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Further contribution to the knowledge of the *Carabus* Linnaeus, 1758 subgenus *Neoplectes* Reitter, 1885, with description of three new subspecies (Coleoptera: Carabidae)

Дальнейший вклад в познание подрода *Neoplectes* Reitter, 1885 рода *Carabus* Linnaeus, 1758 (Coleoptera: Carabidae) с описанием трех новых подвидов

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KEY WORDS: Coleoptera, Carabidae, *Carabus*, *Neoplectes*, South Caucasus, distribution, new subspecies.
КЛЮЧЕВЫЕ СЛОВА: Coleoptera, Carabidae, *Carabus, Neoplectes*, Закавказье, новые подвиды.

ABSTRACT. Based on material collected by the authors in 2016–2024 in the South Caucasus, three new subspecies of the *Carabus* Linnaeus, 1758 subgenus *Neoplectes* Reitter, 1885, namely *C. ibericus pseudoszekelyi* **ssp.n.** from Central Georgia and South Ossetia, Racha mountains (mountain range), *C. szekelyi tatulyani* **ssp.n.** from northern part of South Ossetia, and *C. titarenkoi kozlovantoni* **ssp.n.** from Central Georgia, Racha mountains, are described.

РЕЗЮМЕ. На основе материалов, собранных авторами в 2016–2024 гг. в Закавказье, описаны три новых подвида подрода *Neoplectes* Reitter, 1885 рода *Carabus* Linnaeus, 1758: *C. ibericus pseudoszekelyi* **ssp.n.** из Центральной Грузии и Южной Осетии, Рачинский хр., *C. szekelyi tatulyani* **ssp.n.** из северной части Южной Осетии и *C. titarenkoi kozlovantoni* **ssp.n.** из Центральной Грузии, Рачинский хр.

Introduction

Study of the material on *Carabus* Linnaeus, 1758 subgenus *Neoplectes* Reitter, 1885, collected in Central Georgia in 2016–2024 (Fig. 1), and analysis of comparative material and previous publications on the subject [Gottwald, 1982; Retezár, Djavelidze, 1992; Deuve, 2013, 2015; Fominykh, Zamotajlov, 2014; Retezár, 2015; Fominykh *et al*., 2016; Březina *et al*., 2017] revealed a supposedly earlier undistinguished form, which is described below as a new subspecies *C. ibericus pseudoszekelyi* **ssp.n.**, it inhabits the territory, previously expected to be populated by *C. szekelyi* Retezár, 2011. Examination of extensive new material from different populations, very heterogeneous in adult general appearance, revealed that it can clearly be divided into different species, based on the endophallus structure, their ranges being also quite clearly delimited, as will be further illustrated.

Also, some unknown populations of *Neoplectes* from the territory of South Ossetia were found and avail-

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able material examined, one appeared to be identic to *C. ibericus pseudoszekelyi* **ssp.n.** from Racha mountains in Georgia, it occurs sympatrically with another consubgener, *Carabus szekelyi*, according to a number of features, this population also was regarded to represent a new subspecies, *Carabus szekelyi tatulyani* **ssp.n.**

The third newly described taxon — a subspecies of *Carabus titarenkoi* Zamotajlov et Fominykh, 2014, collected for the first time already in 2018, turned out to be a rather unexpected one. Initially it was known only from several specimens detected sympatric with *Carabus mellyi* Chaudoir, 1992, sharply different in some features from all related species inhabiting neighboring territories and the most similar in general appearance to *Carabus titarenkoi*. However, spatially the nearest populations of the latter species are known remotely 60 km to the southwest and are disjunct by different *Neoplectes*-species populations, furthermore, this quite insufficient for the justified conclusion material was collected from the only locality. In 2024 we managed to collect additional material from two more localities, confirming correct affiliation to *Carabus titarenkoi*, but at the same time, according to a number of external features, being different from two previously known subspecies, so it is also described as a new subspecies *C. titarenkoi kozlovantoni* **ssp.n.**

Material and methods

Standard methods were applied for treating the material. Endophallus inflation methods generally follow Janovska *et al*. [2013]. External characters were studied with the Zeiss Stemi 2000-C stereoscope. Pictures of the habitus and male genitalia were taken by the authors using a Nikon D800 camera with AF-S Micro NIKKOR 60 mm 1:2 8 G ED macro photo lens. Biotope photographs were taken by the authors. Measurements were taken using the stereoscope with an ocular-micrometer, body length was measured from the tips of mandibles to the elytral apex.

Since the appearance of *Neoplectes* adults varies greatly depending on locality, biotope, and sometimes humidity and temperature conditions during larvae development, it is hardly possible to point out reliable specific morphological discriminative features. Therefore, we consider mainly the structure of the internal sac (endophallus), which demonstrates a fairly stable shape for a number of populations and proved to be a reliable feature for taxa discrimination, new taxa described below also can be identified and distinguished from previously known ones by endophallus structure. The names of the morphological structures of endophallus generally follow those given by Shilenkov [1996], their homology is depicted in the Fig. 2.

The following acronyms are used for designation of the depositories of the specimens examined: CFDD — Private collection of D.D. Fominykh (Moscow, Russia); CPSM — Private collection of S.M. Pavlyuchuk (Stavropol, Russia); CSAA — Private collection of A.A. Safronov (Tula, Russia); CSIA — Private collection I.A. Solodovnikov (Vitebsk, Belarus); CTAP — Private collection of A.P. Tatulyan (Essentuki, Russia); CTAYu — Private collection of A.Yu. Titarenko (Moscow, Russia); CTYT — Private collection of Ya.T. Talibov (Makchackala, Russia); CZAM — Private collection of A.S. Zamotajlov (Krasnodar, Russia); CZAS — Private collection of A.S. Zubov (Kishinev, Moldavia); MPSU — Moscow Pedagogical State University, Chair of Zoology and Ecology (Moscow, Russia); ZISP — Zoological Institute of the Russian Academy of Sciences (St. Petersburg, Russia).

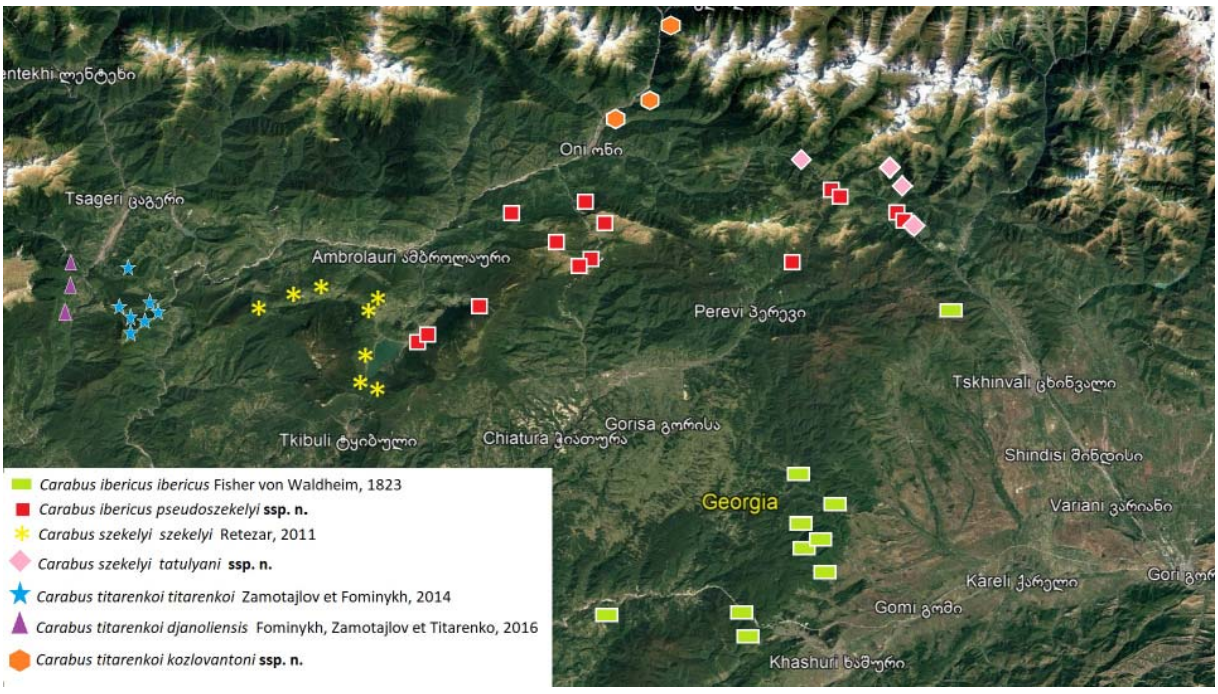


Fig. 1. Studied localities of the *Carabus* subgenus *Neoplectes* in Transcaucasia.
Рис. 1. Изученное распространение подрода *Neoplectes* рода *Carabus* в Закавказье.

Results

Carabus (*Neoplectes*) *ibericus pseudoszekelyi* A. Fominykh, Zamotajlov, Titarenko et D. Fominykh, **ssp.n.**
Figs 1, 15–32, 85–93, 117–119.

MATERIAL. Holotype ♂ (ZISP), **Georgia**, Racha, N slopes of Racha Mt. Range N of Shkmeri vill., right bank of Kheeri river, 1800–2100 m, 11.V.2015, pitfall traps, D. Fominykh, A. Zubov, R. Khryapin leg.; Paratypes: 47 ♂♂, 33 ♀♀ (MPSU, CFDD, CTAY, CSIA), same data as holotype; 67 ♂♂, 95 ♀♀ (CFDD, CTAY, CSAA), Georgia, Racha, N slopes of Racha Mt. Range, S of Bokva vill, right bank of river Kheeri, 1257–1473 m, 11.V–6.VII.2015, pitfall traps, D. Fominykh, A. Zubov, R. Khryapin leg.; 7 ♂♂, 11 ♀♀ (CFDD), Georgia, Imereti, S slopes of Racha Mt. Range near

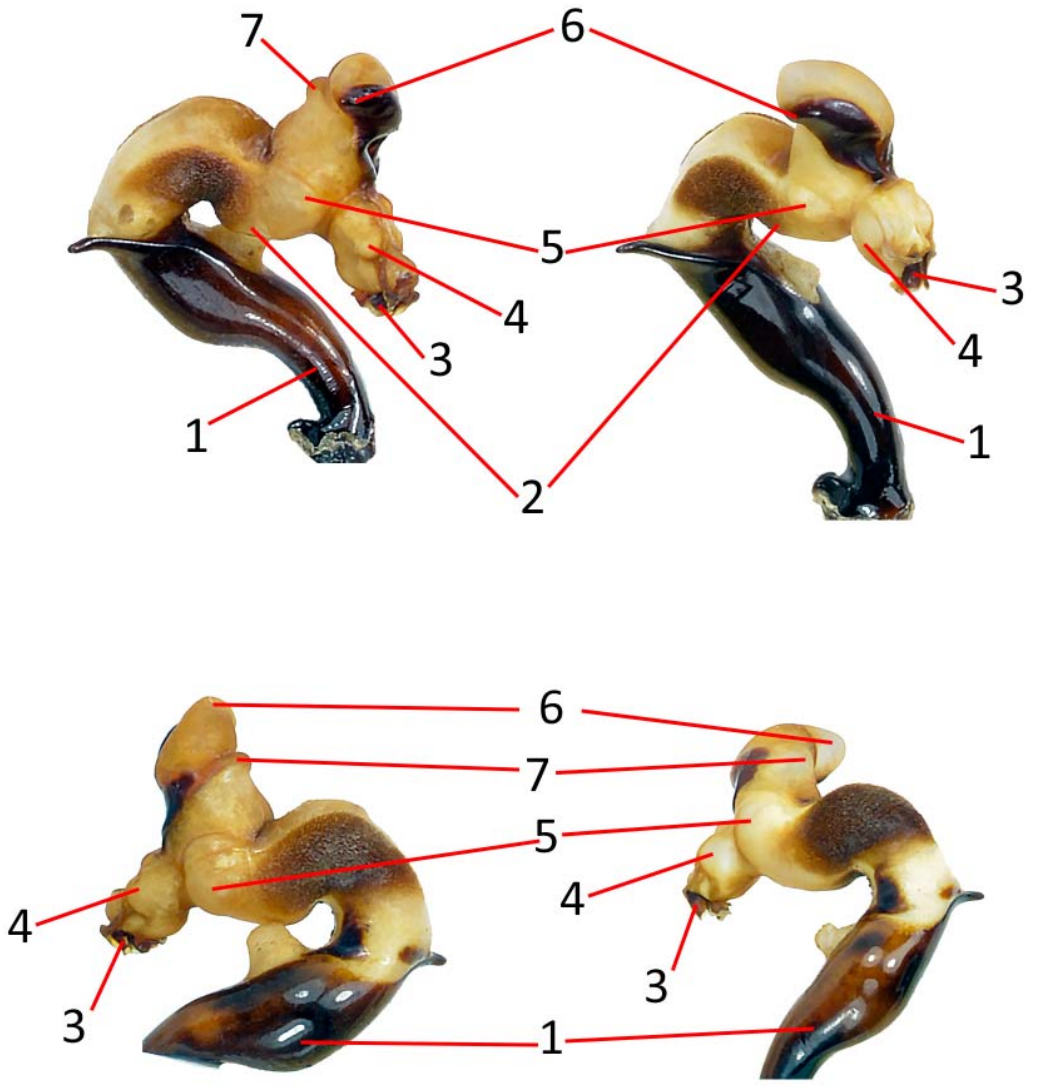
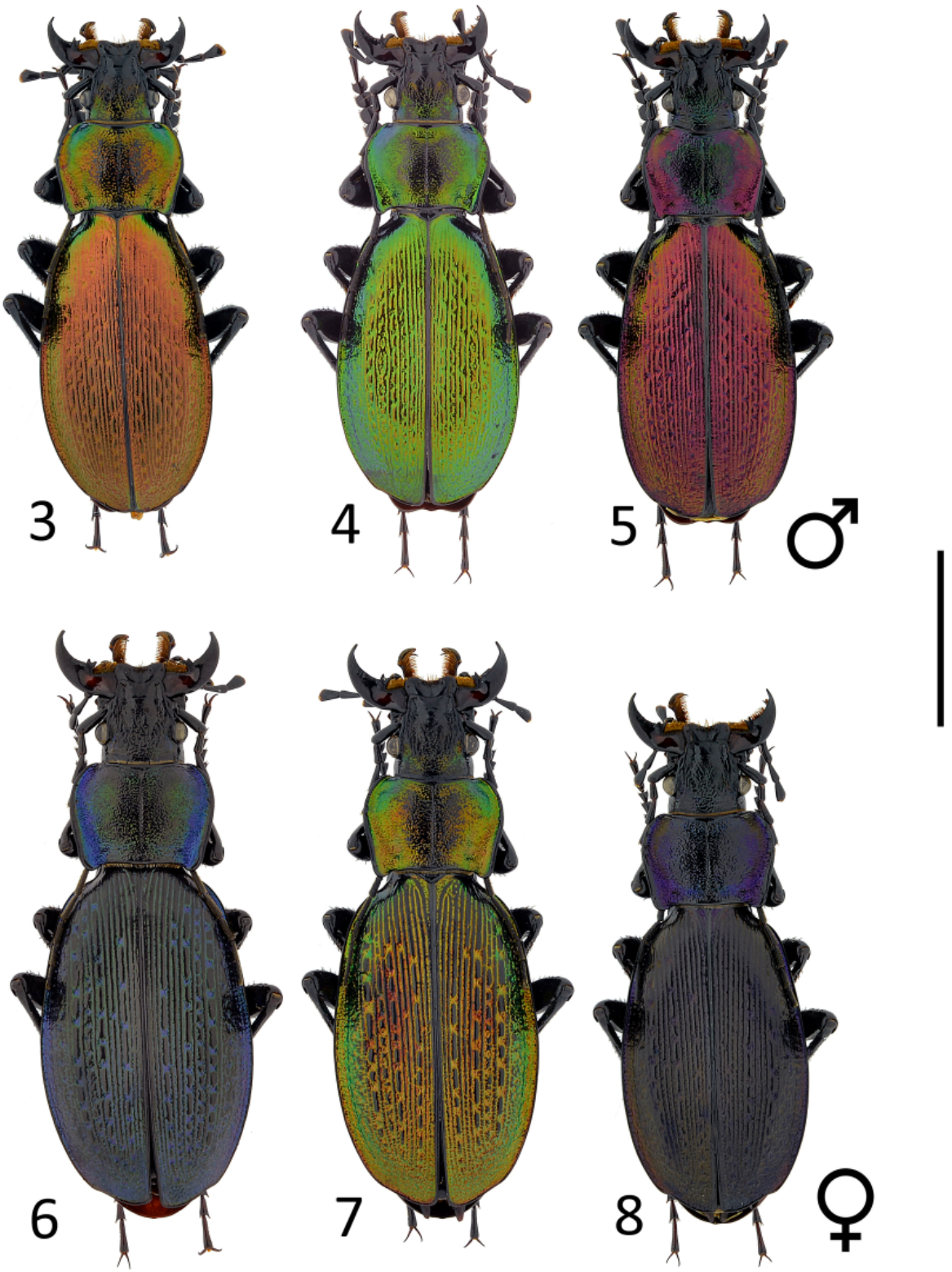
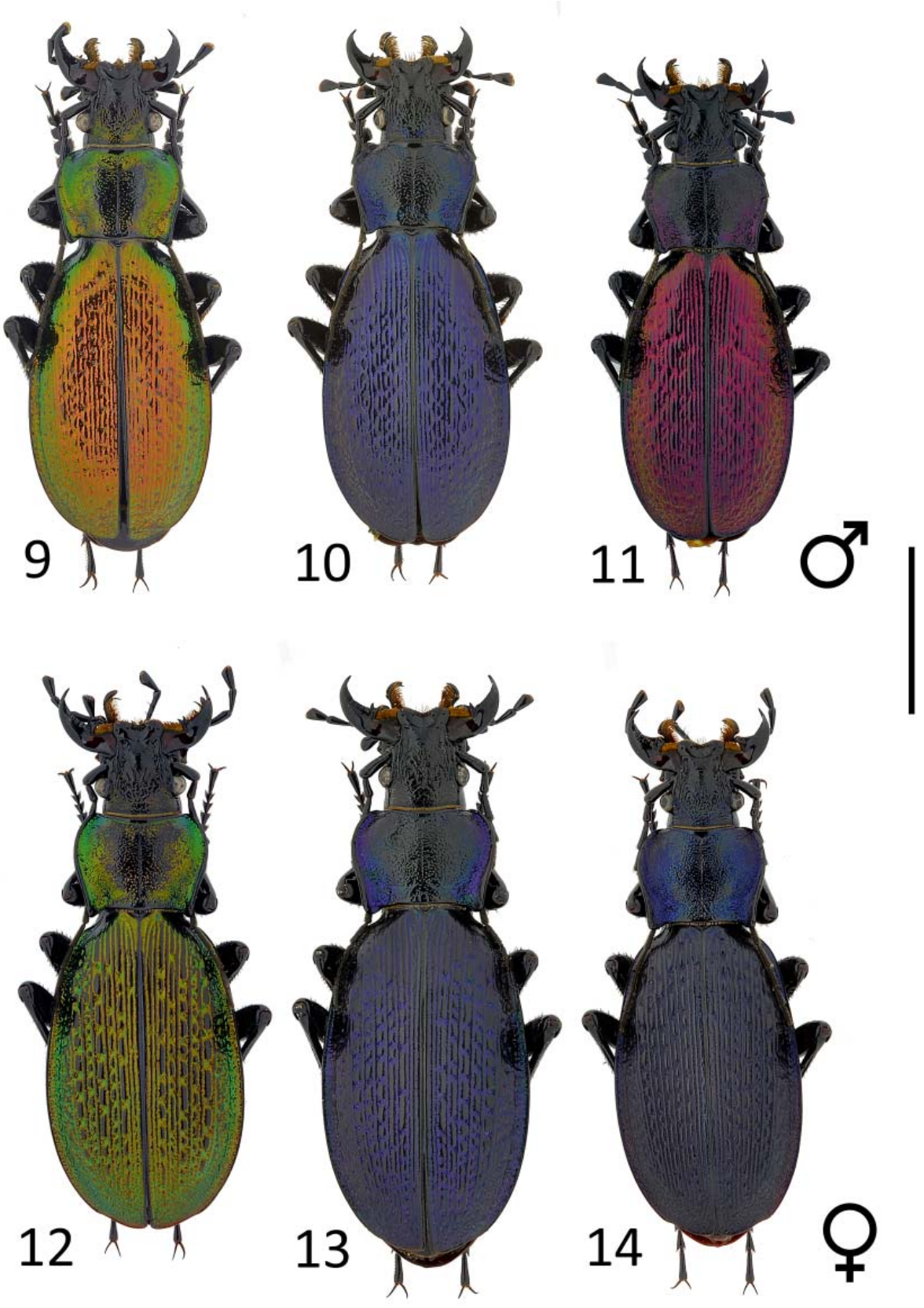


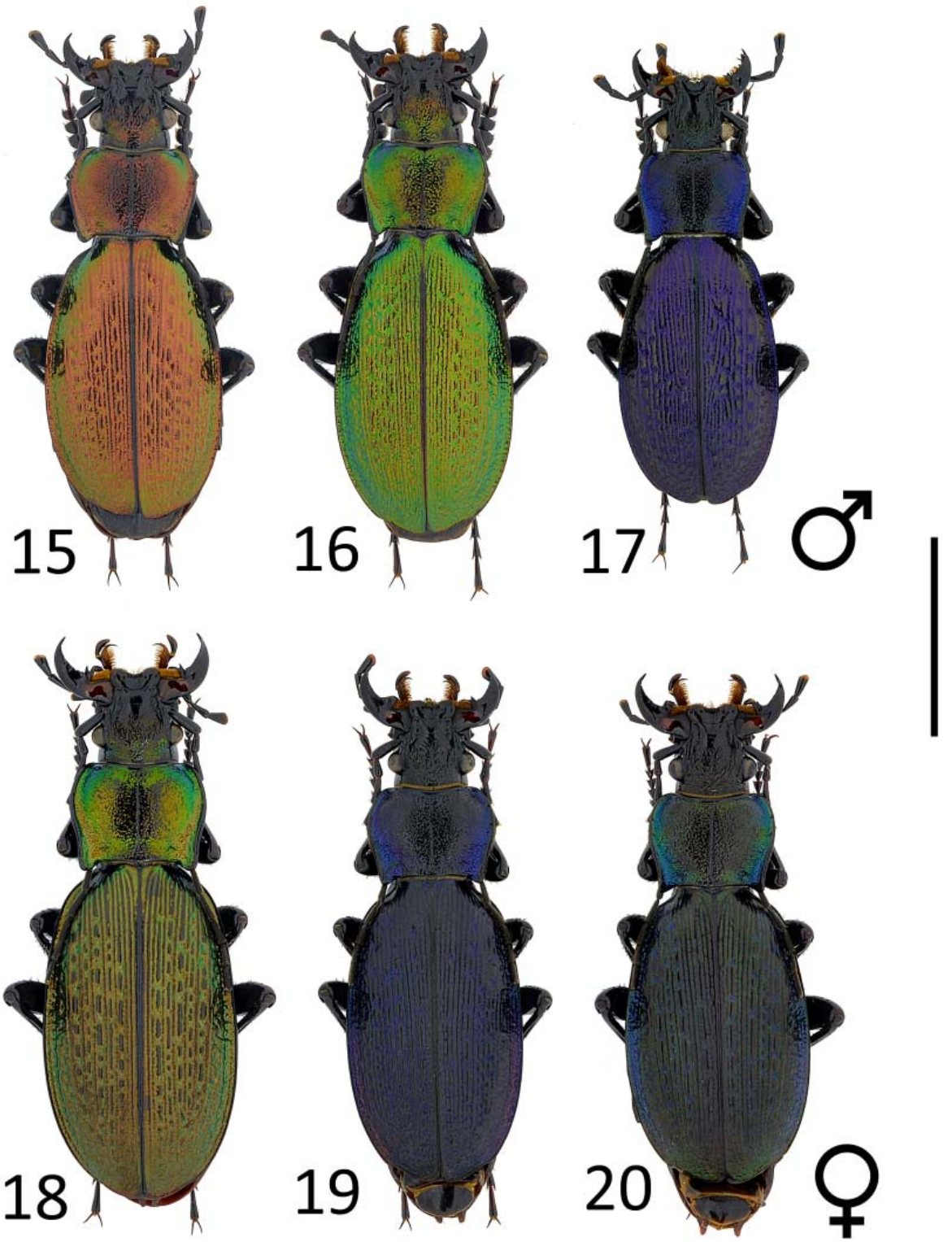
Fig. 2. Aedeagus and homology of structures in the fully inflated endophallus preparation of the *Carabus* subgenus *Neoplectes*: 1 — tube of penis; 2 — mediolateral lobe; 3 — aggonoporius; 4 — dorsoapical lobe; 5 — dorsolateral lobe; 6 — ventroapical lobe; 7 — subventroapical lobe.
Рис. 2. Эдеагусы и гомология структур препарата полностью вывернутого внутреннего мешка в подроде *Neoplectes* рода *Carabus*: — трубка пениса; 2 — медиолатеральная лопасть; 3 — аггонопорий; 4 — дорзоапикальная лопасть; 5 — дорзолатеральная лопасть; 6 — вентроапикальная лопасть; 7 — субвентроапикальная лопасть.



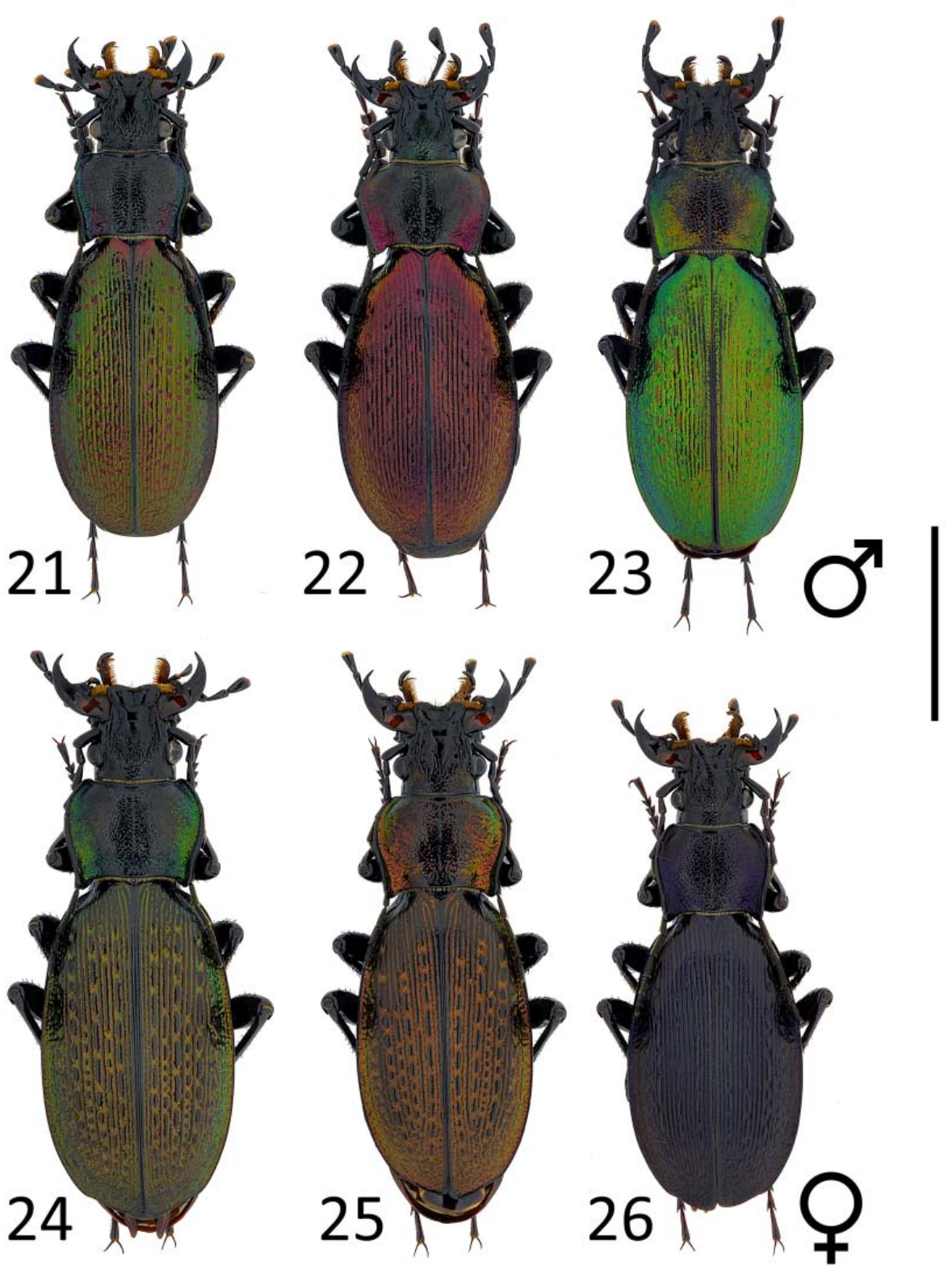
Figs 3–8. Dorsal habitus of *Carabus ibericus ibericus*, Ulumbo env. Scale bar 10.0 mm.
Рис. 3–8. Габитус сверху *Carabus ibericus ibericus*, окр. Улумбо. Масштаб 10,0 мм.



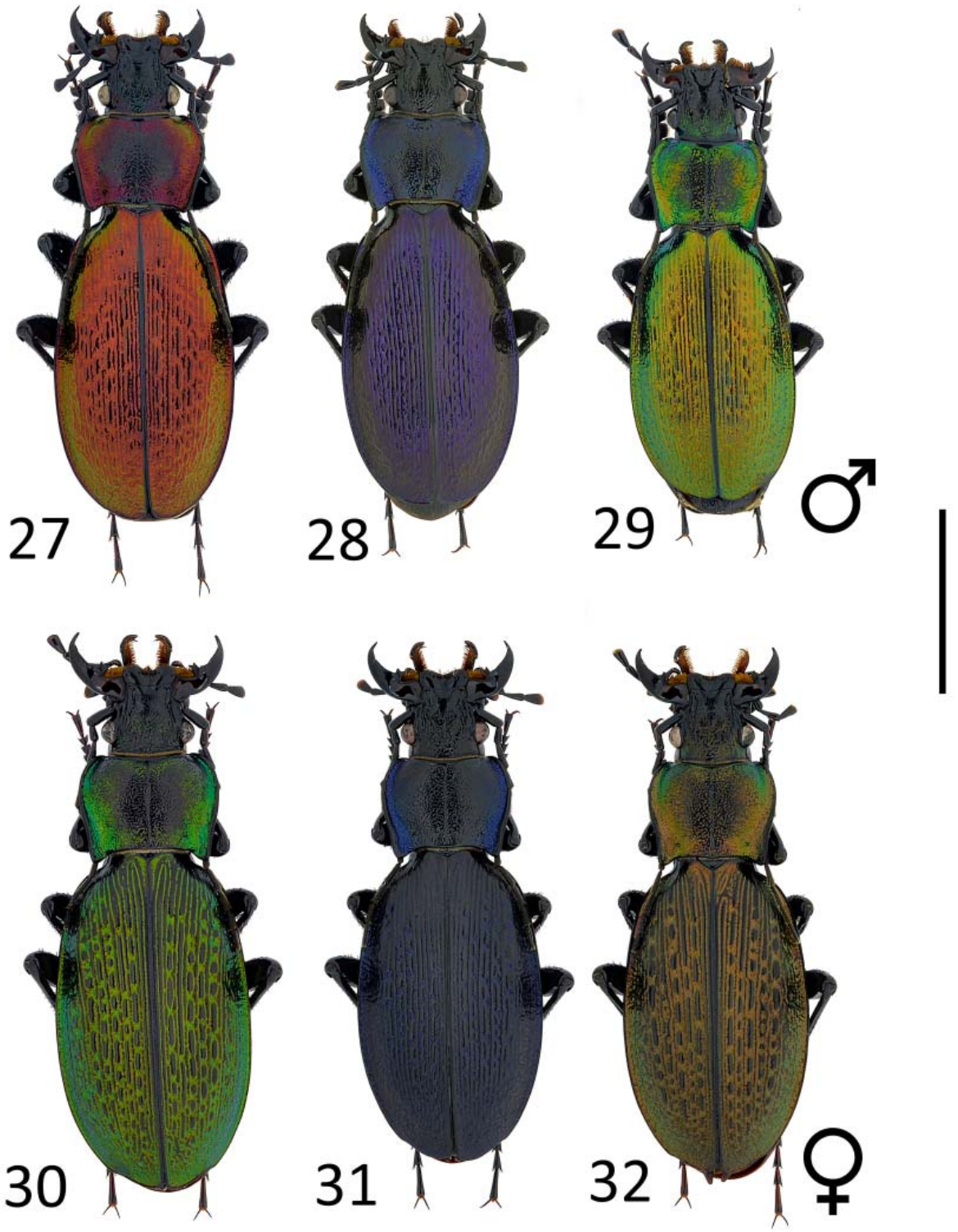
Figs 9–14. Dorsal habitus of *Carabus ibericus ibericus*, Goresha env. Scale bar 10.0 mm.
Рис. 9–14. Габитус сверху *Carabus ibericus ibericus*, окр. Гореша. Масштаб 10,0 мм.



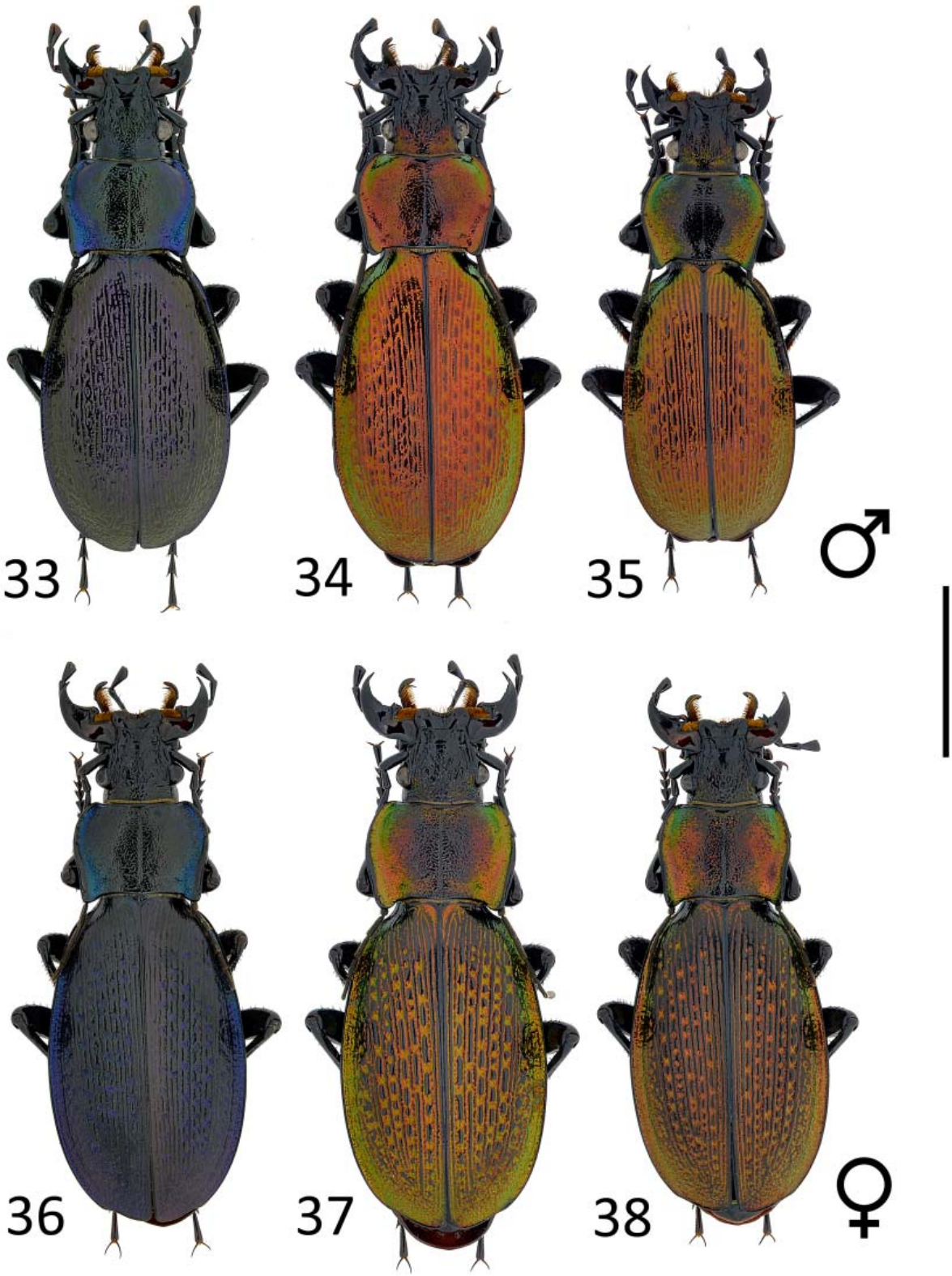
Figs 15–20. Dorsal habitus of *Carabus ibericus pseudoszekelyi* **ssp.n.**, Betlevi env. Scale bar 10.0 mm.
Рис. 15–20. Габитус сверху *Carabus ibericus pseudoszekelyi* **ssp.n.**, окр. Бетлеви. Масштаб 10,0 мм.



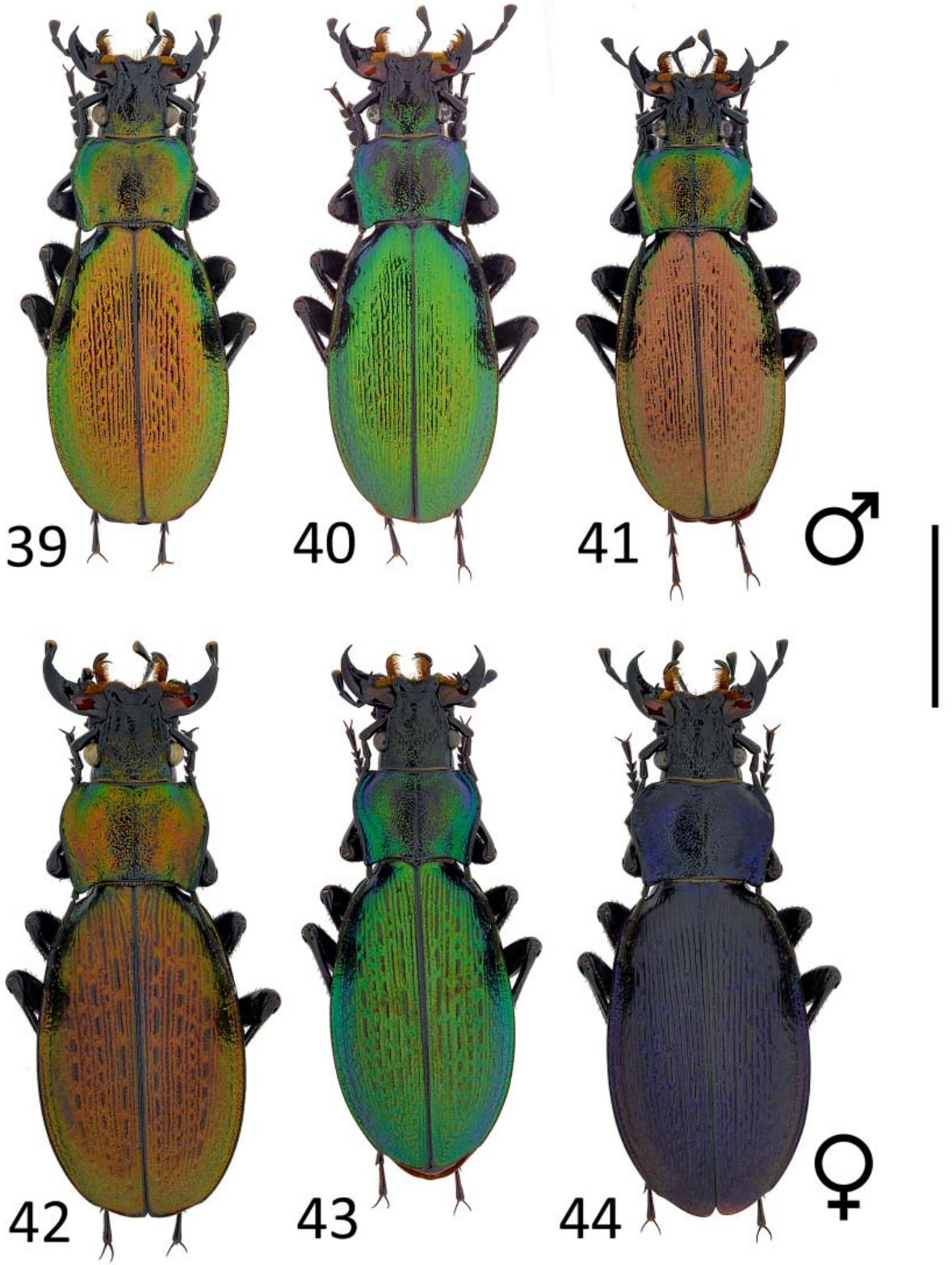
Figs 21–26. Dorsal habitus of *Carabus ibericus pseudoszekelyi* **ssp.n.**, Kontanto env. Scale bar 10.0 mm.
Рис. 21–26. Габитус сверху *Carabus ibericus pseudoszekelyi* **ssp.n.**, окр. Контанто. Масштаб 10,0 мм.



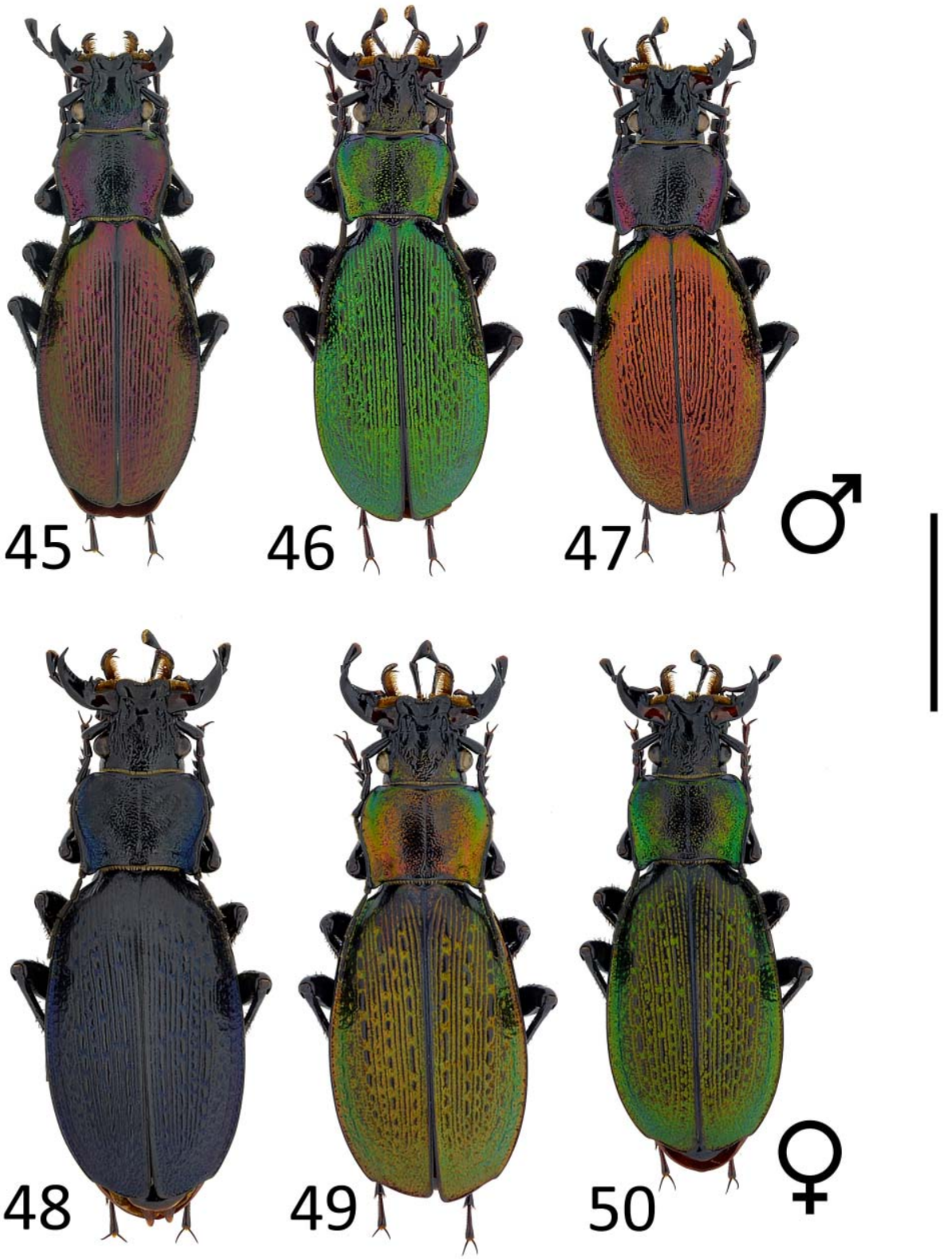
Figs 27–32. Dorsal habitus of *Carabus ibericus pseudoszekelyi* **ssp.n.**, Shkmeri env. Scale bar 10.0 mm.
Рис. 27–32. Габитус сверху *Carabus ibericus pseudoszekelyi* **ssp.n.**, окр. Шкмери. Масштаб 10,.0 мм.



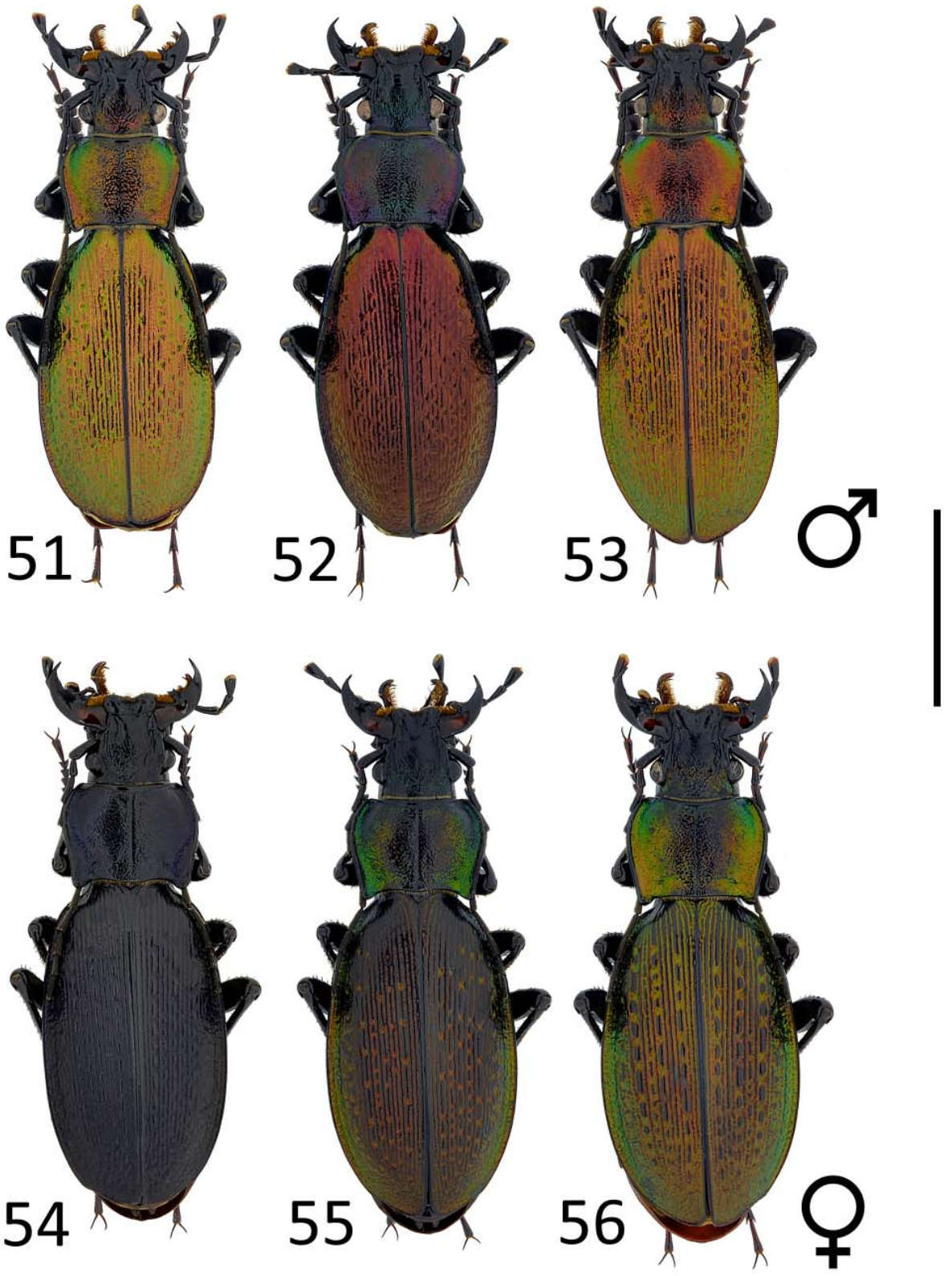
Figs 33–38. Dorsal habitus of *Carabus szekelyi szekelyi*, Kedisubani env. Scale bar 10.0 mm.
Рис. 33–38. Габитус сверху *Carabus szekelyi szekelyi*, окр. Кедисубани. Масштаб 10,0 мм.



Figs 39–44. Dorsal habitus of *Carabus szekelyi szekelyi*, Shaori env. Scale bar 10.0 mm.
Рис. 39–44. Габитус сверху Габитус сверху *Carabus szekelyi szekelyi*, окр. Шаори. Масштаб 10,0 мм.

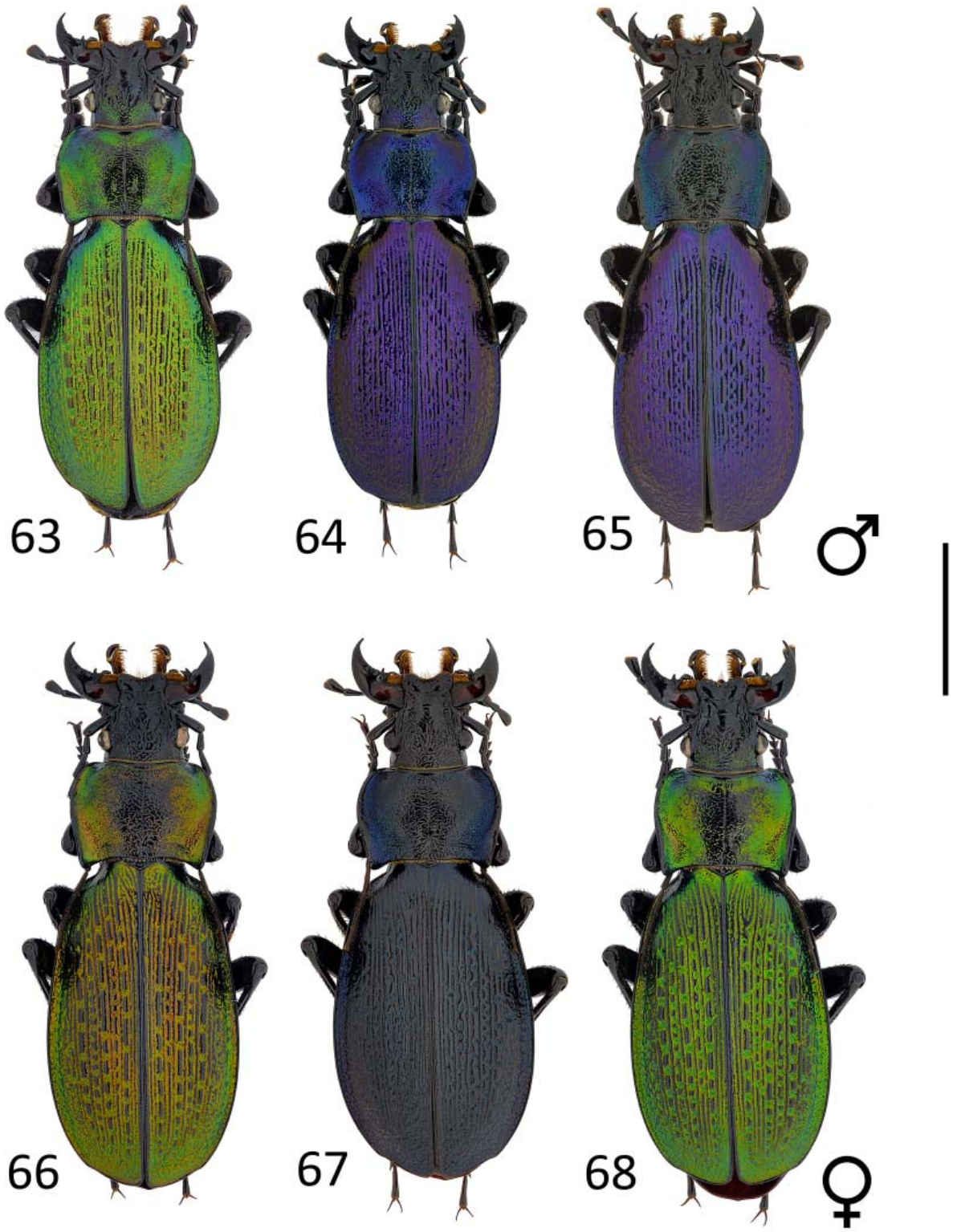


Figs 45–50. Dorsal habitus of *Carabus szekelyi tatulyani* **ssp.n.**, Tli env. Scale bar 10.0 mm.
Рис. 45–50. Габитус сверху *Carabus szekelyi tatulyani* **ssp.n.**, окр. Тли. Масштаб 10,0 мм.

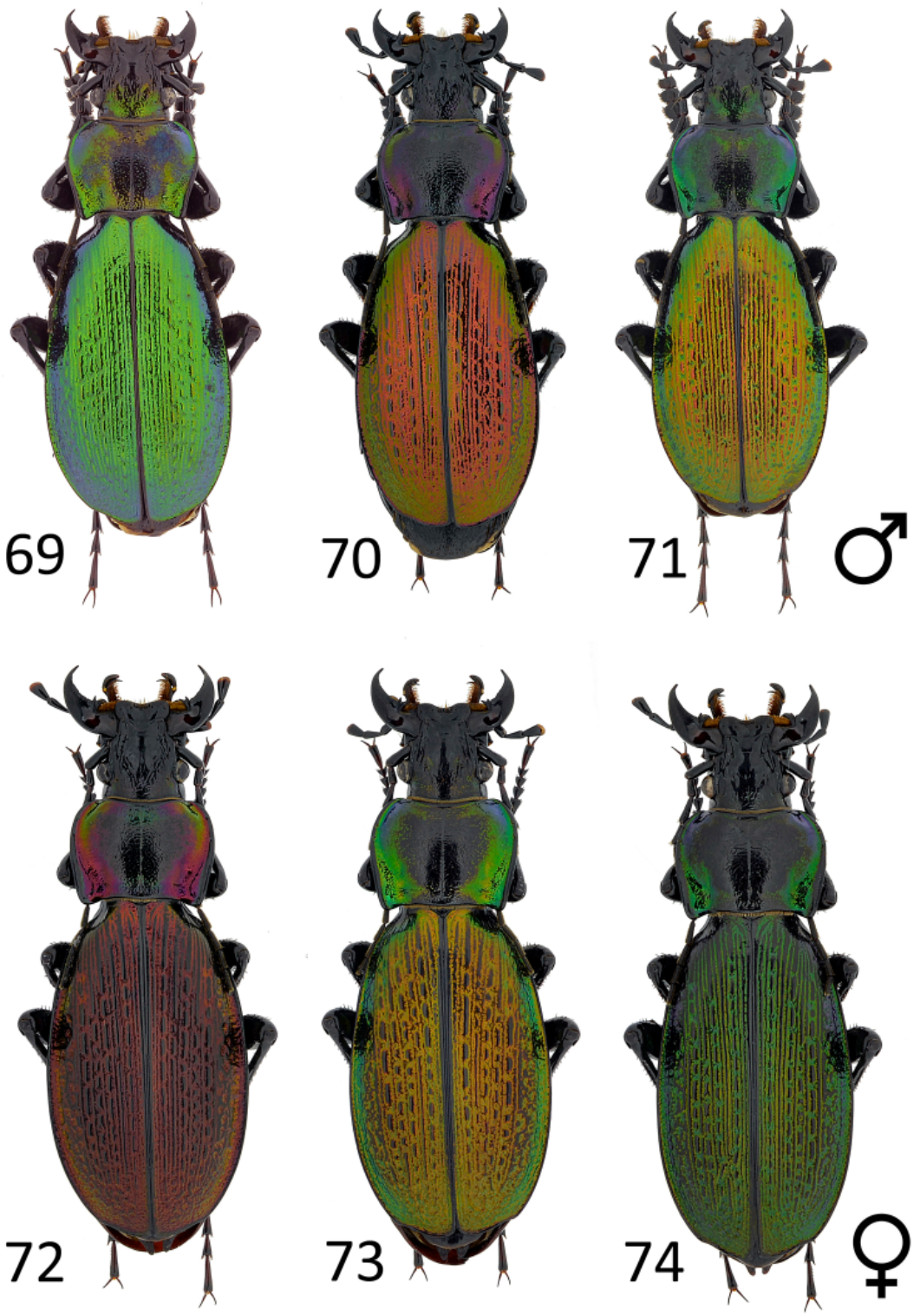


Figs 51–56. Dorsal habitus of *Carabus szekelyi tatulyani* **ssp.n.**, Kontanto env. Scale bar 10.0 mm.
Рис. 51–56. Габитус сверху *Carabus szekelyi tatulyani* **ssp.n.**, окр. Контанто. Масштаб 10,0 мм.

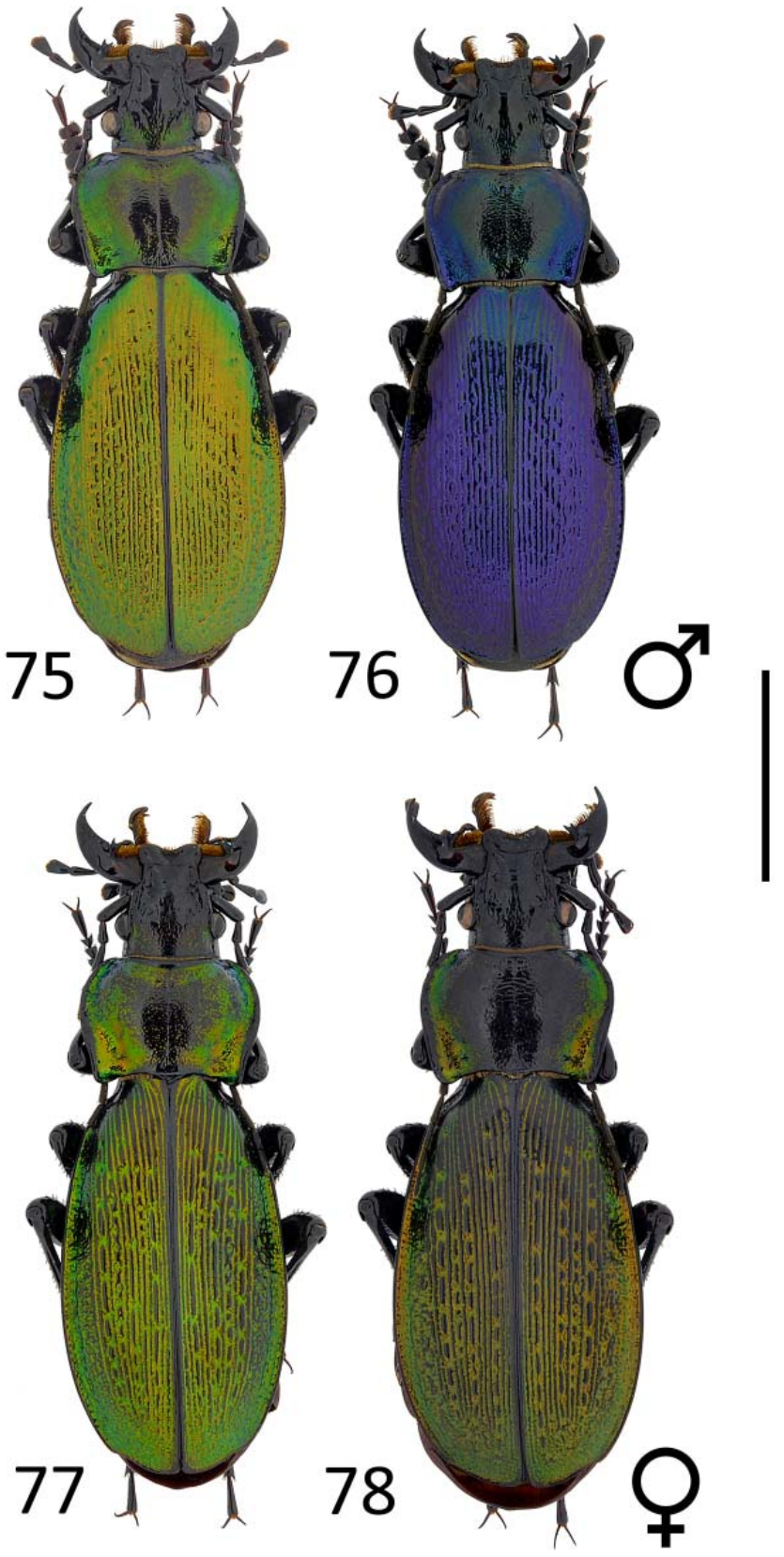
Figs 57–62. Dorsal habitus of *Carabus titarenkoi titarenkoi*, Okureshi env. Scale bar 10.0 mm.
Рис. 57–62. Габитус сверху *Carabus titarenkoi titarenkoi*, окр. Окуреши. Масштаб 10,0 мм.



Figs 63–68. Dorsal habitus of *Carabus titarenkoi djanoliensis*, Zubi env. Scale bar 10.0 mm.
Рис. 63–68. Габитус сверху *Carabus titarenkoi djanoliensis*, окр. Зуби. Масштаб 10,0 мм.



Figs 69–74. Dorsal habitus of *Carabus titarenkoi kozlovantoni* **ssp.n.**, Oni env. Scale bar 10.0 mm.
Рис. 69–74. Габитус сверху *Carabus titarenkoi kozlovantoni* **ssp.n.**, окр. Они. Масштаб 10,0 мм.



Figs 75–78. Dorsal habitus of *Carabus titarenkoi kozlovantoni* **ssp.n.**, Gomi env. Scale bar 10.0 mm.
Рис. 69–74. Габитус сверху *Carabus titarenkoi kozlovantoni* **ssp.n.**, окр. Гоми. Масштаб 10,0 мм.

Uzunta vill., right bank of river Pasknara, 890 m, 22.IV–21.VI.2015, pitfall traps, D. Fominykh, A. Zubov, R. Khryapin leg.; 7 ♂♂, 11 ♀♀ (CFDD), Georgia, Racha, Racha Mt. Range, right bank of river Rustavi near Shkhivana vill., 1270 m, 25.IV–8.VI.2016, pitfall traps, D. Fominykh, A. Zubov leg.; 8 ♂♂, 6 ♀♀ (CFDD, CSAA), Georgia, Racha, Racha Mt. Range, W slope of Pir-Tziteli Mt. near Zemo-Bari vill., 1100–1350 m, 24.IV–9.VI.2016, pitfall traps, D. Fominykh. A. Zubov leg.; 26 ♂♂, 31 ♀♀ (CFDD), Georgia, Racha, Racha Mt. Range, N slope of Khikhata Mt. Range near Mravaldzali vill., 2100 m, 8–22.VI.2016, pitfall traps, leg. D. Fominykh, A. Zubov, D. Safronov; 131 ♂♂, 262 ♀♀ (CFDD, CTAY, CSIA, CSAA), Georgia, Racha, N slopes of Racha Mt. Range near Betlevi vill., 1245 m, 2.V–17.VI.2018, pitfall traps, D. Fominykh leg.; 1 ♂, 2 ♀♀ (CFDD), Georgia, Racha, N slope of Racha Mt. Range near Zeda-Tlugi vill., left bank of river Gortskali, 1150 m, 6–12.V.2023, pitfall traps, D. Fominykh, A. Tatulyan leg.; 2 ♀♀(CSIA), "Géorgie, Basse-Ratcha, à l'est de Nikortsminda, Skhartali, E de Betlevi, mixed forest, h = 1200–1300 mètres", VI.2017, Stephani Pascal leg.; 31 ♂♂, 38 ♀♀ (CFDD, CTAP), Georgia, Racha, Racha Mt. Range, Khikhata Mt. Range near Shkmeri vill., SE slopes of Khikhata Mt., 2040 m, 22.VI–21.VII.2024, pitfall traps, D. Fominykh, A. Tatulyan leg.; 6 ♂♂, 14 ♀♀ (CFDD, CTAP, CSAA), Georgia, Racha, Racha Mt. Range, Khikhata Mt. Range, near Shkmeri vill., SE slopes of Khihata Mt., 1920 m, 22.VI–21.VII.2024, pitfall traps, D. Fominykh, A. Tatulyan leg.; 11 ♂♂, 13 ♀♀ (CFDD, CTAY, CZAM), **South Ossetia**, Racha Mt. Range, 4 km NE of Dzhalobet vill., right bank of river Kvirila, 1450 m, 29.V–12.VII.2015, pitfall traps, D. Fominykh leg.; 26 ♂♂, 18 ♀♀ (CFDD, CTAY, CZAM), South Ossetia, Racha Mt. Range near Ertzo Pass, 1800 m, 29.V–12.VII.2015, pitfall traps, D. Fominykh leg.; 77 ♂♂, 111 ♀♀, (CFDD, CTAY, CSIA), South Ossetia, Racha Mt. Range near Ertzo vill., N slopes of Alkhashenda Mt., 1800 m, 17.V–10.VII.2016, pitfall traps, D. Fominykh, A. Zubov leg.; 9 ♂♂, 15 ♀♀ (CFDD, CTAY, CZAM), South Ossetia, 1 km MW of Bakhuta vill., left bank of river Patsa, 1250 m, 28.V–12.VII.2015, pitfall traps, D. Fominykh leg.; 10 ♂♂, 15 ♀♀ (CFDD), South Ossetia, left bank of river Patsa near Kotanto vill., 1600 m, VI–VII.2018, pitfall traps, A. Tatulyan leg.; 3 ♂♂, 7 ♀♀ (CFDD), South Ossetia, 1 km MW of Bakhuta vill., left bank of river Patsa, N 42°25'10.83", E43°50'35.45", 1250 m, 28.V–12.VII.2015, pitfall traps, D. Fominykh leg.; 2 ♂♂, 3 ♀♀ (CSIA, CTAP), C Caucasus, South Ossetia, 1.3 km ENE vill. Kvaisa (env. vill. Bsita), mixed forest+ferns, 1550 m, 20.V–4.VII.2017, pitfall traps, A. Tatulyan leg.; 2 ♂♂, 5 ♀♀ (CSIA, CPSM), South Ossetia, road to Kvaisa vill., 0.92 km NW of Bakhuta vill., 1280 m, 17.V–1.VII.2018, pitfall traps, A. Tatulyan leg.; 2 ♂♂, 2 ♀♀ (CSIA), C Caucasus, South Ossetia, 0.94 km NW of Bakhuta vill., left bank of river Patsa, mixed forest, 1280 m, 20.V–3.VII.2017, pitfall traps, A. Tatulyan leg.; 1 ♂, 4 ♀♀ (CSIA, CPSM), South Ossetia, Dzau distr., right bank of river Patza, 0.7 km E of Nizhnya Kemulta vill., 1335 m, 17.V–1.VII.2018, pitfall traps, leg. A. Tatulyan; 3 ♀♀ (CSIA), South Ossetia, Dzau distr., right bank of river Patza, 0.7 km E of Nizhnya Kemulta vill., 1335 m, 1.VII–13.VIII.2018, pitfall traps, A. Tatulyan leg.; 4 ♂♂, 6 ♀♀ (CSIA, CTAP, CPSM), South Ossetia, right bank of Ertzo lake, 1808 m, 1.VII–13.VIII.2018, pitfall traps, A. Tatulyan leg.

MATERIAL USED FOR COMPARISON. *Carabus* (*Neoplectes*) *ibericus* Fisher von Waldheim, 1823: 269 ♂♂, 208 ♀♀ (CFDD, CTAYu, CZAM, CZAS), **Georgia**, Surami Mt. Range near Rikoti Pass, 1000 m, 22.IV–1.VII.2014, D. Fominykh, A. Zubov, D. Zherebilo leg.; 2 ♂♂, 3 ♀♀ (CFDD, CTAY, CZAM), Georgia, Shida-Kartli, Surami Mt. Range, 6 km W of Surami vill., S slopes of Sabuleti Mt., 908 m, N 42°01'14.30", E 43°28'21.30", 06.IV–06.VI.2015, leg. D. Fominykh, A. Zubov; 19 ♂♂, 21 ♀♀ (CFDD, CTAY, CZAM), Georgia, Imereti, Surami Mt. Range near Jvari (=Dzhvari) Pass, 970 m, N 42°11'42.30", E 43°35'54.90", 23.IV–21.VI.2015, D. Fominykh, A. Zubov leg.; 2 ♂♂, 8 ♀♀ (CFDD, CTAY, CZAM), Georgia, Imereti, Surami Mt. Range, left bank of river Cheratkhevi, 823 m, N 42°09'10.10", E 43°38'28.20", 23.IV–21.VI.2015, D. Fominykh & A. Zubov leg.; 19 ♂♂, 13 ♀♀ (CFDD, CTAY), Georgia, Shida-Kartli, Surami Mt. Range, right bank of river Cheratkhevi, near Ulumbo monastery, 923 m, 7.IV–9.VI.2017, D. Fominykh, D. Safronov leg.; 32 ♂♂, 39 ♀♀ (CFDD, CTAY), Georgia, Shida Kartli, Surami Mt. Range, near Ulumbo vill., 890 m, 7.IV–6.VI.2018, D. Fominykh, A. Zubov, B. Dubinin leg.; 15 ♂♂, 17 ♀♀ (CFDD), Georgia, Imereti, Surami Mt. Range, near Goresha vill., 765 m, 13.IV–6.VI.2018, D. Fominykh, A. Zubov, B. Dubinin leg.; 3 ♂♂, 1 ♀♀ (CFDD), Georgia, Shida-Kartli, near Brili vill., Surami Mt. Range, 866 m, 1–13.V.2023, D. Fominykh, A. Tatulyan leg.; 58 ♂♂, 91 ♀♀ (CFDD, CTAP), Georgia, Shida Kartli, Surami Mt. Range, near Ulumbo vill., 830 m, 15.IV–11.VI.2024, D. Fominykh, A. Tatulyan, Ya. Talibov leg.; 3 ♂♂, 11 ♀♀ (CFDD), C Caucasus, **South Ossetia**, Surami Mt. Range, right bank of river Itrapula, 1600 m, 30.V–12.VII.2015, D. Fominykh leg.

DESCRIPTION. Small to medium sized subspecies, body length 25–35 mm, males 25–29 mm, females 26.5–35 mm long. Underside black, dorsum usually with bright metallic luster, bronze, less often green, olive-green, red, dark blue, black, dark purple (Figs 15–32). Body slender. Head not inflated, unlike some other *Neoplectes* taxa. Median groove of pronotum distinct, disk regularly transversally rugose, microsculpture being rather uniform. Elytra elongate, more rounded and flattened in females and more elongated and convex in males, elytral apices rounded in both sexes. Elytral sculpture smoother in males, links of its intervals shorter and less pronounced than in females; in females sculpture coarser, intervals more pronounced, this resulting in the more matte surface appearance. Aedeagus comparatively medium-sized, of characteristic in *Neoplectes* form, with prominent inflation in the middle, the latter being however comparatively faintly pronounced, slightly bent. Endophallus as in Figures 85–93, with rather short basal part, aggonoporius comparatively small, bilobed, conspicuously sclerotized.

DIFFERENTIAL DIAGNOSIS AND REMARKS. A new subspecies resembles in body shape, elytral punctation and color *C. szekelyi* (Figs 33–44), which populates the same mountain mass (Racha Mt. Range), but differs in the endophallus structure (Figs 100–105). These two taxa possess sympatry in one locality in Souths Ossetia. However, in other known places a new subspecies and populations of *C.* (*Neoplectes*) *szekelyi* don't get together, even they have no well-defined geographical barrier between each other. Maybe future researches will reveal more localities with sympatric occurrence of both species. In comparison with the nominative subspecies (Figs 3–14, 79–84), a new taxon differs primarily in the endophallus structure, as well as in the narrower shape of the pronotum and, on average, smaller body size, but probably the latter feature is associated primarily with habitat, the main portion of the known populations of this new subspecies populate the colder northern slope of the mountain range, and on average, a higher altitude biotopes, while the nominative subspecies occurs further south and lower, at the massif of Surami Mt. Range.

DISTRIBUTION. A new subspecies is known from the Racha Mt. Range (Fig. 1) and populates generally its northern macroslope, it spreads eastward, starting from the Shaori res-

ervoir, at the southern macroslope, though limits of the distribution range in Georgia is not precisely established, extreme population is known from the vicinity of the Uzunta village. Further, in South Ossetia, known populations occur in the lake Ertzo environs, they are replaced northwards by the similar in appearance *C. szekelyi*, further to the east the extreme known populations are detected in the vicinity of the village of Kontanto, on the left bank of river Patsa (Ossetian Пацъа, Georgian ფაცა), eastwards populations of this taxon have not been found.

HABITAT. A new subspecies inhabits beech and fir-mixed forest sites on karstic landforms, reaching the zone of alpine meadows (Figs 117–119), its altitude preferences ranging from 890 to 2100 m. Activity of imago proceeds from April until August. *Carabus* (*Neoplectes*) *szekelyi* Retezar, 2011, *C.* (*Archiplectes*) *compressus* Chaudoir, 1846, *C.* (*Tribax*) *fossiger* Chaudoir, 1877, *C.* (*Tribax*) *kasbekianus* Kraatz, 1877, *C.* (*Sphodristocarabus*) *armeniacus* Mannerheim, 1830, *C.* (*Megodontus*) *septemcarinatus* Motschulsky, 1840, *C.* (*Procerus*) *scabrosus colchicus* Motschulsky, 1844, *C.* (*Tomocarabus*) *decolor* Fischer, 1823, and *C.* (*Lipaster*) *stjernvalli* Motschulskiy, 1865 also occur together with this subspecies.

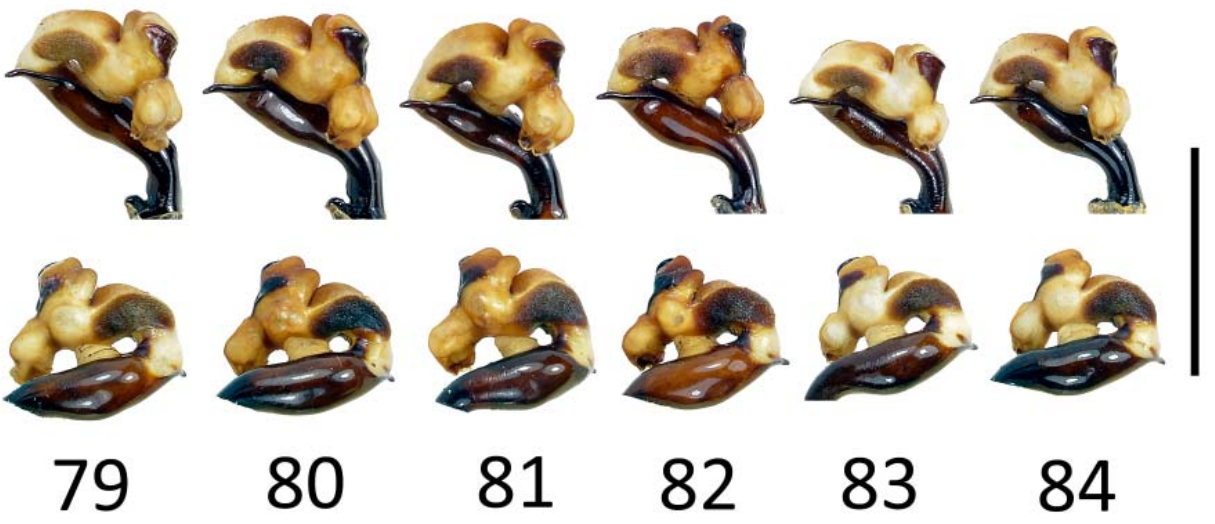
ETYMOLOGY. The subspecific epithet refers to the morphological similarity of the new form to *C. szekelyi*.

Carabus (*Neoplectes*) *szekelyi tatulyani* A. Fominykh, Zamotajlov, Titarenko et D. Fominykh, **ssp.n.**
Figs 1, 45–56, 94–99, 120.

MATERIAL. Holotype ♂ (ZISP), **South Ossetia**, Racha Mt. Range, near Tli vill., right bank of river Valtkatzi, 1900–2300 m, 17.V–09.VII.2016, pitfall traps, D. Fominykh, A. Zubov leg.; Paratypes: 126 ♂♂, 173 ♀♀ (MPSU, CFDD), same data as holotype; 5 ♂♂, 9 ♀♀ (CFDD), South Ossetia, left bank of river Patsa, near Kotanto vill., 1600 m, VI–VII.2018, pitfall traps, A. Tatulyan leg.; 1 ♂ (CFDD), South Ossetia, Racha Mt. Range, near Shiboyta vill., right bank of river Valtkatzi, 1700 m 17.V–9.VII.2016, pitfall traps, D. Fominykh, A. Zubov leg.; 7 ♂♂, 6 ♀♀ (CSIA, CTAP, CPSM), South Ossetia, 0.4 km S of Nagreba vill., 1560 m, 17.V–1.V.2018, pitfall traps, A. Tatulyan leg.

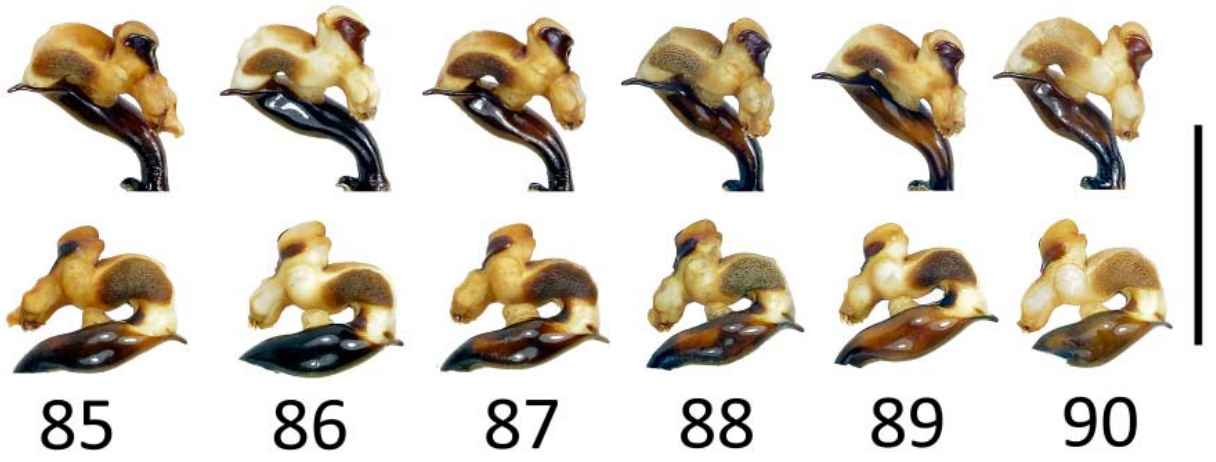
MATERIAL USED FOR COMPARISON. *Carabus* (*Neoplectes*) *szekelyi szekelyi* Retezár, 2011: 32 ♂♂, 33 ♀♀ (CFDD, CTAYU, CZAM, CZAS), **Georgia**, N slopes of Racha Mt. Range near Nakerala Pass, 1100–1200 m, 23–24.IV.2014, D. Fominykh, A. Zubov, D. Zherebilo leg.; 17 ♂♂, 12 ♀♀ (CFDD, CTAY, CZAM, CZAS), Georgia, Imereti, Racha Mt. Range, 5 km NW of Nakerala Pass near Tkibuli town, 1454 m, 9.V–7.VII.2015 D. Fominykh, A. Zubov leg.; 47 ♂♂, 61 ♀♀ (CFDD), Georgia, Racha, Racha Mt. Range, left bank of Shaori reservour, near Haristvala vill., 1100 m, 24.IV–9.VI.2016, D. Fominykh, A. Zubov leg.; 3 ♂♂, 8 ♀♀ (CFDD), Georgia, Racha, Racha Mt. Range, right bank of river Sharaula, near Nikortzminda vill., NW slopes of Sharaula Mt., 1270 m, 26.IV–9.VI.2016, D. Fominykh, A. Zubov leg.; 39 ♂♂, 72 ♀♀ (CFDD), Georgia, Racha, N slopes of Racha Mt. Range, left bank of river Sharaula, near Tkhmori vill., 1150 m, 12.V–12.VII.2017, D. Fominykh, R. Khryapin leg.; 6 ♂♂, 9 ♀♀ (CFDD), Georgia, Racha, right bank of river Sharaula, near Zeda-Shavra vill., 1090 m, 3.V–12.VII.2018, D. Fominykh, B. Dubinin leg.; 15 ♂♂, 12 ♀♀ (CFDD, CTAP), Georgia, Racha, near Nikortzminda vill., left bank of river Shareula, 1053 m, 6–12.V.2023, D. Fominykh, A. Tatulyan leg.; 34 ♂♂, 28 ♀♀ (CFDD, CTAP), Georgia, Racha, near Kedisubani vill., right bank of Shareula riv., 1110 m, 5–12.V.2023, D. Fominykh, A. Tatulyan leg.; 3 ♂♂, 6 ♀♀ (CFDD), Georgia, Racha, near Zeda-Shavra vill., right bank of river Shareula, 1120 m, 5–12.V.2023, D. Fominykh, A. Tatulyan leg.

DESCRIPTION. Small subspecies, body length 21–30 mm, males 21–29 mm, females 24–30 mm long. Underside black, dorsum usually with bright metallic luster, bronze, less often green, olive-green, red, dark blue, black, dark purple (Figs 45–56). Body slender. Head not inflated, unlike some other *Neoplectes* taxa. Median groove of pronotum distinct, disk regularly transversally rugose, microsculpture being rather uniform. Elytra elongate, more rounded and flattened in females and more elongated and convex in males, elytral apices rounded in both sexes. Elytral sculpture smoother in males, links of its in-

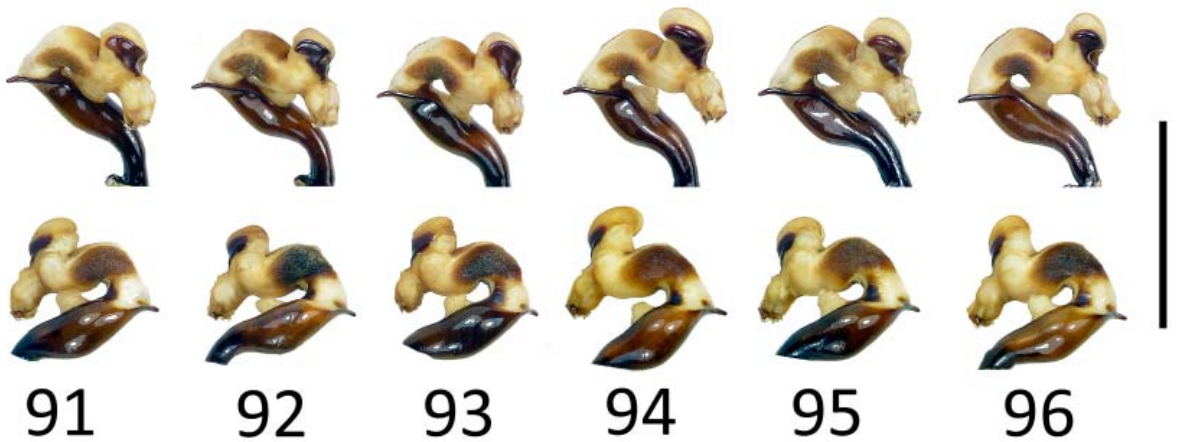


Figs 79–84. Aedeagus and fully inflated endophallus preparation of *Carabus ibericus ibericus*, right lateral view on top, left lateral view below: 79–81 — Ulumbo env.; 82–84 — Goresha env. Scale bar 10.0 mm.

Рис. 79–84. Эдеагус и препарат полностью вывернутого внутреннего мешка *Carabus ibericus ibericus*, вверху вид сбоку справа, внизу вид сбоку слева: 79–81 — окр. Улумбо; 82–84 — окр. Гореша. Масштаб 10,0 мм.



Figs 85–90. Aedeagus and fully inflated endophallus preparation of *Carabus ibericus pseudoszekelyi* **ssp.n.**, right lateral view on top, left lateral view below: 85–87 — Shkmeri env.; 88–90 — Betlevi env. Scale bar 10.0 mm.
Рис. 85–90. Эдеагус и препарат полностью вывернутого внутреннего мешка *Carabus ibericus pseudoszekelyi* **ssp.n.**, вверху вид сбоку справа, внизу вид сбоку слева: 85–87 — окр. Шкмери; 88–90 — окр. Бетлеви. Масштаб 10,0 мм.



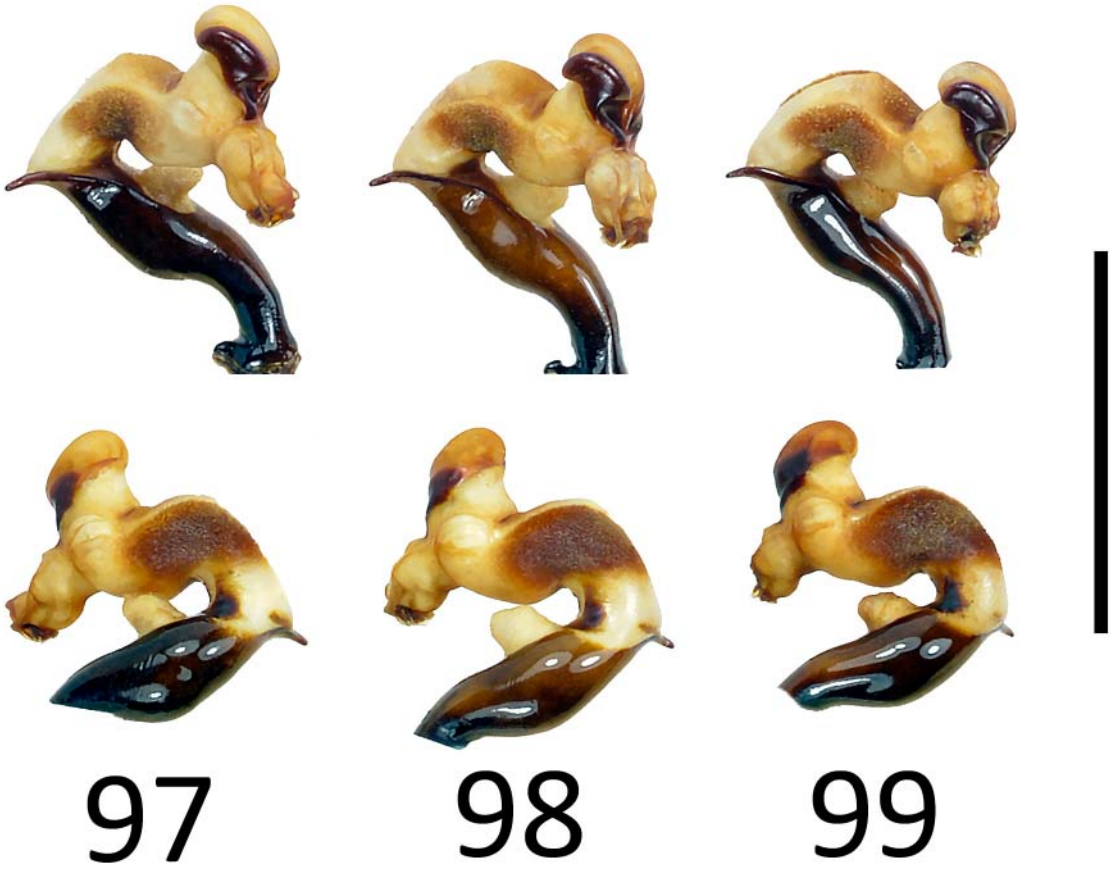
Figs 91–96. Aedeagus and fully inflated endophallus preparation of the *Carabus* subgenus *Neoplectes*, right lateral view on top, left lateral view below: 91–93 — *C. ibericus pseudoszekelyi* **ssp.n.**, Kontanto env.; 94–96 — *C. szekelyi tatulyani* **ssp.n.**, Kontanto env. Scale bar 10.0 mm.
Рис. 91–96. Эдеагус и препарат полностью вывернутого внутреннего мешка подрода *Neoplectes* рода *Carabus*, вверху вид сбоку справа, внизу вид сбоку слева: 91–93 — *C. ibericus pseudoszekelyi* **ssp.n.**, окр. Контанто; 94–96 — *C. szekelyi tatulyani* **ssp.n.**, окр. Контанто. Масштаб 10,0 мм.

tervals shorter and less pronounced than in females; in females sculpture coarser, intervals more pronounced, this resulting in the more matte surface appearance. Aedeagus comparatively medium-sized, of characteristic in *Neoplectes* shape, with prominent inflation in the middle, slightly bent. Endophallus as in figures 94–99, with rather short basal part, aggonoporius comparatively small, bilobed, conspicuously sclerotized.

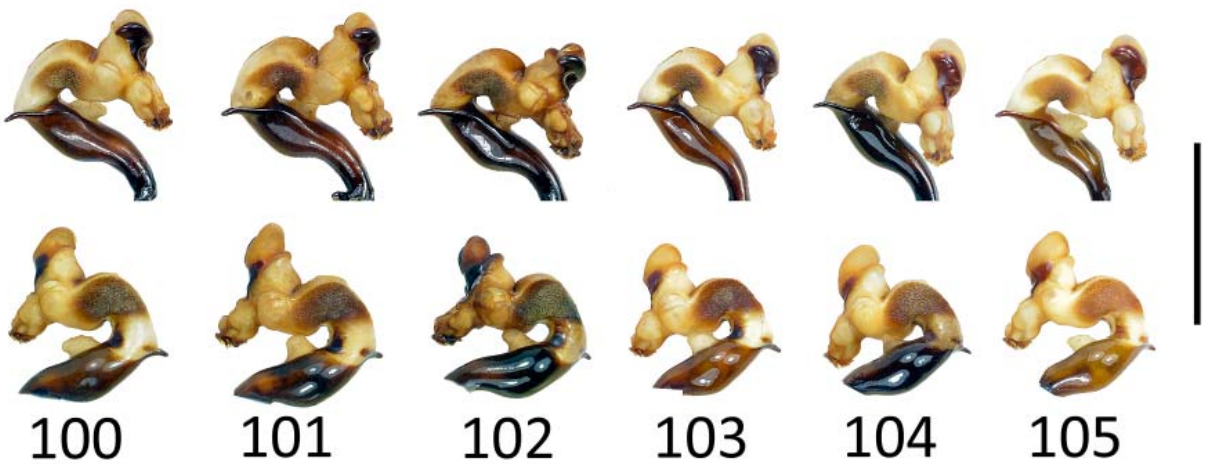
DIFFERENTIAL DIAGNOSIS AND REMARKS. Externally, the new subspecies is very similar to *C. ibericus pseudoszekelyi* **ssp.n.**, from which it differs primarily in the structure of the endophallus (Figs 91–96), discriminative features being especially pronounced in the localities, where both species dwell sympatrically. The posterior angles of the pronotum in the new taxon are stronger protruded laterally than in *C. ibericus pseudoszekelyi* **ssp.n.** From the nominative subspecies, the new subspecies externally differs in a smoother elytral sculpture, as well as in the structure of endophallus. Spatially, areas of both subspecies of *C. szekelyi* are separated by the areas, populated by *C. ibericus pseudoszekelyi* **ssp.n.**

DISTRIBUTION. Three populations of the new taxon are known till now from the southern macroslope of the Main Caucasian Range, approximately in the interfluve of rivers Dzedzora (Georgian მდინარე ძედზორა) and Bolshaya Liakhvi (=Didi Liakhvi, Georgian დიდი ლახვი) (Fig. 1).

HABITAT. A new subspecies inhabits beech and fir-mixed forest sites (Fig. 120), reaching the zone of alpine meadows, its altitude preferences ranging from 1600 to 2300 m. Activity of imago proceeds from May until July. *Carabus* (*Neoplectes*) *szekeliy* Retezár, 2011, *C.* (*Tribax*) *fossiger* Chaudoir, 1877, *C.* (*Tribax*) *kasbekianus* Kraatz, 1877, *C.* (*Sphodristocarabus*) *armeniacus* Mannerheim, 1830, *C.* (*Megodontus*) *septemcarinatus* Motschulsky, 1840, *C.* (*Tomocarabus*) *decolor* Fischer,



Figs 97–99. Aedeagus and fully inflated endophallus preparation of *Carabus szekelyi tatulyani* **ssp.n.**, Tli env., right lateral view on top, left lateral view below. Scale bar 10.0 mm.
Рис. 97–99. Эдеагус и препарат полностью вывернутого внутреннего мешка *Carabus szekelyi tatulyani* **ssp.n.**, окр. Тли, вверху вид сбоку справа, внизу вид сбоку слева. Масштаб 10,0 мм.



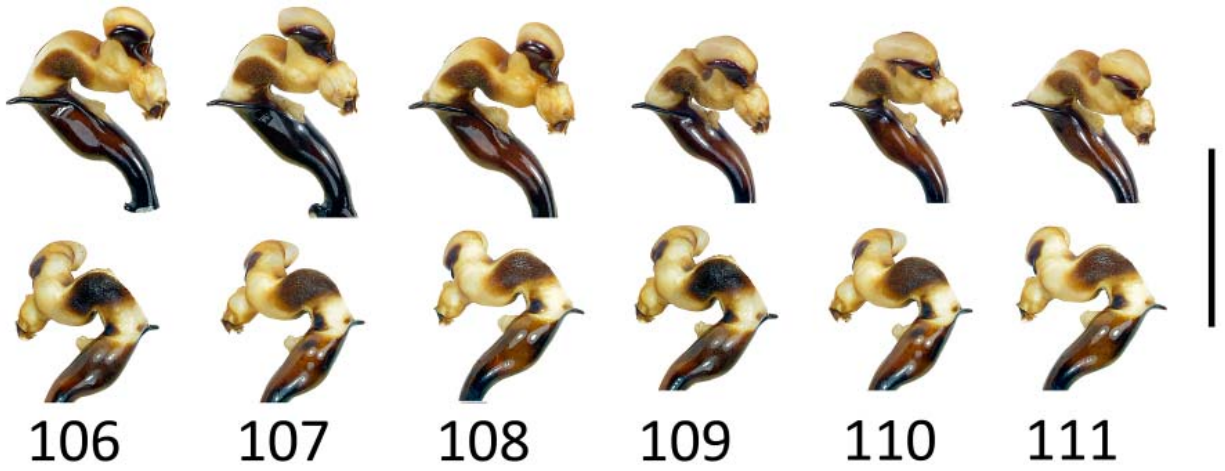
Figs 100–105. Aedeagus and fully inflated endophallus preparation of *Carabus szekelyi szekelyi*, right lateral view on top, left lateral view below: 100–102 — Kedisubani env.; 103–105 — Shaori env. Scale bar 10.0 mm.
Рис. 100–105. Эдеагус и препарат полностью вывернутого внутреннего мешка *Carabus szekelyi szekelyi*, вверху вид сбоку справа, внизу вид сбоку слева: 100–102 — окр. Кедисубани; 103–105 — окр. Шаори. Масштаб 10,0 мм.

1823, and *C.* (*Lipaster*) *stjernvalli*, Motschulskiy, 1865 also occur together with this subspecies.

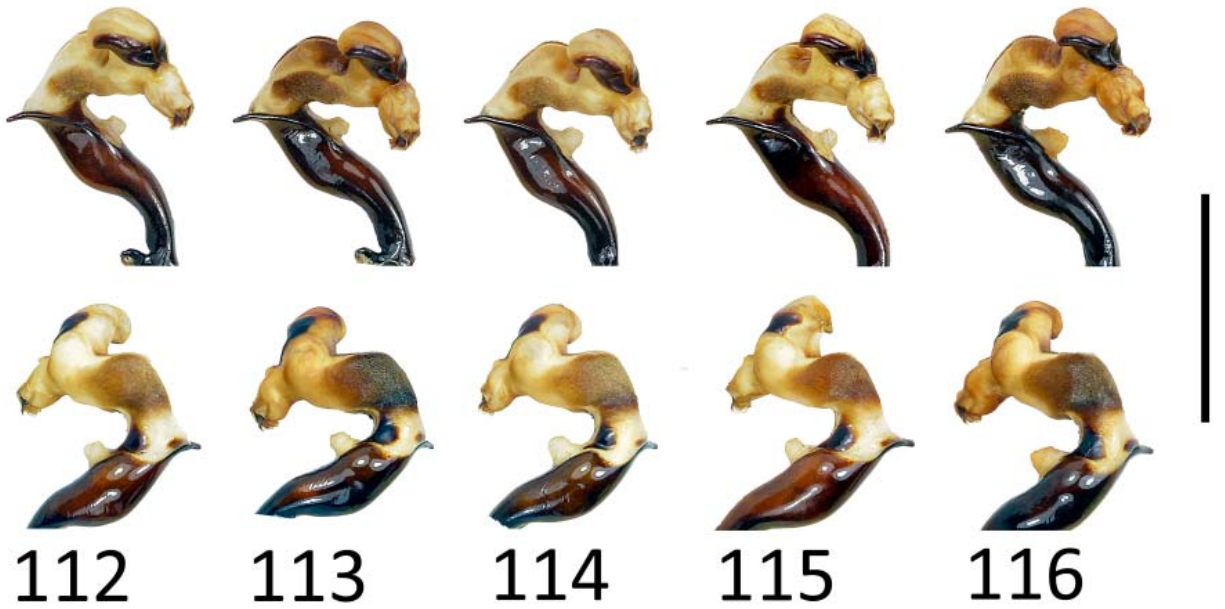
ETYMOLOGY. We are pleased to dedicate this new subspecies to Mr. Alexey P. Tatulyan of Essentuki in commemoration of his kind assistance during numerous cooperative expeditions, invaluable help in collecting and field studies of the *Carabus* species in the Caucasus, as well as providing material fundamentally important for the present description.

Carabus (*Neoplectes*) *titarenkoi kozlovantoni* A. Fominykh, Zamotajlov, Titarenko et D. Fominykh, **ssp.n.**
Figs 1, 69–78, 112–116, 121.

MATERIAL. Holotype ♂ (ZISP), **Georgia**, Racha, Oni town env., near Ghari vill., btw rivers Rioni and Gharula., 870 m, 13.V–22.VI.2024, pitfall traps, D. Fominykh, A. Tatulyan, Ya. Talibov leg.; Paratypes: 11 ♂♂, 29 ♀♀ (MPSU, CFDD, CTAP, CTYT), same data as holotype; 3 ♂♂, 4 ♀♀ (CFDD), Georgia, Ratcha, right bank of river Gamrula, near



Figs 106–111. Aedeagus and fully inflated endophallus preparation of the *Carabus* subgenus *Neoplectes*, right lateral view on top, left lateral view below: 106–108 — *C. titarenkoi titarenkoi*, Okureshi env.; 109–111 — *C. titarenkoi djanoliensis*, Zubi env. Scale bar 10.0 mm.
Рис. 106–111. Эдеагус и препарат полностью вывернутого внутреннего мешка подрода *Neoplectes* рода *Carabus*, вверху вид сбоку справа, внизу вид сбоку слева: 106–108 — *C. titarenkoi titarenkoi*, окр. Окуреши; 109–111 — *C. titarenkoi djanoliensis*, окр. Зуби. Масштаб 10,0 мм.



Figs 112–116. Aedeagus and fully inflated endophallus preparation of *Carabus titarenkoi kozlovantoni* **ssp.n.**, right lateral view on top, left lateral view below: 112–114 — Oni env., 115–116 — Gomi env. Scale bar 10.0 mm.
Рис. 112–116. Эдеагус и препарат полностью вывернутого внутреннего мешка *Carabus titarenkoi kozlovantoni* **ssp.n.**, вверху вид сбоку справа, внизу вид сбоку слева: 112–114 — окр. Они; 115–116 — окр. Гоми. Масштаб 10,0 мм.

Fig. 117. Habibtat of *Carabus* (*Neoplectes*) *ibericus pseudoszekelyi* **ssp.n.**, Betlevi env., 1245 m a.s.l.
Рис. 117. Местообитание *Carabus* (*Neoplectes*) *ibericus pseudoszekelyi* **ssp.n.**, окр. Бетлеви, 1245 м над ур. м.

Fig. 118. Habibtat of *Carabus* (*Neoplectes*) *ibericus pseudoszekelyi* **ssp.n.**, Ertso env., 1800 m a.s.l.
Рис. 118. Местообитание *Carabus* (*Neoplectes*) *ibericus pseudoszekelyi* **ssp.n.**, окр. Эрцо, 1800 м над ур. м.

Fig. 119. Habibtat of *Carabus ibericus pseudoszekelyi* **ssp.n.**, Shkmeri env., 2040 m a.s.l.
Рис. 119. Местообитание *Carabus ibericus pseudoszekelyi* **ssp.n.**, окр. Шкмери, 2040 м над ур. м.

Fig. 120. Habibtat of *Carabus szekelyi tatulyani* **ssp.n.**, Tli env., 1900 m a.s.l.
Рис. 120. Местообитание *Carabus szekelyi tatulyani* **ssp.n.**, окр. Тли, 1900 м над ур. м.

Fig. 121. Habibtat of *Carabus titarenkoi kozlovantoni* **ssp.n.**, Oni env., 870 m a.s.l.
Рис. 121. Местообитание *Carabus titarenkoi kozlovantoni* **ssp.n.**, окр. Они, 870 м над ур. м.

Gomi vill., 1385 m, 3.V–12.VII.2018, pitfall traps, D. Fominykh, B. Dubinin, D. Safronov leg.; 1 ♂ (CFDD), Georgia, Racha, NW slopes of Dolomistsveri Mt., W of Glola vill., left bank of river Chanchakhi, 1150 m, 13.V–22.VI.2024, pitfall traps, D. Fominykh, A. Tatulyan, Ya. Talibov leg.

MATERIAL USED FOR COMPARISON. *Carabus* (*Neoplectes*) *titarenkoi titarenkoi* Zamotajlov et Fominykh, 2014: 5 ♂♂, 5 ♀♀ (CFDD), **Georgia**, Lechkhumi, N slopes of Mt. Khvamli near Okhureshi vill., 1700 m, 1.V–16.VI.2014, D. Fominykh, A. Zubov leg.; 9 ♂♂, 11 ♀♀ (CFDD), Georgia, Lechkhumi, S slopes of Mt. Dzhvari near Okhureshi vill., 1500 m, 30.IV–15.VI.2014, D. Fominykh, A. Zubov leg.; 4 ♂♂, 4 ♀♀ (CFDD), Georgia, Lechkhumi, NE slopes of Mt. Khvamli near Lakhepa vill., 1200 m, 30.IV–16.VI.2014, D. Fominykh, A. Zubov leg.; 2 ♂♂, 3 ♀♀ (CFDD), Georgia, Lechkhumi, NE slopes of Mt. Khvamli near Lakhepa vill., 900 m, 29.IV–16.VI.2014, D. Fominykh, A. Zubov leg.; 7 ♂♂, 4 ♀♀ (CFDD), Georgia, Lechkhumi, near Nakuraleshi vill., 1100 m, 5.V–13.VII.2018, D. Fominykh, B. Dubinin, D. Safronov leg.; 16 ♂♂, 13 ♀♀ (CFDD), Georgia, Lechkhumi, left bank of river Tskhenis-Tskali, near Okureshi vill., S slopes of Jvari Mt., 1188 m, 18.V–14.VI.2017, D. Fominykh leg.; 4 ♂♂, 9 ♀♀ (CFDD), Georgia, Lechkhumi, near Nasperi vill., btw rivers Tskhenis-Tskali and Rioni, 690 m, 5–11.V.2023, D. Fominykh, A. Tatulyan leg. *Carabus* (*Neoplectes*) *titarenkoi djanoliensis* Fominykh, Zamotajlov et Titarenko, 2016: 10 ♂♂, 10 ♀♀ (CFDD), **Georgia**, Letchkhumi, right bank of river Tskhenis-Tskali, near Zubi vill., E slopes of Askhi plateau, 850 m, 24.IV–18.VI.2016, D. Fominykh, A. Zubov leg.; 11 ♂♂, 11 ♀♀ (CFDD), Georgia, Lechkhumi, right bank of river Tskhenistskali, near Makhura vill., 730 m, 14.V–15.VII.2018, D. Fominykh, B. Dubinin, D. Safronov leg.; 6 ♂♂, 6 ♀♀ (CFDD), Georgia, Lechkhumi, right bank of river Dzhanoli, near Chkhumi vill., E slopes of Mushulda Mt., 526 m, 16.IV–13.VI.2015, D. Fominykh, A. Zubov leg.

DESCRIPTION. Medium sized subspecies, body length 28.5–34.5 mm, males 28.5–31 mm, females 31.5–34.5 mm long. Underside black, dorsum usually with bright metallic luster, bronze, less often green, olive-green, red, dark blue, black, dark purple (Figs 69–78). Body slender. Head not inflated, unlike some other *Neoplectes* taxa, Median groove of pronotum distinct, disk regularly transversally rugose, microsculpture being rather uniform. Elytra elongate, more rounded and flattened in females and more elongated and convex in males, elytral apices rounded in both sexes. Elytral sculpture smoother in males, links of its intervals shorter and less pronounced than in females; in females sculpture coarser, intervals more pronounced, this resulting in the more matte surface appearance. Aedeagus comparatively medium-sized, of characteristic in *Neoplectes* shape, with prominent inflation in the middle, slightly bent. Endophallus as in figures 112–116, with rather short basal part, aggonoporius comparatively small, bilobed, conspicuously sclerotized.

DIFFERENTIAL DIAGNOSIS AND REMARKS. A new subspecies is clearly distinguishable from the other subspecies

of *C. titarenkoi* (Figs 57–68, 106–111) by the rounded lateral sides of pronotum and smoother sculpture of the elytra, as well as by details of the endophallus structure. Noteworthy, above described subspecies is quite strongly spatially separated from the other known ones. It is clearly distinguishable from *C.* (*Neoplectes*) *mellyi*, which is distributed sympatrically (at least in some localities), by the structure of the endophallus.

DISTRIBUTION. Populations of a new subspecies have been discovered till now only at the southern macroslope of the Main Caucasian Range, at the left bank of the river Rioni.

HABITAT. A new subspecies inhabits beech and fir-mixed forest sites (Fig. 121), its altitude preferences ranging from 870 up to 1385 m. Activity of imago proceeds from May until June. *Carabus* (*Neoplectes*) *mellyi* Chaudoir, 1846, *C.* (*Tribax*) *fossiger* Chaudoir, 1877, *C.* (*Sphodristocarabus*) *armeniacus* Mannerheim, 1830, and *C.* (*Megodontus*) *septemcarinatus* Motschulsky, 1840 also occur together with this species.

ETYMOLOGY. This new species is named in honor of Mr. Anton O. Kozlov of Moscow, to whom we express our deep gratitude for his kind assistance in cooperative expeditions and invaluable help in collecting and field studies of the *Carabus* species in the Caucasus.

Competing interests. The authors declare no competing interests.

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