

***Myrmica scabrinodis* as a possible host of *Myrmica hirsuta* (Hymenoptera: Formicidae)**

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Two queens of socially parasitic *Myrmica hirsuta* Elmes, 1978 was discovered in two nests of *Myrmica scabrinodis* Nylander, 1946 in Hradec Králové, Czech Republic. *Myrmica sabuleti* Meinert, 1861 and *M. lonae* Finzi, 1926 were the only known host species of *M. hirsuta* up to now. According to our observations, *M. hirsuta* can enter *M. scabrinodis* colonies. More research is needed to clarify whether *M. scabrinodis* can serve as a host of *M. hirsuta*.

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1. Introduction

Myrmica hirsuta Elmes, 1978 is a European socially parasitic species that uses *M. sabuleti* Meinert, 1861 and *M. lonae* Finzi, 1926 as hosts (Radchenko & Elmes 2003, 2010, Seifert 2007). Most of the *M. hirsuta* offspring develop into sexual individuals and the presence of the worker caste is very rare. Both macro- and microgynes are known (Elmes 1983, 1994).

2. Material, methods and results

We collected many samples of ants on 20.IX. 2012 on a mesic meadow (with *Ranunculus repens* L., *Cardamine amara* L., *Sanguisorba officinalis* L., *Veronica chamaedrys* L., *Lathyrus pratensis* L., *Plantago lanceolata* L.) in Roudnička near Hradec Králové (geographic coordinates 50°10'N, 15°49'E), Czech Republic. All samples were taken directly from nests and consisted of 4–10 individuals. During the determination, we found that one sample consisted of three

workers of *Myrmica scabrinodis* Nylander, 1846 and one normal (macrogyne) apterous queen of *M. hirsuta*. Therefore, we digged eight *Myrmica* nests four days later (24.IX.) in the same locality and took them into the laboratory and placed all nests in a fridge in 0°C. We searched the nests carefully within the next several days. Seven nests contained *M. scabrinodis* individuals only, but one nest contained 25 workers of *M. scabrinodis* and one normal apterous *M. hirsuta* queen. No eggs, larvae or pupae were present in this nest. The live queen was placed in a plastic tube together with the workers out of the fridge. Workers soon attacked and finally killed the queen. All workers and queens were conserved in pure ethanol.

3. Discussion

Myrmica sabuleti is the nearest relative to *M. hirsuta*, and *M. hirsuta*, *M. scabrinodis*, *M. sabuleti* and *M. lonae* are all closely related species belonging to the same clade (Jansen *et al.*

2010; *M. lonae* was not included in Jansen *et al.*'s analysis, but it is a sister species of *M. sabuleti* according to Seifert 2000). Many social parasites use several ant species as hosts even in the case of such intimate parasite-host relationships as between cuckoo species of *Phengaris* Doherty, 1891 and *Myrmica* (e.g. Pech *et al.* 2007, Jansen *et al.* 2011). The ability of *M. hirsuta* to parasitise all three species is theoretically possible and probable. *Myrmica sabuleti*, which is the usual host of *M. hirsuta* in central Europe, is not present in the locality as we found only *M. scabrinodis*, *M. ruginodis* Nylander, 1846 and *M. rubra* (Linnaeus, 1758). Therefore, our two records could be hardly considered as an accident or poor sampling.

There are at least two possible explanations of the attack of host workers on the queen:

1) *Myrmica scabrinodis* is not the host species of *M. hirsuta*. The *M. hirsuta* queen was not able to find the right host, it attempted to enter a nest of non-host species and it was killed.

2) The attack could be caused by high temperature in the lab (approximately 20°C). Daily maximum air temperatures varied between 10–20°C and they were slightly below freezing point at night in the field. We do not know the temperature of the soil, but the ants did not forage, they were not aggressive and moved slowly during the samplings. Most *M. hirsuta* queens search for a host nest in autumn (Radchenko & Elmes 2010) and queens of many socially parasitic species use low temperatures for entering host colonies, because the aggression of host workers is suppressed (Hölldobler & Wilson 1990; Schlick-Steiner *et al.* 2002). This behaviour was not examined in *M. hirsuta*. Probably, the queen had entered the nest shortly before we digged it and the queen was yet not fully integrated into the colony. We suppose that this explanation is more probable and *M. scabrinodis* can serve as an additional host of *M. hirsuta*. This is because the fact of two mixed *M. hirsuta*–*M. scabrinodis* samples at a locality where *M. sabuleti* or *M. lonae* do not occur suggests to us rather a host–parasite relationship between *M. hirsuta* and *M. scabrinodis* than the dispersal abilities of *M. hirsuta* queens and their inability to find a host nest. However, only a dis-

covery of a true mixed colony of *M. hirsuta* and *M. scabrinodis* can confirm the latter as a host of *M. hirsuta*.

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