



## RESEARCH ARTICLE - ANTS

## First record of the ant-loving cricket *Myrmecophilus fuscus* Stalling, 2013 (Orthoptera: Myrmecophilidae) in mainland Spain

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### Abstract

We present the first published records of *Myrmecophilus fuscus* Stalling, 2013 from the Spanish mainland. We observed the species at various localities in Catalonia and in the city of Madrid. Six ant species are known hosts for *M. fuscus* in mainland Spain: *Camponotus lateralis* (Olivier, 1792), *Crematogaster scutellaris* (Olivier, 1792) and *Formica cunicularia* Latreille, 1798, as well as three ant species of the genus *Lasius*, two native and one exotic: *L. grandis* Forel, 1909, *L. cinereus* Seifert, 1992, and the invasive *L. neglectus* Van Loon, Boomsma & Andrásfalvy, 1990.

### Introduction

Social insect nests are a rich source of biodiversity (Kistner, 1982). Arthropods are the main organisms inhabiting the galleries and spaces of ant nests (Passera & Aron, 2005). Ant-loving crickets are rarely observed and seldom collected, although we believe their occurrence in the field is greatly underestimated. Accordingly, myrmecologists and orthopterologists should collaborate to determine the distribution of these species and share knowledge and techniques.

One ant-loving cricket species, *Myrmecophilus fuscus* Stalling, 2013, was recently described from Mallorca, Balearic Islands, Spain (Stalling, 2013) and was subsequently found in several countries within the Mediterranean Basin (Stalling, 2015). We present the first records of *M. fuscus* from the Spanish mainland. Two additional *Myrmecophilus* species are presently known in mainland Spain: *Myrmecophilus acervorum* (Panzer, [1799]) and *Myrmecophilus ochraceus* Fischer, 1853.

### Materials and Methods

During routine myrmecological surveys, ant nests located beneath stones were checked for ant-loving crickets by Xavier Espadaler and Nilo Ortiz de Zugasti Carrón. All *Myrmecophilus* specimens were caught, preserved in ethanol, and subsequently pinned and dried. Additional specimens collected by Hervé Brustel were examined. Most of the records from previous years from the Barcelona region were published as *M. acervorum* (Panzer, [1799]) by Espadaler and Olmo-Vidal, (2011) and the specimens were re-examined in 2015, after the description of *M. fuscus*.

Specimen identification was performed according to the criteria of Stalling (2013) and by direct comparison with specimens of the type series of *M. fuscus*. The species differs from other *Myrmecophilus* species in Spain by the following characteristics: the coloration is dark ochreous with pale ochreous posterior margins of the pronotum, mesonotum



and tergites 1–3 (dark reddish-brown coloration with pale ochreous posterior margins of the pronotum and mesonotum in *M. acervorum*), the valvae of female (lateral view) are double-pointed (rounded in *M. ochraceus*), the hairs on the front and antennae are short and inconspicuous (long, distant, and bushy in *M. ochraceus*), and the first segment of the basitarsus has two or sometimes three subapical spines (only one spine in *M. ochraceus*).

## Results

We detected *Myrmecophilus fuscus* at the following localities (Fig 1, all specimens in coll. T. Stalling).



**Fig 1.** Distribution of *Myrmecophilus fuscus* in Spain. Black dots: new records from the Spanish mainland; white dot: locus typicus published by Stalling (2013). The map is based on a map from Виктор, © Creative Commons License.

Spain, Catalonia, Barcelona province (all leg. X. Espadaler, most specimens were published as *M. acervorum* by Espadaler & Olmo-Vidal, 2011): Bellaterra, Universitat Autònoma de Barcelona campus, 41°29'54.1" N, 002°06'34.7" E, approximately 115 m.a.s.l., 25.v.2012, 1 ad. male in nest of *Lasius grandis* Forel, 1909; La Roca del Vallès, 41°35' N, 002°19' E, approximately 100 m.a.s.l., 12.v.2003, 2 ad. males and 3 nymphs of unknown sex in nest of *Lasius cinereus* Seifert, 1992; Matadepera, 41°36'33.6" N, 002°00'56.1" E, 400 m.a.s.l., 22.x.2009, 1 ad. female, 3 ad. males and 3 nymphs of unknown sex in nest of *Lasius neglectus* Van Loon, Boomsma & Andrásfalvy, 1990; Riera de Fuirosos, La Batlloria, 41°42'58.55" N, 002°34'29.60" E, 85 m.a.s.l., 27.x.2008, 1 ad. female in nest of *Lasius cinereus*; Sant Cugat del Vallès, 41°28' N, 002°04' E, approximately 150 m.a.s.l., 14.x.2014, 4 ad. males, 3 adult females and 2 female nymphs in nest of *Lasius grandis*.

Spain, Catalonia, Tarragona province (all leg. H. Brustel): Alcover, Vall del Glorieta, 41°16' 03" N, 001°07' 43" E, 25.xii.2012, 1 adult female in nest of *Formica cunicularia*

Latreille, 1798; Alcover, Mas de Flores, 41°15' 60" N, 001°07' 55" E, 05.v.2014, 2 adult males and 3 adult females in nest of *Crematogaster scutellaris* (Olivier, 1792) and 4 female nymphs in nest of *Camponotus lateralis* (Olivier, 1792).

Spain, Madrid (all leg. N. Ortiz de Zugasti Carrón): Madrid, 40°25'40.7" N, 003°43'54.1" W, 590 m.a.s.l., 25.vii.2014, 3 ad. males, 2 ad. females (Fig 2), 2 female nymphs and 3 nymphs of unknown sex in nest of *Lasius grandis*. Madrid, 40°26'17.0" N, 3°43'29.28" W, 641 m.a.s.l., 03.vii.2015. 2 adult females, 1 adult male and 8 nymphs in a nest of *L. grandis*. The first nest, observed in 2014, was established under a small concrete slab of 60 × 60 × 6 cm. The location is watered periodically, although the irrigation frequency has greatly diminished over the past few years owing to drought in the Madrid region, resulting in a loss of the green lawn that surrounded the nest. However, all of the trees in the area remain. The slab is located underneath three cypress trees where the ants actively forage as well as a fruit tree (*Prunus* sp.), and is in proximity to *Robinia pseudoacacia*. Despite the dry and dusty surrounding ground, there is sufficient atmospheric humidity owing to the Manzanares River, which is within approximately 25 m (with a phreatic level of about -3 m underground). Some cricket nymphs were found (but not collected) in other *L. grandis* nests (under typical rocks) within 300 m of this nest. The second nest, detected in 2015, was established under a similar concrete slab in a permanently watered lawn with abundant poplar trees; this site is located within the terrain of the Principality buildings of Complutense University. Some nymphs were also detected (July, 2015) under rocks along the artificial stream of the "Parque del Oeste" (Western Park), within 500 m of the second location and also in permanently watered lawn.

Considering together all sexually identifiable specimens from Mainland Spain (16 males, 21 females) the sex ratio is not different from 1:1 (Chi-square = 0.67; P = 0.58).



**Fig 2.** *Myrmecophilus fuscus*, female, July 25, 2014, Spain, Madrid. Scale bar: 1 mm.

## Discussion

We recorded *Myrmecophilus fuscus* on the Spanish mainland. Prior to its description in 2013, the species was not distinguished from *M. acervorum* and some specimens were therefore erroneously identified as *M. acervorum* (Espadaler & Olmo-Vidal, 2011). *M. acervorum* is also found in the Barcelona region. The observation of the species in Madrid greatly extends the known range of *M. fuscus* in Spain. We detected the crickets on both banks of the Manzanares River at sites separated by a distance of 3 km. The presence of the species in artificially watered gardens indicates a possible accidental introduction.

*Camponotus lateralis*, *Crematogaster scutellaris* and *Formica cunicularia*, as well as three *Lasius* species, two native and one exotic, are known hosts for *M. fuscus* in mainland Spain. *L. grandis* "... is the most abundant species of the subgenus on the Iberian peninsula..." (Seifert, 1982) and *L. cinereus* is common in eastern Spain (Espadaler et al., 2011). The invasive *L. neglectus* in Iberia is restricted to limited localities in Catalonia and the Basque country. *Camponotus lateralis*, *Crematogaster scutellaris* and *Formica cunicularia* are widely present in the Mediterranean region, with continuous distribution across the Iberian Peninsula (Gómez & Espadaler, 2007). Accordingly, *M. fuscus* could be expected to occur in the wide area between Madrid and Barcelona. Portugal is a candidate country for *M. fuscus* based on the presence of known ant hosts in the country.

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