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Preimaginal morphology of the genera *Salpingogaster* Schiner, 1868 and *Eosalpingogaster* Hull, 1949 (Diptera: Syrphidae), with its systematic implications

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Abstract

The puparium of *Salpingogaster nigra* and *Eosalpingogaster umbra* are described, and diagnosis and illustrations are provided. The morphology of immature stages of the genera *Salpingogaster* and *Eosalpingogaster* are studied and compared for the first time. The results are in agreement with previous molecular analyses that recognise both genera as valid. We found two different puparium morphotypes for *E. umbra* and discuss the improbability of immature sexual dimorphism in this species. An identification key is also provided for all species with known puparia.

Key words: hover flies, flower flies, immature stages, puparium, description

Introduction

Salpingogaster Schiner, 1868 and *Eosalpingogaster* Hull, 1949 are two New World species-groups of Syrphidae that range from southern USA to south of Chile and Argentina. About 35 species are known and both taxa have been traditionally recognized as subgenera of *Salpingogaster* (Thompson *et al.* 2010).

Adults of *Salpingogaster* and *Eosalpingogaster* share a set of conspicuous morphological characters including a similar adult habitus with the abdomen distinctly and strongly petiolate. Since the original description by Hull (1949), *Eosalpingogaster* has been considered as a subgenus of *Salpingogaster* until very recently (Thompson *et al.* 1976; Vockeroth & Thompson 1987; Thompson 1999; Thompson *et al.* 2010). Mengual *et al.* (2008a), based exclusively on molecular data, recovered the monophyly of *Salpingogaster* s. str., but the single species of *Eosalpingogaster* analysed was resolved in another clade, more related to species of the genera *Ocyptamus* Macquart, 1834 and *Toxomerus* Macquart, 1855. More recently, a detailed review of *Eosalpingogaster* based on adult morphology, which included a molecular analysis with several species of both species-groups, concluded that *Salpingogaster* and *Eosalpingogaster* must be considered distinct and valid genera (Mengual & Thompson 2011).

As in virtually all flower flies, adults feed on nectar and pollen from flowers, and are considered common plant pollinators. Plant species pollinated by flies often present low specificity and generalized pollination systems, but unidentified species of *Salpingogaster* have been recently cited as exclusive visitors and pollinators of a South American orchid through a pollen-deceptive mechanism (Pansarin 2008). After checking the very low-quality images in Pansarin (2008), it seems that there has been a misidentification: the specimen(s) photographed is an *Ocyptamus* species. This is not the first case of misidentification between *Salpingogaster* and *Ocyptamus* (see Thompson & Zumbado 2000).

The larval biology of a few species of *Salpingogaster* and *Eosalpingogaster* is known, and all of them are related to hemipteran pests of crops (see review in Rojo *et al.* 2003). The natural history of both species-groups is