

A preliminary review of the genus *Myrmecophilus* Berthold, 1827 (Orthoptera: Myrmecophilidae) in the Maltese Islands

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ABSTRACT. A preliminary review of the ant crickets in the Maltese Islands is presented and a total of three species are known to-date. One species was originally described from Malta but is now known to occur also in Pantelleria and Tunisia. The history of ant cricket research in the Maltese Islands is outlined, and sampling locality data and the biogeographical context are discussed. An identification key is provided.

KEY WORDS. Ant crickets, biogeography, central Mediterranean area, Malta, myrmecophiles.

INTRODUCTION

Ant crickets appear to have a fairly global distribution, from the Nearctic realm, eastwards through the Palaearctic and Indomalayan realms, to the Australasian and Oceanian realms. Only one species is known from the Neotropical realm, while representation within the Afrotropical realm seems to be confined to the islands of St. Helena and the Seychelles (CIGLIANO *et al.*, 2020; HSU *et al.*, 2020). At least one species is known to have dispersed passively via human intervention (ZIMMERMAN, 1948) and it is not excluded that other species may have inadvertently followed similar dispersal strategies. Ant crickets are assumed to feed by means of trophallaxis with their ant hosts, as do other interspecific kleptoparasitic organisms (e.g. some taxa of the genus *Neoasterolepisma*, which at times coexist with apterous ant crickets in ant colonies).

At least fourteen species of the genus *Myrmecophilus* (inclusive of the subgenus *Myrmophilina*) are known from the Mediterranean region, distributed across both the northern and the southern shores of the basin (MASSA *et al.*, 2012; WILLEMSE *et al.*, 2018; CIGLIANO *et al.*, 2020; STALLING, 2013, 2016, 2017). In the central Mediterranean area, the genus is represented by five species (STALLING, 2014; IORIO *et al.*, 2019), of which three are known from the Maltese Islands (STALLING, 2015; CASSAR *et al.*, 2020).

The presence of ant crickets in the Maltese Islands was first reported by BACCETTI (1966) in his treatise entitled “Il genere *Myrmecophilus* Berth. in Italia”, in which the author also included the Maltese Islands. In the said contribution, Baccetti listed *Myrmecophilus* (*Myrmophilina*) *ochraceus* (Fischer, 1853), a pan-Mediterranean species that was noted to be widespread across the three main islands of the Maltese archipelago, and *Myrmecophilus baronii* Baccetti, 1966, being new to science (BACCETTI, 1966, 1973; HARZ, 1969). The latter species was taken on 21 April 1965 by the myrmecologist Cesare Baroni Urbani from St. Thomas Bay, Marsascala, and described on

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the basis of three specimens (1♂ and 2♀♀) (BACCETTI, 1966; SCHEMBRI, 1984). *M. baronii* was subsequently discovered on Pantelleria, at Lago Bagno dell'Acqua, on 30 March 1990 (BACCETTI *et al.*, 1995) and later at Bir Bou Rebka and El-Fahs, Zaghuan in Tunisia, between the 10th and 14th April, 2010 (STALLING, 2014). In December 1970, LANFRANCO (1970) reported the presence of a "*Myrmecophila* sp." from a single specimen found by the author's brother, Edwin, in Sliema. It was tentatively determined as *M. acervorum* (Panzer, [1799]), but the author casts some doubt in view of its similarity to *M. ochraceus* (referred to as *M. ochracea* in the original contribution) and further suggests that more specimens ought to be examined before confirming the species' identification, given the damaged condition of the specimen. CILIA (1975) reported the presence of two forms of a 'yet to be determined' species of ant cricket from Buskett (dark brown form) and Comino (pale yellow-brown), among other unnamed sites. SCHEMBRI (1984) reported a second record of *M. baronii* and subsequently a third, both from Buskett, respectively, 2♀♀ on 30 April 1983 and 1♀ on 30 April 1984. The author adds that *M. ochraceus* was a seemingly widespread species and provided a map with its recorded distribution across Malta, Gozo and Comino. STALLING (2015) added a new record for the Maltese Islands, that of the recently described *Myrmecophilus fuscus* Stalling, 2013 (Fig. 1).



Figure 1: *Myrmecophilus fuscus*, adult female. 2 November 2019, La Roque-sur-Pernes, France.

The single specimen, a male, was collected by Hervé Brustel on 1 November 2012. However, the locality was reported as "Malta Majjistral, Dingli, Buskett Gardens", evidently incorrect, given that Majjistral park and Buskett lie more than 11 km apart. CASSAR *et al.* (2020) reported *M. baronii*, as a species restricted to Malta, Pantelleria and Tunisia, and *M. ochraceus*, as a fairly widespread species that occurred on all three main islands of the Maltese archipelago.

MATERIALS AND METHODS

Published records to-date and associated data for the Maltese Islands of *Myrmecophilus* species were reviewed. Moreover, the location coordinates reported for *Myrmecophilus fuscus* were rechecked. Concurrently, the person who collected the specimen in 2012, Hervé Brustel, was contacted by one of the authors [TS] and asked to verify whether the said specimen was actually taken from Majjistral or from Buskett, since both localities were listed on the data label.

RESULTS

Myrmecophilus ochraceus (Fischer, 1853)

(Fig. 2)

Literature records. BACCETTI, 1966, 1973; HARZ, 1969; SCHEMBRI, 1984; CASSAR *et al.*, 2020.

It is evident, from existing records to-date, that *M. ochraceus* is the most widespread of the three species whose presence has been confirmed within the archipelago thus far. This gregarious species has been found to occur in scores of localities throughout the three main islands, Malta, Gozo [*Malt. Ghawdex*] and Comino [*Malt. Kemmuna*]. The adults live in nests of the ant genus *Messor*, while the nymphs live in nests of the smaller ant species like *Monomorium*, *Tetramorium* and *Pheidole*. Its distribution extends from Morocco and Spain in the West through Malta and Italy to Greece and Lebanon in the East.

Myrmecophilus baronii Baccetti, 1966

(Fig. 3)

Literature records. BACCETTI, 1966, 1973; HARZ, 1969; SCHEMBRI, 1984; MASSA *et al.*, 2012; IORIO *et al.*, 2019; CASSAR *et al.*, 2020.

M. baronii has so far only been reported from two stations, that is, St. Thomas Bay, in Marsascala, where it was originally found, and Buskett, where it was found eighteen years after its initial discovery. This species is found in nests of large *Camponotus* species. Its distribution is restricted to Malta, Italy (Pantelleria) and Tunisia.

Myrmecophilus fuscus Stalling, 2013

(Fig. 4)

Literature record. STALLING, 2015.

It can be affirmed that *M. fuscus* was actually found at Buskett - N 35°51', E 014°23' approx. 200m amsl - (1♂ [adult] 01.xi.2012, leg. H. Brustel; det. *et coll.* T Stalling) and the mention of Majjistral as a part of the locality of collection (STALLING, 2015) is attributed to oversight. This species lives in nests of *Lasius* species and *Crematogaster scutellaris*. Its distribution extends from Spain in the West through Malta and Italy to Croatia in the East.

Clarification on the precise locality was sought not only to ensure precise reporting, but also because the biotopes at the two locations are quite different; such clarification would therefore be crucial for future research on this newly described species. Majjistral comprises a sprawling boulder

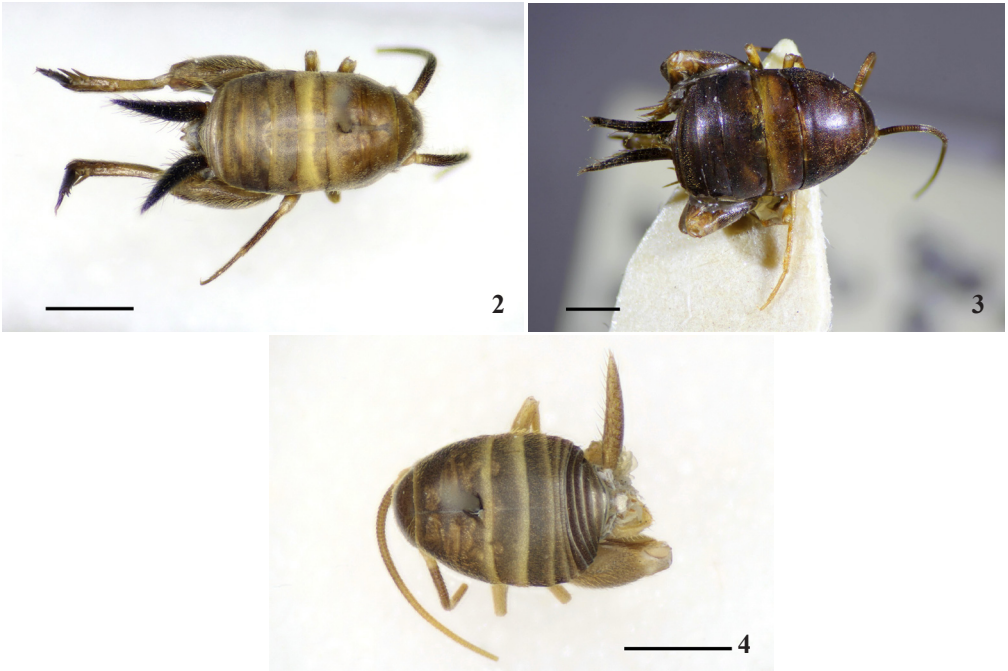


Figure 2: *Myrmecophilus ochraceus*, adult male. 1 November 2012, Buskett, Malta. Habitus of a preserved specimen. Scale bar: 1 mm. **Figure 3:** *Myrmecophilus baronii*, adult male. 21 April 1964, St. Thomas Bay, Marsascala, Malta. Habitus of a preserved specimen. Paratype, collected by Cesare Baroni Urbani. Scale bar: 1 mm. **Figure 4:** *Myrmecophilus fuscus*, adult male. 1 November 2012, Buskett, Malta. Habitus of a preserved specimen. Scale bar: 1 mm.

scree environment beneath an extensive escarpment and a karstic cliff-top plateau, located on the exposed western coast of mainland Malta. Buskett consists of a landscape mosaic that features a sclerophyll woodland remnant and riparian system with extensively cultivated and afforested slopes, located within approximately a kilometre of the south-facing coastal cliffs near the village of Dingli.

KEY TO SPECIES OF THE GENUS MYRMECOPHILUS IN THE MALTESE ISLANDS

- 1 First segment of basitarsus with only one subapical spine in the distal third. Male: hairs on the front and antennae long, distant, and bushy. Female: outer valvae in lateral view rounded *Myrmecophilus ochraceus*
- First segment of basitarsus with two or rarely three subapical spines in the proximal and the medial or distal positions. Male: hairs on the front and antennae short and inconspicuous. Female: outer valvae in lateral view truncated or double-pointed 2

- 2 First segment of basitarsus with two subapical spines in the proximal and medial positions (the spine in the distal position is usually absent, but rarely occurs additionally). Female: outer valvae in lateral view distinctly double-pointed. Small species, body dark ochreous, except the posterior margins of pronotum, mesonotum, and tergites 1–3, which are contrasting pale ochreous *Myrmecophilus fuscus*
- First segment of basitarsus with two subapical spines in the proximal and distal positions. Female: outer valvae in lateral view truncated or slightly double-pointed. Large species, dark reddish brown with one pale stripe *Myrmecophilus baronii*

DISCUSSION

The value of any scientific knowledge pertaining to the ecology and geography of these apterous biomarkers extends beyond the species themselves. Their very presence on the islands and their distribution within the Mediterranean basin throw significant light upon the biogeography of the central Mediterranean area, in particular, in relation to physical connectivity between the Maltese Islands and surrounding landmasses post-Messinian Salinity Event. While the presence of *M. fuscus* in Sicily, Malta and the Balearic Islands is of immense interest, the occurrence of *M. baronii* on Pantelleria, in Tunisia and Malta is particularly intriguing, given the prevailing school-of-thought on the geo-tectonic history and sea-level fluctuations within the central Mediterranean area after the early-middle Pliocene (i.e. based on the notion that a physical connection with the North African mainland is not likely at any time since). There is no doubt that more research is warranted on the occurrence, status and distribution of ant crickets in the Maltese Islands (it is not excluded that other species, like *Myrmecophilus myrmecophilus* (Savi, 1819) or even undescribed species, are eventually discovered locally) in view of the occurrence of various species on the nearby shores. Such work, however, should not be considered in isolation, but rather in a broader and more holistic biogeographical context that explores potential spatial linkages, for example, during sea-level lowstands within the basin, coupled by an investigation of fluvio-marine sedimentary conditions at the time.

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