

First records of the myrmecophilous spider *Thyreosthenius biovatus* (O. Pickard-Cambridge, 1875) for Slovenia and new Slovenian records for the myrmecophilous spider *Mastigusa arietina* (Thorell, 1871)

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Abstract. Ants from the *Formica rufa* group, also known as red wood ants, build large mound nests and play an important role in their environment, especially in forests. Their nests harbour a species rich and abundant myrmecophilous fauna, including a few European spider species. Myrmecophilous spiders in 40 nests of red wood ants from 25 sites were searched for in Slovenia. In each mound nest, four to five litres of material were collected, which were placed in a sifter, with the sifted material examined for the presence of spiders. Two myrmecophilous spider species were found in the nests: *Thyreosthenius biovatus* (fam. Linyphiidae), representing first records for Slovenia, and *Mastigusa arietina* (fam. Cybaeidae), previously known from several sites in western Slovenia, but never purposefully searched for in ant nests. The first spider species was found in half of the examined nests, belonging to all sampled species of red wood ants, most of them to *F. aquilonia*, and *M. arietina* was detected in 37.5% of the examined nests, belonging to *F. aquilonia* and *F. lugubris*. The two spider species are presumably not rare in Slovenia, especially in the areas with a high number of red wood ant nests.

Key words: distribution, *Formica*, myrmecophiles, red wood ants, Slovenia, spiders

Izvleček. Prve najdbe mirmekofilnega pajka *Thyreosthenius biovatus* (O. Pickard-Cambridge, 1875) za Slovenijo in nove slovenske najdbe mirmekofilnega pajka *Mastigusa arietina* (Thorell, 1871) – Mravlje iz skupine *Formica rufa*, poznane tudi kot rdeče gozdne mravlje, gradijo velika kopasta mravljišča in imajo v svojem okolju, še posebno v gozdovih, pomembno vlogo. Njihova mravljišča so zatočišča za vrstno bogato in številčno mirmekofilno favno, ki vključuje tudi nekaj evropskih vrst pajkov. Mirmekofilne pajke smo iskali v 40 mravljiščih rdečih gozdnih mravelj iz 25 lokalitet v Sloveniji. V vsakem od kopastih mravljišč smo vzeli od štiri do pet litrov materiala, ga dali v sejalnik in pregledali presejani material, ali so v njem pajki. V mravljiščih smo našli dve vrsti mirmekofilnih pajkov: *Thyreosthenius biovatus* (družina Linyphiidae), kar je prva najdba za Slovenijo, in *Mastigusa arietina* (družina Cybaeidae), ki je bila pred tem znana iz več lokalitet v zahodni Sloveniji, a nikoli ciljano iskana v mravljiščih. Prva vrsta pajka je bila najdena v polovici preiskanih mravljišč, ki so pripadala vsem vzorčenim vrstam rdečih gozdnih mravelj, vrsta *M. arietina* pa je bila odkrita v 37,5 % preiskanih mravljišč, ki so pripadala vrstama *F. aquilonia* in *F. lugubris*. Predvidevamo, da ti vrsti pajkov v Sloveniji nista redki, zlasti na območjih z velikim številom mravljišč rdečih gozdnih mravelj.

Ključne besede: razširjenost, *Formica*, mirmekofili, rdeče gozdne mravlje, Slovenija, pajki



Introduction

Ant colonies can be considered as partially isolated ecosystem, their nests and surroundings are structured into many diverse microhabitats (Hölldobler & Wilson 1990). Nests are often rich in long-lasting resources, such as brood, retrieved or cultivated food, and nutrient-rich refuse material (Parmentier 2020). Nest temperature is often strictly regulated, and colonies are commonly defended by an army of workers. These nest microhabitats are occupied by various organisms, which show special adaptations to each of the niche in turn (Hölldobler & Wilson 1990). They exploit the nest's resources and homeostatic conditions, at the same time, successful adaptation to the inner environment protects them from many predators that cannot penetrate this hostile space (Parmentier 2020).

Myrmecophiles are organisms that must spend at least part of their life cycle with ant colonies (Hölldobler & Wilson 1990). There is hardly any terrestrial arthropod group that does not include at least few myrmecophiles (Seifert 2018). They can prey on ants in the vicinity or inside nest, they can act as scavengers in the nest or prey on other myrmecophiles, some are ectoparasites or endoparasites, or in case of trophobionts, supply their ants with food (honeydew) in exchange for protection against predators (Hölldobler & Wilson 1990; Seifert 2018). Myrmecophiles use different tactics to avoid ant attacks, either they are swift and escape, use repellent secretions or mechanical defensive structures. Others are ignored because of their slow movement or an apparently indistinct odour (chemical insignificance). Some myrmecophiles have evolved different types of chemical, morphological and behavioural adaptations that deceive the host ants, which accept them as members of the colony (Hölldobler & Wilson 1990; Parmentier 2020). Ant species with the largest colonies generally harbour the greatest diversity of myrmecophiles, as nests of large colonies provide a larger variety of microhabitats and have longer life span, so they can sustain larger and more stable populations of guests over longer time periods (Hölldobler & Wilson 1990; Kronauer & Pierce 2011).

In Europe, ants from the *Formica rufa* group, also known as the red wood ants, usually build large mound nests constructed of dry plant material and soil particles (Fig. 1). They play an important role in their environment, especially in forests, where they are often ecologically dominant organisms and recognized as the keystone species and ecosystem engineers (Robinson & Stockan 2016; Sorvari 2016). Due to their large colonies and long life span, the nests of red wood ants harbour species rich and abundant myrmecophile fauna (Parmentier et al. 2014; Robinson et al. 2016).

Myrmecophilous spiders are known in 13 spider families (Cushing 1997, 2012). They can prey on ants or other myrmecophiles that live in host nests. Females of several myrmecophilous spiders lay their egg sacs inside the chambers of ant nests. Some spiders may be occasional visitors to ant colonies, using the nests as temporary refuges. In Europe, three spider species are considered myrmecophilous and are found in the nests of red wood ants, specifically *Mastigusa arietina* (Thorell, 1871) (after a recent revision by Castellucci et al. (2023a) placed to fam. Cybaeidae), *Thyreosthenius biovatus* (O. Pickard-Cambridge, 1875) and *Acartauchenius scurriilis* (O. Pickard-Cambridge, 1873) (both fam. Linyphiidae) (Cushing 1997; Parmentier et al. 2014). *Thyreosthenius biovatus* is a myrmecophile in the nests of *Formica* species, mainly from the *F. rufa* group, while the other two species are also associated with species from other ant

genera (e.g. *Lasius*, *Tetramorium*). In the nests, *T. biovatus* and *M. arietina* feed on other smaller myrmecophiles, ant eggs or ant prey (kleptoparasitism) (Parmentier et al. 2016a, 2018).



Figure 1. Nest of *Formica aquilonia* (locality Rogla (SW of the parking area)) (photo: Gregor Bračko).

Slika 1. Mravljišče vrste *Formica aquilonia* (lokaliteta Rogla (JZ od parkirišča)) (foto: Gregor Bračko).

In Slovenia, the spider fauna of the Prealpine region can be considered relatively well researched, while other biogeographic regions still have a considerable potential for new records (Kostanjšek & Kuntner 2015; Kuralt & Kostanjšek 2016). The initial checklist of Slovenian spiders comprises 738 species belonging to 286 genera and 43 families (Kostanjšek & Kuntner 2015), and over 35 additional species were subsequently found (Kuralt & Kostanjšek 2016, 2019; Kuralt et al. 2024). *Mastigusa arietina* is known from several sites in western Slovenia (Polenec 1961, 1963, 1964, 1966, 1969, 1975, 1979, 1981, 1989; Novak 2005; Gorjan 2014). It is worth mentioning that another species in the genus, specifically *M. macrophthalma* (Kulczyński, 1897), has also been recorded from several locations in western Slovenia (Kostanjšek & Kuntner 2015). Since the species differ from each other only in position and dimension of the posterior median eyes, it is not unlikely that the two forms represent separate races, rather than species (Roberts 1995). The taxonomic status of *M. macrophthalma* is therefore debated and the genus is currently under revision (Castellucci et al. 2023a). Two other myrmecophilous spiders, *Thyreosthenius biovatus* and *Acartauchenius scurrilis*, have so far never been recorded from Slovenia.

Our sampling of arthropods in the mound nests of the *Formica rufa* group at several sites in Slovenia yielded the first records of *Thyreosthenius biovatus* for the country and several new records of *Mastigusa arietina*.

Materials and methods

In the period from June to October 2023, we sampled arthropods in the mound nests of the *Formica rufa* group. Forty nests were examined at 25 sites, mainly in the northern parts of Slovenia (Tab. 1).

Table 1. Information on sampled nests of red wood ants (*Formica rufa* group) in Slovenia in 2023.

Tabela 1. Podatki o vzorčenih mravljiščih rdečih gozdnih mravelj (skupina *Formica rufa*) v Sloveniji leta 2023.

Nest no.	<i>Formica</i> species	Locality	WGS84	Altitude [m]	Habitat	Date of sampling
			coordinates [dec. degr. N/E]			
1	<i>F. aquilonia</i>	Vršič (near Erjavčeva koča)	46.4385/13.74817	1530	Alpine grassland with <i>Larix decidua</i>	12.9.2023
2	<i>F. polyctena</i>	Kranjska Gora (Golf Course)	46.4885/13.80517	780	belt of trees next to golf course	12.10.2023
3	<i>F. lugubris</i>	Vrata Valley (NE of Aljažev Dom)	46.41317/13.85	980	pasture with isolated spruces	12.10.2023
4	<i>F. lugubris</i>	Vrata Valley (NE of Aljažev Dom)	46.41317/13.85	980	edge of spruce forest	12.10.2023
5	<i>F. aquilonia</i>	Pokljuka (W of Planina Praprotnica loc. 1)	46.327/13.91283	1230	edge of spruce forest	23.7.2023
6	<i>F. aquilonia</i>	Pokljuka (W of Planina Praprotnica loc. 1)	46.327/13.91283	1230	edge of spruce forest	23.7.2023
7	<i>F. aquilonia</i>	Pokljuka (W of Planina Praprotnica loc. 2)	46.32567/13.9145	1230	pasture with isolated spruces	23.7.2023
8	<i>F. aquilonia</i>	Pokljuka (W of Planina Praprotnica loc. 2)	46.32567/13.9145	1230	open mixed forest	23.7.2023
9	<i>F. polyctena</i>	S of Matavun near Divača	45.661/13.992	410	mixed forest	27.9.2023
10	<i>F. lugubris</i>	Soriška Planina (NW of Lajnar)	46.24433/14.00667	1280	grassland with isolated spruces	20.8.2023
11	<i>F. lugubris</i>	Soriška Planina (SW of Lajnar)	46.2415/14.00767	1280	open spruce forest	20.8.2023
12	<i>F. lugubris</i>	Soriška Planina (SW of Lajnar)	46.2415/14.00767	1280	open spruce forest	20.8.2023
13	<i>F. lugubris</i>	Ljubelj Pass (W of parking area)	46.43183/14.25917	1060	edge of mixed forest along the path	12.10.2023
14	<i>F. rufa</i>	2.5 km NW of Podljubelj near Tržič	46.42033/14.26933	810	edge of mixed forest along the path	12.10.2023
15	<i>F. polyctena</i>	Krancelj near Škofja Loka	46.162/14.30133	460	edge of mixed forest	13.8.2023
16	<i>F. rufa</i>	1 km SW of Golnik near Kranj	46.31917/14.32383	450	edge of mixed forest along the road	14.10.2023
17	<i>F. rufa</i>	1.5 km N of Bevke near Vrhnika	45.99817/14.36167	300	spruce forest	16.7.2023
18	<i>F. rufa</i>	1.5 km N of Bevke near Vrhnika	45.99817/14.36167	300	edge of spruce forest	16.7.2023

Nest no.	<i>Formica</i> species	Locality	WGS84 coordinates [dec. degr. N/E]	Altitude [m]	Habitat	Date of sampling
19	<i>F. rufa</i> × <i>polyctena</i>	1.5 km N of Bevke near Vrhnika	45.99817/14.36167	300	edge of spruce forest	16.7.2023
20	<i>F. lugubris</i>	Menina Planina (NW area)	46.26883/14.805	1370	edge of spruce forest	8.7.2023
21	<i>F. lugubris</i>	Menina Planina (NW area)	46.26883/14.805	1370	edge of spruce forest	8.7.2023
22	<i>F. lugubris</i>	Menina Planina (NW area)	46.26883/14.805	1370	edge of spruce forest	8.7.2023
23	<i>F. aquilonia</i>	Menina Planina (0.5 km NW of the hut)	46.26433/14.81583	1420	open spruce forest	8.7.2023
24	<i>F. aquilonia</i>	Menina Planina (0.5 km NW of the hut)	46.26433/14.81583	1420	open spruce forest	8.7.2023
25	<i>F. aquilonia</i>	Menina Planina (0.7 km W of the chapel)	46.24517/14.83117	1310	edge of spruce forest	8.7.2023
26	<i>F. aquilonia</i>	Rogla (SW of the parking area)	46.44933/15.32033	1430	open spruce forest	10.6.2023
27	<i>F. aquilonia</i>	Rogla (SW of the parking area)	46.44933/15.32033	1430	open spruce forest	10.6.2023
28	<i>F. aquilonia</i>	Rogla (SW of the parking area)	46.44933/15.32033	1430	open spruce forest	10.6.2023
29	<i>F. aquilonia</i>	Rogla (S of the parking area)	46.44667/15.334	1350	spruce forest	10.6.2023
30	<i>F. aquilonia</i>	Rogla (S of the parking area)	46.44667/15.334	1350	spruce forest	10.6.2023
31	<i>F. aquilonia</i>	Pohorje (0.5 km N of Jurgovo)	46.46367/15.37267	1240	edge of spruce forest	24.6.2023
32	<i>F. aquilonia</i>	Pohorje (1 km S of Lukanja)	46.432/15.39383	1030	edge of spruce forest	24.6.2023
33	<i>F. aquilonia</i>	Pohorje (1 km S of Lukanja)	46.432/15.39383	1030	edge of spruce forest	24.6.2023
34	<i>F. aquilonia</i>	Pohorje (Osankarica)	46.45867/15.42683	1200	edge of spruce & pine forest	24.6.2023
35	<i>F. aquilonia</i>	Pohorje (Osankarica)	46.45867/15.42683	1200	edge of spruce forest	24.6.2023
36	<i>F. aquilonia</i>	Pohorje (Areh, near Ruška koča)	46.49717/15.51317	1200	edge of spruce forest	1.8.2023
37	<i>F. aquilonia</i>	Pohorje (Areh, near Ruška koča)	46.49717/15.51317	1200	edge of spruce forest	1.8.2023
38	<i>F. lugubris</i>	Mariborsko Pohorje (1.5 km SW of Hotel Bellevue)	46.50467/15.5625	1060	edge of mixed forest	1.8.2023
39	<i>F. lugubris</i>	Mariborsko Pohorje (slope NE of Hotel Bellevue)	46.51483/15.58083	1030	edge of spruce forest	1.8.2023
40	<i>F. rufa</i>	1.5 km S of Apače near Gornja Radgona	46.68467/15.906	220	mixed forest	2.8.2023

Sampling of spiders in the nests of the *Formica rufa* group was carried out by digging by hand inside the mound and collecting four to five litres of nest material. This was placed in the litter sifter with 5 × 5 mm mesh. The sifted material was placed on a white sheet and carefully examined for the presence of spiders (juvenile or adult specimens) and other arthropods. Detected specimens and some host ants were collected and preserved in 96% ethanol. After inspection, the nest material, together with ants, was returned to the sampled nest.

Spiders were identified using on-line taxonomic key Spiders of Europe (Nentwig et al. 2023), and *Formica* ants using key in Seifert (2018).

Results and discussion

Spiders and other arthropods were examined in 40 nests of the *Formica rufa* group: 20 examined nests belonged to *F. aquilonia*, 11 to *F. lugubris*, 5 to *F. rufa*, 3 to *F. polyctena*, and one colony was identified as a hybrid *F. rufa* × *F. polyctena* (Tab. 1). Our search for the red wood ants nests was not random, as we focused mainly on the areas where these nests are more common, specifically in the Alpine and Prealpine regions of Slovenia above 1,000 m altitude. In these areas, *F. aquilonia* and *F. lugubris* are by far the commonest species of the *F. rufa* group (Bračko 2023).

Thyreosthenius biovatus (Fig. 2A) was found at 13 different sites in 20 nests (half of all examined nests), belonging to all sampled species of red wood ants, most of them to *F. aquilonia* (Figs. 3, 4). *Mastigusa arietina* (Fig. 2B) was found at 11 sites in 15 nests (37.5% of the nests examined), but only in *F. aquilonia* and *F. lugubris* (Figs. 3, 4).

Of the two most frequently sampled ant species, i.e. *F. aquilonia* and *F. lugubris*, the first seems to be preferred by both myrmecophilous spiders. *Thyreosthenius biovatus* was recorded in 65% of *F. aquilonia* nests and in 36% of the *F. lugubris* nests examined, while *Mastigusa arietina* was found in 60% of the *F. aquilonia* and in 27% of the *F. lugubris* nests examined. In seven cases, both spider species were present in the same *F. aquilonia* nest, which was not detected in *F. lugubris* or any other sampled wood ant species. The reason for this preference could be that at the visited sites with *F. aquilonia*, the nests of this species were very numerous, especially in the area of Rogla and Pohorje, which enables larger populations of myrmecophiles.

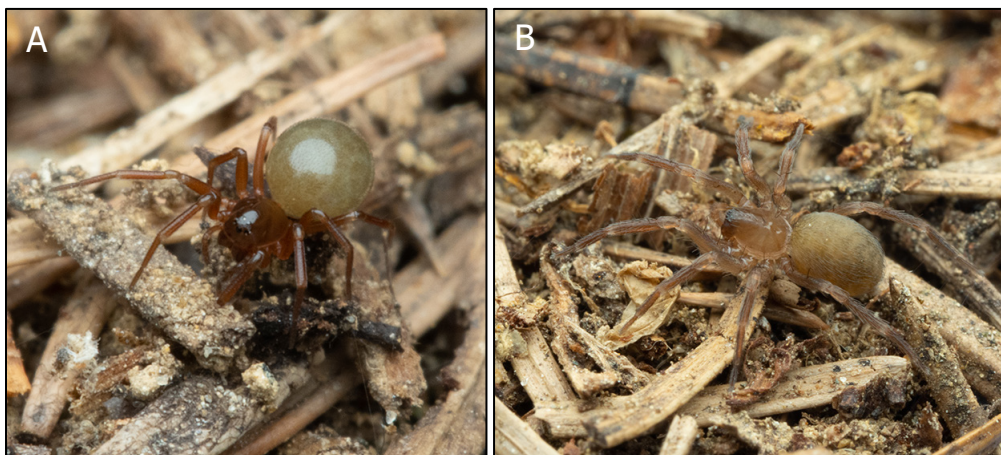


Figure 2. *Thyreosthenius biovatus* female (A) and *Mastigusa arietina* female (B) from locality Pohorje (1 km S of Lukanja) (photo: Gregor Bračko).

Slika 2. *Thyreosthenius biovatus* samica (A) in *Mastigusa arietina* samica (B) z lokalitete Pohorje (1 km J od Lukanje) (foto: Gregor Bračko).

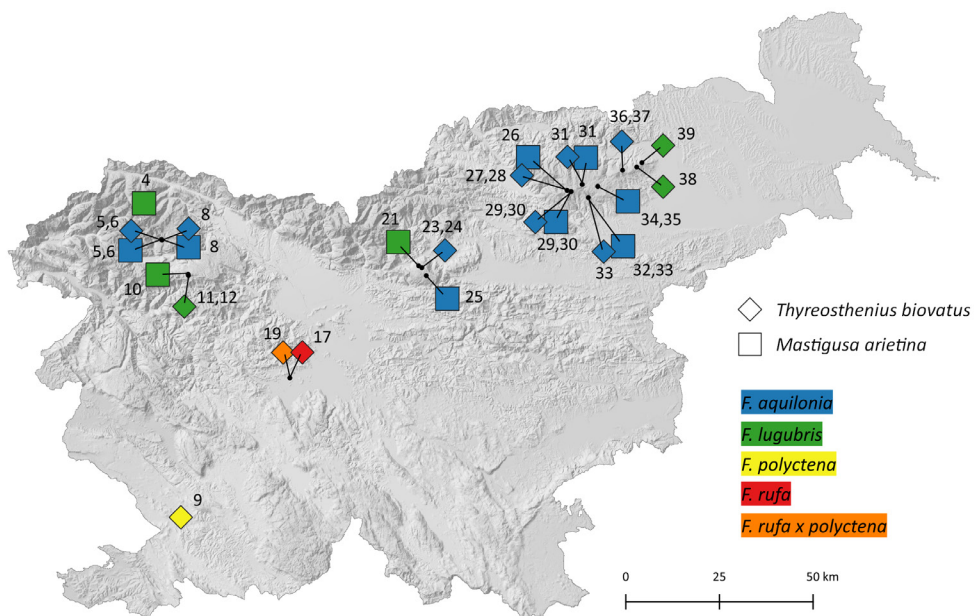


Figure 3. Localities of the spider species *Thyreosthenius biovatus* and *Mastigusa arietina* in Slovenia (the numbers next to symbols refer to successive nest numbers as shown in Tab. 1; the different colours of the symbols refer to different *Formica* host species).

Slika 3. Najdišča vrst pajkov *Thyreosthenius biovatus* in *Mastigusa arietina* v Sloveniji (številke ob simbolih se nanašajo na zaporedne številke mravljišč, kot so prikazane v Tab. 1; različne barve simbolov se nanašajo na različne gostiteljske vrste Formica).

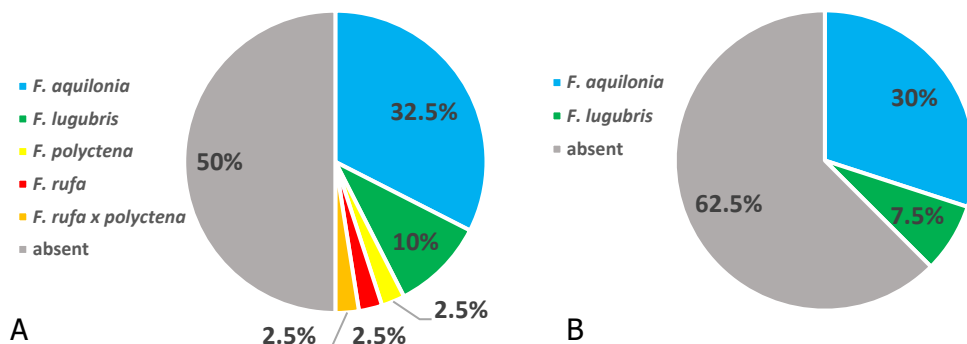


Figure 4. The presence of two myrmecophilous spider species (A – *Thyreosthenius biovatus*, B – *Mastigusa arietina*) in the examined ant nests of the *Formica rufa* group (percentage according to all examined nests (n = 40)).

Slika 4. Prisotnost dveh vrst mirmekofilnih pajkov (A – *Thyreosthenius biovatus*, B – *Mastigusa arietina*) v preiskanih mravljiščih mravelj skupine *Formica rufa* (odstotek glede na vsa preiskana mravljišča (n = 40)).

In a similar study conducted in the Italian Alps, the two myrmecophilous spider species were found in the nests of *F. aquilonia* (most frequently), *F. lugubris*, *F. paralugubris* (a species not known for Slovenia), *F. polychteta* and *F. rufa* (Castellucci et al. 2022). In contrast to our study, *M. arietina* was more common in the nests than *T. biovatus* (found in 81% of the examined nests compared to 31% for *T. biovatus*). Prior to their study, there had been no literature records of *M. arietina* from nests of *F. aquilonia*, *F. lugubris* and *F. paralugubris*, and *T. biovatus* had not been recorded from the nests of *F. aquilonia*. According to Castellucci et al. (2022), this is probably due to taxonomic uncertainties, as in previous literature many of the red wood ants were not correctly identified and were often given as *Formica rufa*. Our results confirm the conclusions of Castellucci et al. (2022), as the two spider species were regular guests in the *F. aquilonia* and *F. lugubris* colonies examined.

Despite long history of spider research in Slovenia, *T. biovatus* had not been recorded previously from the country, presumably due to absence of sampling in the mounds of red wood ants. Our results indicate that this species is not rare in Slovenia. We found it in half of the examined nests, which belonged to all of the studied ant species. The localities of *T. biovatus* are situated mainly in the Alpine and Prealpine parts of the country, but also in the Submediterranean region (locality Matavun).

Similarly to *T. biovatus*, *M. arietina* was never searched for inside red wood ant nests, or the nest of other ant species, despite of being aware of its common association with ants (Polenec 1964). Records of the species by Polenec and other authors (summarized in Kostanjšek & Kuntner 2015) originate mainly from sampling of *M. arietina* in pitfall traps or sifting the leaf litter, presumably close to host ant nests. This spider species is less integrated into wood ant colonies compared to *T. biovatus* (Parmentier et al. 2014, 2016b; Nentwig et al. 2023) and is probably more active also in the vicinity of the host nests. The results of the present study show that *M. arietina* is common in the nests of *F. aquilonia* and not rare in the nests of *F. lugubris*, which means that this spider species is probably widespread in the Alpine and at higher altitudes of Prealpine regions of Slovenia, where the two host ant species are common.

Similar to some other European countries, e.g. Spain (Castellucci et al. 2023b), Denmark (Scharf & Gudik-Sørensen 2006), Belgium (Parmentier et al. 2022) and Italy (Castellucci et al. 2022), our study confirms that additional approaches in fieldwork, such as sampling for spiders in ant nests, can provide new records of *T. biovatus* and *M. arietina* and reveal that these spiders are not as rare as previously thought. Myrmecophiles have never been systematically sampled in Slovenia, so many species are missing from the checklists. This should be improved by future studies on these guests of ant colonies.

Povzetek

Mravljišča in njihovo neposredno okolico sestavlja veliko raznolikih mikrohabitata, ki jih poseljujejo različni organizmi. Mirmekofili so organizmi, ki morajo vsaj del svojega življenja preživeti s kolonijami mravelj (Hölldobler & Wilson 1990). Zlasti velike, dolgoživeče kolonije vsebujejo vrstno bogato in številčno favno mirmekofilov (Hölldobler & Wilson 1990; Kronauer & Pierce 2011). Med takimi so tudi rdeče gozdne mravlje (skupina *Formica rufa*), ki gradijo velika kopasta mravljišča in imajo v okolju, ki ga poseljujejo, zelo pomembno vlogo, zato so pogosto prepoznane kot ključne vrste in ekosistemski inženirji (Robinson & Stockan 2016; Sorvari 2016).

Med mirmekofili, ki jih srečamo v mravljiščih rdečih gozdnih mravelj, so tudi pajki, v Evropi predvsem vrsti *Thyreosthenius biovatus* (O. Pickard-Cambridge, 1875) (družina Linyphiidae) in *Mastigusa arietina* (Thorell, 1871) (družina Cybaeidae) (Cushing 1997; Parmentier et al. 2014). V kolonijah gozdnih mravelj plenita bodisi druge manjše mirmekofilne vrste, jajca mravelj ali pa mravljam kradeta njihov plen (Parmentier et al. 2016a, 2018). Kljub relativno dolgi zgodovini raziskav favne pajkov v Sloveniji, vrsta *T. biovatus* pri nas še ni bila zabeležena, vrsta *M. arietina*, ki je sicer poznana iz več lokalitet v zahodni Sloveniji, pa nikoli ni bila ciljano vzorčena v mravljiščih (Kostanjšek & Kuntner 2015).

V obdobju od junija do oktobra 2023 smo sistematično iskali členonožce v mravljiščih rdečih gozdnih mravelj. Vzorčili smo na 25 lokalitetah, predvsem v severnem delu Slovenije. Iz kopastega dela mravljišča smo vzeli od štiri do pet litrov materiala in ga dali v sejalnik, presejani material skrbno pregledali in iz njega pobrali pajke ter druge členonožce.

Skupno smo pregledali 40 mravljišč rdečih gozdnih mravelj. Največ pregledanih mravljišč je pripadalo vrsti *F. aquilonia*, sledile so *F. lugubris*, *F. rufa*, *F. polyctena*, eno kolonijo pa smo določili kot hibrid *F. rufa* x *F. polyctena*. V naši raziskavi smo našli obe omenjeni vrsti mirmekofilni pajkov. *Thyreosthenius biovatus* smo odkrili v polovici od vseh preiskanih mravljišč, največkrat pri *F. aquilonia*, sicer pa smo jo zabeležili pri vseh vzorčenih vrstah rdečih gozdnih mravelj. *Mastigusa arietina* smo našli v 37,5 % pregledanih mravljišč, in sicer le pri vrstah *F. aquilonia* in *F. lugubris*. V sedmih primerih smo v istem mravljišču (v vseh primerih vrste *F. aquilonia*) zabeležili obe vrsti pajkov. Izmed dveh vrst mravelj, ki sta bili najpogostejše vzorčeni (*F. aquilonia* in *F. lugubris*), v naši raziskavi obe vrsti pajkov dajeta prednost gostovanju pri *F. aquilonia*.

Z našo raziskavo smo prvič pri nas ciljano ugotavljali prisotnost mirmekofilnih pajkov v mravljiščih rdečih gozdnih mravelj. Podatki raziskave nakazujejo, da obe vrsti pajkov v Sloveniji nista redki, še posebno v alpski regiji in v višjih predelih predalpske regije, kjer so rdeče gozdne mravlje (predvsem vrsti *F. aquilonia* in *F. lugubris*) precej pogoste.

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