

## Supralitoral talitrid Amphipoda and oniscid Isopoda (Crustacea) from the Southwest African coast.

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### Abstract

The amphipod crustacean species *Talorchestia skoogi*, *Talorchestia quadrispinosa*, *Talorchestia tricornuta*, collected on the southwest coast of Africa, and the isopod *Deto echinata* from the same geographic region are redescribed and illustrated in detail. Records of other amphipod and isopod species occurring at the same localities are given.

**Key words:** Crustacea, Amphipoda, Talitridae, Isopoda, Oniscidea, southwest Africa, taxonomy

### Introduction

During a collecting trip to southwestern African beaches Dr Manfred Uhlig collected several talitrid amphipod and isopod crustaceans found under algae that had been washed ashore. Some of these species are redescribed herein.

K.H. Barnard worked intensively on southern African *Talorchestia* species and lists *T. capensis* (Dana, 1853), *T. quadrispinosa* Barnard, 1916, *T. australis* Barnard, 1916 and *T. ancheidos* Barnard, 1916 for South Africa (K.H. Barnard, 1935-40). He mentioned other *Talorchestia* species from the western African coast: *T. landanae* Schellenberg, 1925, *T. tricornuta* Shoemaker, 1920 and *T. skoogi* Stebbing, 1922. The latter species has never been mentioned in the scientific literature since the original description, which is incomplete and not illustrated to modern standards.

### Material and Methods

A major part of the material was collected along the coastline of Namibia from beneath decaying kelp and algae on the beach. Part of the isopod material and *Talorchestia tricornuta* are from the collections of the Museum für Naturkunde Berlin (ZMB).

The animals were transferred into glycerol and drawn with a camera lucida on a Leica Wild M8 dissecting microscope. The specimens were dissected and appendages and mouthparts transferred onto slides in glycerol and drawn under a Leica DMLB light microscope using a camera lucida.

The material is deposited in the Museum für Naturkunde in Berlin (ZMB).

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## Systematics

### Amphipoda, Talitridae Rafinesque, 1815

#### *Talorchestia skoogi* Stebbing, 1922 Figs. 1-6

**Material examined:** neotype male; 17°27'05"S 11°44'35"E; neoallotype, 18°29'31"S 12°01'56"E, Skeleton Coast Park, Namibia, leg. Dr M. Uhlig, 20-21.III.1998; both ZMB 27 315.

**Additional material:** 6 males, 3 juveniles (females?) 17°27'05"S 11°44'35"E, 20.III.98; 2 males, 18°29'31"S 12°01'56"E, 21.III.98; 1 male, 17°32'27"S 11°44'26"E, 20.III.98; 1 male, 1 female, 1 juvenile, 18°15'43"S 11°57'29"E, 20.III.98; 2 males, 18°25'58"S 12°00'17"E, 21.III.98; 2 males, 1 female, 19°04'18"S 12°33'23"E, 22.III.98; 1 male, 17°21.5'S 11°45.4'E, 19.III.98; 2 males, 3 females, 18°36'30"S 12°10'04"E, 21.III.98; 1 male, 17°18.4'S 11°45.3'E, 19.III.98; 1 male, 17°22.3'S 11°45.5'E, 19.III.98; 3 males, 1 juvenile, 18°07'00"S 11°50'54"E, 20.III.98; 1 male, 2 females, 1 juvenile, 18°59'35"S 12°28'36"E, 22.III.98; 2 females, 29°46'52"S 13°22'51"E, 24.III.98; 2 females, 17°47'27"S 11°46'25"E, 20.III.98; 1 female, 3 juveniles, 18°44'53"S 12°19'48"E, 21.III.98, all leg. M. and B. Uhlig, ZMB 27 315.

**Description of male:** Head with inconspicuous rostrum; eyes wider than long. Pereonite 1 and 2 subequal; pereonites 3-5 longer; pereonites 6-7 and pleonite 1 longest; posteroventral corners of pereonite 1-4 rounded, that of pereonites 5-7 produced. Posteroventral corner of pleonites angular. Dorsal protuberances on pleon segments 1-3 (Fig. 1a, b). Urosomite 1 longest with posteroventral process forming a process for uropod 1, urosomite 2 shortest; urosomite 3 expanded ventrally.

Antenna 1 (Fig. 2d) slightly longer than apex of article 4 of antenna 2; peduncle article 1 expanded distally; article 2 slightly shorter and weakly expanded distally; article 3 longest, subrectangular; 4 flagellar articles.

Antenna 2 (Fig. 2b): length of article 5 180% of article 4; flagellum consisting of 18 articles.

Upper lip (labrum) (Fig. 3f) entire with hair-like setae on apical margin.

Mandible (Fig. 3b) stout; incisor multi-dentate; setal row with 4 stout plumose setae; lacinia mobilis bi-dentate; pars molaris triturative.

Lower lip (hypopharynx) (Fig. 3e) with wide lobes and tapering hypopharyngeal processes.

Maxilla 1 (Fig. 3a): inner plate narrow with oblique apex and 2 stout apical, plumose setae; outer plate oblique with 9 spine-like, medially serrate setae; palp very short, uni-articulate.

Maxilla 2 (Fig. 2c): inner plate narrower with oblique distal margin, 1 stout, long, plumose seta medially; outer plate rounded distally, setae especially long on apex.

Maxillipeds (Fig. 2a, e): inner plates apically oblique with nodular setae and plumose setae on apical and medial margin and submarginally on posterior face; outer plate somewhat exceeding distal margin of 1<sup>st</sup> palp article.

Maxillipedal palp article 1 wider than long with oblique distal margin; article 2 rounded medially, length 150% of article 1, apical margin excavate; article 3 ovoid, densely covered with stout setae; rudimentary 4<sup>th</sup> article present.

Pereopod 1 (Fig. 3d): coxa with straight anterior and posterior margins, oblique distal margin, anterodistal angle rounded; basis as long as merus and carpus combined, straight anteriorly and weakly convex posteriorly; ischium shortest, rounded posteriorly; merus and carpus connected by diagonal joint; carpus slightly curved posteriorly with rounded posterodistal process; propodus expanded distally, palm halfway slightly excavate; dactylus narrow, longer than palm, parachelate.

Pereopod 2 (Fig. 4a) coxa parallelogram-shaped with short posteroproximal process; basis subrectangular; ischium narrow, longer than wide; merus and carpus forming base for dominant propodus, this about twice the length of coxa, with convex anterior margin; posterior margin developed into palm, with two excavations distally resulting in small protuberance with 3 stout setae; row of marginal setae on palm and additional submarginal setae, proximal part of palm drawn out into forward curved acute process; dactylus strongly curved proximally, distal 2/3 less curved, exceeding proximal palm process.

Pereopod 3 (Fig. 4e) coxa subquadrate with pointed process posteromarginally; basis with straight anterior and weakly convex posterior margin; ischium shortest, with anteromarginal excavation; merus expanded and oblique distally; carpus 2/3 of merus; propodus slender, slightly longer than carpus; dactylus slender.

Pereopod 4 (Fig. 4c, d) coxa subquadrate with posterior notch-like excavation; basis to propodus shorter but as wide as pereopod 3; dactylus with projecting lobe on the posterior margin (detail of Fig. 4d).

Pereopod 5 (Fig. 6b) short and bulky; coxa 2x wider than long with 2 rounded ventral lobes; basis circular, with a shallow excavation ventrally; ischium wider than long; merus width 79% of length, slightly produced posterodistally; carpus 2x wider than propodus; setation of anterior carpus and propodus margins in particular stout and long; dactylus short and bulky.

Pereopod 6 (Fig. 5a) coxa with short anterior lobe and ventrally expanded posterior lobe, covered by the dominant basis; basis much wider than long, posterior margin strongly produced, medial surface setose; ischium normal; merus weakly expanded distally; carpus subequal in length to basis; propodus 140% of carpus length, 50% carpus width; dactylus slender with setae on inner curvature.

Pereopod 7 (Fig. 5c) shorter than pereopod 6; coxa wider than long, with rounded ventral lobe posteriorly; basis convex anteromarginally; ischium normal; merus weakly expanded distally; carpus subrectangular, 2x width of propodus, this slightly longer than carpus; dactylus slender with setae on inner curvature.

Uropod 1 (Fig. 6e) peduncle longer than rami with row of setae on lateral margin and some setae mediomarginally; outer ramus slightly longer than inner; both rami with rounded apex and long stout distal setae; outer ramus lacking setae on medial margin.

Uropod 2 (Fig. 6c) peduncle weakly longer than rami, those subequal in length; setation consisting of long and stout spine-like setae; outer ramus lacking setae on medial margin.

Uropod 3 (Fig. 6g, f): stout peduncle, only 1 ramus without setae on inner margin, apex with group of slender setae.

Telson with setae on distal margin as in Fig. 6h.

**Description of female:** Female much smaller than male. Setation of appendages much sparser. Dorsal face of pleonites smooth.

Pereopod 1 (Fig. 3c) lacking posterodistal lobes on carpus and propodus, the latter tapers distally.

Pereopod 2 (Fig. 2f) coxa as wide as long; basis weakly convex posteromarginally and strongly rounded and expanded anteromarginally, more than 2x ischium width; merus roundly produced posterodistally; carpus lobately produced halfway posteromarginally; propodus convex posteromarginally with rounded weakly anteriorly curved lobe; dactylus inserted proximally of this lobe, tapering distally and curved posteriorly (see detail of Fig. 2f).

Pereopod 3 (Fig. 4b) coxa slightly wider than long, posteromarginally acutely produced; basis subrect-

angular; ischium shortest with anteroproximal depression; merus weakly expanded distally with oblique apex; carpus slightly shorter and somewhat narrower than merus; propodus narrow and subrectangular; dactylus slender with apical nail.

Pereopod 4 (Fig. 6a) coxa subequal to coxa 3, remaining articles of similar shape as in pereopod 3, but shorter: merus 81%; carpus 60%; propodus 74%; dactylus expanded proximally with notch on inner curvature.

Pereopod 5 (Fig. 6d) about the same length as pereopod 4; coxa bilobed, anterior lobe wider and weakly longer than posterior one; basis ovoid, with ridge on medial face; ischium wider than long; merus as wide as ischium, slightly produced posterodistally; carpus expanded posteroproximally, weakly tapering distally; propodus subequal to carpus, narrow, with especially long setae anteromarginally; dactylus stout.

Pereopod 6 (Fig. 5d) much longer than preceding pereopods; coxa bilobed, anterior lobe short and narrow, posterior lobe half the length of basis, partially hidden by basis; basis ovoid, much narrower than that of male; ischium with posteromarginal notch; merus slightly expanded distally and convex posteromarginally; carpus longer and narrower than merus, subrectangular; propodus very narrow, 125% of merus length, dactylus narrow with setae on inner curvature.

Pereopod 7 (Fig. 5b) subequal to pereopod 6; coxa rounded posteriorly and oblique anteriorly; basis convexly rounded antero- and posteromarginally, remaining articles as for pereopod 6.

**Remarks:** This species was named by Stebbing (1922) for the collector of the type material, Mr Skook, whose collection is deposited in the Natural History Museum of Göteborg (Sweden). The type material appears to be lost, it is not in Göteborg, Stockholm or London. A neotype has therefore been designated. As the animals studied herein conform fairly well to Stebbing's description and the type locality is located only 180 km to the north it is very probable that these populations are part of one species. However, there are a few differences between Stebbing's specimens and the redescribed material: 1) Stebbing does not mention the dorsal protuberances of large mature males in the material studied herein; 2) the posteromarginal proximal process of the male gnathopod 2 is blunt in Stebbing's material vs pointed and slightly curved apically; 3) the eyes are contiguous in Stebbing's material vs widely separate.

***Talorchestia quadrispinosa* K.H. Barnard, 1916****Figs. 7-11**

**Material examined:** 1 male, 1 juvenile, 21°38'38"S 13°55'17"E, 24.III.98; 1 male 26°44'09"S 15°05'40"E, 27.III.98, leg. M. and B. Uhlig; ZMB 27 316.

**Description of male:** Head with inconspicuous rostrum (Fig. 7a); eyes round. Pereonite 1 and 2 subequal; pereonites 3-5 longer; pereonites 6-7 and pleonite 1 longest; posteroventral corners of pereonite 1-4 rounded, those of pereonites 5 and 6 produced. Posteroventral corner of pleonites acutely drawn out. Pairs of dorsal teeth on pleon segments 1 and 2, shorter ones on pleonite 3 (Fig. 7a). Urosomite 1 longest with posteroventral process for uropod 1, urosomite 2 shortest with similar process for uropod; urosomite 3 expanded ventrally.

Antenna 1 (Fig. 7b) reaching distal margin of 4<sup>th</sup> article of antenna 2; peduncle article 1 as wide as long, articles 1-3 combined longer than flagellum, which consists of 5 articles.

Antenna 2 (Fig. 7c, d) peduncle longer than flagellum, article 5 of peduncle longest; flagellum consisting of 18 articles (Fig. 7c).

Upper lip (labrum) (Fig. 8a) wider than long, entire and rounded distally with hair-like marginal setae.

Mandible (Fig. 9d) stout, incisor 7-dentate, setal row with 4 stout plumose setae; lacinia mobilis multi-dentate; pars molaris triturative with one long seta.

Lower lip (hypopharynx) (Fig. 8d) with wide lobes and tapering hypopharyngeal processes.

Maxilla 1 (Fig. 9a) inner plate with 2 stout apical plumose setae; outer plate with 9 medially serrate setae; palp vestigial, uniaarticulate.

Maxilla 2 (Fig. 7e): inner plate narrower with oblique and rounded distal margin, 1 stout, long, plumose seta medially; outer plate rounded distally, setae especially long on apex.

Maxillipeds (Fig. 8b, c, f): coxa and basis with stout setae on posterior face; inner plates apically rounded with nodular setae and plumose setae on apical and medial margin and submarginally on posterior face; outer plate somewhat exceeding distal margin of 1<sup>st</sup> palp article; palp article 1 widest, article 2 mediolaterally lobate; article 3 about the length of article 2, but narrower; article 4 present, but strongly reduced in length.

Pereopod 1 (Fig. 11a) coxa with straight anterior and posterior margins and oblique distal margins; basis with straight anterior margin and weakly convex posterior margin, expanded distally; ischium wider

than long; merus and carpus connected by transverse margins; carpus expanded distally; propodus inserted on anterior distal region of carpus resulting in a carpal palm, convex anterior and excavate posterior margins, distal margin with short palm; dactylus slender with long nail.

Pereopod 2 (Fig. 8e) coxa longer than wide with short process on posterior margin and rounded apex; basis longest, slightly expanded distally with convex posterior and straight anterior margin; ischium subquadrate; ischium and merus forming basis for the massive propodus; anterior margin of propodus convex, posterior margin with inconspicuous basal protrusions, excavation on distal third, accompanied by rounded lobe; dactylus slender and falcate, as long as dactylus.

Pereopod 3 (Fig. 10c) coxa longer than wide, similar to coxa 2; basis longest, slightly expanded distally with convex posterior and straight anterior margin; ischium with shorter anterior than posterior margin; merus weakly expanded distally, oblique distal margin; carpus 67% of merus; propodus slender, 125% of carpus; dactylus slender with long nail.

Pereopod 4 (Fig. 9c) shortest; coxa subquadrate with short process posteromarginally; basis longest, slightly expanded distally with convex posterior and convex anterior margin; ischium with shorter anterior than posterior margin; merus weakly expanded distally, oblique distal margin; carpus 60% of merus; propodus slender, 150% of carpus; dactylus wide with excavation on inner curvature.

Pereopod 5 (Fig. 10a) rather short; coxa bilobed, about twice as wide as long, anterior lobe longer and wider than the posterior; basis ovoid with distal excavation; ischium wider than long, straight anteriorly, rounded posteromarginally; merus weakly expanded distally, straight anteromarginally, convex posteromarginally; carpus 115% of merus length; merus and carpus with especially long spine-like setae; propodus very slender, less than half width of carpus; dactylus straight.

Pereopod 6 (Fig. 9b) longest; coxa with short anterior lobe, half the length of posterior lobe, which is partially covered by basis; which is considerably enlarged and expanded posteriorly; ischium as wide as long with straight anterior margin and convex posteriorly; merus weakly expanded, straight anterior and convex posterior margin, 71% of carpus length; carpus subrectangular, approx. 67% of propodus; propodus slender and elongate, slightly curved anteriorly; dactylus straight with row of setae on anterior margin.

Pereopod 7 (Fig. 10) coxa smallest, wider than long, with rounded ventral margin; basis smaller than on pereopod 6; ischium to propodus of similar shape to pereopod 6, but shorter; dactylus straight with row of setae on anterior margin.

Uropod 1 (Fig. 11c) peduncle longer than rami; inner ramus slightly shortened.

Uropod 2 (Fig. 11d) peduncle shorter than rami, which are subequal.

Uropod 3 (Fig. 11e) peduncle slightly longer than wide; ramus distally oblique.

Telson weakly emarginate with spine-like setae (Fig. 11f).

**Remarks:** Not much is known about this species. Barnard (1916) illustrated only 4 small details from the appendages in his original description, and added a few details later (Barnard, 1935-40). Griffiths (1976) presented drawings of the gnathopods, which show that there is some variability in the shape and proportions of the illustrated articles, especially the shape of the gnathopod 2 dactylus which varies from sickle-shaped to rather straight. In the redescribed specimen this article is relatively longer than in Barnard's and Griffiths' material, almost reaching the proximal corner of the palm.

***Talorchestia tricornuta* Shoemaker, 1920**  
**Figs. 12-17**

**Material examined:** 1 male, 10 mm; 1 ovigerous female, 10 mm, Landana (Congo), on the beach, Darteville leg.; ZMB 25 061.

**Description of male:** Head with short rostrum and circular large eyes. Pereonite 2 and 3 subequal; pereonites 4-5 longer; pereonites 6-7 and pleonite 1 longest; posteroventral corners of pereonite 1-4 rounded, those pereonites 5-7 produced. Posteroventral corner of pleonites 2-3 angular. Dorsal pair of processes on pleon segments 2 and forward curved dorsal tooth on pleonite 3 (Fig. 12b). Urosomite 1 longest with posteroventral process forming a stalk for uropod 1, urosomite 2 shortest; urosomite 3 expanded ventrally.

Antenna 1 (Fig. 14b) not exceeding distal margin of 4<sup>th</sup> peduncular article of antenna 2; peduncular articles increasing in length successively, decreasing in width; 4 flagellar articles.

Antenna 2 (Fig. 12e) peduncular article 5 more than twice as long as 4; 16 flagellar articles.

Labrum (Fig. 12g) wider than long; rounded distally with hair-like marginal setae.

Mandible (Fig. 14d) stout, incisor multi-dentate, setal row with stout plumose setae; lacinia mobilis multi-dentate; pars molaris triturative with one long seta.

Lower lip (hypopharynx) with wide lobes and tapering hypopharyngeal processes.

Maxilla 1 (Fig. 12e) inner plate with 2 stout apical plumose setae; outer plate with 9 medially serrate setae; palp vestigial, uni-articulate.

Maxilla 2 (Fig. 12d, f): inner plate narrower with oblique and rounded distal margin, 1 stout, long, plumose seta medially; outer plate rounded distally, setae especially long on apex.

Maxillipeds (Fig. 12c): coxa and basis with stout setae on posterior face; inner plates apically truncate with 3 nodular setae and plumose setae on apical and medial margin and submarginally on posterior face; outer plate somewhat exceeding distal margin of 1<sup>st</sup> palp article; palp article 1 widest, article 2 mediolaterally lobately produced; article 3 about the length of article 2, but narrower; article 4 vestigial.

Pereopod 1 (Fig. 13a) coxa with straight anterior and posterior and oblique distal margins; basis with straight anterior margin and weakly convex posterior margin, somewhat expanded distally; ischium longer than wide; merus and carpus connected by transverse margins; carpus with narrow rounded lobe posterodistally; propodus with convex anterior and excavate posterior margins, distally expanded, resulting in a short palm; dactylus slightly curved, slender with long nail.

Pereopod 2 (Fig. 14b) slightly wider than long, with short posteromarginal process; basis with straight anterior margin and weakly convex posterior margin, slightly expanded distally; ischium wider than long, subequal to merus; carpus very short; propodus massive with convex anterior margin, posterior margin with 2 basal slightly downward curved processes and another process on proximal third, stout spine-like setae on distal half, dactylus falcate, elongate, surpassing proximal pairs of processes reaching ischium.

Pereopod 3 (Fig. 16c) coxa subquadrate with small posteromarginal process; basis with straight anterior margin and weakly convex posterior margin, slightly expanded distally; ischium longer than wide; carpus with oblique distal margin, 125% of carpus length; carpus with pointed apical margin; propodus slender, slightly shorter than merus; dactylus slightly curved with few setae on inner curvature.

Pereopod 4 (Fig. 15c) coxa oblique, posterior margin longer than anterior one with short pointed process; basis with straight anterior margin and weakly

convex posterior margin, slightly expanded distally; ischium longer than wide, slightly curved anteriorly; merus with convex anterior margin, rather straight posterior margin and oblique distally; carpus 78% of merus, weakly tapering distally; propodus slender, about the length of merus; dactylus with rounded lobe on inner curvature (see detail of Fig. 15c).

Pereopod 5 (Fig. 15b) coxa bilobed, about twice as wide as long, anterior lobe subequal to posterior one; basis circular with shallow distal excavation; ischium wider than long, straight anteriorly, rounded posteromarginally; merus weakly expanded distally, straight anteromarginally, convex posteromarginally; carpus 190% of merus length; posterior margin of carpus with especially long spine-like setae; propodus very slender, less than half the width of carpus; dactylus weakly curved with few setae on anterior margin.

Pereopod 6 (Fig. 16a) longest; coxa bilobed, anterior lobe narrow and slightly shorter than posterior, which is partially hidden by basis; posterior margin of basis immensely expanded; ischium longer than wide; merus elongate, more than 3x as long as ischium, weakly expanded distally; carpus 111% of merus; propodus slender, 158% of merus, slightly curved anteriorly; dactylus slender with row of small setae on inner curvature.

Pereopod 7 (Fig. 17a) coxa wider than long, rounded distally; basis ovoid; ischium with straight anterior and sinuous posterior margin; merus and carpus similar in shape of those of pereopod 6, but shorter; propodus straight, 160% of merus; dactylus weakly curved with row of setae on inner curvature.

Uropod 1 (Fig. 13 e) peduncle longer than rami; rami with long spine-like setae terminally.

Uropod 2 (Fig. 14e) peduncle only slightly long than rami; those subequal in length.

Uropod 3 (Fig. 14c) with only one ramus, subequal to peduncle.

Telson (Fig. 14d) tapering distally, emarginate.

**Description of female:** Female much smaller than male. Dorsal face of pleonites smooth.

Pereopod 1 (Fig. 13c) coxa with oblique distal margin; basis expanded distally, with convex posterior margin; ischium with shorter anterior margin compared with the posterior; merus and carpus connected by transverse articulation; carpus with convex anterior margin, posterior margin with long spine-like setae; propodus tapering distally, slightly curved posteriorly; dactylus normal.

Pereopod 2 (Fig. 14a) coxa longer than wide with rounded apex; both margins of basis slightly convex;

ischium longer than wide, posterior margin convex; merus subequal to ischium; carpus with convex anterior margin and lobate posteriorly, distally rounded; propodus with straight anterior and strongly convex posterior margin, tapering distally with rounded apex; scale-like dactylus inserted subterminally on distal third of anterior margin.

Pereopod 3 (Fig. 17c) coxa longer than wide with rounded apex; basis subrectangular; ischium with shorter anterior margin compared to posterior one; merus expanded distally with oblique distal margin; carpus 83% of merus; propodus slender, 87% of merus length; dactylus slender.

Pereopod 4 (Fig. 16d) coxa rounded distally, posterior margin oblique with small subacute process; basis subrectangular; ischium to dactylus similar in shape to pereopod 3, but shorter.

Pereopod 5 (Fig. 15a) short and bulky; coxa bilobed, posterior lobe longer than anterior one; basis with strongly convex posterior and weakly convex anterior margins, distally slightly excavate; ischium wider than long; merus as wide as ischium, roundly produced posterodistally; carpus narrower than merus, with especially long, stout setae on anterior margin; propodus about half the width of carpus; dactylus short and stout.

Pereopod 6 (Fig. 17b) longest; coxa bilobed, anterior lobe very small, posterior lobe rounded and partially hidden by basis; basis ovoid; ischium normal; merus expanded distally, posterior margin convex and posterodistal angle produced; carpus subrectangular with some especially stout, long setae posterodistally; propodus slender subrectangular; dactylus normal.

Pereopod 7 (Fig. 16a) shorter than pereopod 6; coxa rounded distally; basis almost circular; merus to propodus as for pereopod 6, but all articles shorter.

**Remarks:** These redecribed specimens match very well with Shoemaker's description (1920), except for the male having 9 vs 5 robust setae on the distal palmar margin of gnathopod 2.

### *Talorchestia capensis* (Dana, 1853)

**Records:** 2 males, 3 females, 7 juveniles, 30°19.0'S 17°16.4'E, 2. IV.98, N. Cape, Hondekliip; 2 males, 3 females, 1 juvenile, 29°17.2'S 16°52.0'E, 1.IV.98, N. Cape, Port Nolloth; 1 male, 5 females, 4 juveniles, 34°20.2'S 18°20.9'E, 10.IV.98, Olifantsbaai, Cape of Good Hope; 1 male, 7 females, 5 juveniles; 34°20.8'S 18°29.9'E, 10.IV.98, Bordjiesrif, Cape of Good Hope; leg. M. and B. Uhlig; ZMB 27 317.

***Talorchestia australis* K.H. Barnard, 1916**

**Records:** 1 male, 34°23.0'S 21°25.4'E, 7.IV.98, Stil Bay, W. Cape; 1 male, 4 females, 2 juveniles, 34°08.6'S 18°51.0'E, 10.IV.98, W. Cape, Gordon's Bay; leg. M. and B. Uhlig; ZMB 27318.

**Isopoda, Oniscidea****Ligiidae Brandt & Ratzeburg, 1831*****Ligia dilatata* Brandt, 1833**

**Record:** 3 males, 1 ovigerous female, 1 female, max. 23 mm, Republic South Africa 34°20.8'S 18°29.9'E West Cape, Cape of Good Hope NR, Bordjesrif, sandy and rocky Atlantic beach, under kelp, leg. M. and B. Uhlig, 10.04.1998. ZMB 27 329.

***Ligia natalensis* Collinge, 1920**

**Records:** 6 males, 6 females, 4 mm., max. 19 mm, Republic South Africa, 33°57.9'S 18°22.4'E Western Cape, Cape Town, Klein-Koeelbaai, rocky and sandy Atlantic beach, under kelp, leg. M. and B. Uhlig, 10.04.1998; 2 male, 3 females, 8 imm., Republic South Africa, 33°08.9'S 18°00.1'E Western Cape, West Coast NR, Tsaarsbank, rocky and sandy Atlantic beach, under kelp, leg. M. and B. Uhlig, 04.04.1998; 1 female, Republic South Africa, 32°05'S 18°16'E, Western Cape, Lambert's Bay, sandy and rocky Atlantic beach, under kelp, leg. M. and B. Uhlig, 03.04.1998; 1 male, 1 female, 2 imm., Republic South Africa, 34°01.4'S 23°53.3'E, Western Cape, Struis Bay, sandy Indian Ocean beach, under kelp, leg. M. and B. Uhlig, 09.04.1998. ZMB 27 322, 27 323, 27 330.

**Tylidae Milne Edwards, 1840*****Tylos granulatus* Krauss, 1843**

**Records:** 2 males, 3 females, Namibia, 26°33'53" S 15°10'35"E, Lüderitz, Agat Beach North, sandy Atlantic beach, under kelp, leg. M. and B. Uhlig, 27.-28.03.1998; 1 female, Namibia, 19°21'50"S 12°42'58"E, Skeleton Coast Park, Möwe Bay, stony and sandy Atlantic beach, under debris, leg. M. and B. Uhlig, 22.03.1998. ZMB 27 333.

**Scyphacidae Dana, 1852*****Deto echinata* Guérin, 1836****Figs. 18-22**

**Synonymy:** ? *Deto whitei* Kinahan after Chilton (1915)

*Deto armata* Budde-Lund after Panning (1924)

*Deto acinosa* sensu Chilton, 1915 after Barnard (1932)

**Material examined:** 1 male (12.4 x 6.8 mm) Lectotype, ZMB 11426, St. Paul, Indischer Ozean, leg. Deutsche Südpolar-Expedition, 26.04.1903; 1 male (10.9 x 5.3 mm), 2 females with marsupium (10.5 x 5.7 mm, 10.3 x 5.3 mm), 2 females (10.2 x 4.9 mm, 11.5 x 5.9 mm) Paratype, same data as lectotype.

**Additional material:** 1 male (14.3 x 6.8 mm), 1 female (12.8 x 5.5 mm), 1 immature (ca. 7 mm), ZMB uncataloged, Seapoint near Cape Town, leg. Deutsche Tiefsee-Expedition, 11.11.1898; 1 male (16 x 9.2 mm) ZMB 7560, Seapoint near Cape Town, leg. Hendorf; 3 males (17.5 X 7.6 mm, 12 x 5.8 mm, 11.7 x 6 mm), 1 female with marsupium (10.3 x 5.0 mm), 1 female (12.2 x 5.5 mm) ZMB 16613, Neu Amsterdam, leg. Deutsche Südpolar-Expedition, 27.04.1903; 2 males (2.3 mm, 2.4 mm), additional 3 males, 7 females, 1 immature, Republic South Africa, 32°05'S 18°16'E, Western Cape, Lambert's Bay, sandy and rocky Atlantic beach, under kelp, leg. M. and B. Uhlig, 03.04.1998; 1 male 6 females 1 ovigerous female, Namibia, 26°33'53" S 15°10'35"E, Lüderitz, Agat Beach, sandy Atlantic beach, under kelp, leg. M. and B. Uhlig, 27.03.1998; 1 female, 1 immature, Republic South Africa, 33°57.9'S 18°22.4'E Western Cape, Cape Town, Klein-Koeelbaai, rocky and sandy Atlantic beach, under kelp, leg. M. and B. Uhlig, 10.04.1998; 1 male, 2 females, 5 immature, Republic South Africa, 33°08.9'S 18°00.1'E Western Cape, West Coast NR, Tsaarsbank, rocky and sandy Atlantic beach, under kelp, leg. M. and B. Uhlig, 04.04.1998; 1 male, 9 females, 5 imm., Namibia, 20°00'05"S 13°02'06"E, Skeleton Coast Park, Terrace Bay, pebble Atlantic beach, under debris, leg. M. and B. Uhlig, 23.03.1998. ZMB 27 319, 27 321, 27 324, 27 326.

Maximal length: male 30 x 13 mm, female 22 x 9 mm (after Barnard 1932).

**Description:** colour: dorsally dark brown with inconspicuous lighter patches, cephalothorax of same colour, ventral surface and appendages light brown.

Cephalothorax: Linea supra-antennalis and linea frontalis lacking, lateral lobes formed by line running

from antennal sockets laterally and caudally, ending ventrally of compound eyes, lamina frontalis present, compound eyes consisting of about 18 ommatidia, vertex arched, bearing a medial transverse carina, two infraocular tubercles and several smaller tubercles (Fig. 18f).

Pereon: Tegument slightly granulate, tricorn-like setae plentiful, every pereonite bearing a paralateral pair of coniform protuberances, length up to breadth of coxal plates. Coxal plates without gland pores, sulcus marginalis and noduli laterales flagelliform (Fig. 18e).

Pleon: As broad as pereon, neopleurae of pleonites 3 to 5 prominent, continuing outline of body, sometimes pleonite 4 and/or 3 with coniform protrusions similar to pereonites, pleotelson with rounded apex, laterally slightly sinuous, bearing tricorn-like setae.

#### Appendages:

Antennula 3-articulate, slender with distal article bearing medial row of pairs of aesthetascs medially and two aesthetascs apically (Fig. 18c).

Antenna: length ratio of peduncular articles 1 to 5 1: 2: 2: 4: 5, flagellum four-articulate with the more distal articles the shorter in length, distal article slightly small, with prominent bundle of sensilla forming the apical organ (Fig. 18d).

Mandible: molar penicil composed of about 14 to 17 plumose branches, pars intermedia with two penicils on left and one on right mandible, additional plumose seta more proximally (Fig. 19a, b).

Maxillula: medial endite with two pointed penicils, subapical tip medially, lateral endite with apically 5+7 teeth, slender stalk inserted in outer group, hyaline lobe present (Fig. 19d).

Maxilla: lateral and medial lobe subequal in breadth, both covered with trichiform setae, medial endite bearing some cusps apically (Fig. 19c).

Maxilliped: basipodite without sulcus lateralis covered with ribbon-shaped cuticular scales, palp with two setae on proximal article, three prominent setal tufts on distal articles, endite with teeth caudally, prominent penicil rostrally, both sides densely covered with setae (Fig. 19e).

Pereopods rather slender (Fig. 20a-c, h, Fig. 21a, d, e), carpus of pereopod 1 cylindrical, with small antenna-grooming brush and slightly serrate ornamental sensory spine (Fig. 20e), propodus 1 with prominent antenna grooming brush, dactylus with short inner claw and bifid dactylar seta (Fig. 20d). Basis of pereopod 7 with longitudinal row of scales of water conducting system. Row of small sensory spines of merus and carpus of all pereopods similar to ornamental spine (Fig. 20f, g)

Sexual differentiation: pereopods 2 to 4 merus with medio-proximal field of trichiform cuticular scales (Fig. 20a-c).

Pleopod exopodites rounded with sinuous lateral margin, margins with prominent plumose setae (Fig. 22a, c-f).

Sexual differentiation: male pleopod exopodite ovate, endopodite with parallel margins, about three times longer than exopodite, apex obtusely bent laterally, caudal surface with longitudinal row of with hyaline scales, caudal row of distal third, inconspicuous (Fig. 22c). Pleopod 2 exopodite similar to those of following pleopods, endopodite flagelliform, almost four times longer than exopodite, apically incurved (Fig. 22f), pleopod 5 exopodite with medial guide slot on caudal surface (Fig. 22d).

Protopodite of uropod broad triangular, endopodite inserting more proximally than exopodite, both densely covered with tricorn-like setae (Fig. 21h).

Genital papilla long and slender, apically acute with small orifices, no ventral shield (Fig. 22b).

**Remarks:** Budde-Lund (1906) described a species of this genus from Auckland Island, off New Zealand which he called *Deto armata*. It was synonymized by Panning (1924) with *Deto echinata*. As evidenced from the original description of the former entity this synonymy is probable, although the distribution of *D. echinata* is restricted to southern Africa and the question arises whether the record from Auckland Island may be correct. Unfortunately, the syntypes of *D. armata* which had been deposited in the Dresden Museum für Naturkunde were destroyed during World War II.

*Deto echinata* is among the biggest species of Oniscidea measuring up to 30 mm (Barnard 1932). There is considerable variation in the length and number of dorsal protuberances. In the material collected by Dr Uhlig, their length is correlated with the total body length of the specimen. The material of the Deutschen Südpolar-Expedition contains a male with smaller protuberances on the pleonites 4 and 5 and one bearing them on pleonite 3 to 5. This is in congruence with the description of *D. armata*. The dorsal protrusions are sex specific, only males bearing them. Females are slightly smaller than the males.

The apical organ is typical of the family Scyphacidae: the sensilla are short and are not covered by a cuticular sheath, the organ is located on a small fourth article. These characters are plesiomorphic in relation to the ground plan of the genus; similar plesiomorphic characters are the longitudinal row of



cuticular scales which are part of the open water-conducting system.

### Philosciidae Vandel, 1952

#### *Nahia hirsuta* (Budde-Lund, 1906)

**Records:** 1 male, 1 female, Republic South Africa, 34°27.2'S 20°24.2'E, Western Cape: De Hoop NR, De Hoop Vlei, *Phragmites* sievings, leg. M. and R. Uhlig, 7.04.1998; 1 male, 1 ovigerous female, 7 imm., Republic South Africa, 34°27.2'S 20°24.2'E, Western Cape: De Hoop NR, De Hoop Vlei, *Phragmites* sievings, leg. M. and R. Uhlig, 9.11.1997; 1 male, 1 female, 4 imm., Republic South Africa, 34°27.2'S 20°24.2'E, Western Cape: De Hoop NR, De Hoop Vlei, *Phragmites* sievings, leg. M. and R. Uhlig, 9.11.1997; 11 males, 21 ovigerous females, 4 females, 4 imm., Republic South Africa, 34°27.2'S 20°24.2'E, Western Cape: De Hoop NR, De Hoop Vlei, *Carex* sievings, leg. M. Uhlig, 10.11.1997; 7 males, 6 females, 9 ovigerous females, 2 imm., Republic South Africa, 34°22.8'S 20°19.5'E, Cape Province, Potteberg, river banks, *Phragmites* sievings, leg. M. and R. Uhlig, 11.11.1997; 1 male, Republic South Africa, Western Cape, West Coast NP, Langebaan Lagoon, stagnant water pool edge, leg. M. and R. Uhlig, 4.4.1998. ZMB 27 334.

Maximal length: 10.5mm

**Remarks:** There were many ovigerous females in the collections of M. and B. Uhlig indicating that the reproductive period lasts at least from October to May.

The species was originally described as belonging to the genus *Philoscia* Latreille, 1804 by Budde-Lund (1906). Later in a study on East African Isopoda, he transferred it to the new monotypic genus *Nahia* (Budde-Lund, 1908). The genus is close to other African Philosciidae but differs considerably by the absence of a second nodulus lateralis on coxal plate VII; the prominent compound eyes are a plesiomorphic character. Ferrara & Taiti (1985) reviewed on the synonymy of this species, which they recorded frequently in the Cape Province.

### Trachelipodidae Stouhal, 1953

#### *Phalaba dorkai* Ferrara, 1974

**Records:** 1 male 10.5mm, Republic South Africa; 33°58'S 20°26'E, Cape Province, Marloth NR, Duiwelsbos, mountain rivulet, leaf litter and moss sievings, leg. M. Uhlig, 13.11.1997. ZMB 27 331.

### Armadillidae Brandt & Ratzeburg, 1831

#### *Diploexochus* species

**Records:** 1 female, Republic South Africa, 34°27.2'S 20°24.2'E, Western Cape: De Hoop NR, De Hoop Vlei, *Phragmites* sievings, leg. M. and R. Uhlig, 7.04.1998

#### *Venezillo flavescens* (Brandt, 1833)

**Records:** 1 male, 1 female max. 5mm, Republic South Africa; 33°52'S 20°26'E, Cape Province, Marloth NR, Duiwelsbos, mountain rivulet, leaf litter and moss sievings, leg. M. Uhlig, 13.11.1997; ZMB 27 332.

#### *Venezillo nebulosus* (Barnard, 1932)

**Records:** 6 males, 6 females, 1 ovigerous female, 2 imm., max. 5.5mm, Republic South Africa; 32°19.2'S 22°30.6'E, Cape Province, Karoo NP, permanent spring: bottom of Pienaars pass, shore sievings: grass and leaf litter, leg. Uhlig and Ndamane, 16.11.1997; ZMB 27 324.

### Discussion

During the determination of the amphipod material the problem of distinguishing between the genera *Talorchestia* and *Orchestoidea* became evident. In J.L. Barnard (1969) the diagnoses of these genera are indistinguishable. Bousfield & Klawe (1963) pointed out many shared features of "*Talorchestia*" *brito* Stebbing and *Orchestoidea brasiliensis* Dana "indicating that presently accepted generic criteria have outlived their usefulness." The proposal of Bousfield (1982, 1984) to solve the problem by introducing new genera into the Talitridae, and Bousfield's (1982) proposed splitting of *Talorchestia* is in the opinion of the authors not helpful to clear up this issue. The definition of the genus *Talorchestia* s. str. according to Morino & Miyamoto (1988) is limited to the *spinipalma*-complex which consists of only 4 of the about 50 described *Talorchestia* species. So for the time being the authors have decided to leave the amphipod species redescribed herein within the genus *Talorchestia* in order not to add to the confusion by assigning species to inadequately defined superspecific taxa. A future phylogenetic study of talitrid amphipods will give morphological (or biochemical) arguments for defining superspecific taxa on the basis of monophyletic groups. This could result in putting together certain superspecific taxa into more

manageable groups. A candidate for such an amalgamation could, for example, be *Talorchestia* and *Orchestoidea*. Bousfield's use of biogeographical patterns to support classification is interesting, but will show its full potential only when applied to a cladogram.

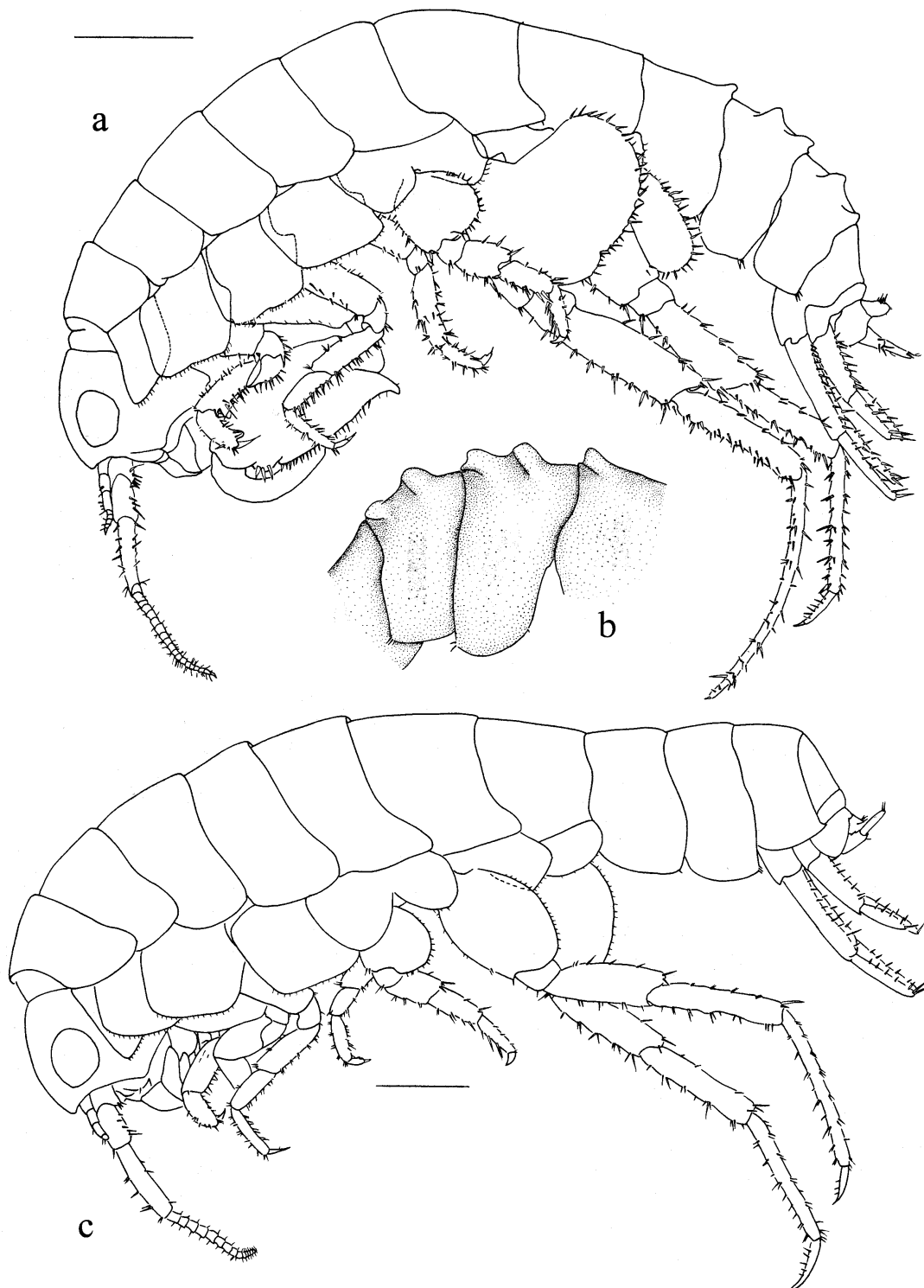
## Acknowledgements

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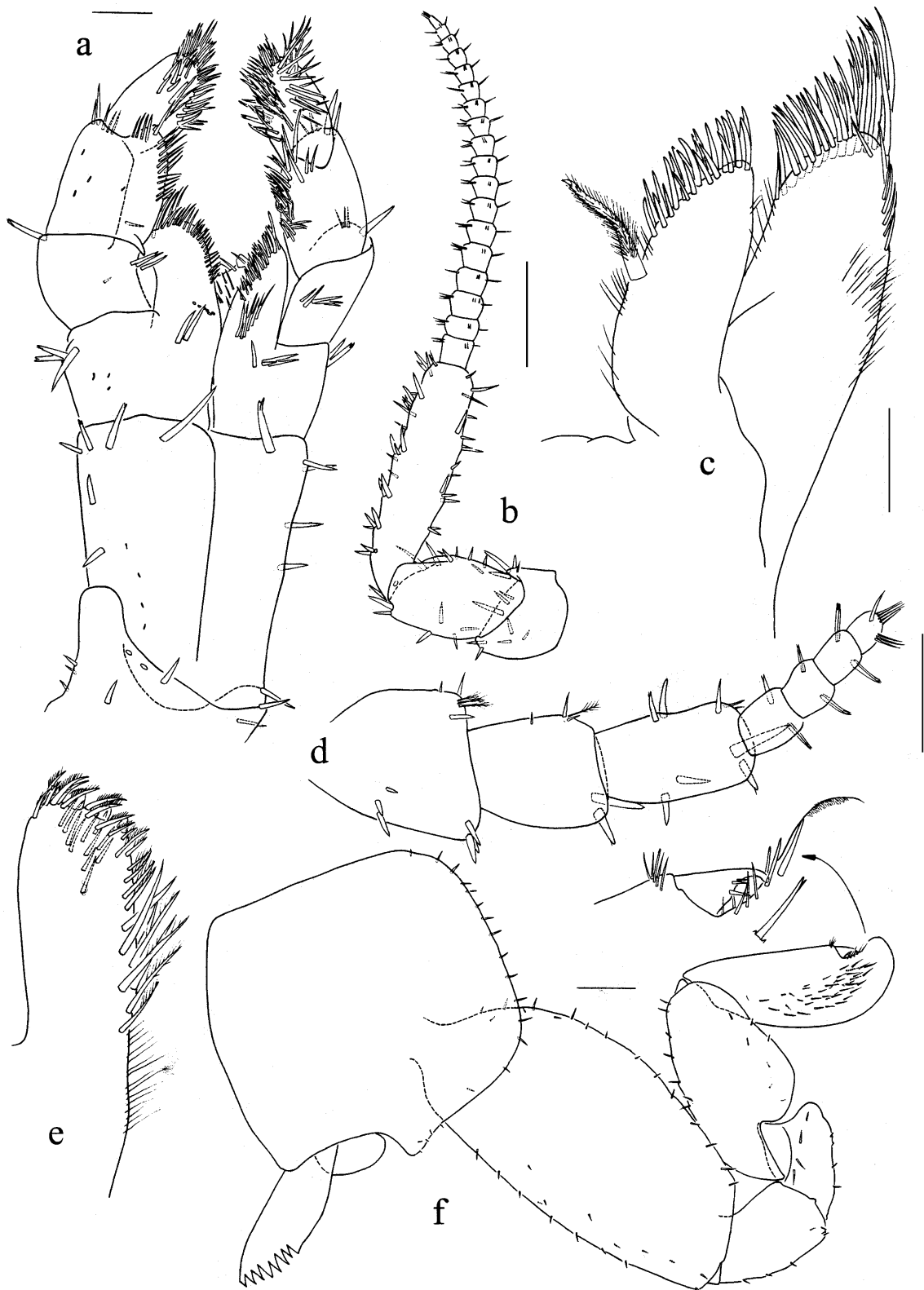
We would like to thank Ms Ulrike Bardeleben for the pencil drawing of some details. Many thanks also to Ms I. Kiliyas for her help in obtaining literature.

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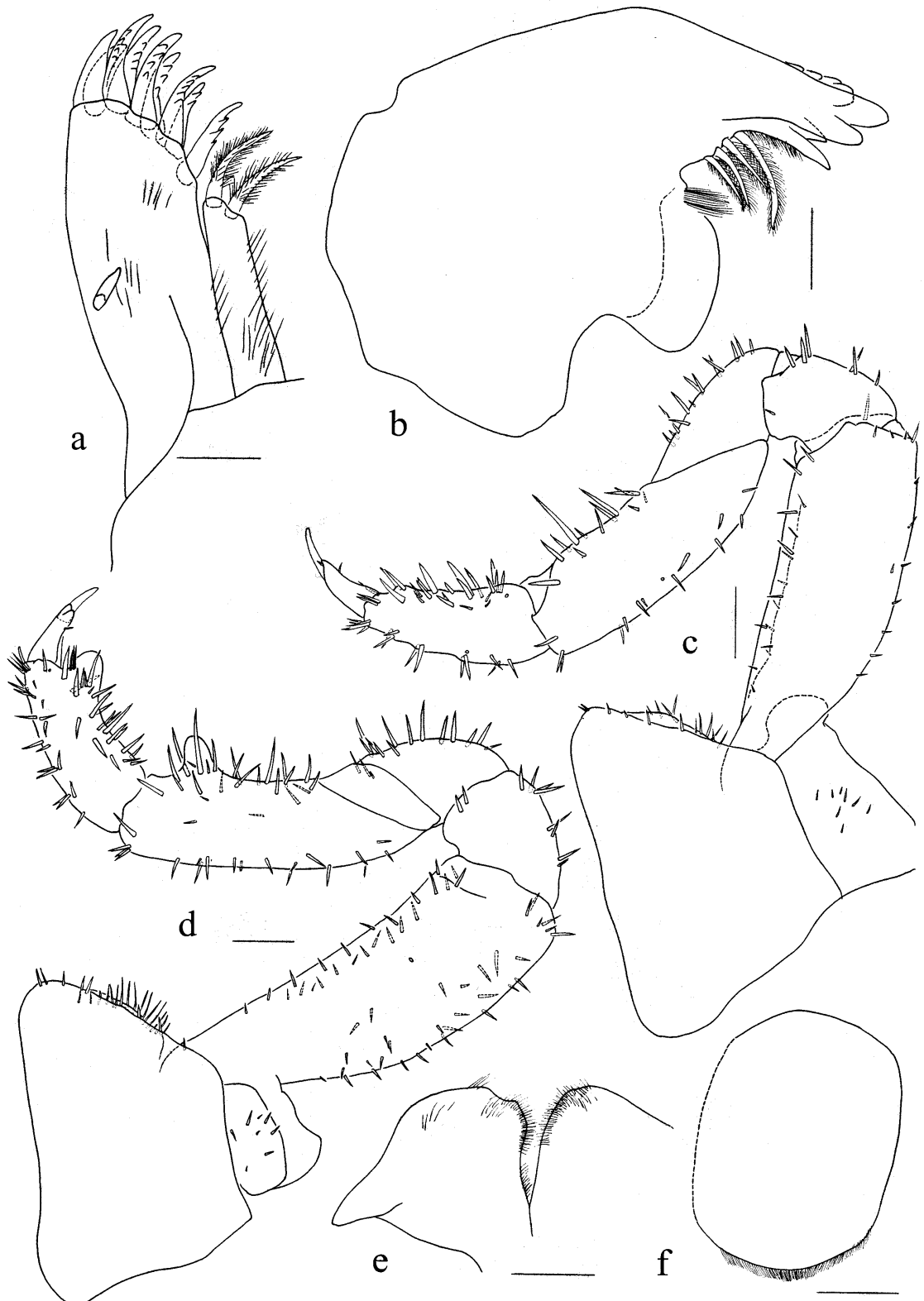
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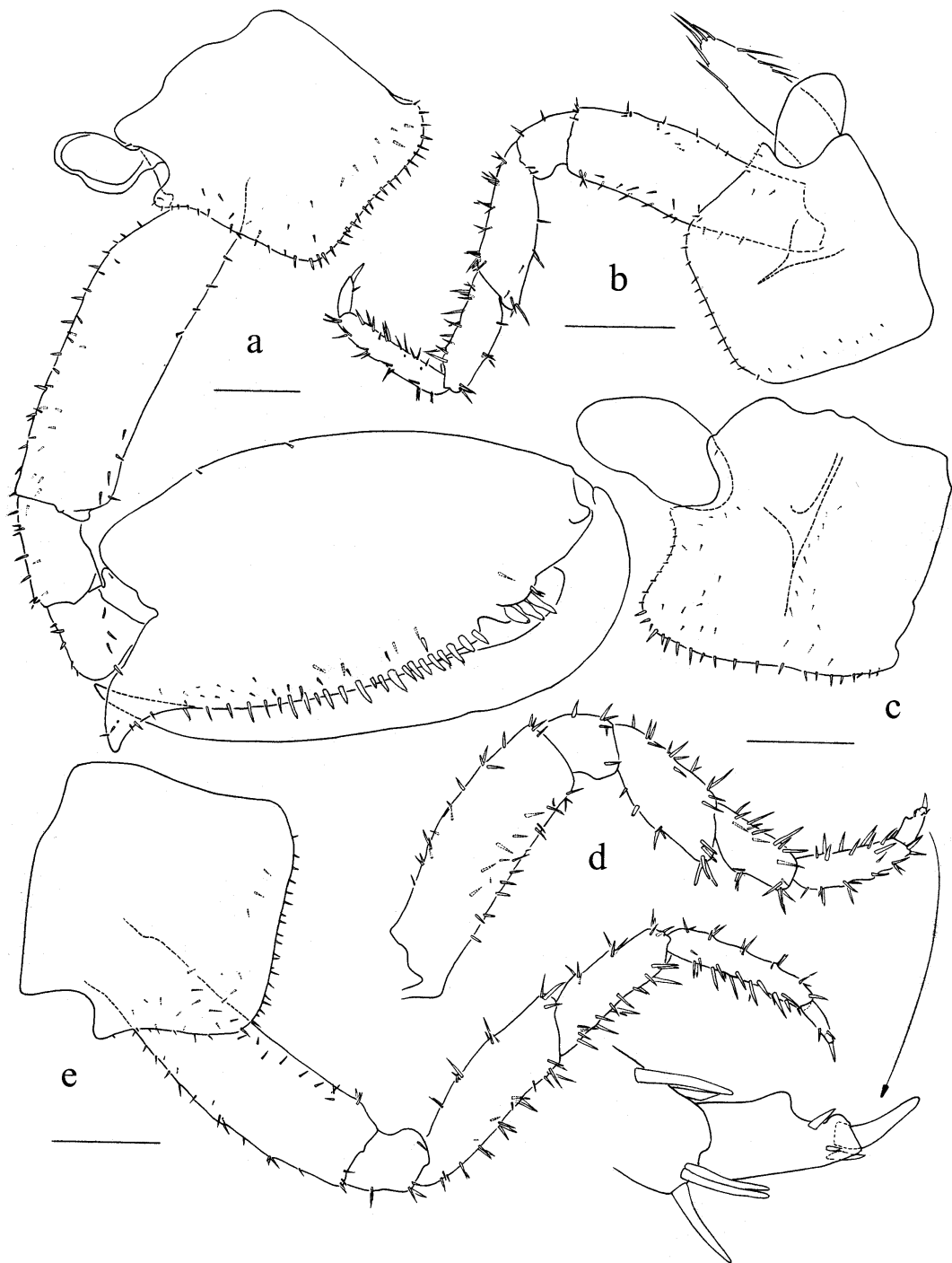
**Fig. 1a-c.** *Talorchestia skoogi*. a: habitus of male neotype, left aspect; b: dorsal armature of pleonites 1-3 of male neotype, dorsolateral aspect, pleonite 1 on the right, pleonite 3 on the left; c: habitus of female neallotype, left aspect. Scale bars: a: 3 mm, c: 1 mm.



**Fig. 2a-f.** *Talorchestia skoogi* Stebbing, 1922. a: maxillipeds, posterior aspect; b: antenna 2; c: maxilla 2; d: antenna 1; e: inner plate of maxillipeds; f: pereopod 2, female. Scale bars: a, c: 100  $\mu$ m; d, f: 200  $\mu$ m; b: 500  $\mu$ m.



**Fig. 3a-f:** *Talorchestia skoogi* Stebbing, 1922. a: maxilla 1; b: mandible; c: pereopod 1, female; d: pereopod 1, male; e: lower lip (hypopharynx); f: labrum. Scale bars: a, b: 100  $\mu$ m; c-f: 200  $\mu$ m.



**Fig. 4a-e.** *Talorchestia skoogi* Stebbing, 1922. a: pereopod 2, male; b: pereopod 3, female; c: coxa of pereopod 4, male; d: basis to dactylus of pereopod 4, male; e: pereopod 3, male. Scale bars: a: 200  $\mu$ m, b-e: 500  $\mu$ m.

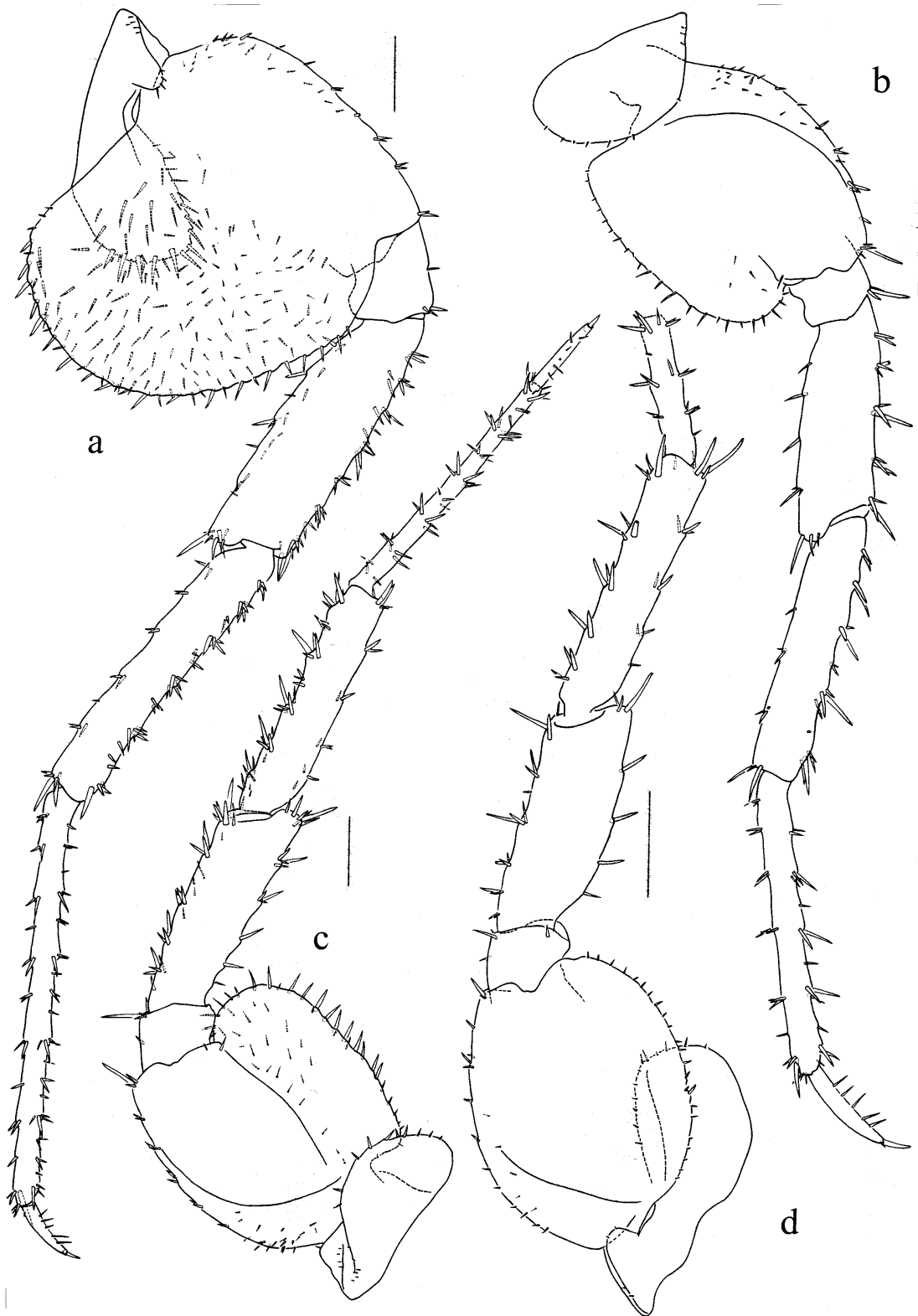


Fig. 5a-d. *Talorchestia skoogi* Stebbing, 1922. a: pereopod 6, male; b: pereopod 7, female; c: pereopod 7, male; d: pereopod 6, female. Scale bars: a-c: 500  $\mu$ m.

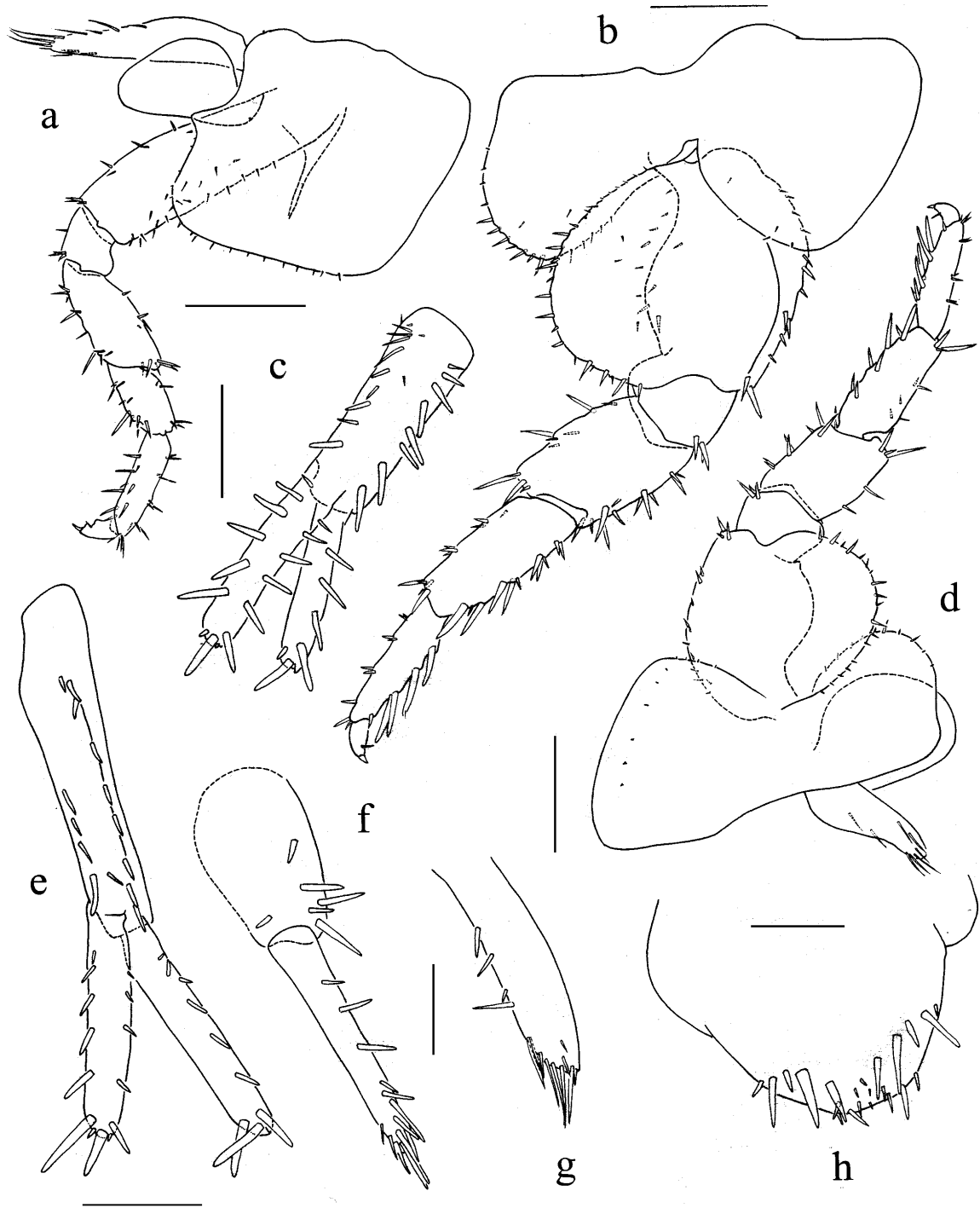
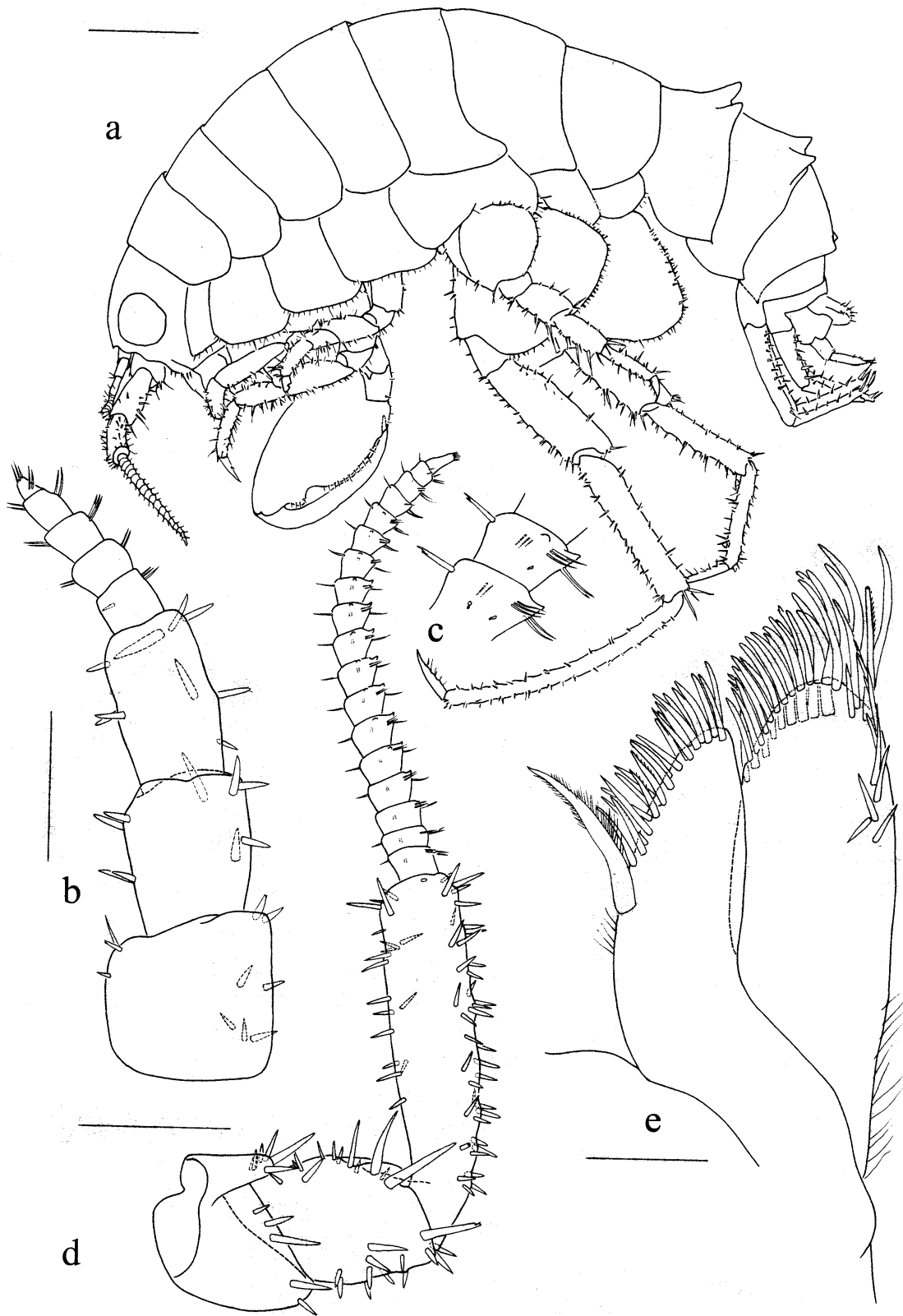
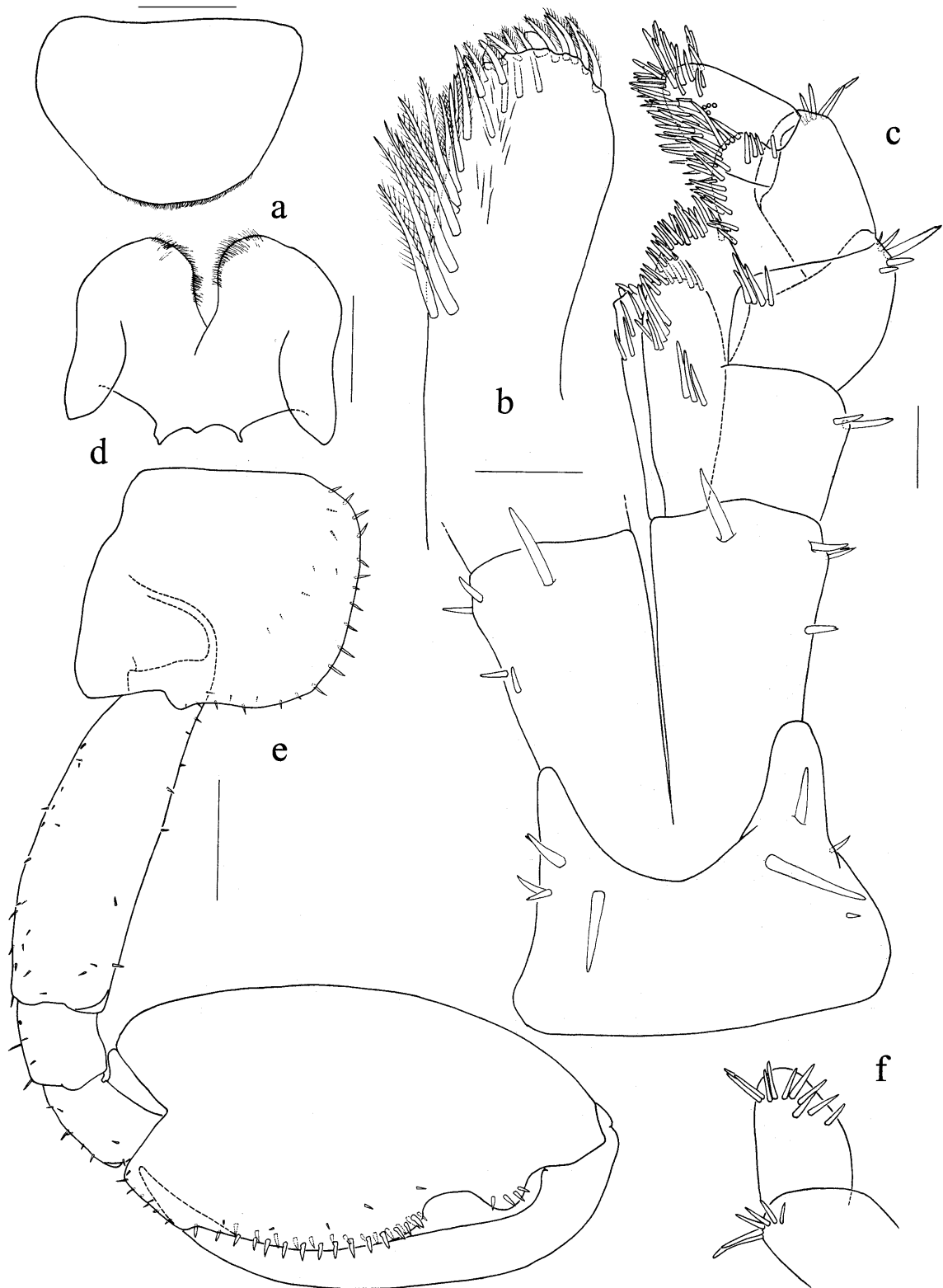


Fig. 6a-h. *Talorchestia skoogi* Stebbing, 1922. a: pereopod 4, female; b: pereopod 5, male; c: uropod 2; d: pereopod 5, female; e: uropod 1; f: right uropod 3; g: left uropod 3 ramus; h: telson. Scale bars: a-e: 500  $\mu$ m; f-h: 200  $\mu$ m.





**Fig. 7a-e.** *Talorchestia quadrispinosa* K.H. Barnard, 1916, male. a: habitus of male, left aspect; b: antenna 1; c: detail of antenna 2 flagellum articles; d: antenna 2; e: maxilla 2. Scale bars: a: 3 mm; b, d: 500 μm; e: 100 μm.



**Fig. 8a-f.** *Talorchestia quadrispinosa* K.H. Barnard, 1916, male. a: labrum; b: inner plate of maxillipeds; c: maxillipeds, posterior aspect, right side of outer and inner plates not drawn; d: lower lip (hypopharynx); e: pereopod 2; f: ventral setation of palp article 3 of maxillipeds. Scale bars: a: 200  $\mu$ m; b, c: 100  $\mu$ m; d, e: 500  $\mu$ m.

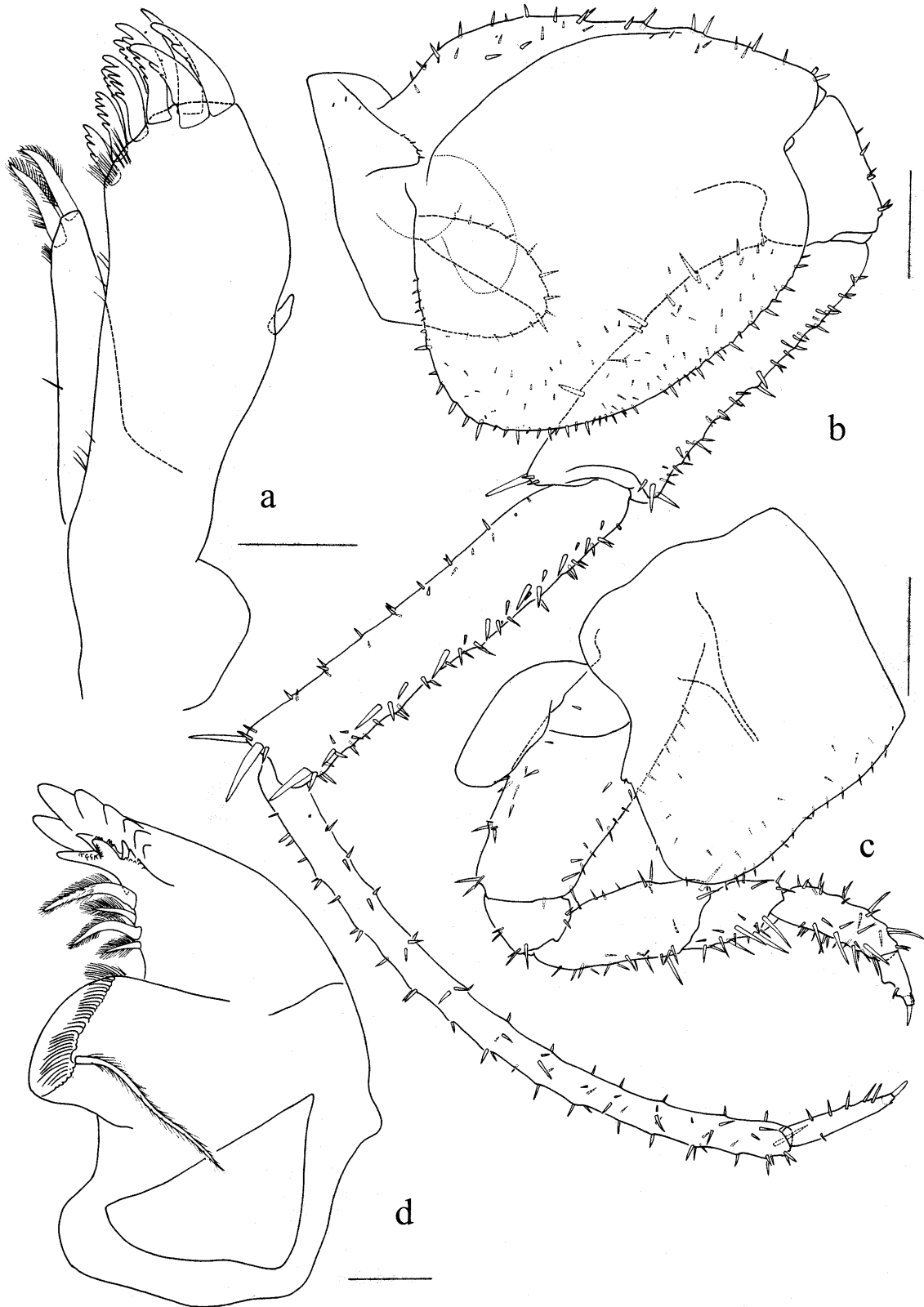


Fig. 9a-d. *Talorchestia quadrispinosa* K.H. Barnard, 1916, male. a: maxilla 1; b: pereopod 6, male; c: pereopod 4; d: mandible. Scale bars: a-c: 500  $\mu$ m; d: 100  $\mu$ m.

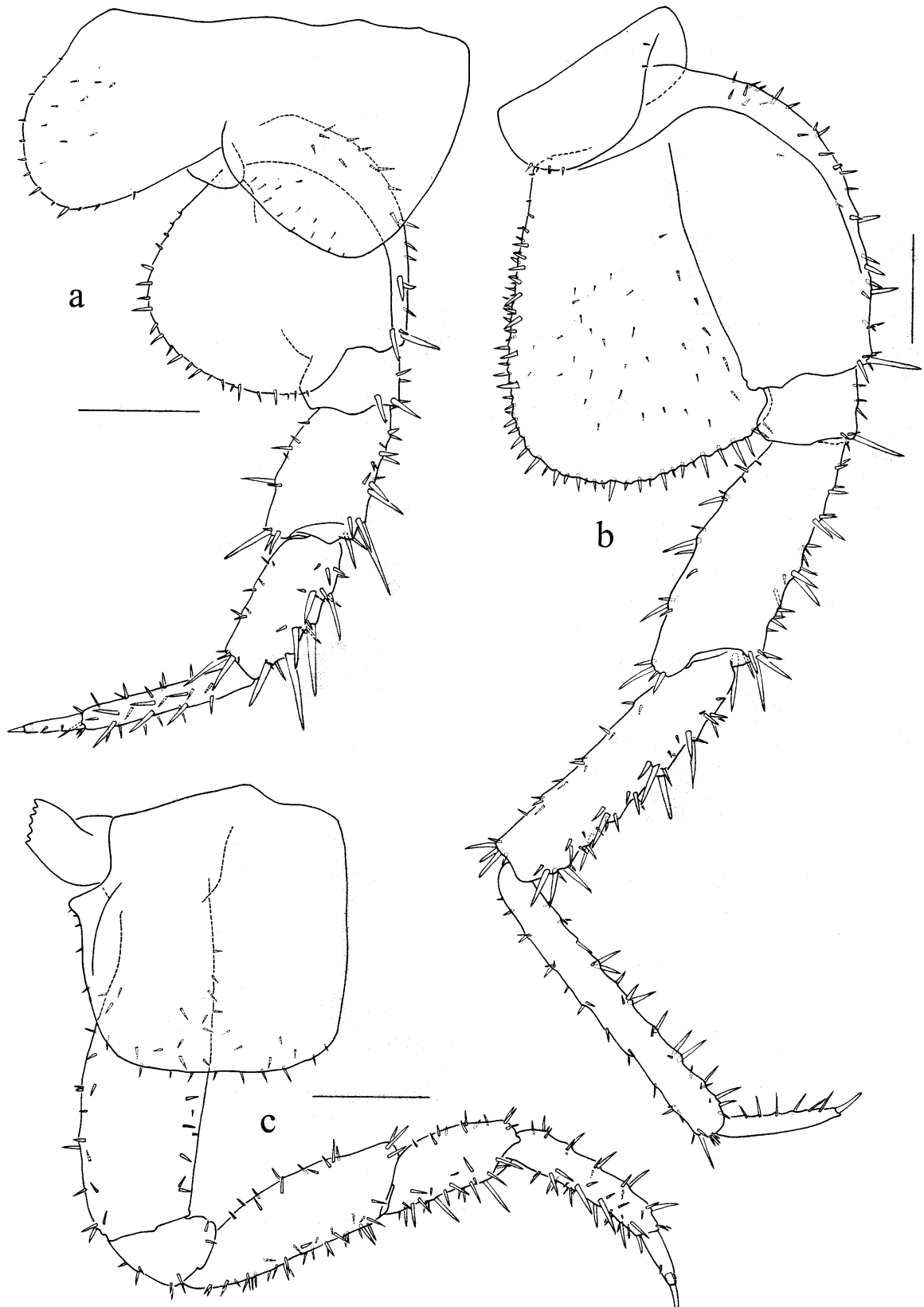
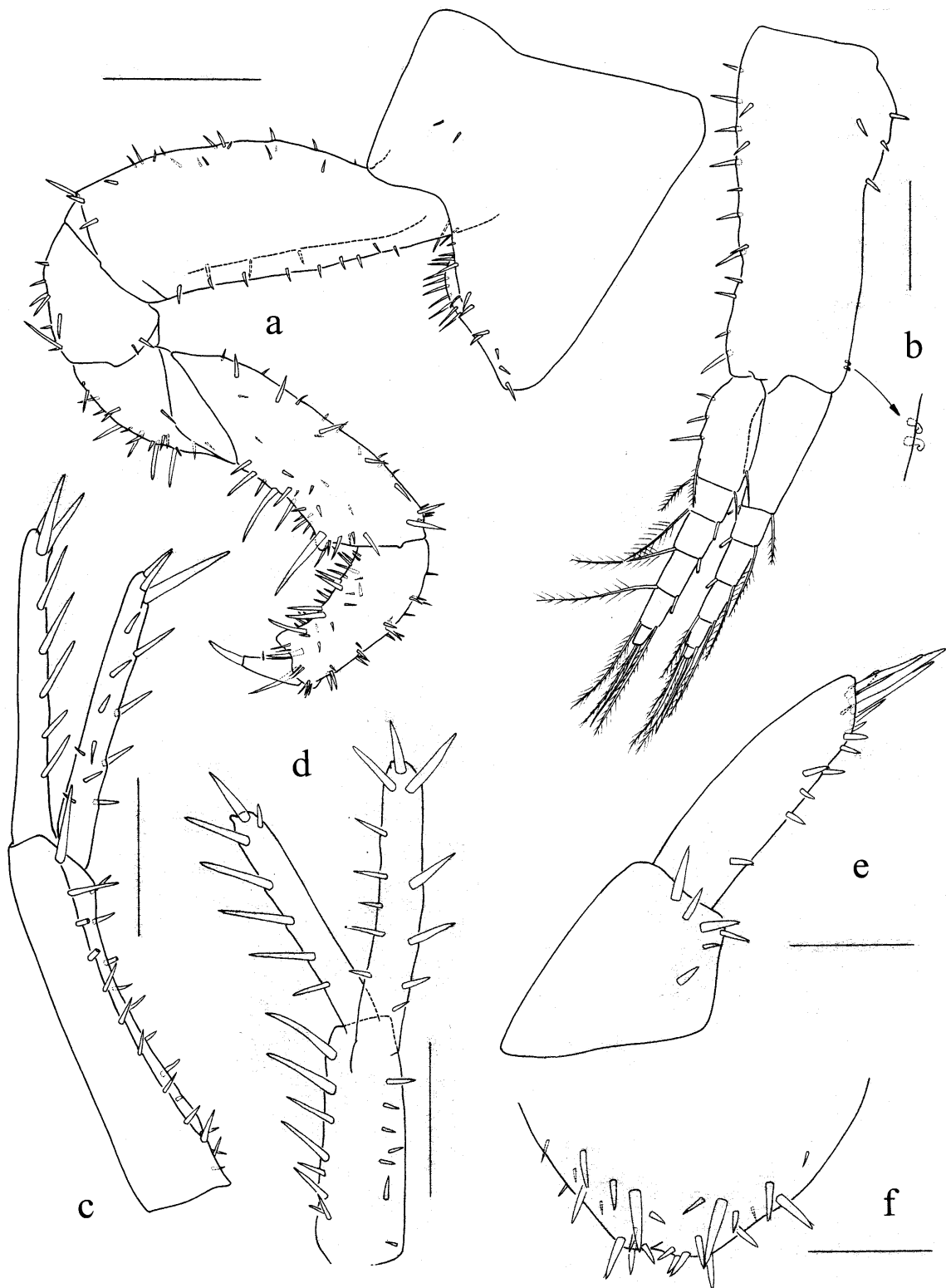


Fig. 10a-c. *Talorchestia quadrispinosa* K.H. Barnard, 1916, male. a: pereopod 5; b: pereopod 7 male; c: pereopod 3, male. Scale bars: a-c: 500  $\mu$ m.



**Fig. 11a-f.** *Talorchestia quadrispinosa* K.H. Barnard, 1916, male. a: pereopod 1; b: pleopod 1, detail: coupling hooks. c: uropod 1, lateral aspect; d: uropod 2; e: uropod 3; f: apex of telson. Scale bars: a-d: 500  $\mu$ m; e-f: 200  $\mu$ m.

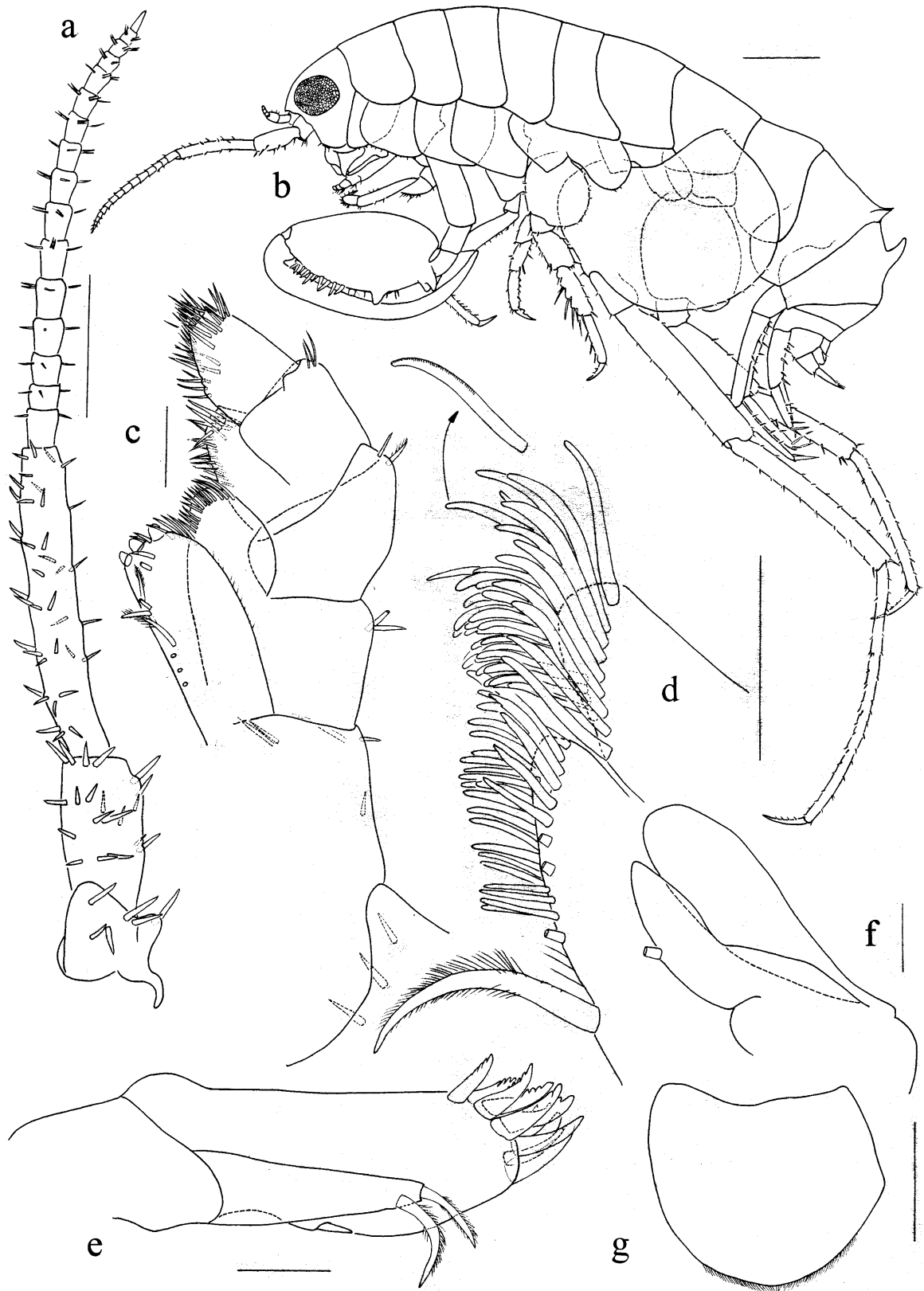
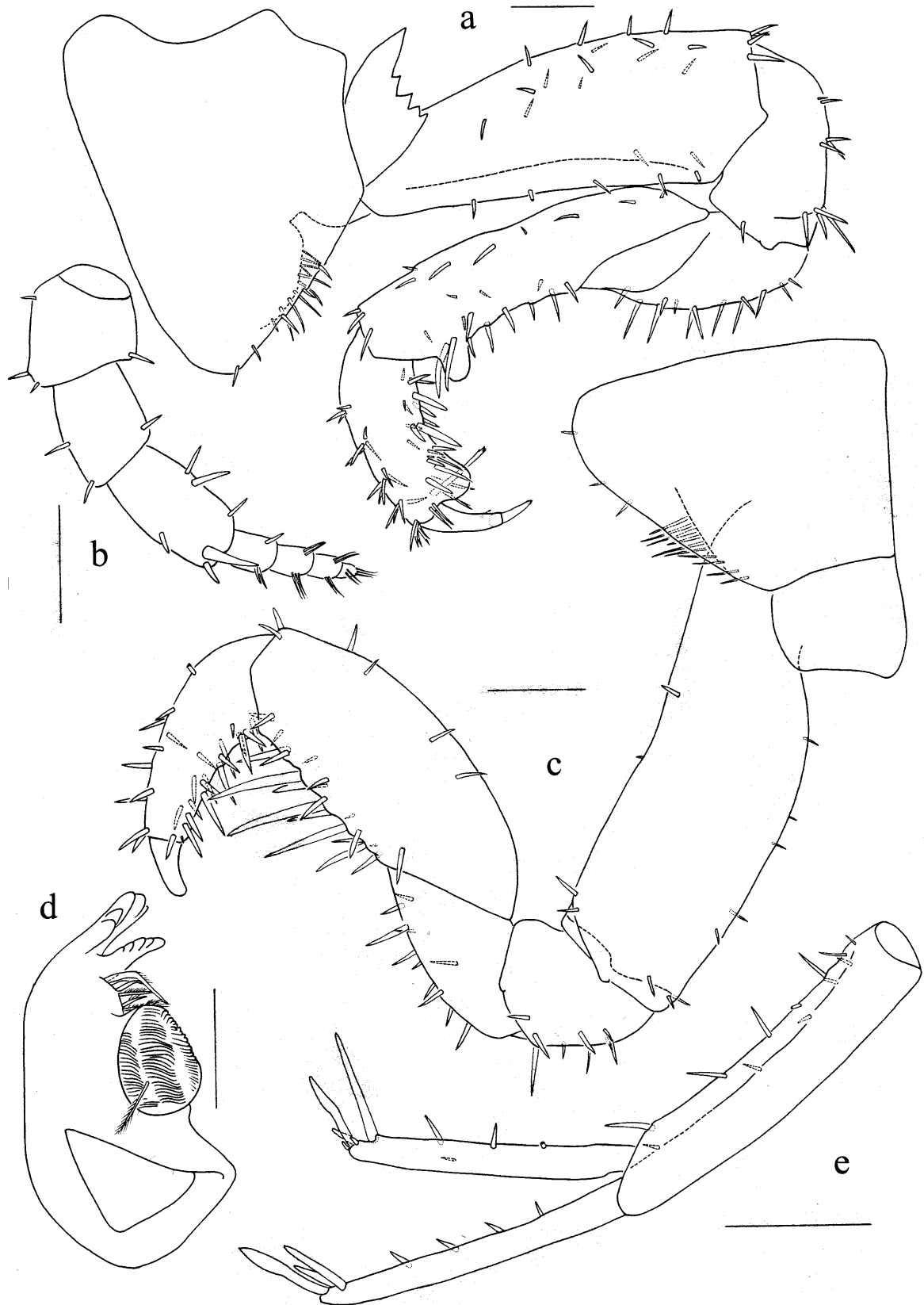
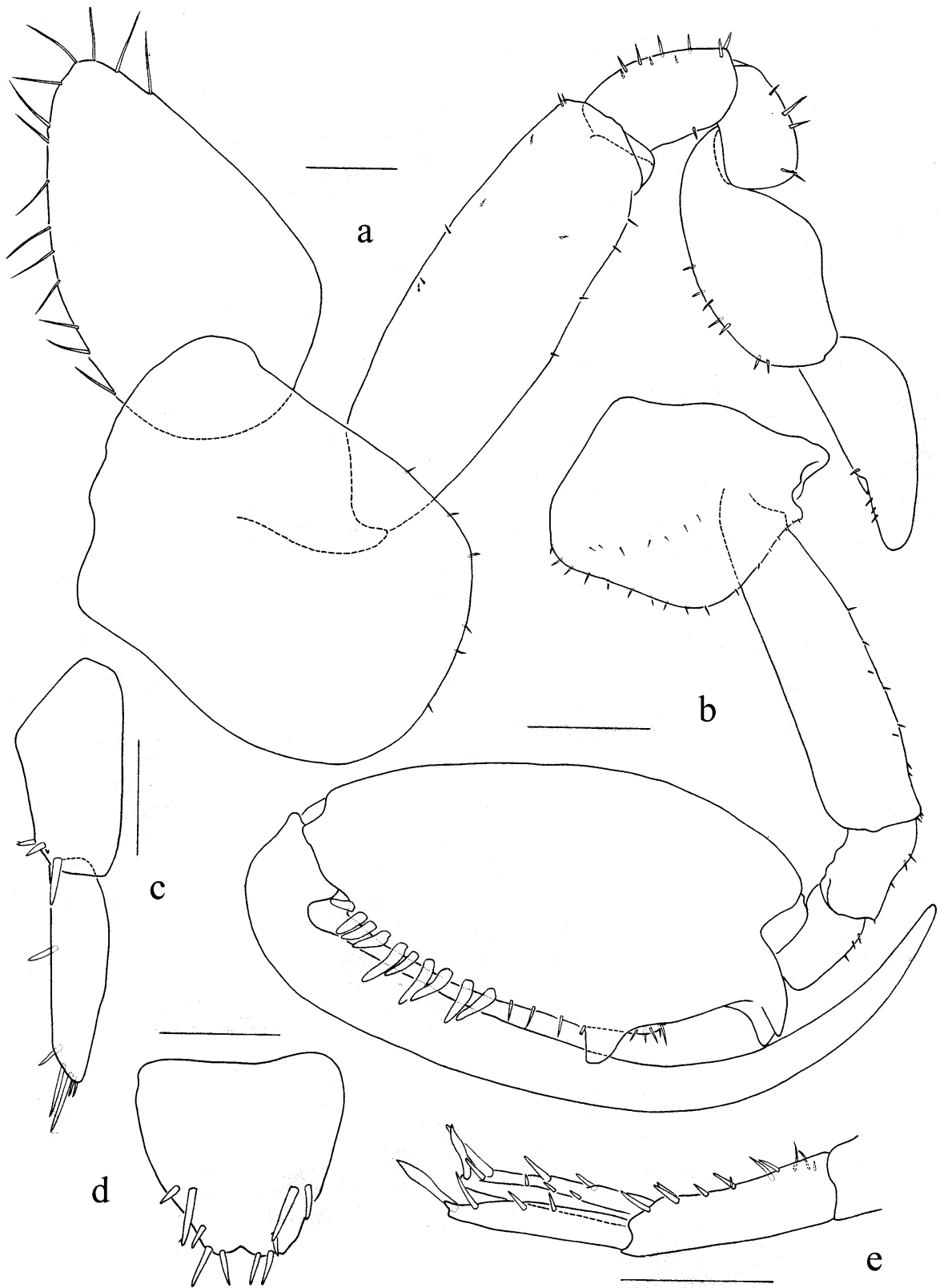


Fig. 12a-g. *Talorchestia tricornuta* Shoemaker, 1920. a: antenna 2; b: habitus, left aspect of male; c: right anterior face of maxillipeds; d: apex of maxilla 2; e: maxilla 1; f: outline of maxilla 2; g: labrum. Scale bars: a: 500  $\mu$ m; b: 1 mm; c-f: 100  $\mu$ m; g: 200  $\mu$ m.

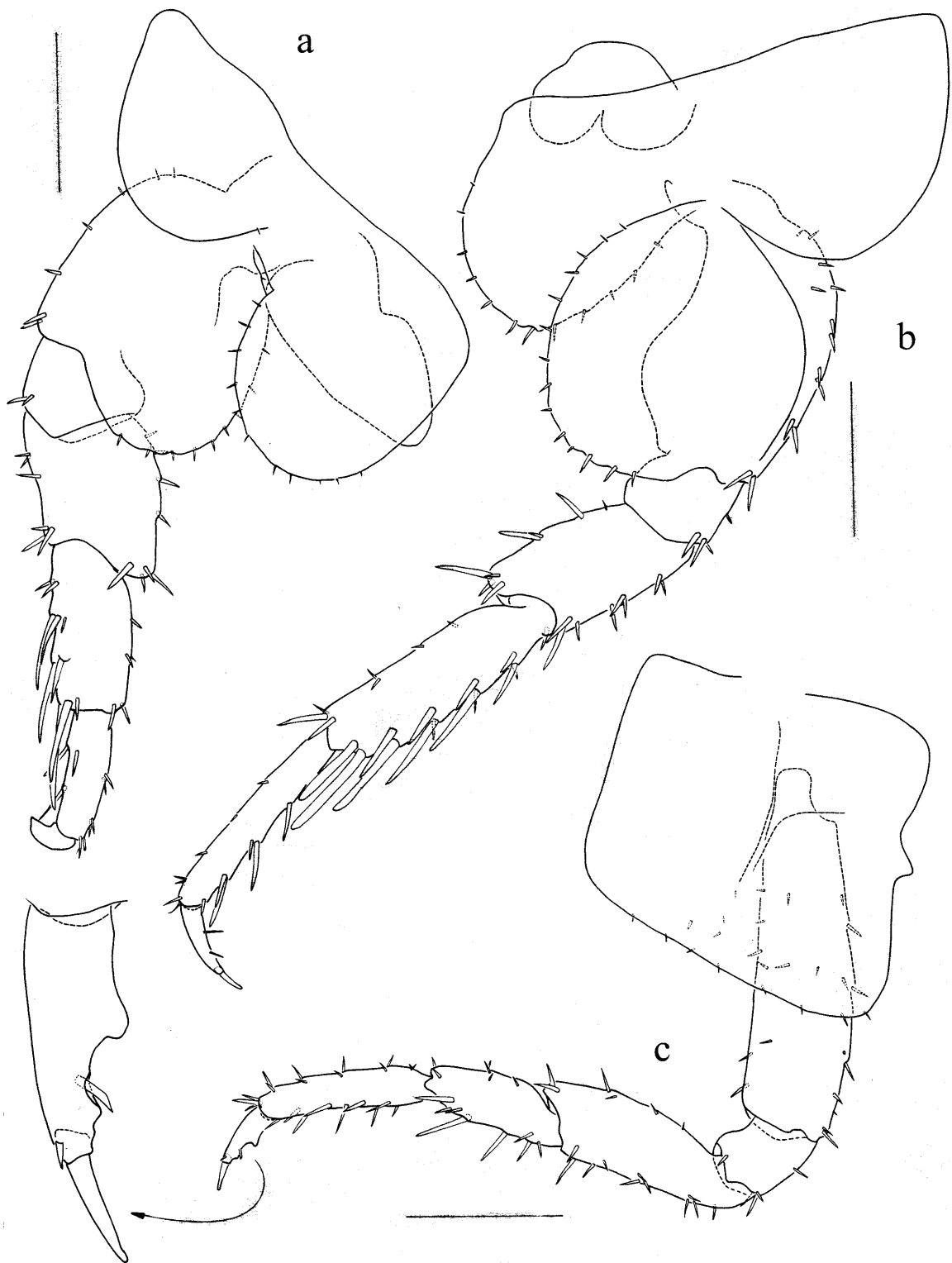


**Fig. 13a-g.** *Talorchestia tricornuta* Shoemaker, 1920. a: pereopod 1, male; b: antenna 1; c: pereopod 1, female; d: mandible; e: uropod 1, lateral aspect. Scale bars: a-c: 200  $\mu$ m; d-e: 500  $\mu$ m.

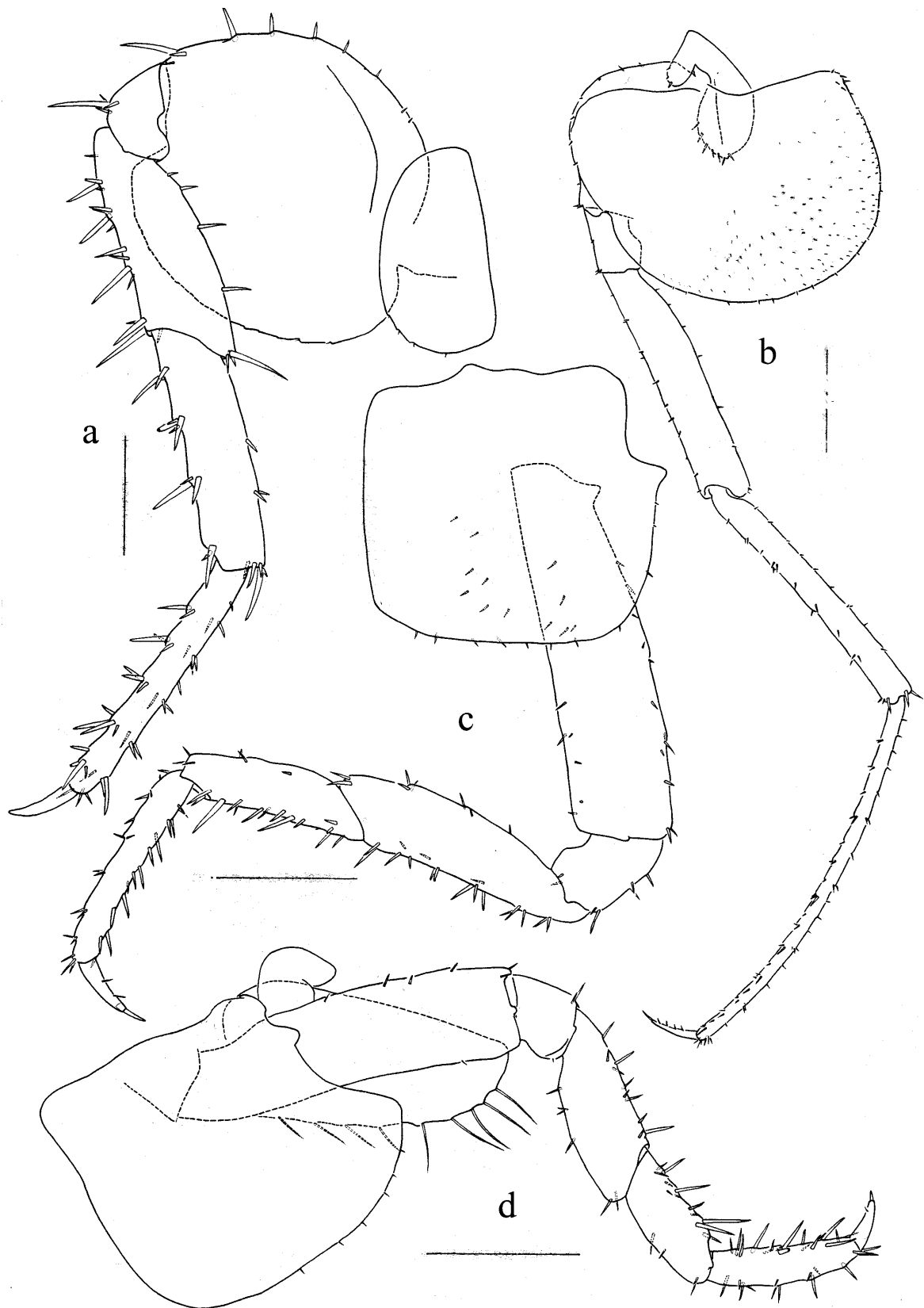


**Fig. 14a-e.** *Talorchestia tricornuta* Shoemaker, 1920. a: pereopod 2, female; b: pereopod 2, male; c: uropod 3; d: telson; e: uropod 2, lateral view. Scale bars: a: a, b, e: 500 μm; c, d: 200 μm.

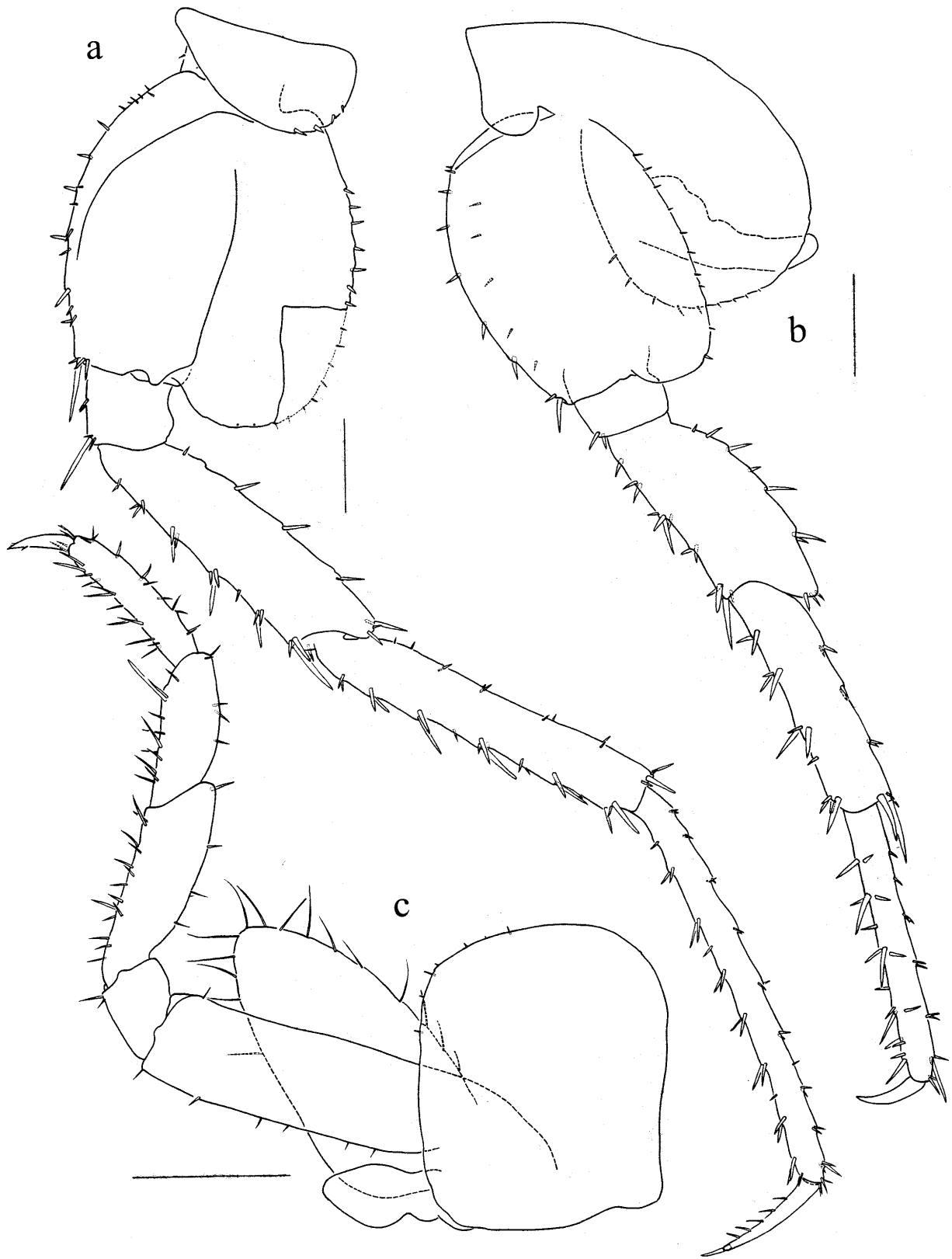




**Fig. 15a-c.** *Talorchestia tricornuta* Shoemaker, 1920. a: pereopod 5, female; b: pereopod 5, male; c: pereopod 4, male. Scale bars: a-c: 500  $\mu$ m.



**Fig. 16a-d.** *Talorchestia tricornuta* Shoemaker, 1920. a: pereopod 7, female; b: pereopod 6, male; c: pereopod 3, male; d: pereopod 4, female. Scale bars: a, c, d: 500  $\mu$ m; b: 1 mm.



**Fig. 17a-c.** *Talorchestia tricornuta* Shoemaker, 1920. a: pereopod 7, male; b: pereopod 6, female; c: pereopod 3, female. Scale bars; a-c: 500  $\mu$ m.

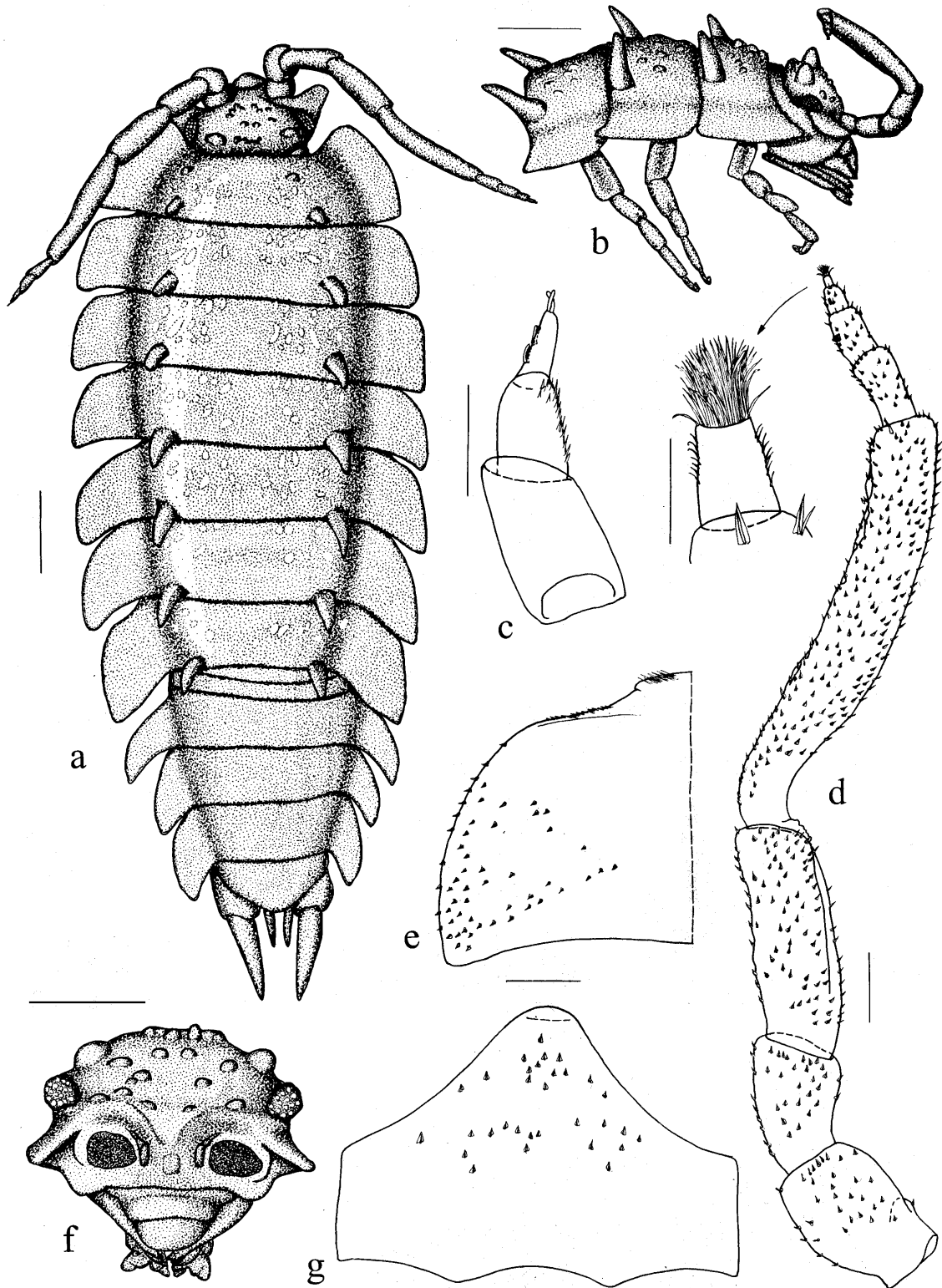
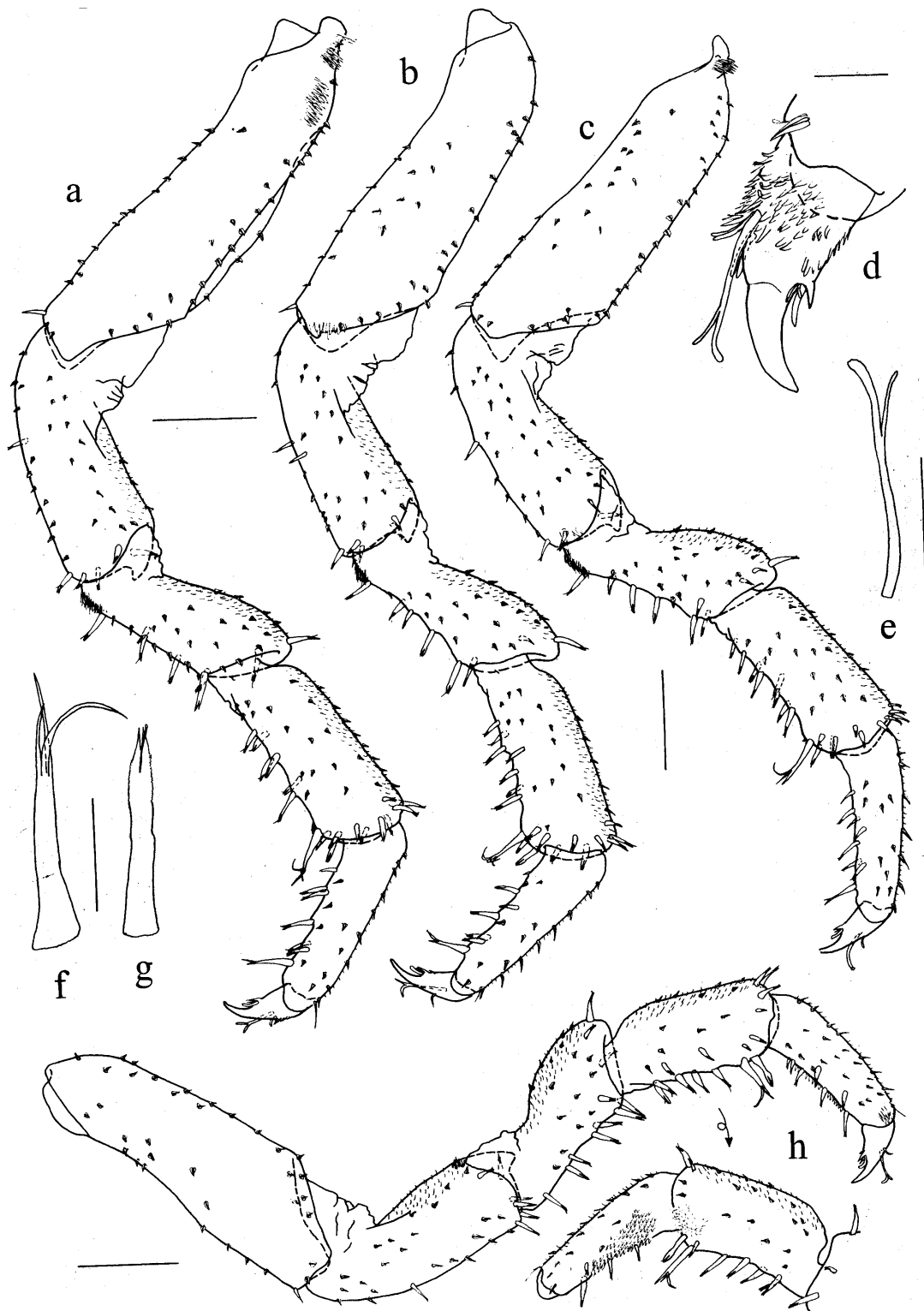


Fig. 18a-f. *Deto echinata* Guérin, 1836. a: habitus in dorsal view; b: habitus in lateral view; c: antennula; d: antenna with detail of apical organ; e: coxal plate IV; f: cephalothorax in frontal view; g: pleotelson in dorsal view. Scale bars: a,b: 2 mm; c: 200µm; d: 500 µm, detail, 100 µm; e, g: 500µm; f: 1 mm.



**Fig. 19a-e.** *Deto echinata* Guérin, 1836. a: left mandible; b: right mandible; c: maxilla; d: maxillula with detail of apical region of lateral endite; e: maxilliped, with detail of endite in rostral view. Scale bars: a-e: 200  $\mu$ m, details 100  $\mu$ m.



**Fig. 20a-h.** *Deto echinata* Guérin, 1836. a: pereopod 4; b: pereopod 3; c: pereopod 3, all caudal view; d: dactylus 1, rostral view; e: dactylar seta; f: longest medial sensory spine of carpus 1; g: ornamental sensory spine of carpus 1; h: pereopod 1, caudal view, with detail of carpus and propodus in rostral view. Scale bars: a-c, h: 500  $\mu$ m; d-g: 100  $\mu$ m.

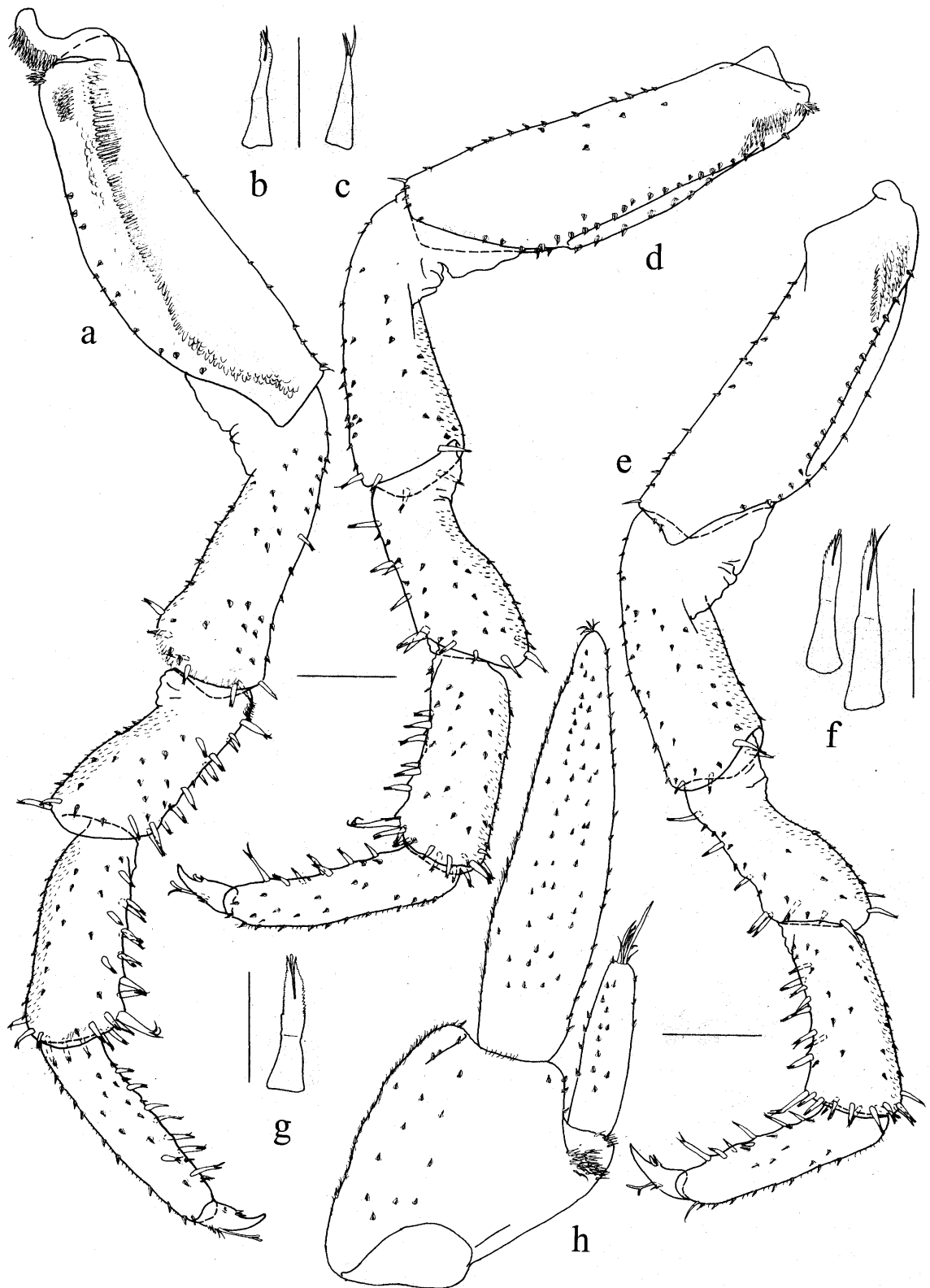
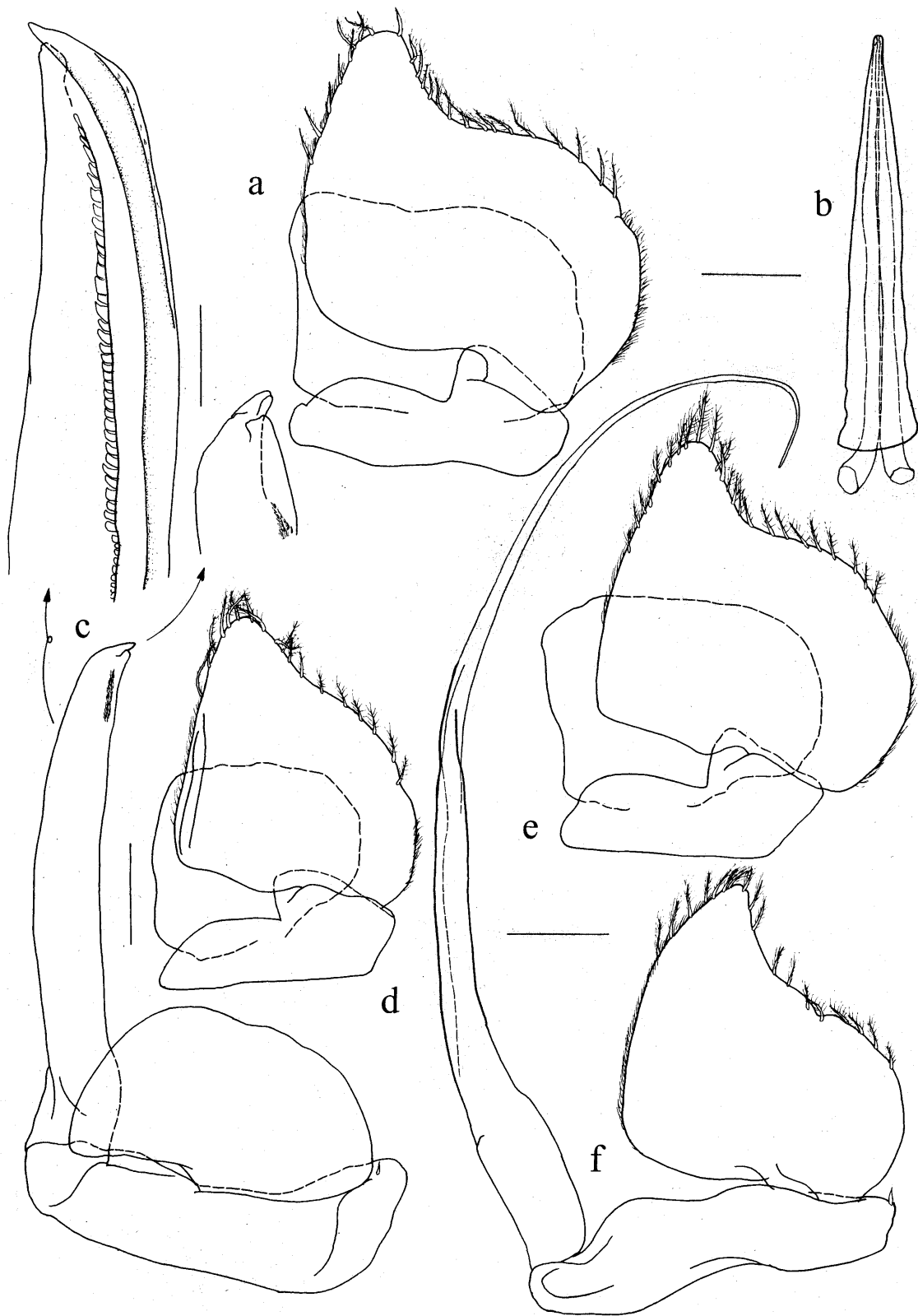


Fig. 21a-h. *Deto echinata* Guérin, 1836. a: pereopod 7, rostral view; b: sensory spine of carpus 3; c: sensory spine of ischium 3; d: pereopod 5; e: pereopod 6; f: sensory spines of merus 1; g: sensory spine of carpus 7; h: uropod, dorsal view. Scale bars: a, d, e, h: 500  $\mu$ m; b, c, f, g: 100  $\mu$ m.



**Fig. 22a-f.** *Deto echinata* Guérin, 1836. a: pleopod 3; b: genital papilla; c: pleopod 1 with details of endopodite in caudal and rostral view; d: pleopod 5; e: pleopod 4; f: pleopod 2, all in caudal view. Scale bars: a-f: 500  $\mu$ m, details 200  $\mu$ m.