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Two new species of the genus *Austroniscus* Vanhoeffen, 1914 (Isopoda: Asellota: Nannoniscidae) from the Antarctic shelf

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Abstract

During the BENDEX expedition (BENthic Disturbance-EXperiment) with RV *Polarstern* in Antarctic summer 2003/04, species of the genus *Austroniscus* Vanhoeffen, 1914 were sampled from the continental shelf of the eastern Weddell Sea. Besides *Austroniscus ovalis* Vanhoeffen, 1914, which is the first record of this species from western Antarctica, two other species were found, i.e. *Austroniscus chelus* sp. nov. and *Austroniscus obscurus* sp. nov. They both bear many resemblances to *Austroniscus ovalis*, but can be easily distinguished from *A. ovalis* by the shape of the rostral crest and the first pereonite. The two new species are very similar to each other but differ in the number of articles of the antennula and the shape of pleopods 3 to 5.

Key words: Isopoda, *Austroniscus*, Nannoniscidae, BENDEX, Antarctic shelf, new species

Introduction

The thermal and oceanographic isolation of Antarctica produces a unique and diverse macrobenthic fauna (Brandt 1999, 2000). Particularly peracarid crustaceans show a high diversity of species, both in the deep sea and on the continental shelf (e.g. Arntz *et al*. 1997; Brandt 2000, 2005; Brandt *et al.* 2004; Clarke *et al*. 2004).

Until now, over 250 isopod species have been described from the Antarctic shelf (Brandt 1999; Clarke *et al.* 2004). Approximately 88% of these species are endemic (Brandt 1999). Different hypotheses about the colonization of the Antarctic continental shelf by Isopoda were published in the past. Kussakin (1973) suggested that the tropical shelves yielded the most primitive isopods, while the temperate and polar shelves represented a more recent isopod fauna. He postulated that the deep-sea regions bore the youngest fauna and that the deep-sea taxa were descendants of primitive shelf taxa. The origin of Serolidae or Antarcturidae supports the theory of polar submergence (Brandt 1991). Hessler & Wilson (1983) hypothesised that the Antarctic shelf species were derived from species of the deep sea. This form of migration (polar emergence) is represented for example in the asellote families Desmosomatidae and Nannoniscidae (Brandt 1991).

Two genera of Nannoniscidae are recorded from the Antarctic shelf (*Austroniscus* Vanhoeffen, 1914 and *Nannoniscus* Sars, 1870) with two species each (*A. ovalis, A. rotundatus, N. bidens, N. australis*).

During the BENDEX expedition in the eastern Weddell Sea in Antarctic summer 2003/04 (Arntz & Brey 2005) specimens of the genus *Austroniscus* were sampled. Besides individuals of *Austroniscus ovalis*, two very similar new species were discovered: *Austroniscus chelus* sp. nov. and *Austroniscus obscurus* sp. nov. Description and illustration of these new species form the basis of this paper. Furthermore *Austroniscus ovalis* is redescribed on the basis of material from the Museum für Naturkunde (Berlin) for a detailed comparison of all three species.

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Methods

Specimens of the genus *Austroniscus* were collected during the expedition ANT XXI/2 (BENDEX) with RV *Polarstern* in the eastern Weddell Sea (Station: 232–1, 71°18.61`S, 013°56.12`E–71°18.73`S, 013°56.57`E, 910–899.6 m) in Antarctic summer 2003/04 by means of an epibenthic sledge (Brandt & Barthel 1995; Brenke 2005). Samples were fixed in 96% precooled ethanol and kept for 48 hours at 20°C for later DNA extraction. The material was sorted on board and in the laboratory by Dr. Michael Raupach (Ruhr-Universität Bochum). Illustrations were made using a *Leitz Mi 85* compound microscope with a *camera lucida*. For dorsal illustrations methylene green stained glycerine was used. Appendages were dissected and fixed in stained antibacterial glycerine-gelatine (*Merck*).

Scanning electron microscopy (SEM) specimens were washed in a solution of 70% ethanol and Triton (Merck) then irradiated twice with ultraviolet rays (20% intensity) for 10 s. The objects were critical point dried, sprayed with graphite and gold.

The material is deposited at the Zoological Museum of Hamburg (ZMH). The terminology of the setation follows Hessler (1970) and Watling (1989).

Abbreviations: A1—antennula; A2—antenna; lMd—left mandible; rMd—right mandible; Mx1—maxillula; Mx2—maxilla; Mxp—maxilliped; P1–7—pereopods 1–7; Plt—pleotelson; Plp 1–5—pleopods 1–5; Pr 1–7—pereonites 1–7; Urp—uropods.

Taxonomy

Asellota Latreille, 1803
Janiroidea Sars, 1897
Nannoniscidae Hansen, 1916

Synonymy: Desmosomidae Sars, 1899: 118; Vanhoeffen, 1914: 549; Nannoniscini Hansen, 1916: 83.
Type genus: Nannoniscus Sars, 1870

Austroniscus Vanhoeffen, 1914

Synonymy: Nannoniscella Hansen, 1916: 84.
Type species: Austroniscus ovalis Vanhoeffen, 1914

Diagnosis

Body flattened and broadened; *pereon* and *pleotelson* expanded laterally in flat, marginal flanges. Rostral crest often well developed. Expansions of *pereonites 1–4* anteriorly produced. *Antennula* generally with 6 articles (*A. chelus* sp. nov. only with 7 articles), terminal article unspecialised. *Pereopod 1* somewhat shorter and distally more robust than in pereopods 2–7; *pereopods 5–7* not derived for swimming, with few natatory setae. *Pleotelson* without postlateral spines; without ventral spines on operculum or pereonites. *Operculum* rectangular, covering a small part of the ventral surface. *Uropods* short in relation to pleotelson, hardly projecting above posterior margin; *uropods* biramous, endo- and exopodite almost of same length (modified after Hansen 1916, Siebenaller & Hessler 1981, Vanhoeffen 1914).

Species composition (Table 1)

Austroniscus acutus Birstein, 1970; *Austroniscus chelus* sp. nov.; *Austroniscus coronatus* Schiecke & Modigh Tota, 1976; *Austroniscus groenlandicus* (Hansen, 1916); *Austroniscus karamani* Birstein, 1963; *Austroniscus norbi* Svavarsson, 1982; *Austroniscus obscurus* sp. nov.; *Austroniscus ovalis* Vanhoeffen, 1914; *Austroniscus rotundatus* Vanhoeffen, 1914; *Austroniscus vinogradovi* Gurjanova, 1950.

TABLE 1. Species composition and distribution of the genus *Austroniscus* Vanhoeffen, 1914.

Species	Locality	Position	Depth [m]
Austroniscus acutus Birstein, 1970	Japan	44°48`N, 156°33`E	5005–6135
Austroniscus chelus sp. nov	Weddell Sea, W.-Antarctica	71°18.61`S, 013°56.12`E–71°18.73`S, 013°56.12`E	910–899.6
Austroniscus coronatus Schiecke & Modigh-Tota, 1976	Gulf of Naples, Mediterranean	not specified	55–200
Austroniscus groenlandicus (Hansen, 1916)	W.-Greenland	64°03`N, *not specified*	10–132
Austroniscus karamani Birstein, 1963	E.-Japan, N.-W. Pacific	37°54`N, 141°43.9`E	5005–5495
Austroniscus norbi Svavarsson, 1982	Norwegian Sea, Greenland	74°43.6`N, 03°27.9`W	3595
Austroniscus obscurus sp. nov	Weddell Sea, W.-Antarctica	71°18.61`S, 013°56.12`E–71°18.73`S, 013°56.12`E	910–899.6
Austroniscus ovalis Vanhoeffen, 1914	E.-Antarctica, Gauss-Station	not specified	70–385
Austroniscus rotundatus Vanhoeffen, 1914	E.-Antarctica, Gauss-Station	not specified	70–385
Austroniscus vinogradovi Gurjanova, 1950	Kamchatca Sea	55°23`N, 134°46`W	125

***Austroniscus chelus* sp. nov.**
(Figs 1–5)

Material examined

Holotype: 1 ♀ (preparatory, 2.4 mm), eastern Weddell Sea, 71°18.61`S, 013°56.12`E–71°18.73`S, 013°56.12`E, *PS* ANT XXI/2, Station 232–1, 910–899.6 m, ZMH K–40991.

Paratypes: 16 ♀ (10 preparatory, 3 adult, 3 damaged), ZMH K–40992, 2 ♀ (preparatory) for SEM, ZMH K–40993, same station as holotype.

Diagnosis

Pereonite 1 strongly frontally directed, with a spine-like appendix inserting ventrally, tipped with a small spine and almost reaching anterior margin of the cephalothorax. Posterior half of *cephalothorax* half covered by pereonites 1–2. *Antennula* with 7 articles. Left *mandible* length 1.3 times right mandible length; *incisor* of right mandible with 5 teeth, of left mandible with 6 teeth; *lacinia mobilis* with 4 teeth, molar with 11 simple setae. Outer margin of *maxilliped* with a row of short membranously embedded setae. Exopod of *pleopod 4* almost as long as endopod; *pleopod 5* length 1.4 times endopod of pleopod 4 length.

Description

Habitus of female holotype (Figs 1A, 5A): *Body* dorsoventrally considerably flattened and broadened (Fig. 5A, B), almost twice as long as wide, with few simple setae laterally. *Coxae* not visible in dorsal view. *Pereonites* 1–4 with strongly frontally directed laterofrontal margins, tipped with a small spine apically. *Pereonite 1* widest, 3.7 times longer than wide, with a spine-like appendix, inserting ventrally, tipped with a small spine and almost reaching anterior margin of the cephalothorax. *Pereonites 1–3* increasing, *pereonites 4–7* decreasing in length and width distally. *Pleotelson* 0.23 times body length, 1.8 wider than long, width 0.8 times pereonite 3 width. Posterior margin strongly rounded, anterior dorsal margin straight; dorsal surface smooth. *Anus* (Fig. 1B) covered by anus valves laterally. *Uropods* inserting closely to the anus valves; *uropods* and *operculum* relatively small, anterior ventral margin medially convex.

Cephalothorax almost as wide as long, posterior half covered by pereonites 1–2; *rostrum* well developed (Fig. 5C, D), frontomedial margin of head slightly concave. *Antennae* inserting frontolaterally in a deep fold between rostral crest and anterolateral, triangular projections; each fold with a single spine medially.

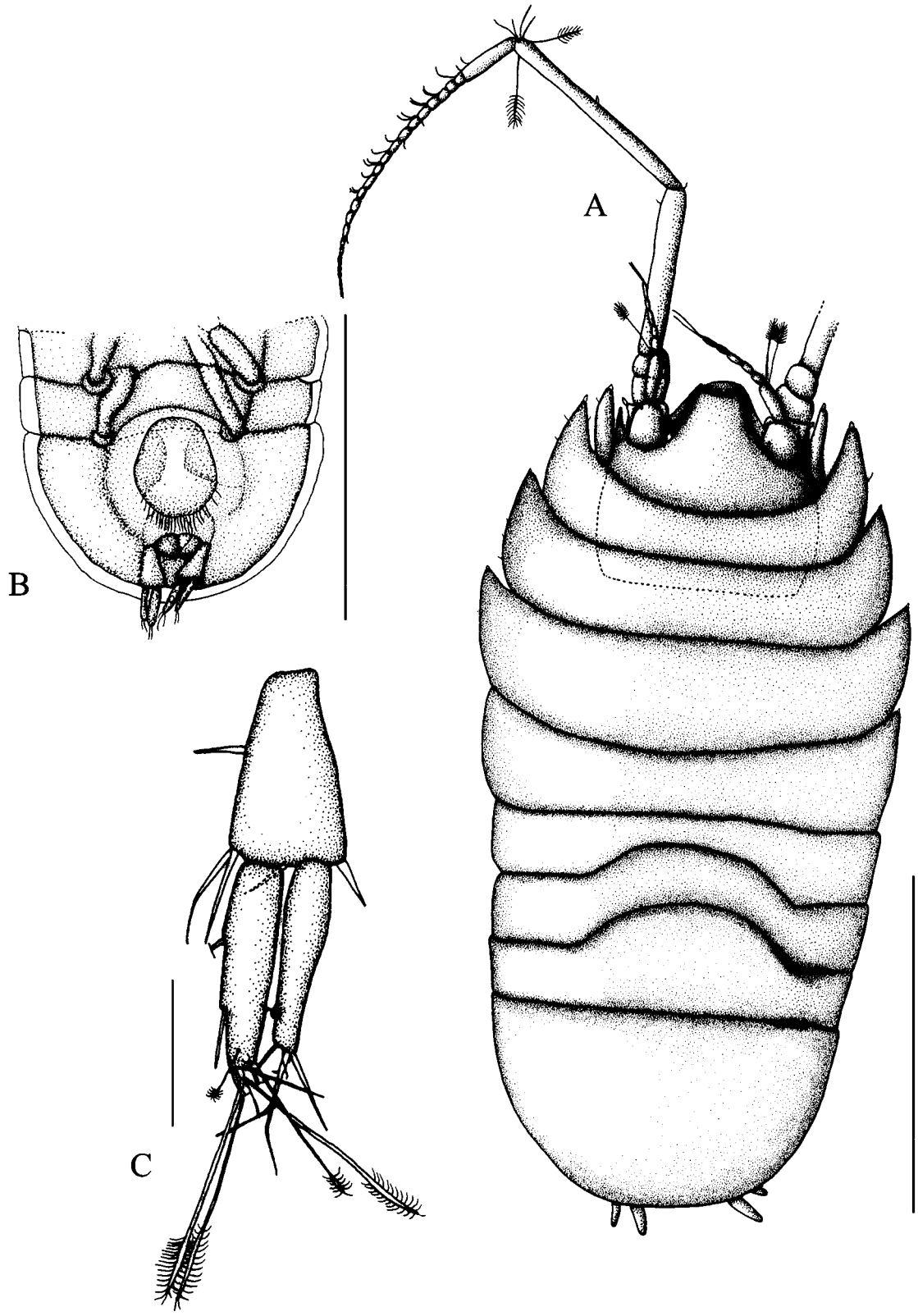

FIGURE 1. *Austroniscus chelus* sp. nov.; A–B, holotype female (ZMH K–40991); A, dorsal view. B, Plt ventrally. C, paratype female (ZMH K–40992), Urp. Scale bar: A–B = 1 mm, C = 100 µm.

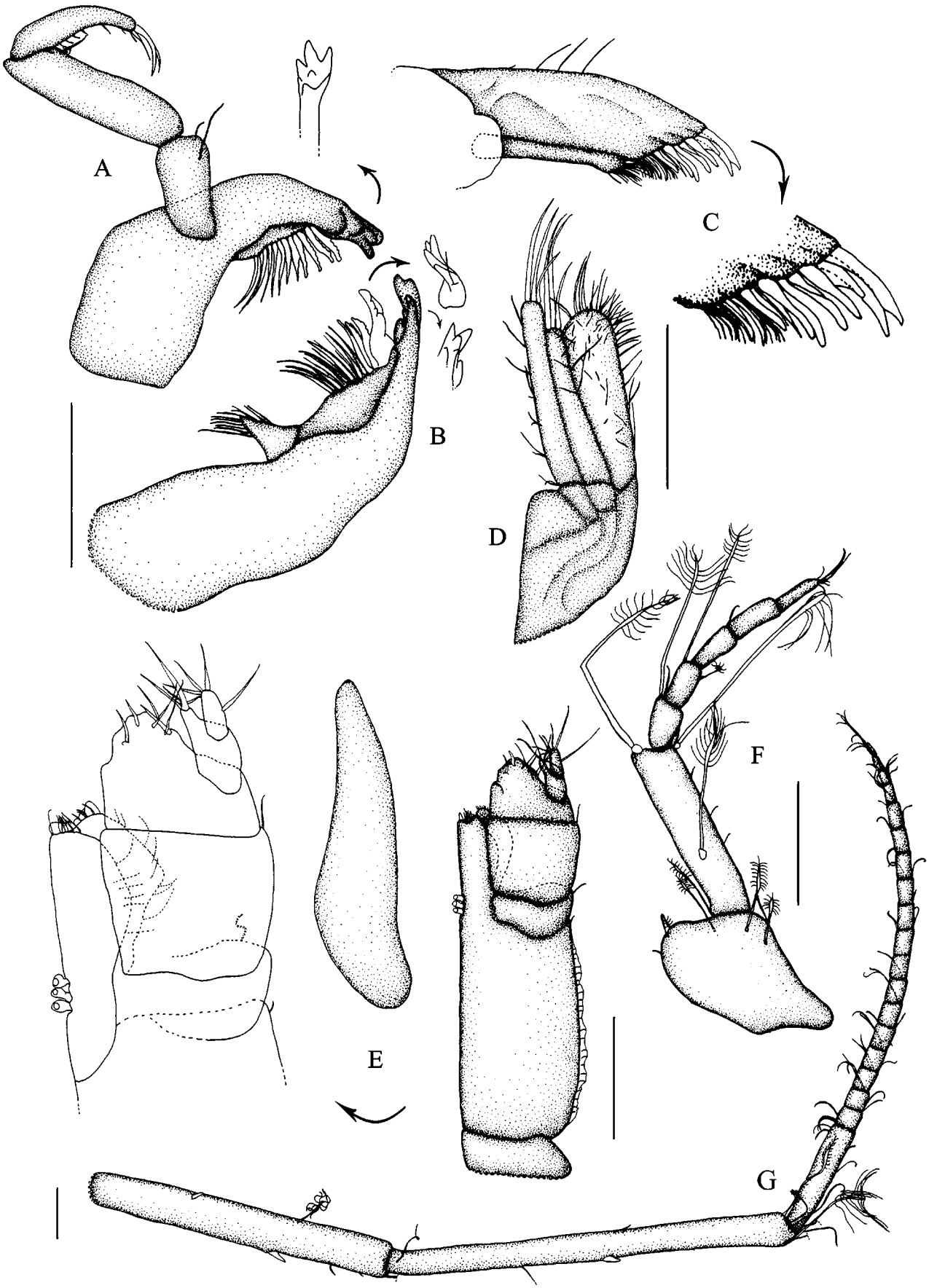

FIGURE 2. *Austroniscus chelus* sp. nov., paratype female (ZMH K–40992); A, rMd. B, lMd. C, Mx1. D, Mx2. E, Mxp. F, A1. G, A2. Scale bar = 100 µm.

Antennula of female paratype (Fig. 2F) 0.13 times body length, with 7 articles. Basal article short, 1.4 times longer than wide, with 5 short broom setae and 2 slender, simple setae distally. Article 2 slender, 4 times longer than wide, with 3 short, simple setae and 1 long broom seta laterally, with 2 long broom setae and 1 short simple seta distally. Articles 3–7 almost of same length, each about 0.25 of article 2 length, width decreasing distally. Article 3 with 1 long broom seta and 1 short simple seta distally. Article 4 with 2 broom setae of different size distally. Article 5 with 1 short simple seta distally. Article 7 with 2 long and 4 short simple setae terminally.

Antenna length (Fig. 2G) almost of body length, with 6 peduncular and 18 flagellar articles. Peduncular articles 1–4 short; article 2 with 1 short spine laterally, article 3 with a large spine almost as long as article 4 (Fig. 5D). Articles 5–6 long and slender, article 5 about 7.5 times longer than wide, with 2 robust setae, 1 broom seta and 2 small simple setae laterally, with a single seta (broken off) distally. Article 6 about 11.3 times longer than wide, with 1 short spine and 3 short simple setae laterally, with 3 broom setae and 4 slender setae of different sizes distally. Flagellar article 1 longest, about 0.3 times peduncular article 6 length, 5.2 times longer than wide, with 4 simple setae laterally. Flagellar articles 2–16 of similar length, width decreasing distally, each article with 1–3 short simple setae distally. Articles 17–18 somewhat shorter, article 17 with 5 simple setae, article 18 with 7 long, slender setae terminally.

Left *mandible* (Fig. 2B) length 1.3 times right mandible (Fig. 2A) length. Mandibular palp of left mandible lost during dissection; palp of right mandible long and robust, overlapping tip of incisor about a half, consisting of 3 articles; article 1 shortest, with 2 simple setae distally; article 2 1.5 times longer than article 1, 3 times longer than wide, with 3 simple setae distally; terminal article tapering distally, with 9 short simple setae ventrally, with 3 robust setae terminally. Incisor of right mandible with 5 teeth, of left mandible with 6 teeth. Lacinia mobilis of left mandible with 4 teeth and 1 short setule. Setal row of right mandible with 12 setae; distal seta dentate and robust, dentation decreasing proximally. Setal row of left mandible with 14 setae; distal setae 1–3 most robust and dentate, proximal setae more slender. Molar of right mandible lost, of left mandible triangular, with 11 simple setae distally.

Outer endite of *maxillula* (Fig. 2C) with 9 robust spine-like setae and 16 slender setae distally. Outer margin with 3 long, slender and 1 short seta. Inner endite half length of outer endite, with 12 fine setae distally.
Maxilla (Fig. 2 D) outer margins of lateral and inner endites with several long setules. 3 strong setae of varying length on lateral and medial endites. Distal margin of inner endite with numerous long setules. Surface of inner endite with some short setules.

Maxilliped epipodite (Fig. 2E) triangular, slender, 4.1 times longer than wide, reaching to mid of palpal article 2. Palpal article 1 short, 2.3 times wider than long, with 1 simple seta distally. Article 2 longest, 2.4 times longer than article 1, almost quadrangular, with 1 simple seta distally. Palpal article 3 length 1.8 of article 1 length, 1.4 times longer than wide, with 2 robust sensory setae and 6 somewhat longer, slender setae distally. Article 4 about 0.75 of article 1 length, as long as wide, with a projection almost reaching tip of article 5, with 5 slender setae of varying size distally. Article 5 as long as fourth, twice as long as wide, with 6 slender setae terminally. Endite´s inner margin with numerous short setae, membranously embedded; distal margin with some dentate setae. Protopod rectangular, about 3 times wider than long.

Pereopod 1 (Fig. 3A) more robust than pereopods 2–7. Basis 3.25 times longer than wide, with 1 broom seta, 4 short simple setae dorsally and 7 simple setae of varying size ventrally. Ischium length almost half of basis length, 2.4 times longer than wide; with 2 simple setae distodorsally and 3 simple setae ventrally. Merus length 0.6 times ischium length, 1.6 times longer than wide; with 1 distal simple seta dorsally and ventrally. Carpus length twice merus length, 3.6 times longer than wide; with 1 seta dorsally, ventral margin slightly concave, with 5 simple setae of varying size and 1 more robust seta distally. Propodus length 0.8 times carpus length, 4 times longer than wide; with 5 slender simple setae dorsally, increasing in length distally, with numerous small setae, membranously embedded, and 6 somewhat longer setae in between ventrally. Dactylus nearly half of carpus length, 2.6 times longer than wide; with 2 small, slender setae medially. Unguis with 1 robust cuspidate seta dorsally and with 2 slender, somewhat longer setae ventrally.

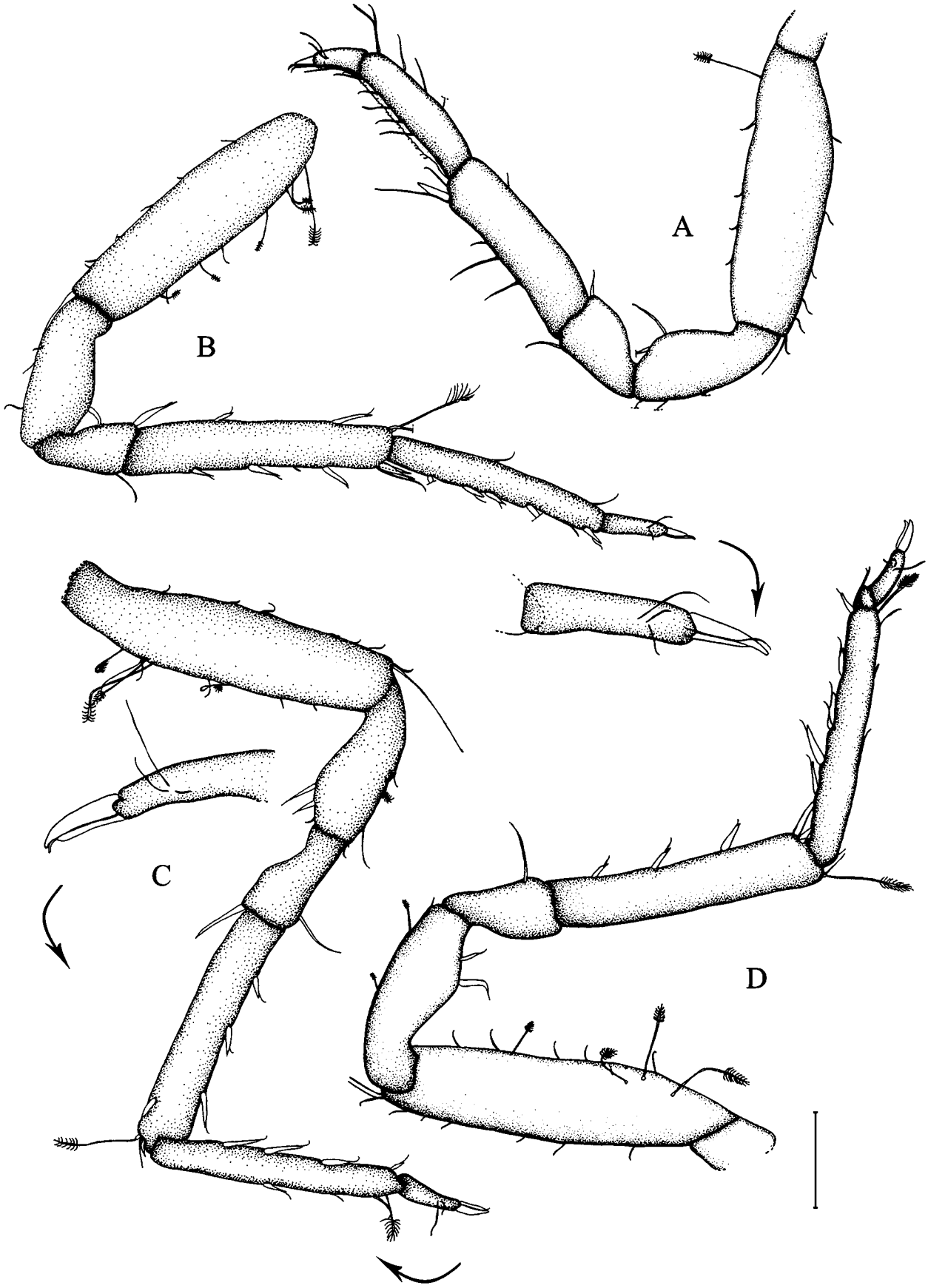

FIGURE 3. *Austroniscus chelus* sp. nov., paratype female (ZMH K–40992); A–D, P1–4. Scale bar = 100 µm.

Basis of *pereopod 2* (Fig. 3B) 3.6 times longer than wide; with 6 broom setae and 2 small simple setae dorsally, with 1 long and robust seta at distal margin ventrally. Ischium half of basis length, 2.25 times longer than wide; with 1 robust simple seta dorsally and 3 short simple setae ventrally. Merus length 0.7 times ischium length, 1.8 times longer as wide, with 1 robust unequally bifid seta dorsally, with 1 long seta ventrally. Carpus length 2.8 times merus length, 5.6 times longer than wide; with 2 stout unequally bifid setae dorsally, with 1 slender seta (broken off) and 1 long broom seta distally, with 3 stout unequally bifid setae ventrally and with 2 robust simple setae and 1 slender simple seta distally. Propodus length 0.8 times carpus length, 7 times longer than wide, with 2 simple setae dorsally and with 5 robust unequally bifid setae and 1 slender, simple seta ventrally. Dactylus length 0.4 times propodus length, 4.6 times longer than wide, with 3 thin, simple setae medially. Unguis with 2 robust cuspidate setae and 1 somewhat longer simple seta in between.

Basis of *pereopod 3* (Fig. 3C) 4.3 times longer than wide; with 5 broom setae of varying size and 4 small simple setae dorsally and with 6 short simple setae and 1 long slender seta ventrally. Ischium length half of basis length, 2.6 times longer than wide; with 3 simple setae dorsally decreasing in size distally, with 3 simple setae of varying size and 1 short broom seta ventrally. Merus length 0.7 times ischium length, 2.1 times longer than wide; with 1 long seta ventrally and dorsally. Carpus length 2.1 times merus length, 5 times longer than wide; with 1 robust seta, 2 slender setae and 1 long broom seta dorsally, with 3 stout unequally bifid setae ventrally. Propodus length nearly carpus length, 7.8 times longer than wide, with 1 unequally bifid seta, 2 simple setae and with 1 broom seta dorsally, with 4 stout unequally bifid setae ventrally, decreasing in length distally. Dactylus length 0.4 times propodus length, 4.5 times longer than wide; with 3 thin, simple setae medially. Unguis with 2 robust cuspidate setae and 1 slender seta in between.

Basis of *pereopod 4* (Fig. 3D) 4.1 times longer than wide; with 4 broom setae and 7 small simple setae dorsally, with 9 simple setae of varying size ventrally. Ischium length 0.6 times basis length, about 2.8 times longer than wide; with 2 robust simple setae dorsally, with 2 small broom setae and 1 short simple seta ventrally. Merus length 0.6 times ischium length, twice as long as wide; with 1 long seta ventrally. Carpus length 2.4 times merus length, 5.6 times longer than wide, with 1 long broom seta and 2 somewhat shorter simple setae distodorsally, with 3 stout unequally bifid, 2 robust and 1 slender setae ventrally. Propodus length almost carpus length, 7 times longer than wide; with 4 short, simple setae dorsally and with 2 broom setae distodorsally, with 5 stout unequally bifid setae and 3 slender, simple setae ventrally. Dactylus length 0.4 times propodus length, 6 times longer than wide; with 3 thin, simple setae medially. Unguis with 2 robust cuspidate setae.

Basis of *pereopod 5* (Fig. 4A) 3.1 times longer than wide; with 5 simple setae dorsally and with 1 long broom seta and 1 very short simple seta ventrally. Ischium length 0.7 times basis length, 2.4 times longer than wide; with 2 short simple setae dorsally and with 1 long robust seta and 2 somewhat shorter simple setae ventrally. Merus length about half of ischium length, 1.3 times longer than wide; with 1 slender, simple seta dorsally and with 1 robust, long seta distoventrally. Carpus length 2.8 times merus length, 3.8 times longer than wide; with 3 robust unequally bifid setae and 1 slender seta (broken off) dorsally, with 3 robust unequally bifid setae, 1 slender, simple seta and 1 broom seta ventrally. Propodus length 0.9 times carpus length, 7.2 times longer than wide; with 1 simple seta and 2 unequally bifid setae dorsally, with 1 broom seta and 2 short, simple setae distoventrally. Dactylus length 0.3 times propodus length, 4.3 times longer than wide; with 3 slender setae medially; unguis with a robust cuspidate seta and 1 slender simple seta.

Basis of *pereopod 6* (Fig. 4B) broken off, 3.7 times longer than wide; with 5 slender, simple setae ventrally. Ischium length 0.7 times basis length, 3.2 times longer than wide; with 2 slender simple setae dorsally. Merus length 0.4 times ischium length, 1.5 times longer than wide; with 2 robust long setae distodorsally. Carpus length 2.9 times merus length, 3.8 times longer than wide; with 2 unequally bifid setae, 1 simple short seta and 2 broom setae (1 broken off) dorsally, with 3 unequally bifid setae of varying size ventrally. Propodus length 0.9 times carpus length, 7.1 times longer than wide; with 2 simple setae distodorsally, with 3 robust unequally bifid setae seta ventrally. Dactylus length 0.4 times propodus length, 4.8 times longer than wide. Unguis with 1 robust cuspidate seta, and 3 slender setae of similar size.

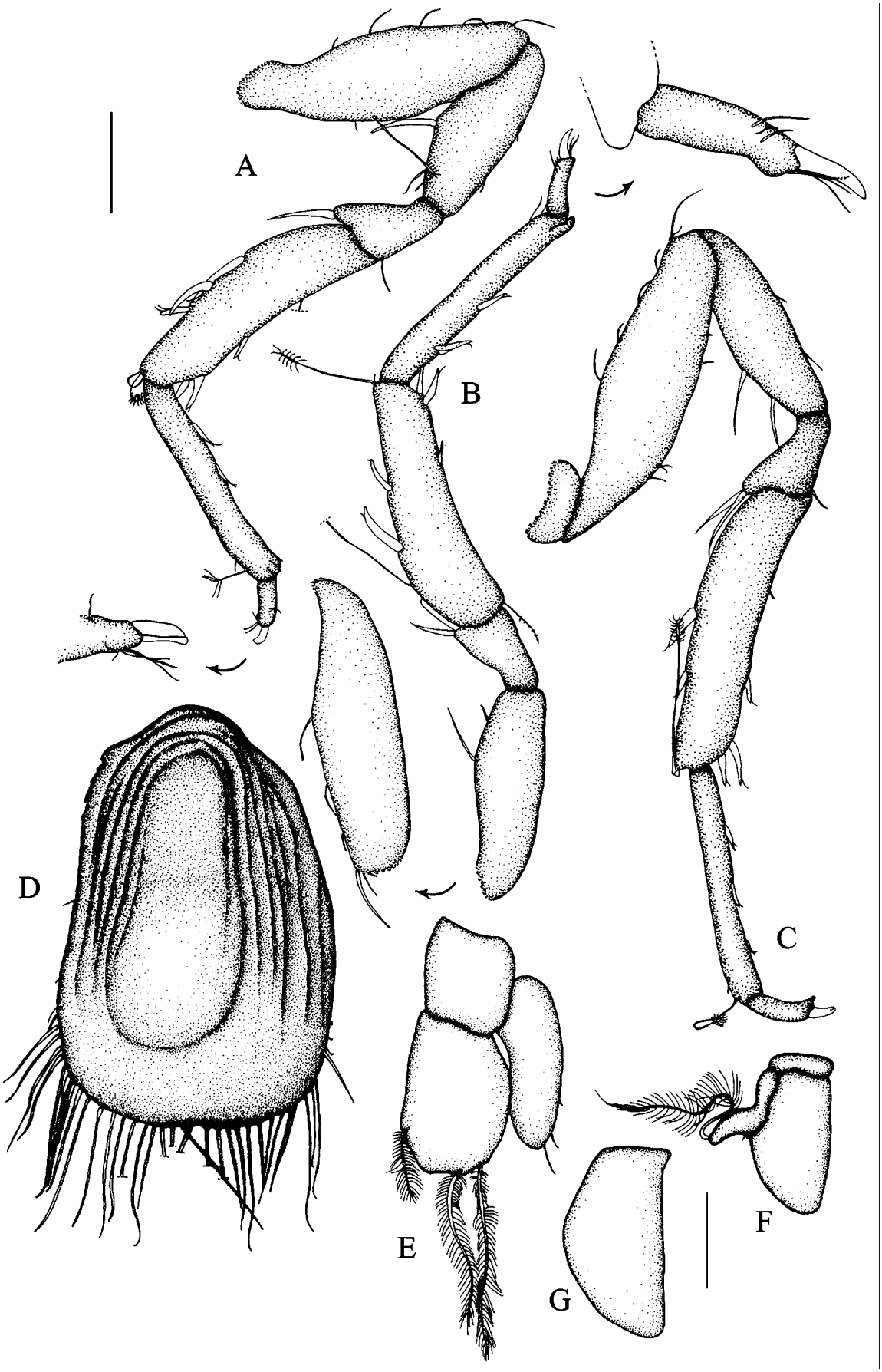

FIGURE 4. *Austroniscus chelus* sp. nov., paratype female (ZMH K–40992); A–C, P5–7. D, Plp 2 (operculum). E–G, Plp 3–5. Scale bar = 100 µm.

Basis of *pereopod 7* (Fig. 4C) 3.8 times longer than wide; with 5 simple setae dorsally and with 6 simple setae of varying size ventrally. Ischium length 0.7 times basis length, 3.25 times longer than wide; with 2 robust, long setae dorsally and with 2 short simple setae ventrally. Merus length 0.4 times ischium length, 1.3 times longer than wide; with 2 robust long setae distodorsally and with 1 short simple seta distoventrally. Carpus length 3.3 times merus length, 4.4 times longer than wide; with 2 unequally bifid setae and 1 broom seta dorsally, with 3 robust unequally bifid setae and 1 short simple seta ventrally. Propodus length 0.8 times carpus length, 8.6 times longer than wide; with 1 broom seta and 1 short simple seta dorsally, with 3 robust unequally bifid setae ventrally, decreasing in size distally. Dactylus length 0.4 times propodus length, 5.3 times longer than wide. Unguis with 1 robust cuspidate seta and 1 slender seta ventrally; with a small ventral appendix.

Pleopod 2 (operculum, Fig. 4D) 1.6 times longer than wide, ventral surface with fissures. Lateral margin with few short setules, posterior margin with numerous (> 30) long, slender setae.

Protopodite of *pleopod 3* (Fig. 4E) rectangular, almost as long as wide, length 0.6 times endopodite length. Exopodite almost as long as endopodite, 2.5 times longer than wide, with 3 simple setae of varying length. Endopodite 1.5 times longer than wide, with 1 short and 2 long plumose setae distally.

Protopodite of *pleopod 4* (Fig. 4F) short, 3.8 times longer than wide. Exopodite slender, 5 times longer than wide, with 1 long robust plumose seta distally. Endopodite 1.8 times longer than wide.

Pleopod 5 (Fig. 4G) small oval lobe, 1.4 times longer than endopodite of pleopod 4, almost twice as long as wide. Inner margin straight, outer margin strongly rounded, without setation.

Uropods (Fig. 1C) biramous. Protopodite trapezoid, 1.7 times longer than wide, as long as exopodite, with 5 robust setae of varying size. Exo- and endopodite almost of same length. Exopodite length 0.9 times endopodites length, 4.1 times longer than wide, with 6 setae of varying size terminally. Endopodite 3.9 times longer than wide, with 2 robust simple setae and 1 short broom seta laterally, with 5 broom setae of varying size, 2 simple setae and 2 setae (broken off) terminally.

Type locality

Eastern Weddell Sea, Kapp Norvegia.

Distribution

The species is only known from type locality.

Etymology

Chelus (lat.) is masculine, means *turtle* and refers to the cephalothorax of the species that is *turtle-like* covered by the first pereonite.

Remarks

Austroniscus chelus sp. nov. is most similar to *Austroniscus obscurus* sp. nov.; the latter can be distinguished from the first species by the following characters (Table 2): antennula with 6 articles; incisor of the right mandible with 6, of left mandible with 5 distinct teeth; lacinia mobilis 3-lobed, molar of the left mandible medially notched yielding numerous small setules; fourth palpal article without appendix; dactylus of pereopods 5 and 7 with ventral appendices distally; protopodite of pleopod 3 only reaching one third of endopodite length; pleopod 5 smaller than pleopods 3 and 4.

The new species can be distinguished from *Austroniscus ovalis* Vanhoeffen, 1914 by the following characters (Table 2): antennula with 7 articles; rostrum not as deeply vaulted as in *A. ovalis* (Fig. 11C, D); first pereonite anterofrontally directed and tipped with a small spine (Figs 5D, 11C).

TABLE 2. Distinguishing characters of *Austroniscus chelus* sp. nov., *Austroniscus obscurus* sp. nov., *Austroniscus ovalis* Vanhoeffen, 1914 (E-Antarctica) and *A. ovalis* (W-Antarctica).

characters	*Austroniscus chelus* sp. nov.	*Austroniscus obscurus* sp. nov.	*Austroniscus ovalis* Vanhoeffen, 1914	*Austroniscus ovalis* (BENDEX material)
rostrum	slightly concave	slightly concave	deeply vaulted	deeply vaulted
A1	with 7 articles	with 6 articles	with 6 articles	with 6 articles
Pr 1	tergits anteriorly projected, tipped with a small spin	tergits anteriorly projected, tipped with a small spine	tergits anteriorly rounded	tergits anteriorly rounded
Incisor of rMd	with 5 teeth	with 6 teeth	not specified	not specified
Incisor of lMd	with 6 teeth	with 5 teeth	not specified	not specified
Lacinia mobilis	4-lobed	3-lobed	not specified	not specified
Molar lMd	distal margin rounded	medially notched	not specified	not specified
Mxp	fourth palpal article with appendix	fourth palpal article without appendix	not specified	not specified
Pr 6 and 7	anterior margins strongly convex	anterior margins strongly convex	anterior margins straight	anterior margins strongly convex
P5 and 7	dactylus without ventral appendices	dactylus with ventral appendices	not specified	not specified
Operculum	slightly anteriorly extended	slightly anteriorly extended	slightly anteriorly extended	strongly anteriorly extended, ventrally compressing Pr 6 and 7
Plp 3	protopodite 0.6 x endopodite length	protopodite 0.3 x endopodite length	not specified	not specified
Plp 5	1.4 times endopodite length of Plp 4	smaller than Plp 3 and 4	not specified	not specified

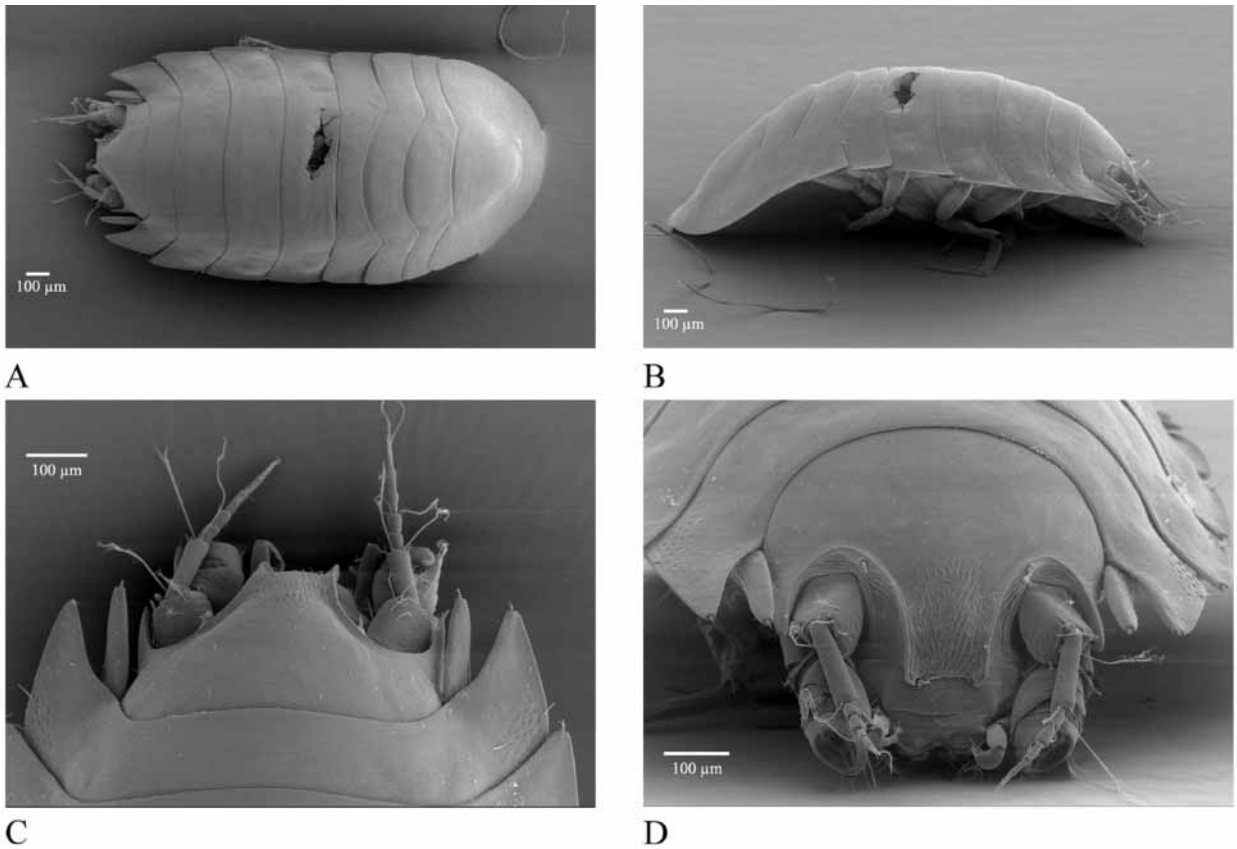

FIGURE 5. *Austroniscus chelus* sp. nov., paratype female (ZMH K–40993), SEM; A, habitus, dorsal view. B, habitus, lateral view. C, cephalothorax, dorsal view. D, cephalothorax frontally.

***Austroniscus obscurus* sp. nov.**
(Figs 6–9)

Material examined

Holotype: 1 ♀ (adult, 1.9 mm), eastern Weddell Sea, 71°18.61`S, 013°56.12`E–71°18.73`S, 013°56.12`E, *PS* ANT XXI/2, Station 232–1, 910–899.6 m, ZMH K–40994.

Paratypes: 3 ♀ (2 preparatory, 1 damaged), ZMH K–40995, 1 ♀ (SEM specimen), preparatory, ZMH K–40996, same station as holotype.

Diagnosis

Pereonite 1 strongly frontally directed, with a spine-like appendix inserting ventrally, tipped with a small spine and almost reaching anterior margin of the cephalothorax. Posterior half of *cephalothorax* half covered by pereonites 1–2. *Incisor* of right mandible with 6 teeth, left mandible with 5 teeth. *Lacinia mobilis* with 3 teeth. *Unguii* of pereopods 5 and 7 with 1–2 robust ventral spines proximally.

Description

Habitus of female holotype (Figs 6A, 9A–B) similar to *A. chelus* sp. nov.

Antennula length (Fig. 6B) 0.2 times body length, with 6 articles. Article 1 broad, 1.4 times longer than wide, with 3 broom setae (one broken off) and 3 slender simple setae of varying size. Article 2 as long as first, 3.7 times longer than wide; with 4 long broom setae and 2 small simple setae distally. Articles 3–4 about 1.5 times longer than wide, with 1–2 small simple setae distally. Article 5 elongated, 4 times longer than wide. Article 6 as long as article 3, with 2 long and 2 somewhat shorter simple setae terminally.

Antenna (Fig. 6C) long and slender, almost as long as body. Peduncular articles 1–4 short; article 3 with a large spine almost as long as article 4. Peduncular articles 5–6 long and slender; article 5 about 5.3 times longer than wide, with some short setae and 2 robust setae laterally, with 1 broom seta and 2 simple setae of varying size distally. Article 6 about 8.3 times longer than wide, with some short setae and 1 small seta laterally, with 5 broom setae and 5 simple setae of varying size distally. Distal 21 flagellar articles tapering in width and length distally. Flagellar article 1 longest, length 0.25 times peduncular article 6 length, 3.7 times longer than wide. Flagellar articles 1–20 with 1–5 setae distally; terminal article with 6 long and slender setae.

Right and left *mandible* (Fig. 6E, F) with long mandibular palp, overlapping incisor about one quarter. Article 1 shortest, in right mandible with 1 simple seta. Article 2 longest, medially and in left mandible also laterally with a row of short setules, with a single, more robust seta distally. Article 3 tapering in width distally, very slender in right mandible; ventral margin with some small, robust setae, with 1–3 somewhat longer robust setae terminally. Incisor in right mandible well pronounced, with 6 distinct teeth; in left mandible incisor short (damaged in this specimen), with 5 distinct teeth. Setal row of right mandible with 17 setae; distal setae most robust and dentate, expressivity of this dentation decreasing proximally; in right mandible setal row with 8 robust setae and 11 slender setae in between. Molar triangular, in right mandible with 4 simple and 4 serrated setae. Molar of left mandible with 11 fine setae laterally, apical margin notched, yielding several small setules.

Outer endite of *maxillula* (Fig. 6G) with 10 spine-like setae followed by 8 slender ones distally. Outer margin with 7 slender setae, inner margin with 4 short setae. Inner endite about half as long as outer endite, with 15 simple setae distally, outer margin with 3 short setae.

Maxilla (Fig. 6H) outer margin of lateral endite with few slender setae and with 3, medial endite with 4 strong setae of varying size distally. Outer margin of inner endite with numerous long, slender setae, inner margin with few slender setae; distal margin with few fine and 2 robust, somewhat longer setae. Surface of inner endite with few short setules.

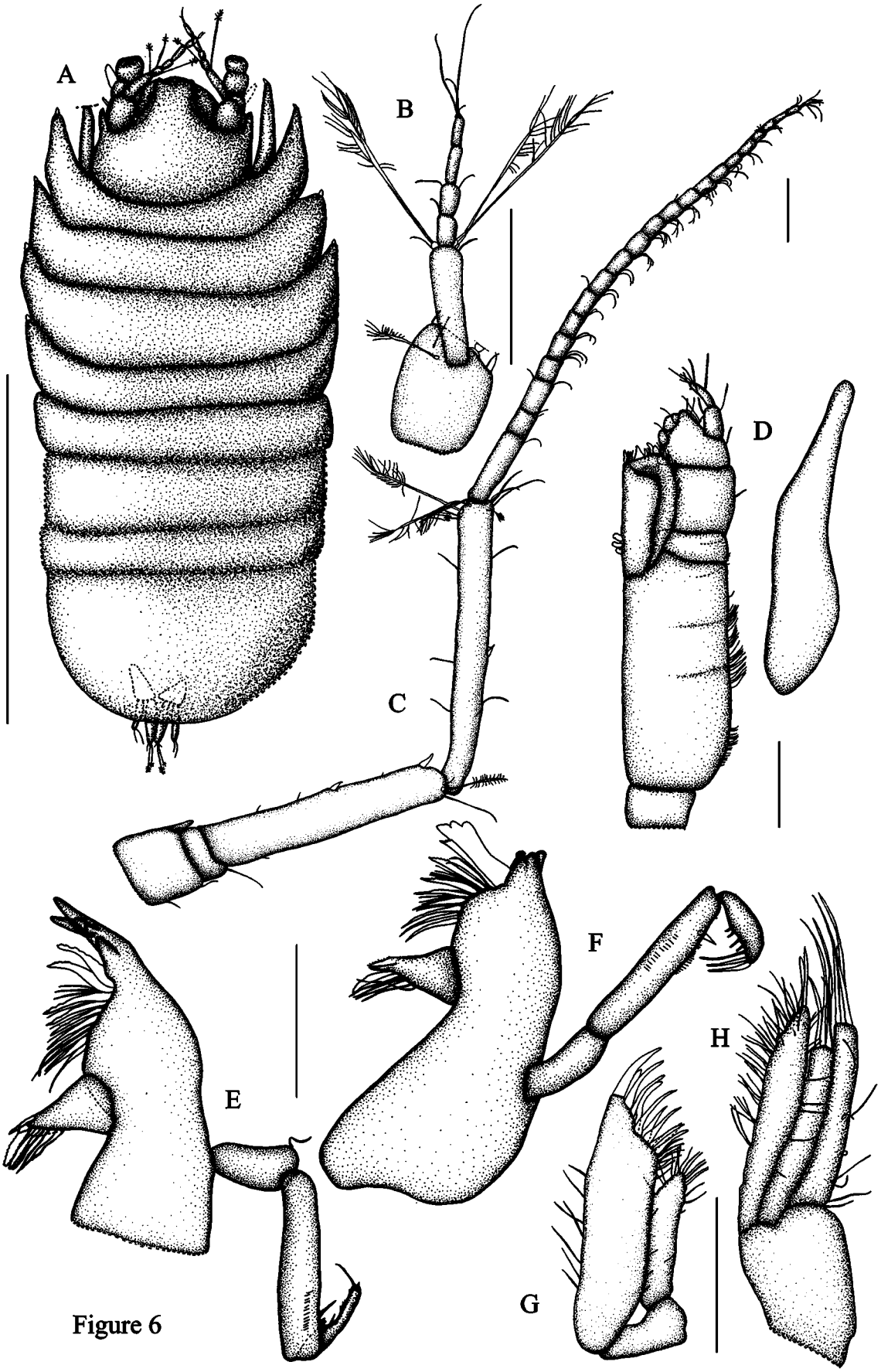

FIGURE 6. *Austroniscus obscurus* sp. nov.; A, holotype female (ZMH K–40994), habitus, dorsal view. B–H, paratype female (ZMH K–40995); B, A1. C, A2. D, Mxp. E, rMd. F, lMd. G, Mx1. H, Mx2. Scale bar: A = 1 mm; B–H = 100 µm.

Left and right *maxilliped* (Fig. 6D) connected by 3 retinacula. Epipodite triangular, slender, 4.5 times longer than wide, reaching middle of palpal article 2. Palpal article 1 short, 2.7 times wider than long, outer margin with some small setules. Article 2 longest, 2.3 times longer than wide, almost quadrangular, with 1 simple seta laterally. Article 3 twice as long as article 1, about 1.25 times longer than wide, notched distally, with 7 slender setae laterally. Article 4 as long as article 1, 1.5 times longer than wide, without appendix, with 2 simple setae distally. Article 5 as long as fourth, half of article 4 width, with 8 slender setae. Endite's inner margin with numerous slender setae; distal margin with several dentate setae, membranously embedded. Protopodite rectangular, width 1.6 times length.

Pereopod 1 (Fig. 7A) more robust than pereopods 2–7. Basis 3.7 times longer than wide; with 2 small broom setae and 3 short, simple setae dorsally, with 1 very long and 2 short broom setae and 3 simple setae ventrally. Ischium length half of basis length, twice as long as wide; with 1 slender and 1 robust seta dorsally and with 2 short slender setae ventrally. Merus length 0.7 times ischium length, 1.6 times longer than wide; with 2 robust setae distodorsally and with 2 slender setae distoventrally. Carpus length 2.2 times merus length, 3.5 times longer than wide; with 1 seta mediodorsally, ventral margin slightly concave, with 3 slender setae and 1 robust seta laterally, with 1 robust unequally bifid seta distally. Propodus length 0.7 times carpus length, 3 times longer than wide; with 1 long, slender seta mediodorsally, with a fringe of short setae, membranously embedded, and 1 robust unequally bifid seta ventrally and with 2 setae of varying size distally. Dactylus length 0.7 times propodus length, 4.3 times longer than wide; with 3 slender setae medially. Unguis with 2 robust, cuspidate setae, ventral one a bit shorter and more slender with 2 slender setae of similar size in between.

Basis of *pereopod 2* (Fig. 7B) 3.6 times longer than wide; with 1 broom seta and 1 simple seta dorsally; with 1 simple seta distoventrally. Ischium length half of basis length, about 2.4 times longer than wide; with 1 simple seta dorsally. Merus half of ischium length, 1.8 times longer than wide. Carpus length 3.3 merus length, 5.8 times longer than wide, with 1 long broom seta and 1 robust simple seta dorsally, with 4 robust unequally bifid setae and 1 robust simple seta ventrally. Propodus length 0.9 times carpus length, 8.4 times longer than wide; with 3 slender simple setae dorsally and with 1 simple seta medially, with 1 robust simple seta ventrally. Dactylus length 0.4 times propodus length, 6 times longer than wide; with 3 slender setae of varying size ventrally. Unguis with 1 robust cuspidate seta and with 2 slender setae ventrally.

Basis of *pereopod 3* (Fig. 7C) 3.8 times longer than wide; with 3 broom setae of varying size and 3 simple setae dorsally, with 4 short setae and 1 robust simple seta ventrally. Ischium length half of basis length, 2.4 times longer than wide; with 1 robust simple seta dorsally. Merus length 0.7 times ischium length, 1.9 times longer than wide; with 1 long, robust seta distodorsally and 1 slender simple seta ventrally. Carpus length 2.3 times merus length, 4.9 times longer than wide; with 1 long broom seta distodorsally, with 3 robust unequally bifid setae ventrally (2 broken off) and with 4 setae of varying size distoventrally. Propodus length 0.9 times carpus length, 6.5 times longer than wide; with 3 slender setae dorsally and 1 simple seta distally, with 3 robust unequally bifid setae and 1 simple seta ventrally. Dactylus length 0.5 times propodus length, 5.1 times longer than wide; with 4 slender setae of varying size medially. Unguis with 1 robust cuspidate seta and with 2 slender setae ventrally.

Basis of *pereopod 4* (Fig. 7D) 4.5 times longer than wide; with 1 simple seta dorsally and with 1 broom seta and 2 short simple setae ventrally. Ischium length half of basis length, 2.8 times longer than wide; with 1 slender simple seta ventrally. Merus half of ischium length, 1.7 times longer than wide; with 1 long, robust seta dorsally and 1 more slender seta distoventrally. Carpus length 2.7 of merus length, 5.9 times longer than wide; with 1 slender seta distodorsally and with 2 very small setae and 1 robust simple seta ventrally. Propodus length 0.8 times carpus length, 8.8 times longer than wide; with 2 slender simple setae distodorsally and with 3 slender simple setae ventrally. Dactylus length 0.4 times propodus length, 5 times longer than wide; with 3 slender setae of varying size medially. Unguis with 1 robust cuspidate seta and with 1 slender simple seta ventrally.

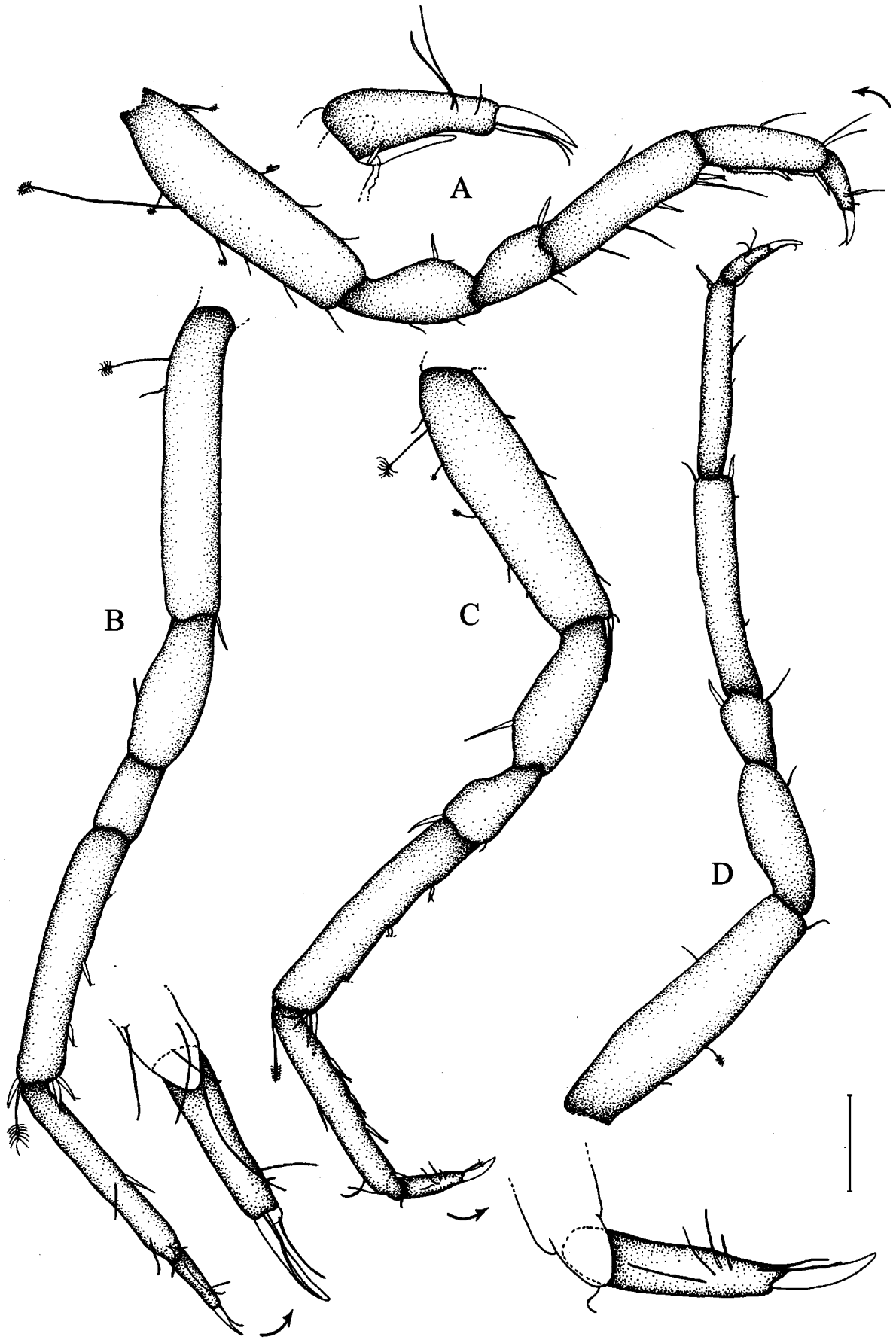

FIGURE 7. *Austroniscus obscurus* sp. nov., paratype female (ZMH K–40995); A–D, P1–4. Scale bar = 100µm.

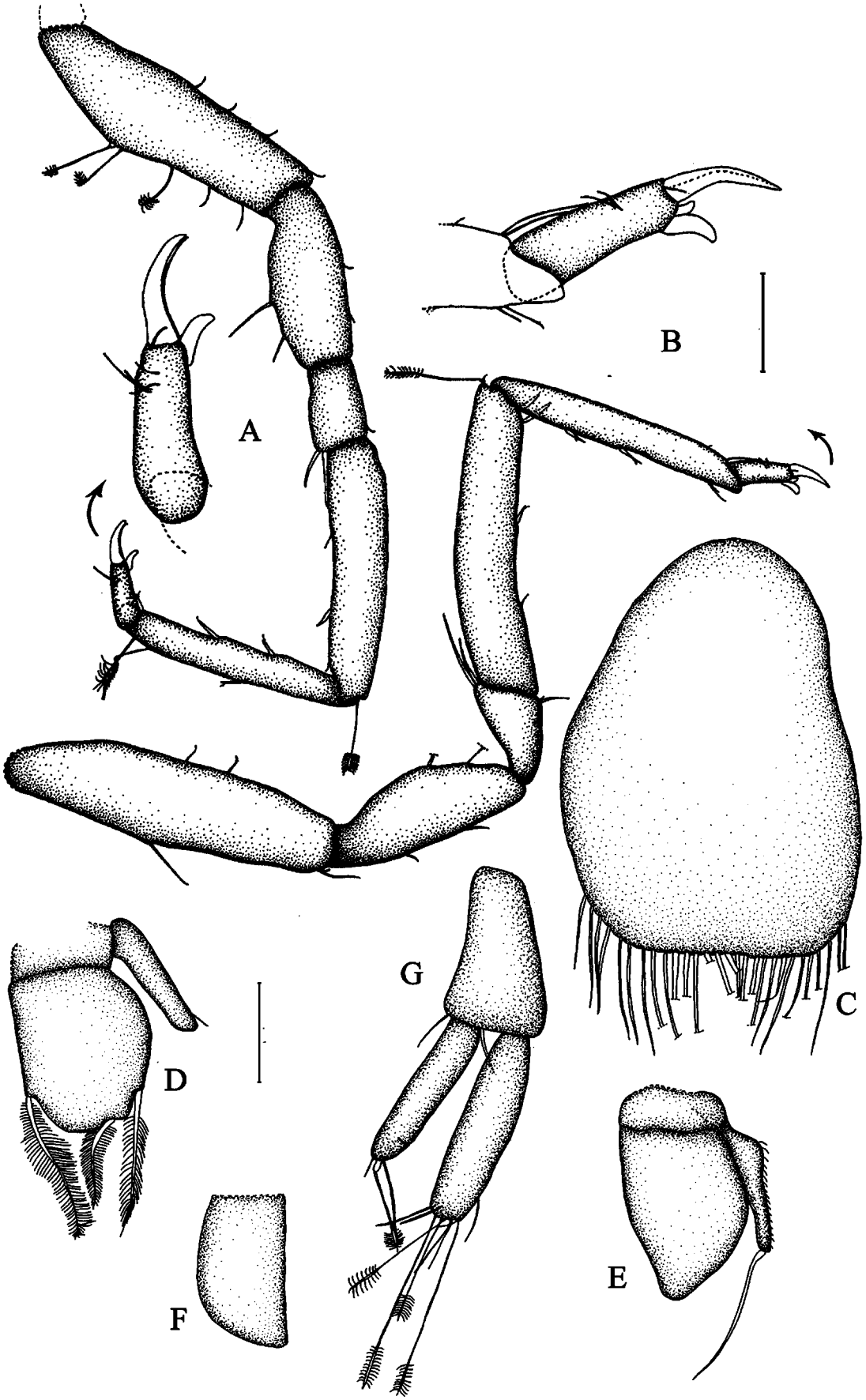

FIGURE 8. *Austroniscus obscurus* sp. nov., paratype female (ZMH K–40995); A–B, P5 and 7. C, Plp 2 (operculum). D–F, Plp 3–5. G, Urp. Scale bar = 100 µm.

Basis of *pereopod 5* (Fig. 8A) 3.2 longer than wide; with 4 short simple setae dorsally and 3 long broom setae and 2 slender simple setae ventrally. Ischium length 0.6 basis length, 2.5 times longer than wide; with 2 dorsal and 2 ventral setae of varying size. Merus half of ischium length, 1.6 times longer than wide; with 1 small simple seta dorsally and 2 robust, long setae distoventrally. Carpus length 2.9 times merus length, 4.7 times longer than wide; with 1 long broom seta distodorsally and with 1 robust unequally bifid seta and 2 slender simple setae ventrally. Propodus length 0.9 times carpus length, 7 times longer than wide; with 2 broom setae and 1 short unequally bifid seta dorsally, with 3 robust unequally bifid setae ventrally. Dactylus length 0.45 times propodus length, 4.8 times longer than wide; with 4 slender simple setae medially and with 1 appendix ventrally. Unguis with 1 robust cuspidate and 1 slender seta ventrally.

Pereopod 6 is missing.

Basis of *pereopod 7* (Fig. 8B) 4 times longer than wide; with 2 small simple setae dorsally and with 3 slender setae of varying size ventrally. Ischium length 0.6 times basis length, 2.8 times longer than wide; with 2 slender simple setae each dorsally and ventrally. Merus length 0.4 times ischium length, 1.3 times longer than wide; with 2 robust, long setae distodorsally and 2 short setae distoventrally. Carpus length 4.5 times merus length, 4.9 times longer than wide; with 1 long broom seta and 1 short simple seta distodorsally, with 1 short unequally bifid and 1 simple seta ventrally and with 2 robust setae distoventrally. Propodus length 0.9 times carpus length, 7.7 times longer than wide; with 1 robust and 1 slender simple seta of different size dorsally, with 2 robust unequally bifid setae and 2 slender simple setae ventrally. Dactylus length 0.4 times propodus length, 4.5 times longer than wide; with 3 slender simple setae medially and with 2 appendices of different size ventrally. Unguis with 1 robust cuspidate and 1 slender seta.

Pleopod 2 (*operculum*, Fig. 8C) 1.4 times longer than wide. Ventral surface with fissures; posterior margin with several (< 30) long, slender setae.

Pleopod 3 protopodite (Fig. 8D) rectangular, length 0.3 times endopodite length. Exopodite relatively long and slender, length 0.75 times endopodite length, about 4 times longer than wide, with 1 long, slender seta. Endopodite 1.2 times longer than wide, with 3 plumose setae distally.

Protopodite of *pleopod 4* (Fig. 8E) 2.4 times longer than wide, length 0.25 times endopodite length. Exopodite slender, about 5 times longer than wide, outer margin with several small setules, with 1 long, robust seta distally. Endopodite 1.4 times longer than wide, tapering distally.

Pleopod 5 (Fig. 8F) small oval lobe without setation; shorter than endopodites of pleopods 3 and 4, about 1.7 times longer than wide.

Uropods (Fig. 8G) biramous; protopodite trapezoid, as long as exopodite, 1.6 times longer than wide, with 2 slender setae distally. Exo- and endopodite almost of same length, about four fifths of endopodite length, 4.2 times longer than wide, with 2 broom setae and 1 simple seta terminally. Endopodite 3.9 times longer than wide, with 4 broom setae and 6 simple setae of varying size terminally.

Type locality

Eastern Weddell Sea, Kapp Norvegia.

Distribution

The species is only known from type locality.

Etymology

Obscurus (lat.) is masculine and means *hidden*. The name emphasises the fact that this species is difficult to distinguish from *Austroniscus chelus* sp. nov.

Remarks

Differences between *Austroniscus obscurus* sp. nov. and *Austroniscus chelus* are referred to in the remark section above.

The new species also resembles *Austroniscus ovalis* Vanhoeffen, 1914 and differs from that species as follows: the rostrum not as deeply vaulted as in *A. ovalis* (Fig. 11C, D); first pereonite anterofrontally directed and tipped with a small spine (Figs 9A, 11C); second article of antennula with 4 long broom setae.

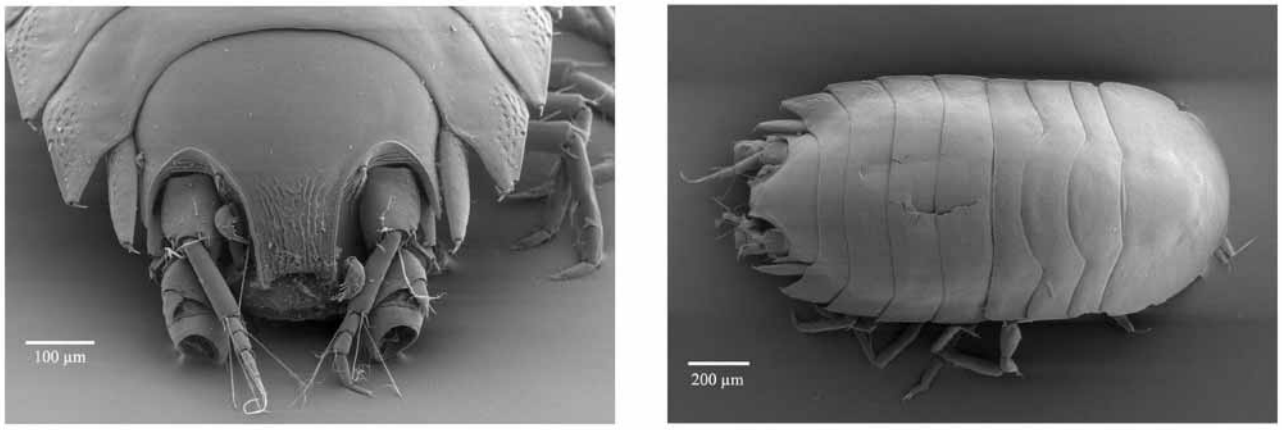

FIGURE 9. *Austroniscus obscurus* sp. nov., paratype female (ZMH K–40996), SEM; A, cephalothorax frontally. B, habitus, dorsal view.

***Austroniscus ovalis* Vanhoeffen, 1914**
(Figs 10–11)

Material examined

Paratype: 1 ♀ (1.9 mm), E-Antarctica, Gauss-Station, 70–385 m, Museum für Naturkunde, Berlin, Nr. 17681.

Other material: 3 ♀ (1 preparatory, 2 for SEM), eastern Weddell Sea, 71°18.61`S, 013°56.12`E–71°18.73`S, 013°56.12`E, *PS* ANT XXI/2, Station 232–1, 910–899.6 m, ZMH K–41123.

Diagnosis

Anterior margin of *cephalothorax* strongly concave. *Pereonite 1* not frontally directed, lateral margins rounded; with 2 spine-like appendices inserting ventrally.

Description

Habitus of paratype female (Figs 10A, 11A): considerably broadened and flattened. *Body* about 1.9 mm length, 1.5 times longer than wide. *Coxae* not visible in dorsal view. *Pereonites 2–4* with strongly projected laterofrontal margins, with a small spine apically. Lateral margins of pereonite 1 rounded, with two spine-like appendices inserting ventrally on both sides of cephalothorax and tipped with a small spine, appendices distinctly separated from cephalothorax by a suture line. *Pereonites 2–7* of similar size, Pereonite 4 widest, pereonite 1 width 0.6 times pereonite 4 width. *Pleotelson* (Fig. 10B) length 0.3 times body length, twice as long as wide; width 0.9 times pereonite 4 width¸ anterior margin slightly concave, posterior margin strongly rounded. *Uropods* not projecting above posterior margin (Fig. 11B).

Cephalothorax (Figs 10A, 11C–D): free, 1.7 times longer than wide, length 0.4 times body length (measured medially), width half of pereonite 4 width, with a well developed *rostrum*, deeply vaulted. *Antennae* inserting frontolaterally in a deep fold between rostral crest and anterolateral triangular projections; each fold medially with a single spine. Posterior margin of cephalothorax slightly rounded.

Antennula (Fig. 10C) with 6 articles. Article 1 as long as article 2, 1.3 times longer than wide. Article 2

about 4.6 times longer than wide, with 3 long broom setae and 2 small simple setae distally. Articles 3–6 together as long as article 1, each of similar size. Articles 4–5 each with 1 short seta distally, article 6 with 5 setae of varying size terminally.

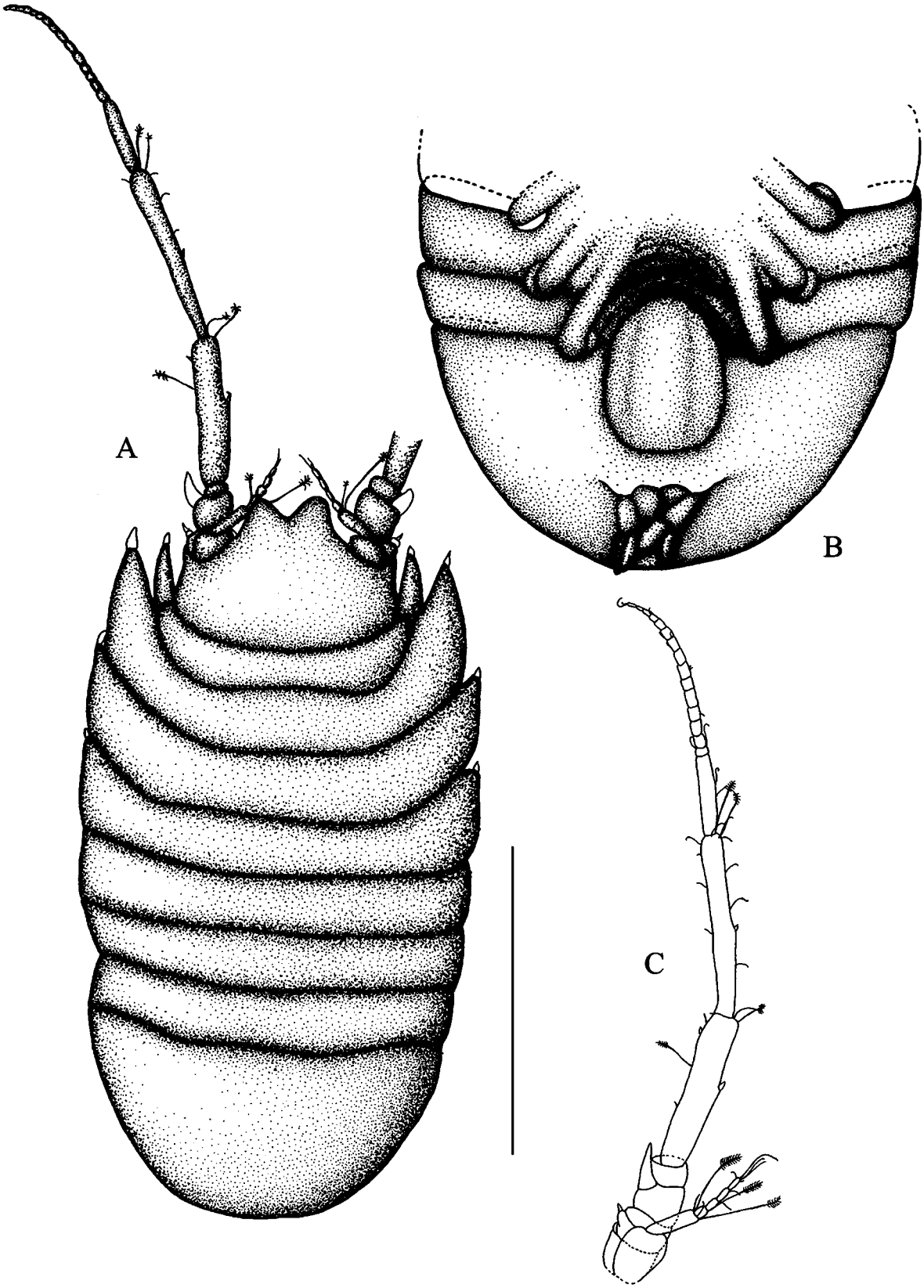

FIGURE 10. *Austroniscus ovalis* Vanhoeffen, 1914, paratype female (Museum für Naturkunde, Berlin, No. 17681); A, habitus, dorsal view. B, Plt, ventral view. C, A1 and A2. Scale bar = 1 mm.

Antenna (Fig. 10C) somewhat longer than body length. Peduncular articles 1–4 short, articles 1–3 of similar size. Article 4 length 0.6 times of article 3 length. Article 2 with a tooth-like projection bearing a spine. Article 3 with a big spine, extending beyond article 4. Article 5 about 1.3 times longer than articles 1–4 together, with 2 robust setae and 8 slender setae laterally and with 2 broom setae and 2 somewhat shorter simple setae distally. Article 6 somewhat longer and more slender than article 5, with 1 robust seta and 8 fine setae laterally, with 2 broom setae and 2 somewhat shorter simple setae distally. Distal 16 flagellar articles tapering in width and length. Flagellar article 1 longest, about one half of peduncular article 5, with 2 fine simple setae laterally; other flagellar articles with single short setae, terminal article with 2 simple setae.

Remarks

The redescription of *Austroniscus ovalis* was necessary because some characters, e.g. the shape of the first pereonite, were not correctly described by Vanhoeffen (1914) and drawings of the antennae were inaccurate. Yet, these features are very important for the distinction of the three species *Austroniscus chelus* sp. nov., *Austroniscus obscurus* sp. nov. and *Austroniscus ovalis*.

Furthermore, SEM pictures were made from new material of *Austroniscus ovalis* (BENDEX expedition). These specimens from western Antarctica show some differences from the species sampled by Vanhoeffen (1914) in eastern Antarctica (Table 2): anterior margins of pereonites 6 and 7 strongly convex (Fig. 11A); operculum anteriorly extended ventrally compressing sixth and seventh pereonite (Fig. 11B). These differences are regarded as a variation within *Austroniscus ovalis*, and do not present the characters of a new species.

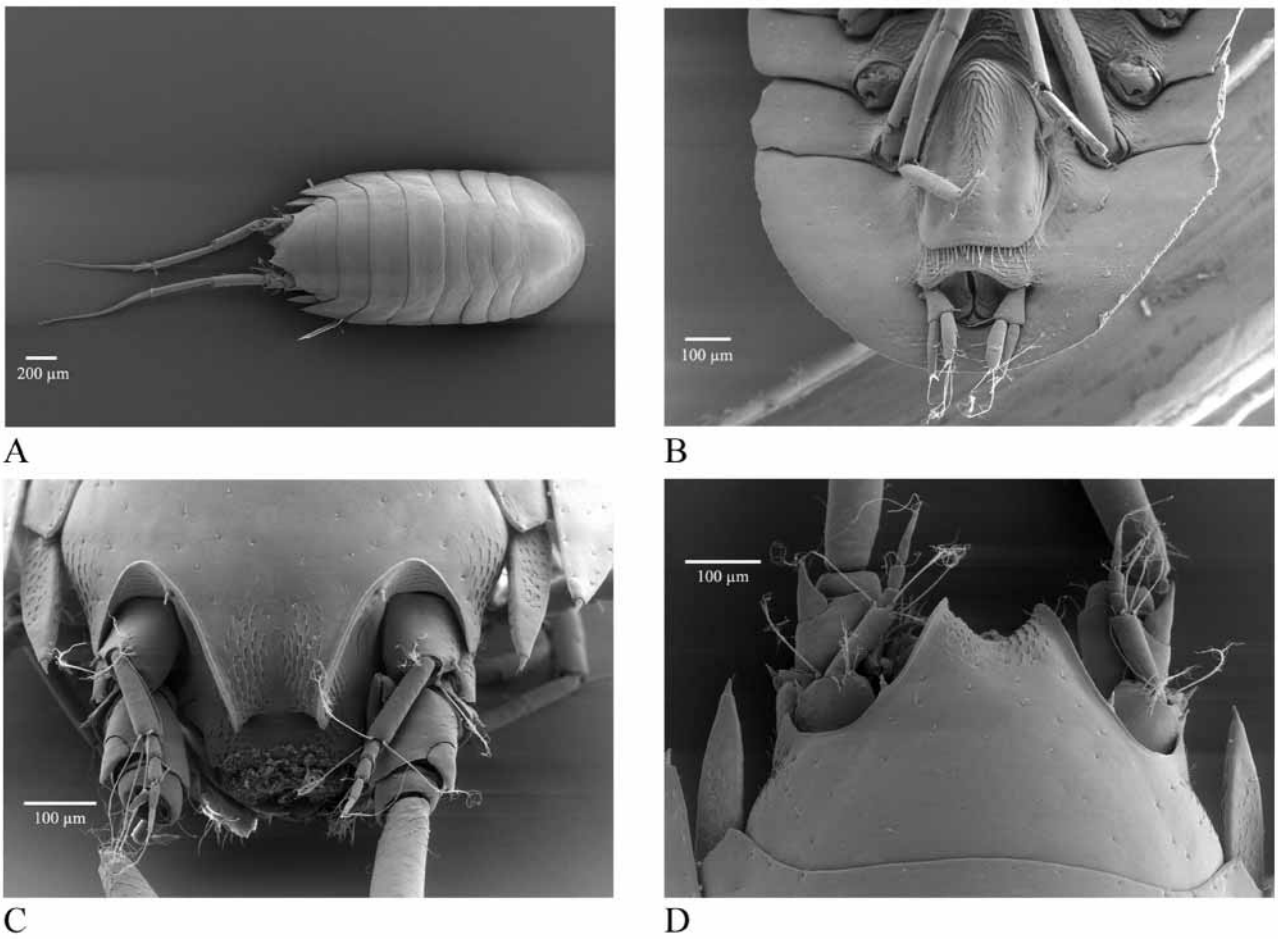

FIGURE 11. *Austroniscus ovalis* Vanhoeffen, 1914, paratype female (BENDEX, ZMH K–41123), SEM; A, habitus, dorsal view. B, Plt, ventral view. C, cephalothorax frontally. D, cephalothorax dorsally.

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