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Notas

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Physocephala inhabilis (Diptera: Conopidae) como parasitoide de *Megachile* (*Sayapis*) *bomplandensis* (Hymenoptera: Megachilidae) en Argentina

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Abstract: The conopid fly *Physocephala inhabilis* (Walker) is newly recorded as parasitoid of the native bee *Megachile* (*Sayapis*) *bomplandensis* (Durante). We also document an unidentified species of *Physocephala* parasitizing a *Megachile* (*Chrysosarus*) sp. in Argentina.

Keywords: Anthophila, New host record, Pollinator, Wild bee.

Resumen: El conópido *Physocephala inhabilis* (Walker) es registrado como parasitoide de la abeja nativa *Megachile* (*Sayapis*) *bomplandensis* (Durante). También se reporta el hallazgo de una especie sin identificar del género *Physocephala* parasitando a *Megachile* (*Chrysosarus*) sp. en Argentina.

Palabras clave: Abeja silvestre, Anthophila, Nuevo registro de hospedador, Polinizador.

The conopid flies are - as far as is known - solitary and internal parasitoids of insects, chiefly of aculeate wasps and bees (Hymenoptera). The females

of these flies attack adult bees during flight and oviposit through the intersegmental membranes of the metasoma, where the parasitoid larvae will develop (*e.g.* De Meijere, 1904; Howell, 1967). There are currently some 129 recognized species of *Physocephala* Schiner around the world, of which 28 are present in the Neotropics and nine have been recorded in Argentina (Gibson et al., 2014). To date, 15 Neotropical species of this genus have been recorded parasitizing adults of various bee genera (Stuke et al., 2011; Stuke & Cardoso, 2013; Couto & Camillo, 2014; Plischuk et al., 2017; Stuke, 2017).

Bees of the family Megachilidae are pollinators of wildflowers as well as of several important crops worldwide. Some species are used commercially as managed crop pollinators (Pitts - Singer & Cane, 2011; Haider et al., 2014). The genus *Megachile* occurs in a wide diversity of habitats in all continents except Antarctica, ranging from lowland tropical rain forests and deserts to high elevation environments (Gonzalez et al., 2019). More than 430 species grouped in 31 subgenera are recorded for the Neotropical region (Raw, 2007; Gonzalez et al., 2018; Roig-Alsina, 2020). Most species of *Megachile* build their nests in pre-existing burrows or cavities using pieces of leaves that are used to create the breeding cells. However, members of the subgenera *Chrysosarus* Mitchell and *Sayapis* Titus use other materials such as mud combined with leaves or petals or chewed leaf material with soil or small pebbles (Michener, 2007). Currently, eight species of *Megachile* have been cited as being parasitized by different species of *Physocephala* around the world (Stuke & Cardoso, 2013). In the Neotropics, the species *Megachile* (*Moureapis*) *maculata* Smith from Brazil has been recorded as host of *Physocephala inhabilis* (Walker) (Stuke & Cardoso, 2013) and of an unidentified conopid fly (Cardoso & Silveira, 2011). In this paper we add new records of *Physocephala* parasitizing two Argentinian species of *Megachile*.

As part of a study on the diversity of native bees associated with horticultural crops performed using trap-nests made of wooden blocks, on 4-III-2019 we found a dead female of *Megachile* (*Sayapis*) *bomplandensis* (Durante) inside a trap-nest of 8 mm in diameter (Fig. 2). On 27-X-2019, approximately nine months later, a single male of *P. inhabilis* emerged (Fig. 1). Also, on 17-XII-2013, we found a dead female of *Megachile* (*Chrysosarus*) sp. (Fig. 3) inside a trap nest of the same diameter. The adult of the conopid did not emerge but the puparium was morphologically similar to that of the *P. inhabilis* found inside the *M. bomplandensis* (Fig. 3). Thus, we assumed it was likely to be the same genus of conopid.

Physocephala inhabilis is widely distributed in the Neotropical region (Stuke, 2017) and in Argentina, where it has been recorded in the Mendoza, Tucumán and Rio Negro provinces (Kröber, 1915 [as soror]; Camras & Parrillo, 1996; Gibson et al., 2014). Evidence suggests that *P. inhabilis*, a relatively small species of conopid, has a wide host range, parasitizing both medium-sized bees such as *Megachile* and *Centris* [*i.e. Megachile* (*Moureapis*) *maculata* Smith, (Stuke & Cardoso, 2013),

M. (*Sayapis*) *bomplandensis*, (this paper) and *Centris analis* Fabricius (Santos et al., 2008; Couto & Camillo, 2014)] with body size-ranges from about 9-10 mm, as well as larger species such as *Centris vittata* (Fabricius) and *Epicharis bicolor* Smith (Santos et al., 2008), with body size ranges of 20-22 mm and 16-18 mm respectively. The time between the collection date of the dead bee and the emergence of the conopid fly in our study is similar to that recorded for other conopid species such as *Physocephala wulpi* Camras reared from *Xylocopa* (*Neoxylocopa*) *augusti* Lepeletier. *Physocephala wulpi* emerges in the spring from puparia which are collected during the late summer or early autumn, having overwintered within the dead host (Lucia et al., 2020).

Material examined

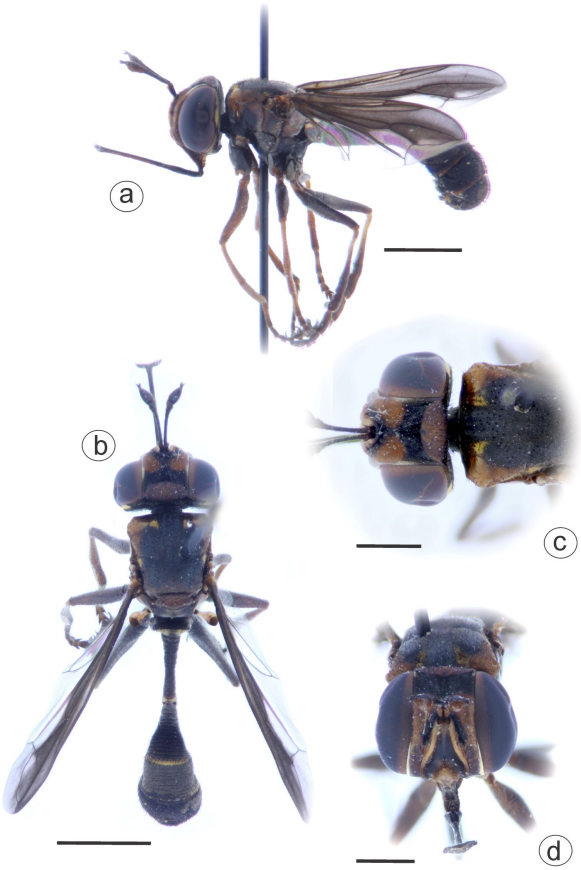

Fig. 1. *Physocephala inhabilis* male. a, habitus in lateral view; b, habitus in dorsal view; c, head and thorax in dorsal view; d, head in frontal view.
Scale bars: (a-b) 2 mm; (c-d) 1 mm.

Fig. 2. Females of *Megachile* (*Sayapis*) *bomplandensis* (Durante). a, habitus in lateral view; b, head in frontal view; c, part of the metasoma containing puparium of *Physocephala inhabilis* in dorsal view.
Scale bars: 2 mm.

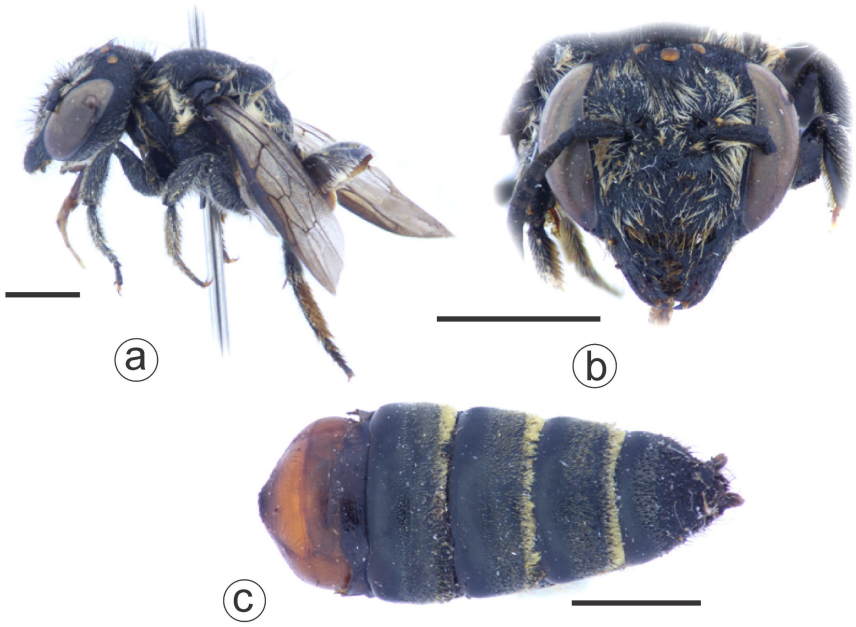

Fig. 3. Female of *Megachile* (*Chrysosarus*) sp. a, habitus in lateral view; b, head in frontal view; c, part of the metasoma containing puparium of a *Physocephala species* in dorsal view.
Scale bars: 2 mm.

1 ♂ of *Physocephala inhabilis* (Walker) ARGENTINA, La Plata, Buenos Aires, 34°54'39"S, 57°55'37"W, 18 m.a.s.l., emerged on 27-X-2019, Col. M. Lucia, & V. Almada. (ex female of *Megachile* (*Sayapis*) *bomplandensis* collected on 4-III-2019); 1 Puparium of *Physocephala* spec., ARGENTINA, La Plata, Buenos Aires 34°54'39"S, 57°55'37"W, 18 m.a.s.l., Col. M. Lucia (ex female of *Megachile* (*Chrysosarus*) sp. collected on 17-XII-2013). The specimen of *Physocephala* as well as

the two adult females of *Megachile* and the conopid puparium, were deposited in the collection of División Entomología del Museo de La Plata, Argentina (MLP).

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