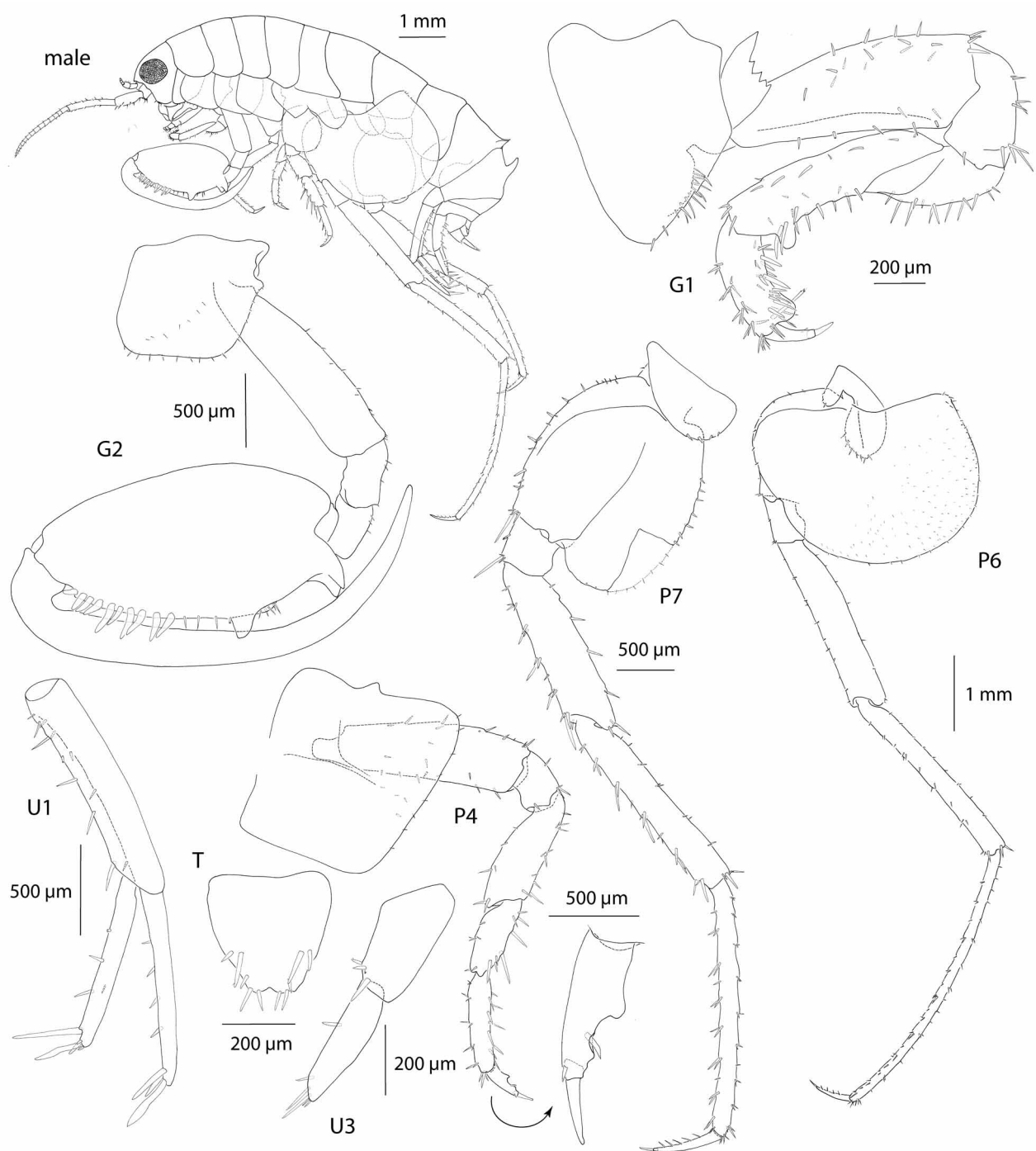


FIGURE 7. *Africorchestia tricornuta* (Shoemaker, 1920), habitus, male. Landana, Democratic Republic of the Congo (after Coleman & Leistikow 2001).

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