

Bruchidius marginalis (Fabricius, 1776) (Coleoptera: Chrysomelidae: Bruchinae) - a species new to the Republic of Khakassia (Russia)

Sofia V. Lopatina

Tomsk Branch of All-Russian Plant Quarantine Center
(VNIKR), Tomsk, Russia; Tomsk State University, Tomsk,
Russia

Sergey V. Lukyantsev

Tomsk State University, Tomsk, Russia

Bruchidius marginalis, a seed beetle, is found in various countries, including the Baltic countries, Balkan peninsula, central, northern, and the western Europe, and Transcaucasian countries. In Russia, the species was previously noted in the south of its European part, Saratov and Kaliningrad regions. *Oxytropis pilosa*, a South Palearctic species, grows in central Europe, the European part of Russia, the Caucasus, Siberia, Mongolia, and Asia Minor. It is distributed in the steppe zone, insular steppes, forb and forb-grass steppes, and steppe meadows. A count of damaged *O. pilosa* seedlings was made and the percentage of fruit infection by seed-eating insects was calculated. The level of infestation in the *O. pilosa* fruits was 23%, and mass emergence of adults was observed in September. When examining leguminous plants for infection with seed-eating insects, a species of carpophage *Bruchidius marginalis* was identified, which is the first for the territory of the Republic of Khakassia.

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Corresponding author: Sofia V. Lopatina (lopatina.sof@mail.ru)

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Keywords

Bruchidius marginalis, Eastern Siberia, first record, Fabaceae, *Oxytropis pilosa*

Introduction

Representatives of the subfamily Bruchinae are herbivorous beetles that develop at the expense of a number of plant groups, but are most closely related to legumes (Fabaceae) (Lukyanovich, Ter-Minassian 1957). On the whole, they can be characterized as oligophages with certain species associated with certain species or a limited number of host plants (Temreshev, Valiyeva 2016). The close relationship with the seeds of leguminous plants allowed many species of grain beetles to

settle in the regions of cultivation of host plants, forming extensive secondary ranges (Lukyanovich, Ter-Minassian 1957). The genus *Bruchidius* Schilsky, 1905 in the Palearctic includes 193 species, of which 47 species are found in Russia (Anton 2010). The genus *Bruchidius* was represented by nine species (*B. crassicornis* Lukjanovitsh et Ter-Minassian, 1957, *B. glycyrrhizae* (Fahraeus, 1839), *B. halodendri* (Gebler, 1825), *B. jakutikus* Ter-Minassian et Egorov, 1980, *B. kaszabi* Ter-Minassian, 1973, *B. ptilinoides* (Fahraeus, 1893), *B. scutulatus* (Baudi, 1890), *B. unicolor* (Olivier, 1795) and *B. apicipennis* (Heyden, 1892)) in Siberia (Egorov, Ter-Minassian 1983; Legalov 1999, 2011, Legalov, Reshetnikov 2022).

The seed beetle *Bruchidius marginalis* (Fabricius, 1776) (Coleoptera: Chrysomelidae: Bruchinae) was first described in Germany. This species is found in Baltic countries (Latvia, Lithuania), in the countries of the Balkan Peninsula (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Slovenia, Montenegro, and Turkey), in the countries of central, northern, and western Europe, in the Transcaucasian countries (Azerbaijan, Armenia and Georgia) (Bercio, Folwaczny 1979; Šablevičius 2004; Delobel 2007; Anton 2010; Bukejs 2010; Szentesi et al. 2017). On the territory of Russia, the species was recorded in the south of the European part (Krasnodar and Stavropol territories, Karachay-Cherkessia, North Ossetia, Dagestan, and the Republic of Adygea), in Saratov and Kaliningrad regions (Lukyanovich, Ter-Minassian 1957; Kasatkin 2000; Coleopterous insects. 2010; Alekseev, Bukejs 2011) (Fig. 1).

The georeferenced database of the Global Biodiversity Information Facility (GBIF 2022) contains 242 observations of this species, most of which were made in Germany and France. For the Asian part of Russia, so far there has been no information on the discovery of *Bruchidius marginalis* in the literature. According to the structure of the male genitalia, *Bruchidius marginalis* is included in the *Bruchidius astragali* group, which in their development are associated with plants from the genera *Oxytropis* (L.) DC and *Astragalus* L. (Delobel, 2006). Lukyanovich and Ter-Minassian (1957) note *Astragalus glycyphyllos* L., *Thermopsis lanceolata* R. Br., *Coronilla varia* (L.) Lassen, *Vicia sylvatica* L., and *Oxytropis uralensis* (L.) DC., while Lukyanovich and Ter-Minassian (1957) note *Astragalus glycyphyllos*, *Thermopsis lanceolata*, *Coronilla varia*, *Vicia sylvatica*, and *Oxytropis uralensis* as hosts of this seed beetle.

In Bulgaria, *Bruchidius marginalis* was first described from the seeds of *Astragalus hamosus* L. (Delobel 2007). In Lithuania, adults were collected on the flowers of *Anthemis tinctoria* L. (Šablevičius 2004), while in Latvia (Bukejs 2010) and the Kaliningrad region, larvae developed on *Astragalus glycyphyllos* (Alekseev, Bukejs 2011). In the Saratov region, damage to *Astragalus dasyanthus* Pall. by the seed beetle reached 50-60% (Kolesnikova 2004). *Oxytropis pilosa* (L.) DC was recorded as a host in the northern Poland (Bercio, Folwaczny 1979), Hungary (Szentesi et al. 2017), and the east of the Russian Plain (Dedyukhin 2016).

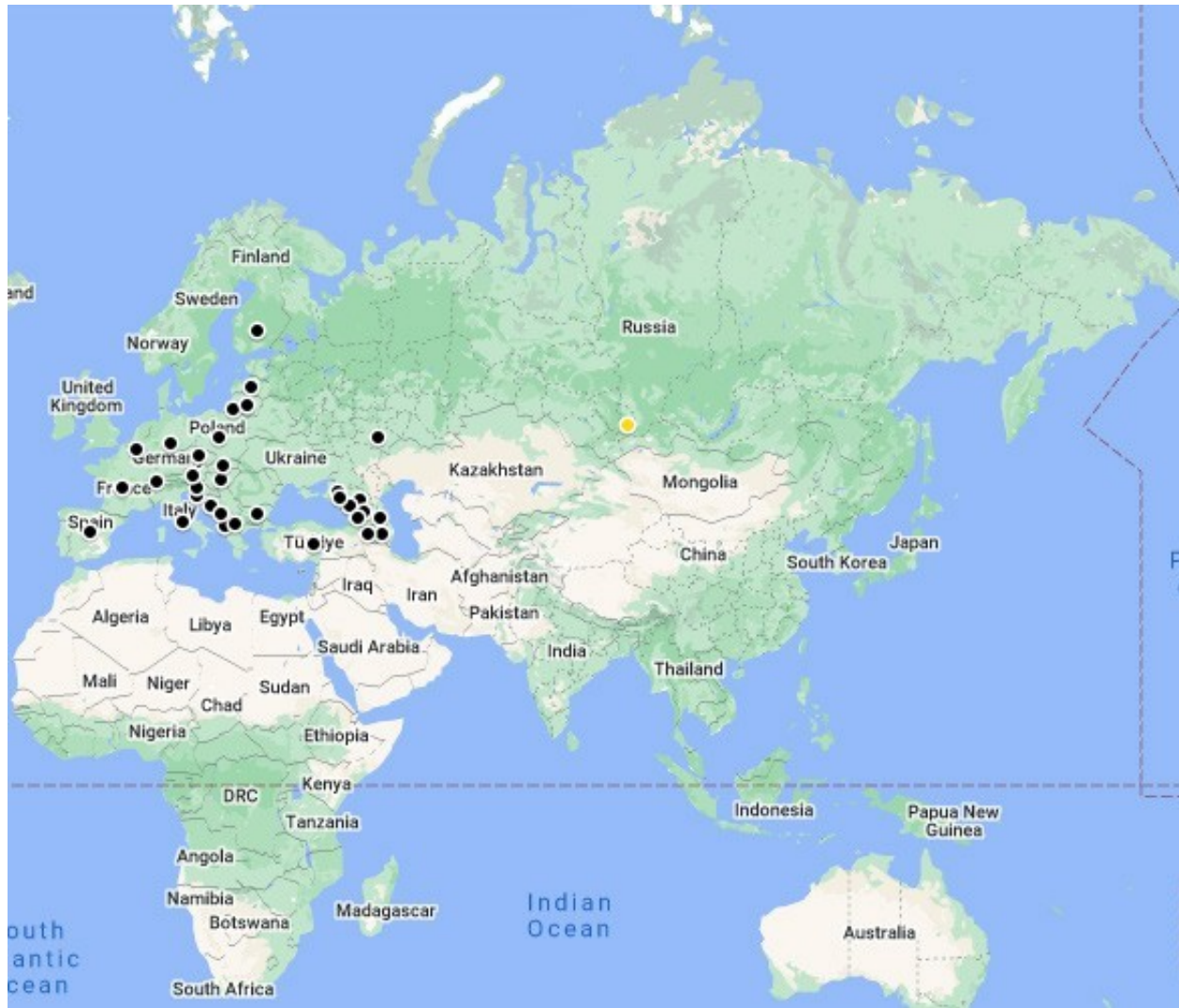


Figure 1. Distribution of *Bruchidius marginalis* in world. New record is indicated with yellow circle.

Oxytropis pilosa (L.) DC., 1802 – South Palearctic species, grows in Central Europe, the European part of Russia, the Caucasus, Siberia, Mongolia, and Asia Minor. Within its range, *O. pilosa* is distributed in the steppe zone and insular steppes, forb and forbgrass steppes, and steppe meadows (Polozhij, Malyshev 1994). In the network project "Flora of Khakassia" (iNaturalist 2023), 29 observations of *O. pilosa* were published on the territory of the Republic of Khakassia, most of the observations were made in the Bogradsky and Minusinsk districts. In addition to *Bruchidius marginalis*, two more species of seed beetles have been recorded on *O. pilosa* in central and southern Europe (Delobel A, Delobel B 2003; 2005): *Bruchidius mulsanti* (Brisout, 1863) and *Bruchidius varipes* (Bohemann, 1839).

Materials and methods

In the 2022 field season, as a result of a study of leguminous plants for the infestation with seed-eating insects on the meadow steppe in the surroundings of Lake Sulfatnoe (Ordzhonikidzevsky District, the Republic of Khakassia), ripe seedlings of the *O. pilosa* were collected. For this, a visual method (detection of damage to the *O. pilosa* by seed eaters under natural conditions), as well as collection of seedlings in paper bags to study them for the population of carpophage larvae population and grow the latter to the adult stage under laboratory conditions (Fasulati 1971). A count of damaged *O. pilosa* seedlings was made and the percentage of fruit infection by seed-eating insects was calculated. Identification of the *B. marginalis* of the authors of industrial enterprises on

the basis of the works of Lukyanovich and Ter-Minassian (1957). Identification of the adult of the seed beetle was carried out by Associate Professor of the Department of Agricultural Biology of Tomsk State University, Ph.D. SV Lukyantsev. The illustrations were made by SV Lopatina at the Tomsk Branch of All-Russian Plant Quarantine Center (VNIIKR): the method of layer-by-layer photography was used on high-resolution equipment using a Carl Zeiss SteREO Discovery.V12 stereomicroscope with an imaging system based on a Canon EOS 6D Mark II camera and the Zerene Stacker program, in which the images were combined layer by layer. The studied material is stored in the collection of the Department of Agricultural Biology of Tomsk State University.

Result

***Bruchidius marginalis* (Fabricius, 1776)**

Figure 2

Material examined. 3♀, 4♂, Russia, Republic of Khakassia, Ordzhonikidzevsky District, near the village of Ustinkino, surroundings of lake Sulfatnoe, southeast slope, 54.9769°N, 89.5963°E, meadow steppe, 11 Aug 2022, T.V. Ebel, A.L. Ebel.

When examining the beans collected from *O. pilosa*, flight holes characteristic of seed beetles (Figs 2C, 2D) and the beetles themselves (Figs 2A, 2B) were found. The infestation level in the *O. pilosa* fruits was 23%, mass emergence of adults was observed in September.

Thus, when examining leguminous plants for infection with seed-eaters, a specimen of carpophage *Bruchidius marginalis* (Fabricius, 1776) was identified, which is the new species for the territory of the Republic of Khakassia.

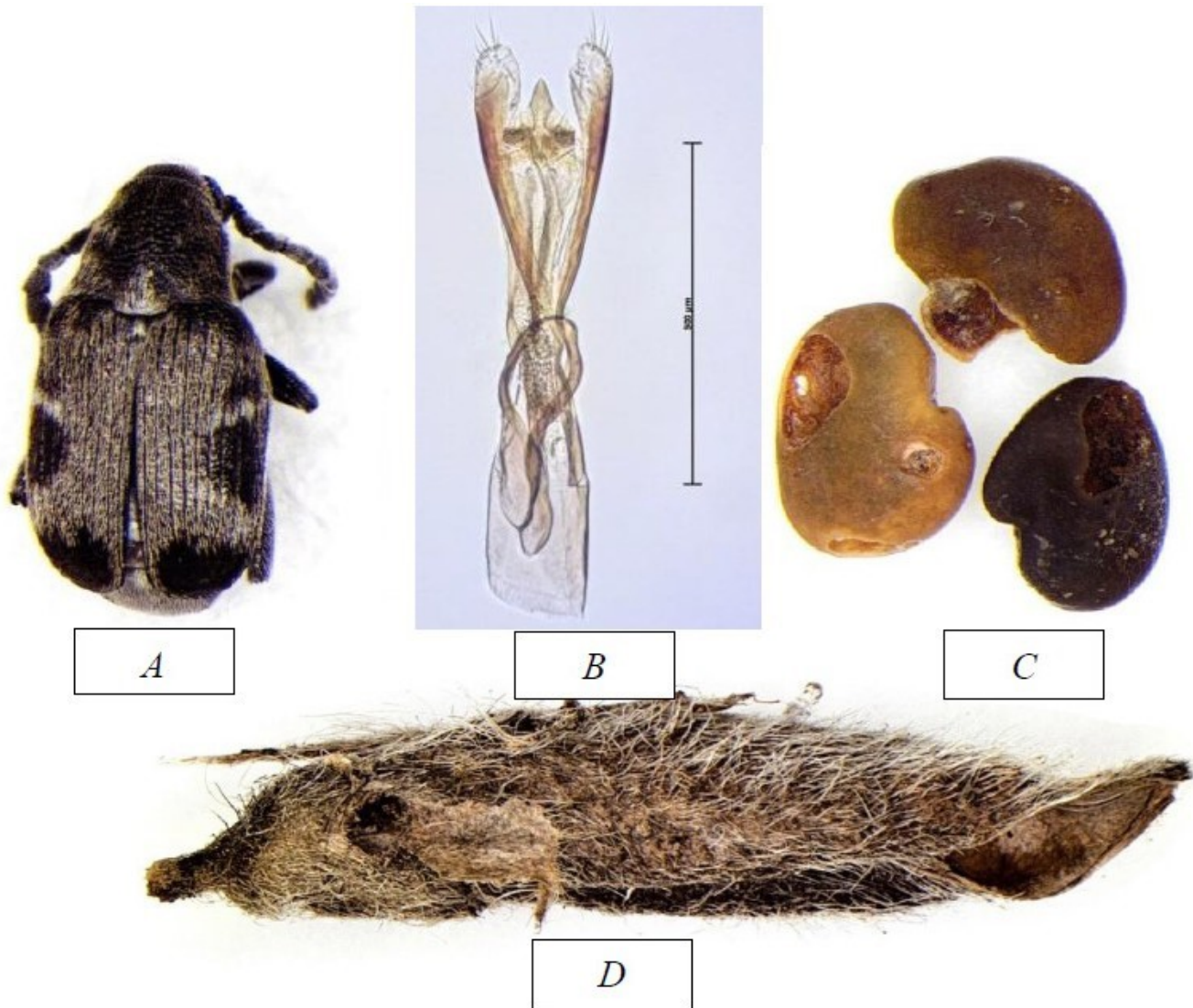


Figure 2. *Bruchidius marginalis* (Fabricius 1776): **A** - adult male; **B** - male genitalia; **C** - seeds of *Oxytropis pilosa* L. with emergence holes; **D** - fruit of *Oxytropis pilosa* L. with emergence hole.

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