

## First record of *Corydalus diasi* Navás, 1915 (Megaloptera: Corydalidae) from Rio de Janeiro state, Brazil

Primer registro de *Corydalus diasi* Navás, 1915 (Megaloptera: Corydalidae) en el estado de Río de Janeiro, Brasil

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**Abstract.** The dobsonfly species *Corydalus diasi* Navás, 1915 is recorded from Rio de Janeiro state, southeastern Brazil, for the first time, increasing its distribution to eight Brazilian states plus Federal District. Diagnostic characters, habitus photographs, and an informative distributional map of *C. diasi* are provided.

**Key words:** Distribution; dobsonfly; Neotropical region; southeastern Brazil.

**Resumen.** El megalóptero de la especie *Corydalus diasi* Navás, 1915, es registrada por primera vez en el estado de Río de Janeiro, en el sureste de Brasil, ampliando su distribución a ocho estados brasileños y al Distrito Federal. Se proporcionan características diagnósticas, fotografías del hábito y un mapa de distribución informativo de *C. diasi*.

**Palabras clave:** Distribución; megalóptero; región neotropical; sureste de Brasil.

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Megaloptera constitutes a globally distributed order of aquatic insects. Among them, the family Corydalidae is commonly known as dobsonflies (Corydalinae) or fishflies (Chauliodinae) (Rivera-Gasperín *et al.* 2019). Within Corydalidae, some representatives of the subfamily Corydalinae, including many species of *Corydalus* Latreille, 1802, stand out for their large mandibles in males. Exclusive to the New World, the genus *Corydalus* is particularly noteworthy, boasting 40 described species and holding the title of the most diverse dobsonfly genus in the continent (Martins *et al.* 2022a, b).

In Brazil, the most speciose country for Megaloptera in South America, there are 14 known *Corydalus* species (Martins 2019, 2023). *Corydalus diasi* Navás, 1915 stands out with one of the most extensive distributions, spanning the northeastern, central, southeastern and south regions. Despite its prevalence in the southeastern region, this species had only been documented previously within this region in the states of São Paulo and Minas Gerais (Andrade *et al.* 2020; Cuquetto-Leite *et al.* 2021; Martins 2023). In a recent study focused on Megaloptera specimens housed at the Museu Nacional - Universidade Federal do Rio de Janeiro (MNRJ), six specimens of *Corydalus diasi* from the municipalities of Itatiaia, Macaé

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and Nova Iguaçu were discovered, stored in 80% ethanol. This finding is the first record of this significant species in the state of Rio de Janeiro. Additionally, it constitutes the second record of a *Corydalus* species for the state; up to date only *C. cephalotes* (Rambur, 1842) is known from Rio de Janeiro.

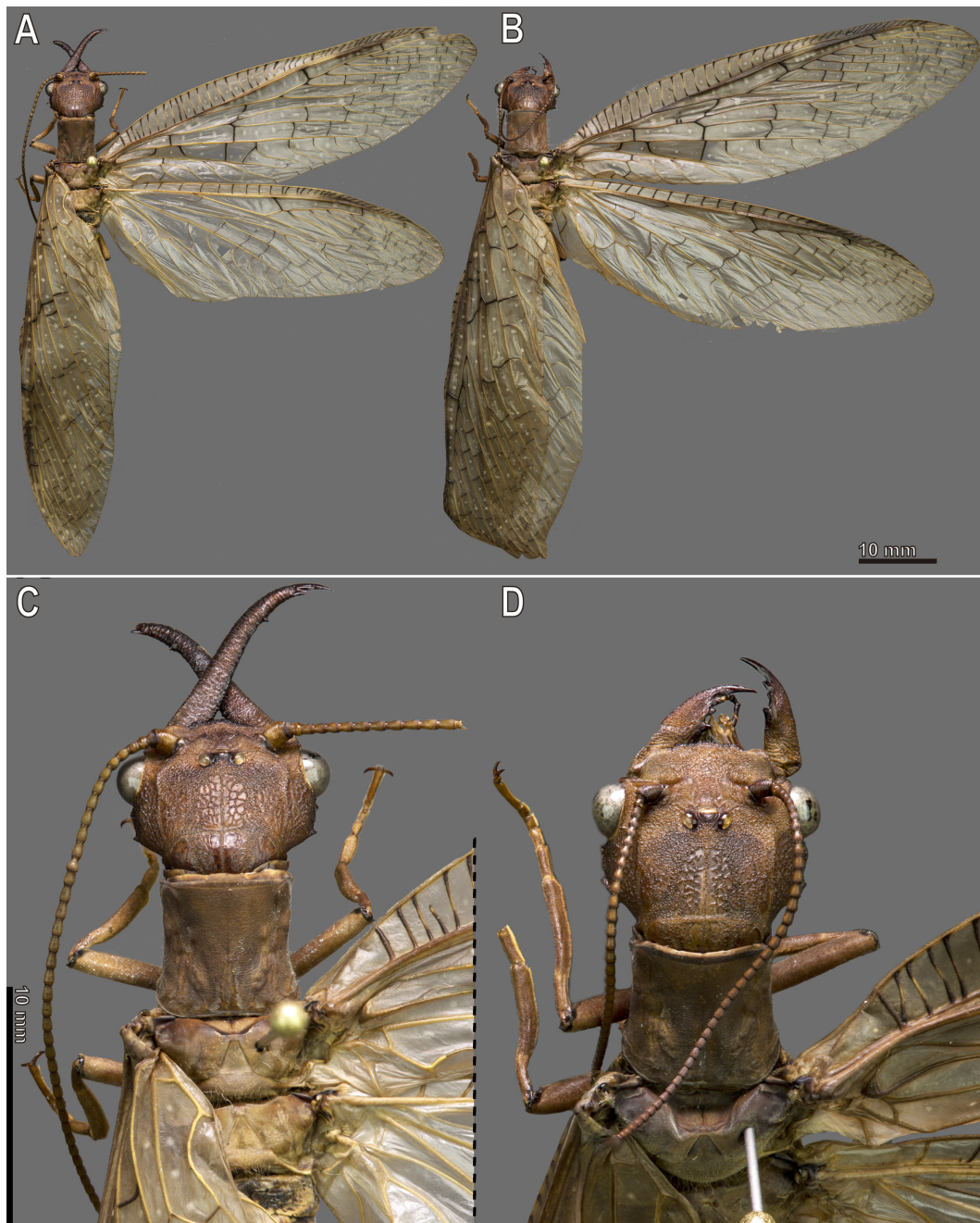
The specimens were identified by the study of external morphology and by dissecting the abdominal apex, which was then cleared with a 10% potassium hydroxide (KOH) solution, following a standard procedure. Subsequently, the genitalia were washed with distilled water, and neutralized with 10% acetic acid, and 70% ethyl alcohol. Specimen structures were dissected and observed in a Petri dish with 70% ethyl alcohol, under a stereoscopic microscope Leica M205C, and posteriorly photographs were taken using a Leica MC190HD camera. The habitus photographs were taken using a Canon EOS6DMarkII, with 100 mm macro lens. The specimen identification was confirmed following the key provided by Contreras-Ramos (1998). *Corydalus cephalotes* specimens that were already deposited at the MNRJ were also used to compare the morphology. The terminology of external morphology follows Contreras-Ramos (1998), while terminalia and genital terminology are based on Liu *et al.* (2016). The distribution map was created and illustrated using the software QGIS version 3.32.3.

### *Corydalus diasi* Navás, 1915

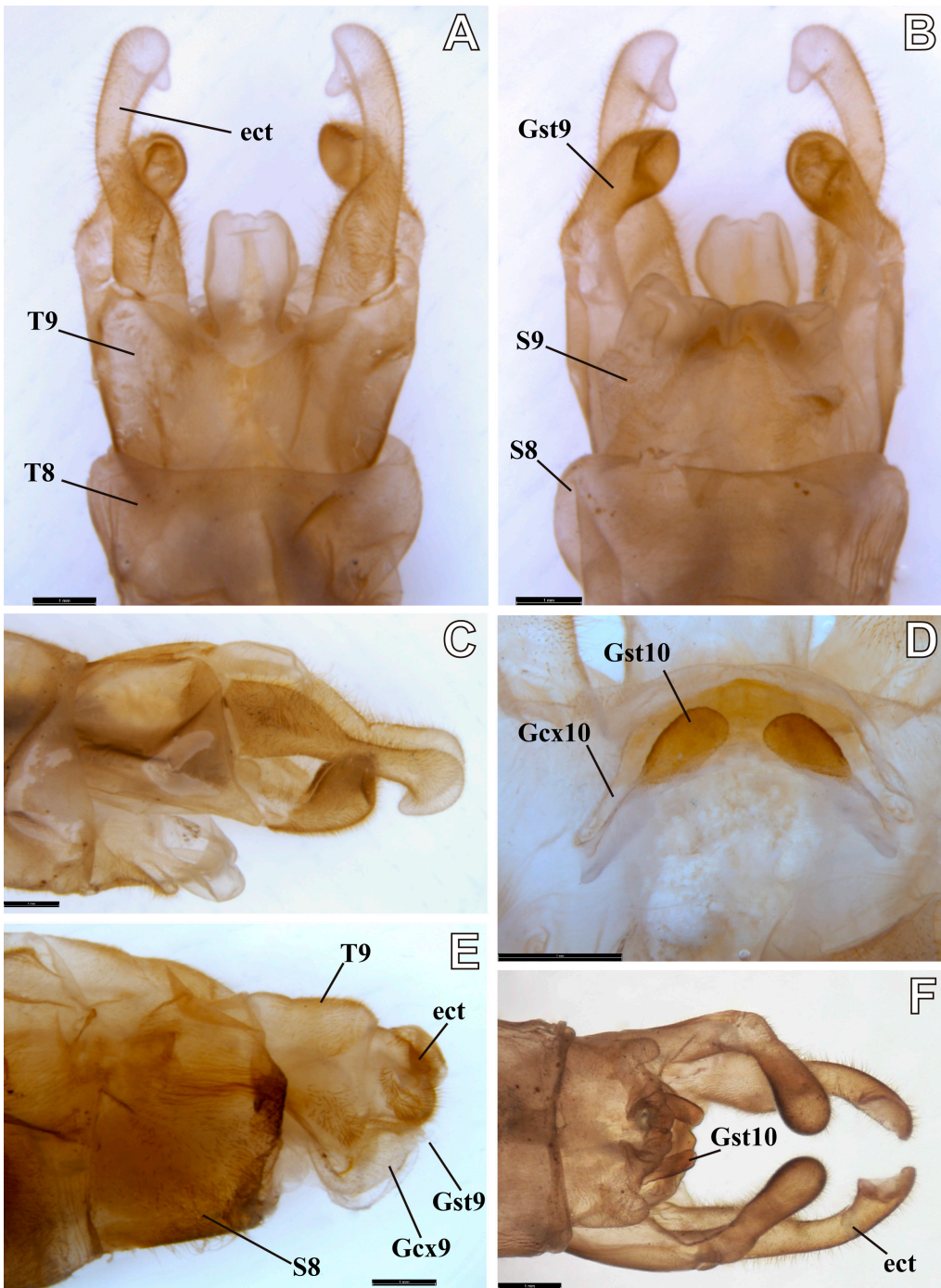
(Figs. 1A-D, 2A-F, 3)

**Diagnosis** (after Contreras-Ramos 1998). **Male** (Figs. 1A, C): Head pale to dark brown, unpatterned. Mandibles short with developed dentition or elongated with reduced dentition. Antennae brown, infusate at apex, filiform, moderately thick. Forewings with light brown membrane, longitudinal veins dark brown, and crossveins strongly black marked. Genitalia barely sclerotized. Tergite IX subquadrate with fine setose. Ectoproct long, larger at the base, with 2/3 of its length more narrowed than apex; apex can portray a projection orientated mesally or completely incised. Sternite IX subquadrate with posterior margin flattened or portraying an incised projection. Gonostylus IX subclavate, elongate, reaching at least 1/2 of the ectoproct length. Gonocoxites X slightly convex with short anterolateral projections or highly convex with fully developed anterolateral projections. **Female** (Figs. 1B, D): Morphologically similar to the male, excepting the terminalia and genitalia structures, and mandibles, which are short with well-developed three pre-apical teeth, and inner protrusion basally to first pre-apical tooth.

**Remarks.** Variations in mandible size were observed among the collected males, the specimen from Nova Iguaçu had female-like mandibles, while those from Itatiaia exhibited elongated ones. Another distinctive variation was noted at the tip of the ectoproct, where specimens from Itatiaia featured a small projected apex (Fig. 2A), while those from Nova Iguaçu exhibits an incised apex (Fig. 2F). Additionally, the sternite IX's posterior margin from Nova Iguaçu males have an incised projection (Fig. 2F), whereas those from Itatiaia have a flattened one (Fig. 2B). Although gonocoxites X shape variations were already observed on *C. diasi*, none of these variations were noted from Rio de Janeiro specimens (Figs. 2D-F). This new record expands the distribution of *C. diasi* from seven states (Bahia, Ceará, Goiás, Minas Gerais, Rio Grande do Sul, São Paulo, Tocantins) and Federal district to eight Brazilian states plus Federal district (Fig. 3). It is quite likely that *C. diasi* occurs in other states besides those previously mentioned, especially in the central and northeastern regions. Future studies focusing on investigating unidentified specimens in scientific collections and collecting in undersampled areas will fill the gaps regarding the distribution potential of *C. diasi*.

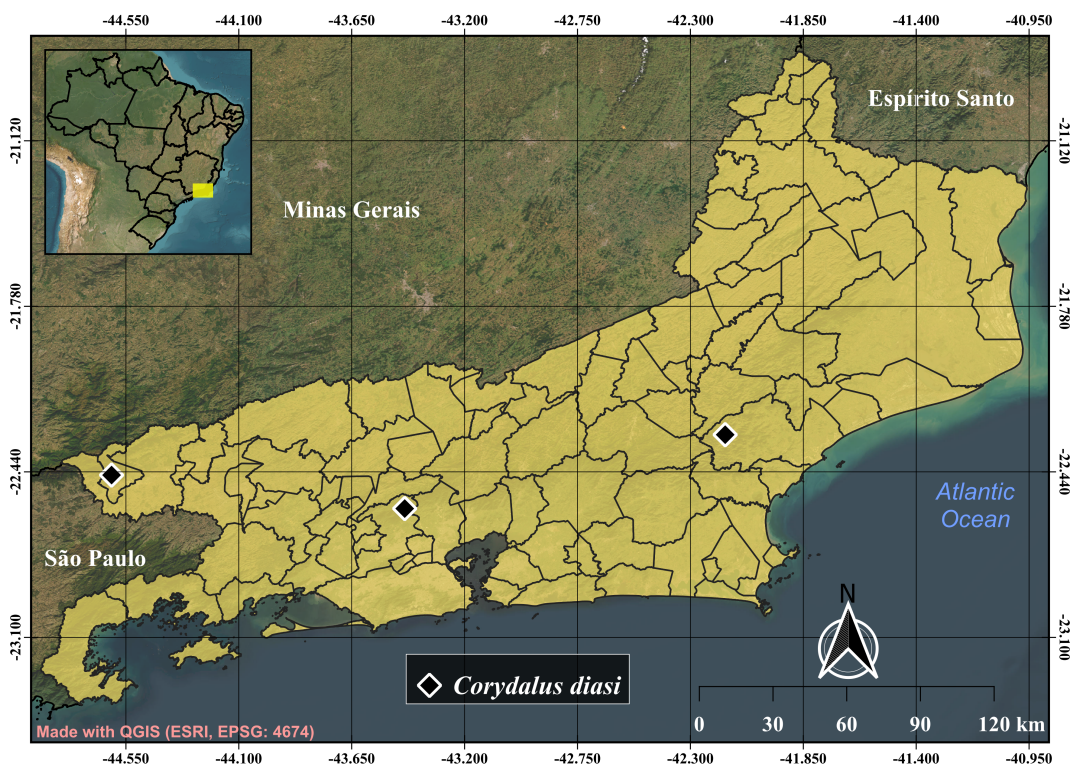


**Figure 1.** *Corydalus diasi* Navás, 1915 from Itatiaia municipality, Rio de Janeiro. **A-C.** Dorsal view of the male. **B-D.** Dorsal view of the female. Scale: 10 mm. / **Figura 1.** *Corydalus diasi* Navás, 1915 del municipio de Itatiaia, Río de Janeiro. **A-C.** Vista dorsal del macho. **B-D.** Vista dorsal de la hembra. Escala: 10 mm.



**Figure 2.** *Corydalus diasi* Navás, 1915 genital structures. A-D. Itatiaia male genitalia. A. Dorsal view. B. Ventral view. C. Lateral view. D. Gonostylus 10. E. Female genitalia. F. Nova Iguaçu's male genitalia, ventral view. Abbreviations: ect, ectoproct; Gst9, gonostylus 9; Gcx9-Gcx10, gonocoxites 9 and 10, Gst10, gonostylus 10; S8-9, sternites 8-9; T8-9, tergites 8-9. Scale: 1 mm. / **Figura 2.** Estruturas genitales de *Corydalus diasi* Navás, 1915. A-D. Genitalia del macho de Itatiaia. A. Vista dorsal. B. Vista ventral. C. Vista lateral. D. Gonostilo 10. E. Genitalia de la hembra. F. Genitalia del macho de Nova Iguaçu, vista ventral. Abreviaturas: ect, ectoprocto; Gst9, gonostilo 9; Gcx9, gonocoxito 9, Gst10, gonostilo 10; S8-9, esternitos 8-9; T8-9, terguitos 8-9. Escala: 1 mm.

**Material examined.** *Corydalus diasi*. 1 male, 2 females. **BRAZIL.** Rio de Janeiro, Itatiaia, Parque Nacional do Itatiaia, Sede do Parque, 22°27'09.4"S, 44°36'25.6"W, 17.xi.2021, Pano Branco, cols. Antunes A., Ferreira A.L., Alexandre M.S.L, Clarkson B. & Gonçalves C.C. [MNRJ]; 1 male. **BRAZIL.** Rio de Janeiro, Macaé, Sana, Cabeceiras do Sana, 22°17'29.9"S 42°09'39.9"W, 17.i.2022, Coleta Ativa, col. Guimarães, S. [MNRJ]; 1 male, 1 female. **BRAZIL.** Rio de Janeiro, Nova Iguaçu, Reserva Biológica Federal do Tinguá, Alojamento, 22°35'10.4"S, 43°26'18.7"W, 20.ix.2023, Coleta Noturna, cols. Monné, Jardins & Quijada [MNRJ].



**Figure 3.** Distributional map of *Corydalus diasi* Navás, 1915 from Rio de Janeiro state. / **Figura 3.** Mapa de distribución de *Corydalus diasi* Navás, 1915 en el estado de Río de Janeiro.

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### Author Contributions

**PHMC:** Investigation, resources, writing - original draft preparation. **CCM:** Conceptualization, data curation, supervision.

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