

ОРИГИНАЛЬНЫЕ СТАТЬИ RESEARCH ARTICLES

FINDINGS OF BLACK AND RED FROGHOPPER *CERCOPIS VULNERATA* ROSSI, 1807 (HEMIPTERA: CERCOPIDAE) IN SOME REGIONS OF RUSSIA

A.B. Ruchin

*Joint Directorate of the Mordovia State Nature Reserve and National Park «Smolny», Russia
e-mail: ruchin.alexander@gmail.com*

An overview of the distribution of *Cercopis vulnerata* Rossi, 1807 (Hemiptera: Cercopidae) in Russia is given in this paper. To date, this species has been found in the Moscow, Kaluga, Bryansk, Pskov, and Tula regions. In 2020, it was found in the Ryazan and Nizhny Novgorod regions. The northernmost find was made in the Pskov region (56°59'14.4"N 30°30'53.3"E). It was discovered in the Republic of Mordovia in 2006. Since 2012, its findings are being made annually. In general, it is known from 32 localities in the Republic of Mordovia. Biotopes of *C. vulnerata* are moist clearings, edges in deciduous secondary forests and mixed forests, burnt in 2010 areas, light forests. The list of plants, including 15 species where adults were registered is given. All observations of *C. vulnerata* imagos on plants were made at a height of 30 cm to 160 cm above the ground. Seasonal activity mainly occurs in late May and June.

Key words: insects, cicadas, fauna, biotopes, distribution, Republic of Mordovia, Russia

Introduction

Faunal research has become more popular in recent years (Kiosya, 2017; Grichanov & Khruleva, 2018; Kirillov & Kirillova, 2018; Chifundera, 2019). Not only professional scientists but also nature lovers participate in such research. In these conditions, nature lovers should clearly establish the fact and location of each find. A professional scientist must correctly identify the find and register it. Thanks to this symbiosis, faunal research becomes better and more accessible.

Cercopidae is one of the largest families of the Cercopoidea superfamily. Its representatives feed on plant juices. Cercopids are common in all zoogeographic regions, but the highest number of species is found in tropical and subtropical regions. Most species have bright color patterns (Anufriev, 2016; Heong et al., 1992; Peck, 2000; Carvalho & Webb, 2005; Paladini et al., 2018).

Cercopis vulnerata Rossi, 1807 is one of the interesting Cercopidae species distributed in the European Russia. Its body length is 9.5–11.0 mm. The body is slender, the length of the elytra at the seam exceeds their total width. The main color of the body is black, with a bluish tint. Elytra have a red pattern formed by a spot at the base of the clavus, a spot in the middle of the corium, and a strongly curved pre-parietal band running parallel to the posterior margin (Emelyanov, 1964). This species is distributed throughout Europe, except Ireland, Ukraine, Belarus, Scandinavia, the Baltic countries, and the European part of Turkey (Nickel, 2003; Hoch, 2009). In Russia, in the east of its range, it was found sporadically in isolated locations (Moscow and Kaluga regions) (Emelyanov, 1964; Tishechkin, 2003). In the Republic of Mordovia, it was first discovered in 2006 in two habitats (Anufriev & Ruchin,

2007) and then listed as a monitored species (Lapshin et al., 2008). Subsequently, continuous monitoring revealed a significant number of new habitats (Ruchin et al., 2012, 2014, 2015, 2017, 2019; Egorov & Ruchin, 2013), and regularly register this species in the same biotopes every year (Ruchin et al., 2016, 2018, 2020; Ruchin & Khapugin, 2019). In this paper, we present new findings of *C. vulnerata* in some regions of Russia and summarize our own data on the biology of the species.

Material and Methods

The material was collected in 2006, 2008, 2012–2020. Usually, manual harvesting and mowing of vegetation were used. The material of the 2020 records is listed below. Previous finds in the Republic of Mordovia were indicated earlier (Ruchin et al., 2012, 2014, 2015, 2016, 2017, 2018, 2019, 2020; Egorov & Ruchin, 2013). The material collected in 2020 is given in the following order: region, locality (with coordinates), date, number of exemplars (ex.), and collector. In addition, we used data from the free Internet portal iNaturalist (<https://www.inaturalist.org>).

Results and Discussion

Places of new findings revealed in 2020

Ryazan region, Kadom district, Bolshoe Lunino village (54°34'44.2"N 42°21'52.0"E), 18.VI.2020, 30.VI.2020, 26 ex., Ruchin A.B.

Ryazan region, Kadom district, Novoselki village (54°36'33.8"N 42°15'17.9"E), 7.VII.2020, 1 ex., Ruchin A.B.

Nizhny Novgorod region, Ardatov district, Zhuraleika village (55°11'48.1"N 43°01'58.3"E), 16.VI.2020, 5 ex., Ruchin A.B.

Nizhny Novgorod region, Ardatov district, 3 km NW Siyazma village (55°09'44.0"N 42°56'19.8"E), 29.VI.2020, 2 ex., Ruchin A.B.

Nizhny Novgorod region, Kulebaki district, Shiloksha village (55°24'25.4"N 42°41'50.8"E), 16.VI.2020, 3 ex., Ruchin A.B.

Nizhny Novgorod region, Vyksa district, Malinovka village (55°10'14.9"N 42°26'38.7"E), 29.VI.2020, 1 ex., Ruchin A.B.

Republic of Mordovia, Temnikov district, Mordovia State Nature Reserve, quarter 206 (54°49'39.6"N 43°12'09.4"E), 20.VI.2020, 3 ex., Ruchin A.B.

Republic of Mordovia, Temnikov district, Mordovia State Nature Reserve, quarter 408 (54°45'01.2"N 43°12'02.7"E), 17.VI.2020, 3 ex., Ruchin A.B.

Republic of Mordovia, Temnikov district, Mordovia State Nature Reserve, quarter 297 (54°48'52.6"N 43°31'52.6"E), 21.VI.2020, 1 ex., Ruchin A.B.

Republic of Mordovia, Temnikov district, Romanovo village (54°48'25.1"N 43°08'20.2"E), 3.VII.2020, 1 ex., Ruchin A.B.

Republic of Mordovia, Temnikov district, Mordovia State Nature Reserve, quarter 86 (54°53'42.3"N 43°36'07.6"E), 14.VI.2020, 2 ex., Semishin G.B.

Republic of Mordovia, Temnikov district, Mordovia State Nature Reserve, quarter 19 (54°54'06.8"N 43°13'54.2"E), 15.VI.2020, 16.VI.2020, 3 ex., Semishin G.B.

Republic of Mordovia, Atyurievo district, Atyurievo village, 22.VI.2020, 1 ex.,
Artyushkina A. (<https://www.inaturalist.org/observations/50532731>)

Republic of Mordovia, Elniki district, Elniki village, 25.VI.2020, 1 ex., Rodichkina A. (<https://www.inaturalist.org/observations/50999070>)

Recently, there has been an accumulation of data on the finds of *C. vulnerata* in Russia. It was observed in six regions: Pskov, Moscow, Kaluga, Tula, Bryansk regions, Republic of Mordovia (Fig. 1). In 2020, we found *C. vulnerata* in the Ryazan and Nizhny Novgorod regions (Fig. 2, 3). The northernmost finds of *C. vulnerata* were made in Loknyansky district of Pskov region (56°59'14.4"N 30°30'53.3"E, <https://www.inaturalist.org/observations/27946445>).

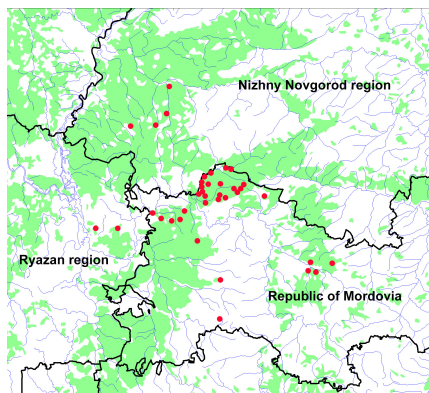
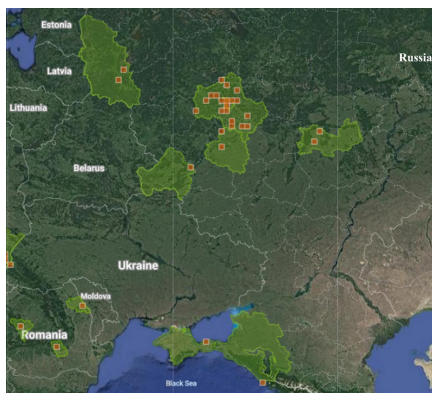


Fig. 1. Locations where *Cercopis vulnerata* was found in some regions of Russia. Red squares – data from <https://www.inaturalist.org/taxa/61862-Cercopis-vulnerata>.



Fig. 3. Photo of collectible specimens of *Cercopis vulnerata* (collection of the Mordovia State Nature Reserve).

By 2009, the northern border of the range of *C. vulnerata* was constantly expanding northwards and was located in Central Europe at 54° N. The northernmost finds at that time were in southern Denmark (Hoch, 2009). In the Moscow region, it was observed on the territory of the Zvenigorod biological station at 55°42' N (Tishechkin, 2003).

During the period from 2006 to 2020, a total of 32 localities were identified in the Republic of Mordovia where *C. vulnerata* was found (Table). In some places, finds are made regularly.

In Western and Central Europe, *C. vulnerata* is found from moderately dry to moderately wet habitats, sunny or moderately shaded (clearings, edges, light forests), in vineyards, and more often occurs in light forests. There are data on the numerous findings of the species in open landscapes, including meadows and on crops of different cultures (Kehlmaier, 2000; Nickel, 2003; Weicherding, 2006; Holzinger, 2008; Hoch, 2009; Żurawlew, 2010; Guglielmino et al., 2017; Quaglino et al., 2019). In our research, the places of *C. vulnerata* finds were wet clearings, edges in deciduous secondary forests and mixed forests (Fig. 4). Two finds were made on the burnt in 2010 areas overgrown with birch (*Betula* spp.). In light forests, *C. vulnerata* was found under the forest canopy. In open landscapes far from forests, we only once noted this species. This find was made in a meadow with steppe formation. Its seasonal activity occurs in Russia from late May till August (Fig. 5). The peak of finds is shifted to late May and June.

Table. The number of localities and the number of discovered *Cercopis vulnerata* specimens in the Republic of Mordovia

Years	The new localities findings*	The findings in the previously identified localities*
2006	2 (19)	—
2008	2 (40–50)	—
2012	2 (3)	—
2013	2 (5)	2 (2)
2014	4 (33)	—
2015	—	1 (1)
2016	2 (3)	—
2017	6 (28)	—
2018	3 (3)	—
2019	3 (3)	2 (4)
2020	6 (11)	2 (4)
The total number of localities for 2006–2020	32	—

Note: * – in parentheses, we indicated the number of recorded individuals in all localities for a given year of observations.



Fig. 4. Biotopes of *Cercopis vulnerata*: 1 – Ryazan region, Kadom district, Novoselki village; 2 – Nizhny Novgorod region, Vyksa district, Malinovka village.

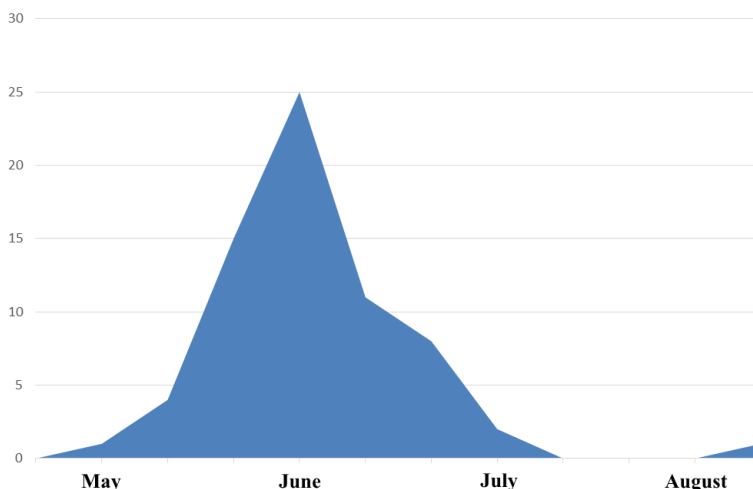


Fig. 5. Activity of *Cercopis vulnerata* in Russia according to open data (on the abscissus axis, there are months and decades; on the ordinate axis, there is the number of finds).

In Europe, imagos are being recorded mainly on tall grasses and shrubs (*Knautia*, *Rumex*, *Vicia*, *Urtica*, *Aegopodium*, *Orchis*, *Lupinus*, *Chrysanthemum*, *Filipendula*, *Solidago canadensis*, *Arrhenatherum* and others) (Kehlmaier, 2000; Nickel, 2003; Weicherding, 2006; Henneresse & Tyteca, 2016). We watched imagos on such plants as *Dryopteris filix-mas* (L.) Schott, *Chamaenerion angustifolium* (L.) Scop., *Rubus idaeus* L., *Aegopodium podagraria* L., *Angelica sylvestris* L., *Filipendula ulmaria* (L.) Maxim., *Campanula patula* L., *Tilia cordata* Mill., *Artemisia vulgaris* L., *Medicago falcata* L., *Epilobium* sp., *Calamagrostis epigeios* (L.) Roth, *Urtica dioica* L., *Hypericum perforatum* L., *Dactylis glomerata* L. All observations of *C. vulnerata* on plants were made at a height of 30 to 160 cm above the ground.

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**О НАХОДКАХ ЦЕРКОПИСА ПЕРЕВЯЗАННОГО
CERCOPIS VULNERATA ROSSI, 1807 (HEMIPTERA: CERCOPIDAE)
В НЕКОТОРЫХ РЕГИОНАХ РОССИИ**

А.Б. Ручин

*Объединенная дирекция Мордовского государственного природного заповедника
имени П.Г. Смидовича и национального парка «Смольный», Россия
e-mail: ruchin.alexander@gmail.com*

В статье представлен обзор сведений о распространении *Cercopis vulnerata* Rossi, 1807 (Hemiptera: Cercopidae) на территории России. К настоящему времени этот вид обнаружен в Московской, Калужской, Брянской, Псковской, Тульской областях. В 2020 году нами найден в Рязанской и Нижегородской областях. Самая северная находка – это Псковская область (56°59'14.4"N 30°30'53.3"E). Нами он обнаружен в Республике Мордовия в 2006 году, а с 2012 года его находки делаются ежегодно. В общей сложности за время наблюдений он стал известен из 32 локалитетов из Республики Мордовия. Биотопами *C. vulnerata* являются влажные поляны, опушки в лиственных лесах вторичного происхождения и смешанных лесах, места горельников 2010 года, редколесья. Приведен список растений, включающий 15 видов, на которых мы регистрировали имаго. Все наблюдения *C. vulnerata* на растениях сделаны на высоте от 30 до 160 см над землей. Сезонная активность в основном приходится на конец мая и июнь.

Ключевые слова: насекомые, цикады, фауна, биотопы, распространение, Республика Мордовия, Россия