

REVISITING THE AREA BOUNDARIES OF *CARABUS CORIACEUS* LINNAEUS, 1758 IN THE EUROPEAN PART OF RUSSIA

Leonid V. Egorov, Valentina N. Podshivalina

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The new records of *Carabus coriaceus* Linnaeus, 1758 are described. The border of the species area in the European part of Russia made more precise.

Key words: ground beetles, distribution, protected species, Chuvashia, Russia.

Leonid V. Egorov. The Prisursky State Nature Reserve, Lesnoj, 9, 428034 Cheboksary, Russia, E-mail: platyscelis@mail.ru.

Valentina N. Podshivalina. The Chuvash State University, Moscow av., 15, 428015 Cheboksary, Russia, The Prisursky State Nature Reserve, Lesnoj, 9, 428034 Cheboksary, Russia, E-mail: verde@mail.ru.

INTRODUCTION

Carabus (Procrustes) coriaceus Linnaeus, 1758 is distributed in Europe and Southwest Asia. The nominative subspecies *C. coriaceus coriaceus* Linnaeus, 1758 inhabits the territory of Russia. It occurs in northern and central parts of the species area – in Europe exclusively (from France and Italy to European part of Russia) (Turin et al. 2003, Břesina et al. 2017). It is also reported from Estonia, Latvia (Břesina et al. 2017), Belarus (in all nature zones) (Aleksandrowicz et al. 1996), Ukraine (in almost all zones except south steppe subzones in Left and Right banks areas) (Putchkov 2012). It is a nemoral mesophilous species, distributed from south taiga to the forest outliers in steppe. It is a zoophage (preliminary pray on snails without shell (Gastropoda: Limacidae)), epigeobiont species, reproduces mainly in late summer or in autumn (Turin et al. 2003, Aleksanov & Alekseev 2019). It is able to move over the great

distance autonomously (Riecken & Rath 1996, Aleksanov & Alekseev 2019).

The species entered in the Red data lists in many regions of the European part of Russia: Leningrad province (Kataev 2018a) and Saint-Petersburg (Kataev 2018b), Ivanovo (Tikhomirov 2017), Yaroslavl (Vlasov 2015), Belgorod (Prisny 2004), Tambov (Ishin 2012), Vladimir (Zhukov 2018), Ryazan (Trushitsina 2011), Smolensk (Gildenkov 1997), Nizhny Novgorod (Potanin 2014) and Penza (Polumordvinov et al. 2019) provinces, the Chuvash Republic (Egorov & Arzamastsev 2010) and Moscow city (Gryuntal 2011).

The causes of the present study are the new records from the Chuvash Republic and published data from other regions of Russia. These have made it possible to define the border of the species area in the European part of Russia more precise.

The species reported from Saint-Petersburg and Tula precincts in the 19th century (Lindeman 1871), at the beginning of the XXth – from Tula, Moscow, Yaroslavl, Tver and Saint-Petersburg provinces (Jakobson 1905). The species distribution was restricted by Leningrad, Tver, Yaroslavl, Orel, Voronezh provinces and Tatar Republic (the Kama river outflow) at the end of the last century (Kryzhanovskij 1979). At the beginning of the XXth *C. coriaceus* was reported to the west and in the central European part of Russia. The north boundary of the area extended through Saint-Petersburg – Yaroslavl – Nizhny Novgorod (to the east up to The Volga River). The easternmost findings occurred in Dryazga (Nizhny Novgorod province), in Mordovsky State Nature Reserve and Elnikovskiy district (The Republic of Mordovia). The south area boundary lies in the Tambov province (Turin et al. 2003).

The first finding of the species on the territory of the Chuvash Republic happened in 2001 (Egorov 2001) and the species recorded only from the Sura river floodplain up to the present (Egorov 2005, Egorov et al. 2012).

MATERIAL AND METHODS

The published on 1871–2019 data on *C. coriaceus* occurrence in the European part of Russia were analyzed. The new data from the east part of the area studied.

RESULTS AND DISCUSSION

In 2020 the information on the new records of the *C. coriaceus* from the Chuvash Republic was summarized. The following offers their description.

Material. The Chuvash Republic: Morgaushskiy district: 2.8 km NNW from Shomikovo village, 56°07'45,35"N, 46°54'35"E, 14–17.VII.2010, leafed forest (*Quercus robur* L., *Tilia cordata* Mill.) on the right bank of the Volga River, at night, 30 specimens, Aleksandrov A.N.; Shomikovo village, 56°05'41"N, 46°55'35"E, 20.VIII.2020, home lawn, at the village peripheral, close to the forest, 1♀, Sergeeva M.A.; Krasnie Chetai district, Sankino village, 55°43'52"N, 46°18'47"E, 28.VIII.2020,

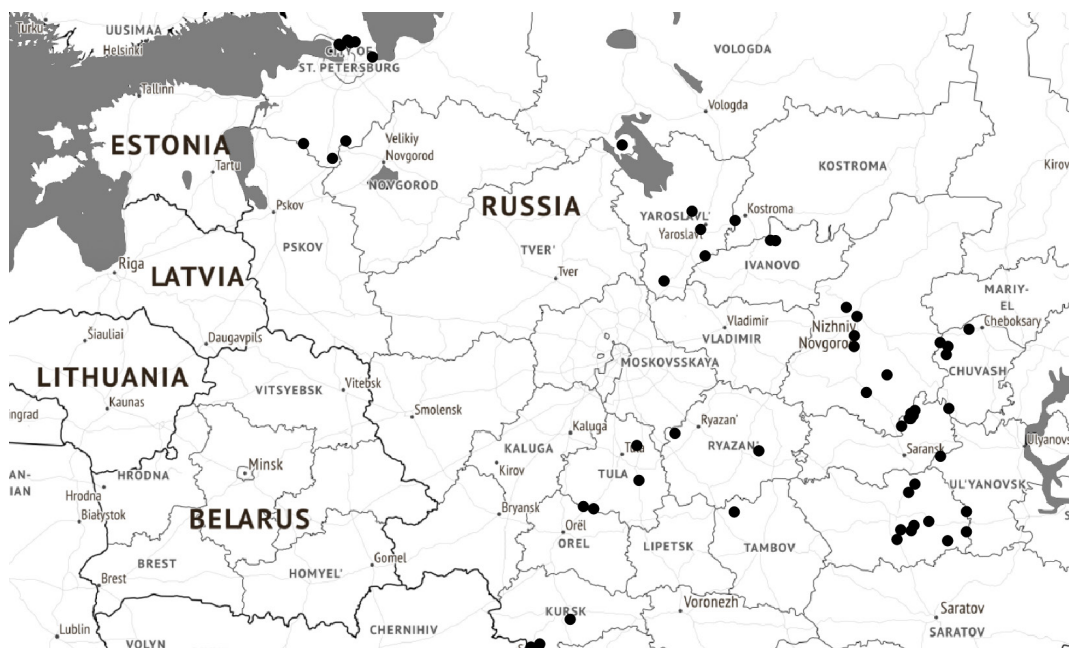


Fig. 1. *Carabus coriaceus* distribution near the east area boundaries in the European part of Russia.

vegetable garden, under the fallen leaves, 1♂, Mokeeva A.I.; Yadrinskiy district, Yarovoikasy village, 55°51'05"N, 46°21'48"E, 12.VIII.2020, household plot, 1♂, Belyakova M.R.

The new records are the easternmost species localities. The species findings in the household plots and gardens could be attributable to snails' (Gastropoda: Limacidae) abundance in the Chuvash Republic in 2020.

The species found in adjacent to the Chuvash Republic territories – in Nizhny Novgorod province (common in mixed forest, only on the right bank of the Volga river) (Anufriev & Sharygin 1989) and in the Republic of Mordovia (the easternmost findings occur in Bol'shie Berezhnyaky (Alekseev 2008), Ichalky (Ruchin et al. 2007) and Bol'shie Ignaty (Ruchin et al. 2019) districts). The species reported from the Penza province eastern part (the easternmost findings located ~ 53°17'27"N, 46°51'22"E and 52°57'54"N, 46°51'21"E) (Polumordvinov et al. 2019, O.A. Polumordvinov personal communication). It was not found on such neighbor territories as the Mari El Republic (Matveev V. & Matveev I. 2006), the Tatarstan Republic and Ulyanovsk province (Isaev et al. 2004). It was not also reported from some other regions in the Volga River basin (Samara (Tilli 1991, 2012), Saratov (Sazhnev 2007), Volgograd and Astrakhan provinces and the Republic of Kalmykia (Kalyuzhnaya et al. 2000)).

With respect to the new data the north and the east borders of the species area extend in Pskov (Antipova & Baykova 2002), Leningrad, Tver (Zheltukhina & Korobov 2009), Vologda (the only finding is from the Darwin State Nature Reserve (Rybnikova 2006); so the species occurrence in the region should be confirmed), Yaroslavl (Vlasov & Rusinov 2011), Kostroma (Antsiferov & 2015), Ivanovo (the right bank of the Volga river) (Tikhomirov 2017), Nizhny Novgorod provinces, the Chuvash Republic, the Mordovia Republic and Penza province (Fig. 1). It is quite probable to find the species in Novgorod and Ulyanovsk provinces. The *C. coriaceus* occurrence in the Tatarstan Republic

(Kryzhanovskij 1979) should be confirmed, since was not found there at the beginning of the XXIth (Zherebtsov 2000) and over the last 20 years (D.N. Vavilov and R.A. Sukhodolskaya personal communications). In the European part of Russia it also occurs in Kaliningrad (Alekseev 2008), Smolensk (Semenov et al. 2011), Bryansk (Kolesnikov 2007), Kaluga (Aleksanov & Alekseev 2019), Moscow (Fedorenko 1988), Tula (Dorofeev 2001), Vladimir (Zhukov 2018), Ryazan (Priklonsky et al. 2001), Tambov (Ishin 2012), Oryol (Rychkova & Tyapkina 2012) and Kursk (Poluyanov et al. 2014, T.E. Grechanichenko personal communication) provinces.

The species reported from Belgorod province, but was not detected after the 1960th. (Prisny 2004). After the findings in the last century (Kryzhanovskij 1979) it was not also registered (Negrobov et al. 2005, personal communication of V.M. Emets) in Voronezh province. Thus, south border in the east part of the *C. coriaceus* contemporary area extends through the Penza, Tambov, Ryazan, Tula, Oryol and Kursk provinces (Fig. 1).

CONCLUSION

The northern border of the *C. coriaceus* area in the European part of Russia is well limited by the Volga river bed downstream Yaroslavl province. The species is not found on the left bank of the Volga river. The new records made it possible to define the east and south borders of the species area in the European part of Russia more precise. *C. coriaceus* was not detected eastwards 47°E. The south border of the area is restricted by the forest outliers in the steppe zone.

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