

New data on the *Zabrus* Clairville, 1806 subgenus *Eutroctes* Zimmermann, 1831 of Georgia and adjacent territories, with the key to known species (Coleoptera: Carabidae)

Новые данные о подроде *Eutroctes* Zimmermann, 1831 рода *Zabrus* Clairville, 1806 (Coleoptera: Carabidae) Грузии и прилегающих территорий с ключом к известным видам

A.D. Fominykh¹, A.S. Zamotajlov^{2, 3}, A.Yu. Titarenko⁴, D.D. Fominykh⁴
А.Д. Фоминых¹, А.С. Замотайлов^{2, 3}, А.Ю. Титаренко⁴, Д.Д. Фоминых⁴

¹ Russian Entomological Society, Kuban Branch, Kalinina st. 13, Krasnodar 350044 Russia.

¹ Русское энтомологическое общество, Кубанское отделение, ул. Калинина, 13, Краснодар 350044 Россия.

² I.T. Trubilin Kuban State Agrarian University, Kalinin st. 13, Krasnodar 350044 Russia.

² Кубанский государственный аграрный университет им. И.Т. Трубилина, ул. Калинина, 13, Краснодар 350044 Россия.

³ Adyghei State University, Pervomayskaya st., 208, Maykop, Republic of Adygheia 385000 Russia.

³ Адыгейский государственный университет, ул. Первомайская, 208, Майкоп, Республика Адыгея 385000 Россия.

⁴ Publicly Traded Company “Morpho Absoloni”, Bolotnikovskaya st., 5/3, Moscow 117556 Russia.

⁴ ОАО «Morpho Absoloni», ул. Болотниковская, 5/3, Москва 117556 Россия.

Andrey Fominykh biologie@mail.ru

Alexandr Zamotajlov a_zamotajlov@mail.ru ORCID <https://orcid.org/0000-0003-3623-9219>

Andrey Titarenko odindva3@gmail.com

Dmitriy Fominykh odindva3@gmail.com

KEY WORDS: Coleoptera, Carabidae, *Zabrus*, *Eutroctes*, Caucasus, distribution, new synonyms, illustrated key to species.

КЛЮЧЕВЫЕ СЛОВА: Coleoptera, Carabidae, *Zabrus*, *Eutroctes*, Кавказ, новые синонимы, иллюстрированный определитель видов.

ABSTRACT. Based on material, mainly collected by the authors in the Caucasus in 2014–2022, further data are provided on the taxonomy, distribution, and ecology of the known species of the subgenus *Eutroctes* Zimmermann, 1831 from Georgia and some surrounding areas. *Z. adzharcicus* Samedov, 1954, **syn.n.** is synonymized with *Z. chalceus* Faldermann, 1836 and *Z. aurichalceus svaneticus* Samedov, 1954, **syn.n.** — with *Z. aciculatus* (Schaum, 1864). The color illustrations and distribution map are proposed, as well as a key to discussed species.

РЕЗЮМЕ. На основе материала, преимущественно собранного авторами на Кавказе в 2014–2022 гг., представлены новые данные по таксономии, распространению и экологии известных видов подрода *Eutroctes* Zimmermann, 1831 из Грузии и некоторых прилегающих территорий. *Z. adzharcicus* Samedov, 1954, **syn.n.** синонимизирован с *Z. chalceus* Faldermann, 1836, а *Z. aurichalceus svaneticus* Samedov, 1954, **syn.n.** — с *Z. aciculatus* (Schaum, 1864). Приведены цветные иллюстрации, карта распространения и определительная таблица обсуждаемых видов.

Introduction

Modern authors adhere in general to subgeneric differentiation of *Zabrus* Clairville, 1806, long proposed by Ganglbauer [1915], validity of his own subgenera, remaining problematic for a long time, was later proved by Andújar & Serrano [2000]. The Caucasian genus *Eutroctes*, nowadays considered as a subgenus, was erected by Zimmermann [1831] to house two species, “*E. aurichalceus*” from the North Caucasus and “*E. congener*” from the former Kars Region of Russian Empire. The first described consubgener was *Z. aurichalceus* (Adams, 1817). Later, several more taxa of the subgenus in question were described, a lot of them were synonymized, one appeared a homonym. The system of the subgenus proposed by Ganglbauer includes three valid species, namely *Z. aciculatus* (Schaum, 1864), *Z. aurichalceus*, and *Z. chalceus* Faldermann, 1836. This concept, which we follow below, was also admitted by the authors of several important catalogs [Kryzhanovskij et al., 1995 and its subsequent e-versions; Lorenz, 2005, 2025; Serrano, Andújar, 2017], although their interpre-

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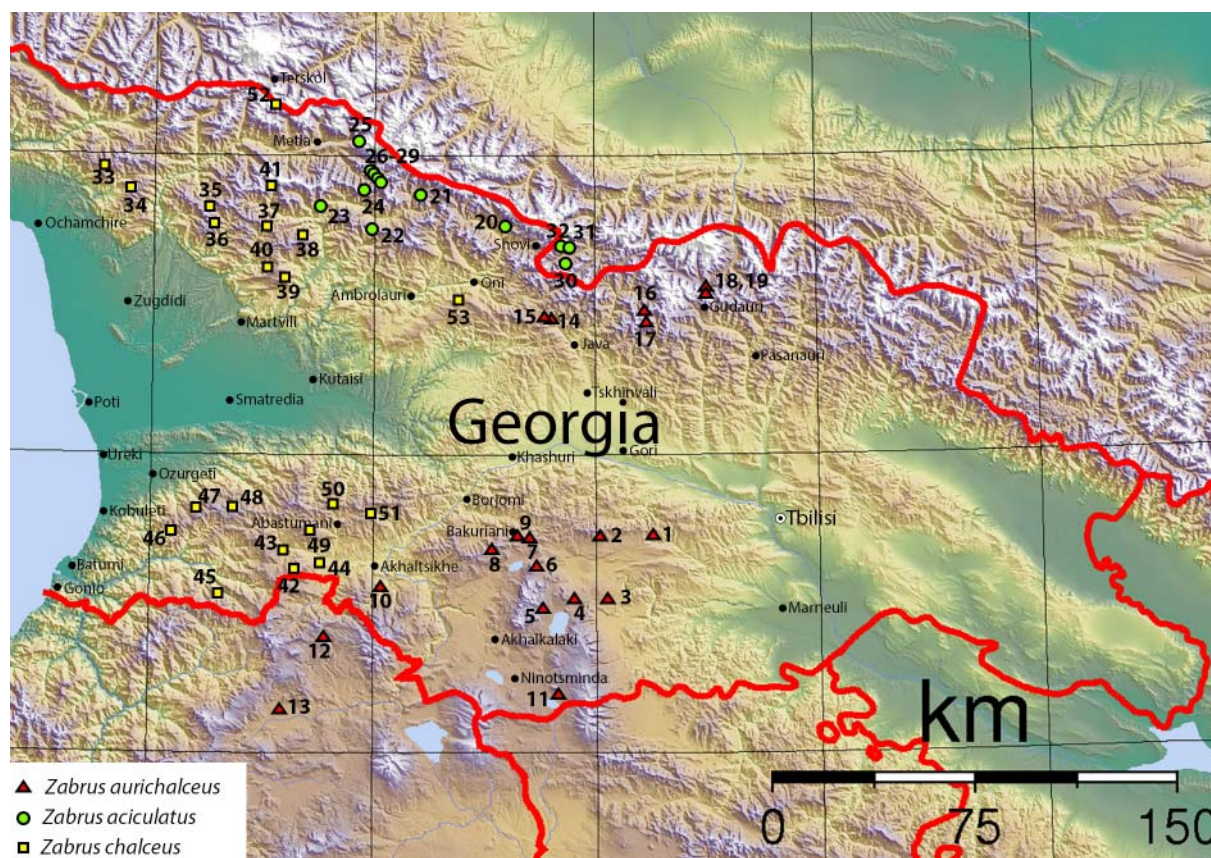


Fig. 1. Studied localities of the *Zabrus* subgenus *Eutroctes* in Georgia and adjacent territories: 1 — Chemani vill. env., 2000 m; 2 — Khachkhoy vill. env., 2100 m; 3 — Tsalka town env., 1700 m; 4 — Tuxmatash Pass, 2100 m; 5 — Paravani lake vic., 2100–2200 m; 6 — Tabatzkuri lake vic., 2300 m; 7 — Tskhratskaro Pass., 2450 m; 8 — Tskhratskaro Pass, 2500 m; 9 — Bakuriani vill. env., 2197 m; 10 — Shabanibeli Mt., 2270 m; 11 — Gorelovka vill. env., 2285 m; 12 — Ilgar Pass, 2600 m; 13 — Cham Pass, 2700 m; 14 — Ertso lake vic., 1800 m; 15 — Ertso vill. env., 1800 m; 16 — Mangavtaz Mt., 2700–3000 m; 17 — source of Chaparuhitskali riv., 2900–3000 m; 18 — Jvari Pass vic., 2450 m; 19 — Jvari Pass., 2500 m; 20 — Chiora Mt., 2500 m; 21 — Zeskho Mt., 2700–2850 m; 22 — Sasashi vill. env., 2300–2600 m; 23 — Goldash Mt., 2615 m; 24 — Latpari Pass, 2700–3000 m; 25 — Tetnuld Mt., 2900–3100 m; 26 — Zagar Pass, 2628 m; 27 — Ushguli vill. env., 2467 m; 28 — Ushguli vill. env., 2315 m; 29 — Ushguli vill. env., 2266 m; 30 — Kudar Pass env., 2365 m; 31 — Mamison Pass env., 2265 m; 32 — Mamison Pass env., 2550 m; 33 — Kodor Mt. Range, 2580 m; 34 — Kodor Mt. Range, 1500–2200 m; 35 — Egrisi Mt. Range, 2500 m; 36 — Tsatskhibali Mt., 2300 m; 37 — Lebarde Mt., 2350 m; 38 — Tsikuri Mt., 2400–2600 m; 39 — Askhi Plateau, Lekhi Mt., 2200 m; 40 — Askhi Plateau, Gadirkili Mt., 2400 m; 41 — Laila-Lakheli Mt., 2700–3000 m; 42 — Goderdzi Pass, 2300 m; 43 — Tsvinta Mt., 2400 m; 44 — Tail' Mts., 2290 m; 45 — Karapeti vill. env., 2200 m; 46 — Khino Mt., 1500 m; 47 — Gomismta vill. env., 2100–2300 m; 48 — Chidila Pass, 2350 m; 49 — Pirsagat Mt. Range, 2290 m; 50 — Zekari Pass, 2100–2300 m; 51 — Okuzdag Mt., 2350 m; 52 — Becho Pass, 3000 m; 53 — Mravaldzali vill. env., 2100 m.

Рис. 1. Изученное распространение подрода *Eutroctes* рода *Zabrus* в Грузии и на прилегающих территориях: 1 — пос. Чемани, 2000 м над ур. м.; 2 — пос. Хачхой, 2100 м над ур. м.; 3 — гор. Цалка, 1700 м над ур. м.; 4 — пер. Тухматаш, 2100 м над ур. м.; 5 — окр. оз. Паравани, 2100–2200 м над ур. м.; 6 — окр. оз. Табацкuri, 2300 м над ур. м.; 7 — пер. Цхрацкаро, 2450 м над ур. м.; 8 — пер. Цхрацкаро, 2500 м над ур. м.; 9 — окр. пос. Бакуриани, 2197 м над ур. м.; 10 — г. Шабанибель, 2270 м над ур. м.; 11 — пос. Гореловка, 2285 м над ур. м.; 12 — пер. Илгар, 2600 м над ур. м.; 13 — пер. Чам, 2700 м над ур. м.; 14 — окр. оз. Эрцо, 1800 м над ур. м.; 15 — пос. Эрцо, 1800 м над ур. м.; 16 — г. Мангавцаг, 2700–3000 м над ур. м.; 17 — ист. р. Чапарухицкали, 2900–3000 м над ур. м.; 18 — пер. Джвари, 2450 м над ур. м.; 19 — пер. Джвари, 2500 м над ур. м.; 20 — г. Чиора, 2500 м над ур. м.; 21 — г. Зесхо, 2700–2850 м над ур. м.; 22 — окр. пос. Сасаши, 2300–2600 м над ур. м.; 23 — г. Гольдаш, 2615 м над ур. м.; 24 — пер. Латпари, 2700–3000 м над ур. м.; 25 — г. Тетнульд, 2900–3100 м над ур. м.; 26 — пер. Загар, 2628 м над ур. м.; 27 — окр. пос. Ушгули, 2467 м над ур. м.; 28 — окр. пос. Ушгули, 2315 м над ур. м.; 29 — окр. пос. Ушгули, 2266 м над ур. м.; 30 — пер. Кударский, 2365 м над ур. м.; 31 — пер. Мамисонский, 2265 м над ур. м.; 32 — пер. Мамисонский, 2550 м над ур. м.; 33 — хр. Кодорский, 2580 м над ур. м.; 34 — хр. Кодорский, 1500–2200 м над ур. м.; 35 — хр. Эгрисский, 2500 м над ур. м.; 36 — г. Цацхибали, 2300 м над ур. м.; 37 — г. Лебарде, 2350 м над ур. м.; 38 — г. Цикури, 2400–2600 м над ур. м.; 39 — плато Асхи, г. Лехи, 2200 м над ур. м.; 40 — плато Асхи, г. Гадиракили, 2400 м над ур. м.; 41 — г. Лайла-Лакхели, 2700–3000 м над ур. м.; 42 — пер. Годердзи, 2300 м над ур. м.; 43 — г. Цвинта, 2400 м над ур. м.; 44 — хр. Тайль, 2290 м над ур. м.; 45 — окр. пос. Карапети, 2200 м над ур. м.; 46 — г. Хино, 1500 м над ур. м.; 47 — окр. пос. Гомисмта, 2100–2300 м над ур. м.; 48 — пер. Чидила, 2350 м над ур. м.; 49 — хр. Пирсагат, 2290 м над ур. м.; 50 — пер. Зекарский, 2100–2300 м над ур. м.; 51 — г. Окюздаг, 2350 м над ур. м.; 52 — пер. Бечо, 3000 м над ур. м.; 53 — окр. п. Мравалдзали, 2100 м над ур. м.

tations of species' distribution patterns is different, the latter remaining unclear till now. Furthermore, all above mentioned species, besides the Caucasus proper, are also recorded for the modern Turkey [Lodos, 1983; Koçak, Kemal, 2009, etc.].

The present publication does not claim to be a full revision and some names used hereafter still remain rather tentative. The aim of this study was to show the real "field" differentiation of *Eutroctes* species and to offer an illustrated key for their identification. Some peculiarities of species' ecology are also specified. Due to the lack of comparative material, the taxon *Zabrus aurichalceus punctipennis* (Chaudoir, 1846) from Armenia is not considered below. The material for this paper is based on the authors' own long-term collections in the Caucasus, as well as specimens kindly provided by some colleagues.

Material and methods

Standard methods were applied for treating the material. 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. External characters were studied with the LZOS MBS-10 and PZO MST-131 stereoscopes. Digital photographs of the morphological microstructures were taken by Dr. K. Makarov, live and biotope photographs — by the authors.

The following acronyms are used for designation of the depositories of the specimens examined: MPSU — Moscow Pedagogical State University, Chair of Zoology and Ecology (Moscow, Russia); cFDD — Private collection of D.D. Fominykh (Moscow, Russia); cTAY — Private collection of A.Yu. Titarenko (Moscow, Russia).

Taxonomy, distribution, and ecological preferences

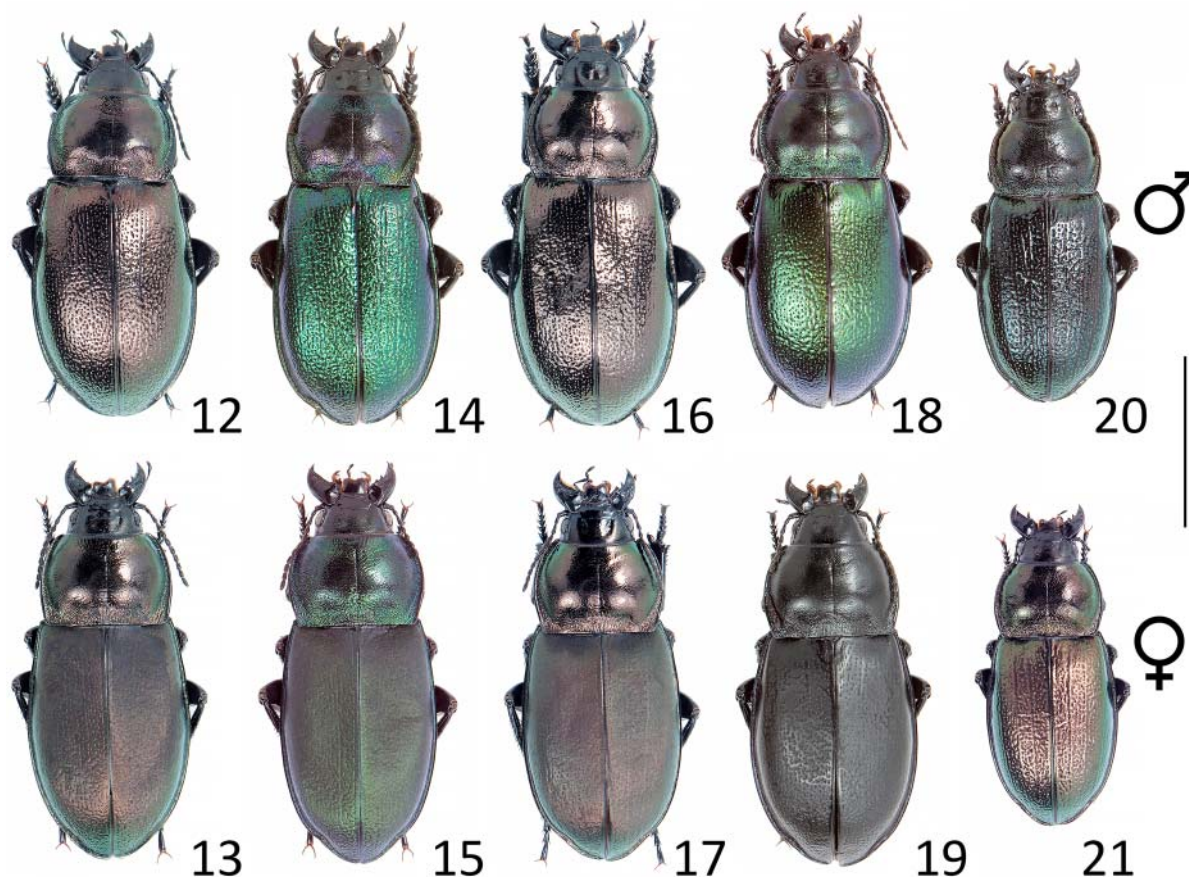
Zabrus (Eutroctes) aciculatus (Schaum, 1864)
Figs 1, 2–11, 58–62, 78–82, 104–106.

Schaum, 1864: 173 (*Eutroctes*). — *laevigatus* Chaudoir, 1846: 152 (*Eutroctes*) (homonym, non Zimmermann, 1831). — *svaneticus* Samedov, 1954: 651 (*aurichalceus* ssp.), **syn.n.**



Figs 2–11. Dorsal habitus of *Zabrus aciculatus*: 2, 3 — Chiora env., 2500 m; 4, 5 — Goldash Mt., 2615 m; 6, 7 — Latpari Pass, 2700 m; 8, 9 — Sasahi env., 2300 m; 10, 11 — Zeskho Mt., 2700 m. Scale bar 10.0 mm.

Рис. 2–11. Габитус сверху *Zabrus aciculatus*: 2, 3 — окр. пос. Чиора, 2500 м над ур. м.; 4, 5 — г. Гольдаш, 2615 м над ур. м.; 6, 7 — пер. Латпари, 2700 м над ур. м.; 8, 9 — окр. пос. Сасаши, 2300 м над ур. м.; 10, 11 — г. Зесхо, 2700 м над ур. м. Масштаб 10,0 мм.



Figs 12–21. Dorsal habitus of *Zabrus aurichalceus*: 12, 13 — Akhalzikhe env., 2270 m; 14, 15 — Cham pass, 2700 m; 16, 17 — Ertzo lake env., 1800 m; 18, 19 — Gorelovka env., 2285 m; 20, 21 — Gudissi Mt. Range, 2900 m. Scale bar 10.0 mm.

Рис. 12–21. Габитус сверху *Zabrus aurichalceus*: 12, 13 — окр. Ахалцихе, 2270 м над ур. м.; 14, 15 — пер. Чам, 2700 м над ур. м.; 16, 17 — окр. оз. Эрцо, 1800 м над ур. м.; 18, 19 — пос. Гореловка, 2285 м над ур. м.; 20, 21 — Гудисский хр., 2900 м над ур. м. Масштаб 10,0 мм.

MATERIAL. (Fig. 1, loc. 20)* 16♂♂, 9♀♀ (cFDD), Georgia, Racha, S slopes of Main Caucasus Ridge, 2 km E of Chiora Mt., 42°46'N, 43°36'E, 2500 m, 15.VI–13.VII.2018, D. Fominykh leg.; (Fig. 1, loc. 21) 14♂♂, 6♀♀ (cFDD), Georgia, Kvemo Svaneti, NE slopes of Zeskho Mt., left bank of river Zeskho, near Zeskho vill., 42°51'N, 43°12'E, 2700–2850 m, 14.VII.2018, D. Fominykh leg.; (Fig. 1, loc. 22) 11♂♂, 8♀♀ (cFDD), Georgia, Kvemo Svaneti, N slopes of Letchkhumi Mt. Range, left bank of river Tskhenis-Tskali, 4 km S of Sasashi vill., near Jvari Pass, 42°45'N, 42°58'E, 2300–2600 m, 26–27.VI.2016, A. Zubov leg.; (Fig. 1, loc. 23) 8♂♂, 2♀♀ (cFDD), Georgia, Kvemo-Svaneti, S slopes of Svaneti Mt. Range, near Lentekhi vill., S slope of Goldash Mt., 42°50'N, 42°45'E, 2615 m, 18.VI–13.VII.2017, D. Fominykh leg.; (Fig. 1, loc. 24) 9♂♂, 5♀♀ (cFDD), Georgia, Kvemo-Svaneti, Svaneti Mt. Range, near Latpari Pass., 42°52'N, 42°56'E, 2700–3000 m, 24.VI.2016, D. Fominykh & A. Zubov leg.; (Fig. 1, loc. 25) 8♂♂, 3♀♀ (cFDD), Georgia, Zemo Svaneti, S slopes of Main Caucasus Range, W slopes of Tetnuld Mt., 43°01'N, 42°55'E, 2900–3100 m, 15.VI.2018, D. Fominykh leg.; (Fig. 1, loc. 26) 13♂♂, 8♀♀ (cFDD, cTAY), Georgia, Zemo Svaneti, E part of Svaneti Mt. Range, Zagar

Pass, source of river Shavtskala-Kvishara, 42°54'N, 43°06'E, 2628 m, 17.VI–3.VII.2015, D. Fominykh & A. Zubov leg.; (Fig. 1, loc. 27) 11♂♂ (cFDD), Georgia, Zemo Svaneti, E part of Svaneti Mt. Range, 5 km E of Ushguli vill., right bank of river Shavtskala-Kvishara, 42°54'N, 43°04'E, 2467 m, 17.VI–3.VII.2015, D. Fominykh & A. Zubov leg.; (Fig. 1, loc. 28) 4♂♂, 4♀♀ (cFDD, cTAY), Georgia, Zemo Svaneti, E part of Svaneti Mt. Range, 3.5 km E of Ushguli vill., right bank of river Shavtskala-Kvishara, 42°54'N, 43°03'E, 2315 m, 17.VI–3.VII.2015, D. Fominykh & A. Zubov leg.; (Fig. 1, loc. 29) 11♂♂, 9♀♀ (cFDD), Georgia, Zemo Svaneti, E part of Svaneti Mt. Range, 1.5 km E of Ushguli vill., right bank of river Shavtskala-Kvishara, 42°54'N, 43°01'E, 2266 m, 17.VI–3.VII.2015, D. Fominykh & A. Zubov leg.; (Fig. 1, loc. 30) 12♂♂, 9♀♀ (cFDD), **Russia, North Caucasus**, North Ossetia, right bank of river Zemegondon, near Kudar Pass, 42°37'12,30"N, 43°48'04,60"E, 2365 m, 15.VI.2022, D. Fominykh leg.; (Fig. 1, loc. 31) 11♂♂, 4♀♀ (cFDD), Russia, North Ossetia, left bank of river Mamikhdon, near Mamison Pass, 42°40'11,20"N, 43°50'13,60"E, 2265 m, 14.VI.2022, D. Fominykh leg.; (Fig. 1, loc. 32) 15♂♂, 10♀♀ (cFDD), Russia, North Ossetia, left bank of river Mamikhdon, near Mamison Pass, 42°41'00,47"N, 43°48'45,59"E, 2550 m, 14.VI.2022, D. Fominykh leg.

* Each location is accompanied by a number, labelled in Fig. 1.

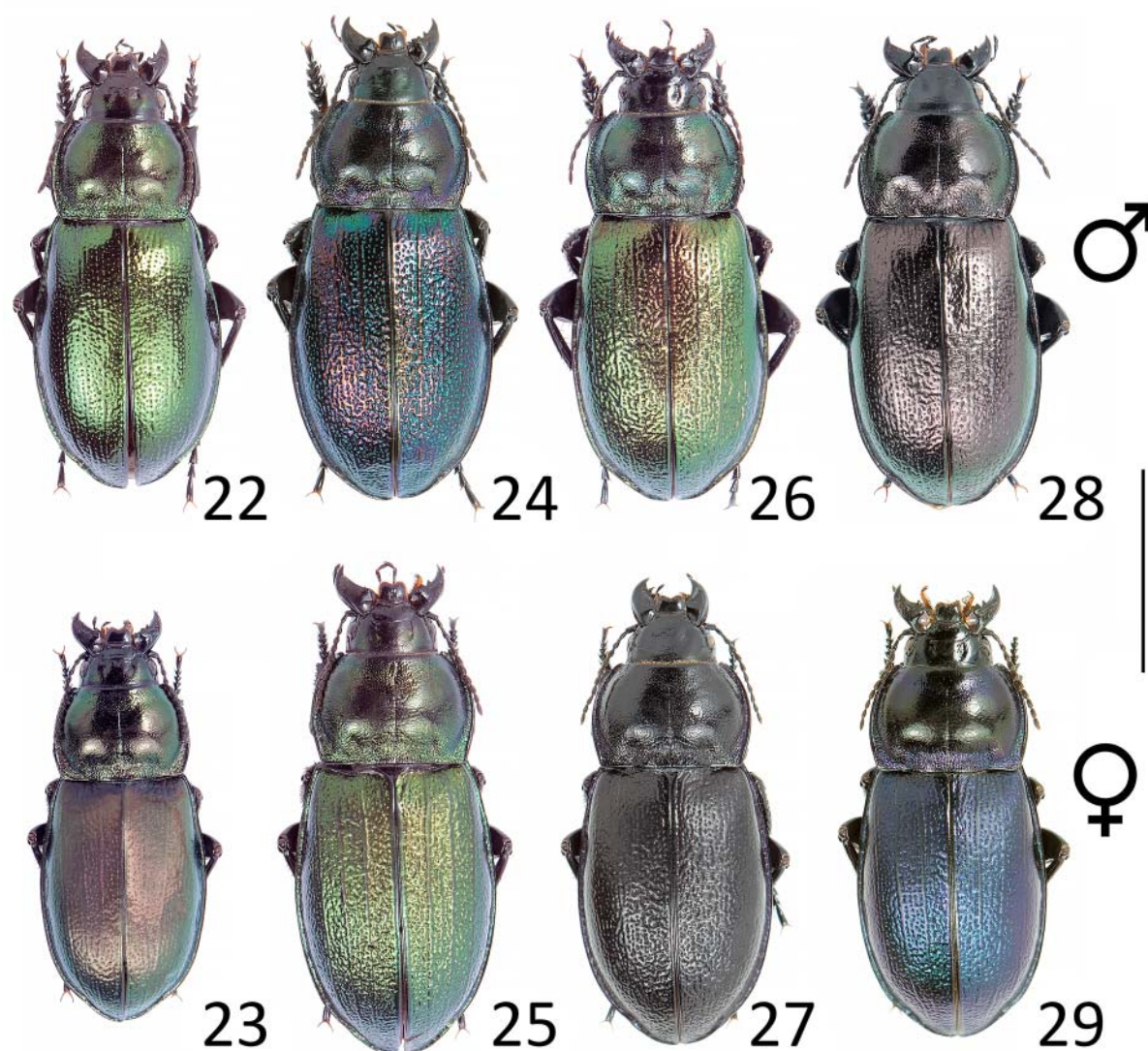
FURTHER MATERIAL STUDIED. 38♂♂, 29♀♀ (cFDD), **Georgia**, Racha, E part of Lechkhumi Mt. Range, S slopes of Sakaosmta Mt., 42°40'48,30"N, 43°27'14,19"E, 2700 m, 22.VI–20.VII.2024, D. Fominykh leg.; 42♂♂, 36♀♀ (cFDD), **Georgia**, Racha, E part of Lechkhumi Mt. Range, S slopes of Sakaosmta Mt., 42°39'48,30"N, 43°26'48,79"E, 2320 m, 21.VI–20.VII.2024, D. Fominykh leg.; 2♂♂, 2♀♀ (MPSU), **Russia, North Caucasus**, North Ossetia, Mamison Pass, 12.VII.1997, I. Shokhin leg.; 1♂, 1♀ (MPSU), **South Ossetia**, Dvaleti Mt. Range, SW spurs of Khalatsa Mt., 2000 m, 12.VIII.1987, I. Belousov leg.

DISTRIBUTION. *Z. laevigatus* was described from "...les montagnes de l'Imérétie, près d'Oui [?Oni] et de Glola, à 8000 pieds..." [Chaudoir, 1846] (Georgia, 42°35'00"N, 43°26'35"E and 42°41'58.9"N, 43°38'29.0"E, respectively), both locali-

ties being completely overlapped by the known distribution of *Z. aciculatus*.

The studied geographic range (Fig. 1) includes the central part of the Main Caucasus Ridge, generally its southern slopes, but also covering the northern slopes of spatially the closest Mamison and Kudar passes, also collected in central and eastern parts of Svaneti Mt. Range and western part of Lechkhumi Mt. Range. This species is probably sympatric with *Z. chalceus* in the central part of Svaneti Mt. Range, where finds known to the authors are recorded very close to each other.

HABITAT. The species inhabits the zone of alpine meadows, above 2000 m (Figs 104–106). Activity is mainly diurnal. The period of activity lasts from the moment of snow melt and probably until August–September.



Figs 22–29. Dorsal habitus of *Zabrus aurichalceus*: 22, 23 — Jvari Pass env., 2500 m; 24, 25 — Tskhratskaro Pass, 2450 m; 26, 27 — Tsalka env., 1700 m; 28, 29 — Tabatskuri lake env., 2300 m. Scale bar 10.0 mm.

Рис. 22–29. Габитус сверху *Zabrus aurichalceus*: 22, 23 — пер. Джвари, 2500 м над ур. м.; 24, 25 — пер. Цхрацкаро, 2450 м над ур. м.; 26, 27 — окр. г. Цалка, 1700 м над ур. м.; 28, 29 — окр. пос. Табацкури, 2300 м над ур. м. Масштаб 10,0 мм.

REMARKS. As a rule, individuals with smoothed elytral sculpture prevail, but populations from locs. 22, 24, and 25 possess distinctly expressed coarser sculpture, externally resembling in this respect another consubgener — *Z. chalceus*, but are easily distinguishable by the structure of male genitalia.

Z. aurichalceus svaneticus Samedov, 1954 was recorded by the author of this taxon from Latpari Pass and “Gorvashi” Mountain (apparently, Gorvashi Pass, 42°53'14.942"N, 42°58'34.928"E, Mestia Municipality) [Samedov, 1954]. The studied material from Latpari Pass is identical to *Z. aciculatus*, on this basis *Z. aurichalceus svaneticus* is synonymized here with *Z. aciculatus*, however, subspecific division of the latter species still requires further judgment.

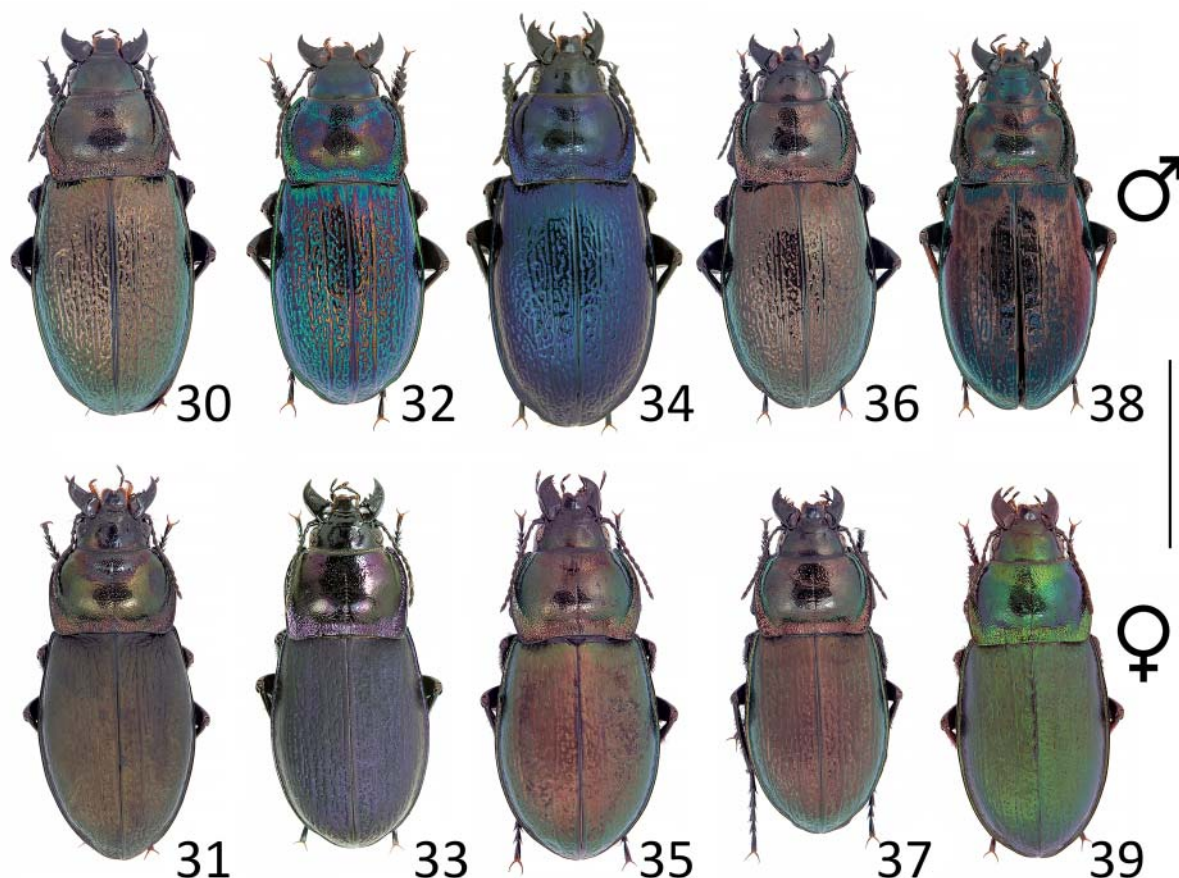
Zabrus (Eutroctes) aurichalceus aurichalceus (Adams, 1817)

Figs 1, 12–29, 63–68, 83–88, 107–108.

Adams, 1817: 307 (*Blaps*). — *adamsii* Fischer von Waldheim, 1817: 468. — *congener* Zimmermann, 1831: 19 (*Eutroctes*). — *fus-sii* Fischer von Waldheim, 1817: 468. — *heros* Faldermann, 1836: 69. — *moestus* Kuster, 1847: 12 (*Eutroctes*). — *schneideri* Ganglbauer, 1915: 136 (*Eutroctes*).

MATERIAL. (Fig. 1, loc. 1) 7♂♂, 7♀♀ (cFDD, cTAY), Georgia, Kvemo Kartli, Trialeti Mt. Range, 2.8 km N of

Chemani vill., 41°44'N, 44°12'E, 2000 m, 7.VI–10.VII.2018 D. Fominykh leg.; (Fig. 1, loc. 2) 5♂♂, 5♀♀ (cFDD, cTAY), Georgia, Kvemo Kartli, Trialeti Mt. Range, N of Khachkhoy vill., 41°43'N, 43°58'E, 2100 m, 8.VI–10.VII.2018, D. Fominykh leg.; (Fig. 1, loc. 3) 9♂♂, 11♀♀ (cFDD, cTAY), Georgia, Kvemo-Kartli, Tsalka distr., 4.5 km SW of Kavta (Tchapaevka) vill., NE slopes of Buladag Mt., 41°32'N, 44°01'E, 1700 m, 20.V–4.VI.2015, A. Zubov & R. Khryapin leg.; (Fig. 1, loc. 4) 11♂♂, 7♀♀ (cFDD, cTAY), Georgia, Kvemo-Kartli, Trialeti Mt. Range, near Tukhmatash Pass, E slopes of Dalidag Mt., 41°32'N, ' 43°52'E, 2100 m, 28.V–29.VI.2016, D. Fominykh leg.; (Fig. 1, loc. 5) 9♂♂, 6♀♀ (cFDD, cTAY), Georgia, Samtskhe-Dzhavakheti, W bank of lake Paravani, near Aspara vill., E slopes of Kyerogly Mt., 41°28'N, 43°46'E, 2100–2200m, 4–5.VI.2015, D. Fominykh & A. Zubov leg.; (Fig. 1, loc. 6) 24♂♂, 25♀♀ (cFDD, cTAY), Georgia, Kvemo Kartli, N part of Samsar Mt. Range, N of Shavnabad Mt., 5 km E of lake Tabatzkuri, 41°38'N, 43°43'E, 2300 m, 7.VI–10.VII.2018, D. Fominykh leg.; (Fig. 1, loc. 7) 11♂♂ (cFDD, cTAY), Georgia, Samtskhe-Dzhavakheti, near Tzkratskaro Pass., N slopes of Trialeti Mt. Range, 41°41'N, 43°31'E, 2450 m, 6.VI.2015, D. Fominykh & A. Zubov leg.; (Fig. 1, loc. 8) 27♂♂, 14♀♀ (cFDD), Georgia, Samtskhe-Dzhavakheti, Trialeti Mt. Range, 3 km SW of Tskhratskaro Pass, 41°40'N, 43°29'E, 2500 m, 10.VI.2018, D. Fominykh leg.; (Fig. 1, loc.



Figs 30–39. Dorsal habitus of *Zabrus chalceus*: 30, 31 — Kodor Mt. Range, 2200 m; 32, 33 — Goderdzi Pass env., 2400 m; 34, 35 — Gomismta Mt., 2100 m; 36, 37 — Karapeti env., 2200 m; 38, 39 — Askhi Plateau, 2400 m. Scale bar 10.0 mm.

Рис. 30–39. Габитус сверху *Zabrus chalceus*: 30, 31 — Кодорский хр., 2200 м над ур. м.; 32, 33 — пер. Годердзи, 2400 м над ур. м.; 34, 35 — г. Гомисмта, 2100 м над ур. м.; 36, 37 — окр. пос. Карапети, 2200 м над ур. м.; 38, 39 — плато Асхи, 2400 м над ур. м. Масштаб 10,0 мм.

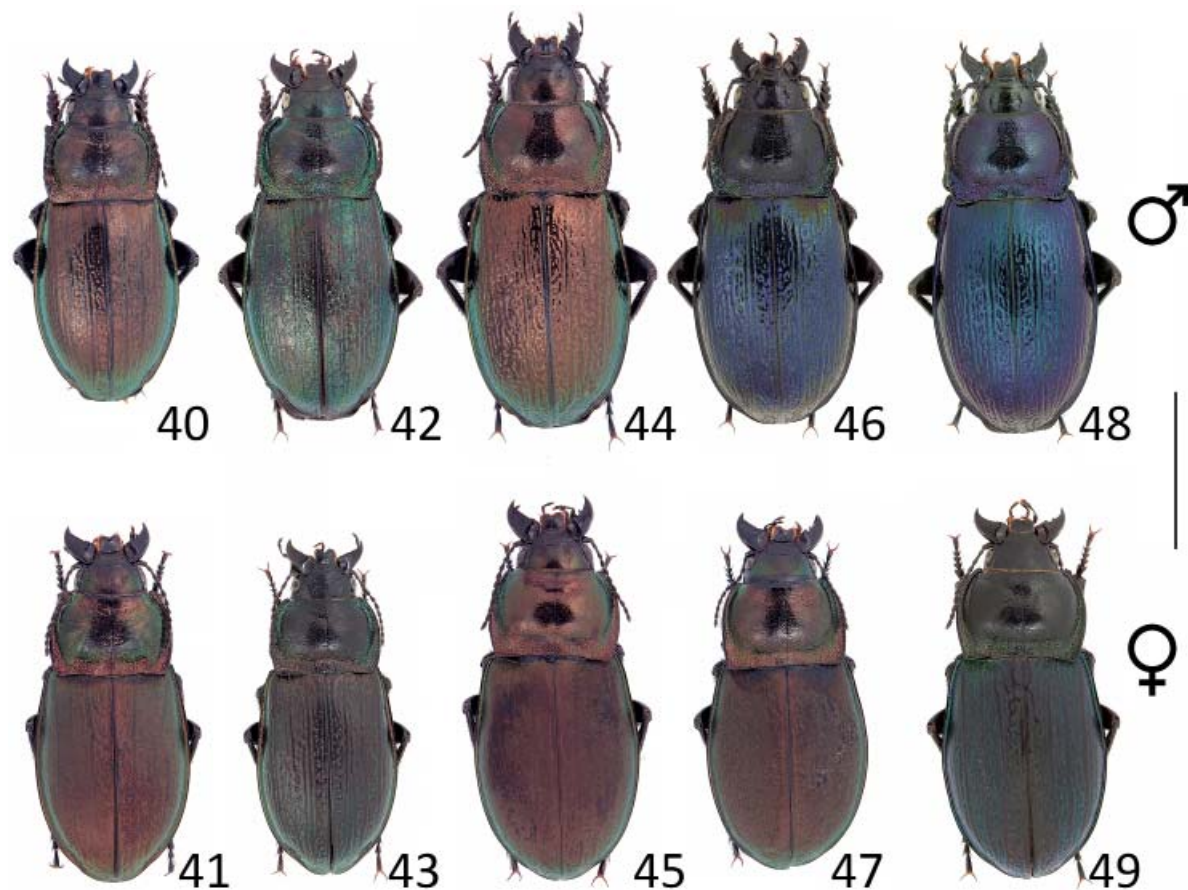
9) 9♂♂, 7♀♀ (cFDD, cTAY), Georgia, Samtskhe-Dzhavakheti, NW slopes of Trialeti Mt. Range, near Bakuriani vill., 41°42'N, 43°30' E, 2197 m, 29.IV–28.VI.2016, D. Fominykh leg.; (Fig. 1, loc. 10) 12♂♂, 7♀♀ (cFDD, cTAY), Georgia, Samtskhe-Dzhavakheti, source of river Borbala, 10 km SW of Akhaltzikhe town, N slopes of Shabanibeli Mt., 41°33'N, 42°55'E, 2270 m, 28.V–11.VI.2015, A. Zubov & R. Khryapin leg.; (Fig. 1, loc. 11) 15♂♂, 6♀♀ (cFDD), Georgia, Samtskhe-Dzhavakheti, near Gorelovka vill., SW slopes of Madatapa Mt., near lake Madatapa, 41°12'N, 43°47'E, 2285 m, 9.VI–11.VII.2018, D. Fominykh leg.; (Fig. 1, loc. 12) 1♂ (cFDD), **Turkey**, Artvin prov., Ardahan, Ilgar Pass, 2600 m, 3.VII.2011, V. Slovak leg.; (Fig. 1, loc. 13) 6♂♂, 2♀♀ (cFDD, cTAY), Turkey, NE Artvin, Cam Pass, 2700 m, 21.VI.2010, V. Slovak leg.; (Fig. 1, loc. 14) 3♂♂, 8♀♀ (cFDD), **South Ossetia**, Racha Mt. Range, near Ertso Pass, 42°28'N, 43°45'E, 1800 m, 29.V–12.VII.2015 D. Fominykh leg.; (Fig. 1, loc. 15) 12♂♂, 3♀♀ (cFDD, cTAY), South Ossetia, Racha Mt. Range, near Ertso vill., N slopes of Alkhashenda Mt., 42°27'N, 43°46'E, 1800 m, 17.V–10.VII.2016, D. Fominykh & A. Zubov leg.; (Fig. 1, loc. 16) 9♂♂, 7♀♀ (cFDD), South Ossetia, N part of Gudissi Mt. Range, source of river Britadon, N slope of Mangavtzag Mt., 42°28'N, 44°10'E, 2700–3000 m,

21–28.VII.2013 D. Fominykh leg.; (Fig. 1, loc. 17) 12♂♂, 9♀♀ (cFDD), South Ossetia, N part of Gudissi Mt. Range, source of river Chaparuhitskali, 42°25'N, 44°10'E, 2900–3000 m, 25–27.VII.2013, D. Fominykh leg.; (Fig. 1, loc. 18) 11♂♂, 3♀♀ (cFDD), **Georgia**, Mtskheta-Mtianeti, Mtiuleti Mt. Range, near Jvari Pass, source of river Bedara, 42°30'N, 44°28'E, 2450 m, 30.VI.2015, D. Fominykh leg.; (Fig. 1, loc. 19) 4♂♂, 3♀♀ (cFDD), Georgia, Mtskheta-Mtianeti, Mtiuleti Mt. Range, near Jvari Pass, 42°30'N, 44°27'E, 2500 m, 5.VI.2018, D. Fominykh leg.

DISTRIBUTION. According to original description, “Habitat in vallibus Caucasi septentrionalis, ad pagos Sion et Kobi Iberiae...” [Adams, 1817], both localities are situated within the studied range of *Z. aurichalceus aurichalceus*.

The northern part of the range (Fig. 1) includes the Main Caucasus Ridge near Jvari Pass (=Cross Pass or Krestovi Pereval), Gudissi Mt. Range, and eastern part of Racha Mt. Range. The southern part of the range includes Trialeti Mt. Range, Dzhavakheti mountains, and mountains in the south from Akhaltzikhe town. Basing on available material, it also occurs at Erushet[i] Mt. Range in Turkey.

REMARKS. The subspecies *Z. aurichalceus punctipennis* Chaudoir, 1846 inhabits the territory of Armenia, but at present



Figs 40–49. Dorsal habitus of *Zabrus chalcus*: 40, 41 — Laila Mt., 3000 m; 42, 43 — Lebarde env., 2350 m; 44, 45 — Mravaldzali env., 2100 m; 46, 47 — Pirsagat Mt. Range, 2290 m; 48, 49 — Tail Mt., 2290 m. Scale bar 10.0 mm.

Рис. 40–49. Габитус сверху *Zabrus chalcus*: 40, 41 — г. Лайла, 3000 м над ур. м.; 42, 43 — окр. кур. Лебарде, 2350 м над ур. м.; 44, 45 — окр. пос. Мравалдзали, 2100 м над ур. м.; 46, 47 — хр. Пирсагат, 2290 м над ур. м.; 48, 49 — г. Тайль, 2290 м над ур. м. Масштаб 10,0 мм.

the authors have insufficient material to establish its correct taxonomic status.

HABITAT. The species inhabits the zone of alpine meadows, above 2000 m (Figs 107, 108). Activity is mainly diurnal. The period of activity lasts from the moment of snow melt and probably until August–September.

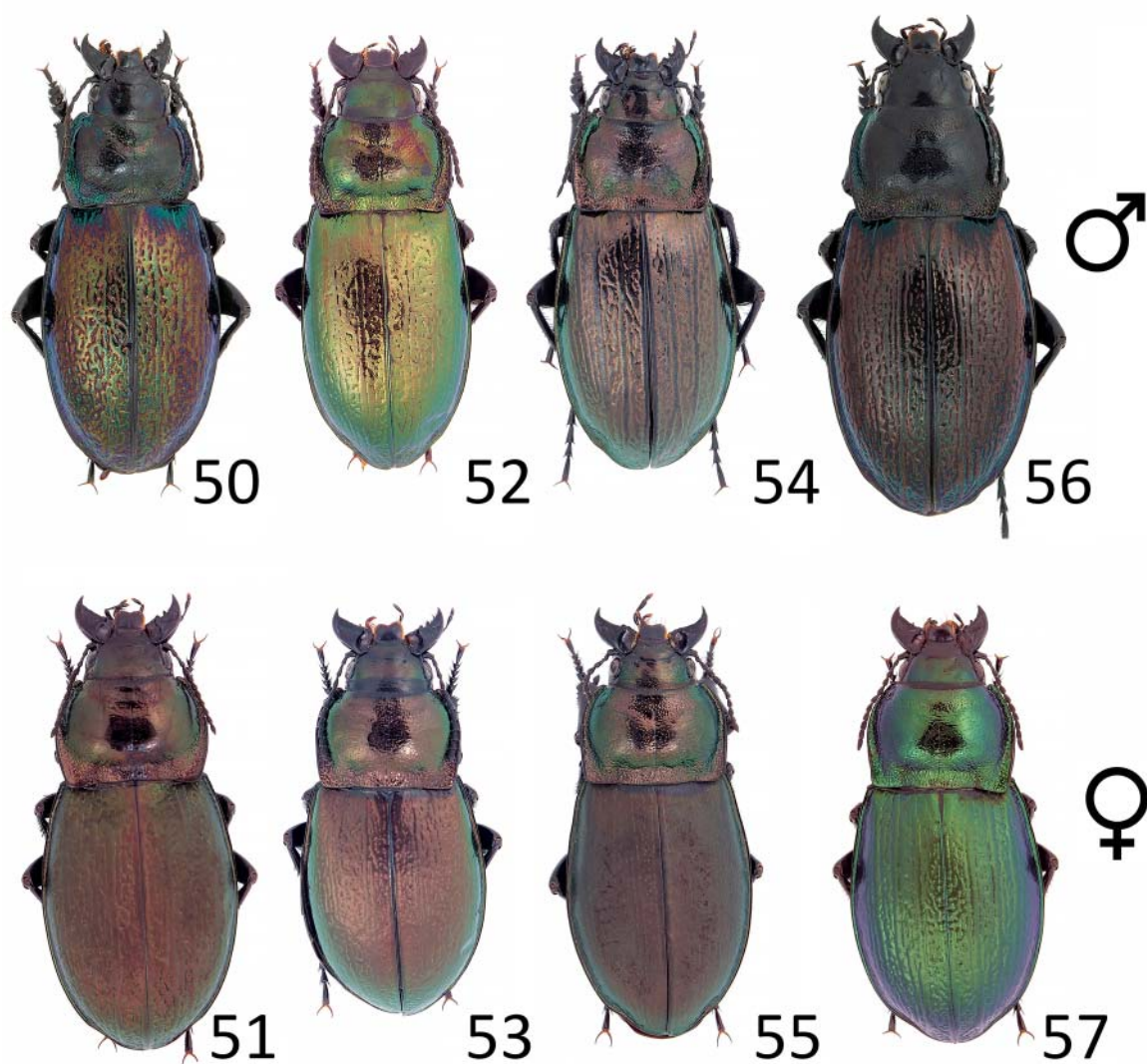
Zabrus (Eutroctes) chalceus Faldermann, 1836

Figs 1, 30–57, 69–77, 89–97, 98–103.

Faldermann, 1836: 71. — *aureoles* Faldermann, 1836: 72. — *costipennis* Faldermann, 1836: 70. — *lugubris* Faldermann, 1836: 73. — *oxygonus* Chaudoir, 1846: 151 (*Eutroctes*). — *adzharicus* Same-dov, 1954: 549, *syn.n.*

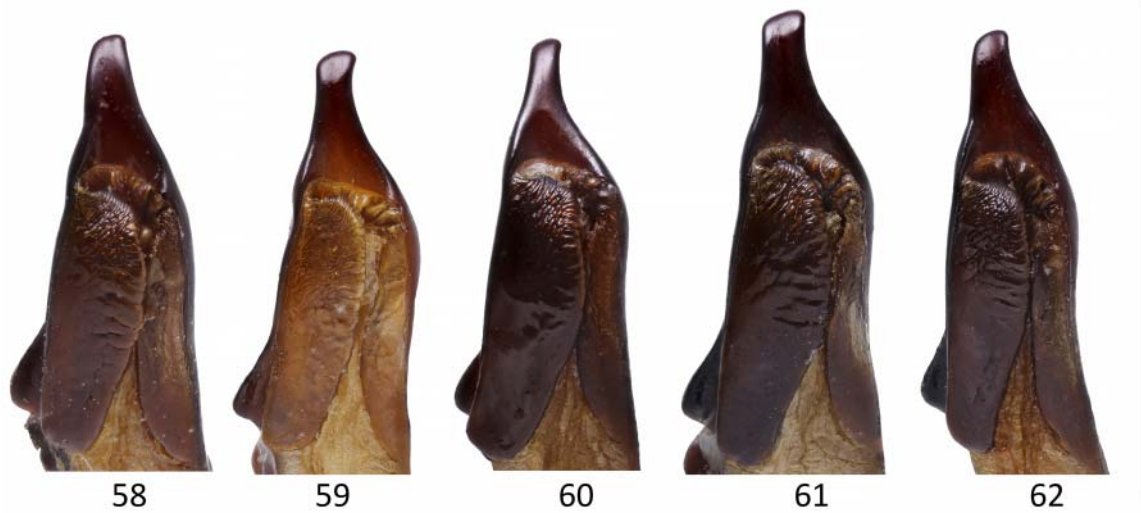
MATERIAL. (Fig. 1, loc. 33) 7♂♂, 7♀♀ (cFDD), **Abkhaz-ia**, source of river Mokvi, Kodor Mt. Range, 42°57'N, 41°46'E,

17.VII–11.VIII.2018, 2580 m, I. Solodovnikov leg.; (Fig. 1, loc. 34) 2♂♂ (cFDD), **Abkhazia**, Kodor Mt. Range, left bank of river Okumi, between mountains Okhachkhue and Akiba, 1500–2200 m, 6–8.V.1991, A. Zamotajlov leg.; (Fig. 1, loc. 35) 1♂ (cFDD), **Georgia**, Mingrelia, Egrisi Mt. Range, sources of river Khobi, 2500 m, 16.VII.1990, I. Belousov leg.; (Fig. 1, loc. 36) 7♂♂, 6♀♀ (cFDD), **Georgia**, Samegrelo, Egrisi Mt. Range, S slopes of Tsatskhibali Mt., source of river Gunzhi, 42°43'N, 42°15'E, 2300 m, 14–17.VI.2018, A. Zubov & B. Dubinin leg.; (Fig. 1, loc. 37) 3♂♂, 2♀♀ (cFDD), **Georgia**, Samegrelo, Egrisi Mt. Range, 2.7 km NE of Lebarde resort, E slopes of Lebarde Mt., 42°45'N, 42°30'E, 2350 m, 30.VI–1.VII.2015, A. Zubov leg.; (Fig. 1, loc. 38) 7♂♂, 6♀♀ (cFDD), **Georgia**, Kvemo Svaneti, N slopes of Egrisi Mt. Range, NE slopes of Tzikuri Mt., source of river Lakhshuri, Labrakhi site, 42°42'N 42°38'E, 2400–2600 m, 19.VI.2016, D. Fominykh leg.; (Fig. 1,



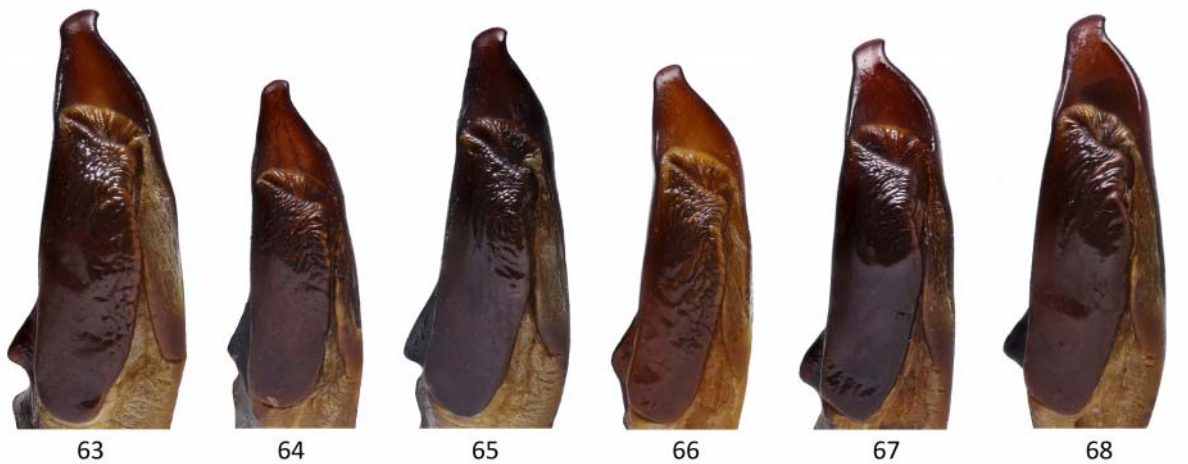
Figs 50–57. Dorsal habitus of *Zabrus chalceus*: 50, 51 — Tchidila Pass env., 2350 m; 52, 53 — Tsatskhibali Mt., 2300 m; 54, 55 — Tsikuri Mt., 2400 m; 56, 57 — Zekari Pass env., 2100m. Scale bar 10.0 mm.

Рис. 50–57. Габитус сверху *Zabrus chalceus*: 50, 51 — окр. пер. Чидила, 2350 м над ур. м.; 52, 53 — г. Цацхибали, 2300 м над ур. м.; 54, 55 — г. Цикури, 2400 м над ур. м.; 56, 57 — окр. пер. Зекасский, 2100 м над ур. м. Масштаб 10,0 мм.



Figs 58–62. Apical lamella of aedeagus of *Zabrus aciculatus*: 58 — Chiora env., 2500 m; 59 — Sasahi env., 2300 m; 60 — Tetnuld Mt., 2900 m; 61 — Ushguli env., 2315 m; 62 — Zeskho Mt., 2700 m. Scale bar 5.0 mm.

Рис. 58–62. Вершина ламеллы эдеагуса *Zabrus aciculatus*: 58 — окр. г. Чиора, 2500 м над ур. м.; 59 — окр. пос. Сасаши, 2300 м над ур. м.; 60 — г. Тетнульд, 2900 м над ур. м.; 61 — окр. пос. Ушгули, 2315 м над ур. м.; 62 — г. Зесхо, 2700 м над ур. м. Масштаб 5,0 мм.



Figs 63–68. Apical lamella of aedeagus of *Zabrus aurichalceus*: 63 — Cham Pass, 2700 m; 64 — Gudissi Mt. Range, 2900 m; 65 — Ertso lake env., 1800 m; 66 — Jvari Pass env., 2500 m; 67 — Tskhratskaro Pass, 2450 m; 68 — Tukhmatash Pass env., 2100 m. Scale bar 5.0 mm.

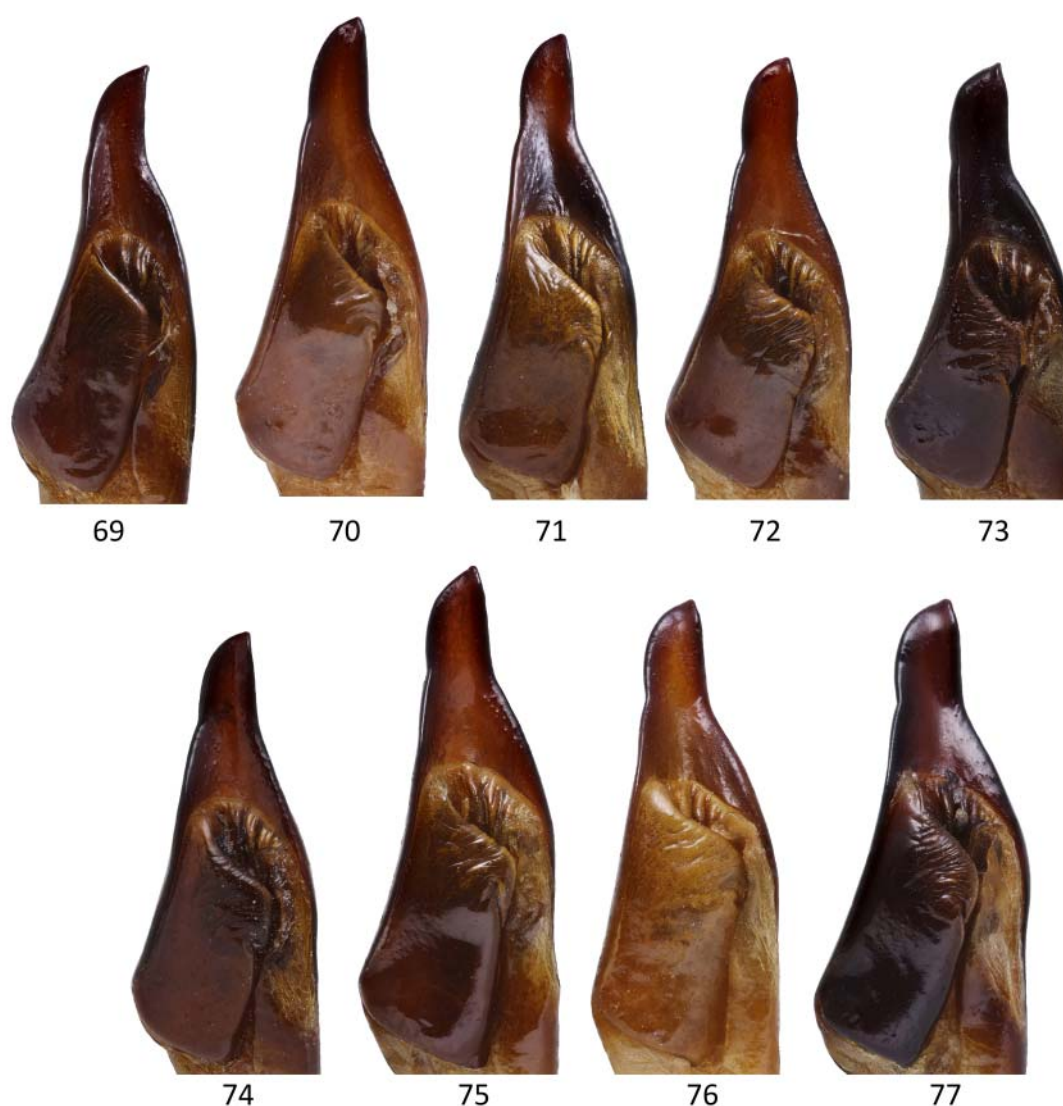
Рис. 63–68. Вершина ламеллы эдеагуса *Zabrus aurichalceus*: 63 — пер. Чам, 2700 м над ур. м.; 64 — Гудисский хр., 2900 м над ур. м.; 65 — окр. оз. Эрцо, 1800 м над ур. м.; 66 — окр. пер. Крестового, 2500 м над ур. м.; 67 — пер. Цхрацкаро, 2450 м над ур. м.; 68 — окр. пер. Тухматаш, 2100 м над ур. м. Масштаб 5,0 мм.

loc. 39) 5♂♂, 2♀♀ (cFDD, cTAY), Georgia, Lechkumi, Askhi Plateau, N slopes of Lekhi Mt., 42°34'N, 42°33'E, 2200 m, 19–21.VI.2014, D. Fominykh leg.; (Fig. 1, loc. 40) 9♂♂, 5♀♀ (cFDD, cTAY), Georgia, Lechkumi, Askhi Plateau, S slopes of Gadirakili Mt., 42°36'N, 42°31'E, 2400 m, 20–22.VI.2014, D. Fominykh leg.; (Fig. 1, loc. 41) 7♂♂, 2♀♀ (cFDD), Georgia, Kvemo-Svaneti, S slope of Svaneti Mt. Range, NW slopes of Laila-Lakheli Mt., source of river Skirili, 42°54'N, 42°31'E, 2700–3000m, 2–4.VII.2014, D. Fominykh leg.; (Fig. 1, loc. 42) 9♂♂, 8♀♀ (cFDD, cTAY), Georgia, Adjara, Arsiyanskiy Mt. Range (=Arsianis K'edi, Yalnızçam Dağları), near Goderdzi

Pass, Tchanchakhi Mt., 41°36'35.00"N, 42°31'34.15"E, 2300m, 10.VI.2015, D. Fominykh & A. Zubov leg.; (Fig. 1, loc. 43) 27♂♂, 13♀♀ (cFDD), Georgia, Adjara, Tsvinta Mt. env., N of Goderdzi Pass., 41°40'N, 42°30'E, 2400 m, 12.VI.2018, D. Fominykh leg.; (Fig. 1, loc. 44) 18♂♂, 11♀♀ (cFDD), Georgia, Samtskhe-Dzhavakheti, Adigeni distr., Khoramani Mt. Range, E slopes of Tail' Mts., 41°36' N, 42°40'E, 2290 m, 22–24.V.2015, A. Zubov & R. Khryapin leg.; (Fig. 1, loc. 45) 5♂♂, 1♀ (cFDD), Georgia, Adjara, N slopes of Shavsheti Mt. Range, N slope of Karapetis-Mta Mt. Range, near Karapeti vill., 41°31'N, 42°15'E, 2200 m, 19.VI.2017, A. Zubov leg.;

(Fig. 1, loc. 46) 1♂, 1♀ (cFDD), Georgia, Adjara, SE slopes of Khino Mt., Kintrishi, 1500 m, 21.V.1991 N. Okhrimenko leg.; (Fig. 1, loc. 47) 16♂♂, 12♀♀ (cFDD, cTAY), Georgia, Guria, Adzharo-Imeretian Mt. Range, near Gomishta vill., 41°49'N, 42°11'E, 2100–2300m, 8.VI.2015, A. Zubov leg.; (Fig. 1, loc. 48) 15♂♂, 10♀♀ (cFDD), Georgia, Adjara, Adzharo-Imeretian Mt. Range, near Tchidila Pass, 6 km S of Bakhmaro vill., 41°47'N, 42°19'E, 2350 m, 5.VI.2016 D. Fominykh leg.; (Fig. 1, loc. 49) 12♂♂, 7♀♀ (cFDD, cTAY), Georgia, Samtskhe-Dzhavakheti, N slopes Adzharo-Imeretian Mt. Range, S part of Pirsagat Mt. Range, Pirsagat Mt., 41°43'N, 42°44'E, 2290 m, 26.V–11.VI.2015, A. Zubov & R. Khryapin leg.; (Fig. 1, loc. 50)

9♂♂, 3♀♀ (cFDD), Georgia, Samtskhe-Dzhavakheti, Adjaro-Imeretian Mt. Range, near Zekari Pass, Funduk Mt., 41°50'N, 42°49'E, 2100–2300m, 14–15.VI.2014, D. Fominykh leg.; (Fig. 1, loc. 51) 2♂♂, 1♀ (cFDD), Georgia, Samtskhe-Dzhavakheti, S slope of Adzharo-Imeretian Mt. Range, near Okuzdag Mt., 41°46'N, 42°56'E, 2350 m, 11–13.VI.2018, A. Zubov & B. Dubinin leg.; (Fig. 1, loc. 52) 1♂, 2♀♀ (cFDD), Georgia, river Becho. vic. Dolar village, 21–22.VII.1990, I.A. Belousov leg.; (Fig. 1, loc. 53) 8♂♂, 4♀♀ (cFDD), Georgia, Racha, Racha Mt. Range, N slope of Khikhata Mt. Range, near Mravaldzali vill., 42°29'N, 43°21'E, 2100 m, 8–9.VI.2016, D. Fominykh leg.



Figs 69–77. Apical lamella of aedeagus of *Zabrus chalcus*: 69 — Askhi Plateau, 2400 m; 70 — Goderdzi Pass env., 2400 m; 71 — Gomishta Mt., 2100 m; 72 — Karapeti env., 2200 m; 73 — Resort Lebarde env., 2350 m; 74 — Kodor Mt. Range, 2200 m; 75 — Mravaldzali env., 2100 m; 76 — Tail Mt., 2290 m; 77 — Zekari Pass env., 2100 m. Scale bar 5.0 mm.

Рис. 69–77. Вершина ламелы эдеагуса *Zabrus chalcus*: 69 — плато Асхи, 2400 м над ур. м.; 70 — окр. пер. Годердзи, 2400 м над ур. м.; 71 — г. Гомисмта, 2100 м над ур. м.; 72 — окр. пос. Карапети, 2200 м над ур. м.; 73 — окр. кур. Лебарде, 2350 м над ур. м.; 74 — Кодорский хр., 2200 м над ур. м.; 75 — окр. пос. Мравалдзали, 2100 м над ур. м.; 76 — г. Таиль, 2290 м над ур. м.; 77 — окр. пер. Зекарского, 2100 м над ур. м. Масштаб 5,0 мм.



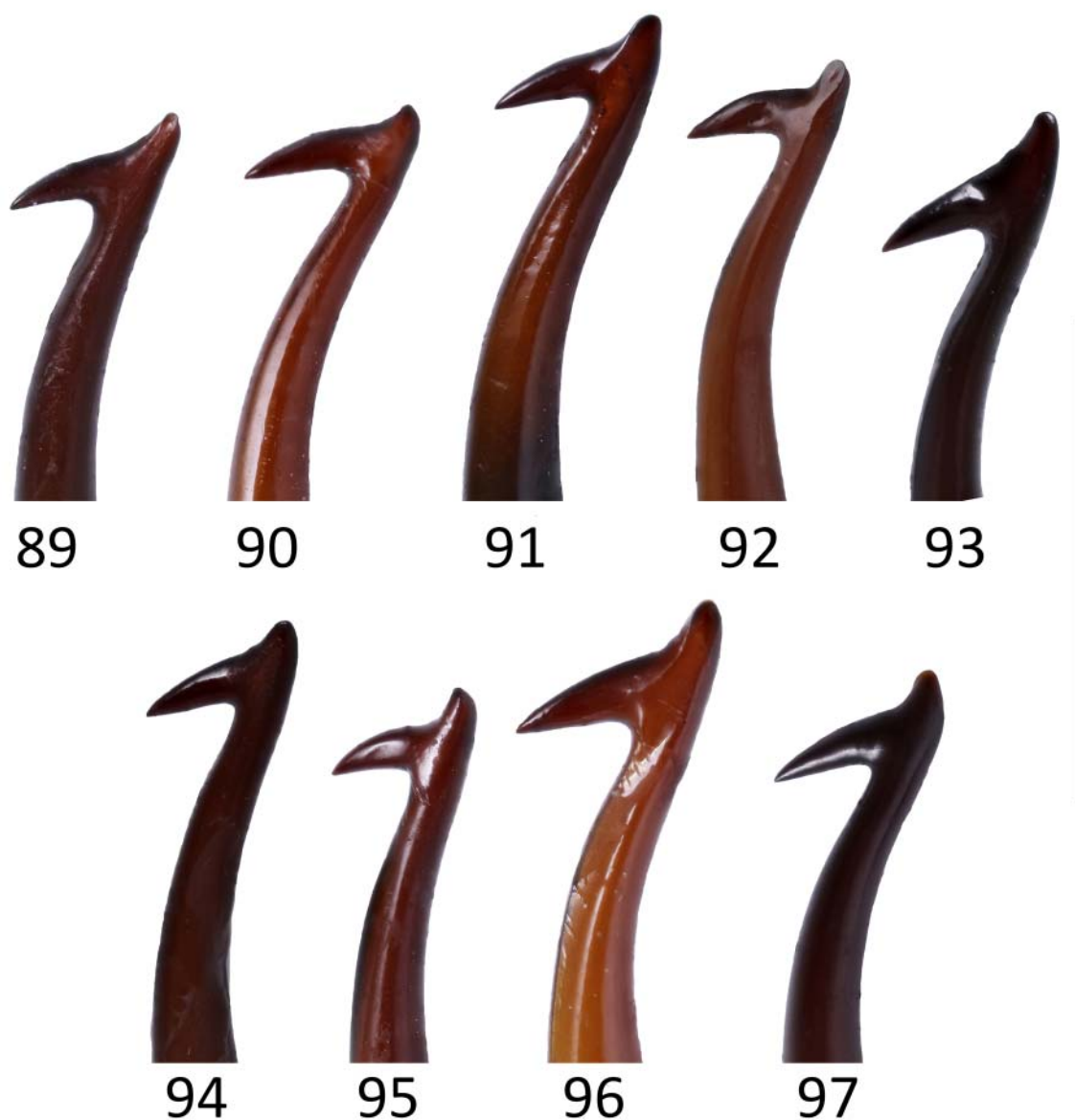
Figs 78–82. Right paramere in lateral view of *Zabrus aciculatus*: 78 — Chiora env., 2500 m; 79 — Sasahi env., 2300 m; 80 — Tetnuld Mt., 2900 m; 81 — Ushguli env., 2315 m; 82 — Zeskho Mt., 2700 m. Scale bar 2.0 mm.

Рис. 78–82. Вид сбоку правой парамеры *Zabrus aciculatus*: 78 — окр. г. Чиора, 2500 м над ур. м.; 79 — окр. пос. Сасаши, 2300 м над ур. м.; 80 — г. Тетнульд, 2900 м над ур. м.; 81 — окр. пос. Ушгули, 2315 м над ур. м.; 82 — г. Зесхо, 2700 м над ур. м. Масштаб 2,0 мм.



Figs 83–88. Right paramere in lateral view of *Zabrus aurichalceus*: 83 — Cham Pass, 2700 m; 84 — Gudissi Mt. Range, 2900 m; 85 — Ertso lake env., 1800 m; 86 — Jvari Pass env., 2500 m; 87 — Tskhratskaro Pass, 2450 m; 88 — Tukhmatash Pass env., 2100 m. Scale bar 2.0 mm.

Рис. 83–88. Вид сбоку правой парамеры *Zabrus aurichalceus*: 83 — пер. Чам, 2700 м над ур. м.; 84 — Гудисский хр., 2900 м над ур. м.; 85 — окр. оз. Эрцо, 1800 м над ур. м.; 86 — окр. пер. Крестового, 2500 м над ур. м.; 87 — пер. Цхрацкаро, 2450 м над ур. м.; 88 — окр. пер. Тухматаш, 2100 м над ур. м. Масштаб 2,0 мм.



Figs 89–97. Right paramere in lateral view of *Zabrus chaldeus*: 89 — Askhi Plateau, 2400 m; 90 — Goderdzi Pass env., 2400 m; 91 — Gomis-mta Mt., 2100 m; 92 — Karapeti env., 2200 m; 93 — Lebarde env., 2350 m; 94 — Kodor Mt. Range, 2200 m; 95 — Mravaldzali env., 2100 m, 2500 m; 96 — Tail Mt., 2290 m; 97 — Zekari Pass env., 2100 m. Scale bar 2.0 mm.

Рис. 89–97. Вид сбоку правой парамеры *Zabrus chaldeus*: 89 — плато Асхи, 2400 м над ур. м.; 90 — окр. пер. Годердзи, 2400 м над ур. м.; 91 — г. Гомисмта, 2100 м над ур. м.; 92 — окр. пос. Карапети, 2200 м над ур. м.; 93 — окр. кур. Лебарде, 2350 м над ур. м.; 94 — Кодорский хр., 2200 м над ур. м.; 95 — окр. пос. Мравалдзали, 2100 м над ур. м.; 96 — г. Таиль, 2290 м над ур. м.; 97 — окр. пер. Зекарского, 2100 м над ур. м. Масштаб 2,0 мм.

DISTRIBUTION. We failed to establish unambiguously the type locality of this species, its specific affiliation is based on the morphological description given by Faldermann [1836] and Ganglbauer [1915], which the most probably coincides with *Z. chaldeus* (in our sense).

Geographic range in Georgia is obviously split into two parts (Fig. 1). The northern one includes Kodori Mt. Range, the Main Caucasus Ridge near Becho Pass, central part of Svaneti Mt. Range, Egrisi Mt. Range, and Askhi Plateau. Species also oc-

curs in the central part of Racha Mt. Range. The southern part of the range covers the Adzharo-Imeretian (Meskheti) Mt. Range and its southern spurs; a find from the Shavsheti Mt. Range on the border of Georgia and Turkey is also known.

HABITAT. The species inhabits the zone of alpine meadows, above 2000 m., rarely descending lower along the meadow biotopes (Figs 98–103). Activity is mainly diurnal. The period of activity lasts from the moment of snow melt and probably until August–September.

REMARKS. Populations inhabiting Egrisi Mt. Range (locs. 35, 36, 37, 38) and Askhi Plateau (locs. 39, 40) possess somewhat more smoothed elytral sculpture than the other known ones, and may represent a different new subspecies.

Z. adzharicus Samedov, 1954 was described from the collections of Yu. Voronov from "Mountain Mereti in Adjara" (Batumi Province of the former Russian Empire) [Samedov, 1954]. It is now located in modern Turkey, near the border with Adjara ("Mereti", according to the maps of the USSR General Staff, or Mereta Yaylası, Artvin Province). The diagnostic characters of this taxon correspond to the studied variability of *Z. chaldeus*, which is recorded from the nearby Karçal Mountains (Karçal Dağları, Artvin Province) [Tezcan *et al.*, 2018]; the spatially nearest known locality from Georgia is Karapeti. On this basis, *Z. adzharicus* is synonymized here with *Z. chaldeus*.

KEY TO SPECIES OF THE SUBGENUS *EUTROCTES***

- 1(2) Elytra with coarse punctation, lamella of aedeagus elongate, pointed (Figs 69–77), right (long) paramere with a hook-shaped apical projection, the length of which is 2 or more times longer than its width (Figs 89–97) *Z. chaldeus*
- 2(1) Elytra faintly punctured, right (long) paramere with apical projection, the length of which is approximately equal to its width (Figs 78–88).
- 3(4) Elytral sculpture of males often smoothed, in some populations more coarsely punctured, males with metallic luster, females more matte. Lamella of aedeagus elongate, its length 1.5 or more times longer than its width (Figs 58–62) *Z. aciculatus*
- 4(3) Elytra faintly punctured, males and females practically indistinguishable in luster. Lamella of aedeagus not elongate, its length approximately equal to its width (Figs 63–68), right (long) paramere with apical projection that is weakly bent toward the base, the length of the projection approximately equal to its width (Figs 83–88) *Z. aurichaldeus*

Compliance with ethical standards

CONFLICT OF INTEREST: The authors declare that they have no conflict of interest.

Ethical approval: No ethical issues were raised during our research.

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** Due to the fact that the above species have significant external morphological variability, even in different populations of the same species, for the purpose of more reliable identification of species, attention is first of all paid to the characters in the structure of male genitalia, which are more stable and less adaptive, than external ones. Identification of females, without the presence of males, may be now difficult, perhaps further studies of the endophallus structures of males (s. Anichtchenko & Ruiz-Tapiador [2008]) and female genitalia (s. Ortuño *et al.* [2003]) will help to find additional characters for the diagnosis of the *Eutroctes* species.



Fig. 98. *Zabrus chaldeus* in nature, Goderdzi Pass env., 2400 m.

Рис. 98. *Zabrus chaldeus* в природе, окр. пер. Годердзи, 2400 м над ур. м.



Fig. 99. *Zabrus chaldeus* in nature, Gomismta Mt. env., 2100 m.

Рис. 99. *Zabrus chaldeus* в природе, окр. г. Гомисмта, 2100 м над ур. м.



Fig. 100. *Zabrus chaldeus* in nature, Askhi Plateau, 2400 m.

Рис. 100. *Zabrus chaldeus* в природе, плато Асхи, 2400 м над ур. м.



Fig. 101. Habitat of *Zabrus chalceus*, Goderdzi Pass env., 2400 m.

Рис. 101. Местообитание *Zabrus chalceus*, окр. пер. Годердзи, 2400 м над ур. м.



Fig. 102. Habitat of *Zabrus chalceus*, Kodor Mt. Range, 2200 m.

Рис. 102. Местообитание *Zabrus chalceus*, Кодорский хр., 2200 м над ур. м.



Fig. 103. Habitat of *Zabrus chalceus*, Askhi Plateau, 2400 m.

Рис. 103. Местообитание *Zabrus chalceus*, плато Асхи, 2400 м над ур. м.



Fig. 104. Habitat of *Zabrus aciculatus*, Kudara Pass env., 2365 m.

Рис. 104. Местообитание *Zabrus aciculatus*, окр. Кударского пер., 2365 м над ур. м.



Fig. 105. Habitat of *Zabrus aciculatus*, Zagar Pass env., 2628 m.

Рис. 105. Местообитание *Zabrus aciculatus*, окр. пер. Зекарского, 2628 м над ур. м.



Fig. 106. Habitat of *Zabrus aciculatus*, Zeskho Mt. env., 2700 m.

Рис. 106. Местообитание *Zabrus aciculatus*, окр. г. Зесхо, 2700 м над ур. м.



Fig. 107. Habitat of *Zabrus aurichalceus*, Chemani vill. env., 2000 m.
Рис. 107. Местообитание *Zabrus aurichalceus*, окр. пос. Чемани, 2000 м над ур. м



Fig. 108. Habitat of *Zabrus aurichalceus*, Paravani lake env., 2100–2200 m.
Рис. 108. Местообитание *Zabrus aurichalceus*, окр. оз. Паравани, 2100–2200 м над ур. м.

tions from the store under his care. The authors are grateful to E.E. Khomitskiy for his extensive work in preparing the map.

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