

FIRST RECORD OF THE SOLDIER FLY GENUS *MEROSARGUS* FROM THE PALEARCTIC REGION (DIPTERA: STRATIOMYIDAE)

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Soldier flies are a large Diptera family with a diverse larval biology. Larvae of several subfamilies live in decaying organic, usually vegetable material. Some of these species have spread over large parts of the world due to human transport (trade). In this article, we report the first European record of a New World genus with this type of larval biology. Only a photo is available and unfortunately it is not possible to identify it to the species level.

INTRODUCTION

On the Dutch internet forum Waarneming.nl (part of Observation.org), Linda Aandeweg posted several pictures made on 6.v.2021 of an unknown soldier fly (fig. 1) on a window of a house located at Dinteloord (51.641 N, 4.366 E), a small village in the southwest of the Netherlands (province of Noord-Brabant) (fig. 2).



Figure 1. *Merosargus* spec., Dinteloord (the Netherlands), 6.v.2021. Photo Linda Aandeweg.
Figuur 1. *Merosargus* spec., Dinteloord (Nederland), 6.v.2021. Foto Linda Aandeweg.

RECOGNITION

Based on the elongated abdomen, presence of a distinct aristate antenna, presence of transverse yellow bands on tergites and striking black-and-white leg colouration, the soldier fly was considered to be a non-Palearctic species of Sarginae by the first two authors. After consultation with the last two authors, it was identified as a member of the genus *Merosargus* Loew, 1855, possibly *M. cingulatus* Schiner, 1868 or *M. gracilis* Williston, 1888. Both species are widespread in Central and South America and quite similar in general appearance, with green to metallic reflections on head and thorax and, as commented, with yellowish bands on tergites and black-and-white colouration especially on the hind leg. The main character to distinguish them from each other is the frontal callus in the lower frons of the head, which can be homogeneously white or separated in the centre by a dark brown marking, forming two circular maculae, and intensity of colour of the prothorax (orange to reddish brown in *M. cingulatus*, while dark brown to black in *M. gracilis*) (fig. 3) (see also James & McFadden 1971, Iide & Pujol-Luz 1999). These characters are not visible on the photos and the specimen was not collected, so it is not possible to identify this specimen to the species level.



Figure 2. Locality of record of *Merosargus* spec. in the Netherlands.

Figuur 2. Vindplaats van *Merosargus* spec. in Nederland.

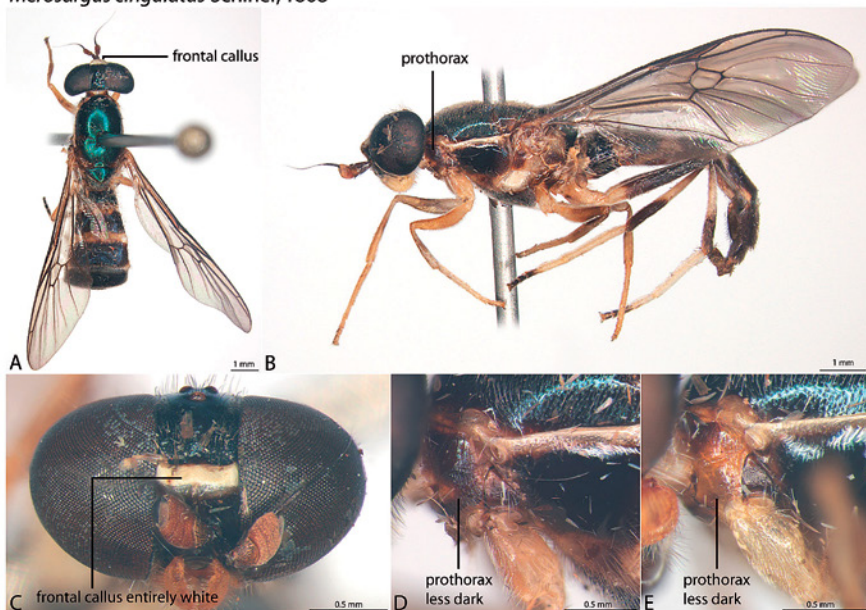
DISCUSSION

The genus *Merosargus* occurs predominantly in the Neotropical region, with only two species reaching the Nearctic (Woodley 2001). It is represented by at least 140 species, which makes it the largest genus of soldier flies in the New World (Woodley 2009). Larvae of Sarginae are known to be associated with a wide variety of decaying organic matter (McFadden 1967, Rozkošný 1982), with *Merosargus* particularly developing in decaying plants and fruits (Fontenelle et al. 2012). At our request, the room was inspected for foreign plants and only one recently purchased plant, identified as *Dendrobium nobile* Lindley, 1830, a well-known commercially grown orchid, also in the Netherlands, originally from Asia (fig. 4) (det. B. Gravendeel), was found. Whether or not this was the source of introduction, remains unclear. Alternatively, the fly (or its larva) might have been introduced by boat on tropical fruit, but the nearest commercial harbours are at 40 km distance (both Rotterdam and Antwerp).

Merosargus is not the first exotic soldier fly to be reported in Europe. Recently, Martínez & Haenni (2021) reported another New World species of Sarginae in Europe: *Sargus fasciatus* Fabricius, 1805. There is a single record dating from a century ago, so the species evidently never got established. Two other well-known cases from different sub-families did get established: *Hermetia illucens* (Linnaeus, 1758) (Hermetiinae) and *Exaireta spinigera* (Wiedemann, 1830) (Beridinae). Both also have larvae feeding on decaying organic material. *Hermetia illucens*, originally from the New World, is known from Europe since 1926, where it is spreading northward continuously and rapidly (Roháček et al. 2013, Ståhls et al. 2020, Kaya et al. 2021). It is also reared as protein source on a large scale (Smit et al. 2019). *Exaireta spinigera*, originally from Australia (Woodley 2001), has been found in Europe since 2008 and is currently expanding its range slowly but steadily. This species is known from Sicily and the Italian peninsula (Schifani & Paolinelli 2018), the Black Sea coast of Russia and Georgia (Nartshuk et al. 2021), Belgium (near Gent), as well as multiple locations in France (Corsica, Provence, the Atlantic coast (Nouvelle-Aquitaine), Brittany) that can be found online in iNaturalist.

In short, some exotic soldier flies get established in Europe, some don't. In the case of *Merosargus*, it has been suggested that the larval biology is less versatile than in the other cases mentioned and that most species in this genus need higher temperatures than present in the Netherlands (Fontenelle et al. 2012). If this is correct, the chance of this genus establishing itself in Europe seems relatively small. On the other hand, if indeed the larva would have been introduced via commercially grown tropical plants, it might spread more rapidly, but would not pose a threat to agriculture.

Merosargus cingulatus Schiner, 1868



Merosargus gracilis Williston, 1888

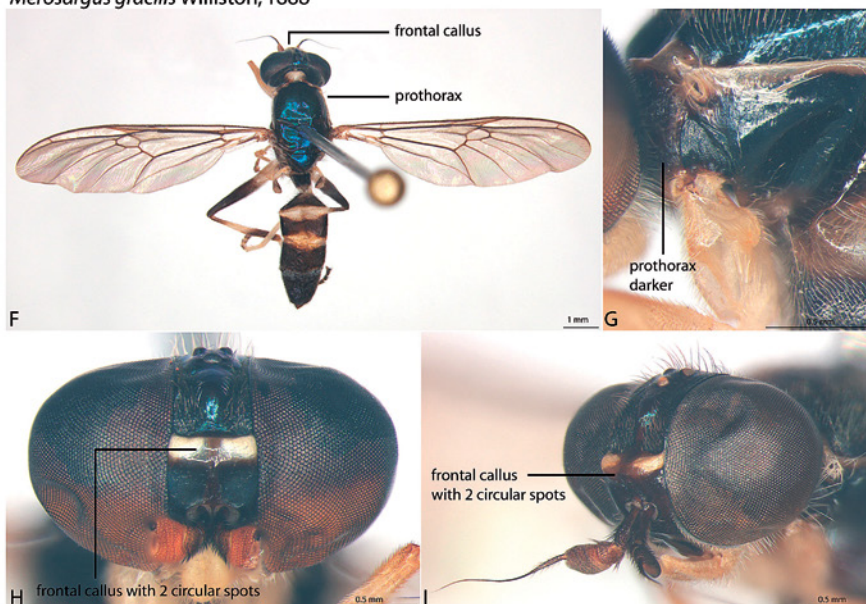


Figure 3. Diagnostic features for separating *Merosargus cingulatus* and *M. gracilis*. All specimens are females from Brazil. a-e. *Merosargus cingulatus*, f-i. *Merosargus gracilis*, a., f. habitus, dorsal, b. habitus, lateral, c., h. head, frontal, d., e., g. thorax, lateral, close-up of prothorax, i. head, laterofrontal. Photos Diego Fachin.

Figuur 3. Kenmerken voor het onderscheiden van *Merosargus cingulatus* en *M. gracilis*. Alle exemplaren zijn vrouwtjes uit Brazilië. a-e. *Merosargus cingulatus*, f-i. *Merosargus gracilis*, a., f. habitus, van boven, b. habitus, van opzij, c., h. kop, van voren, d., e., g. thorax, van opzij, close-up van prothorax, i. kop, schuin van voren. Foto's Diego Fachin.



Figure 4. Recently purchased *Dendrobium nobile* at the locality of the observed *Merosargus* spec., possible origin of the larva. Photo Linda Aandeweg.
 Figuur 4. Recente gekochte *Dendrobium nobile* op de plek waar de *Merosargus* spec. waargenomen is, mogelijk de bron van de introductie. Foto Linda Aandeweg.

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SAMENVATTING

Eerste waarneming van een wapenvlieg uit het genus *Merosargus* in de Palearctische regio (Diptera: Stratiomyidae)

Op grond van een foto uit Dinteloord, Noord-Brabant, op Waarneming.nl melden wij voor het eerst een wapenvlieg uit het genus *Merosargus* in de Palearctische regio. Op grond van de foto's is de soort niet met zekerheid vast te stellen, maar het betreft aannemelijk *M. cingulatus* of *M. gracilis*. De larven van *Merosargus* en andere Sarginae leven in rottend plantaardig materiaal. Soorten met een dergelijke levenswijze laten zich relatief makkelijk over de aarde transporteren. De bron is in dit geval mogelijk, maar niet zeker, een gekweekte orchidee *Dendrobium nobile*.

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