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A new species of *Telenomus* Haliday (Hymenoptera: Platygasteridae) egg parasitoid of *Parides ascanius* (Cramer) (Lepidoptera: Papilionidae), a threatened species from Brazil

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Abstract

Telenomus parides Loiácono et Margaría **sp. nov.**, is described and illustrated based on specimens reared from the eggs of *Parides ascanius* (Cramer). *Parides ascanius* is a threatened papilionid, which is endemic to the restingas of the Atlantic Forest of Rio de Janeiro, Brazil. The new *Telenomus* species is gregarious endoparasitoid and belongs to the *Telenomus californicus* species complex.

Key words: Platygasterid, natural enemy, lepidopteran, Neotropical

Resumo

Telenomus parides Loiácono et Margaría **sp. nov.**, é descrita e ilustrada baseada em espécimes criados a partir de ovos de *Parides ascanius* (Cramer). *Parides ascanius* é uma borboleta da família Papilionidae, que é endêmica das restingas da Mata Atlântica do Rio de Janeiro, Brasil. A nova espécie de *Telenomus* é um endoparasitóide gregário e pertence ao complexo de espécies de *Telenomus californicus*.

Introduction

The fluminense swallowtail, *Parides ascanius* (Cramer) (Lepidoptera: Papilionidae: Troidini) is a threatened Neotropical papilionid species that is listed in the IUCN Red Data Book since 1983 (Wells *et al.* 1983; IUCN 2015) and threatened by the Brazilian government since 1973 (IBDF 1973; MMA 2014; Brown & Freitas 2008). This primitive, aposematic and relict species is endemic to the Atlantic Forest of Southeastern Brazil and can be found in the coastal and subcoastal lowland swampy vegetation, mainly restinga. Females lay isolated eggs year-round directly in the canopy of pipevine, *Aristolochia macroura* (Aristolochiaceae) or neighboring trees (Tyler *et al.* 1994; New *et al.* 1995; Brown 1996; Herkenhoff *et al.* 2013). Six generations of the fluminense swallowtail develop per year similarly to other Brazilian *Parides* species (D'Almeida 1966; Otero & Brown 1986).

Tavares *et al.* (2006) published the first record of parasitoids reared from *P. ascanius* but none of them were egg parasitoids. Otero & Brown (1986) have reported one parasitized egg of *Parides ascanius* but did not provide any taxonomic information about the parasitoid. Johnson (1984) broadly established eleven host specific groups of *Telenomus* Haliday: *T. tabanivorus* (Ashmead), from Diptera, *T. californicus* Ashmead, *T. arzamae* Riley and *T.*

dalmanni Ratzeburg species group complex from Lepidoptera, *T. floridanus* (Ashmead), *T. crassiclava* Nixon, *T. podisi* Ashmead, *T. phymatae* Johnson, *T. laricis* Walker, *T. nigricoxalis* Ashmead from Hemiptera, and *T. longicornis* Ashmead with host unknown. Several species of *Telenomus californicus* species group were recorded as endoparasitoids of lepidopteran eggs from Brazil (Loiácono & Margaría 2002). Although most *Telenomus* species are solitary egg parasitoids, and only a few species that attack larger eggs of different insect orders are gregarious (Margaría *et al.* 2007).

Hereby we describe a new gregarious *Telenomus* species that parasitize *Parides ascanius* eggs.

Material and methods

Telenomus specimens were reared from eggs of *Parides ascanius* from natural populations collected by one of the authors (GSSA) in Rio de Janeiro City, Rio de Janeiro, Brazil. Samples were maintained at room temperature following the rearing protocol of Tyler *et al.* (1994). *Parides ascanius* eggs were kept individually in colorless, 270 ml, hermetically sealed plastic vials with a piece of wet filter paper and inspected daily until the emergence of adult parasitoids or the host caterpillars. Parasitoid specimens were frozen and stored in 70% ethanol while caterpillars were returned to the same site where they were collected. Type specimens and other material are deposited in Coleção Entomológica da Universidade Federal do Espírito Santo -UFES-, Departamento de Ciências Biológicas, Vitória, Brazil (UFES) and División Entomología, Museo de La Plata, Argentina (MLP).

Morphological terminology follows Masner (1976) and Johnson (1984).

Specimens were examined and brightfield images were taken with Leica S8 Apo stereomicroscope and Leica DFC290 camera. Genitalia images were taken with a Leitz/Wetzlar/SM/LUX microscope. For Scanning Electron Microscopy (SEM) examination specimens were dehydrated in ethanol series (80% - 96% - 100% - 100%), critical point dried, and mounted on insect pins. SEM micrographs were obtained with FEI Quanta 250 environmental SEM. Images were edited with Adobe Photoshop CS3.

Unless otherwise noted, all ratios are of length: width (L/W). The abbreviations A and T are used for antennal segments and metasomal terga, respectively; TL: total length.

Telenomus parides Loiácono *et* Margaría sp. nov.

Figs. 1–6

Description. Female. Body length 0.8 mm.

Color. Head and body dark brown, covered by short whitish setae; coxae light chestnut brown; femora, tibiae and tarsi yellow; A1–A6 yellow, A7–A11 light brown, gradually darkening distally.

Head. Vertex smoothly rounded onto occiput medially, occiput coriaceous throughout; hyperoccipital carina absent; occipital carina simple; frons slightly coriaceous; orbital bands present; frontal pit absent; frontal depression absent; frons not bulging between toruli and inner orbits; eyes extremely large, hairy; malar space coriaceous, temples not bulging, not grooved; frons width equal eye height; Antennae 11-segmented; clava 5-segmented; A2 subequal to A3; A6 as long as wide; A9–A10 transverse.

Mesosoma. Mesoscutum convex, finely coriaceous, setose; scutellum smooth, scarcely setose, submarginal foveae about equal in size to dorsellar punctures; mesoscutellum rectangular, overlapping metapectal-propodeal complex, finely punctate reticulate; acetabular carina simple; episternal foveae and mesopleural carina absent; width of intercoxal space less than length of fore coxa, intercoxal space greater than length of setae arising from its surface; wings clear (Fig. 3), surpassing apex of metasoma in flexed position; basal vein not pigmented; postmarginal vein longer than stigmal; hind wing narrow, greatest width only slightly greater than width of fringe at that point.

Metasoma (Fig. 4). T1 with 1 pair of sublateral setae and 3 pairs of lateral setae; greatest length of basal costae on T2 about two times medial length of T1. L/W T1: 28/75; L/W T2: 18/15; L/W metasoma: 69/43.

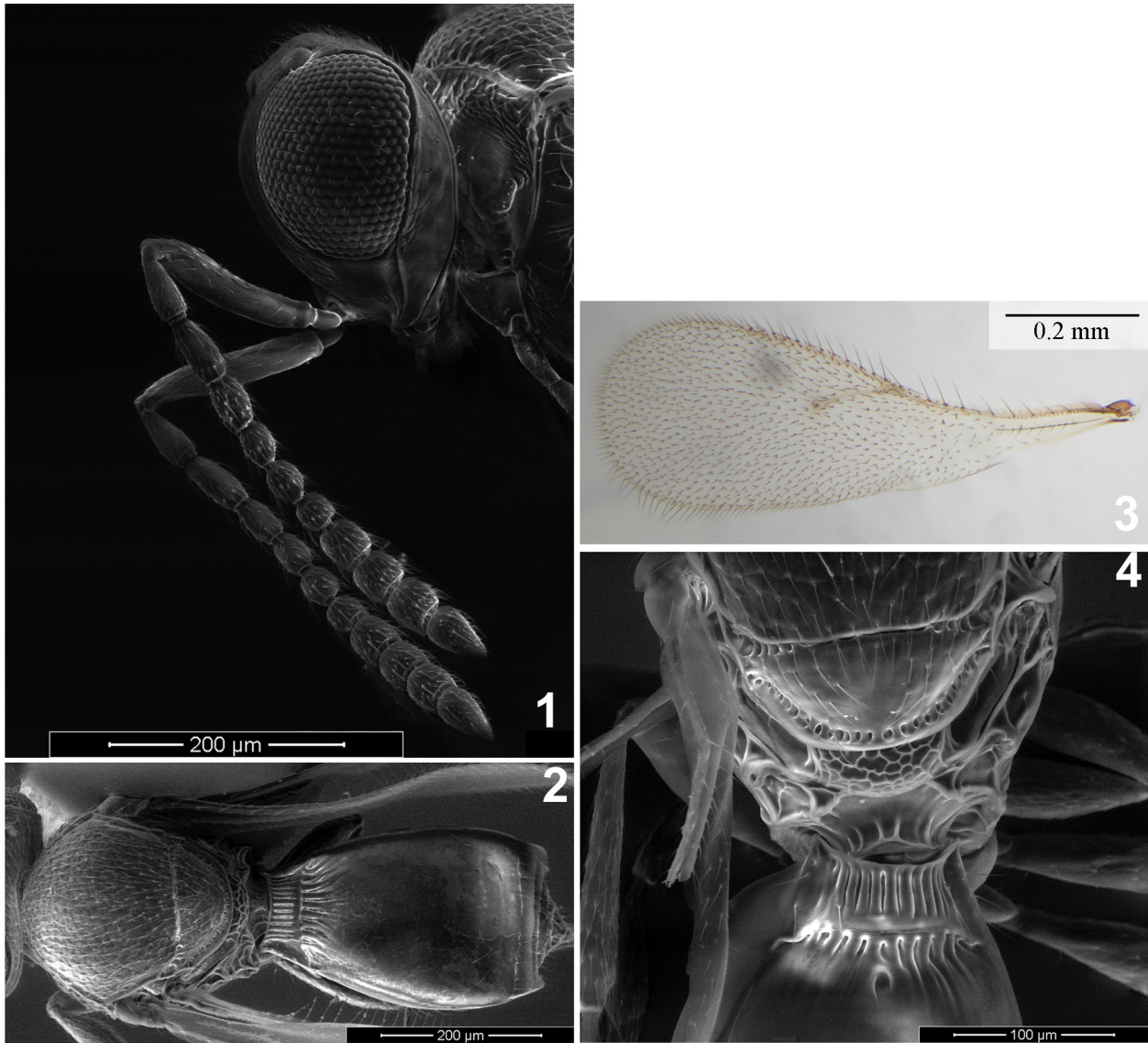
Male: Identical to the female differing only in the normal secondary sexual characters; antennae A2 subequal to A3; A3–A5 longer than wide; A6–A11 moniliform; A12 longer than wide (Fig. 5). Genitalia: digitus with 3 small teeth, laminae volsellares not well-delimited medially, aedeagal lobe rounded (Fig. 6).

Distribution: Rio de Janeiro City, Rio de Janeiro, Brazil.

Host. *Parides ascanius* (Lepidoptera, Papilionidae) (Fig. 7).

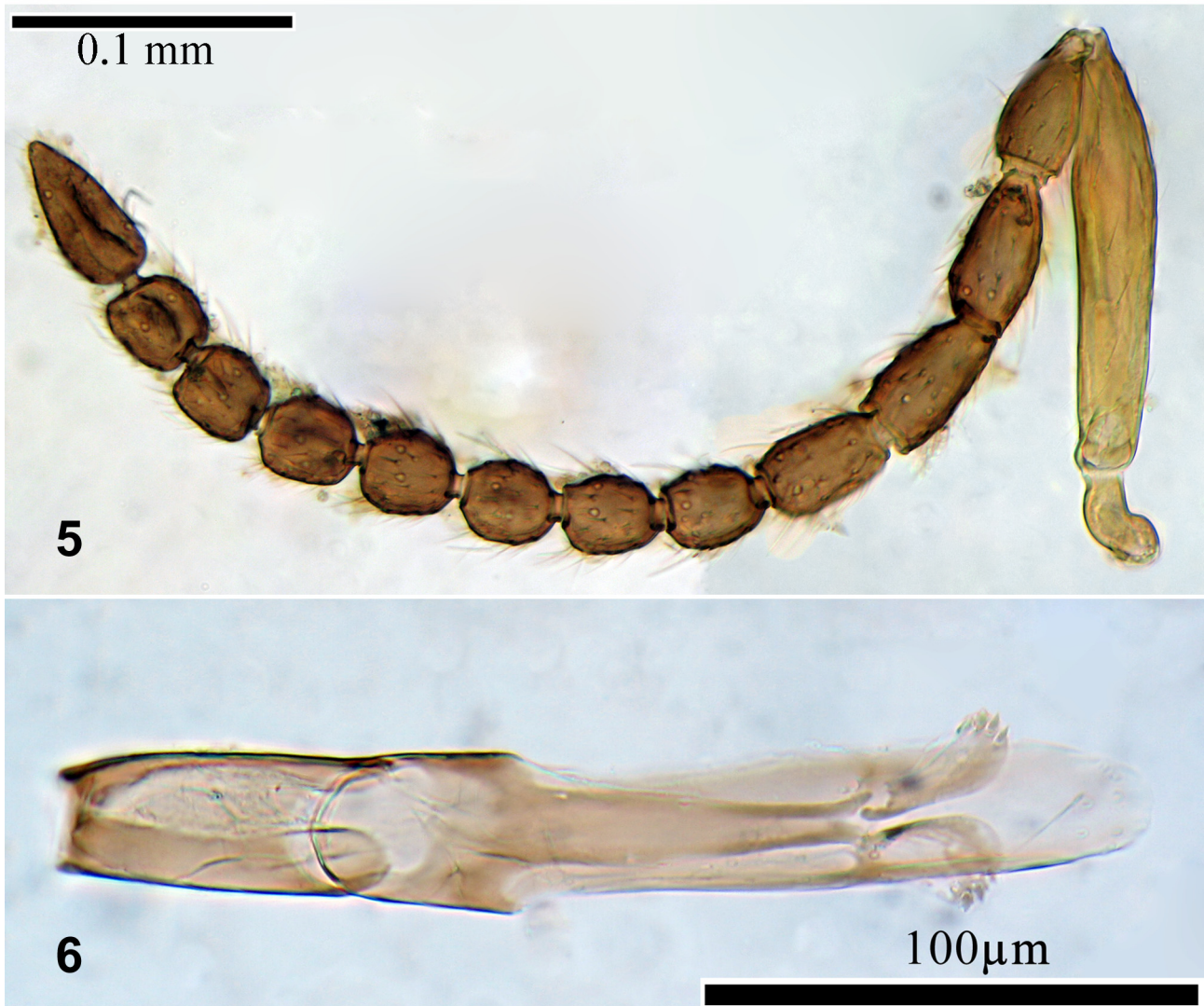
Biological data. *Telenomus parides* is a gregarious egg endoparasitoid of *Parides ascanius* with 2–15 parasitoids developing in one host egg (mean = 8.56 ± 2.46; N = 48). The progeny size of gregarious *Telenomus* usually range from

5–10 specimens (Johnson 1984), but may reach 20 (Margaría *et al.* 2007). Parasitized eggs of *Parides* darkening progressively until they became entirely black, similar to the host eggs of other proctotrupomorph parasitoids (Tyler *et al.* 1994; Austin *et al.* 2005; Loiácono *et al.* 2006). The sex ratio (female offspring/total offspring) of natural *Telenomus parides* populations were female biased, ranging from 0.73 to 1 (mean = 0.89 ± 0.09 ; N = 11). Female biased sex ratio is common in *Telenomus* species both in natural and in captive populations (Bruce *et al.* 2009; Carleton *et al.* 2010; Pomari *et al.* 2012).



FIGURES 1–4. *Telenomus parides* Loiácono et Margaría sp. nov. Female 1. Head in lateral view (SEM). 2. Mesosoma and metasoma dorsal view (SEM). 3. Fore wing. 4. Mesosoma and metasoma details in dorsal view (SEM).

Material examined. Holotype female, Parque Natural Municipal de Marapendi (Itaúna), 23°0'44.53"S 43°25'13.7"W, (Rio de Janeiro City, Brazil), 7.XII.2008, Almeida coll., (UFES). Paratypes, 7 females, 8.IX.2005, Almeida coll. (UFES); 26 females, 4 males, 7.X.2005, Almeida coll. (UFES); 31 females, 5 males, 7.XII.2008, Almeida coll. (UFES); 3 females (UFES), 5 females (MLP), 2 males (MLP, mounted and microscopic slide), same data as holotype. Paratypes, 3 females (UFES), 3 females (MLP), same data as holotype except 12.XII.2008; 1 male (UFES), 2 males (MLP, mounted and microscopic slide), same data as holotype except 12.XII.2008; 8 females, 1 male, 12.XII.2008, Almeida coll. (UFES); Parque Natural Municipal de Marapendi (head office), 23°1'0.23"S 43°26'55.13"W, (Rio de Janeiro City, Brazil), 7 females, 30.VIII.2005, Almeida coll. (UFES); Parque Natural Municipal Bosque da Barra, 22°59'58.65"S 43°22'23.63"W, (Rio de Janeiro City, Brazil), 4 females, 6.VIII.2005, Almeida coll. (UFES); 8 females, 1 male, 27.XII.2008, Almeida coll. (UFES).



FIGURES 5–6. *Telenomus parides* Loíacono et Margaría sp. nov. Male. 5. Antenna. 6. Genitalia.

Diagnosis. *Telenomus parides* belongs to the *T. californicus* species-complex (see key in Johnson, 1984) by the following morphological characters: female antennal clava 5-segmented; eyes hairy; occipital carina simple; metascutellum about as long laterally as medially, punctate above; episternal fovea absent, metapleural carina absent. Basal wing not pigmented. T1 with one pair of sublateral setae. The new species belong to the “Other unplaced species of the *T. californicus* complex” as *T. demodoci* based on the presence of small digital teeth and not well-delimited laminae volsellares.

Telenomus parides is similar to *T. demodoci* Nixon 1936, both differs from other members of the complex by the very distinctive male genitalia, longer and narrower. *Telenomus demodoci* and *T. parides* genitalia is 4–4.2x as long as wide, whereas in other *Telenomus* species of the *californicus* group is about 3.5x as long as wide. Both species were reared from eggs of papilionids: *Telenomus demodoci* from *Papilio demodocus* in Uganda (Nixon, 1936) and *T. parides* from *Parides ascanius* in Brazil. *Telenomus parides* differs from *T. demodoci* by the female antenna segments: A2 is longer than A3 in *demodoci*, subequal in *parides*; A9–A10 more transverse in *demodoci*; fringe of hind wing with about two thirds to three-fourths the greatest width of the wing in *demodoci*, only slightly greater than width of fringe at that point in *parides*. Male genitalia of *parides* has digital teeth slightly shorter than *demodoci*, laminae volsellares fused for part of their length in *parides* and in the form of two well-sclerotized ventral rods in *demodoci*, aedeagal lobe shorter in *parides* than in *demodoci*.

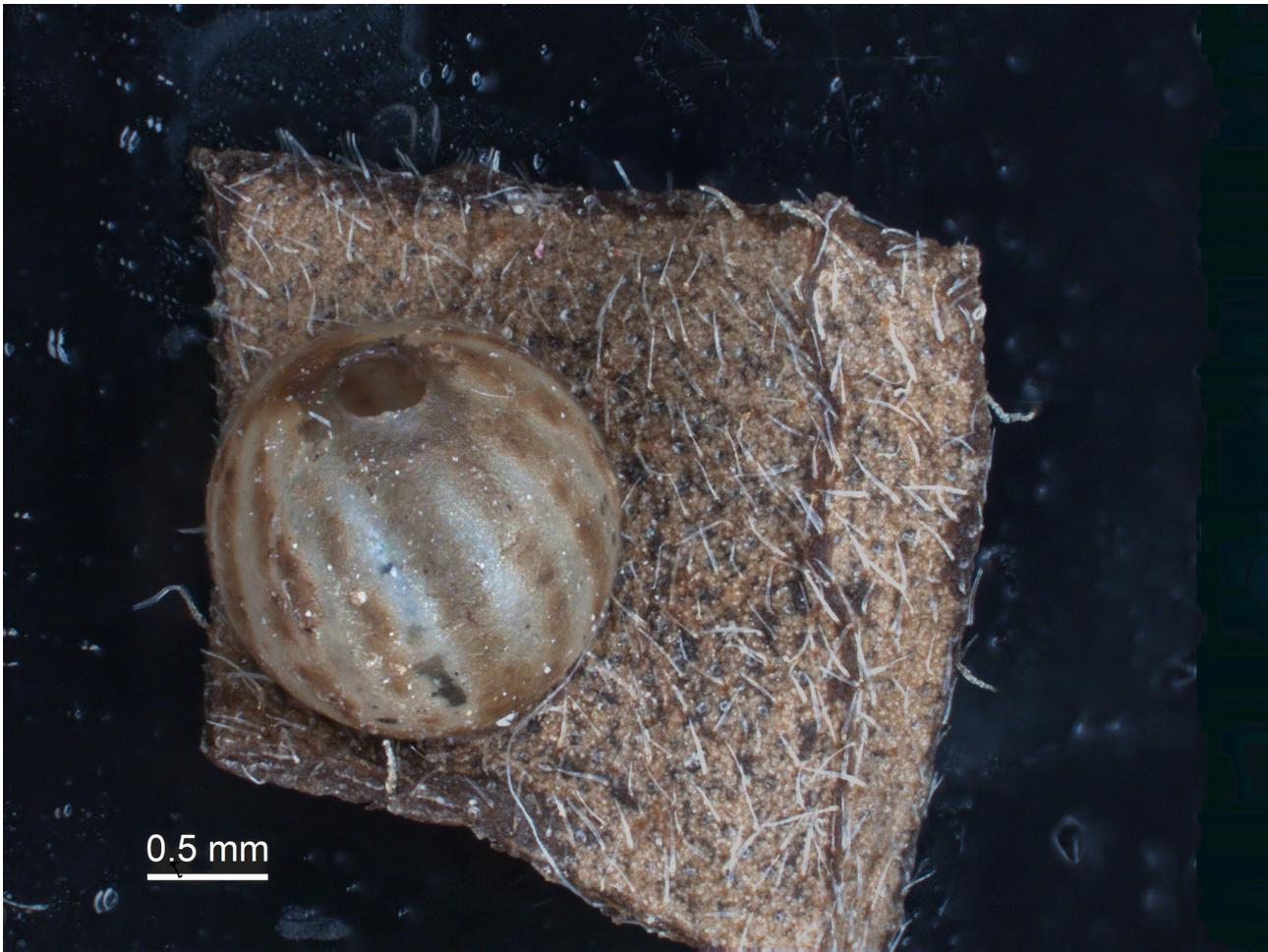


FIGURE 7. *Parides ascanius* egg after the emergence of adult wasps.

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