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First record of *Cremnocephalus alpestris* (Heteroptera: Miridae) in Croatia

Prvi nalaz vrste *Cremnocephalus alpestris* (Heteroptera: Miridae) u Hrvatskoj

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Abstract

A single individual of species *Cremnocephalus alpestris* (Wagner 1941) (Hemiptera: Heteroptera: Miridae) was discovered on Medvednica Mountain during July of 2022, being recorded from Croatia for the first time. History of the species, location of the finding and ecology of the species is mentioned and discussed. Identification key for the Croatian members of the genus is provided, along with an updated map of the species' global distribution.

Keywords: Checklist, Croatia, Europe, fauna, Heteroptera, Miridae, new record.

Sažetak

Jedinka vrste *Cremnocephalus alpestris* (Wagner 1941) (Hemiptera: Heteroptera: Miridae) pronađena je na planini Medvednici tijekom srpnja 2022. godine, čime je zabilježena za Hrvatsku po prvi put. Spominje se i raspravlja povijest, mjesto pronalaska te sama ekologija vrste. Također je priložen identifikacijski ključ za hrvatske članove roda, zajedno s ažuriranom kartom globalne distribucije vrste.

Ključne riječi: Europa, fauna, Heteroptera, Hrvatska, Miridae, novi nalaz, spisak

Introduction - *Uvod*

The genus *Cremnocephalus* (Fieber, 1860) is a small Palearctic genus of true bugs (Heteroptera) belonging to the family of plant bugs (Miridae). The genus is currently composed of five valid species: *C. albolineatus* (Reuter 1875), *C. alpestris* (Wagner 1941), *C. calabricus* (Magnien 2000), *C. kariae* (Rieger 1983), and *C. matocqi* (Magnien 2000), which are distributed mostly in temperate regions of various European countries (GBIF, 2023).

Cremnocephalus alpestris was described in 1941 by Wagner after the examination of over 250 specimens collected from numerous different locations in the Alps (Austria, Germany, and Switzerland). It was shown to differ from the similar *C. albolineatus* by smaller body size, with male individuals reaching 6 mm in length unlike males of *C. albolineatus* which can reach almost 7 mm in length. They also differ in clavus pattern and genital structure, but some other morphometrical and structural differences are also present (Wagner 1941, Wagner and Weber, 1964). The holotype (♂, Austria, Steiermack, Barndôrf) is preserved at the Hamburg

Zoological Museum (ZMUH), and paratypes are deposited at the Museum of Natural History in Paris (Magnien, 2000). The two taxa have different activity periods, with C. albolineatus adults occurring from the end of June to in temperate regions of various European countries and *C. alpestris* adults occurring much later in the year, from mid-July to mid-August (Wagner 1941).

Cremnocephalus alpestris is an oligophagous species feeding on plant sap from trees belonging to Pinaceae family, being associated with genera such as *Abies* Mill., *Larix* Mill., *Picea* A. Dietr and *Pinus* L. while also being aphidophagous (Goßner et al. 2005). It is found in montane spruce forests in the altitude range from 1000 to 1700 m. Individuals mostly reside on silver fir trees but can be found on other tree species as visitors (e.g. Goßner 2008). The species overwinters in the egg stage and produces only one generation per year. It was originally thought to occur only in the Alps, but new records showed that it can be found in a wider area outside the Alps.

Currently the species has known distribution in 16 countries: Austria, Bulgaria, Czech Republic, France, Germany, Greece, Italy, Lichtenstein, North Macedonia, Montenegro, Poland, Serbia, Slovakia, Slovenia, Switzerland, and Ukraine (Wagner 1941, Rieger 1983, Aukema and Rieger 1999, Protić 2011, 2016).

Materials and Methods – *Materijali i metode*

An individual of an unusual Miridae species was encountered during July of 2022 on the Medvednica mountain. While walking and observing the flora of a meadow next to the mountain lodge "Hunjka" (Figure 1), an adult Miridae specimen landed on the author's hand. It was not collected, but photographs were taken using a Nikon D3500 digital camera with a macro lens attached (Sigma 105mm f/2.8 EX DG OS HSM Macro model). The finding was uploaded to iNaturalist (inaturalist.org) where it was identified as species *C. alpestris* and later confirmed using relevant keys, Wagner and Weber (1964) and Wyniger (2006).

Figure 1 Habitat of species *Cremnocephalus alpestris* on Medvednica mountain, Croatia. Photo by Stjepan Brbod (http://www.medvednica.info)

Slika 1. *Stanište vrste* Cremnocephalus alpestris *na planini Medvednici, Hrvatska. Fotografija: Stjepan Brbod (http://www.medvednica.info).*

Results and Discussion – *Rezultati i rasprava*

Material examined: central Croatia, Medvednica Nature Park, next to the mountain lodge "Hunjka", 45.9145007 N, 15.9752097 E, 877 m a.s.l., 13.7.2022, one adult, female individual, observer - S. Ćato. Photographed individual (Figure 2 a) was identified as an adult female specimen of the species *Cremnocephalus alpestris*. Among other traits, white transverse band at cuneus base being narrow and not reaching the inner margin of the cuneus confirms the species being *C. alepstris* while the second antennal segment being club-shapped with the top half widened indicates that the photographed individual is in fact female (Figure 2 b,c). This is the first record of the species for the country, as it was not listed in the most recent Croatian Miridae checklist (Pajač et al. 2010) and is also not mentioned as a member of the Croatian fauna elsewhere.

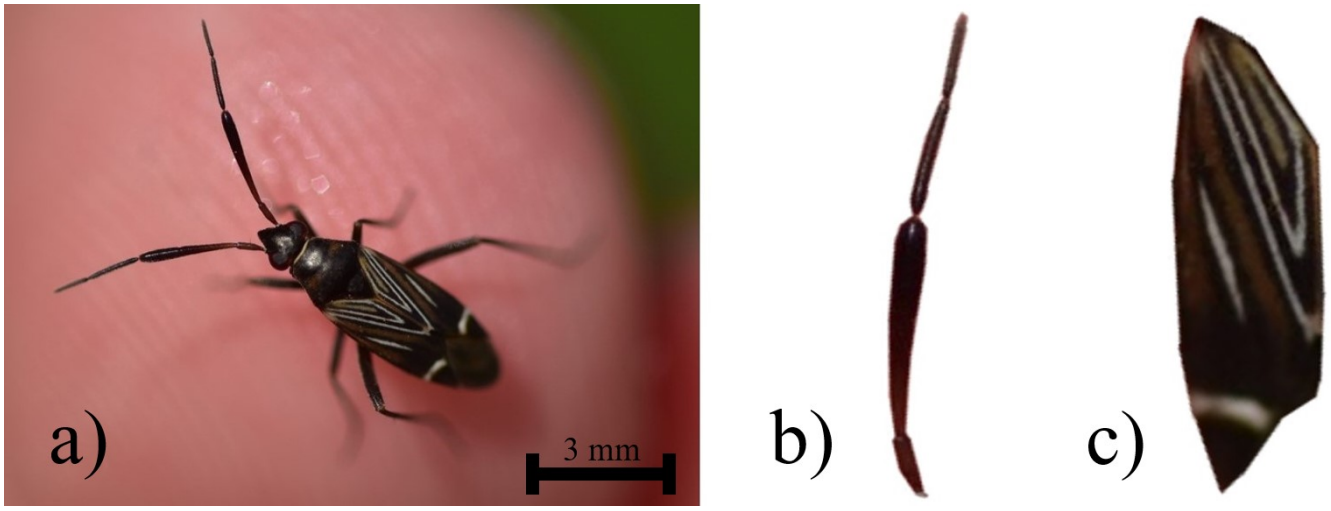

Figure 1 a) *Cremnocephalus alpestris* from Medvednica mountain, b) four-segmented antenna with the widened second segment (characteristic for females), c) clavus and cuneus with species specific patterns

Slika 1. a) *Cremnocephalus alpestris* s planine Medvednice, b) ticalo s četiri članka s proširenim drugim člankom (karakterističnо za ženke), c) clavus i cuneus s uzorcima specifičnim za vrstu.

The meadow where the specimen was encountered (Figure 1) is in central Croatia, situated on Medvednica mountain near Zagreb. In this meadow multiple host trees belonging to the family Pinaceae can be found, making it indeed a suitable habitat for *C. alpestris*. This could very well be one of the lowest documented altitudes for the species, as it is usually recorded on altitudes of 1000 m and above. The meadow is surrounded by the fir and mountain fescue forest (Festuco drymeiae-Abietum Vukelić et Baričević 2007). This forest association appears on this mountain above the mountain belt (higher than ca. 800 m), and the most common two species are fir (*Abies alba* Mill.) and beech (*Fagus sylvatica* L.). The most notable plant species that separates this forest association from other beech-fir forests is mountain fescue (*Festuca drymeja* Mert. & W.D.J. Koch) (Trinajstić 2008).

Although the time of appearance would indicate that the specimen is a nymph (as mentioned above, the adults start appearing in mid-July), the fully developed wings show that it was in fact an adult specimen. Its' earlier appearance in the season is probably related to the population being at a lower altitude as well as to the changes in climate over the last decades. The only other *Cremnocephalus species* in Croatia, *C. albolineatus*, was found in Paklenica National Park in 1940 (Novak and Wagner, 1951). In Croatia, both species are probably more widely distributed than is currently known, and new records of both are expected in the future; however, research on these species is lacking and interest for studying this order remains low. An updated distribution map of *Cremnocephalus alpestris* is shown in Figure 3.

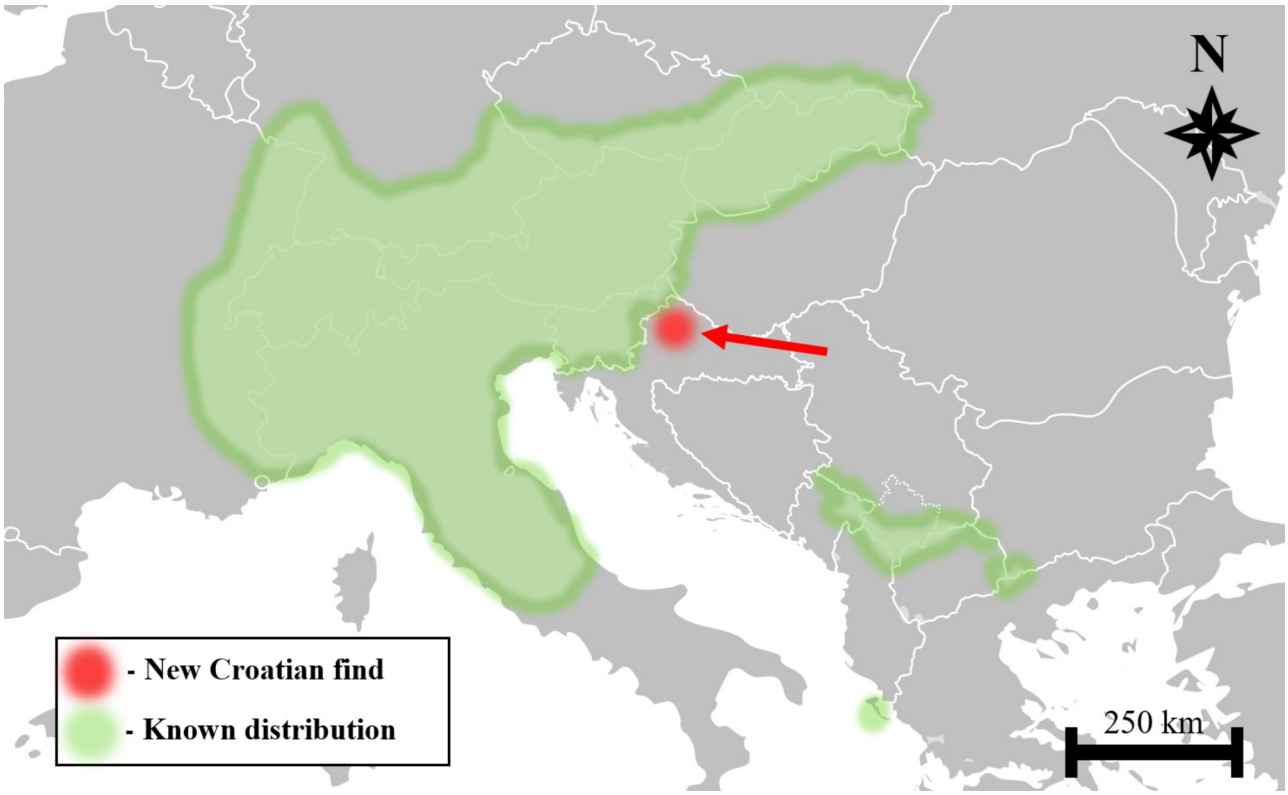

Figure 2 Previously known and updated distribution of *C. alpestris* reconstructed from literature data and iNaturalist observations
Slika 2. Trenutna i ažurirana rasprostranjenost vrste *C. alpestris* rekonstruirana na temelju podataka iz literature i opažanja s platforme iNaturalist.

The most recent Croatian Miridae checklist listed 276 species for the Croatian flora (Pajač et al. 2010). Three years later Kment (2013) added one more species to the Croatian fauna checklist, namely Platycranus metriorrhynchus (Reuter 1883) which was discovered on the Biokovo mountain. Along with this new record of C. alpestris presented here, a total of 278 Miridae species have been confirmed for the Croatian fauna.

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