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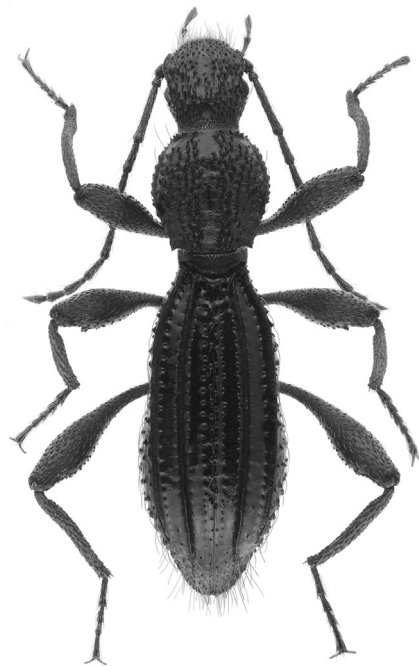


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A new species of soldier beetles of the genus *Podistra* Motschulsky, 1839 (Coleoptera: Cantharidae) from the Northern Caucasus, with notes on distribution of the genus

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Abstract. A new species of soldier beetles of the genus *Podistra* Motschulsky, 1839, *P.* (s. str.) *makarova* sp. n., is described from the vicinity of Mount Elbrus, in Kabardino-Balkaria, Russia. The total number of *Podistra* species registered in the Northern Caucasus is thus raised to sixteen. Unlike many species of the genus in the area, males of the new taxon are winged and have developed elytra. Photos of the aedeagus of the holotype of *P.* (s. str.) *iugosa* Kazantsev, 2010 are given for the first time. Provided is a key to all *Podistra* species of the Northern Caucasus, with their distribution map.

Key words: Coleoptera, Cantharidae, Cantharinae, *Podistra*, new species, key to species, Palaearctic.

Новый вид жуков-мягкотелок рода *Podistra* Motschulsky, 1839 (Coleoptera: Cantharidae) с Северного Кавказа с замечаниями о распространении рода

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Резюме. Из окрестностей горы Эльбрус, Кабардино-Балкария, описан новый вид жуков-мягкотелок рода *Podistra* Motschulsky, 1839: *P.* (s. str.) *makarova* sp. n. Общее число видов *Podistra*, зарегистрированных на Северном Кавказе, таким образом, увеличивается до шестнадцати. В отличие от многих представителей рода региона, самцы нового таксона крылатые и имеют развитые надкрылья. Впервые приведены фотографии эдеагуса голотипа *P.* (s. str.) *iugosa* Kazantsev, 2010. Дана определительная таблица всех видов *Podistra* Северного Кавказа, а также карта их распространения.

Ключевые слова: Coleoptera, Cantharidae, Cantharinae, *Podistra*, новый вид, определительная таблица, Палеарктика.

Introduction

The soldier beetle genus *Podistra* Motschulsky, 1839 is widely distributed in the Holarctic realm, but lists less than 30 species [Delkeskamp, 1977; Kazantsev, 2023a]. At the same time *Podistra* is the second in terms of the number of species among the Caucasian cantharine genera after *Rhagonycha* Eschscholtz, 1830, and is represented in the Northern Caucasus by two subgenera, *Podistra* s. str. and *Hemipodistra* Ganglbauer, 1922, with just two species from *Hemipodistra* and 13 attributed to the nominotypical subgenus [Kazantsev, Brancucci, 2007; Kazantsev, 2011, 2023b].

The studies on this group of the family Cantharidae of the North Caucasus started in the first half of the 19th and the beginning of the 20th centuries [Motschulsky, 1839; Ganglbauer, 1922], and resumed last three decades [Kazantsev, 1992, 1998, 2001, 2010, 2023b]. The genus was found to be rather rich in species in the region, in contrast to other parts of its distribution area, including the southern macroslope of the Greater Caucasus and the Lesser Caucasus [Delkeskamp, 1977; Kazantsev, 2023a, b].

An opportunity to study new material collected in Kabardino-Balkaria, near Kashkatash Glacier, ca 25 km south-east of Mount Elbrus, and the re-analysis of the previously collected *Podistra* specimens, allows adding another species to *Podistra* s. str. Its description is presented below, along with a key to all species of the genus of the Northern Caucasus, which mostly follows the

recently published one [Kazantsev, 2023b], but reflects the hereby introduced changes.

Material and methods

The studied beetles were glued on cardboard triangles. Before the examination, they were relaxed in water, then their detached abdomens were kept for several hours in 10% KOH at room temperature. The KOH treated aedeagi and terminal abdominal segments were then placed in micro vials with glycerin for photographing.

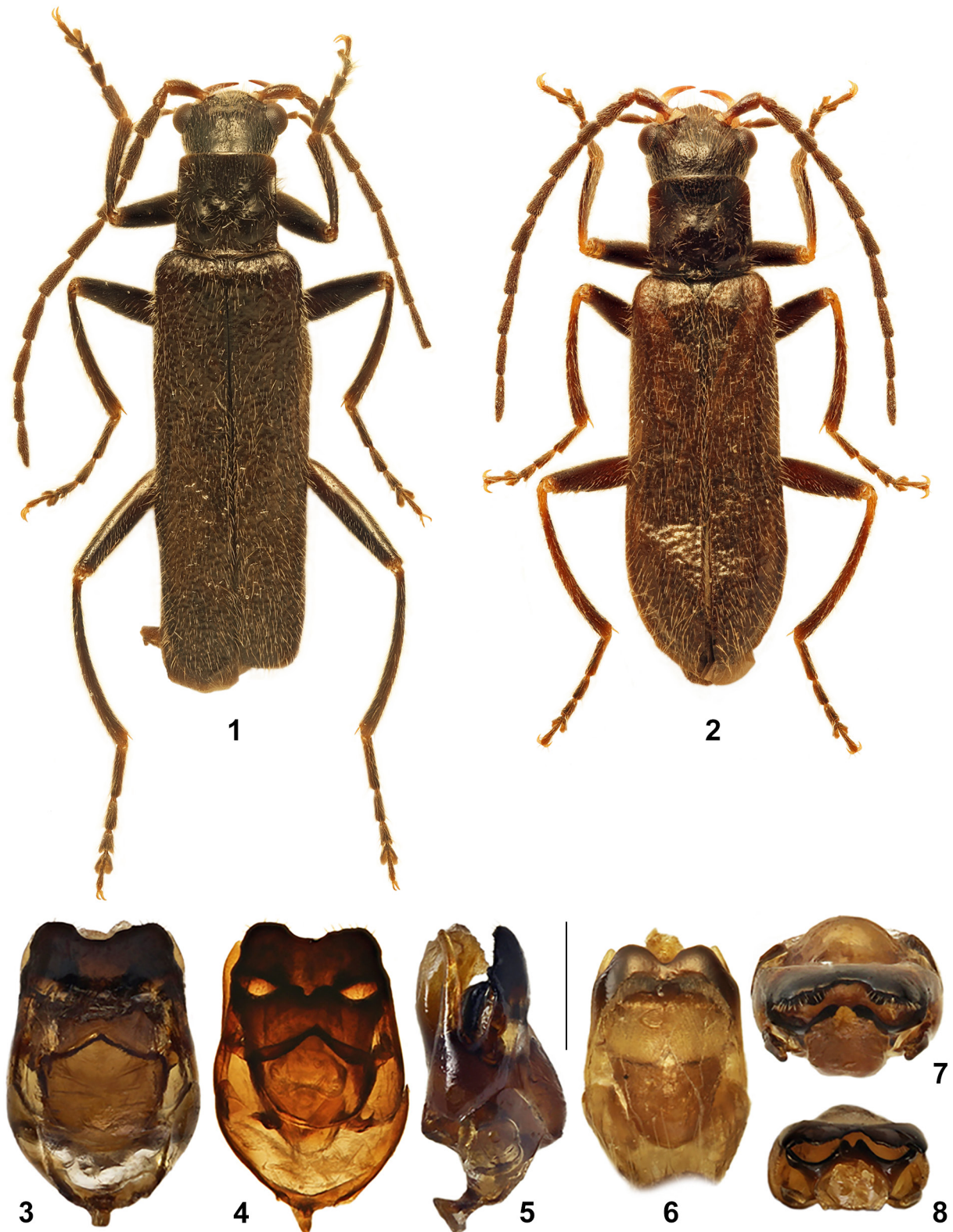
MSP-1 zoom stereoscopic dissecting microscope with 8–80 times magnification range was used for examination of diagnostic characters. Photographs were taken with a Canon EOS 6D camera and Canon MP-E 65 mm lens.

The following acronym is used the text: ICM – Insect Center (Moscow, Russia).

Family Cantharidae Imhoff, 1856
Subfamily Cantharinae Imhoff, 1856
Tribe Cantharini Imhoff, 1856
Genus *Podistra* Motschulsky, 1839
Subgenus *Podistra* Motschulsky, 1839

Podistra Motschulsky, 1839: 78. Type species *Podistra alpina* Motschulsky, 1839 (by monotypy).

= *Pseudoabsidia* Wittmer, 1969: 128, type species *Telephorus prolixus* Märkel, 1852 (original designation) (recent synonymy by Kazantsev [2023a]).



Figs 1–8. *Podistra* s. str., males, general view and aedeagi.
 1, 3–5, 7 – *P. makarovae* sp. n., holotype; 2, 6, 8 – *P. iugosa*. 1–2 – habitus (2 – after Kazantsev [2022]); 3–8 – aedeagi (holotypes): 3, 4, 6 – dorsally (4 – in passing light), 5 – laterally, 7–8 – apically. Scale bar for Figs 3–8 – 0.5 mm.

Рис. 1–8. *Podistra* s. str., самцы, общий вид и эдеагусы.
 1, 3–5, 7 – *P. makarovae* sp. n., голотип; 2, 6, 8 – *P. iugosa*. 1–2 – рабитус (2 – по [Kazantsev, 2022]); 3–8 – эдеагусы (голотипы): 3, 4, 6 – вид сверху (4 – в проходящем свете), 5 – вид сбоку, 7–8 – апикально. Масштабная линейка для рисунков 3–8 – 0.5 мм.

Podistra (s. str.) *makarovae* Kazantsev, sp. n.
(Figs 1, 3–5, 7)

Material. Holotype, ♂ (ICM): ca 25 km SE of Mount Elbrus, Kabardino-Balkaria, Adyl-Suu River headwaters, Kashkatash Glacier, h~2488, 43°12'44"N 42°41'14"E (side moraine), 16.VII–5.VIII.2023, O. Makarova leg. Paratype: 1♂ (ICM), NW Caucasus, N Elbrus, Terskolak Pass, 2900–3000 m, 17.VIII.1992, G. Davidyan leg.

Diagnosis. *Podistra* (s. str.) *makarovae* sp. n. is similar to *P.* (s. str.) *iugosa* Kazantsev, 2010 from Skalistye Mountains in North Ossetia, differing in the greater size (8–8.2 mm vs 6–7 mm in *P. iugosa* males), slightly more convex eyes, relatively more elongate elytra (ca 4.3 times longer than pronotum vs 4 times longer in *P. iugosa*), almost right anterior pronotal angles (noticeably rounded in *P. iugosa*) and simple claws (Fig. 1) (provided with minute tooth at the anterior claw base in *P. iugosa* males), as well as in the shape of the dorsal plate of the aedeagus, with semi-rectangular incision, and the distinctly separated median dents of the laterophyses, as seen in apical view (Figs 3–5, 7) (vs triangular incision and approximate median laterophysal dents in *P. iugosa* (Figs 6, 8)).

Description. Male. Dark brown to black; antennomeres 1–2 and knees somewhat brownish (Fig. 1).

Head transverse, about as wide as pronotum. Eyes relatively small, spherical, interocular distance ca 2.25 times greater than eye diameter. Vertex in scarce punctation. Ultimate maxillary and labial palpomeres dissimilar in size and shape, with ultimate maxillary palpomere ca 3 times longer than wide, ca 1.1 times longer, but ca 1.1 times narrower than ultimate labial palpomere; ultimate maxillary palpomere widest at proximal third, while ultimate labial palpomere widest at base. Antennae filiform, reaching elytral two thirds; antennomere 3 ca 1.6 times longer than pedicel (antennomere 2) and ca 1.3 times shorter than antennomere 4; antennal pubescence short and semi-erect (Fig. 1).

Pronotum subquadrate, slightly longer than wide, almost straight anteriorly and at sides, with almost right anterior and minute acute posterior angles, with long erect pubescence; lateral bordering complete, somewhat less pronounced near posterior angles (Fig. 1).

Elytra elongate, ca 3 times longer than wide at humeri, slightly narrowing towards apices, entirely covering abdomen; elytral pubescence uniform, with relatively long erect or sub-erect hairs. Scutellum about as long as wide, slightly narrowing distally, broadly rounded at apex (Fig. 1).

Legs long and slender; femora and tibiae narrow, subequal in length. Tibiae slightly curved; tibial spurs relatively short; tarsi long, metatarsomere length ratio 3.7 : 2.2 : 1.5 : 1 : 2.2; in all tarsi tarsomeres 1–3 narrow, tarsomere 4 deeply cleft; all claws simple (Fig. 1).

Aedeagus elongate, noticeably narrowing distally, its dorsal plate with relatively broad, semi-rectangular incision at distal margin, laterally with a distinct dent meeting the latero-distal process of laterophyses; parameres elongate, about as long as the dorsal plate, relatively narrow, almost straight; laterophyses about as wide as dorsal plate, considerably shorter than dorsal plate and parameres, medially, in apical view, with a pair of relatively distant from each other and approximate to dorsal plate dents (Figs 3–5, 7).

Length: 8–8.2 mm; width (at humeri): 1.7–1.8 mm.

Female unknown.

The paratype from the northern side of Mount Elbrus, externally identical to the holotype, lacks aedeagus.

Etymology. The new species is named after Dr Olga Makarova (Moscow, Russia) who collected the type specimen.

A key to *Podistra* species of the Northern Caucasus

- 1(4). Laterophyses narrowing distally (subgenus *Hemipodistra*).
- 2(3). Laterophyses distally relatively broad, only ca 1.5 times narrower than dorsal plate. Body length 7.7 mm (Addala Mt., Bogoss Range, Dagestan, Russia, 2800–3100 m) *P. motschulskyi* Kazantsev, 2001
- 3(2). Laterophyses distally relatively narrow, ca 2.2 times narrower than dorsal plate. Body length 5.4–7.2 mm (SW slopes of Shalbuzdag Mt., Dagestan, Russia, 3000–3300 m) *P. savitskiorum* Kazantsev, 2001
- 4(1). Laterophyses widened distally (subgenus *Podistra* s. str.) (Figs 3–8).
- 5(18). Pronotum with incomplete lateral bordering (bordering wanting, or at least less distinct near hind angles).
- 6(11). Male elytra complete (Figs 1, 2). Pronotum dark brown, with narrow light anterior and posterior borders; elytra dark brown, broadly lighter at sides and suture.
- 7(8). Dorsal plate of aedeagus short, not surpassing laterophyses in length, with broad triangular incision distally; laterophyses relatively narrow distally, with inconspicuous median dents, as seen in apical view. Body length 6.8 mm (Elbrus Mt., Kabardino-Balkaria, Russia, 2900–3000 m) *P. davidyani* Kazantsev, 2023
- 8(7). Dorsal plate of aedeagus long, noticeably surpassing laterophyses in length; laterophyses distally wide, with conspicuous median dents, approximate to dorsal plate, as seen in apical view.
- 9(10). Sutural light stripe attaining to elytral apices. Dorsal plate noticeably narrowed distally, with relatively narrow semicircular median incision, in apical view with double bulging; laterophyses with approximate median dents, as seen in apical view. Body length 6.5–8 mm (Teberda, Karachay-Cherkessia, Russia, 2900–3000 m) *P. piceolineata* Pic, 1922
- 10(9). Sutural light stripe attaining only to elytral half. Dorsal plate noticeably less narrowed distally, with broader, but more shallow median incision, in apical view with triple bulging; laterophyses with widely separated median dents, as seen in apical view. Body length 7.5 mm (Elbrus Mt., Kabardino-Balkaria, Russia, 2900–3000 m) *P. elbrusensis* Kazantsev, 2023
- 11(6). Male elytra considerably shortened.
- 12(13). Anterior part of head above reddish brown; pronotum testaceous, darkened at disc. Body length 7 mm (Fisht Mt., Adygeya, 2800 m)
..... *P. rufomaculata* Kazantsev, 1998
- 13(12). Body dark brown to black, sometimes with lighter knees and antennal bases.
- 14(15). Dorsal plate distally with three incisions; laterophyses distally in apical view elaborately incised. Body length 6.2 mm (Abago Mt, Adygea, Russia, ca 2000 m) *P. circassicola* Reitter, 1889
- 15(14). Dorsal plate distally with one incision; laterophyses distally in apical view simply bisinuate.
- 16(17). Aedeagus hardly longer than wide; its dorsal plate distally with relatively small semicircular incision. Body length 7 mm (Abago Mt., Adygea, Russia, ca 2000 m) *P. starcki* Ganglbauer, 1922

- 17(16). Aedeagus noticeably longer than wide; its dorsal plate distally with broad triangular incision. Body length 7 mm (Addala Mt., Bogoss Range, Dagestan, Russia, 3500 m) *P. alpina* Motschulsky, 1839
- 18(5). Pronotum with complete distinct lateral bordering (Figs 1, 2).
- 19(24). Elytra uniformly testaceous.
- 20(21). Aedeagus hardly longer than wide; its dorsal plate with rather deep triangular incision. Body length 8–10 mm (Northwestern Caucasus, Georgia, 300–2000 m) *P. caucasica* Ganglbauer, 1922
- 21(20). Aedeagus noticeably longer than wide; its dorsal plate with shallow semicircular incision.
- 22(23). Laterophyses medially only slightly elevated. Body length 8–11 mm (Northwestern Caucasus, Georgia, 250–2000 m) *P. unicolor* (Faldermann, 1835)
- 23(22). Laterophyses medially noticeably elevated. Body length 7.5–9.5 mm (Tkhav Mt., Krasnodar Region, Russia; Lagonaki Plateau, Adygea, Russia, 900–1200 m) *P. arnoldii* Kazantsev, 1998
- 24(19). Elytra uniformly or partly dark brown to black.
- 25(26). Pronotum transverse, with convex sides. Female flightless, with greatly reduced elytra. Aedeagus oval, its dorsal plate distally narrowed and distal margin with small medial incision. Body length 6–8.5 mm (Zgid Mt., North Ossetia, Russia, 2800 m) *P. ossetica* Kazantsev, 1998
- 26(25). Pronotum elongate, with straight sides.
- 27(28). Pronotum lighter at angles. – Femora distally and tibiae in most part testaceous. Dorsal plate of aedeagus noticeably narrowed distally; lateral angles of laterophyses extended beyond dorsal plate; laterophyses in apical view medially not approaching dorsal plate. Body length 6.8 mm (Zagedan Mt., Karachay-Cherkessia, Russia, 2000 m) *P. cherkessica* Kazantsev, 1998

- 28(27). Pronotum uniformly black.
- 29(30). Smaller (6–7 mm), elytra shorter (ca 4 times longer than pronotum), anterior pronotal angles noticeably rounded; claws provided with minute tooth at the anterior claw base (Fig. 2); dorsal plate of the aedeagus with triangular incision, median laterophysal dents, as seen in apical view, approximate (Figs 6, 8) (Skalistye Mts, North Ossetia, Russia, 2750–3250 m) *P. iugosa* Kazantsev, 2010
- 30(29). Larger (8–8.2 mm), elytra more elongate (ca 4.3 times longer than pronotum), anterior pronotal angles almost right; claws simple (Fig. 1); dorsal plate of aedeagus with semi-rectangular incision, median dents of laterophyses, as seen in apical view, distinctly separated (Figs 3–5, 7) (SE Elbrus Mt., Kabardino-Balkaria, Russia, 2488 m) *P. makarova* sp. n.

Discussion

A notable aspect of distribution of *Podistra* in the area is that the most of its species in the Greater Caucasus occur on its northern, rather than on the southern, macroslope – out of 18 species registered here, 16 are from its northern side, of which 14 are local endemics (Fig. 9). In the Lesser Caucasus that lies further south just one *Podistra* species has been registered [Kazantsev, Brancucci, 2007]. The rare occurrence of this genus south of the main range watershed may be explained by its ‘northern’ origin, when only very few of its members made it south, not capable of crossing the ridge when its distribution area was expanding. Besides, given that almost three fourths of all *Podistra* species worldwide occur in the Greater Caucasus, none of its members known from Asia Minor [Kazantsev, 2023a], it seems reasonable to conclude that its biodiversity hotspot is right here.

On the other hand, quite unsimilarly, the other two widespread Holarctic cantharine genera, *Cantharis* Linnaeus, 1758 and *Rhagonycha*, being well represented in the Caucasus (13 and 30 species accordingly), are noticeably more species-rich in Asia Minor, accounting for 23 and 61 species each [Kazantsev, Brancucci, 2007; Kazantsev, 2022]. Such distribution pattern suggests that *Cantharis* and *Rhagonycha*, on the one hand, and *Podistra*, on the other, being all related to one subfamily (Cantharinae) and one tribe (Cantharini) [Motyka et al., 2023], apparently must have originated in different places or at different times (or both). Unfortunately, the geological evidence for the area between the Greater Caucasus and the platform with Asia Minor, Iran and the Lesser Caucasus is not much informative to this end, as the two were separated by the sea or straits from the times of the epicontinental basin Paratethys until Mid-Late Miocene (8.5–7.0 Ma) [Ilyina et al., 2004; Palcu et al., 2021], preventing species expansion in either direction.

Representatives of *Podistra* are distributed and diversified predominantly on the northern slopes of the Greater Caucasus, many of them at high altitudes. It is clear that the settlement of the alpine level (with subsequent isolation and diversification) occurred after the Pleistocene glaciations, either from the forest belt or from sub-arid basins, where thermophilic fauna might have

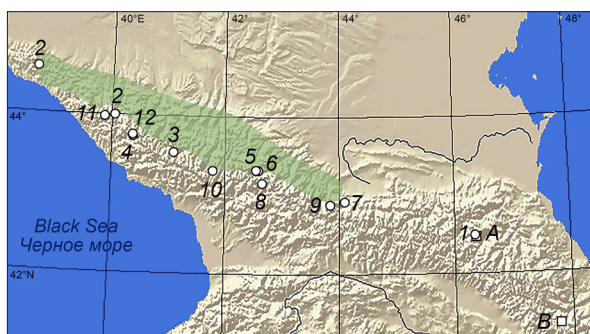


Fig. 9. Distribution of *Podistra* in the Northern Caucasus.

Circles 1–12 and shaded area – *Podistra* s. str., squares A, B – *P.* (*Hemipodistra*). 1 – *P. alpina*; 2 – *P. arnoldii*; 3 – *P. cherkessica*; 4 – *P. circassicola*; 5 – *P. davidyani*; 6 – *P. elbrusensis*; 7 – *P. iugosa*; 8 – *P. makarova* sp. n.; 9 – *P. ossetica*; 10 – *P. picolineata*; 11 – *P. rufomaculata*; 12 – *P. starcki*; shaded area – *P. caucasica* and *P. unicolor*; A – *P. motschulskyi*; B – *P. savitskiorum* (after Kazantsev, [2023b], modified).

Рис. 9. Распространение *Podistra* на Северном Кавказе.

Круги 1–12 и заливка – *Podistra* s. str., квадраты A, B – *P.* (*Hemipodistra*). 1 – *P. alpina*; 2 – *P. arnoldii*; 3 – *P. cherkessica*; 4 – *P. circassicola*; 5 – *P. davidyani*; 6 – *P. elbrusensis*; 7 – *P. iugosa*; 8 – *P. makarova* sp. n.; 9 – *P. ossetica*; 10 – *P. picolineata*; 11 – *P. rufomaculata*; 12 – *P. starcki*; заливка – *P. caucasica* и *P. unicolor*; A – *P. motschulskyi*; B – *P. savitskiorum* (по [Kazantsev, 2023b], с изменениями).

been preserved during glaciation periods. Therefore, it is obvious that the group is historically young, post-glacial. Perhaps this could be an argument in favour of the Eocene *Lycocerus* Gorham, 1889 [Kazantsev, 2018, 2020] rather than *Podistra*, although the two genera can only be reliably distinguished by the male genitalia, as already discussed in one of the previous papers [Kazantsev, 2018].

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