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First Record of the Horseshoe Ladybird *Clitostethus arcuatus* (Rossi, 1794) (Coleoptera, Coccinellidae) from Tambov Region (Russia)

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Abstract. The southern Palaearctic species of ladybird, *Clitostethus arcuatus* (Rossi, 1794) (Coleoptera, Coccinellidae), has been recorded in Tambov Region for the first time. This species is known from a small number of regions in Russia, including the Republic of Crimea, the Krasnodar Territory and the Republic of Adygeya, the Lipetsk Region, and the Moscow Region. Recent finds in Central Russia may indicate the species' continuing expansion across European Russia. It is considered to be one of the most effective entomophages feeding on whiteflies (Aleurodidae), which is why it was introduced into America. In the future, greenhouses in Russia may need to establish colonies of ladybird species to provide biological control of Aleurodidae; some species of the latter are quarantine pests that are currently expanding their range.

Keywords: Aleurodidae, biological control, distribution, entomophages, European Russia, expansion, Voroninsky Nature Reserve

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Первое указание коровки *Clitostethus arcuatus* (Rossi, 1794) (Coleoptera, Coccinellidae) из Тамбовской области (Россия)

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Аннотация. Впервые на территории Тамбовской области обнаружен южнопалеарктический вид божьих коровок *Clitostethus arcuatus* (Rossi, 1794) (Coleoptera, Coccinellidae), который ранее уже был

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известен из некоторых регионов России (Республика Крым, Республика Адыгея, Краснодарский край, Липецкая и Московская области). Недавние находки в Центральной России могут свидетельствовать о продолжающейся экспансии вида на европейской части России. *C. arcuatus* считают одним из наиболее эффективных энтомофагов белокрылок (Aleurodidae), для борьбы с которыми он был интродуцирован в Америку. На территории России в будущем, возможно, также потребуются его колонизация в теплицы и оранжереи для биологической борьбы с Aleurodidae, некоторые виды которых являются карантинными вредителями и в настоящее время расширяют свои ареалы.

Ключевые слова: биологический контроль, Европейская Россия, заповедник «Воронинский», распространение, экспансия, энтомофаги, Aleurodidae

Финансирование: работа выполнена в рамках исследований по программе государственного задания 124032500016-4, а также частично профинансирована грантом Российского научного фонда 22-14-00026-П.

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Introduction

The Horseshoe Ladybird *Clitostethus arcuatus* (Rossi, 1794) (Coleoptera, Coccinellidae) is the most effective predator-entomophage of whitefly (Aleurodidae) [Tavadjoh et al., 2010]. First described in Italy, this species has Holarctic-Afrotropical distribution. This species was introduced to America for biological pest control, and is now known from Argentina, Bolivia, United States (California), Chile and Peru [Rioja, Ceballos, 2023]. In the first decade of the 21st century, *C. arcuatus* was found in central regions of Ukraine, Poland, and in some other European countries [Ceryngier et al., 2016; Akhatov, Korotyaev, 2019]. In Russia, this ladybird species was previously known from natural habitats only in the Northwestern Caucasus and Crimea [Akhatov, Korotyaev, 2019]. After 2000, *C. arcuatus* was found in more northern regions of the European part of Russia: the Lipetsk Region (until 2009 in Galichya Gora Nature Reserve) and the Moscow Region (2019 in the Balashikha Urban District) [Tsurikov, 2009; Akhatov, Korotyaev, 2019]. Data on the expansion of *C. arcuatus* to other regions are lacking, and our new discovery of this beetle in the Tambov Region expands the known distribution of the species in European Russia.

Materials and methods

In May 2025, the entomological material was collected in the Tambov Region using interception trap [Volodchenko, Seleznev, 2022] that was located on the trunk of a willow tree in a floodplain forest. The trap was exposed for 49 days (March 25 – May 13).

The identification was conducted using the latest key to ladybugs in European Russia [Bieńkowski, 2020]. The material is deposited in the collection of the Papanin Institute for Biology of Inland Waters Russian Academy of Sciences, Borok, Yaroslavl Region, Russia (IBIW).

The map was created using the online project <https://www.simplemapp.net>. GPS coordinates are taken according to Google Maps.

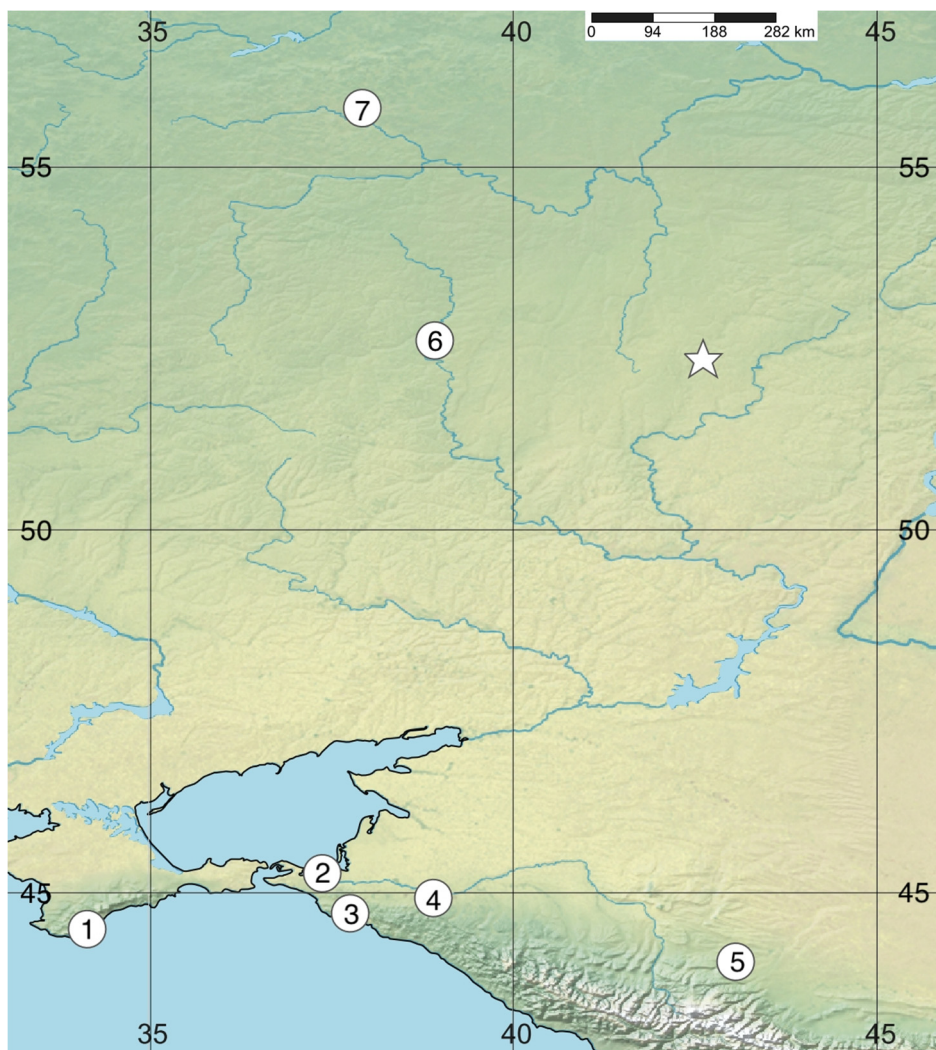
Results and discussion

Family Coccinellidae Latreille, 1807

Clitostethus arcuatus (Rossi, 1794).

Material examined. Russia: Tambov Region, Inzhavinsky District, 2 km W of Karay-Saltykovo vill., Voroninsky Nature Reserve, deciduous forest in the floodplain of the Vorona River, interception trap on a willow tree, May 13, 2025, 1♀ (A.N. Volodchenko leg.).

Taking into account the data obtained, the distribution of the species looks as follows (see Figure).



Locations of finds *Clitostethus arcuatus* (Rossi, 1794) in Russia:
white circles – literature data [by: Akhatov, Korotyayev, 2019]: 1 – Crimea, Yalta; 2 – Krasnodar Territory, Temryuk; 3 – Krasnodar Territory, Glebovka; 4 – Republic of Adygeya, Enem;
5 – Stavropol Territory (Pyatigorsk – personal message by I.A. Zabaluev);
6 – Lipetsk Region, Galichya Gora; 7 – Moscow Region, Balashikha;
white star – Tambov Region (Karay-Saltykovo) (authors' data)

Места обнаружения *Clitostethus arcuatus* (Rossi, 1794) в России:
белые кружки – литературные данные [по: Ахатов, Коротяев, 2019]: 1 – Крым, Ялта;
2 – Краснодарский край, Темрюк; 3 – Краснодарский край, Глебовка; 4 – Республика Адыгея, Энем;
5 – Ставропольский край (Пятигорск – личное сообщение И.А. Забалуева);
6 – Липецкая область, Галичья Гора; 7 – Московская область, Балашиха;
белая звезда – Тамбовская область (Карай-Салтыково) (данные авторов)

Along with *C. arcuatus*, other ladybirds were caught in the interception trap in the Tambov Region, including: *Halizia sedecimguttata* (Linnaeus, 1758) (1 specimen), *Calvia quindecimguttata* (Fabricius, 1777) (3 specimens) and *Propylea quatuordecimpunctata* (Linnaeus, 1758) (1 specimen), as well as beetles of other families: Leiodidae (*Anisotoma*), Staphylinidae (*Sepedophilus*, *Atheta*, *Pella*, *Scaphisoma*, *Gabrius* and *Quedius*), Eucnemidae (*Melasis*), Throscidae (*Aulonothroscus*), Elateridae (*Ampedus*), Scirtidae (*Contacyphon*), Cerylonidae (*Cerylon*), Mycetophagidae (*Mycetophagus*), and Anthribidae (*Platystomos*).

According to the literature, in natural habitats *C. arcuatus* is found in coniferous and deciduous woodland or other habitats with trees [Roy, Brown, 2018]. This species overwinters on the imago stage in bark crevices and under the bark of different tree species [Roy, Brown, 2018].

C. arcuatus is a predatory ladybird (a polyphagous one) that feeds on various whitefly (Aleyrodidae) and spider mite eggs [Tavadjoh et al., 2010; Akhatov, Korotyaev, 2019].

C. arcuatus may feed on *Aleyrodes proletella* (Linnaeus, 1758), *Aleurothrixus floccosus* (Maskell, 1896), *Bemisia tabaci* (Gennadius, 1889), *Dialeurodes citri* Riley & Howard 1893, *Siphoninus phillyreae* (Haliday, 1835), *Trialeurodes lauri* (Signoret, 1882), *T. vaporariorum* (Westwood, 1856), and other whitefly species [Agekian, 1977; Tavadjoh et al., 2010; Rioja, Ceballos, 2023]. Horseshoe ladybird may be used in greenhouses in Russia for biological control of the Aleyrodidae family, some species of the latter being quarantine pests that are currently expanding their range (e.g., *Aleurothrixus floccosus*, *Bemisia tabaci*, *Dialeurodes citri*).

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