

Abstract*

Investigations of aphid-ant mutualism in sandy habitat complexes (Homoptera: Aphididae; Hymenoptera: Formicidae)

Nóra MOLNÁR, Dorottya ANGYAL & Eszter GULYÁS

Dr. Nóra Molnár (contact author), Dorottya Angyal, Eszter Gulyás, Department of Ecology, Szeged University, Egyetem u. 2., Szeged, H-6722 Hungary.

E-mail: molnarn@bio.u-szeged.hu; angyal.dorottya@gmail.com; eszter.gulyas@gmail.com

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We studied the seasonal and spatial patterns of aphid-ant mutualism and the alternative foraging strategies of ants at two Hungarian sites, in the sandy grassland area of the Kiskunság National Park (Bugac) and in the vicinity of Kiskundorozsma from May to November 2005. We marked 31 poplar trees (*Populus alba* LINNAEUS, 1753) at different heights in a pannonic juniper-poplar steppe forest and at the edge of sandy steppe and poplar woods in Bugac, and 30 trees were selected in a similar habitat in Kiskundorozsma. Three aphid species and 8 ant species occurred on the poplar trees, and 2 further ant species were found on the ground. We used three-level bait stands in order to simulate the structure of the trees, and the baits were made up of animal protein (tuna fish flakes), and carbohydrates (polyfloral honey). *Chaitophorus populeti* (PANZER, 1801) was the most abundant aphid species in the Bugac area, while *Ch. populeti* and *Ch. populialbae* (BOYER DE FONSCOLOMBE, 1841) exhibited equal abundances in Kiskundorozsma during the investigation period. The third aphid species, *Pterocomma populeum* (KALTENBACH, 1843), was less abundant in both areas. All of them were attended by different ant species. The most frequent mutualist ants were *Lasius psammophilus* SEIFERT, 1992, *Formica sanguinea* LATREILLE, 1798 and *Plagiolepis vindobonensis* LOMNICKI, 1925. Although the bait stands were situated directly next to the sample trees, there was no significant correlation between the ant visiting frequencies of the two types of food sources (Figs. 1, 2). For example, whereas *Formica sanguinea* preferred aphid colonies, *Tetramorium cf. caespitum* (LINNAEUS, 1758) visited mainly the baits. *Myrmica schencki* VIERECK, 1903 was quite abundant on the baits, but did not attend aphids at all. This phenomenon can be explained by the different foraging strategies of these ants (CARROLL & JANZEN 1973). The aphid colony size and the number of their attending ants varied in parallel in Bugac, but not in Kiskundorozsma, although the size of an aphid colony is usually directly related to the number of attending ants (DEGEN & al. 1986, FLATT & WEISSER 2000). The ant populations differed from each other in the intensity of attendance. The most significant aphid visitors were *Formica sanguinea* and *F. pratensis* RETZIUS, 1783 in the Bugac area, and *Lasius psammophilus* in Kiskundorozsma. There was no significant correlation between the ants on the poplars and the ant visits at the third level of the bait stands. Most of the individuals, except for the more timid

ant species such as *Formica cunicularia* LATREILLE, 1798, were on the first (ground) level. At the edge zones of the different habitat types the highest number of ant species was found.

References

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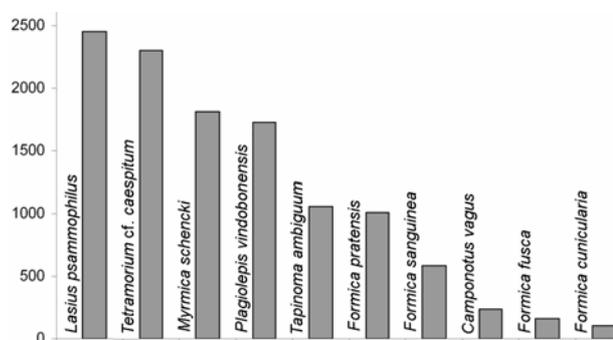


Fig. 1: Individual numbers of ant species on the bait stands.

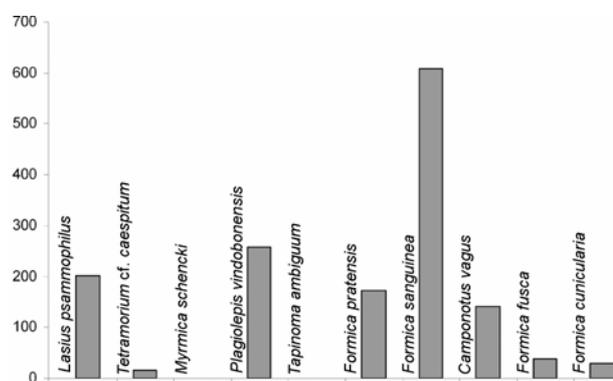


Fig. 2: The individual numbers of ant species on the aphid colonies on the poplar trees.

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