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ARTICLE

New records of pincer wasps in urban parks of Bogotá city (Colombia) (Hymenoptera: Dryinidae)

Juliana DURÁN-PRieto¹  • Massimo OLMI²  • Esteban TULANDE-MARÍN³ 

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Abstract

The species *Gonatopus vidanoi* OLMI, 1994 and *Haplogonatopus hernandezae* OLMI, 1984 (Hymenoptera: Dryinidae) are recorded for the first time from urban parks of Bogotá city (Colombia). In addition, *Gonatopus vidanoi* is recorded for the first time in Colombia. These new records contribute to a better knowledge of the diversity of parasitoid wasps present in Bogotá city and in Colombia, in the context of their trophic role as natural enemies of leafhoppers (Hemiptera: Auchenorrhyncha) recognized as pests of the urban flora.

Keywords | Chrysoidea • Gonatopodinae • parasitoid • urban parks

Nouvelles espèces de Dryinidae (Hymenoptera) dans des parcs urbains de la ville de Bogotá (Colombie)

Résumé

Les espèces *Gonatopus vidanoi* OLMI, 1994 et *Haplogonatopus hernandezae* OLMI, 1984 (Hymenoptera: Dryinidae) sont citées ici pour la première fois des parcs urbains de la ville de Bogotá (Colombie). De plus, *Gonatopus vidanoi* est cité pour la première fois en Colombie. Ces nouvelles données contribuent à une meilleure compréhension de la diversité des guêpes parasitoïdes dans la ville de Bogotá, compte tenu de leur rôle trophique d'ennemis naturels des cicadelles (Hemiptera : Auchenorrhyncha), reconnus comme ravageurs de la flore urbaine.

Mots-clefs | Chrysoidea • Gonatopodinae • parasitoïdes • parcs urbains

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INTRODUCTION



Dryinidae (Hymenoptera: Chrysoidea) is a family of both parasitoid and predator wasps, whose larvae develop on nymphs and adults of several species of Auchenorrhyncha (Hemiptera), some of which are recognized as major pests of diverse crops plants (GUGLIELMINO *et al.*, 2013). The predatory and parasitic efficiency of this family has been studied in many species and some of them (e.g. *Neodryinus thyphlocybae* (ASHMEAD 1893) and *Neodryinus nelsoni* PERKINS, 1905) are actually used in programs of biological control (GUGLIELMINO, 2002).

Worldwide, Dryinidae comprises about 1900 species belonging to 50 genera (OLMI *et al.*, 2021). The subfamily Gonatopodinae, which has a cosmopolitan distribution,

comprises nine genera of which eight are known from the Neotropics (OLMI & VIRLA, 2014). Among the Gonatopodinae, the most interesting genera, because they are natural enemies of diverse pest insects with effective and/or potential use in programs of biological control, are *Gonatopus* LJUNGH, 1810 and *Haplogonatopus* PERKINS, 1905 (see hosts in OLMI & VIRLA, 2014). The genus *Gonatopus* is very diverse, including about 129 species recorded from the Neotropical region (OLMI & VIRLA, 2014; SPERANZA *et al.*, 2019). The genus *Haplogonatopus* includes in the Neotropical region only two species, one of them (*H. insularis* OGOBLIN, 1953) exclusively known from the Juan Fernandez Islands (Chile) (OLMI & VIRLA, 2014). *H. hernandezae* OLMI, 1984 is a species with a broad

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distribution, as it has been recorded in Argentina, Brazil, Colombia, Costa Rica, Dutch Antilles, Ecuador (Galápagos Islands), México, Panamá, Perú and Venezuela (OLMI & VIRLA, 2014).

In Colombia, 74 species of Dryinidae were recorded (OLMI & VIRLA, 2014; SPERANZA *et al.*, 2019), including species of the

two genera previously mentioned, among which a new species was found recently in Bogotá city (*Gonatopus duranprietoae* SPERANZA, OLMI, CAPRADOSSI & GUGLIELMINO 2019). The two new species records presented in this work detailing the sampling method and their location broaden the knowledge of the family in the city and in Colombia.

MATERIALS AND METHODS

Dryinids were collected by chance in two urban parks of Bogotá city between 2016 and 2017 with pitfall traps, while we were collecting coprophagous beetles and ants. Sampled wasps were deposited in vials with ethanol (70 %) before their identification. Then, specimens were dried, mounted and prepared for their identification and photography. Stacks of photographs were taken using a Nikon SMZ 1000

stereomicroscope adapted with a camera Nikon DXM1200C. Combine ZP 1.0 software was used for 3D photo composition. The specimens examined during this study were deposited in the entomological collection of the IAvH (Instituto de Investigaciones biológicas Alexander von Humboldt, Villa de Leyva-Boyacá, Colombia).

RESULTS

The following two species of Dryinidae were obtained from field work: *Gonatopus vidanoi* OLMI, 1994 (figure 1) and *Haplogonatopus hernandezae* OLMI 1984 (= *H. crucianus* OLMI, 1986) (figure 2). There were identified by Massimo OLMI (author of this publication).



Figure 1. *Gonatopus vidanoi* OLMI 1994, habitus of the female.



Figure 2. *Haplogonatopus hernandezae* OLMI 1984, habitus of the female.

Gonatopus vidanoi OLMI, 1994

Known distribution. Argentina, Bahamas, Chile (OLMI & VIRLA, 2014).

New record. 1 ♀. Cundinamarca, Bogotá D.C., localidad Usme, Parque Ecológico Cantarrana. N 4° 30' 12.8", W 74° 07' 23.5", 2686 m.a.s.l. 03.VI.2016, J. DURÁN *leg.* Collected by a pitfall trap baited with human excrement because this trap was used mainly with the objective to collect coprophagous beetles in the same green urban parks.

Comments. This species, recorded in a public park of Bogotá, is mentioned for the first time in Colombia. Its hosts are Cicadellidae species (OLMI & VIRLA, 2014). The subxerophytic ecosystem in the south of the city where *G. vidanoi* has been collected hosts diverse species of leafhoppers (authors, pers. obs.).

Haplogonatopus hernandezae OLMI, 1984 (= *H. crucianus* OLMI, 1986, synonymized by OLMI & VIRLA, 2014)

Known distribution. Argentina, Brazil, Colombia, Costa Rica, Dutch Antilles, Galápagos Islands (Ecuador), México, Panamá, Perú (OLMI & VIRLA, 2014).

Material examined. 1 ♀. Cundinamarca, Bogotá D.C., localidad Usaquén, Parque Canal Molinos. N 4° 41' 59.8", W 74° 03' 56.2", 2569 m.a.s.l. 03.III.2017, J. DURÁN *leg.* Collected on a pitfall trap filled with ethanol (70 %).

Comments. In Colombia, this species is known as a parasitoid of the rice leafhopper *Tagosodes orizicolus* (MUIR, 1926) (Hemiptera: Auchenorrhyncha: Delphacidae) (HERNÁNDEZ & BELLOTTI, 1984). However, it is known that this species parasitizes also other planthoppers, such as *Chionomus haywardi* (MUIR), *Delphacodes sitarea* REMES LENICOV & TESÓN, *D. kuscheli* FENNAH and *Metadelphax* (= *Toya*) *propinqua* (FIEBER, 1866) (Hemiptera: Delphacidae). All these species are recognized as pest insects causing viral diseases on rice, wheat, and maize, in addition to other crop plants (VIRLA & OLMI, 1998; REMES LENICOV & VIRLA, 1999). In green urban parks of Bogotá, these phytophagous insects have never been reported. However, other hemipterans belonging to the subfamilies Deltocephalinae, Xestocephalinae and Typhlocybinae (Hemiptera:

Cicadellidae) are commonly found on urban grasses and trees and they have been identified as vectors or potential vectors of phytoplasmas, which are plant pathogenic bacteria that can adversely affect many plant families, including native and exotic tree species in the city (PERILLA *et al.*, 2016; SILVA-CASTAÑO *et al.*, 2019a, 2020b). However, species such as *Exitianus atratus* LINNAVUORI, *Amplicephalus*

funzaensis LINNAVUORI or *Empoasca* sp. which have been recorded in urban spaces of Bogotá and in close areas of the “Sabana de Bogotá” (PERILLA *et al.*, 2016; SILVA-CASTAÑO *et al.*, 2020) could not be hosts of *H. hernandezae*, because it attacks only Delphacidae. On the contrary, the above pests can be hosts of *G. vidanoi*, as this species is specialized on Cicadellidae (except *Empoasca* sp.) (OLMI, 1994).

DISCUSSION

These new records are added to some other important entomological news for Colombia and particularly for its urban biodiversity, by expanding the knowledge that has been developing in recent years about wasps of Bogotá city, including new records of pincer wasps (DURÁN & OCAMPO, 2019; SPERANZA *et al.* 2019; DURÁN-PRIETO *et al.*, 2020; TULANDE-MARÍN & DURÁN-PRIETO, 2021). This is relevant considering that the family Dryinidae in Colombia is insufficiently studied, although in the last decade, new species, most of them in natural ecosystems have been discovered, enriching thus the records of approximately 62 species known for Colombia (e.g. *Gonotopus duranprietoae* SPERANZA, OLMI, CAPRADOSSI & GUGLIELMINO, 2019, *Deinodryinus multicolor* OLMI, 2004 and *Dryinus tugarrensis* OLMI, 2004, among others) (OLMI 2000; OLMI 2004; OLMI & VIRLA, 2014; SPERANZA *et al.*, 2019).

On the other hand, in the next few years, it should be

important to continue to investigate about pincer wasps in Bogotá, particularly to understand better their diversity, distribution and host relationships that are nearly unknown, because that could lead to develop new programs of biological control to reduce the traditional use of chemicals employed to control pest and other diseases of trees and shrubs in streets and parks, urban forests, and other green areas. It is well known that pesticides increase risks of human exposure and can cause ecological disruptions in urban ecosystems, such as pesticide resistance, secondary pest outbreaks, and target pest resurgence (RAUPP *et al.*, 2010). As cities play an important role in the conservation of global biodiversity, particularly through the planning and management of urban green spaces, a sustainable management of biological diversity in cities is crucial for achieving sustainability, livability, resilience, and equity in the today and future cities all over the world (ARONSON *et al.*, 2017; KOWARIK *et al.*, 2020).

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