Research Article

Unusual Ant Hosts of the Socially Parasitic Ant

Anergates atratulus (Schenck, 1852) (Hymenoptera, Formicidae)

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The extreme inquiline ant Anergates atratulus (Schenck, 1852) (Hymenoptera, Formicidae) was collected in ant nests of Tetramorium moravicum Kratochvil, 1941 in Bulgaria and of T. chefketi Forel, 1911 in Bulgaria and Turkey. The reported ant hosts belong to the Tetramorium chefketi species complex in contrast with the typical hosts from Tetramorium caespitum/impurum complex. This finding confirms the assumption that a broader range of host species for the socially parasitic species A. atratulus may be expected. Present data on the new host species expand knowledge about biology of this rare ant species, included in the IUCN Red List of threatened species.

1. Introduction

Anergates atratulus (Schenck, 1852) is a rare workerless socially parasitic ant from the Palaearctic region, which has even been introduced together with its host in North America [1]. This extreme inquiline is represented only by female and pupoid type male individuals, whose morphology and anatomy indicate a highly specialized level of parasitism [2]. The body of males is depigmented, the cuticle is thin, the petiole and postpetiole are widely connected, and degenerate mandibles, palps, and antennae are observed. Female wing venation is reduced and the occipital region is narrowed [3]. Mature females are typically physogastric and found in queenless host nests [2, 3].

Although A. atratulus was reported previously mainly in Tetramorium caespitum (Linnaeus, 1758) and T. impurum ( Förster, 1850) [4–7] nests within the Tetramorium caespitum/impurum complex, it was also recorded from Sicily (Italy) from a nontypical low altitude (300 m) in a nest of T. diomedeum Emery, 1908, which is a member of the Tetramorium ferox complex [8]. Future clarification of the complicated taxonomic composition of the Tetramorium caespitum/impurum complex will probably enlarge the number of known host ant species parasitized by A. atratulus [5].

The only report about T. chefketi Forel, 1911 as a host of A. atratulus was given by Schulz and Sanetra [9] as an amendment of the identified material published by Heinze [10] from Tavşanlı (Turkey, Kütahya district). Tetramorium moravicum Kratochvil, 1941 was also mentioned in Sanetra and Buschinger [5] as a possible host of A. atratulus, but without any additional data and references.

In Bulgaria, A. atratulus was reported to parasitize T. caespitum nests in several mountains—the Western Balkan Range, Vitosha, Osogovska, Rhodopes, and the Black Sea coast [11, 12], but no specific habitats and collecting data for this species were given in these studies.

The first data on the presence of A. atratulus in Turkey was given by Heinze [10] who reported parasitized T. chefketi nests in Anatolia [9]. Following the record of Çamlıtepe and Aktaç [13] from the European part of Turkey without mentioning the host species, Aktaç et al. [14] recorded A. atratulus in a T. caespitum nest in the same region (Kofçaz-Ahmetler Village, Kirkareli district). More recently, Schulz and Sanetra [9] found this species in a T. caespitum nest in Erciyes Mountain, Kayseri district in Anatolia.

The present study identifies known localities of A. atratulus in Bulgaria and Turkey from nests of two nontypical ant host species: T. chefketi and T. moravicum. The new data
broaden the knowledge about the biology of this extremely rare ant species, included in the IUCN Red List of threatened species [15].

2. Results

2.1. Anergates atratulus (Schenck, 1852)

2.1.1. Studied Material from Bulgaria. Eastern Rhodopes, Krumovgrad district, near Golyama Chinka Village (41°24′28″ N 25°34′43″ E), 430 m, 21.07.2009, leg. A. Lapeva-Gjova, 1 gyne in a nest of Tetramorium chefketi; Konyavska Mountain, Kyustendil district, the main road to the TV tower (42°21′54″ N 22°49′39″ E), 1170 m, 22.09.2009, leg. A. Lapeva-Gjova, 3 gynes in a nest of Tetramorium moravicum.

The first habitat is in the Eastern Rhodopes (South Bulgaria)—a mountain with relatively low altitude and increased Mediterranean climate influence. The collecting locality was situated in an open dry area close to an oak and pine forest. One alate A. atratulus gyne was collected from a T. chefketi nest under a stone. The second habitat was in the Konyavska Mountain (West Bulgaria), where three alate gynes were collected from a T. moravicum nest, also under a stone, on talus in the beech forest belt.

2.1.2. Studied Material from Turkey. Sündiken Mountain, Eskişehir district, Mihalıççık-Yalımkaya Village (39°58′31″ N 31°14′05″ E), 1198 m, 10.08.2010, leg. K. Kiran and V. Aksoy, 1 gyne in a T. chefketi nest; Bozok Plateau, Yozgat district, Büyükcınirli Village (39°38′17″ N 34°55′08″ E), 1049 m, leg. K. Kiran and V. Aksoy, 1 gyne in a T. chefketi nest.

The first habitat was in the northwestern Central Anatolia in an old forest zone, almost more than 100 years old, occupied by Pinus nigra Arn. trees. The slope of the area was nearly 30% and the underlying stones were very few and small. The second locality was a broad river bank with Salix and Populus trees in the steppe zone of northeast Central Anatolia. Both gynes were collected from nests in the ground without stones on them.

No gynes of the host Tetramorium species were found in any of the investigated nests.

3. Discussion

Tetramorium chefketi and T. moravicum from the Tetramorium chefketi species complex are nontypical hosts of the socially parasitic ant A. atratulus. This study provides the first specific data about the presence of A. atratulus in a nest of T. moravicum, a xerophilous species inhabiting sunny, dry, and open places with low and scarce herb vegetation [16]. This ant host species is distributed in the Western Palaearctic from Southern France to the Caucasus [17].

The present record from Bulgaria represents the first report of A. atratulus parasitizing a T. chefketi nest in Europe since Heinze [10] and the redetermination of the host species T. caespitum given by Schulz and Sanetra [9] from the Anatolian part of Turkey. In Bulgaria, however, the habitat of the host is situated at a much lower altitude (430 m) than in Tavşanlı (1000 m) in Turkey. Tetramorium chefketi is a species distributed from the eastern part of Southern Europe to Kyrgyzstan [17].

Host queens were not found in any of the parasite-occupied nests, supporting previous data about A. atratulus’s exploitation of already orphaned Tetramorium colonies [2, 3].

Our results confirm the previous suggestion that A. atratulus parasitizes a wide range of ant host species of the genus Tetramorium. Although A. atratulus usually exploits T. caespitum, a common Palaearctic ant species, this inquiline species is very rare and is included in the IUCN Red List of threatened species. Conservation measures are aimed to protect host ant species and the habitats they occupy. Tetramorium chefketi and T. moravicum inhabit mainly, as in the case of T. caespitum, open, sun-exposed, and dry areas. Future investigations will clarify whether T. chefketi and T. moravicum are normally local hosts of A. atratulus or not. However, data from these two host Tetramorium species might have been rare simply due to their limited geographical distributions compared to T. caespitum. Present results will be useful for local-scale needs in conservation management of native xerophylous places and for examining the evolution of specific social parasite-host relationships.

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