

The ensign wasps (Hymenoptera: Evaniidae) of the Maltese Islands

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ABSTRACT. The ensign wasp fauna of the Maltese Islands is reviewed for the first time. The family Evaniidae is represented by three species, the cosmopolitan *Evania appendigaster* (Linnaeus), the Mediterranean *Zeuxevania splendidula* (Costa), and *Brachygaster minutus* (Olivier), widely distributed in Europe and north-northeast Africa. A key to genera is provided.

KEY WORDS. Malta, new records, *Evania*, *Zeuxevania*, *Brachygaster*.

INTRODUCTION

The Evaniidae form part of the superfamily Evanoidea together with Aulacidae and Gasteruptionidae. The family consists of some 450 extant species in 20 genera, with a further 30 species and 16 genera known solely from fossils (LI *et al.*, 2018). Evaniids are generally short- and stout-bodied wasps, with the metasoma small, laterally compressed and attached high up on the propodeum by a curved petiole; the mesosoma is heavily sclerotized and relatively high. Both sexes possess the same number of flagellomeres; females possess a short ovipositor which tends to be hidden. The wings' jugal and claval lobes are well-separated with a deep incision. Though the life history of many species remains unascertained, all evaniids with rearing records are known to oviposit inside the oothecae of cockroaches, where their larvae feed as egg predators and pupate within the empty oothecal case.

The evaniid fauna of the Maltese Islands has not been previously studied. There is no mention of Evaniidae in any of the literature related to Maltese hymenopterans as far as the authors are aware. Only *Evania appendigaster* (Linnaeus, 1758) was mentioned in some popular printed works of Maltese wildlife, without any citation of examined material. The aim of the present work is to provide the first annotated species list of the Evaniidae inhabiting the Maltese Islands.

MATERIAL AND METHODS

The material examined consists of specimens captured in malaise traps and sweep nets by the authors. Specimens were identified by making use of keys provided by DEANS (2003) and PAGLIANO (1986). Taxonomy follows DEANS (2005). Photographs of mounted specimens were taken using an Olympus TG-5 camera on focus stacking macro mode in conjunction with a Leica M80 stereomicroscope. All specimens are deposited in the private collection of David Mifsud and Thomas Cassar.

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IDENTIFICATION KEY TO THE GENERA OF MALTESE EVANIIDAE

1. Wings with 3 closed cells.....*Brachygaster*
 - Wings with more than 3 closed cells.....2
2. Forewings with 6 closed cells.....*Zeuxevania*
 - Forewings with 7 closed cells.....*Evania*

ANNOTATED SPECIES LIST

Brachygaster minutus (Olivier, 1792)

(Fig. 1)

Material examined. MALTA: Mellieha (St Maria Estate), 25.vii-25.viii.2017, 1 ex. (malaise trap), leg. D. Mifsud.

Description. Length 3-3.5 mm; body overall black; head and mesosoma with strong punctuation, metasoma smooth and shiny; wings with only three complete cells.

Notes. *Brachygaster minutus* occurs in much of Europe, from Spain up to as far East as Russia, and from Malta up to as far North as Finland. It also inhabits other countries encircling the Mediterranean basin, including North African territories, Egypt and Israel (DEANS, 2005). All reliable rearing records of this species indicate that *Brachygaster minutus* is an egg predator of cockroaches in the genus *Ectobius* (BROWN, 1973). The Maltese Islands are inhabited by at least one species, *Ectobius kraussianus* Ramme, 1923 (SCHEMBRI, 1980), which may be a possible host - though the Maltese *Ectobius* fauna may consist of other unrecorded species. Though *Blatella germanica* and *Blatta orientalis* have been regarded as possible hosts for this evaniid in the past, such records are dubious (DEANS, 2005).



Figure 1: *Brachygaster minutus* (Olivier, 1792). Scale bar 1mm. Collection data as indicated in material examined.

Evania appendigaster (Linnaeus, 1758)

(Fig. 2)

Material examined. MALTA: Żebbuġ, 1.vii.2013, 1 ex., leg. T. Cassar; Marfa, 20.vii.2014, 1 ex., leg. T. Cassar; Mellieħa, 25.vii.2017, 1 ex. (malaise trap), leg. D. Mifsud.

Description. Length 6-7 mm; body overall black; face smooth and shiny, punctuated only sparsely; propodeum bearing coarse reticulation; petiole smooth; gaster shiny, each tergite adorned by a band of very small hairs; wings with seven closed cells.

Notes. *Evania appendigaster* is a cosmopolitan species, likely found throughout Africa and the Americas; in Europe it occurs in most countries; it inhabits most of Asia with the exception of eastern Russia, and it also occurs in Australia (DEANS, 2005). Its hosts are species of *Periplaneta* and *Blatta orientalis*; females prefer to oviposit in oothecae which are yet to harden completely (CROSSKEY, 1951). Though the species is cosmopolitan, it occurs mostly in urban areas where its hosts – particularly *Periplaneta americana* – are abundant. Both *Blatta orientalis* Linnaeus, 1758 and *Periplaneta americana* (Linnaeus, 1758) are present in the Maltese Islands, though the latter is more common and widespread (VALLETTA, 1954, 1955). *Evania appendigaster* was mentioned by SULTANA & FALZON (2002) as occurring in the Maltese Islands, but the illustration in that work does not show the necessary morphological features required to confirm its specific identity.



Figure 2: *Evania appendigaster* (Linnaeus, 1758). Collection data: Malta, Mellieħa, 25.vii.2017 (malaise trap), leg. D. Mifsud.

Zeuxevania splendidula (Costa, 1884)

(Fig. 3)

Material examined. MALTA: Mellieha (St Maria Estate), 25.vii-25.viii.2017, 37 exs. (malaise trap), leg. D. Mifsud; Fawwara, 1-8.v.2017, 5 exs. (malaise trap), leg. D. Mifsud.

Description. Length 4.5-5.5 mm; body overall black, with tibiae, tarsi and parts of the antennae of an oxblood hue; head with evident punctuation except for the clypeus which is smooth and shiny; petiole heavily punctuated.

Notes. *Zeuxevania splendidula* has a largely Mediterranean distribution, occurring in southern european countries such as France, Italy, Croatia and Greece; it is also recorded from Egypt (DEANS, 2005). It has only been reared from a single cockroach species, *Loboptera decipiens* (Germar, 1817). *Loboptera decipiens* is a very common and widespread cockroach in the Maltese Islands, found under stones and among leaf litter in garigue, maquis and woodland (VALLETTA, 1955).



Figure 3: *Zeuxevania splendidula* (Costa, 1884). Scale bar 1mm. Collection data: Malta, Fawwara, 1-8.v.2017 (malaise trap), leg. D. Mifsud.

DISCUSSION

Only three species of evaniids are here recorded from the Maltese Islands. Though this number is objectively low, the evaniid fauna of the archipelago is not expected to be exceptionally richer, due to the low number of potential host species paired with a small land area. In fact, only seven cockroach species are known to inhabit the Maltese Islands (SCHEMBRI, 1980). The oothecae of *Blatta orientalis* and *Periplaneta americana* are preferred by *Evania appendigaster*; those of *Loboptera decipiens* are preyed on by *Zeuxevania splendidula*; *Brachygaster minutus* oviposits into the oothecae of

Ectobius, of which at least one species occurs in the Maltese Islands – *E. kraussianus*. However, the oothecae of *Supella longipalpa* are not preyed on by any evaniids found so far in Malta, and those of *Blattella germanica* have only been dubiously linked to *Evania appendigaster* (DEANS, 2005). Similarly, no evaniid is known to attack the oothecae of *Polyphaga aegyptiaca*; the oothecae of this species are deposited directly into sand and fine limestone dust, where evaniid oviposition may be hindered.

An additional evaniid which could potentially also occur in Malta is *Prosevania fuscipes* (Illiger, 1807). Its possible presence is linked to the fact that it is distributed throughout the Mediterranean basin and due to the presence of its hosts, *Blatta orientalis* and *Periplaneta americana* (Deans, pers. comm., 2020). More sampling efforts may reveal the possible presence of this species in Malta. The three species recorded so far from the Maltese Islands are either near-cosmopolitan, European, or broadly Mediterranean in distribution.

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