

Research Article / Artículo de Investigación

Contribution to the knowledge of pincer wasps (Hymenoptera: Dryinidae): new records from South America

Contribución al conocimiento de las avispas pinza (Hymenoptera: Dryinidae): nuevos registros de América del Sur

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Abstract. Dryinidae wasps are poorly known in the regions of the Neotropics. Because it is a group considered rare in most collections, most species are obtained in sporadic collections using Malaise traps, flight intercepts, yellow pan traps and sweep nets. In this study new distribution records for 14 Dryinidae species belonging to three genera are provided: one species for *Deinodryinus*, nine species for *Dryinus* and four for *Gonatopus* with reports for Brazil, Costa Rica, French Guiana, Peru and Paraguay. The species *D. maximus* and *G. stellaris* are recorded for the first time from Brazil, while *D. bolivianus*, *D. piscencens* and *Gonatopus willinki* are recorded from Paraguay; *D. chiapasensis* is recorded for the first time from French Guiana and other species from different localities and different countries.

Key words: Brazil; Costa Rica; French Guiana; Paraguay; Peru.

Resumen. Las avispas Dryinidae son poco conocidas en las regiones del Neotrópico. Debido a que es un grupo considerado raro en gran parte de las colecciones, la mayoría de las especies se obtienen en recolecciones esporádicas utilizando trampas Malaise, de intercepciones de vuelo, trampas de plato amarillas y redes de barrido. En este estudio se aportan nuevos registros de distribución para 14 especies de Dryinidae pertenecientes a tres géneros: una especie para *Deinodryinus*, nueve especies para *Dryinus* y cuatro para *Gonatopus* con informes para Brasil, Costa Rica, Guayana Francesa, Perú y Paraguay. Las especies *D. maximus* y *G. stellaris* se registran por primera vez en Brasil, mientras que *D. bolivianus*, *D. piscencens* y *Gonatopus willinki* se registran en Paraguay; *D. chiapasensis* se registra por primera vez en la Guayana Francesa y otras especies de diferentes localidades y diferentes países.

Palabras clave: Brasil; Costa Rica; Guayana Francesa; Paraguay; Perú.

Introduction

The pincer wasps (Hymenoptera: Dryinidae) are cosmopolitan parasitoids and predators of leafhoppers (Hemiptera) belonging to the Membracoidea and Fulgoroidea superfamilies (Guglielmino *et al.* 2013; Martins *et al.* 2021; Virla *et al.* 2023). Currently, this family comprises about 1,924 species, grouped in 53 genera and 17 subfamilies (Olmi *et al.* 2019; Martins *et al.* 2021; Martins 2022; Martins and Domahovski 2022).

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The Dryinidae of the Neotropical region are considered the most diverse in comparison with other biogeographic regions, including more than 500 known species (Olmí and Virla 2014; Martins *et al.* 2021; Martins and Domahovski 2022). In the last 10 years, the Dryinidae of this region have been studied from the point of view of taxonomic revisions, sporadic descriptions of species, biodiversity and interactions between with their hosts, distribution records and biology (Coelho *et al.* 2011; Versuti *et al.* 2014; Martins *et al.* 2015a, b, 2021; Martins and Krinski 2016; Martins and Domahovski 2017a, b, 2022; Martins and Olmi 2021; Martins 2013, 2015, 2018, 2019, 2022, 2023; Olmi *et al.* 2020, Silva-Neto *et al.* 2022).

Dryinidae fauna of the Neotropics are known mainly based on two main reviews, by Olmi (1984, 1991) including all species worldwide and Olmi and Virla (2014) and Martins and Domahovski (2022), focusing on the review of the family's species for this region.

The Dryinidae are a group of wasps considered to be not very abundant in most collections. The main collection methods are based on colored plates, flight interception, Malaise traps and sweep nets (Versuti *et al.* 2014; Martins 2020; Martins *et al.* 2020, 2021; Martins and Domahovski 2022). Although this work has mainly been carried out on Brazilian fauna, many specimens of different genera of Dryinidae are deposited in institutions and have not been studied. Considering the few records for most species in the Neotropical region, this study aims to compile information on the distribution data of different Dryinidae species, expanding their distribution to different countries, Brazil, Costa Rica, French Guiana, Paraguay and Peru, and states within them.

Material and Methods

A total of 14 species belonging to three subfamilies and three genera of Dryinidae were studied. The identifications were made using identification keys from Olmi and Virla (2014), Martins *et al.* (2015b), Martins and Perioto (2021) and confirmed with holotype images. The examined material comes from different localities and is deposited in the following institutions:

DZUP: Padre Jesus Santiago Moure Entomological Collection, Universidade Federal do Paraná, Curitiba, Paraná, Brazil (Dr. Gabriel Melo).

LESPP: Laboratório de Ecologia e Sistemática de Insetos Polinizadores e Predadores, Universidade Federal do Maranhão, São Luis, Maranhão, Brazil (Dra. Gizele G. Azevedo).

New distribution records for localities within the country are indicated by an asterisk (*) and records from new countries are represented by two asterisks (**). The photographs were obtained using a LEICA digital camera, DFC295, attached to the LEICA stereoscopic microscope, and stacked using Zerene Stacker software (ver. 1.04 Build). The figure boards were made using Adobe Photoshop® CS6.

Results

Subfamily Anteoninae Perkins, 1912

Deinodryinus Perkins, 1907

Deinodryinus pseudoamoenus Olmi, 1984

(Fig. 1A)

Deinodryinus pseudoamoenus Olmi, 1984: 188. BRAZIL: Santa Catarina, Nova Teutonia (CNC).

Distribution. Brazil (Paraná: Curitiba and Foz do Jordão*; Santa Catarina (Olmí 1984; Olmi & Virla 2014)).

Material examined. One female: Brasil, PR, Foz do Jordão, \ Posto Florestal Salto \ Segredo, 3-10.xi.2004, \ E. Soares, Malaise (DZUP).

Subfamily Dryininae Haliday, 1833

Dryinus Latreille, 1804

Dryinus bicolor (Olmí, 1984)

(Fig. 1B)

Perodryinus bicolor Olmi, 1984: 1045. VENEZUELA: Carabobo, Puerto Cabello, San Estaban (EMUS).

Distribution. Brazil, Costa Rica (Alajuela and Heredia*), Mexico, Panama, Venezuela (Olmí 1984; Olmi & Virla 2014).

Material examined. One female: Costa Rica, Heredia Puerto Viejo, La Selva, 80 m, 10°25'N 80° 0'W, \ 04-15.vi.1996, \ S. \ Haase-Statz & Hanley, \ Fligh-Intercept trap (DZUP).

Dryinus bolivianus (Olmí, 1984)

(Fig. 1C)

Perodryinus bolivianus Olmi, 1984: 1041. BOLIVIA: Beni, Rurenabaque (NMHUK).

Distribution. Brazil, Colombia and Paraguay**(Olmí 1984; Olmi & Virla 2014).

Material examined. One female: PARAGUAY: PARAGUARI: La \ Colmean Caatymi, Arroyo Rory-\ mi, 189 msnm, \ 25°55'23,9"S \ 56°47'25,2"W, 29-31.i.2005, 20 \ Yellow Pan Traps along forested \ border of hilside, B. Garcete coll. (DZUP).

Dryinus chiapasensis (Olmí, 1991)

(Fig. 1D)

Tridryinus chiapasensis Olmi, 1991: 280. MEXICO: Chiapas, Palenque (CAS).

Distribution. El Salvador, French Guiana**, Mexico (Olmí 1991; Olmi & Virla 2014).

Material examined. One female: French Guiana: Saul, \ Belvedere Saul, \ 3.6228°N 53.1258°W, \ 326 m, 2010-2011, \ S. E. G. team leg. (DZUP).

Dryinus maximus (Olmí, 1984)

(Fig. 1E)

Tridryinus maximus Olmi, 1984: 954. SURINAME: Zanderij (RNHL).

Distribution. Brazil**, Panama and Suriname (Olmí 1984; Olmi & Virla 2014).

Material examined. One female: Brasil, Maranhão, \ Urbano Santos, Faz. \ Santo Amaro, 4.x.2009, \ 03.2431°S 43.4246°W, \ G. G. Azevedo, n°036 (LESPP).

Dryinus onorei Olmi, 1996

(Fig. 1F)

Dryinus onorei Olmi, 1996: 77. Holotype female. ECUADOR: Sucumbios, Río Napo (AMNH).

Distribution. Argentina, Bolivia, Brazil, Ecuador, Peru (Loreto and Cuzco*) (Olmi 1996; Olmi & Virla 2014; Versuti *et al.* 2014).

Material examined. One female: Peru, Cuzco, 3 km NE, \ de Quincemil, 613 m, \ 13.218°S 70.728°W, \ 20.viii.2012, G. Melo, \ Malaise (DZUP).

Dryinus pegnai (Olmi, 1984)

(Fig. 2A)

Alphadryinus pegnai Olmi, 1984: 991. PERU: Cusco, Marcapata, Quincemil (EMUS).

Distribution. Colombia, Ecuador, French Guiana, Panama, Paraguay (Canindeyú, Reserva Natural Bosque Mbaracayú), Peru and Venezuela (Olmi 1984; Olmi & Virla 2014).

Material examined. One female: PARAGUAY: Canindeyú, \ Reserva Natural Bosque \ Mbaracayú: Jejuí-mí \ MALAISE 3, bosque bajo \ inundado, Colr. A.C.F. Costa \ 10-16. IV.1996" " *Dryinus* \ *pegnai* \ M. OLMÍ det. 1997 (DZUP); One female: PARAGUAY: Canindeyú, \ Reserva Natural Bosque \ Mbaracayú: Jejuí-mí \ MALAISE 3, bosque bajo \ inundado, Colr. A.C.F. Costa \ 29.III-9.IV.1996" " *Dryinus* \ *pegnai* \ M. OLMÍ det. 1997 (DZUP).

Dryinus picescens (Olmi, 1984)

(Fig. 2B)

Tridryinus picescens Olmi, 1984: 965. ARGENTINA: Tucumán (IFML).

Distribution. Argentina, El Salvador and Paraguay** (Olmi 1984; Olmi & Virla 2014).

Material examined. One female: PARAGUAY: MISIONES: San \ Ignacio, Tahyity, 165 msnm, \ 26°52'14,9"S 56°56'52,6"W, 22- \ 23.ii.2005, 14 yellow pan traps in \ forest border, B. Garcete col. (DZUP).

Dryinus ruficeps Cameron, 1888

(Fig. 2C)

Dryinus ruficeps Cameron, 1888: 445. PANAMA: Bugaba, Champion leg. (NHMUK).

Distribution. Argentina, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, French Guiana, Honduras, Mexico, Panama, Paraguay (Concepción, Estancia Don Carlos; Cordillera, San Bernardino; Colmean Caatymi*, Misiones*), Peru, Suriname, Trinidad and Tobago, Venezuela (Cameron 1888; Olmi 1984; Olmi & Virla 2014).

Material examined. One female: PARAGUAY: PARAGUARI: La \ Colmean Caatymi, 199 msnm, \ 25°55'23,9"S 56°47'25,2"W, 29- \ 31.i.2005, 20 Yellow Pan Traps in \ forest border,

B. Garcete coll. (DZUP). One female: PARAGUAY: Misiones: San Ignacio, Tahyity, 164 msnm, 26°52'13,6"S 56°51'51,3"W, 22-23.ii.2005, 20 Yellow Pan Traps in forest with degraded lower stratus, B. Garcete coll. (DZUP). One female: PARAGUAY: ALTO PARAGUAY: Parque Nacional Defensives del Chaco, 10 Km SE, de Lagerenza'i, Paso Tereré, 233, msnm, 20°07'53,4"S 60° 59'56,5"W, 7.iv.2005, 76 Yellow Pan Traps arranged in web to cover roadside, forest and pond borders, B. Garcete, coll. (DZUP).

***Dryinus striatus* (Fenton, 1927)**

(Fig. 2D)

Lestodryinus striatus Fenton, 1927: 2. BRAZIL: Pará, Santarém (USNM).

Distribution. Brazil (Amazonas, Bahia, Goias, Pará, Rio de Janeiro*, Santa Catarina), Colombia, Ecuador, French Guiana, Panama, Paraguay, Venezuela (Fenton 1927; Olmi 1984; Olmi & Virla 2014).

Material examined. One female: Brasil, RJ, Nova Friburgo, xii. 2008, P. Grossi (DZUP).

Subfamily Gonatopodinae Kieffer in Kieffer & Marshall, 1906

***Gonatopus* Ljungh, 1810**

***Gonatopus contortus* Olmi, 1984**

(Fig. 3A)

Gonatopus contortus Olmi, 1984: 1768. BOLIVIA: Beni, Rio Itenez (AMNH).

Distribution. Argentina, Bolivia, Brazil, Paraguay (Guairá and Parque Nacional Medanos del Chaco and Boquerón * (Olmi 1984; Olmi & Virla 2014).

Material examined. One female: PARAGUAY: ALTO PARAGUAY: Parque Nacional Medanos del Chaco, Pikirenda, 335 msnm 20°05'19"S 61° 47'12"W, 8.iv.2005, 57 Yellow Pan Traps and 20 Blue Pan Traps, arranged in web to cover roadside, forest and pond borders, B. Garcete, coll. (DZUP); One female: PARAGUAY: BOQUERÓN: Parque Nacional Medanos del Chaco, Picada Kimbolo, 21 Km SE de Pozo Independencia II, 301 msnm, 20°17' 39,9"S 61° 38' 19,8"W, 6.iv.2005, B. Garcete coll. (DZUP).

***Gonatopus flavoniger* Olmi, 1991**

(Fig. 2B)

Gonatopus flavoniger Olmi, 1991: 349. BRAZIL: São Paulo, Serra da Bocaina, (PMA).

Distribution. Brazil (Paraná (São José dos Pinhais and Paulo Frontin*), São Paulo (Olmi & Virla 2014; Martins & Domahovski 2017b).

Material examined. One female: Brazil: Paraná, Paulo Frontin, Ponto P2-GV, 23.xi.2020, 26.0158°S 50.6525°W, 768 m, A. L. Martins & D. B. Muniz, Varredura (DZUP).

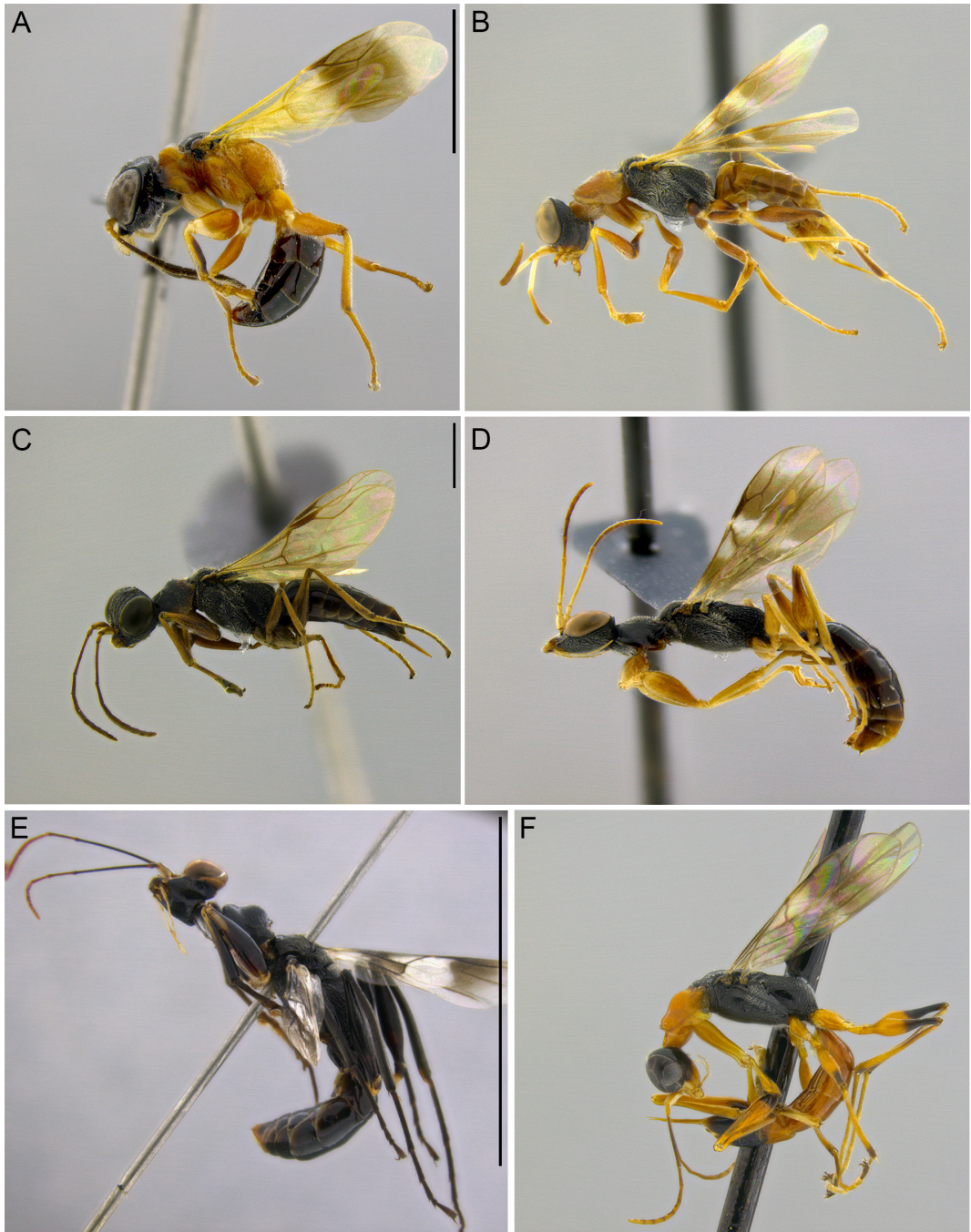


Figure 1. Habitus in lateral of *Deinodryinus* and *Dryinus* species. **A.** *Deinodryinus pseudoamoenus*. **B.** *Dryinus bicolor*. **C.** *Dryinus bolivianus*. **D.** *Dryinus chiapasensis*. **E.** *Dryinus maximus*. **F.** *Dryinus onorei*. Scale bar: A, D, F= 1 mm; B, C= 1 mm; E= 0,5 mm. / Hábito lateral de las especies de *Deinodryinus* y *Dryinus*. **A.** *Deinodryinus pseudoamoenus*. **B.** *Dryinus bicolor*. **C.** *Dryinus bolivianus*. **D.** *Dryinus chiapasensis*. **E.** *Dryinus maximus*. **F.** *Dryinus onorei*. Barra de escala: A, D, F= 1 mm; B, C= 1 mm; E= 0,5 mm.

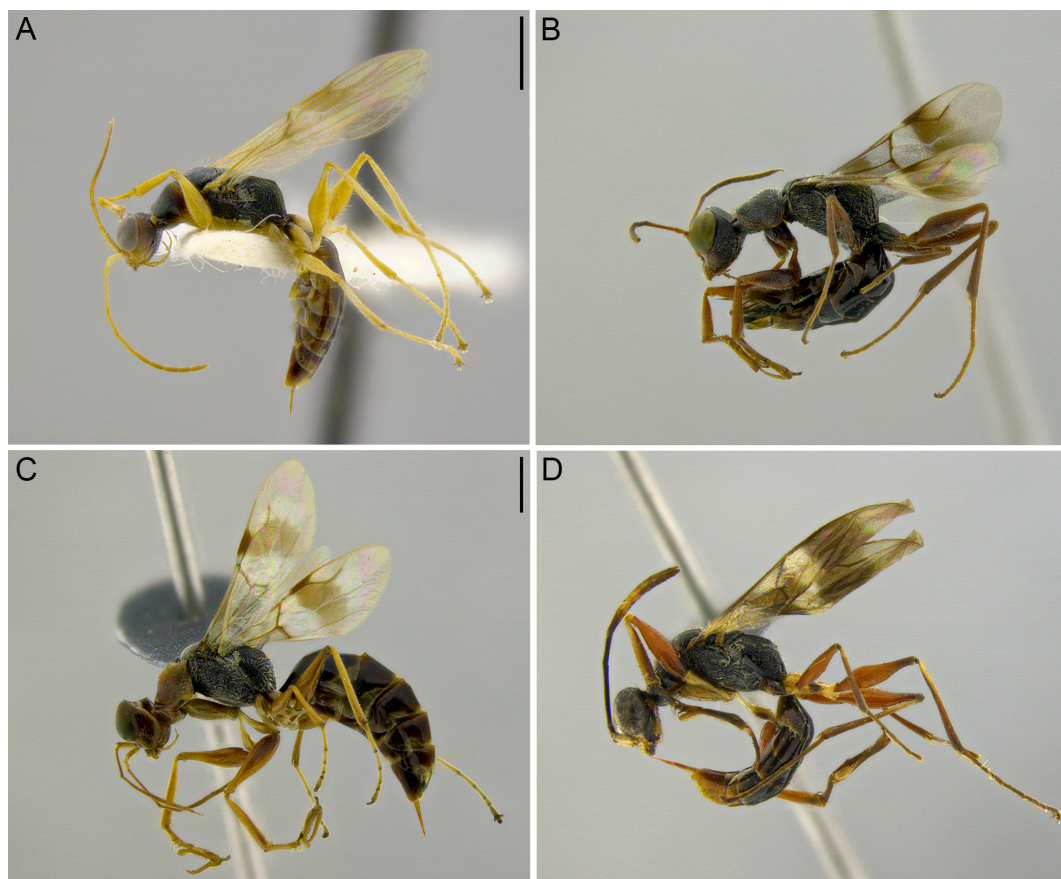


Figure 2. Habitus in lateral view of *Dryinus* species. **A.** *Dryinus pognai*. **B.** *Dryinus picescens*. **C.** *Dryinus ruficeps*. **D.** *Dryinus striatus*. Scale bar: A, B= 1 mm; C, D= 1 mm. / Hábito en vista lateral de las especies de *Dryinus*. **A.** *Dryinus pognai*. **B.** *Dryinus picescens*. **C.** *Dryinus ruficeps*. **D.** *Dryinus striatus*. Barra de Escala: A, B= 1 mm; C, D= 1 mm.

***Gonatopus stellaris* (Virla, 1997)**

(Fig. 3C)

Trichogonatopus stellaris Virla, 1997: 172. Female holotype. ARGENTINA: Salta, Yacochuya (IFML).

Distribution. Brazil**, Argentina and Mexico (Virla 1997; Olmi & Virla 2014).

Material examined. One female: Brasil, Paraná, Curitiba, \ Hugo Lange, \ 22.xii.2020, G. Melo (DZUP).

***Gonatopus willinki* Olmi, 1984**

(Fig. 3D)

Gonatopus willinki Olmi, 1984: 1742. ARGENTINA: Tucumán, San Miguel de Tucumán (IFML).

Distribution. Argentina and Paraguay** (Olmi 1984; Olmi & Virla 2014).

Material examined. One female: PARAGUAY: BOQUERÓN: \ Parque Nacional Medanos del \ Chaco, Picada Kimbolo, 21 Km SE \ de Pozo Independencia II, 301 \ msnm, 20°17' 39,9"S \ 61° 38' 19,8"W, 6.iv.2005, 13 \ Yellow pan trap and Blue Pan trap in \ low Forest near pond, B. Garcete coll. (DZUP).

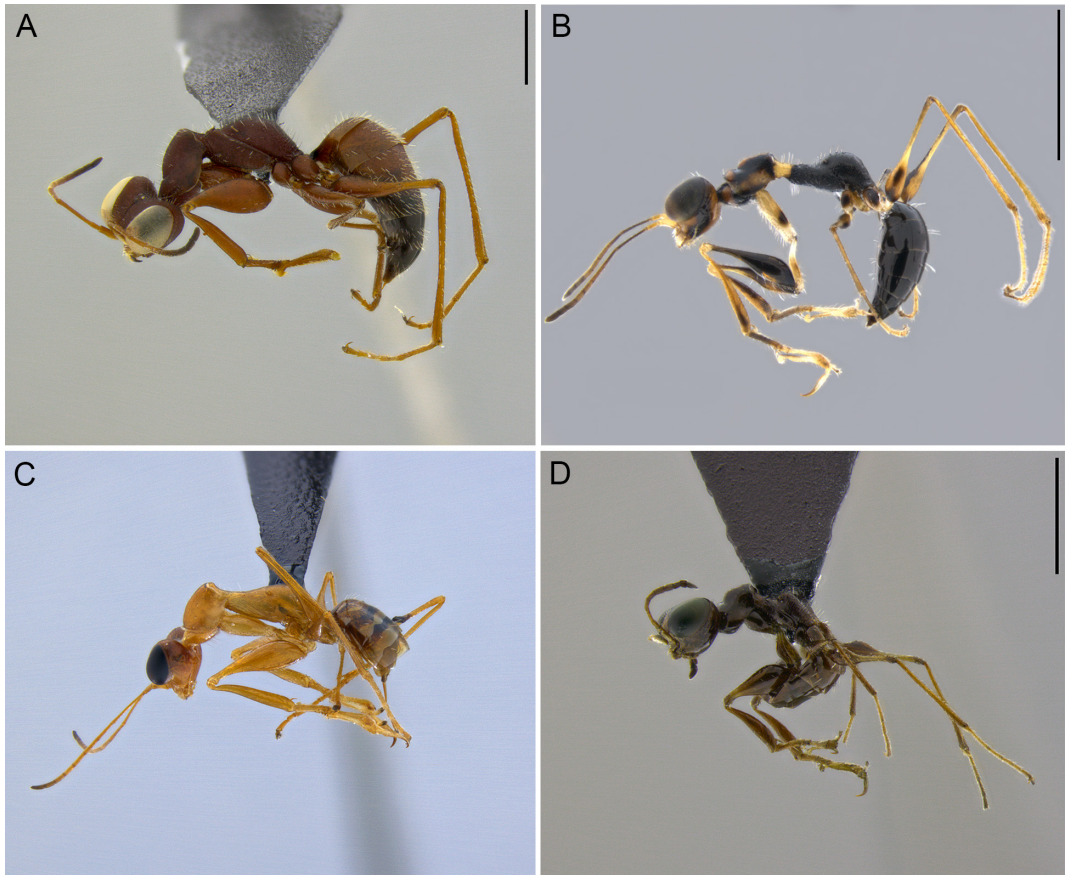


Figure 3. Habitus in lateral view of *Gonatopus* species. **A.** *Gonatopus contortus*. **B.** *Gonatopus flavoniger*. **C.** *Gonatopus stellaris*. **D.** *Gonatopus willinki*. Scale bar: A= 1 mm; B, C= 1 mm; D= 1 mm. / Hábito en vista lateral de las especies de *Gonatopus*. **A.** *Gonatopus contortus*. **B.** *Gonatopus flavoniger*. **C.** *Gonatopus stellaris*. **D.** *Gonatopus willinki*. Barra de Escala: A= 1 mm; B, C= 1 mm; D= 1 mm.

Discussion

Three genera of Dryinidae included in this study are considered the most diverse for the Neotropical region: *Deinodryinus* with 114 species, *Dryinus* with 110 species and *Gonatopus* with 128 species (Olmí and Virla 2014; Martins 2015, 2022; Martins *et al.* 2015a, b; 2021; Olmí *et al.* 2019; Martins and Perioto 2021). Among the five Neotropical countries hosting species studied in this article, the Brazil is considered to have the highest number of known species with around 171 species, 17 genera and five subfamilies (Olmí and Virla 2014; Martins 2022, 2023; Martins and Domahovski 2022); followed by Costa Rica with a record of 150 species, contained in 15 genera and six subfamilies; Peru with 68 species, contained in 10 genera and five subfamilies; Paraguay with 58 species contained in 10 genera and five subfamilies and French Guiana with 38 species contained in seven genera and four subfamilies (Olmí and Virla 2014).

Of the 14 species in this study, three species have their first record for Paraguay: *Dryinus bolivianus*, *D. picescens* and *Gonatopus willinki*, and two species *Dryinus ruficeps* and *Gonatopus contortus* have their distribution expanded within the country. For the French Guiana, *Dryinus chiapasensis* has its first record. Two species *Dryinus maximus* and *Gonatopus stellaris* have their first record for Brazil, while *Deinodryinus pseudoamoenus*, *Dryinus striatus* and *Gonatopus flavoniger* have their record extended within the same country. The species *Dryinus bicolor* has expanded its distribution within Costa Rica and *Dryinus onorei* in Peru. In addition, *Dryinus pegnai* was examined for a locality already recorded by Olmi and Virla (2014) in Paraguay.

This study shows how incipient studies of the Dryinidae fauna in the Neotropical region are showing that the species' distribution is poorly known for most of the countries in which they occur.

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