

Short scientific note

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First record of *Aphaereta difficilis* Nixon, 1939 from Italy with a key to the Italian species of the genus (Hymenoptera: Braconidae, Alysiniinae)

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Abstract

The present article reports the first discovery of *Aphaereta difficilis* Nixon, 1939 (Hymenoptera: Braconidae: Alysiniinae) in Italy. The specimens were captured on the external wall of a house on the outskirts of the city of Galatone (province of Lecce, South-Eastern Italy) at the end of October 2020. They formed an aggregation of about eight specimens, all females, and they were in the immediate vicinity of pieces of rotting meat, so it is plausible to assume that the specimens came out of some Diptera-Cyclorhapha chrysalis. These finds represent a significant contribution towards a better knowledge of the distribution of members of the genus *Aphaereta* in Italy. Moreover, a key to the Italian *Aphaereta* species is provided.

Key words: Endoparasitoids, Braconidae, *Aphaereta*, Apulia, Italy, key.

Introduction

Members of *Aphaereta* Foerster, 1863 can be recognised amongst the other genera of the tribe Alysini by the following characters: mandible simple and with three teeth; its ventral and diagonal ridges well developed; first flagellar segment distinctly shorter than second segment; pterostigma of fore wing narrow, merging imperceptibly with R1 in most species; fore wing RS+M absent; 2RS shorter than 3RSa; first subdiscal cell open; 2CU interstitial or nearly so; hind wing with m-cu absent, if rarely cu-a present, then r-m and M+CU much shorter than 1M; ovipositor sheath sparsely setose throughout (Wharton 2002).

Aphaereta species are parasitoids of different families of Diptera-Cyclorhapha such as Agromyzidae, Anthomyiidae, Calliphoridae, Chloropidae, Drosophilidae, Fanniidae, Muscidae or Sarcophagidae (Yu et al. 2016). This genus includes 48 species described worldwide, of which only two, *Aphaereta major* (Thomson, 1895) and *A. minuta* (Nees, 1811), are known from Italy (Yu et al. 2016). In this paper, the species *Aphaereta difficilis* Nixon, 1939 is recorded for the first time in Italy. Moreover, a key for the identification of *Aphaereta* species in Italy is provided.

Material and methods

The specimens were collected on the external wall of a house on the outskirts of the city of Galatone, province of

Lecce, Apulia (South-Eastern Italy) at the end of October 2020 by aspirator bottle. Galatone is a town located in Apulia (40°09'N, 18°03'E) with an altitude of 50m above sea level. This site is located in a transition area between two different biogeographical realities (Eastern and Western Apulia).

The climate is typically Mediterranean with hot and breezy summers and mild winters. Soil is characterized 100% by plains. Surface hydrography is absent due both to the low rainfall and also because of the karstic nature of the soil. In Galatone, as in most of Apulia, man-made alterations, especially the excessive use of herbicides and pesticides, have led to a worrying reduction in biodiversity.

The terminology of morphological features, sculpture and measurements (including mandibles) see Peris-Felipo et al. (2014); for wing venation nomenclature see van Achterberg (1993); for measurements of the marginal cell see Peris-Felipo & Belokobylskij (2017). Material was imaged using a Digital Microscope Keyence® VHX-2000 and Adobe Photoshop® imaging system. The types of described species are deposited in the Insect Collection of Salento [“Collezione insetti del Salento”] (Galatone, Italy; CIDS), the Civic Museum of Natural History of Ferrara [“Museo Civico di Storia Naturale di Ferrara”] (Ferrara, Italy; MSNF) and the F.J. Peris-Felipo Entomological Collection (Basel, Switzerland; PFEC).

Taxonomic part

Order Hymenoptera Linnaeus, 1758

Family Braconidae Nees, 1811
 Subfamily Alysiinae Leach, 1815
 Tribe Alysiini Leach, 1815
 Genus *Aphaereta* Foerster, 1863

***Aphaereta difficilis* Nixon, 1939**

Aphaereta difficilis Nixon 1939: 64; Papp 1965: 18; Fischer 1967: 111; Shenefelt 1974: 957; Tobias 1986: 240; Belokobylskij 1998: 276; van Achterberg et al. 2012: 7; Yu et al. 2016.

Diagnosis: Body length 1.5–2.2 mm. Head, in dorsal view, 1.9 times as wide as its median length and 1.5 times as wide as mesoscutum. Eye, in lateral view, 2.3–2.4 times as wide as temple medially. Face 1.4 times as wide as high. Mandible 1.6 times as long as wide. Upper tooth wider than lower tooth. Antenna 19–24-segmented. Second flagellar segment 1.7–1.8 times as long as first segment. Mesosoma, in lateral view, 1.3 times as long as high. Mesoscutum as long as its maximum width. Notaulus mainly absent. Mesoscutal pit absent. Prescutellar depression without lateral carinae. Scutellum distinctly convex medially. Precoxal suture present, wide and crenulate. Posterior mesopleural furrow slightly crenulated below. Propodeum sculptured with a small pentagonal areola. Propodeal spiracle relatively small. Hind femur 5.0 times as long as its maximum width, with erect setose bristles and comparatively widened apically in lateral view. First

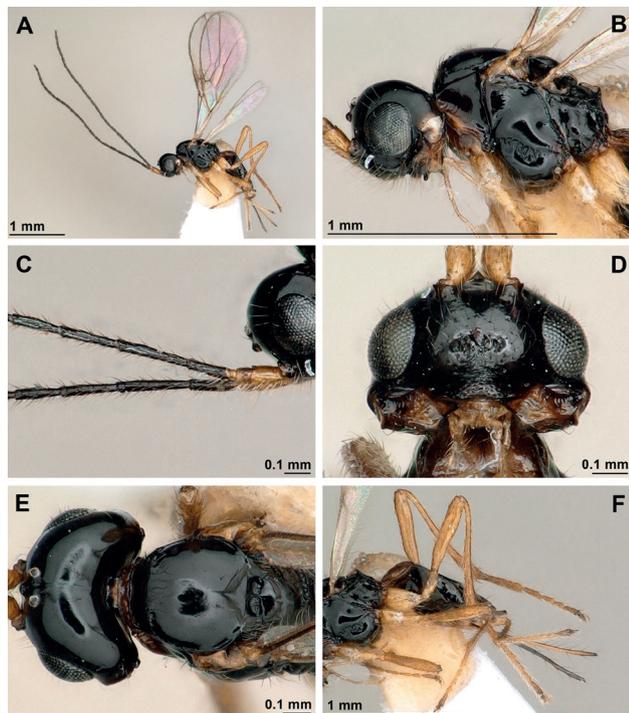


Fig. 1 – *Aphaereta difficilis* Nixon, 1939 (female). **A**, Habitus, lateral view; **B**, Head and mesosoma, lateral view; **C**, Antenna, basal segments; **D**, Head, frontal view; **E**, Head and mesonotum, dorsal view; **F**, Legs, metasoma and ovipositor, lateral view.

metasomal tergite about as long as its apical width, almost smooth. Ovipositor 3.2 times as long as first metasomal tergite, about as long as metasoma, 1.6 times as long as hind femur. Main colour brown and dark brown.

Material examined. 8 ♀♀, Italy, Lecce, Galatone, 27.x.2020 (Rolli leg.) (2♀ CIDS, 2♀ MSNF, 1♀ PFEC).

Comparative diagnosis. This species is similar to *A. minuta* (Nees, 1811) but it differs from the latter in having the precoxal sulcus wide and crenulated (present without impressions in *A. minuta*), scutellum distinctly convex medially (slightly convex in *A. minuta*), and hind femur with erect setose bristles and comparatively widened apically in lateral view (less bristly setose and more slender in *A. minuta*).

Distribution. Palaearctic region (Austria, Bulgaria, France, Germany, Greece, Hungary, Iran, Israel, Korea, Moldova, Morocco, Poland, Romania, Russia, Serbia, Spain, Switzerland, Tunisia, and Uzbekistan) (Yu et al. 2016)

Key to the Italian species of the genus *Aphaereta* Foerster

1. Antenna as long as body. Notauli deep on horizontal surface of mesoscutum. Radial cell not reaching wing apex. First metasomal tergite about as long as its apical width. Hind femur 4.0 times as long as its maximum width. Body length 2.5–4.0 mm. Palaearctic region.
*A. major* (Thomson)
- Antenna longer than body. Notauli mainly absent on horizontal surface of mesoscutum. Radial cell reaching wing apex. First metasomal tergite more than 1.5 times as long as its apical width. Hind femur about 5.0 times as long as its maximum width.....**2**
2. Precoxal sulcus wide and crenulated (Fig. 1B). Scutellum distinctly convex medially (Fig. 1E). Hind femur with erect setose bristles and comparatively widened apically in lateral view (Fig. 1F). Second flagellar segment 1.7–1.8 times as long as first segment (Fig. 1C). Face 1.4 times as wide as high (Fig. 1D). Body length 1.5–2.2 mm. Palaearctic region.....*A. difficilis* Nixon
- Precoxal sulcus mainly smooth (Fig. 3B). Scutellum slightly convex medially (Fig. 3E). Hind femur less bristly setose and more slender in lateral view (Fig. 3F). Second flagellar segment 1.4 times as long as first segment (Fig. 3C). Face 1.6 times as wide as high (Fig. 3D). Body length 2.0–3.0 mm. Nearctic, Oceanic and Palaearctic regions.....*A. minuta* (Nees)

Discussion

Accounts regarding the presence and distribution of the genus *Aphaereta* Foerster, 1863 species are insufficient and only few reports from Italy can be found. Bergamasco et al. (1995) only noted presence in northern Italy of two species: *Aphaereta major* (Thomson) and *A. minor* (Nees).



Fig. 2 – *Aphaereta difficilis* Nixon, 1939, known country-level distribution.

As for most other Italian Braconidae, information on *Aphaereta* species is absent in the most authoritative and representative entomological websites from Italy (Forum degli entomologi Italiani and Forum Natura Mediterraneo). However, the presence of this genus is attested in the surrounding countries such as Austria, Spain or Switzerland, where six, seven and five *Aphaereta* species have been recorded, respectively, or France, where *A. difficilis* and *A. minuta* have been reported.

The evident scarcity of data on this genus in Italy may be linked to the reduced number of specialists on this group of parasitoid wasps and/or to the scarcity of entomological studies that deepen their knowledge (see, e.g., analogous comments on Ichneumonidae by Di Giovanni et al. 2015). Therefore, future studies on Italian parasitoid wasps would be advisable to better understand their distribution and biology, as many of these species make a very important contribution to the biological control of fly pest populations.

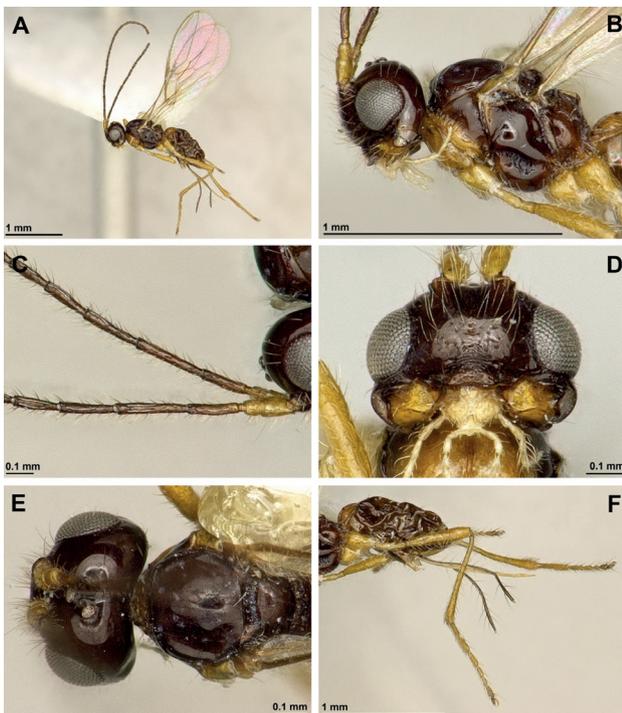


Fig. 3 – *Aphaereta minuta* (Nees, 1811) (female). A, Habitus, lateral view; B, Head and mesosoma, lateral view; C, Antenna, basal segments; D, Head, frontal view; E, Head and mesonotum, dorsal view; F, Legs, metasoma and ovipositor, lateral view.

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