

Scientific Note

First record of Megaloptera (Insecta: Neuropterida) from Sergipe state, Brazil

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Abstract. Megaloptera comprises approximately 400 extant species belonging to Corydalidae or Sialidae, of which 25 have been recorded in Brazil. Here, we provide new occurrence records for *Corydalus diasi* Navás, 1915 (Corydalidae) in the Serra de Itabaiana National Park, Sergipe State, where two females and five males were collected using light traps from June 2022 to May 2023. Specimens were identified using morphological analysis. We provide illustrations that will aid the elucidation of this species and can be used to understand its morphological variation. Originally described from Ceará in 1915, *C. diasi* is currently known to occur in several Brazilian states, with its estimated distribution covering approximately 2,115,282 km², including ecotonal areas between the Atlantic Forest and Caatinga in northeastern Brazil. We highlight the lack of information on Megaloptera in the Northeast, a region affected by Linnean and Wallacean shortfalls, and emphasize the need for further sampling in ecologically diverse areas to uncover invertebrate diversity and support the development of conservation policies.

Keywords: Aquatic insect, Atlantic Forest, Corydalidae, Species Distribution, Northeast Brazil, Neotropical Region.

Megaloptera comprises approximately 400 extant species (Ardila-Camacho & Contreras-Ramos 2018; Rivera-Gasperin et al. 2019; Martins et al. 2022; Hamada & Azevêdo 2024), of which 25 have been recorded in Brazil (Hamada & Azevêdo 2024; Mendes et al. 2024; Martins 2024) and assigned to Corydalidae and Sialidae. Corydalidae adults are easily distinguished from those of Sialidae by body size, with individuals ranging from 25 to 90 mm in length in the former, whereas body length varies from 10 to 25 mm in the latter (Hamada & Azevêdo 2024). Three genera of Corydalidae occur in Brazil: *Chloronia* Banks 1908 (five spp.), *Corydalus* Latreille, 1802 (14 spp.) (both Corydalidae) and *Puri* Cardoso-Costa, Azevêdo & Ferreira-Jr, 2013 (one sp.) (Chauliodinae) (Martins 2024; Hamada & Azevêdo 2024). *Corydalus diasi* Navás, 1915 is a megalopteran species with the most extensive known distribution in Brazil, with records in the northeast, midwest, southeast and south Brazilian geopolitical zones (Contreras-Ramos 1998; Andrade et al. 2020; Gouvêa et al. 2020; Constancio & Martins 2024; Hamada & Azevêdo 2024; Martins 2024). Although there are records of Megaloptera in northeastern Brazil, it is notable that these remain scarce, with only two specimens collected in Ceará and three individuals from Bahia (Contreras-Ramos 1998). The Northeastern Brazil spans four biomes (Atlantic Forest, Caatinga, Cerrado and Amazonia) and covers 18% of the Brazilian territory, yet it exhibits the lowest diversity of Megaloptera (Martins et al. 2024) and, suffers significantly from Linnean and Wallacean biodiversity shortfalls (Hortal et al. 2015).

Therefore, our work aimed to provide new geographic distribution data for *C. diasi* in Northeast Brazil and expand our knowledge of the distribution pattern of this species in the country. Illustrations and distribution maps of this species are also provided.

The material sampled and examined for this new record consisted of two females and five males of *C. diasi* collected from the Serra of Itabaiana National Park (SINP; 10°45'7.21"S, 37°20'28.87"W), Sergipe, Brazil (Fig. 1). SINP is an important conservation unit in Sergipe, covering approximately 7,966 ha in an ecotone area between the Atlantic Forest and Caatinga biomes. It also contains numerous springs

and water bodies within its boundaries (Farias et al. 2024). Individuals were collected using a light trap (white sheet with a mixed 500 W light source) between 17:30 and 05:30 from July 2022 to May 2023. The trap was set up in the common area of the SINP headquarters, which is located within a forest matrix comprising an ecotone between the Atlantic Forest and Caatinga. The trap was positioned 222 m from the nearest stream (Cachoeira da Gruta).

The specimens were identified using a key provided by Contreras-Ramos (1998). The terminalia of the specimens were dissected and photographed under a stereoscopic microscope Nikon AZ100M coupled with a Digital Sight DS-Fi2 camera, and images were stacked using the NIS Elements AR software available at the Department of Zoology, Universidade Federal do Rio Grande do Sul. Habitus photographs were taken using a digital camera. Five *C. diasi* specimens (four male; one female) were deposited in the entomological collection of the Laboratory of Ecology and Biodiversity at the Universidade Federal de Sergipe, São Cristóvão, Sergipe, Brazil, and two specimens (one male, one female) were deposited in the Invertebrate Collection of the Instituto Nacional de Pesquisas da Amazônia. Species occurrence records were compiled from literature (Contreras-Ramos 1998; Andrade et al. 2020; Gouvêa et al. 2020; Constancio & Martins 2024; Hamada & Azevêdo 2024; Martins 2024), and the geographic coordinates of each record, if not included on the labels, were obtained from Google Earth (<https://www.google.com/earth>) using the locality data (Supplementary Information). The distribution map was created and illustrated using QGIS software version 3.18.

Examined Material: Brazil, Sergipe, Areia Branca. One male "Brazil, Sergipe, Areia Branca, Serra of Itabaiana National Park, 29.vii.2022, 10°45'7.21"S, 37°20'28.87"W, Light trap, Farias, A.B.S. col."; same data except: one male 24.ix.2022, one female 26.ix.2022, two male 25.v.2023; one male and one female 19.xii.2022 same data except: Santos, S.A. col.

The specimens collected in this study were attracted to light traps during different months between 2022 and 2023. These months are within the two well-defined seasons in Brazilian Northeast (rainy, May,

and July; dry, November, and December).

Corydalus diasi was described by Navás (1915) based on specimens collected in Ceará (type locality: Fortaleza), sent by Mr. Dias da Rocha, who was honored with the species name (Navás 1915). This species has previously been reported in Argentina, Paraguay, and Brazil. In Brazil, it has been recorded in the states of Ceará, Tocantins, Bahia, Goiás, Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo, and Rio Grande do Sul (Contreras-Ramos 1998; Andrade et al. 2020; Gouvêa et al. 2020; Constancio & Martins 2024), and Sergipe in this study. This species has the widest known distribution in Brazil, occurring in eight of the country's hydrographic basins (Martins et al. 2024). This note extends the distribution of *Corydalus diasi* in 788 km from its original locality.

The species now has an estimated occurrence area of approximately 2,115,282 km², based on the connection polygon of known records. Photographs of the collected specimens and their genitalia will be important to assist in species identification (Fig. 2). In addition, it is important to understand morphological variation in this species, as illustrated by Contreras-Ramos (1998). The Northeast region of Brazil is considered a knowledge gap for several taxa, including Megaloptera. We believe that additional sampling events in diverse ecosystems of a region will result in new records of many invertebrate taxa. This study will serve as a framework for the construction of biodiversity conservation policies in the northeast region.

Finally, there has been no assessment of the conservation status

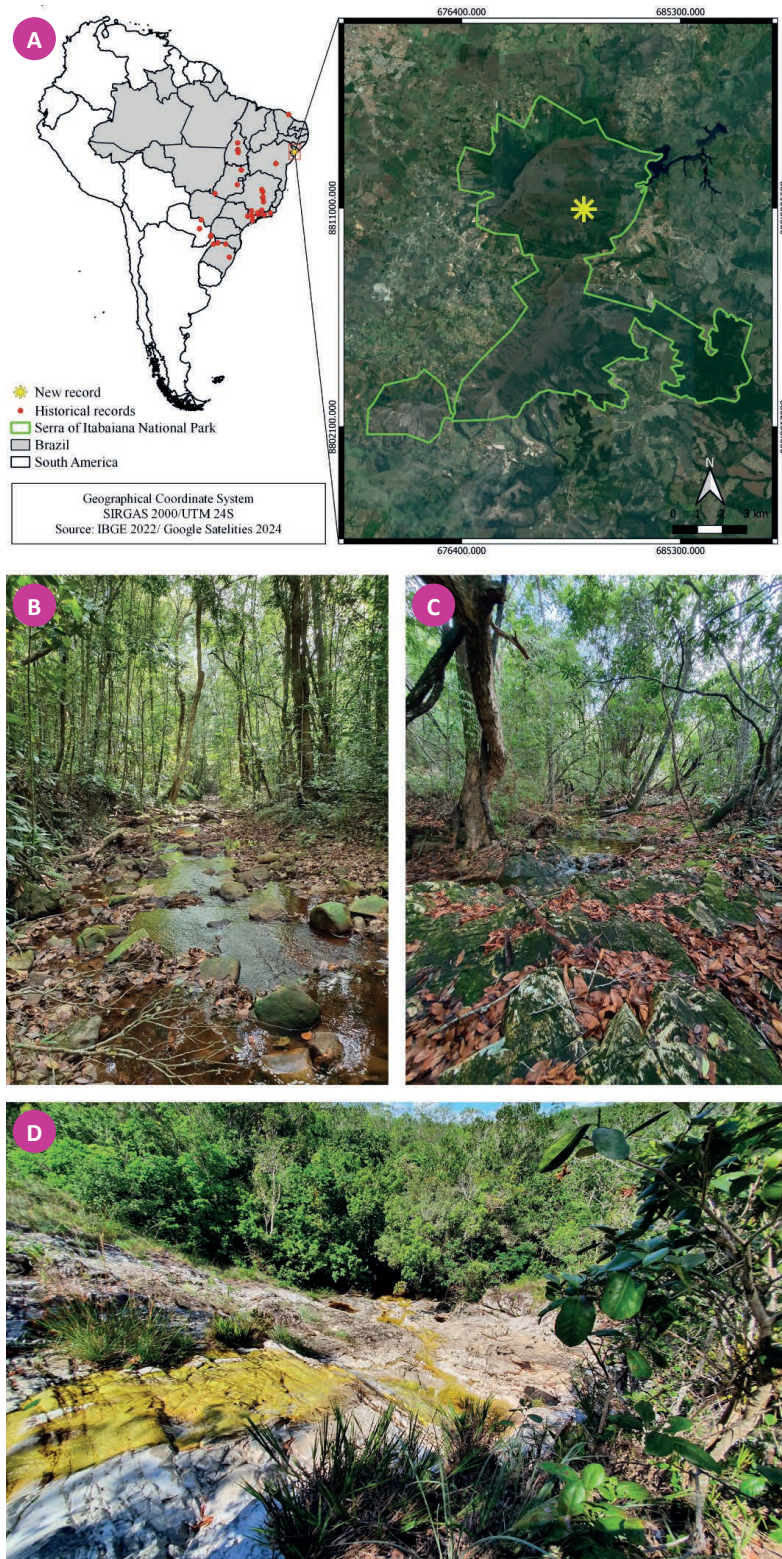


Figure 1. A, New records of *Corydalus diasi* Navás, 1915 (Megaloptera: Corydalidae) in the Serra of Itabaiana National Park, Sergipe, Brazil, and historical records. B–D, Temporary creeks in Serra of Itabaiana National Park close to the collection site.

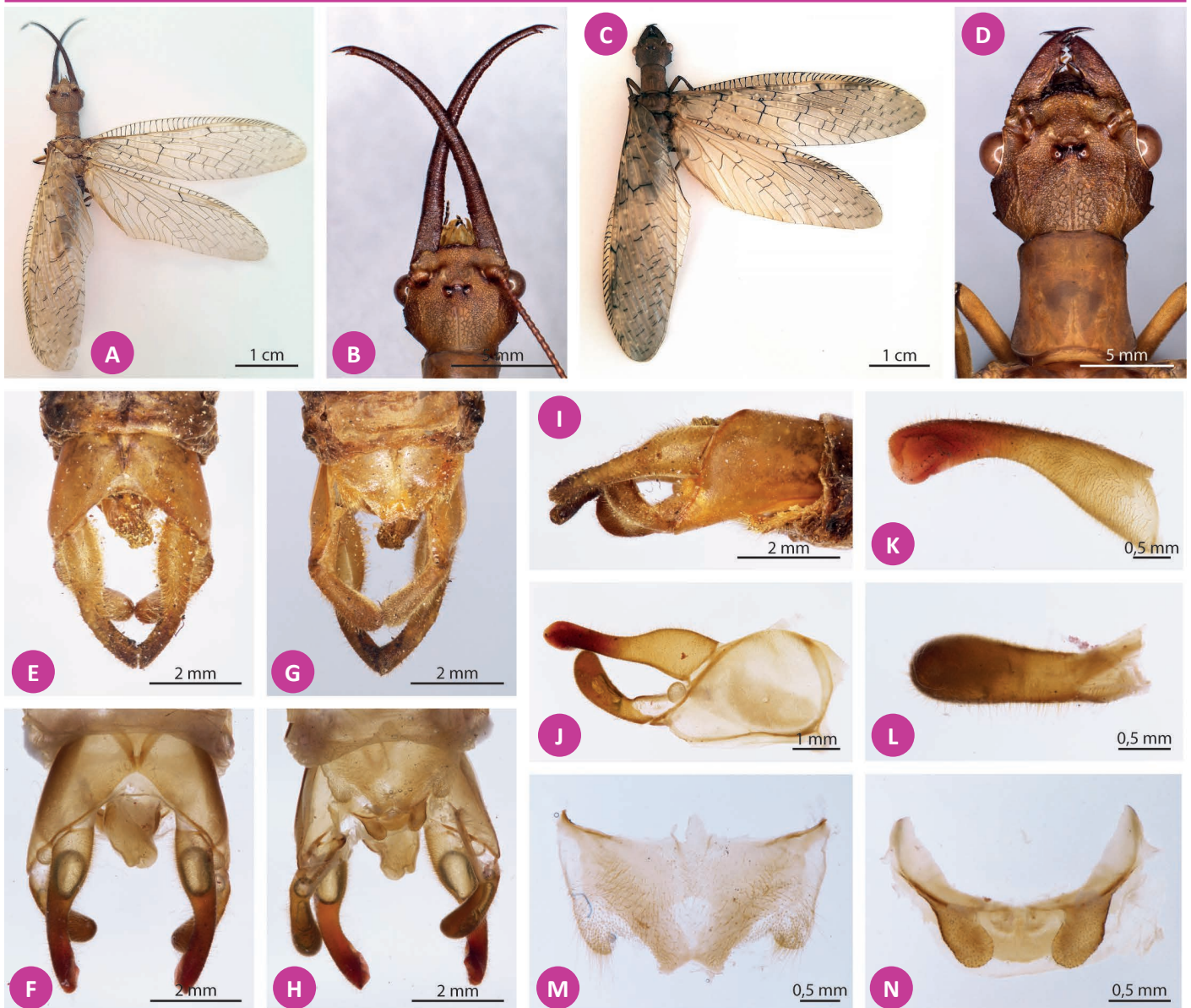


Figure 2. *Corydalus diasi* Navás, 1915 (Megaloptera: Corydalidae) specimens from Sergipe state. A, Male habitus in dorsal view; B, male head in dorsal view; C, female habitus in dorsal view; D, female head in dorsal view; E–H, male terminalia in dorsal (E–F) and ventral (G–H) views; I–J, male terminalia in lateral view; K, ectoproct in ventral view; L, gonostylus 9 in lateral view; M, sternite 9; N, gonocoxite and gonostyli X.

of *C. diasi* in the IUCN or SALVE lists (ICMBio 2024; IUCN 2024), and its distribution is uneven in South America, with most records in the Brazilian Atlantic Forest. Since it was collected in an ecotone, we suggest further studies, especially in the northeast region of Brazil, to catalog invertebrate species in the Atlantic Forest and Caatinga biomes, considering the significant fragmentation and loss of original vegetation in these areas.

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Authors' Contributions

ABSF: Conceptualization, Formal Analysis, Writing – original draft, Writing, review, and editing; SAS: Writing, review, and editing; KRB: Writing, review, and editing; JCS: Writing, review, and editing; GDRF: Writing, review, and editing; NH: Writing, review, and editing.

Conflict of Interest Statement

The authors declare that they have no conflicts of interest.

Supplementary Material

Supplementary data for this article be accessed at doi: <https://doi.org/10.5281/zenodo.14983451>.

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