
REVIEW ARTICLES

ОБЗОРНЫЕ СТАТЬИ

**ON THE DISTRIBUTION AND BIOLOGY OF *ELATER FERRUGINEUS*
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Saproxylic beetle communities play an important bioindicator role in the assessment of biodiversity status in forest habitats. These Coleoptera communities also contain a considerable number of threatened species with a low abundance throughout their range. One of these species is *Elater ferrugineus* (Coleoptera: Elateridae), a threatened species that inhabits old, hollow, deciduous trees. *Elater ferrugineus* is protected in many European countries, including Russia. In the present study, we provide new data on the distribution of this rare and protected species in Russia. The species has been recorded for the first time in Ulyanovsk Region, Ryazan Region, and Voronezh Region, and it is currently indicated in the fauna of 23 Russian regions. The phenology, habitat preferences, and some other aspects of ecology of *Elater ferrugineus* in Russia have been characterised. The main period of activity of adult individuals was observed from the third decade of June to the third decade of July. The species is mainly found in various types of deciduous forests (dominated by trees of the genera *Quercus*, *Tilia*, *Acer*, *Populus*, and *Fagus*) and in mixed forests. In addition, our research also revealed the presence of *Elater ferrugineus* in pine (*Pinus sylvestris*) forest complexes. A general set of measures is proposed to ensure the protection and monitoring of *Elater ferrugineus*. It is recommended that *Elater ferrugineus ferrugineus* needs to be included in Red Data Books of all regions where it is known, because at present this species still has no conservation status in several regions of Russia.

Key words: click beetles, conservation, ecology, fauna, habitat preferences, Protected Area**Introduction**

Insects associated with decaying wood, known as saproxylic insects, particularly Coleoptera, play a considerable role in forest biodiversity (Bosso et al., 2013; Ruchin et al., 2019; Dedyukhin, 2020). These beetles are able to weaken or kill trees and initiate a wood decay, which makes them important components of natural forest ecosystems and potential pests in productive forests (Müller et al., 2008; Gossner et al., 2013). However, human activities cause a decline of the abundance and diversity of saproxylic beetles in forests (Bouget et al., 2013; Gallardo & Cárdenas, 2016; Ruchin & Khapugin, 2019). The main factors contributing to this decline are the removal of dead and old trees (Asbeck et al., 2021; Wetherbee et al., 2021), habitat fragmentation (Fletcher et al., 2018; Fahrig et al., 2019; Chase et al., 2020), and forest decline (Wilson et al., 2016). These processes have a particularly considerable impact on abundance of rare saproxylic beetle species.

Among Elateridae (Coleoptera) species, a large number of saproxylic beetles are known. Many of them are rare and protected in a number of countries (Iablokoff, 1943; Martin, 1989; Schimmel, 1999; Piccini et al., 2023). One of them is *Elater ferrugineus* Linnaeus, 1758, one of the largest Elateridae species in Europe. It is considered a stenotopic species that inhabits old deciduous forests, public parks, and forest clearings (Tolasch et al., 2007; Svensson & Larsson, 2008). In recent years, the species has been intensively studied using various pheromone traps and other types of baited traps (Tolasch et al., 2007; Barševskis & Nītcis, 2011; Harvey et al., 2017; Rukavina et al., 2018). *Elater ferrugineus* is a Eurasian species, which is currently known in 38 countries (see references in the general distribution section below). Data on its distribution in the eastern part of the natural range, particularly from Russia, are still very scarce and fragmentary. The same applies to the data on biology of *Elater ferrugineus* in Russia. Studying the

distribution and biology of *E. ferrugineus* is important for conservation of its populations, because this species has been included in the new edition of the Red Data Book of the Russian Federation (Nikitsky & Sobolev, 2021) as a species declining in abundance and/or distribution. The aim of this study was to summarise data from the available literature and to reveal the distribution and some aspects of the biology of *Elater ferrugineus* in Russia with the use of material from various collections and our personal data.

Material and Methods

Field studies have been conducted in various regions of Russia, including the Republic of Mordovia, Chuvash Republic, Samara Region, Ryzan Region, Ulyanovsk Region, Penza Region, Nizhny Novgorod Region, and Saratov Region in 2008, 2009, 2011, 2015, and 2017–2023. Some distribution data collected during our research have been published previously (e.g. Ruchin & Egorov, 2021, 2022; Egorov & Ruchin, 2022; Egorov et al., 2022; Ruchin et al., 2022a,b,c).

Therefore, they are not included in the studied material (see Appendix 1).

In the field studies we used traditional collection techniques according to Golub et al. (2012). Canopy enzyme traps were also used widely at various heights with baits containing a mixture of beer or wine, sugar, jam and honey (Ruchin et al., 2020).

We have examined material from several institutions, including collections of the Zoological Institute RAS (St. Petersburg, Russia), Zoological Museum of the Lomonosov Moscow State University (Moscow, Russia), Moscow Pedagogical State University (Moscow, Russia), the Department of Entomology of the Lomonosov Moscow State University (Moscow, Russia), and Southern Federal University (Rostov-on-Don, Russia). Additionally, we have included material provided by our colleagues. Some of this material is currently stored in the collection of the Department of Entomology of the Lomonosov Moscow State University. Photographs of *Elater ferrugineus* (Fig. 1) were taken using a Canon EOS-6D camera with a Canon MP-E 65 mm lens.

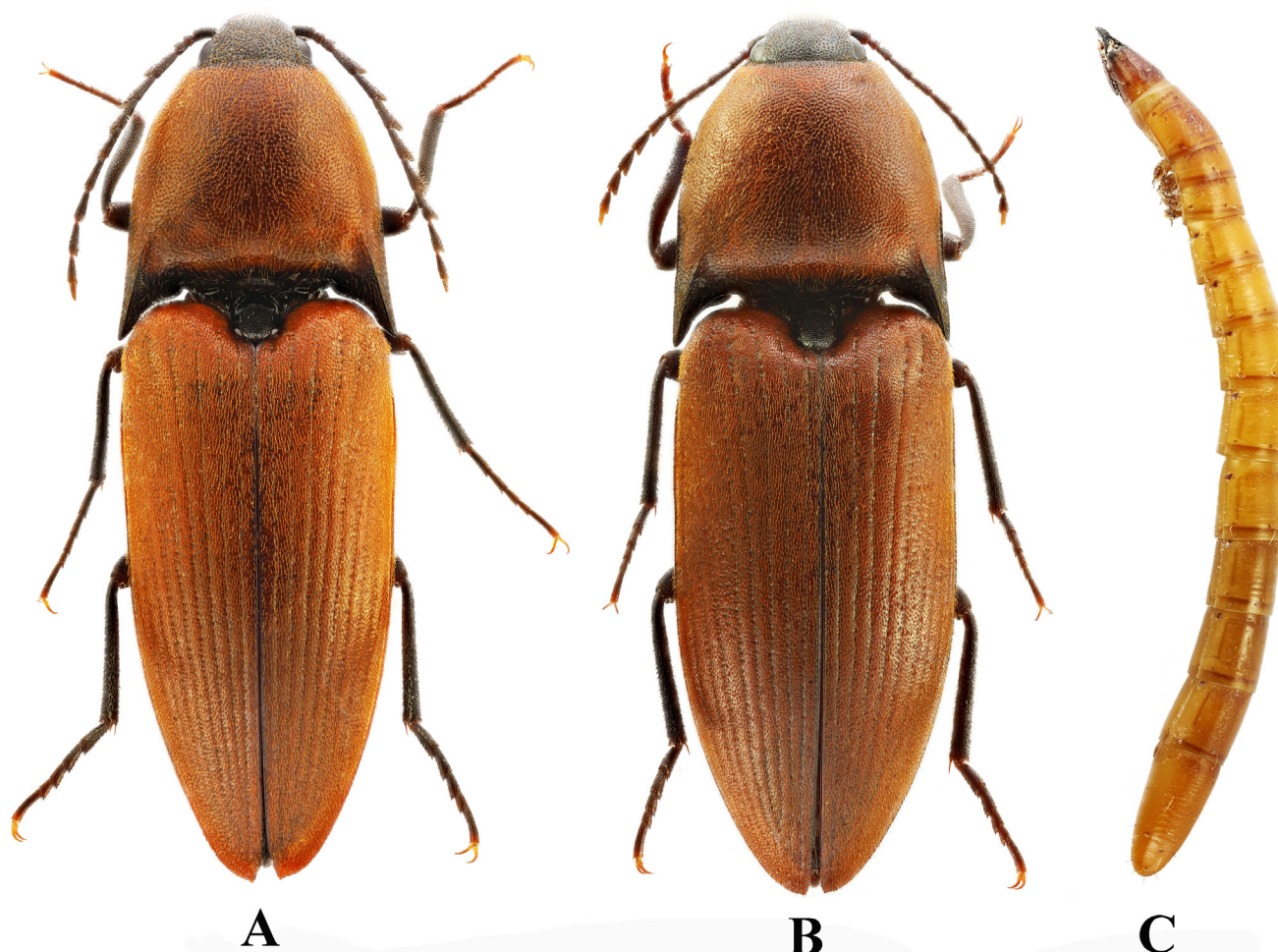


Fig. 1. The habitus of *Elater ferrugineus*. Designations: A – male (Krasnodarsky Krai, Russia), dorsal view; B – female (Krasnodarsky Krai, Russia), dorsal view; C – larva (Republic of Daghestan, Russia), lateral view.

Results and Discussion

General distribution

Elater ferrugineus is a Eurasian species, distributed in Europe and Western and Central Asia. The nominotypical subspecies has been recorded in Albania, Armenia, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, France, Georgia, Germany, United Kingdom, Greece, Hungary, Italy, Latvia, Lithuania, North Macedonia, Moldova, Montenegro, Netherlands, Norway, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, and Ukraine (Burakowski et al., 1985; Cate et al., 2007; Flåten & Fjellberg, 2008; Mertlik & Platia, 2008; Meržijevskis & Tamutis, 2010; Schimmel & Tarnawski, 2010; Barševskis & Nitcis, 2011; Kovács & Merkl, 2013; Krčmar, 2014; Rukavina et al., 2018; Semenyak, 2019; Turić et al., 2019; Mesaroš & Ilić, 2022; Aleksandrowicz et al., 2023; Miščević, 2024). *Elater f. lenkoranus* Gurjeva, 1974 is known from Azerbaijan, Iran, and Turkmenistan (Cate et al., 2007).

Distribution in Russia

Elater ferrugineus is typically found in forest and forest-steppe zones of European Russia, including the Kaluga Region (Alekseev & Perov, 2021), Tula Region (Nikitsky & Sobolev, 2021), Belgorod Region (Kabanov, 1981), Rostov Region (Minoransky & Ponomarenko, 1978), Nizhny Novgorod Region (Esterberg, 1935), Penza Region (Prosvirov & Polumordvinov, 2023), Saratov Region (Sakharov, 1947), Volgograd Region (Komarov, 2004), Kirov Region (Dedyukhin & Nikitsky, 2009), Samara Region (Dmitriev, 1935), Orenburg Region (Shapovalov et al., 2011), Republic of Mordovia (Ruchin & Egorov, 2018), Chuvash Republic (Egorov & Arzamastsev, 2012), Republic of Tatarstan (Lebedev, 1912), and Republic of Bashkortostan (Bayanov et al., 2015). The species has also been reported for the North Caucasus Region, including Krasnodarsky Krai (Stepanova, 1962), Stavropolsky Krai (Gurjeva, 1979), Republic of Adyghea (Orlov, 2010), Republic of North Ossetia-Alania (Penev & Alekseev, 1996), and Republic of Dagestan (Gurjeva, 1979). In the present study, *Elater ferrugineus* has been reported for the first time in the Ulyanovsk Region, Ryazan Region, and Voronezh Region. The record of *Elater ferrugineus* in the Republic of Mari El (Matveev, 2008) may be based on a misinterpretation of the indication of *Elater ferrugatus* Lacordaire, 1835 (= *Ampedus pomorum* (Herbst, 1784))

for this territory by Yakovlev (1910) and, therefore, it requires further confirmation.

It seems that the distribution of *Elater ferrugineus* in Russia is limited to regions with deciduous forests suitable for the species. Further research may lead to the discovery of new localities where the species occurs in Russia. The northern and western limits of *Elater ferrugineus* distribution in Russia are still unclear; its eastern boundary is limited by the Urals. Investigation of the distribution of saproxylic/xylophagous species associated with *Elater ferrugineus* may be useful in revealing of the distribution of this species.

Bionomics of *Elater ferrugineus*

Most of the specimens studied were collected in various types of deciduous forests, including forests dominated by trees of genera *Quercus*, *Tilia*, *Acer*, *Populus*, and *Fagus* (Fig. 2A,D), and mixed forests (Fig. 2C). Several specimens from the Saratov Region and Republic of Mordovia were found in pine (*Pinus sylvestris* L.) forests (Fig. 2B). In the Ryazan Region, we discovered the species on the outskirts of a semi-abandoned village in a canopy trap with beer placed on a solitary poplar (*Populus* sp.) tree (Fig. 2A). The nearest forest cover was located at a distance of 90 m and was dominated by pine (*Pinus sylvestris*) trees. In the Mordovia State Nature Reserve (Republic of Mordovia), *Elater ferrugineus* is repeatedly found in deciduous forests (1–2 specimens per year). The species occurs mainly in the southwestern part of the Mordovia State Nature Reserve, where riparian forests predominate. In the Samara Region we found the species in the Samarskaya Luka National Park using a canopy trap with beer placed at a height of 1.5 m on a *Quercus robur* tree in the forest. During the survey on this site, we also discovered a rare Cerambycidae beetle, *Rosalia alpina* (Linnaeus, 1758). The area where we found the species was a small deciduous forest with old *Quercus robur* trees, minimal undergrowth density, and almost no herbaceous layer.

The main habitat requirement of *Elater ferrugineus* is the presence of proper (usually old) deciduous trees with cavities suitable for larval development, since its larvae are trophically connected with the larvae of some beetles living in the same microhabitat (see below). The species of deciduous tree is not crucial (e.g. Leseigneur, 1972; Schimmel, 1982; Martin, 1989; Laibner, 2000). The biology of *Elater ferrugineus* has been studied in detail in a number of studies in Europe (e.g. Donisthorpe, 1927; Husler & Husler, 1940; Schimmel, 1982), but no similar studies have yet been carried out in Russia.

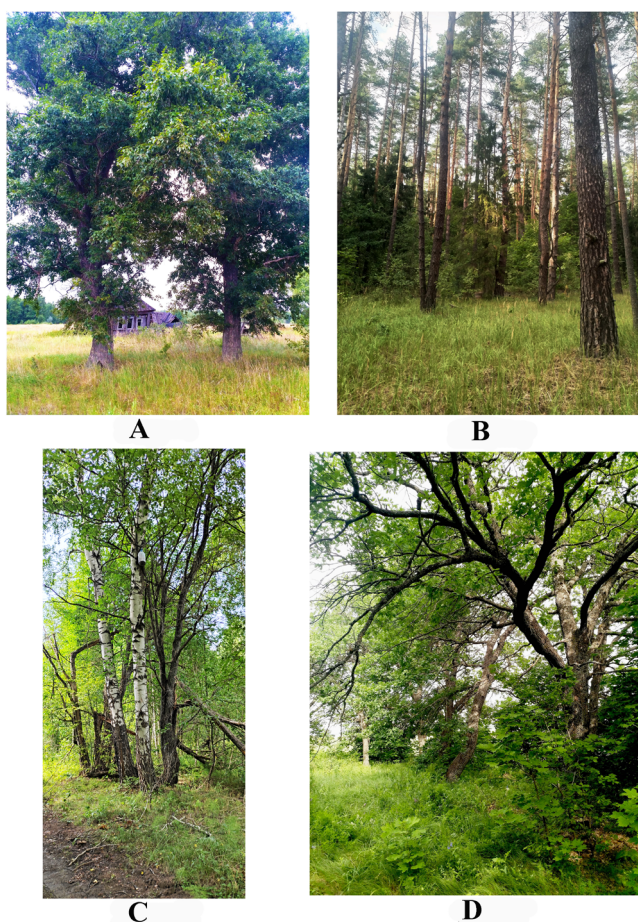


Fig. 2. Examples of habitats of *Elater ferrugineus* in European Russia. Designations: A – Ryazan Region, Kadom district, surroundings of village of Marievka, solitary *Populus* sp. tree; B – Republic of Mordovia, Temnikov district, 8.5 km north of Temnikov town, *Pinus sylvestris* forest; C – Chuvash Republic, Alatyr district, 3.6 km south of Atrat village, mixed forest; D – Saratov Region, Bazarnyi Karabulak district, Nechaevka village, deciduous forest.

Based on the analysis of our own and published data on the phenology of *Elater ferrugineus*, it can be concluded that the main period of adult activity in Russia is from the third decade of June to the third decade of July, which approximately corresponds to published data for *Elater ferrugineus* populations in other parts of Europe (Fig. 3). Although the feeding habits of adults have hardly been studied in general, attraction of *Elater ferrugineus* by exuding *Quercus* sp. sap has been observed (e.g. Shapovalov et al., 2011). This is probably related to the successful capturing of this species using baited enzyme traps (e.g. Miroshnikov, 2018; Ruchin et al., 2021). Adults probably spend most of their time in tree cavities. Flight activity was observed mostly at dusk and during the night, with individuals sometimes attracted to the light. Only occasionally beetles were observed in flight or crawling up a tree trunk during daylight hours (Daniel Juřena, personal communication).

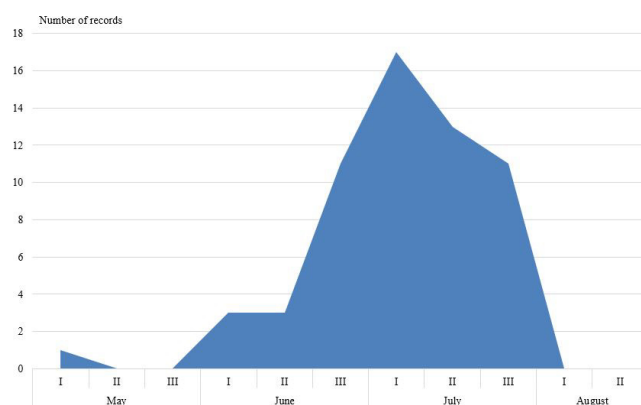


Fig. 3. Seasonal activity of adults of *Elater ferrugineus* in Russia based on a combination of our own and published data.

Larval development of *Elater ferrugineus* typically takes 2–5 years, depending on habitat and microhabitat conditions (Gurjeva, 1979; Schimmel & Tarnawski, 2010). They are considered facultative predators feeding on larvae and eggs of various saproxylic/xylophagous beetles, particularly of Scarabaeidae (genera of *Osmoderma*, *Gnorimus*, *Cetonia*, *Protaetia*) and Lucanidae (genus *Dorcus*). The larvae of *Elater ferrugineus* also feed on fallen wood, which processed by these xylophagous coleopteran larvae (Tolasch et al., 2007; Barševskis & Nitcis, 2011; Svensson et al., 2012; Sabatelli et al., 2023). Some studies suggest that larvae of *Elater ferrugineus* can survive even if they feed only on fallen wood (Tolasch et al., 2007). Schimmel (1982) reported that larvae of *Elater ferrugineus* actively attack larvae of other xylophagous beetles mainly when the substrate is not moist enough. If the substrate is sufficiently moist, they feed on larvae of other species only sporadically and successfully develop by feeding on dead wood. This behaviour is similar to that of other polyphagous wood-inhabit wireworms, such as *Ampedus* spp. (Dolin, 1963; Samoylova, 2018), which also require animal protein in their diet but are also able to survive on decaying wood matter. Therefore, the development of *Elater ferrugineus* larvae appear to be closely associated with microhabitats inhabited by larvae of other saproxylic beetle species, which provide a suitable substrate as well as a source of animal protein for larval nutrition.

Variability in colouration

Most of the studied specimens belong to the typical colour form of the nominotypical subspecies of *Elater ferrugineus*, in which the pronotum and elytra are mostly reddish-brown (Fig. 1A,B). Only two specimens (from Kaluga Region and Stavropolsky Krai) belong to *Elater ferrugin-*

eus var. *occitanicus*, in which the pronotum has brownish-black colouration. This variation is considered very rare within the European populations of *Elater ferrugineus*. It is typical to montane and sub-montane forest habitats (Jagemann, 1955; Leseigneur, 1972).

Conservation and monitoring methods

In order to preserve *Elater ferrugineus* populations, it is necessary to monitor the condition of old deciduous trees in locations, where the species occurs, and to implement measures to prevent their cutting and damaging, including the removal of old stumps. The species is currently listed in the Red Data Book of the Russian Federation (Nikitsky & Sobolev, 2021) and in seven regional Red Data Books with various rarity categories, namely in the Kirov Region (Yuferev, 2014), Saratov Region (Volodchenko & Sazhnev, 2021), Volgograd Region (Komarov, 2017), Krasnodarsky Krai (Orlov, 2017), Orenburg Region (Shapovalov, 2019), Chuvash Republic (Egorov & Ivanov, 2023), and Republic of Adyghea (Orlov, 2012). At present, *Elater ferrugineus* is known from 23 regions of Russia, with no conservation status in 16 of them (Fig. 4).

Thus, the serious problem of *Elater ferrugineus* preservation in Russia is the absence of this species in most Red Data Books published prior to the new edition of the Red Data Book of the Russian Federation (Nikitsky & Sobolev, 2021). However, the list of federally protected taxa was approved earlier, and some regions could have utilised this new information when updating their lists of protected taxa. Unfortunately, this has not been done in most cases. Therefore, in order to address the various problems associated with *Elater ferrugineus* conservation, it is crucial to include this species to the Red Data Books of all regions, where it is known. We propose to conduct surveys of region- and federal-level Protected Areas in regions where *Elater ferrugineus* could potentially occurs (e.g. Vladimir Region, Tambov Region, Kursk Region, and Lipetsk Region). The establishment of new Protected Areas (e.g. natural monuments) at sites with *Elater ferrugineus* may also be beneficial. Since *Elater ferrugineus* is associated with other Red Data Book species, such as *Osmoderma barnabita* Motschulsky, 1845, *Protaetia fieberi* (Kraatz, 1880), and *P. speciosissima* (Scopoli, 1786), the protection of one species covers the protection of all other species. Due to its secretive lifestyle, the most effective method for monitoring of *Elater ferrugineus* appears to be the use of pheromone or canopy enzyme

traps with various baits, which have been reported to be successful in previous surveys (e.g. Tolasch et al., 2007; Harvey et al., 2017; Miroshnikov, 2018; Rukavina et al., 2018; Sabatelli et al., 2023). However, it is important to carefully estimate the potential threats, which these traps may cause to populations of *Elater ferrugineus*. It should be noted that a non-harmful method for monitoring of *Elater ferrugineus* was proposed by Forsmark (2012).

Conclusions

Through the field studies and the investigation of material from various collections, we have obtained new data on the distribution of *Elater ferrugineus* in the Russian Federation, as well as knowledge of its bionomics has been obtained. Currently, the species has been recorded in 23 regions of European Russia and the North Caucasus, although it is likely to occur in some other Russian regions as well. Further studies are required to clarify the northern and western limits of the distribution of *Elater ferrugineus* in Russia.

Populations of *Elater ferrugineus* in Russia have been found in various types of deciduous and mixed forests. The presence of suitable trees with saproxylic/xylophagous beetle larvae, with which *Elater ferrugineus* is associated both trophically and topically, should probably considered a determining factor for its presence in the locations. The main activity of adults was observed from the third decade of June to the third decade of July. Although *Elater ferrugineus* is listed in the Red Data Book of the Russian Federation (Nikitsky & Sobolev, 2021), it has no conservation status in several regions of Russia. It is important to change this situation in order to improve conservation options for preservation of *Elater ferrugineus* in Russia.

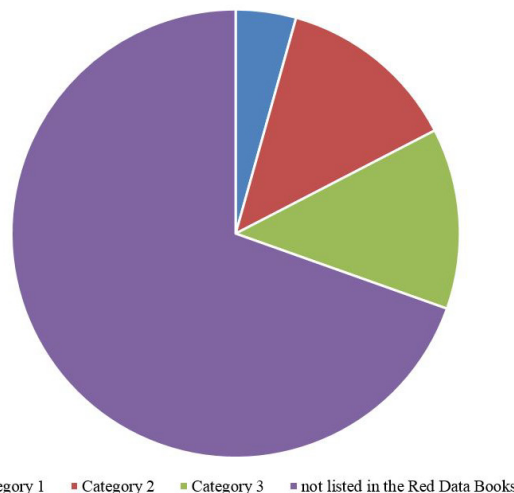


Fig. 4. Rarity categories assigned to *Elater ferrugineus* in Red Data Books of the Russian regions.

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Appendix 1. Material on *Elater ferrugineus* (Elateridae) locations in Russian regions examined for the paper of Prosvirov et al. (2024).

In quadrate brackets, the text is inserted by the authors for better understanding. Abbreviations of the entomological collections are following: ZISP – Zoological Institute RAS (St. Petersburg, Russia), MPGU – Moscow Pedagogical State University (Moscow, Russia), SFU – Southern Federal University (Rostov-on-Don, Russia), ZMMU – Zoological Museum of the Lomonosov Moscow State University (Moscow, Russia), CDE – Department of Entomology at Lomonosov Moscow State University.

Kaluga Region: South-east of Kaluga Region, Kozelsk, 7 km west of the Kireevskaya railway station, 53.8939° N, 35.8100° E, windfalls in a deciduous forest, 01–14.07.2011, 1 ex., S.K. Alekseev.

Ryazan Region: 1) Kadom district, village of Marievka, 54.5839° N, 42.6173° E, canopy trap on *Populus* sp., 13–27.07.2021, 1 ex., A.B. Ruchin (ZISP).

Voronezh Region: 1) Gribovsky district, Tellerman forestry enterprise, forest compartments 46–48, 51.3394° N, 41.9514° E, 13.07.2009, 1 ex., A. Zaitsev (MPGU).

Rostov Region: 1) village of Razdorskaya, 07.2008, 1 ex., E.A. Khachikov (SFU); 2) village of Migulinskaya, 10.07.[19]69, 1 ex. (CDE); 3) Krymsky farm, 25.06.1995, 1 ex. (SFU); 4) village of Razdorskaya, 26.06–10.07.2008, 1 ex., E.A. Khachikov (MPGU).

Krasnodarsky Krai: 1) Caucasus, Novorossiysk, 1 ex., Kirichenko (ZISP); 2) village of Elizavetinskaya, 25.07.[19]82, 1 ex., E. Prokofieva (ZMMU); 3) Novorossiysk urban district, Maly Utrish Cape, near the village of Dyurso, 13–21.07.2009, 9 ex., A.I. Miroshnikov (CDE); 4) Novorossiysk, 10.07.1996, 1 ex., S. Smirnov (CDE); 5) surroundings of Novorossiysk, village of Dyurso, south and south-east slopes of Mount Orel, canopy traps, 25.06–10.07.2014, 7 ex., A.I. Miroshnikov (CDE); 6) Utrish, 4 ex. [no other data] (CDE).

Republic of North Ossetia-Alania: 1) Ardon River basin, Skalistyi Range (northern macroslope), south-south-west of the city of Alagir, ridge of the Suangrag Ridge, 42.9611° N, 44.1750° E, 1135 m a.s.l., in the decayed dead wood inside the dry tree [probably *Fagus* sp.] in the forest, 30.07.2009, 1 ex. (larva), A.S. Prosvirov (CDE).

Republic of Mordovia: 1) Temnikov district, Mordovia State Nature Reserve, forest compart-

ment 447, 8.5 km north of Temnikov, 54.7198° N, 43.2283° E, pine forest complex, canopy trap with beer placed at a height of 12 m, 29.06–12.07.2021, 1 ex., A.B. Ruchin (ZISP); 2) Temnikov district, Mordovia State Nature Reserve, 15 km north-west of Temnikov, cordon Taratinsky, 54.7516° N, 43.0890° E, edge of an oak forest, canopy trap with beer placed at a height of 7.5 m, 20–30.07.2020, 1 ex., A.B. Ruchin (ZISP).

Penza Region: 1) [Gorodishche district], Chadaevka, town, 04.06.[19]09, 1 ex., Korovin (ZISP).

Saratov Region: 1) Saratov urban district, village of Pudovkin Buerak, in a hut, 1899, 1 ex., G.A. Keller (coll. A. Yakovlev) (ZISP); 2) Saratov, Dr. Bolz, 1 ex. (ZISP); 3) 5 km south of Nizhnyaya Bannovka, 45.6333°E, 50.6667°N, 05–12.07.2005, 1 ex., V. Krivokhatsky, O. Ovchinnikova (ZISP); 4) Khvalynsk district, Khvalynsky National Park, 3.1 km west of Khvalynsk, 52.4878° N, 48.1483° E, oak forest with *Acer* sp., *Carex pilosa*, and *Convallaria majalis*, canopy trap with beer, 17–30.06.2021, 1 ex., G.F. Suleymanova (ZISP); 5) Khvalynsk district, Khvalynsky National Park, 3.1 km west of Khvalynsk, 52.4847° N, 48.0503° E, linden/maple forest with *Aegopodium podagraria*, canopy trap with beer, 17–30.06.2021, 1 ex., G.F. Suleymanova (ZISP); 6) Khvalynsk district, Khvalynsky National Park, 3.1 km west of Khvalynsk, 52.4803° N, 48.0447° E, linden/maple forest with *Aegopodium podagraria*, canopy trap with beer, 30.06–23.07.2021, 3 ex., G.F. Suleymanova (ZISP); 7) Khvalynsk district, Khvalynsky National Park, 3.1 km west of Khvalynsk, 52.4850° N, 48.0522° E, dead pine forest complex, canopy trap with beer, 30.06–23.07.2021, 1 ex., G.F. Suleymanova (ZISP); 8) Bazarnyi Karabulak district, village of Nechaevka, 52.1127° N, 46.2492° E, deciduous forest, canopy trap on an oak tree with beer, 11–25.06.2021, 1 ex., A.B. Ruchin (ZISP).

Volgograd Region: 1) north-east of Volgograd, ca. 9 km north-west of the Dubrovka village, Peskovatka gully, 49.1292° N, 44.7569° E, dead specimen, on the sand near the poplars, 08.07.2010, 1 ex., A.S. Prosvirov (CDE); 2) [surroundings of Staroselye village], River Medveditsa, 50.000° N, 43.235° E, 07.06.2012, 1 ex., K. Tomkovich (CDE); 3) Serafimovich district, Pimkin farm, 15–16.06.2014, 1 ex., D.A. Demidov, M.V. Malukhin.

Stavropolsky Krai: 1) Zheleznovodsk, 06.1906, 1 ex., N. Voronikhin, V.A. Kizeritsky (ZISP).

Republic of Dagestan: 1) Belidzhi, 25.06. [19]914, 1 ex., Reichardt (ZISP); 2) Berikey, 1981, 1 ex., G. Abdurakhmanov (ZISP); 3) Derbent, delta of River Samur, 01.05.1993, 1 ex., A. Petrov (ZMMU); 4) Samur forest, ca. 2.5 km north of the Samur village, 41.8486° N, 48.4783° E, ca. 23 m a.s.l., decayed wood in the cavity of a beech tree, 24.07.2020, 1 ex. (larva, together with remains of adult), A.A. Gusakov (CDE); 5) Magaramkent district, 1.5 km north-north-east of Bilbil-Kazmalyar, 41.8358° N, 48.5658° E, 17.07.2022, 1 ex., A.V. Matveev (CDE); 6) 30 km south-east of Derbent, floodplain of the River Samur, 26.06.1991, 1 ex., S. Krusko (MPGU); 7) Magaramkent district, 12 km east of the Samur village, oak grove, 06.1991, 1 ex., A. Brinev (MPGU); 8) Kayakentsky district, village of Gerga, 12.07.2012, 1 ex., T. Razhabkadiyeva (CDE).

Chuvash Republic: 1) Trans-Volga Region, Cheboksary urban district, 3.6 km north-west of Cheboksary, 56.1806° N, 47.1244° E, mixed forest, 26.06–08.07.2023, 1 ex., S.A. Karpeev; 2) Alatyr district, village of Pervomaisk, 54.9158° N,

46.9810° E, 27.06–06.07.2021, 3 ex., A.B. Ruchin; 3) Kanash district, village of Karakly, 55.4080° N, 47.5273° E, 06–20.07.2021, 1 ex., A.B. Ruchin; 4) Kanash district, village of Kibeche, 55.4527° N, 47.3607° E, 06–20.07.2021, 1 ex., A.B. Ruchin.

Ulyanovsk Region: 1) Karsun district, village of Yermaki, 54.1025° N, 46.5489° E, 29.07–12.08.2022, 2 ex., A.B. Ruchin; 2) Inza district, village of Chamzinka, 54.0311° N, 46.4392° E, 29.07–12.08.2022, 1 ex., A.B. Ruchin.

Republic of Tatarstan: 1) «Kasan. coll. Kopp.», 1 ex. (coll. G. Sievers) (ZMMU); 2) Kazan, 20.06. [19]12, 1 ex. (ZMMU).

Samara Region: 1) Stavropol district, village of Berezovyi Solonets, 07–22.07.2023, 2 ex., A.B. Ruchin.

Orenburg Region: 1) Kuvandyk district, Shaytan-Tau State Nature Reserve, ca. 5 km west of the Akchura village, Shaytan-Tau Ridge: on flowing oak sap, 16–17.06.2009, 5 ex., A.M. Shapovalov; 2) in traps on oak with fermented beer, 01–10.07.2010, 24 ex., A.M. Shapovalov.

РАСПРОСТРАНЕНИЕ И БИОЛОГИЯ *ELATER FERRUGINEUS* (COLEOPTERA: ELATERIDAE) НА ТЕРРИТОРИИ РОССИИ

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Сообщества сапроксильных жесткокрылых (Coleoptera) являются важными индикаторами для мониторинга биоразнообразия в лесной среде. В этих сообществах имеется и значительное число редких видов с низкой численностью по всему ареалу. К таким видам относится *Elater ferrugineus* (Coleoptera: Elateridae), находящийся под угрозой исчезновения вид, обитающий в старых дуплистых широколиственных деревьях. В данной обзорной статье представлены новые данные о распространении этого редкого и охраняемого вида на территории России. *Elater ferrugineus* впервые был отмечен в Ульяновской, Рязанской и Воронежской областях. Всего он известен из 23 регионов России. Охарактеризованы фенология, биотопическая приуроченность и некоторые аспекты биологии *Elater ferrugineus* на территории России. Основным периодом активности имаго наблюдается с третьей декады июня до третьей декады июля. Основными местами обитания вида являются различные типы широколиственных (дубравы, липо-кленовые леса, тополевики, буковые леса) и хвойно-широколиственных лесов. Также в наших исследованиях отмечено обитание *Elater ferrugineus* в сложных сосняках. Предложен общий комплекс мер для обеспечения охраны и мониторинга этого вида. Необходимо включить *Elater ferrugineus* в Красные книги всех регионов России, где вид известен, поскольку на данный момент он не имеет природоохранного статуса во многих регионах.

Ключевые слова: биотопические предпочтения, жуки-щелкуны, экология, особо охраняемая природная территория, редкий вид, фауна