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Scientific Note

First report of *Dryinus garcetei* Olmi, 2012 (Hymenoptera, Dryinidae) in the Northeast region of Brazil

André L. Marambaia[1], Ramon L. Ramos[1], Matheus E. Trindade-Santos[1], André L. Martins[2], Favízia F. de Oliveira[1], Rafaela L. da S. Santos[3]

[1]Universidade Federal da Bahia, Salvador, BA, Brazil. [2]Universidade Federal do Paraná, Curitiba, PR, Brazil. [3]Universidade Federal de São Carlos, Buri, SP, Brazil.
Corresponding author: marambandre@gmail.com

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Abstract. The present study reports the first record of *Dryinus garcetei* Olmi, 2012 (Hymenoptera, Dryinidae) for Northeast Brazil. This research is very relevant given the scarcity of data regarding the Dryinidae family and the *Dryinus* Latreille, 1804 genus for this region. Furthermore, illustrations and an updated geographic distribution map of *D. garcetei* are presented.

Keywords: Bahia, Cadeia do Espinhaço, ectoparasitoid, pincer wasps.

The genus *Dryinus* Latreille, 1804 belongs to the Dryinidae family, known as pincer wasps, and comprises around 310 species registered throughout the world, of which 110 species are registered for the Neotropical region and 37 of them are registered for Brazil (Olmi & Virla 2014; Martins et al. 2015a; 2015b; Olmi et al. 2019; Martins & Perioto 2021; Martins 2022; 2023; 2024; Santos et al. 2024).

Dryinus species are obligate ectoparasitoids of leafhoppers (Hemiptera: Auchenorrhyncha) [hemipterans known to cause considerable damage to agricultural crops] and consequently, these microhymenopterans can be considered important biological control agents (Martins & Perioto 2021; Virla et al. 2023).

In Brazil, knowledge about pincer wasps is still incipient for most of the country. The North, Central-West and Northeast regions are the least covered by studies on Dryinidae (Coelho et al. 2011; Olmi & Virla 2014; Martins 2022; 2023; 2024). These regions are characterized by the lack of sampling effort aimed at collecting these insects and the lack of specialists of this group working in these regions (Olmi & Virla 2014; Martins 2022; 2023; 2024). In the Northeast region, only three recent studies present data on dryinids fauna (Martins 2022; 2023; Santos et al. 2024).

In this context, Bahia contains areas such as the Chapada Diamantina region, which, in addition to being an important agricultural hub, houses great biodiversity and different types of ecosystems, due to the presence of biomes such as the Cerrado and Caatinga (Fernandes et al. 2020; Castro et al. 2023). Thus, the present study aimed to present the unpublished record of *Dryinus garcetei* Olmi, 2012 (Dryinidae, Hymenoptera) for the Northeast region of the country and the state of Bahia.

The material was collected in Chapada Diamantina, in the region that comprises the agricultural hub Mucugê-Ibicoara (13°09'10" S, 41°28'40" W), state of Bahia, Brazil. For sampling, Pan Traps were used at 40 sampling points. Each point was sampled bimonthly during eight months of the year 2011. Collections were carried out using three Pan Traps of three different colors (blue with ultraviolet, yellow with ultraviolet and white) at each point.

The material was sent to the Laboratório de Bionomia, Biogeografia e Sistemática de Insetos da Universidade Federal da Bahia (BIOSIS/UFBA) and deposited under the tomb number MHNBA-Hymeno 16489, in the entomological collection of the Zoology sector of Museu de História Natural da Bahia (MHNBA/UFBA). Taxonomic identification was carried out based on the available literature (Olmi 2012; Olmi & Virla 2014) and terminology to for wing venation by (Martins & Melo 2024), and compared with type specimen. Photography of studied specimen were carried out with the aid of a stereomicroscope, send to the co-author and confirmed by expert on this group (A. L. Martins).

The geographic distribution map of the species (Fig. 1A) was made using the geographic coordinates available in the scientific literature (Olmi 2012; Olmi & Virla 2014; Martins et al. 2015a), added to those obtained in this study.

Only one specimen of *D. garcetei* (Fig. 1B) was collected in a yellow Pan Trap, in August 2011. According to Olmi & Virla (2014) and Martins et al. (2015a), *D. garcetei* (Fig. 1B) is morphologically characterized by presenting the following characters: black head, except for dark brown mandibles and antennae and tenth whitish flagellomere; mesosoma black; fore wing venation with two dark transversal bands and metasoma predominantly black, except by dark brown apex; head with reticulated-rough sculpture; posterior ocelli almost reaching the occipital carina; incomplete occipital carina, restricted only at the vertex; pronotum with longitudinal and transverse carinae around the disc; pronotal lobe not reaching the tegula; mesoscutum, scutellum and reticulate-rough propodeum; propodeum with two longitudinal carinae delimiting the median region with hairiness; and 2r-rs short than 3Rs&4Rs; enlarged claw with a subapical tooth and a row of 12 lamellae; 5th protarsomere with two rows of 27 lamellae; and tibial spurs in a 1-1-2 ratio.

Dryinus garcetei, has previously only been recorded to occur in Mexico, Paraguay and Brazil [state of São Paulo - located in the southeast region of the country] (Martins et al. 2015a; Olmi & Virla 2014). This is, therefore, the first record of this species occurring in the Northeast region of Brazil specifically for the state of Bahia (Fig. 1A).

The results presented in this study, therefore, consist of expanding the geographic distribution of *D. garcetei* for the Cerrado biome in Brazil, since this species was only recorded for the Brazilian Atlantic Forest, thus reducing the Wallacean deficit for this group (Whittaker et al. 2005; Martins et al. 2015a, 2015b; Ramos et al. 2022; Vergara-Asenjo et al. 2023; Marambaia et al. 2023). This is corroborated by several studies that point out the fact that biomes characteristic of the Northeast region (especially the Caatinga and the Cerrado) are

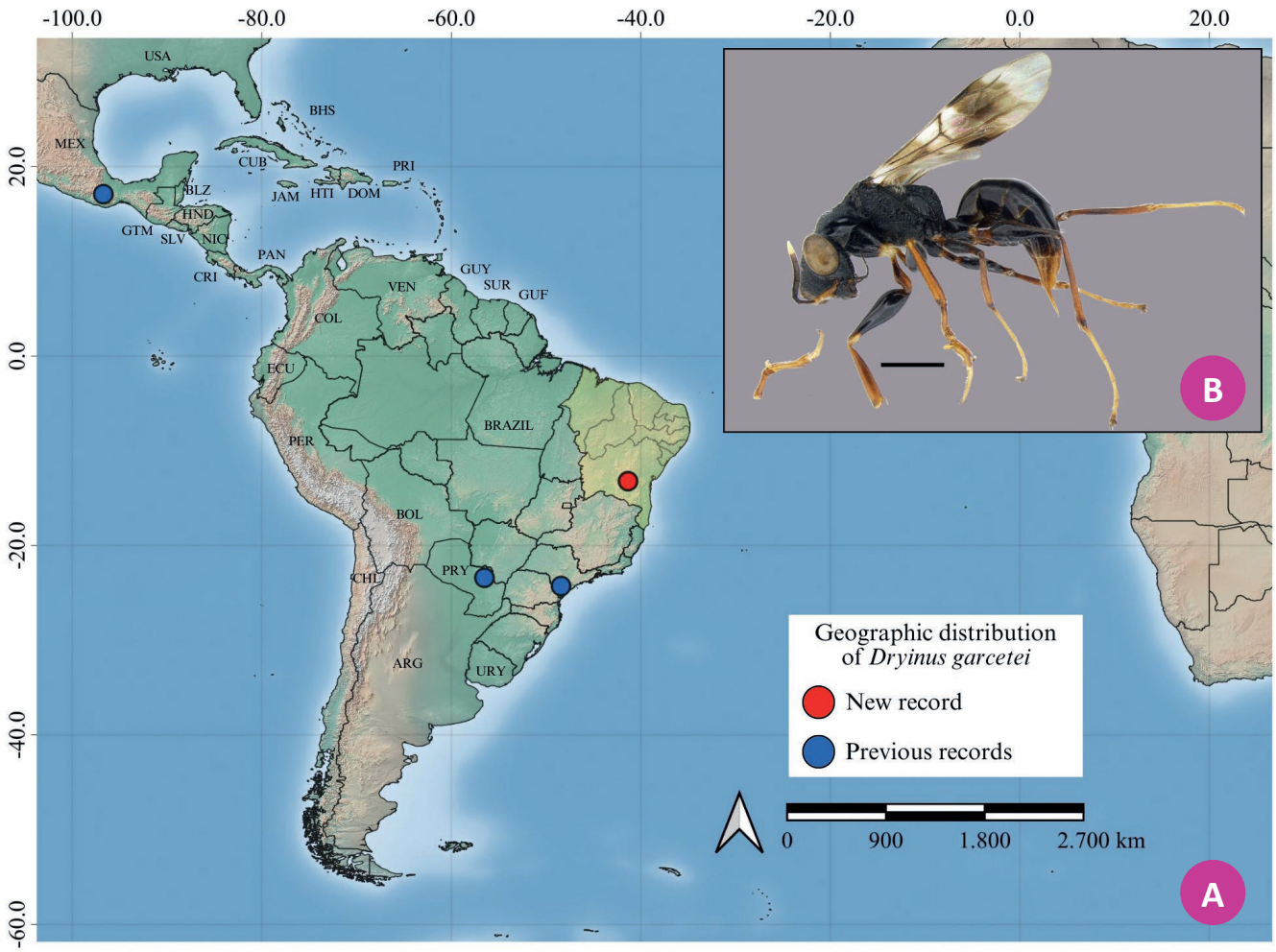

Figure 1. Distribution and illustration of *Dryinus garcetei* Olmi, 2012. A. Geographic distribution of *D. garcetei*. Northeastern region featured (translucid yellow); New record (red circle) and Previous distributions (blue circle). B. Habitus in lateral view of *D. garcetei* from São Paulo, Brazil (Photo by A. L. Martins). Scale bar = 1 mm.

extremely rich in biodiversity, however, they are still poorly sampled (Santos et al. 2011; Oliveira et al. 2016; Martins 2022; Santos et al. 2024).

Such a deficit can make conservation strategies for these species unfeasible, preventing/making it impossible to develop techniques for using these insects as biological control tools for agricultural pests (Lemes et al. 2011; Regos et al. 2019; Melo-Merino et al. 2020).

In this case, the unprecedented record of *D. garcetei* for the Northeast region of Brazil, along with other work carried out by our research group (*e.g.*, Lopes et al. 2018; Ramos et al. 2018; 2021; 2022; Marambaia et al. 2023) highlights just how much the Hymenoptera fauna is still unknown in this Brazilian region. Therefore, encouraging research in these areas, not only on Dryinidae, but also involving different taxonomic groups (especially those that do not have specialists working in the area) is essential for the development of more assertive public policies with regard to conservation, management and sustainable use of biodiversity.

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ALM: Formal analysis; Original draft; Review & editing; RLR: Original draft; Review & editing; MET-S: Original draft; Review & editing; ALM: Species identification; Validation; Original draft; Review & editing; FFO: Review & editing; RLSS: Investigation; Review & editing.

Conflict of Interest Statement

The authors declare no conflict of interest.

References

Castro, M. S.; Trindade-Santos, M. E.; Ramos, R. L.; Spineli, A. C.; Leal, S. M. (2023) Geographical distribution and notes on the nests of the "uruçu-do-chão" bee, *Melipona* (*Melikerria*) *quinquefasciata* Lepeletier, in Bahia, North-eastern Brazil. *EntomoBrasilis*, 16: e1040. doi: 10.12741/ebrasilis.v16.e1040

Coelho, B. W.; Aguiar, A. P.; Engel, M. S. (2011) A survey of Dryinidae (Hymenoptera, Chrysidoidea) from Caxiuanã, Amazon Basin, with three new taxa and keys to genera and species. *Zootaxa*, 2907(1):

1-21. doi: 10.11646/zootaxa.2907.1.1

Fernandes, G. W.; Arantes-Garcia, L.; Barbosa, M.; Barbosa, N. P. U.; Batista, E. K. L.; Beiroz, W.; Resende, F. M.; Abrahão, A.; Almada E. D.; Alves, E., et al. (2020) Biodiversity and ecosystem services in the Campo Rupestre: A road map for the sustainability of the hottest Brazilian biodiversity hotspot. *Perspectives in Ecology and Conservation*, 18(4): 213-222. doi: 10.1016/j.pecon.2020.10.004

Lemes, P.; Faleiro, F.; Tessarolo, G.; Loyola, R. (2011) Refining Spatial Data for Biodiversity Conservation. Natureza e Conservação, *Natureza & Conservação*, 9(2): 240-243. doi: 10.4322/natcon.2011.032

Lopes, D. S.; Oliveira, F. F.; Mello-Patiu, C.A.; Pamponet, F. M.; Thé, T. S. (2018) Espécies de *Oxysarcodexia* (Diptera: Sarcophagidae) associadas a carcaças de suínos (*Sus scrofa* Linnaeus) expostas em um fragmento de Mata Atlântica no município de Salvador, Bahia. *EntomoBrasilis*, 11(2): 103-106. doi: 10.12741/ebrasilis.v11i2.779

Marambaia, A. L.; Silva, G. C. C.; Ramos, R. L.; Trindade-Santos, M. E.; Cambra, R. A.; Williams, K. A.; Oliveira, F. F. (2023) *Atillum* André, 1903 (Hymenoptera: Mutillidae) in Brazil: current and new geographic distribution records. *Revista Chilena de Entomología*, 49(2): 279-289. doi: 10.35249/rche.49.2.23.08

Martins, A. L. (2022) A new species of pincer wasps of *Deinodryinus* Perkins (Hymenoptera, Dryinidae) from oceanic archipelago of Fernando de Noronha, Brazil. *Papéis Avulsos de Zoologia*, 62: e202262044. doi: 10.11606/1807-0205/2022.62.044

Martins, A. L. (2023) Contribution to the knowledge of pincer wasps (Hymenoptera: Dryinidae): new records from South America. *Revista Chilena de Entomología*, 49(4): 801-811. doi: 10.35249/rche.49.4.23.14

Martins, A. L. (2024) Dryinidae in Catálogo Taxonômico da Fauna do Brasil. PNUD. http://fauna.jbrj.gov.br/fauna/faunadobrasil/919. Access on: 10.ii.2024.

Martins, A. L.; Perioto, N. W. (2021) One new species and one new record of *Dryinus* Latreille, 1804 (Hymenoptera: Dryinidae) from Uruguay. *Revista Chilena de Entomología*, 47(2): 243-252. doi: 10.35249/rche.47.2.21.11

Martins, A. L.; Melo, G. A. R. (2024) Discovery of the pincer wasp Thaumatodryininae (Hymenoptera, Dryinidae) in Burmese amber, with description of a new genus and the first phylogenetic analysis of the subfamily. *Arthropod Systematics & Phylogeny*, 82: 235-252. doi: 10.3897/asp.82.e106734

Martins, A. L.; Lara, R. I. R.; Perioto, N. W. (2015a) New records of Dryinidae (Hymenoptera: Chrysidoidea) from the Atlantic Rainforest of São Paulo, Brazil. *The Pan-Pacific Entomologist*, 91(2): 196-199. doi: 10.3956/2015-91.2.196

Martins, A. L.; Lara, R. I. R.; Perioto, N. W.; Olmi, M. (2015b) Two new species of Dryinidae (Hymenoptera: Chrysidoidea) from areas of Atlantic Rainforest at São Paulo State, Brazil. *Brazilian Journal of Biology*, 75(2): 455-459. doi: 10.1590/1519-6984.19613

Melo-Merino, S. M.; Reyes-Bonilla, H.; Lira-Noriega, A. (2020) Ecological niche models and species distribution models in marine environments: A literature review and spatial analysis of evidence. *Ecological Modelling*, 415: 108837. doi: 10.1016/j.ecolmodel.2019.108837

Olmi, M. (2012) Descriptions of new species of Dryinidae from the Neotropical region (Hymenoptera: Chrysidoidea). *Frustula Entomologica*, 33(46): 28-50.

Olmi, M.; Virla, E. G. (2014) Dryinidae of the neotropical region (Hymenoptera: Chrysidoidea). *Zootaxa*, 3792(1): 1-534. doi: 10.11646/zootaxa.3792.2.1

Olmi, M.; Copeland, R. S.; Noort, S. V. (2019) Dryinidae of the Afrotropical region (Hymenoptera, Chrysidoidea). *Zootaxa*, 4630(1): 1-619. doi: 10.11646/zootaxa.4630.1.1

Oliveira, U.; Paglia, A. P.; Brescovit, A. D.; Carvalho, C. J. B.; Silva, D. P.; Rezende, D. T.; Leite, F. S. F.; Batista, J. A. N.; Pena Barbosa J. P. P.; Stehmann, J. R., et al. (2016) The strong influence of collection bias on biodiversity knowledge shortfalls of Brazilian terrestrial biodiversity. *Diversity and Distributions*, 22(12): 1232-1244. doi: 10.1111/ddi.12489

Ramos, R. L.; Lopes, D. S.; Pamponet, F. M.; Thé, T. S.; Morato, V. C. G. (2018) Primeiro registro de *Peckia* (*Squamatodes*) *trivittata* (Curran) (Diptera: Sarcophagidae) colonizando cadáver humano carbonizado em área de restinga da Bahia, Brasil. *EntomoBrasilis*, 11(2): 151-153. doi: 10.12741/ebrasilis.v11i2.765

Ramos, R. L.; Trindade-Santos M. E.; Lopes, D. S.; Pamponet, F. M.; Mello-Patiu, C. A.; Oliveira, F. F. (2021) First record of the *Ravinia almeidai* (Lopes, 1946) (Diptera: Sarcophagidae: Sarcophaginae) to the state of Bahia, Brazil. *Entomological Communications*, 3: ec03026. doi: 10.37486/2675-1305.ec03026

Ramos, R. L.; Trindade-Santos M. E.; Lopes, D. S.; Pamponet, F. M.; Mello-Patiu, C. A.; Oliveira, F. F. (2022) New records of *Sarcophaga* Meigen (Diptera: Sarcophagidae: Sarcophaginae) for the Northeast region of Brazil. *Scientia Plena*, 18(9): 098001. doi: 10.14808/sci.plena.2022.098001

Regos, A.; Gagne, L.; Alcaraz-Segura, D.; Honrado., J. P.; Domínguez, J. (2019) Effects of species traits and environmental predictors on performance and transferability of ecological niche models. *Scientific reports*, 9(1): 4221. doi: 10.1038/s41598-019-40766-5

Santos, J. C.; Leal, I. R.; Almeida-Cortez, J. S.; Fernandes, G. W.; Tabarelli, M. (2011) Caatinga: the scientific negligence experienced by a dry tropical forest. *Tropical Conservation Science*, 4(3): 276-286. doi: 10.1177/194008291100400306

Santos, M. F. M.; Pérez-Maluf, R.; Moreira, A. A.; Santos, C. B.; Martins, A. L.; de Paula, R. C. A. L. (2024) Dryinidae species (Hymenoptera, Aculeata) in the semiarid region of Bahia, Brazil. *Revista Caatinga*, 37: 1-10. doi: 10.1590/1983-21252024v3712357rc

Vergara-Asenjo, G.; Alfaro, F. M.; Pizarro-Araya, J. (2023) Linnean and Wallacean shortfalls in the knowledge of arthropod species in Chile: Challenges and implications for regional conservation. *Biological Conservation*, 281: 110027. doi: 10.1016/j.biocon.2023.110027

Virla, E. G.; Moya-Raygoza, G.; Guglielmino, A. (2023) A review of the biology of the pincer wasps (Hymenoptera: Dryinidae). *Austral Entomology*, 62(3): 274-299. doi: 10.1111/aen.12658

Whittaker, R.; Araújo, M.; Jepson, P.; Ladle, R.; Watson, J.; Willis, K. (2005) Conservation Biogeography: assessment and prospect. *Diversity and Distributions*. 11: 3-23. doi: 10.1111/j.1366-9516.2005.00143.x