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Scientific note

The food is on *Urbanus proteus proteus* (Linnaeus, 1758): First report of its *Apanteles* sp. parasitoids in Alagoas, Brazil

(Lepidoptera, Hesperiidae, Eudaminae and Hymenoptera, Braconidae)

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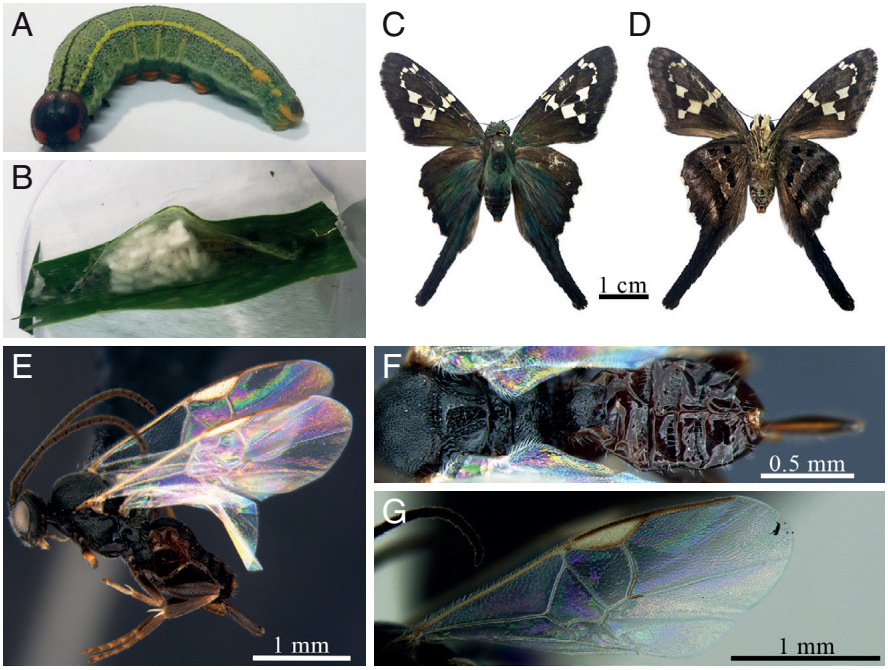

Fig. 1. A. One of *Urbanus proteus proteus* (Linnaeus, 1758) larvae (DZ 63.808–DZUP). **B.** Hymenoptera cocoons on top of the dead hesperiid larva. **C, D.** *U. proteus proteus*, female, dorsal and ventral views. *Apanteles* Förster, 1862, female (DZUP549527): **E.** lateral view, **F.** dorsal view, and **G.** forewing.

Besides interacting with their abiotic environment, species also interact with each other in a complex ecological network. Relationships among plants, herbivores, and their natural enemies are so-called 'tritrophic interactions' (Tscharntke & Hawkins 2002). This type of interaction includes the transfer of chemical signals among these organisms. During the feeding activity of herbivores, host plants emit chemical signals leading to recognition by parasitoids which are attracted to the herbivores and cause increased mortality of the herbivore population (Turlings et al. 2002). For that reason, reporting and identifying the species involved in this association is a basic knowledge to be used in biological control of such defoliators. According to the literature, *Urbanus proteus* (Linnaeus, 1758) larvae have been pointed out as one of the greatest defoliators of bean crops, impacting the plants' development by drastically increasing the damage to leaves during the fourth and fifth larval

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instars (Greene 1971). This work presents the first record of parasitoids associated with *U. proteus proteus* larvae and its host plant in the State of Alagoas, Brazil.

Six larvae were collected between October 2019 and March 2020 in the Universidade Federal de Alagoas (UFAL) (9°33'27.1''S, 35°46'36.4''W 88 m a.s.l.), Maceió, State of Alagoas, Brazil. The immatures were placed into bernadete's cage (Lima & Carvalho 2017) to record egressions of parasitoids or emergences of adults. One hesperiid voucher and some parasitoids specimens were deposited into the Coleção Entomológica Padre Jesus Santiago Moure (DZUP), at the Universidade Federal do Paraná (UFPR), Curitiba, Paraná, Brazil. Branches from the host plant were deposited as voucher in the MAC Herbarium of the Instituto do Meio Ambiente de Alagoas (IMA-AL) and had the species identified. The parasitoid was identified by José Fernández-Triana, a Microgastrinae specialist. The hesperiid was identified through Evans (1952).

Clitoria fairchildiana R.A. Howard (MAC voucher no. 65228) (Fabaceae) was identified as the host plant of *U. proteus proteus* (Fig. 1c,d). Of the six larvae (Fig. 1a), three were parasitized by gregarious parasitoids, which, during the hesperiid last instar, egressed and immediately built white cocoons on top of the dead larva (Fig. 1b). Of 39 cocoons of the first larva, 36 wasps emerged; from the other two sets of 40 and 47 cocoons of the other two larvae, all wasps emerged successfully (Fig. 1e–g).

Apanteles Förster, 1862 (Braconidae) was confirmed as the parasitoid of *U. proteus proteus*. *Urbanus proteus proteus* had already been associated to *Apanteles* in Brazil as an unidentified species (Maruya et al. 2001, Perioto et al. 2003), to *Apanteles leucostigmus* (Ashmead, 1900) in United States of America (Fernández-Triana et al. 2014), and also to a potentially undescribed species of *leucostigmus* species-group in Trinidad, Trinidad and Tobago (Cock 2015). Recently, a review of *Apanteles* Förster, 1862 brought an enormous quantity of new species from Mesoamerica, especially to the *leucostigmus* species-group, which comprises the largest species group within *Apanteles* and it is distributed along the Neotropical Region, and most species are gregarious parasitoids of many hesperiid, including *Urbanus* Hübner, [1807] (Fernández-Triana et al. 2014). However, the species-level identification of this group is a challenge due to the fact that many species are recognized by the combination of mostly DNA barcoding and the host data (Fernández-Triana et al. 2014). This shows how little is known about tri-trophic interactions in the Neotropics, as well as the identity of the organisms parasitizing others. Thus, it is important to report these interactions so as to recognize these species, and finally export this knowledge to further studies such as the biological control of defoliator larvae like *U. proteus proteus*.

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