

***Agalmatium flavescens* (Hemiptera, Issidae) and *Camponotus aethiops* (Hymenoptera, Formicidae) – an unknown trophobiotic association**

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Abstract. The knowledge of trophobiosis between ants and planthoppers of the family Issidae is limited to studies of individual cases from Argentina, Mexico, India, the island of Naxos (Cyclades) and an anecdotal report from Italy. This paper reports a previously undescribed ant-attendance of *Agalmatium flavescens* (Olivier, 1791) (Hemiptera, Issidae) by *Camponotus aethiops* (Latreille, 1798). It includes a brief literature review and presents some ecological aspects of this new finding. In additions, live color photographs of *A. flavescens* and interactions with ants are provided.

Key words: ant-attendance, Issidae, *Agalmatium flavescens*.

Introduction

Trophobiosis commonly occurs in Auchenorrhyncha although it is not as common as in aphids and scale insects. There are much more surveys on relations between ants and members of the Cicadomorpha group (mainly family Membracidae from the tropics and subtropics) and much fewer within Fulgoromorpha. Among Fulgoromorpha, more than 70% of reports of ant-attendance concern the Tettigometridae species (Bourgoin 1997). The other fulgoromorphs involved in such associations are from the families Cixiidae, Delphacidae, Hypochthonellidae and Issidae. Little has been published on trophobiosis in issids, and few cases of attendance by ants have been described (Delpino 1875; O'Brien 1988; Dietrich & McKamey 1990; Gnezdilov & O'Brien 2008; Gnezdilov 2016).

Here, we present an observation of trophobiotic interactions between the planthopper species *Agalmatium flavescens* (Olivier, 1791) (Hemiptera, Issidae) and the ant species *Camponotus aethiops* (Latreille, 1798).

Results and Discussion

On the 9th of July 2016, near Ivan Vazovo vill. (GPS N42,4569 E24,7975, 252,23 m a.s.l.), 3 specimens (2♂ and 1♀) of *Agalmatium flavescens* (Olivier, 1791) were found being tended and antennated by ants of *Camponotus aethiops* on a field elm (*Ulmus minor* Mill.). The ant workers actively followed the planthoppers and antennated them, stimulating in this way the secretion of honeydew. Issids, in turn, showed no sessile behaviour and moved up and down the branches of the elm (Fig. 1). Upon approaching the bush for observation and photographing, *Agalmatium* specimens began moving, leaving the branch between them and the observer, where the ants also moved with them. The ants were not interested in numerous specimens of *Hyalesthes luteipes* Fieber, 1876 located on the same plant.

Agalmatium flavescens (Fig. 2) is a polyphagous species that is most commonly found on bushes. The species is widespread in the Mediterranean. Yet, two species of *Agalmatium*, *A. flavescens* and *A. bilobum* (Fieber, 1877), are known in Bulgaria.

Previously, only 5 known cases of 6 issid species associated with ants had been reported (*Issus* sp. by Delpino (1875); *Asarcopus palmarum* Horvath, 1921 by O'Brien (1988); *Picumna* sp. by Dietrich & McKamey (1990); *Argepara lyra* (Berg, 1883) by Gnezdilov & O'Brien (2008), *Mycterodus colossicus* Dlabola, 1987 and *Agalmatium bilobum* (Fieber, 1877) by Gnezdilov (2016). Only two of the cases are related to Europe, Delpino (1875) and Gnezdilov (2016), and the former is somewhat anecdotal, based probably on misidentification of *Issus* sp. tended by *Formica pubescens* (now *Camponotus vagus* (Scopoli, 1763)). Apart from the observation by Dietrich & McKamey (1990), all others concern relationships with ant species from the *Camponotus* genus.

The present finding complements a recent report by Gnezdilov (2016) about shared presence of *Mycterodus colossicus* Dlabola, 1987 and *Agalmatium bilobum* (Fieber, 1877), together with aphids and coccids, tended by *Camponotus (Tanaemyrmex) ionius* Emery, 1920.

A. flavescens is a common species, and the lack of such observations until now suggests its facultative relationships with ants, in contrast to the opportunistic relationships seen in some other hemipterian species, in which ants collect honeydew from the substrate. However, in the case presented here, we observed antennation and honeydew drops directly collected by ants from the anal openings of issids.

Ant-attendance, both in the Issidae and the other Fulgoromorpha, are still understudied, and we assume that further detailed studies on the biology of planthoppers will prove that such ant-attendance is much more common than was previously known.



Fig. 1. *Agalmatium flavescens* (Olivier, 1791) and *Camponotus aethiops* (Latreille, 1798).



Fig. 2. *Agalmatium flavescens* (Olivier, 1791).

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