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ARANEUS ALSINE (WALCKENAER, 1802), (ARANEIDAE, ARANEAE, ARACHNIDA) – A RARE AND LIKELY THREATENED SPIDER OF THE CROATIAN FAUNA

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The present paper deals with the distribution of *Araneus alsine* (Walckenaer, 1802) (syn.: *Epeira alsine* Walckenaer, 1805; *E. lutea* C. L. Koch, 1837) in Croatia and its habitats based on literature data, museum collections and field findings. The spider *A. alsine* was captured in Croatia's most diverse and oldest peatland, the Đon Močvar Botanical Reserve at Blatuša. The biology, ecology and threat status of *A. alsine* are discussed.

Key words: *Araneus alsine*, Araneidae, Croatia, distribution, peatland, Đon Močvar Botanical Reserve

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U radu je navedena rasprostranjenost i tip staništa pauka *Araneus alsine* (Walckenaer, 1802) (syn.: *Epeira alsine* Walckenaer, 1805; *E. lutea* C. L. Koch, 1837) u Hrvatskoj, koji su izrađeni na temelju literaturnih podataka, podataka iz muzejske zbirke i terenskih opažanja. Pauk *A. alsine* je ulovljen na najraznolikijem i najstarijem cretu u Hrvatskoj, u botaničkom rezervatu Đon močvar, Blatuša. U radu se raspravlja o biologiji, ekologiji i statusu ugroženosti vrste *A. alsine*.

Ključne riječi: *Araneus alsine*, Araneidae, Hrvatska, rasprostranjenost, cret, botanički rezervat Đon Močvar

INTRODUCTION

In the past, the spider fauna of Croatia was poorly investigated and mainly studied by foreign researchers (KEYSERLING, 1862; THORELL, 1870; CHYZER & KULCZYNSKI, 1892–97; KULCZYNSKI, 1914; DI CAPORIACCO, 1927; REIMOSER, 1929, 1930; ABSOLON &

KRATOCHVIL, 1933; KRATOCHVIL & MILLER, 1939, 1940), though the contribution of local researchers is also significant (JURINAC, 1887; GASPERINI, 1891, 1892; DAMIN, 1896, 1900; LANGHOFFER, 1912, 1915; GIROMETTA, 1914, 1929; POLJUGAN, 1915, RUCNER & RUCNER, 1995). The literature is primarily concentrated on subterranean spider fauna, characterised by the vast number of endemic and relict species (DELTSHEV, 1999; OZIMEC, 2002). The most comprehensive study was undertaken by REIMOSER (1930), DAMIN (1896, 1900) and by NIKOLIĆ (cf. NIKOLIĆ & POLENEC, 1981) in the 1950s. NIKOLIĆ and DAMIN left valuable spider collections. In recent years, the spider fauna has only been studied in particular areas of Croatia, e.g. cavernicolous spider fauna (OZIMEC, 2002; PAVLEK, 2006) and the spider fauna of certain protected areas (ŠTAMBUK & ERBEN, 2002; KATUŠIĆ, 2008). According to NIKOLIĆ & POLENEC (1981) and updated by MILOŠEVIĆ (2002), a total of 643 spider species have been recorded in Croatia. Due to its great habitat diversity, the relatively poor exploration of certain regions and lately due to a lack of taxonomical experts, new species for the Croatian arachnid fauna could be expected.

The orange wheelweaving spider or strawberry spider *Araneus alsine* (Walckenaer, 1802) is Palaearctic species which, in its European range, is distributed in Britain (ROBERTS, 1996; MERRETT & MURPHY, 2000), Finland (KOPONEN, 2007), Sweden (KRONESTEDT, 2001), Norway (AAKRA & HAUGE, 2000), Netherlands & Belgium (VAN HELSDINGEN, 1999; BOSMANS & VANUYTVEN, 2001; TUTELAERS, 2008), Denmark (SCHARFF & GUDIK-SØRENSEN, 2006), Switzerland (MAURER & HÄNGGI, 1990), France (CANARD, 2005), Germany (PLATEN *et al.*, 1995), Austria (KOMPOSCH & STEINBERGER, 1999; KOMPOSCH, 2000), Italy (PESARINI, 1995), Slovenia (POLENEC, 1967, 1968; KUNTNER & KOSTANJŠEK, 2000), Hungary (SAMU & SZINETÁR, 1999), Czech Republic (BUCHAR & RŮŽIČKA, 2002), Slovakia (GAJDOS *et al.*, 1999; KORENKO, 2004), Poland (STAREGA, 2004), Serbia (NIKOLIĆ & POLENEC, 1981; DELTSHEV, ĆURČIĆ & BLAGOEV, 2003), Bulgaria (BLAGOEV, 2002), Romania (FUHN & OLTEAN, 1970) and Turkey (TOPCU *et al.*, 2005).

A. alsine has an unmistakable appearance, thanks to the colour of abdomen and legs, which can vary from pale orange to deep purplish-red (ROBERTS, 1996). There are conspicuous pale yellow spots on the dorsal side of abdomen. The spider builds small webs near the ground and waits nearby in one or two dried leaves that it has rolled together with silk or are naturally curled (PLATNICK, 2008). According to ROBERTS (1996) and BIERWIRTH (1998), adult spiders can be found in June and July, and adult females still in September.

The objective of this paper is to determine the distribution of *A. alsine* in Croatia based on literature data, museum collections and field observations and to give further information on its habitat.

MATERIALS AND METHODS

Study area

The Đon Močvar Botanical Reserve is situated in central Croatia (Fig. 1), at an altitude of 130 m, and it phytogeographically belongs to the zone of Illyrian sessile oak-hornbeam forests (*Epimedio-Carpinetum betuli*). Covering an area of 10 ha, this

represents the one of the largest and oldest (GIGOV & NIKOLIĆ, 1960) peatland area in Croatia. It encompasses a mosaic of rare mire vegetation types – from fens (ass. *Caricetum lasiocarpae*) and intermediate bogs (ass. *Drosero-Caricetum stellulatae* and *Rhynchosporetum albae*) to fragments of raised bogs (stands of *Sphagnum capillifolium/ Sph. palustre-Polytrichum longisetum*). In addition to the downy birch (*Betula pubescens*), in the process of succession, the peatland is inhabited by silver birch (*B. pendula*) and other three and shrub species. The eastern and southern edges of the area are bordered by swamp forests and alder shrubs (*Carici elongatae-Alnetum glutinosae*).

Field data

The orange wheelweaving spider was observed during botanical and carabidological research conducted from May to November 2008. It was hand-collected and preserved in 75% alcohol. The specimen was kept in the first author's private collection (ABC). Species was determined according to ROBERTS (1996) and nomenclature follows PLATNICK (2008).

RESULTS AND DISCUSSION

Two specimens of *A. alsine* were found during the study of the Đon Močvar peatland. The first specimen was observed in an alder forest – transitional peatbog ecoton (*Carici elongatae-Alnetum glutinosae – Drosero-Caricetum stellulatae*) on 26.08.

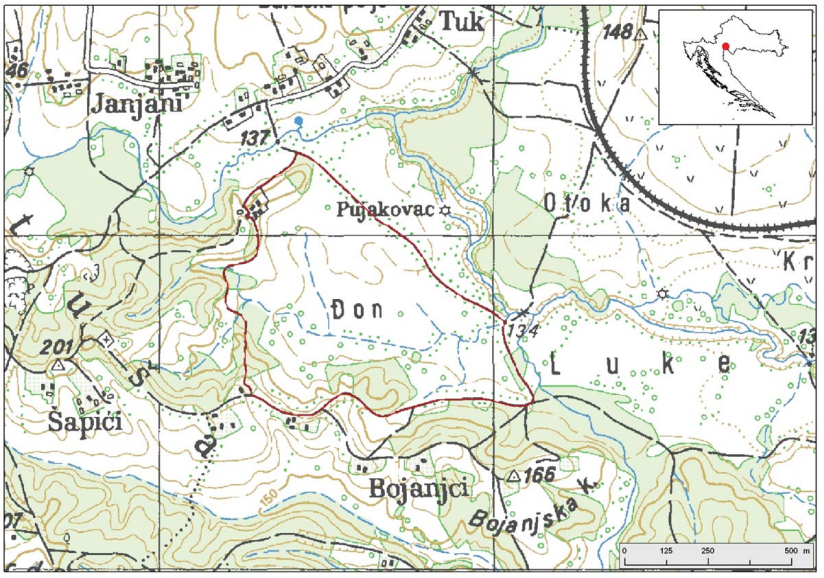

Fig. 1. Geographical position of the Đon Močvar Botanical Reserve. Borders according to Natura 2000.

2008 (Gauss-Krueger coordinates 5571361, 5019689). The second specimen was observed and collected in the intermediate peatbog (*Drosero-Caricetum stellulatae*) on 18.09.2008 (GK: 5571372, 5019689) (Fig. 2A & 2B). Both specimens were found in a dry rolled silver birch leaf attached to moor grass (*Molinia coerulea/arundinacea*), at approximately one metre above the ground. The birch leaves were conically rolled, opened on the broader side and filled with silk on the opposite side. The spider

Fig. 2.A & 2B. *Araneus alsine* (Walckenaer, 1802) (adult female), Đon Močvar Botanical Reserve peatland, Blatuša, Gvozd. leg. V. Šegota (photo: A. Brigić)

web was positioned beneath the leaf. The collected specimen is an adult female, 13 mm long (Fig. 2A & 2B). During the field studies, a number of rolled leaves were observed in September and October. However, they were not inhabited by any spiders.

Four specimens of *A. alsine* from the end of 19th and the beginning of 20th century, all collected by Narcis Damin, are deposited in the spider collection of the Department of Zoology of the Croatian Natural History Museum (Jelenje, 02.07.1893, inventory number 1673; Zagreb, 10.04.1916, inv. nr. 1622; Osijek, inv. nr. 238, 1458, without dates). In addition, the species was recorded in Topusko (DAMIN, 1900) and in Kuzmica near Slavonska Požega in 1970 (RUCNER & RUCNER, 1995) (Fig. 3).

Despite its wide distribution, this spider is often quite rare and only locally present. Furthermore, it can be easily overlooked (ROBERTS, 1996; BIERWIRTH, 1998). Similarly to the results presented here, in most studies the species was caught in small numbers, often less than 10 (BARTHEL & PLACHTER, 1995; SVATOŇ & PRÍDAVKA, 2000; KOMPOSCH, 2000) or only a single specimen (POLENEC 1958; KUNTNER & KOSTANJŠEK, 2000).

This mesophilous species (BUCHAR, 1992; BUCHAR & RŮŽIČKA, 2002) can be found mostly on moist forest clearings and meadows (HEIMER & NENTWIG, 1991; BARTHEL & PLACHTER, 1995; ROBERTS, 1996; BIERWIRTH, 1998; KOMPOSCH, 2000; PLATNICK, 2008).

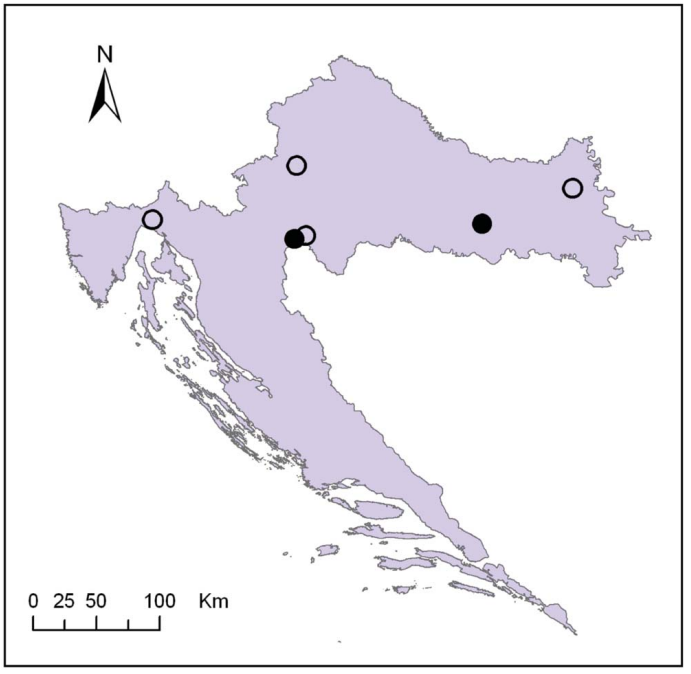

Fig. 3. Distribution of *Araneus alsine* in Croatia. Legend: ○ – findings from the end of 19th century until 1916; ● – findings from 1970 until 2008.

WILLIAMS (2003) reported capturing *A. alsine* on a site including a mosaic of open boggy areas (blanket bog) within a conifer plantation. POLENEC (1958) recorded the species in the ass. *Pineto-Vaccinietum australoalpinum*. Similarly to our findings, SVATOŇ & PRÍDAVKA (2000) recorded the species on an intermediate peatbog (ass. *Caricion fuscae* and *Caricion lasiocarpae*) in Slovakia. The majority of the specimens were caught in the central part of the peatbog and on the moist meadow. RUCNER & RUCNER (1995) captured a single specimen in a flooded pedunculate oak wood (ass. *Genisto elatae-Quercetum roboris*) on 14.07.1970. The authors researched the same wood community at other localities (Prkos near Našice; Draganićki lug – Draganići; Kalje near Lekenik) but *A. alsine* was not found. It can be concluded that this species is scarce even within its known habitats.

According to the present knowledge, *A. alsine* in Croatia inhabits moist pedunculate oak woods and peatland habitats. The latter are extremely rare and one of the most threatened habitats in Croatia and are proposed as future Natura 2000 sites. Even in some Western and Northern European countries, where these types of habitats are more common, this species is Red listed. It is treated as endangered in Denmark (BRUUN, 2006), vulnerable in Belgium-Flanders (MAELFAIT *et al.*, 1998) and Slovenia (POLENEC, 1992) or even regionally extinct in Norway, proposed status (AAKRA & HAUGE, 2000). In some federal states of Germany, e.g. Bayern, Sachsen the orange wheelweaving spider is treated as endangered species (BLICK & SCHEIDLER, 2003; SACHER & PLATEN, 2004), but in some also marked as not threatened, e.g. Czech Republic (BUCHAR & RŮŽIČKA, 2002). According to KOMPOSCH (2000), *A. alsine* could be a potential flagship species and become a symbol and leading element of conservation campaigns. Therefore, special attention has to be paid not only to the protection of the species, but to the protection of all its habitats.

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SAŽETAK

Araneus alsine (Walckenaer, 1802), (Araneidae, Araneae, Arachnida) – rijetka i vjerojatno ugrožena vrsta pauka u hrvatskoj fauni

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Araneus alsine (Walckenaer, 1802) (syn.: *Epeira alsine* Walckenaer, 1805, *E. lutea* C. L. Koch 1837) je široko rasprostranjena palearktička vrsta, koja je često vrlo rijetka na staništu. Od kraja 19. stoljeća pa do danas vrsta je zabilježena svega pet puta u Hrvatskoj. Prvi je vrstu zabilježio Damin 1893. godine na području Jelenja (Gorski kotar), a kasnije ju je pronašao u Zagrebu 1916. godine i Osijeku, ali za Osijek ne

spominje datum nalaza (podaci Zbirke pauka Zoološkog odjela Hrvatskog prirodoslovnog muzeja u Zagrebu). DAMIN (1900) je navodi za Topusko, i kasnije RUCNER i RUCNER (1995) za Kuzmicu, kraj Slavonske Požege.

Vrsta *A. alsine* je u dva navrata zabilježena na području botaničkog rezervata Đon močvar. Prvi je puta opažena u rubnom staništu šume crne johe i prijelaznog creta (*Carici elongatae-Alnetum glutinosae – Drosero-Caricetum stellulatae*) 26.08.2008., a druga jedinka je ulovljena na području samog creta (*Drosero-Caricetum stellulatae*) 18.09.2008. Ulovljena jedinka bila je ženka duga 13 mm. Vrsta živi u suhom, savijenom listu breze koji je s jedne strane ispunjen svilom, a na drugom kraju široko otvoren. List je prihvaćen za travu beskoljenku (*Molinia coerulea/arundinacea*) i smješten jedan metar iznad tla. Ispod lista nalazi se mreža. Tijekom terenskih istraživanja u rujnu i listopadu opažen je veći broj suhih, savijenih listova breze, ali u njima nije bilo pauka.

Slično ovom istraživanju, u većini drugih istraživanja vrsta je zabilježena s malim brojem jedinki (POLENEC, 1958; BARTHEL & PLACHTER, 1995; KOMPOSCH, 2000; KUNTNER & KOSTANJŠEK, 2000; SVATOŇ & PŘÍDAVKA, 2000). U Hrvatskoj nastanjuje prijelazne cretove i šume hrasta lužnjaka i velike žutilovke (*Genisto elatae-Quercetum roboris*). Cretovi u Hrvatskoj su vrlo rijetki, malih površina i međusobno izolirani te su stoga kritično ugrožena staništa u Hrvatskoj. Iako su ovakva staništa na području sjeverne i zapadne Europe učestalija, ova vrsta se nalazi na Crvenim popisima pojedinih zemalja zapadne i srednje Europe. Stoga je zaštita ne samo vrste, već i staništa kao takvog, nužna za očuvanje ove, a i vrsta sličnih ekoloških zahtjeva. Za prikaz stvarnog stanja, ekologije, rasprostranjenosti i moguće ugroženosti potrebno je provesti daljnja terenska istraživanja.