## First record of *Carphuroides rosti* (Pic, 1902) (Coleoptera, Malachiidae) in West Siberia as evidence for the presence of tropical elements in the fauna of North Asia

# Первая находка *Carphuroides rosti* (Pic, 1902) (Coleoptera, Malachiidae) в Западной Сибири как свидетельство присутствия тропических элементов в фауне Северной Азии

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*Key words:* Soft-winged flower beetle, Carphurinae, West Siberia, new record. *Ключевые слова:* жук малашка, Carphurinae, Западная Сибирь, первая находка.

*Abstract. Carphuroides rosti* (Pic, 1902), a representative of the subfamily Carphurinae, has been recorded in West Siberia for the first time. This represents the westernmost known locality of a recent representative of tropical fauna in Eurasia. A male specimen was collected in the vicinity of Krasnoobsk, near Novosibirsk. The potential for the species' penetration into West Siberia and the general distribution of «tropical» forms in Northern Asia are discussed. Illustrations of the male's external morphology, genitalia, antenna, and leg are provided, along with a distribution map of the species.

**Резюме.** Впервые для Западной Сибири отмечен представитель подсемейства Carphurinae, *Carphuroides rosti* (Ріс, 1902). Самец был пойман в окр. п Краснообск под Новосибирском. Это самая западная точка распространения рецентного представителя тропической фауны в Евразии. Обсуждается возможность проникновения вида в Западную Сибирь и общее распространение «тропических» форм в Северной Азии. Приведены иллюстрации внешнего вида, гениталий, антенн и лапок самца, дана карта распространения вида.

The genus *Carphuroides* Champion, 1923 comprises about 60 species of typical representatives of the Malachiidae subfamily Carphurinae. Body of the imago are remarkable staphylinoid type due to short elytra, not completely covering the abdomen. Specific characters differ representatives of the subfamily is elongated, modified, pectinate or setiferous first tarsomere of anterior legs in males, and connate parameres in tegmen of male genitalia. The main area of distribution of the genus is the tropics and subtropics, and only two species are known to inhabit East-North Asia.

*Carphuroides plagiatus* (Kiesenwetter, 1874) is known from Japan and was mentioned by Egorov [1992] for the Russian Far East, but the occurrence of this species in North Asia requires confirmation. The second species,

Carphuroides rosti (Pic, 1902), was described from a locality called «Amur», now considered to be in the Khabarovskii Krai of Russia. Later this species was found in the Trans-Baikal regions of Chita and Ulan-Ude. The registration of Carphuroides in Siberia was unexpected, so two synonyms were proposed for each specimen found in these regions and described as Carphurus transbaicalicus Wittmer, 1954 and Attalus hemipterus Evers, 1964. Later they were synonymised as Carphuroides rosti [Evers, 1964b]. In 2009, the species was recorded for the Primorye regions of the Shkotovskii Raion [Tshernyshev, 2009a] and the Lazo state nature reserve [Tshernyshev, 2009b]. Recently the species was recorded for the Sikhote-Alin state nature reserve, Southern Primorye [Tshernyshev, Sergeev, 2024]. A new locality in the Tunkinskii Raion of the Republic of Buryatia confirms the distribution of the species in the area west of Lake Baikal, the so-called 'Pribaikalie' (Fig. 9). The distribution of C. rosti now extends from Lake Baikal to Pribaikalie.

In 2020, a group of scientists from the Institute of Systematics and Ecology of Animals, Novosibirsk, took part in agricultural testing of experimental plots in a wheat field near the settlement of Krasnoobsk, not far from Novosibirsk. The entomologist, Dr Roman Yu. Dudko felt a bite on his neck and reflexively caught the insect, wondering if it was some kind of mosquito. To his surprise, it was not a dipteran but a coleopteran, a tiny black malachid beetle. Further study of this male specimen allowed it to be identified as *Carphuroides rosti*. This is the westernmost locality of the species, which was first recorded in North Asia. Detailed illustrations and descriptions of the examined specimen are given below, together with a discussion of the possible spread of the species to West Siberia.

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The beetle was studied using an Amscope trinocular stereomicroscope (Ultimate Trinocular Zoom Microscope 6.7X-90X Model ZM-2TY), and digital photographs were taken using a Carl Zeiss Stemi 2000 trinocular microscope and the AxioVision programme. Male genitalia, embedded in DMHF (dimethyl hydantoin formaldehyde), were mounted onto a transparent card and pinned under the specimen.

The specimen is currently deposited in the author's collection, which is kept in the Institute of Animal Systematics and Ecology, Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia.

The present work is registered in ZooBank (www.zoobank.org) under LSID urn:lsid:zoobank. org:pub:C4324DA1-36A1-4F1B-BEC5-8ED1843A888D

> Malachiidae Fleming, 1821 Carphurinae Champion, 1923 Carphuroides Champion 1923 Carphuroides rosti (Pic, 1902) Figs 1–9.

Attalus rosti Pic, 1902: 25 ((«Amur», Khabarovskii Krai); Egorov, 1992: 97;

= *Carphurus transbaicalicus* Wittmer, 1954: 111–112 ('Tschita' = Chita, Transbaikalia); Evers, 1964b: 182;

= *Attalus hemipterus* Evers, 1964a: 16 ('Werchne-Udinsk' now Ulan-Ude, Republic of Buryatia), Evers, 1964b: 182;

= *Carphurus rosti* (Pic, 1902): Evers, 1964b: 182; Švihla, 1995: 19–20 (Gusinoozersk, Republic of Buryatia);

= Carphuroides rosti (Pic, 1902): Wittmer, 1998: 98; Tshernyshev, 2005: 90–91 (Transbaikalia, Amurskaya Oblast); Mayor, 2007 (Transbaikal, Amur); Tshernyshev, 2009a: 32 (Shkotovskii Raion, Primorie); Tshernyshev, 2009b: 150 (Lazo State Natural Reserve, South Primorie); Tshernyshev, 2012a: 104 (from Transbaikalia to Promorie), Tshernyshev, 2012b: 582 (Transbaikalia, South Primorie); Tshernyshev, Sergeev: 2024 (Sikhote-Alin Nature Reserve, South Primorie).

*Material.* Russia, *Novosibirskaya Oblast:* Novosibirskii Raion, settlement of Krasnoobsk environs, h~114 m a.s.l., N54°55', E82°59', 22.VI.2020 – 10<sup>3</sup>; *Republic of Buryatia:* Tunkinskii Raion, settlement of Zun-Murino environs, N51°44', E102°52', 2.VI.1974, V.G. Shilenkov – 12.

*Additional description. Male* (Figs 1–8). Ventral surface of 1–3 antennomeres, apices of tibiae and tarsomeres, connecting membranes of head and prothorax and abdominal segments yellow, other body parts dark brown to black; vesicles yellow-brown, thoracic mesepimeres black-brown.

Body small, with extremely elongate abdomen, parallel, evenly widened at elytral apices and widest at about the 3rd abdominal segment, apices of elytra straight, simple, abdomen slightly constricted and evenly rounded posteriorly.

Head small, subrounded, not elongated, slightly narrower than pronotum, interocular area impressed, blunt, forehead slightly convex, eyes small, round, prominent; surface finely punctured with smoothed microsculpture, evenly covered with thin, long, dark, semi-erect hairs and black, long, erect setae behind the eyes. Antennae set on lateral side of clypeus near its apex, clypeus transverse; palpi short, apical palpomere cylindrical, strongly narrowed apically, intermediate palpomere short, subtriangular, basal palpomere transverse, cup-shaped. Antenna clearly 11-segmented, filiform with slightly asymmetrical triangular 7–10 antennomeres, long, almost completely reaching anterior 1/3 of elytra; 1st antennomere suboval, enlarged, laterally impressed, twice as long as the next, 2nd antennomere round, short, 3rd antennomere slightly elongate and subcylindrical, 4th antennomere symmetrical, subcircular, almost the same shape and size as the 2nd, 5th and 6th antennomere subcircular, long, almost the same shape and size as the 2nd, 7th and 8th antennomere subcircular, long, almost the same shape and size as the 2nd, 9th, 10th and 11th antennomeres, 5th and 6th antennomere asymmetrical, subquadrate, both of the same length as the 3rd antennomere, 7-10 antennomeres asymmetrical, triangular, each segment of the same length as the 5th or 6th segment, but slightly wider, apical antennomere 1.8 times as long as the 10th, elongated, subcylidrical, with a pointed tip, at base with a rounding on the outer side, the same shape as the excavation at the apex of the outer side in the 10th antennomere, so that the joining of antennomeres 11 and 10 at this point gives the impression of a single apical segment; antennomeres covered with dark, fine, short, semi-erect pubescence.

Pronotum transverse, evenly rounded posteriorly, not constricted at base, with straight anterior side and rounded posterior side, anterior angles almost straight and posterior obtuse, disc weakly convex and narrowly depressed at base, giving the middle of the basal margin an elevated appearance; all sides of pronotum with thin margin; surface semi-glossy, sparsely finely punctured, microsculpture smooth, evenly covered with long fine dark adpressed hairs.

Scutellum small, narrow, transverse, rectangular with rounded angles, flat, not marginated; surface dull, sparsely punctured and covered with short, dark, semi-erect hairs.

Elytra rectangular, slightly widened towards the apex, apices straight truncate, simple, not impressed and without impressions or setae; humeri not protruding, but with rib-like longitudinal curvature from base to apices; epipleurae narrow, distinctly marginated, suture thin, with narrow margin; surface slightly shiny, sparsely but evenly punctured, microsculpture smooth, evenly covered with dark, erect hairs.

Wings well developed.

Legs simple, long and thin, posterior femora extending beyond elytral tips, all tibiae straight, slightly widened towards tips, covered with fine adpressed and semi-erect dark hairs; femora somewhat broader than tibiae, compressed, anterior tibiae with distinct excavation on the outside just before the apex; all tarsi 5-segmented, without combs, but 1st tarsomere on anterior legs enlarged, subrectangular, with a brush of black spines on the pedal surface (Fig. 4), narrow and slightly elongate, tarsomeres slightly compressed, 1st tarsomere is the largest in anterior and posterior legs and twice as long as the 2nd, 2nd tarsomere is as long as the 1st in intermediate legs, as long as the 3rd in anterior legs and slightly longer in posterior legs, 3rd tarsomere is as long as the 4th in intermediate and posterior legs, apical tarsomere 5 is almost as long as the 1st in all legs; Claws short, thin and sharp, with widened rounded base.

Ventral surface of body weakly shiny, sparsely punctured and covered with fine, short adpressed dark pubescence; metathorax not convex, simple, lacking any appendage or tuft of hairs; pygidium (apical tergite) (Fig. 5) simple, narrow, transverse, evenly rounded apically; 8th abdominal ventrite (apical sternite) (Fig. 6) transverse, rectangular, 1.7 times as wide as long, with distinct angles on distal side, slightly arched apically; tegmen elongate, narrow, 3 times as long as wide, parameres appendages connate at apex, base membranous (Fig. 8); phallus (Fig. 7) simple, slightly curved dorsally, with elongated apical lamella, penis rounded and massive at base, inner sack with two long straight spines and two rows of small spinules in median part of aedeagus.

Length 3.5 mm, width (at elytral base) 0.85 mm.





Figs 1–9. Details of morphology and distribution of *Carphuroides rosti* (Pic): a male from Novosibirskaya Oblast (1–8) and its locality in map (9). 1 — external appearance, dorsal view; 2 — external appearance, lateral view; 3 — right antenna; 4 — right anterior tarsus; 5 — pygidium; 6 — ultimate abdominal ventrite; 7 — aedeagus, subdorsal view; 8 — tegmen; 9 — distribution map, light asterisk is new locality in West Siberia, dark asterisks are known localities. Scale bar 0.5 mm.

Рис. 1–9. Детали морфологии и распространение *Carphuroides rosti* (Pic): самец из Новосибирской области (1–8) и локалитет его обнаружения на карте (9). 1 — внешний вид сверху; 2 — внешний вид сбоку; 3 — правый усик; 4 — правая передняя лапка; 5 — апикальный тергит (пигидий); 6 — апикальный стернит (последний абдоминальный вентрит); 7 — тегмен; 8 — эдеагус, субдорзально; 9 — карта распространения вида, светлая звездочка — новая находка в Западной Сибири, тёмные звездочки — известные ранее локалитеты. Масштаб: 0,5 мм.

*Distribution.* The species ranges from Baikal to Primorie, introduced in West Siberia.

The finding of Carphuroides rosti in West Siberia is remarkable because of the distance from the original area of the species. It would have had to cross the Alta-Sayan mountain barrier to reach the West Siberian plain. It is completely unclear why this westward movement was necessary for the species, which originally inhabited a wide area of East Siberia and the Far East. It is very likely that the species was introduced to this area with the seedlings grown in the Baikal region. Such nurseries in the Republic of Buryatia as Tokhoiskii (settlement of Tokhoi) or Barguzinskii (settlement of Chitkal) offer a number of cold-resistant cultivars of stone fruit trees popular in Russian private gardens called «dacha». There are a number of dachas close to the experimental field where the beetle was caught. Considering the peculiarities of the Carphuroides habitat in the soil litter near the trees, it is very likely that the larvae or eggs were packed in the soil of a planting stock and planted in one of the dachas. The imago appeared in a previous summer and was caught in the field. There is no confirmation of further occurrence of this species in the suburbs of Novosibirsk.

Another problem in the area representation of *Carphuroides rosti* is the taxonomic ambiguity of the species occurring in the Russian Far East. Probably there are different species in the southern Primorye. Whether it is *C. plagiatus* (Kiesenwetter, 1874), known from Japan, or the true *C. rosti*, described from Khabarovskii Krai, is impossible to conclude without studying the type species of these two species. The male specimen from Novosibirkaya Oblast is identical to the males found in the Baikal region. Further research is needed to determine the exact distribution of *Carphuroides* species in North Asia.

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