

**New data on the distribution of *Charaea minutum* (Joannis, 1865)
(Coleoptera: Galerucinae) in Russia:
faunistic records from Altai and Sayans**

**Новые данные по распространению в России
Charaea minutum (Joannis, 1865) (Coleoptera: Galerucinae):
фаунистические находки из Алтая и Саян**

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KEY WORDS: Altai, Sayans, *Charaea*, Chrysomelidae, Coleoptera.

КЛЮЧЕВЫЕ СЛОВА: Алтай, Саяны, *Charaea*, Chrysomelidae, Coleoptera.

ABSTRACT. In Russia *Charaea minutum* (Joannis, 1865) is registered for the first time from Altai and new data on the distribution in the Sayans are given.

РЕЗЮМЕ. *Charaea minutum* (Joannis, 1865) впервые указывается для Алтая и приводятся новые находки в Саянах.

Introduction

The status of the genus *Charaea* Baly, 1878 has been repeatedly revised. The monotypic genus was proposed by Baly [1878] for *Charaea flaviventris* Baly, 1878. Later on, this genus was not mentioned in literature for a long time. The subsequent new species (later affiliated to *Charaea*) were mostly treated under the genera *Calomicrus* Dillwyn, 1829, *Exosoma* Jacoby, 1903 and *Taphinellina* Maulik, 1936. Beenen [2010] proposed *Taphinellina* as a junior synonym of *Charaea*. Beenen and Warchałowski [2010] listed all species included in this genus. Since then four new species have been described in *Charaea* [Bezděk, Lee, 2014, Bezděk, 2015] and due to recombination eight species are proposed as additions to this genus [Medvedev, 2011; Bezděk, 2012]. *Taphinellina bengalensis* (Jacoby, 1900) was never transferred to *Charaea* but Bezděk [2016] recombined it in *Cassena* Weise, 1892. A detailed taxonomic history of the genus *Charaea* is presented in Bezděk and Lee [2014].

Now, *Charaea* includes 44 species [Bezděk, 2015] widespread in eastern Eurasia: China, Japan, Taiwan, Himalayas and India, Russia (East Siberia, Far East), Mongolia, Vietnam, Laos, Thailand, continental Malaysia and Philippines. At least 20 more species are to be

described [Bezděk, 2015]. The genus *Charaea* is characterized by an elongate oval body, open procoxal cavities, narrow prosternal process, tibiae with apical spine and pygidium without median furrow [Bezděk, Lee, 2014]. *Charaea* species are very similar externally: metallic blue, bluish black, blackish green or black violet color of pronotum and elytra. They differ in the morphology of the aedeagus and in the color of abdomen, legs and antennae.

In 2014 we registered *Charaea minutum* (Joannis, 1865) in Altai. This discovery has significantly extended the area of the species to the West.

Material

In order to compile an overview of the distribution of *Charaea minutum* we studied specimens from various collections. Because of the difficulty in identifying *Charaea* only specimens we studied ourselves have been included. The examined material is deposited in the following collections: ABCZ — Andrzej Bienkowski Collection, Zelenograd, Russia; EACK — Evgenij Akulov Collection, Krasnoyarsk, Russia; EGCB — Elena Guskova Collection, Barnaul, Russia; FFCJ — Frank Fritzl Collection Jena, Germany; HHCR — Hans Hebauer Collection, Rain, Germany; ILCM — Igor Lopatin Collection, Minsk, Belarus; MDCA — Manfred Döberl Collection, Abensberg, Germany; MLCL — Michael Langer Collection, Lichtenwalde, Germany; MNHNP — Museum National d’Histoire Naturelle, Paris; RBCN — Ron Beenen Collection Nieuwegein, Netherlands; SMNS — Staatliches Museum für Naturkunde, Stuttgart, Germany; UACB — Ulf Arnold Collection, Berlin, Germany.

Results

Charaea minutum (Joannis, 1865)

Figs 1–2.

Luperus minutus Joannis, 1865: 136 (original description).

Exosoma minuta: Gressitt, Kimoto, 1963: 566 (key).

Luperus (Calomicrus) minutus: Ogloblin, 1936: 27; Lopatin, 1967: 164; 1968: 215; 1971: 229; 1975: 222; Medvedev, Dubeshko, 1974: 133; 1992: 137; Medvedev, Voronova, 1976: 230; 1977a: 340; 1977b: 219; 1979: 121; Medvedev, 1982: 264; 2006: 140; Guselnikov, Medvedev 1984: 26; Dubeshko, Medvedev, 1989: 161; Medvedev, Korotyayev, 1975: 184; Lopatin et al., 2004: 139; Medvedev, Skomorohov, 2009: 43.

Taphinellina minuta: Wilcox, 1973: 450 (new combination); Beenen, 1992: 141–143; Mikhailov, Chashchina, 2009: 179; Beenen, 2010: 489.

Charaea minutum: Beenen, Warchalowski, 2010: 210; Lim et al., 2013: 101; Yang et al., 2015: 244.

MATERIAL. New records for Altai and Sayans:

RUSSIA: Altai Rep., Ulagan distr., Chulyshman river Valley, 12 km SSE Ko village, N 50°58', E 87°56', 6–8.07.2013, h – 550 m, leg. R.Yakovlev (EGCB: 1 ♂, 4 ♀♀); Krasnoyarsk, Akademgorodok, 9.07.2014, leg. E.Akulov (EACK: 1 ♂, 3 ♀♀); Krasnoyarsk, Udachnyj vill., 2.07.2014, leg. E.Akulov (EACK: 1 ♂, 3 ♀♀).

Additional material examined.

Type: The male type specimen from “Daouri” in MNHNP is labelled as follows: “*Luperus minutus* Mannerh. Dauria”, “Museum Paris ex. coll. R. Oberthur Reiche”, “TYPE”.

We should note that the type habitat of the species is very inaccurate. «Dauria» refers to the vast plain area mainly of eastern Transbaikal near the borders of Russia, north-eastern Mongolia and China. «Selenginskaya Dauria» refers to the steppe of the Selenga river valley in Buryatia and northern Mongolia. Thus, the region called «Dauria» involves at least three large regions: the Republic of Buryatia, Transbaikal and north-eastern Mongolia.

Other material: RUSSIA: Minusinsk, 17.06.2011, leg. E.Akulov (EACK); Irkutsk reg., SW-Baikal, Bolshoe Goloustnoye, 16–19.07.2012, leg. S.Flossmann (FFCJ); same label, 11–25.06.2011, leg. S.Flossmann (FFCJ); Siberia orient., Baical Sea, 20.06.1912, leg. Kuligin (ILCM); 5

ex. Irkutsk, leg. “W. Jacovlev” (ILCM); 1 ex., Buryatia, Selenginskyj District, 3 km from the confluence of the rivers Abiduj and Dunda-Saga, 18.07.2008, leg. P.Petrov (ABCZ); 3 ex., Amur reg., Blagoveshchensk, 29.06.1997, (HHCR); 2 ex. Amur reg., Amur River, Blagoveshchensk, 29.06.1997, leg. Dr.Louda (MLCL); 6 ex., Primorskij Kraj, Novochuguevka, 20.07.1990, leg. Boukal (UACB); 1 ex., Primorskij Kraj, 5 km E Kraskino, 13–16.07.1992, leg. Boukal (UACB); Primorskij Kraj, Lake Khanka, 5.08.1918, (ILCM); 3 ex., Primorskij Kraj, Ussuri Region, Novovarvarovka, 6–10.07.1989, leg S. Becvar (UACB); 2 ex., Suchan [Partizansk] near Vladivostok, leg. Kurnakov (ILCM).

MONGOLIA: Chentej aimak, Candagan Tal, 40 km Ö. v. Somon Zargaltchaan, 1300m, 28.07.1965, Exp. Dr. Kaszab (ILCM); Chentej aimak, 5 km west of Möron, 1200 m, 25–26.06.1976, leg L. N. Medvedev & N.Woronowa (SMNS); Chentej ajmak, Möron-gol, 07.1985, leg. B. Malec (MDCA, RBCN); 32 ex., Central aimak, Ulan Bator env., 07.1985, leg. B. Malec (MDCA, RBCN).

DISTRIBUTION. Based on specimens we studied ourselves, the distribution of *C. minutum* includes Russia: Western Siberia (Altai, new record), Eastern Siberia (Krasnoyarsk kraj: Krasnoyarsk, new record), Khakassia (W Sayany), Tuva, Irkutsk region, Dauria), Far East (Amur region, Yevreyskaya avtonomnaya oblast, Primorskij Kraj) and Mongolia (Chentej and Central Aimaks). *C. minutum* is also recorded from Korea and China (Heilongjiang, Jilin, Sichuan) [Beenen, 2010; Yang et al., 2015].

BIONOMICS. The biology of *C. minutum* is not studied. In Primorye, feeding of beetles on *Clematis* (Ranunculaceae) was indicated [Dubeshko, Medvedev, 1989]. Medvedev and Roginskaja [1988] list *Pulsatilla* (Ranunculaceae), and questionably *Artemisia* (Asteraceae) and *Erysimum* (Brassicaceae). It is likely that *C. minutum* feeds on Ranunculaceae.

DIAGNOSIS. In Russia, two species have been recorded: *Charaea minutum* (Joannis, 1865) and *C. flaviventris* (Motschulsky, 1960). In 2010, Beenen and Warchalowski described a new species *C. pseudominutum* Beenen et Warchalowski, 2010 from China (Hubei) which is very similar to *C. minutum*. Here we give a key for a reliable determination of these three species.

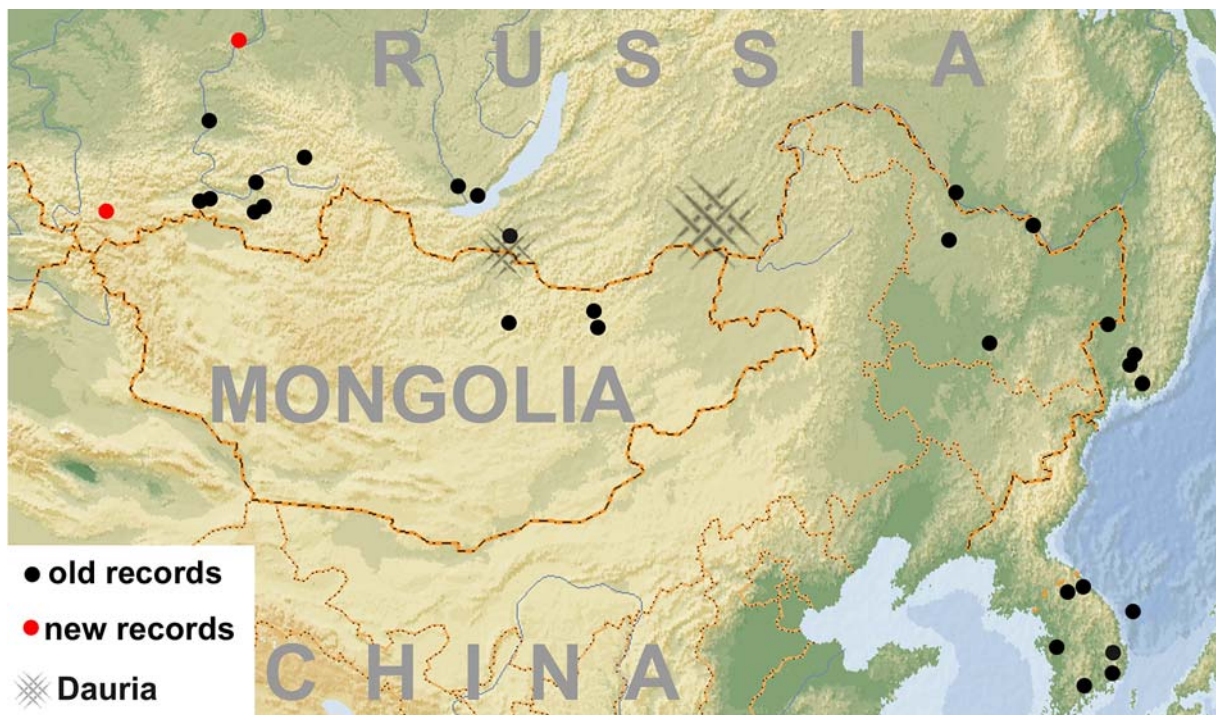
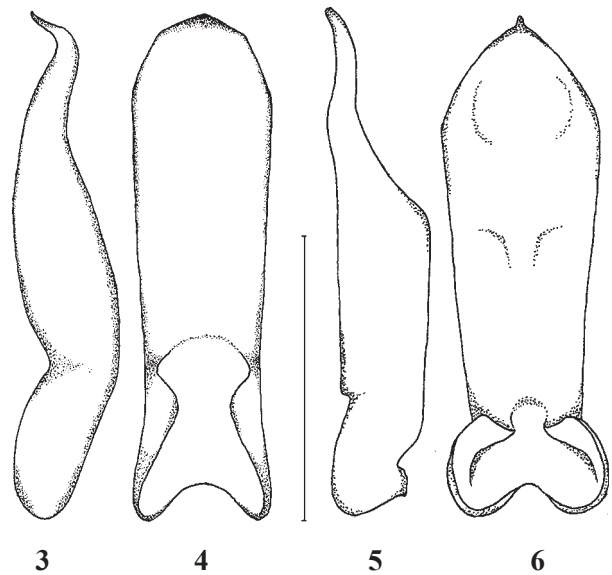


Fig. 1. Distribution map of *Charaea minutum*.

Рис. 1. Карта распространения *Charaea minutum*.



Fig. 2. Habitus of *Charaea minutum* (♀, Altai)
Рис. 2. Габитус *Charaea minutum* (♀, Алтай)



Figs 3–6. *Charaea* ssp., aedeagus: 3–4 — *Ch. minutum*; 5–6 — *Ch. pseudominutum*; 3, 5 — lateral side; 4, 6 — ventral side.
Рис. 3–6. *Charaea* ssp., эдеагус: 3–4 — *Ch. minutum*; 5–6 — *Ch. pseudominutum*; 3, 5 — сбоку; 4, 6 — снизу.

2–3 or 2–4 are yellowish. Aedeagus in lateral view the tip strongly curved twice (S-shaped) and in ventral view is more parallel in basal three quarters (Figs 3–4). Body length 2.7–3.8 mm *C. minutum* (Joannis) (distributed in Russian Far East (Amur region, Primorskij Kraj, Sakhalin, S Kuril Islands), Japan, Korea, China; host plants: Ranunculaceaea.

— Abdomen completely dark brown to black except the ultimate and part of the penultimate segment which are yellow. Upper side metallic blue. Legs and antennae dark brown to black. Aedeagus in ventral view gradually expanding from base towards the apical quarter. From there abruptly narrowing towards the tip which is pointed. In lateral view tip of the aedeagus is faintly curved twice (Figs 5–6). Body length 3.2–3.4 mm *C. pseudominutum* Beenen et Warchalowski (distributed in China (Hubei), Korea; host plants is not known).

Discussion

The widespread East-Asian genus *Charaea* (including also tropical species) is distributed up to Altai in the West. The maximum number of species of the genus *Charaea* can be found in South-Eastern Asia. It is possible that in the Pliocene, when the climate was warm and humid, the species of the genus were widely distributed in Siberia. By the end of the Pliocene era, and especially, in the Pleistocene, sharp cooling and drying of the climate led to the shift of northern boundaries of the habitats to the south. The species tolerant to low temperatures could survive in this climate and remained in south Siberian refugia. Recent records of *C. minutum* from Altai might indicate a recent invasion. However, it cannot be excluded that this species has been overlooked during historic collecting.

The Altai mountains are a barrier for taxa distribution both in latitudinal and longitudinal direction. Such examples of distribution of insect genera are rare, there are some examples among Coleoptera: *Dendrobaris* Egorov, 1976

KEY TO CHARAEA OF RUSSIA AND SIMILAR SPECIES

1. Abdomen completely or almost completely dark brown to black 2
- Abdomen completely yellow. Upper side bluish black, sometimes pronotum black violet or elytra black green. Antennae and legs dark brown to black with lighter base tibiae. Body length 4.3–6.0 mm *C. flaviventre* (Motschulsky) (distributed in Russian Far East, Eastern Siberia, China, Korea and Japan; host plants: *Alnus* (Betulaceae), *Salix* (Salicaceae).
2. Abdomen completely dark brown or black. Upper side metallic bluish black or green. Legs: femora dark brown with the apex a little lighter; tibiae yellowish at base, darker to the apex. Antennae black with the antennomere

(Curculionidae), *Kuatania* Evers, 1948 (Malachiidae), *Epa-phiopsis* Uéno, 1953 (Carabidae) [Dudko, 2011; Legalov, Borisova, 2011; Tshernyshev, 2012] and Lepidoptera: *Ahlbergia* Bryk, 1946 (Lycaenidae) and *Caligula* Moore, 1862 (Saturniidae) [Tuzov, 2000; Huang, Zhu, 2016; Izerskij, 1999]. A similar distribution occurs in the field mouse *Apodemus peninsulae* (Muridae) and is associated with a refugium in the Russian Far East during the Quaternary glaciations and subsequent dispersal directed by the complex topography of the area wherein biogeographic barriers (Gobi desert, Yunnan Guizhou Plateau, Dzungaria basin, and others) play a prominent role [Sakka et al., 2010]. At present, it is impossible to make conclusions about similarities, because of the limited detailed information on *Charaea* and other insect species. However the Altai mountains, defined as one of the barriers by Sakka et al. [2010], seems to have been crossed by *C. minutum*.

ACKNOWLEDGEMENT. The authors express their gratitude to A.A. Gusakov and K.V. Makarov (Moscow, Russia) for making photograph. We are also grateful to R.V. Yakovlev (Barnaul, Russia) for his assistance in the map plotting.

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