

Three new species of *Porcellium* (Isopoda: Oniscidea) from the Caucasus region

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Abstract

Three new species of the terrestrial isopod genus *Porcellium* are described from the western Caucasus region. This means a considerable range extension of the genus to the east, up to now the genus was known from Europe, with easternmost records in Ukraine.

Key words: Isopoda, Oniscidea, *Porcellium*, new species, Caucasus region.

Zusammenfassung

Drei neue Arten der Landisopoden-Gattung *Porcellium* werden aus der westlichen Kaukasus-Region beschrieben. Daraus ergibt sich eine bedeutende Erweiterung des Verbreitungsgebietes dieser Gattung nach Osten, denn bis jetzt war *Porcellium* aus Europa bekannt, mit den östlichsten Fundorten in der Ukraine.

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1 Introduction

Up to now the genus *Porcellium* Dahl, 1916 (presently ascribed to the family Trachelipodidae) was known from Europe, with the exception of Scandinavia, the British Isles and the Iberian Peninsula. Twelve species have been described, most of them from southeastern Europe (SCHMALFUSS 1996). Recent collections from the north-western Caucasus region (Russia and Georgia) yielded three new species which we consider to belong to this genus and which are described and illustrated in the present publication.

Abbreviations

SFUR Southern Federal University, Rostov-on-Don, Russia
SMNS Staatliches Museum für Naturkunde Stuttgart (+ number of isopod collection)

Acknowledgments

Dr. S. GOLOVATCH (Moscow) has donated isopod material used in the article; Drs. S. SFENTHOURAKIS (Patras) and S. TAITI (Florence) helped to improve the original manuscript, J. REIBNITZ (SMNS) edited the illustrations and Dr. K. WOLF-SCHWENNINGER (SMNS) operated the scanning electron microscope. To all of them we wish to express our sincere thanks.

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2 The genus *Porcellium* Dahl, 1916

VERHOEFF (1907: 245) described *Porcellidium* as a subgenus of *Porcellio*. This name was preoccupied by a copepod genus described 1860, so DAHL (1916) changed it to *Porcellium* and raised it to the genus level. The type species is *Porcellio conspersus* C. L. Koch, 1841.

Diagnostic characters (compare SCHMALFUSS 1996): Posterior margin of pereion-epimera 1 clearly concave. Uropods shortened, compared with other genera of the family Trachelipodidae. Inner margins of pleon-epimera 5 less divergent than in other genera of the family, partly parallel or convergent. Telson always with rounded or truncate apex, never pointed at the tip. Median lobe on frontal part of head protruding as far as the well-developed side-lobes. No recognizable gland pore fields on the pereion-epimera. Weakly developed folded lungs in all five pleopod-exopodites (simple *Trachelipus*-type).

The cuticular characters vary greatly in the genus, from smooth to highly tuberculated. An exo-antennal conglobation ability has evolved in several members of the genus (e. g. *P. pieperi*, see SCHMALFUSS 1996).

Although none of these characters is restricted to the genus *Porcellium*, the character combination pleads for a monophyly of the genus, which is corroborated by the distribution of the species. The genus is currently ascribed to the family Trachelipodidae (“Trachelipodidae” s. str. in SCHMIDT (2003: 124). This taxon may be para- or polyphyletic, since it is based exclusively on plesiomorphic characters.

3 Descriptions of three new species

3.1 *Porcellium minoranskyi* n. sp.

(Figs. 1–21, map Fig. 42)

Material examined

Holotype: ♂, Russia, northwestern Caucasus region, Republic of *Adygea*, *Lago-Naki* plateau, Partisanskie polyany, bank of river *Armyanka*, subalpine meadow, 1737 m, under stones, 27.VI.2010, leg. D. KHISAMETDINOVA & A. EVSUKOV (SMNS T609).

Paratypes: 3 ♂♂, 3 ♀♀ (2 ♀♀ with marsupium, 1 ♀ without marsupium), same data as holotype (SMNS T610). – 1 ♂, 3 ♀♀ (without marsupium), same locality as holotype, 1.VII.2011, leg. D. KHISAMETDINOVA (SMNS T611, 1 ♂ in SFUR).

Derivatio nominis

The new species is dedicated to Prof. Dr. VIKTOR MINORANSKY (Southern Federal University, Rostov-on-Don, Russia) who supported the first author in many ways during her Ph. D. work.

Diagnostic characters

Maximum dimensions: 6.6 × 3.4 mm (♀, with marsupium), 4.3 × 2.2 mm (♂).

Coloration: Grayish brown with yellowish spots.

Cuticular structures: Head and tergites with pronounced tuberculation (compare Figs. 1, 2, 14–16).

Frontal part of head with very protuberant triangular middle lobe and well-developed semicircular side-lobes, which are slightly shorter than the middle lobe (Figs. 1, 14). Eyes with 11 ommatidia. Posterior margin of pereion-epimeron 1 with rounded concavity (Figs. 1, 3, 14, 16). Position of noduli laterales see Figs. 3 and 16, on epimeron 1 the nodulus is slightly more distant from the lateral margin than on epimeron 2. Posterior part of telson with parallel sides, apex truncate or broadly rounded (Figs. 2, 15). Flagellum of antenna with proximal segment about 2.5 times as long as distal segment (Fig. 11). Male carpus 1 without ventral brush of spiny setae (Fig. 12), but with usual antennal cleaning apparatus (present in all species of Crinocheta and also in females). Male ischium 7 ventrally

straight, without sexual modifications (Fig. 13). Pleopod-exopodites with weakly developed respiratory structures (Figs. 5–9, 17–21). Male pleopod-exopodite 1 without triangular hind-lobe (Fig. 5), endopodite 1 with apex bent outwards in a right angle (Fig. 10). Female pleopod-exopodites see Figs. 17–21.

Distribution

Known only from the type locality in the northwestern Caucasus region (map Fig. 42).

Differential diagnosis

The new species shows a great similarity to *P. euboicum* from central Greece concerning the tuberculation, the morphology of head and telson, the proportions of the uropods, and the shape of the male ischium 7 and the male pleopod-endopodite 1 (compare Figs. 1, 2, 4, 10, 14–16 in the present paper with figs. 10, 13, 14, 16 in SCHMALFUSS 1996). There are, however, differences in the shape of the pereion-epimeron 1 (posterior margin with an angle in *P. euboicum*, see figs. 10, 11 in SCHMALFUSS 1996, rounded in *P. minoranskyi*, see Figs. 1, 3 in the present paper), in the position of the noduli laterales of pereion-epimera 1 and 7 (considerably more distant from lateral margin in *P. euboicum*, see figs. 11, 12 in SCHMALFUSS 1996 and Figs. 3, 16 in the present paper), and in the shape of the male pleopod-exopodite 1 (with a short posterior lobe in *P. minoranskyi*, see Fig. 5 in the present paper, completely without hind lobe in *P. euboicum*, see fig. 15 in SCHMALFUSS 1996). These differences indicate that the two taxa are not conspecific. From geographical reasons, it would also be somehow improbable to find the same species on an Aegean island and in the northern Caucasus. So the similarities seem to have evolved as convergent characters.

3.2 *Porcellium golovatchi* n. sp.

(Figs. 22–29, map Fig. 42)

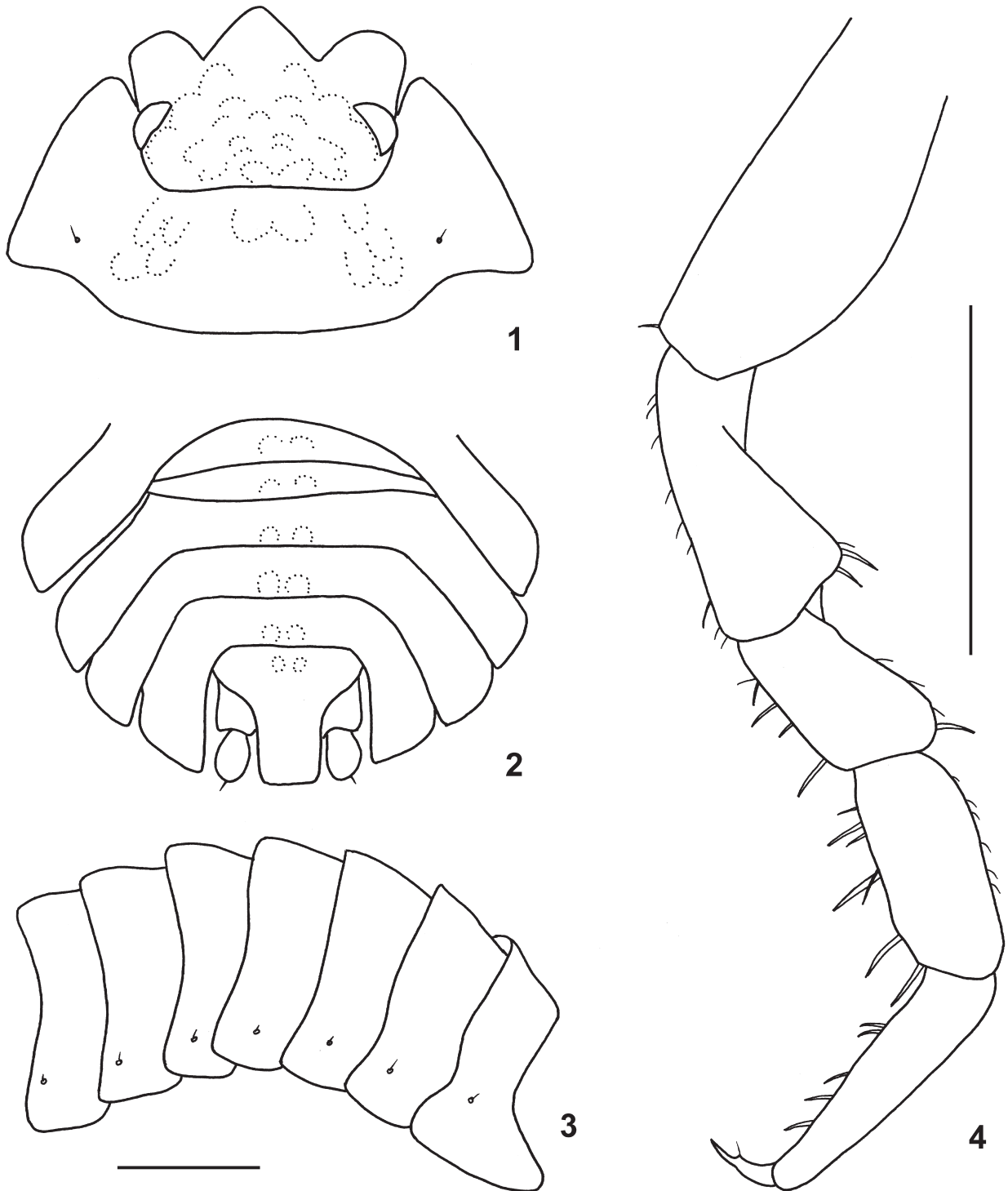
Material examined

Holotype: ♀ (without marsupium), northern Georgia, 40 km W of Mestia, Kherkhvashi, E of Nakra [= Naki], 1250–1700 m, *Quercus*, *Fagus*, *Abies* etc. forest, 21.VIII.–21. IX.1986, leg. S. GOLOVATCH (SMNS T612).

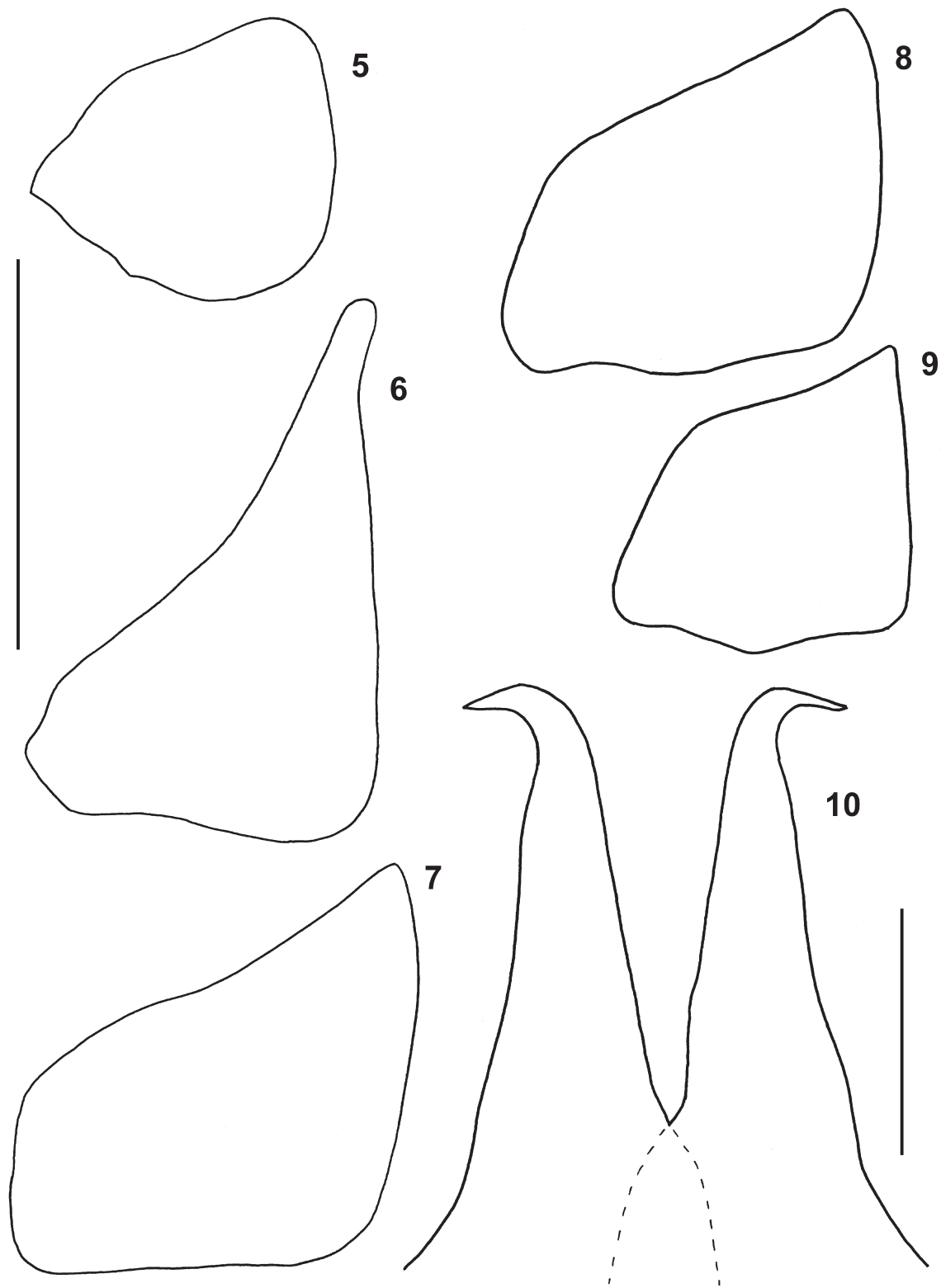
Paratype: ♀ (without marsupium), same data as holotype (SMNS T613).

Derivatio nominis

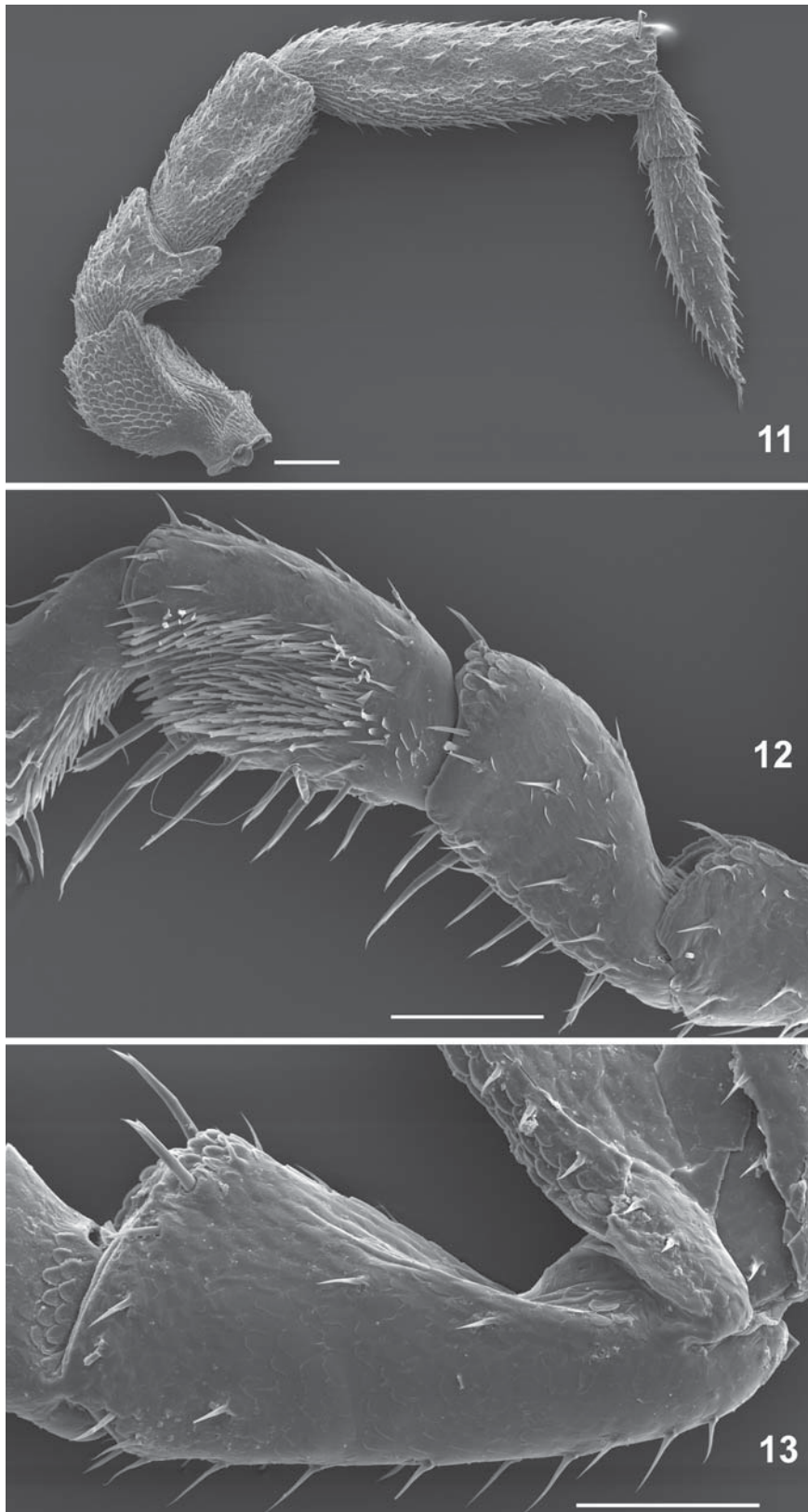
The new species is named after Dr. SERGEI GOLOVATCH (Moscow) who has compiled comprehensive collections of isopods from the Caucasus region and thus contributed greatly to the knowledge of Caucasian woodlice.



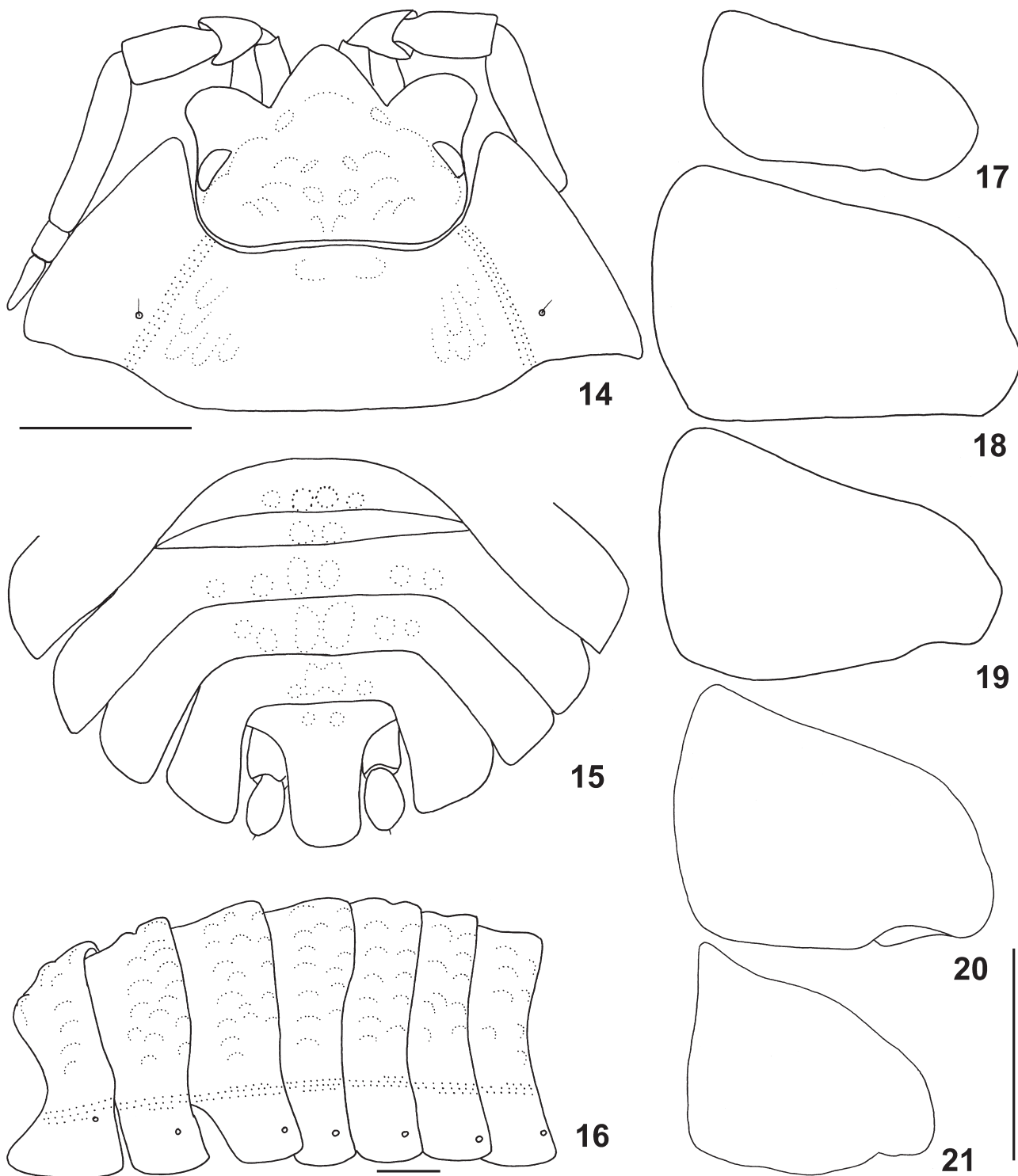
Figs. 1–4. *Porcellium minoranskyi* n. sp., ♂, 4.3 × 2.1 mm, holotype (SMNS T609). – 1. Head and pereion-tergite 1, dorsal view. 2. Pleon with telson and uropods, dorsal view. 3. Pereion-epimera and position of noduli laterales. 4. Pereiopod 7, frontal view. – Scales: 0.5 mm.



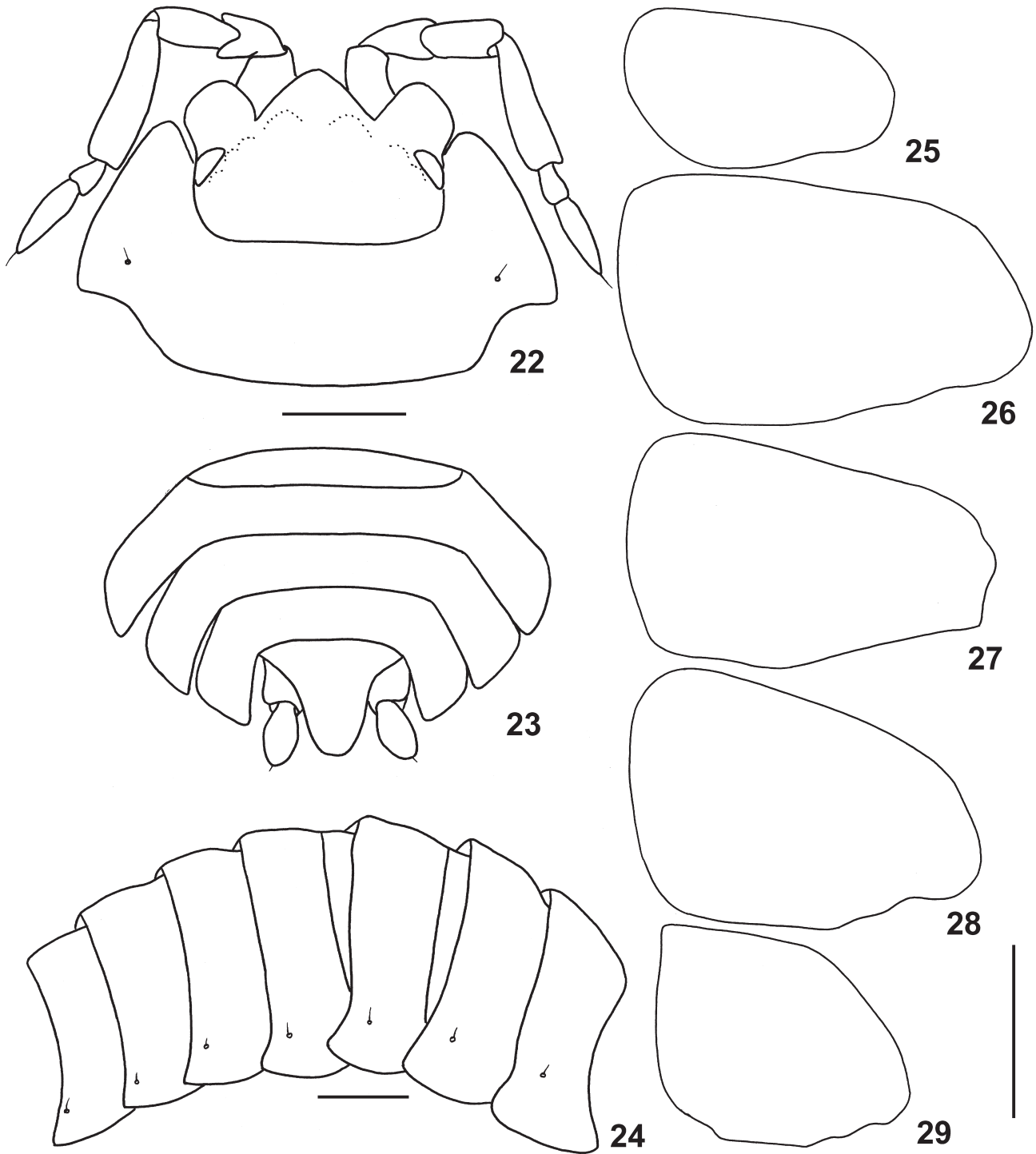
Figs. 5–10. *Porcellium minoranskyi* n. sp., ♂, 4.3 × 2.1 mm, holotype (SMNS T609). – 5–9. Pleopod-exopodites 1–5. 10. Pleopod-endopodite 1. – Scales: 0.5 mm (5–9), 0.2 mm (10).



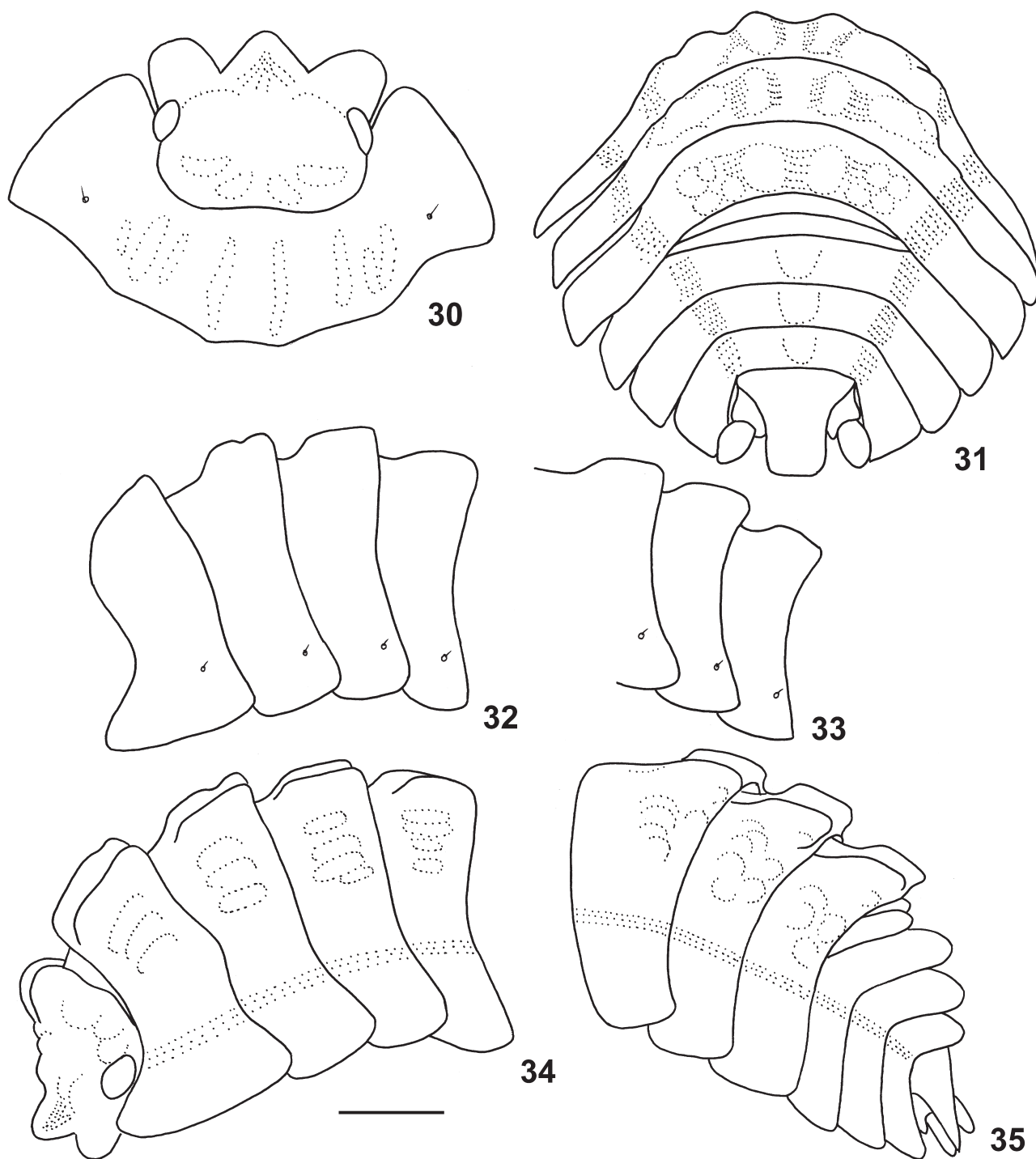
Figs. 11–13. *Porcellium minoranskyi* n. sp., ♂, 4.5 × 2.4 mm, paratype (SMNS T611), SEM-photographs. – 11. Antenna. 12. Pereiopod 1, frontal view. 13. Ischium 7, caudal view. – Scales: 0.1 mm.



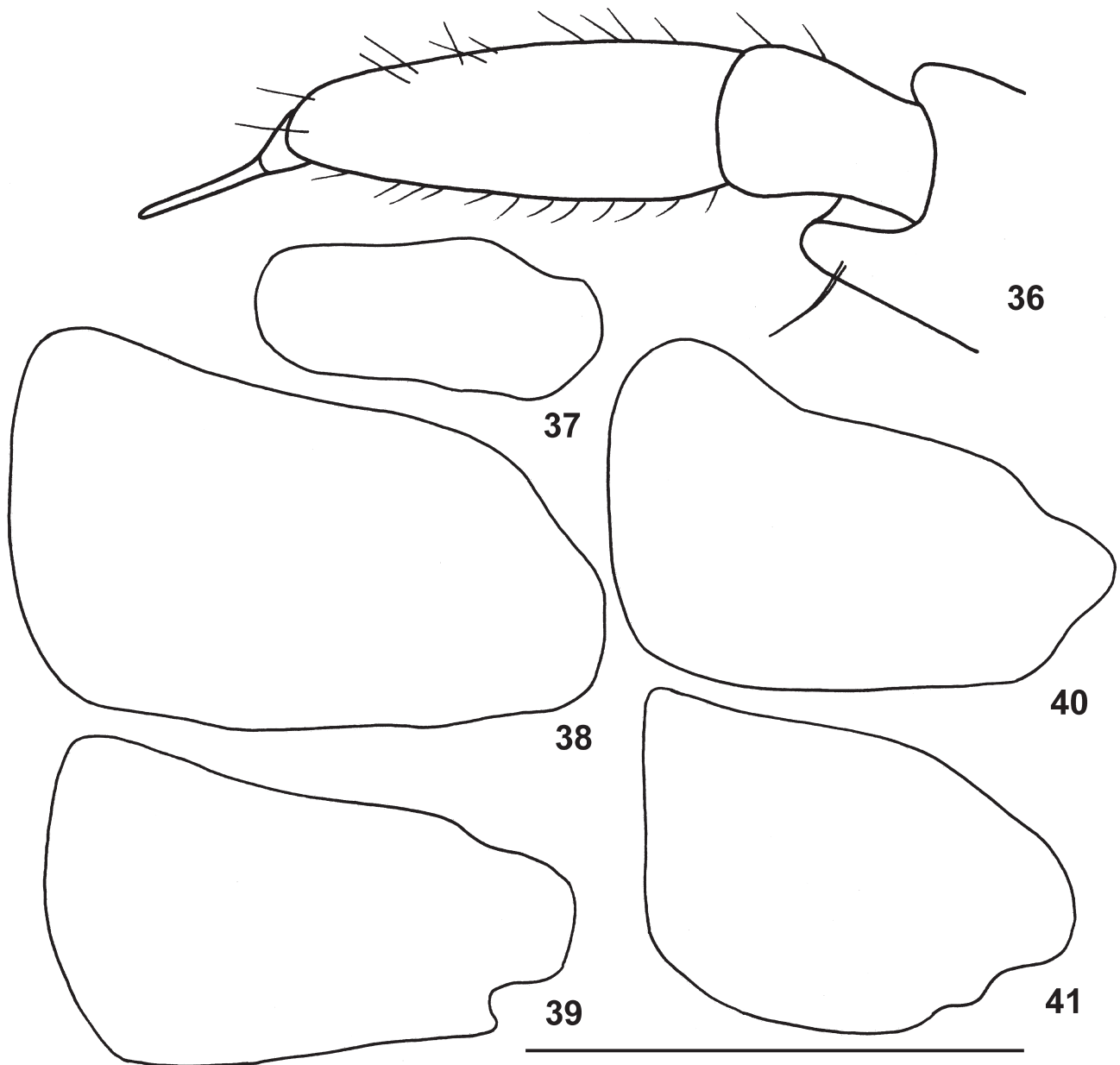
Figs. 14–21. *Porcellium minoranskyi* n. sp., ♀, 6.6 × 3.4 mm, paratype (SMNS T610). – **14.** Head and pereion-tergite 1, dorsal view. **15.** Pleon with telson and uropods, dorsal view. **16.** Pereion-epimera with positions of noduli laterales. **17–21.** Pleopod-exopodites 1–5. – Scales: 0.5 mm.



Figs. 22–29. *Porcellium golovatchi* n. sp., ♀, 5.3 × 2.3 mm, holotype (SMNS T612). – **22.** Head and pereion-tergite 1, dorsal view. **23.** Pleon with telson and uropods, dorsal view. **24.** Pereion-epimera with positions of noduli laterales. **25–29.** Pleopod-exopodites 1–5. – Scales: 0.5 mm.



Figs. 30–35. *Porcellium kutaisium* n. sp., ♀, 4.7×2.3 mm, holotype (SMNS T614). – **30.** Head and pereion-tergite 1, dorsal view. **31.** Pereion-tergites 5–7 and pleon with telson and uropods, dorsal view. **32.** Pereion-tergites 1–4 with noduli laterales, lateral view. **33.** Pereion-tergites 5–7 with noduli laterales, lateral view. **34.** Pereion-tergites 1–4 with very pronounced tuberculation and two paramedian crests, lateral view. **35.** Pereion-tergites 5–7 with very pronounced tuberculation and two paramedian crests and pleon-tergites 3–5 with prominent median tubercle, lateral view. – Scale: 0.5 mm.



Figs. 36–41. *Porcellium kutaishium* n. sp., ♀, 4.7 × 2.3 mm, holotype (SMNS T614). – 36. Antennal flagellum. 37–41. Pleopod-exopodites 1–5. – Scale: 0.5 mm.

Diagnostic characters

Maximum dimensions: 5.3 × 2.4 mm.

Coloration: Dirty white with very light brownish spots, epimera completely without pigmentation, eyes black.

Cuticular structures: Head and tergites very slightly tuberculated.

Frontal part of head with very protuberant triangular middle lobe and well-developed quadrangular side-lobes, which are slightly shorter than the middle lobe (Fig. 22).

Eyes with 12 ommatidia. Posterior margin of pereion-epimeron 1 with rounded concavity (Figs. 22, 24). Position of noduli laterales see Fig. 24, on epimeron 1 the nodulus is slightly more distant from the lateral margin than on epimeron 2. Posterior part of telson with convergent sides, apex rounded (Fig. 23). Flagellum of antenna with proximal segment slightly shorter than half the length of distal segment (Fig. 22). Pleopod-exopodites with weakly developed respiratory structures (Figs. 25–29) as in the previous species. Male characters unknown.

Differential diagnosis

The species is very similar to *P. minoranskyi* concerning the somatic characters (males are unknown), there are, however, significant differences in the tuberculation (clearly developed in *P. minoranskyi*, only traces in *P. golovatchi*) and in the shape of the telson. The apical part has convergent sides and the apex is rounded in *P. golovatchi*, while in *P. minoranskyi* the apical part has parallel sides and the apex is truncate (compare Figs. 2, 15, 23).

Distribution

Known only from the type locality in northern Georgia (map Fig. 42).

3.3 *Porcellium kutaissium* n. sp. (Figs. 30–41, map Fig. 42)

Material examined

Holotype: ♀ (without marsupium), Georgia, ± 30 km NE of Kutaisi, pass between Tkibuli and Mukhura, 1050 m, *Buxus*, 10.V.1987, leg. GOLOVATCH & ESKOV (SMNS T614).

Derivatio nominis

The species is named after the town in Georgia in whose neighborhood the type material was found.

Diagnostic characters

Maximum dimensions: 4.7 × 2.3 mm.

Coloration: Light brown with yellowish spots, epimera without pigmentation, eyes black.

Cuticular structures: Head and tergites with very pronounced tuberculation, pereion-tergites with two paramedian crests, pleon-tergites 3–5 with prominent median tubercle (Figs. 30–31, 34, 35).

Frontal part of head with protuberant triangular middle lobe and well-developed rounded side-lobes, which are slightly shorter than the middle lobe (Fig. 30). Eyes with 10 ommatidia. Posterior margin of pereion-epimeron 1 with rounded concavity (Figs. 30, 32, 34). Position of noduli laterales see Figs. 32–33, on epimeron 1 the nodulus is slightly more distant from the lateral margin than on epimeron 2. Posterior part of telson with parallel sides, apex truncate (Fig. 31). Flagellum of antenna with proximal segment about twice as long as distal segment (Fig. 36). Pleopod-exopodites with weakly developed respiratory structures, exopodite 1 in female relatively smaller than in the other two species (Figs. 37–41). Male characters unknown.

Differential diagnosis

This new species is again very similar to *P. minoranskyi*, as far as the somatic characters of the female are



Fig. 42. Records of *Porcellium minoranskyi* n. sp. (■), *Porcellium golovatchi* n. sp. (▲) and *Porcellium kutaissium* n. sp. (◆).

concerned (males unknown). The only, but significant difference lies in the tuberculation of the tergal parts. In *P. kutaishium* it consists of very prominent longitudinal ridges, especially the two paramedian ones on the pereion-tergites, and a single prominent median tubercle on pleon-tergites 3–5, while in *P. minoranskyi* the pereion-tergites bear recognizable but much less prominent rounded tubercles and the pleon-tergites have two paramedian tubercles (see Figs. 14–16, 30, 31, 34, 35).

Distribution

Known only from the type locality in central Georgia (map Fig. 42).

4 Discussion

The genus *Porcellium* was up to now known only from central and eastern Europe, with one widespread species also occurring in western Europe (SCHMALFUSS 1996). The new species described in the present article extend the distribution area considerably to the east, including now the western Caucasus area (Russian Federation and Georgia).

Concerning the respiratory organs in the pleopod-exopodites the original situation in *Porcellium* is to have *Trachelipus*-like organs in all five exopodites. In a number of species these organs are so weakly developed that they cannot be recognized in the posterior exopodites by light microscopy. The three new species from the Caucasus region belong to this latter category, since in the posterior exopodites it is very difficult to recognize respiratory organs by light microscopy. To avoid wrong interpretations we show in the drawings only the outlines of the exopodites. For objective illustrations SEM-photographs would be necessary. The specimens would need a critical point drying because of their fragility, so for the moment we refrain from SEM-investigations as long as only a few type specimens are available.

In other genera similar situations are known concerning the variability of the respiratory organs inside the genus, e. g. in the East-Mediterranean group of *Nagurus* (see SCHMALFUSS 1994) or in *Orthometopon* (see SCHMALFUSS 1993). In this light we suspect that *Brevurus masandaranus*, described by SCHMALFUSS (1986) from northern Iran (Elburs Mountains), may also be a species of *Porcellium* without recognizable respiratory organs in the posterior pleopod-exopodites. In this case the genus *Brevurus* would be a synonym of *Porcellium*. However, we do not wish to make any final conclusions before new material of this species has been collected, allowing also molecular investigations which should either corroborate or falsify this hypothesis.

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