

A new report on the distribution of *Paraliodorophila burlai* Vilela et Bächli, 2007 (Diptera Drosophilidae) in South-eastern Brazil

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ABSTRACT

This work is a new report of distribution of *Paraliodorophila burlai* Vilela et Bächli, 2007 (Diptera Drosophilidae) recorded from Southeastern Brazil through a female specimen which was collected in the “Parque Nacional do Itatiaia”, Rio de Janeiro state, Brazil. In addition, we provide high-resolution photographs of the external morphology and terminalia, and an update map of geographic distribution of the species.

KEY WORDS

Diptera; Drosophilinae; distribution of species; new record.

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INTRODUCTION

Paraliodorophila Duda, 1925 (Diptera Drosophilidae) is a small worldwide genus, with 21 valid species (Duda, 1925; Bächli, 2024): *P. antennata* Wheeler, 1957; *P. bipartida* Duda, 1925; *P. burlai* Vilela et Bächli, 2007; *P. dudai* Wheeler, 1954; *P. mihalyii* Wheeler, 1963; *P. acumina* Bock, 1982; *P. anomala* Wheeler, 1954; *P. bimaculata* (Malloch, 1934); *P. centralis* Wheeler, 1954; *P. costaricana* Duda, 1925; *P. diversicrus* McEvey et Bock, 1982; *P. lydiae* Tsacas et Chassagnard, 1991; *P. nakamurai* Okada, 1973; *P. neopictula* Wheeler et Takada, 1964; *P. nephelea* Wheeler, 1968; *P. okadai* Wynn et Toda, 1990; *P. parapictula* Wheeler et Takada, 1964; *P. parsonsi* Bock, 1982; *P. pictifrons* (Malloch, 1934); *P. pictula* (de Meijere, 1911); and *P. takadai* Wynn et Toda, 1990.

The species of this genus are relatively tiny flies with a body length of around 2mm. At first glance,

they could easily be mistakenly recognized as being species of closely related genera such as *Mycodrosophila* or *Hirtodrosophila*. However, they can be distinguished from *Mycodrosophila* primarily by the absence of a well-developed lappet preceding the second costal break of the wing and by having two pairs of dorsocentral setae, whereas *Mycodrosophila* species only possess one pair. From *Hirtodrosophila*, it can be differentiated by the glossier and wider than long heads, although this condition also occurs in some broad-headed species of *Hirtodrosophila*. While the association with fungi is well established for species of the genera *Mycodrosophila* and *Hirtodrosophila* (closely related genus) this is not yet observed, although very likely, for the poorly known species of *Paraliodorophila* (Vilela & Bächli, 2007).

In Brazil, there are confirmed records of two *Paraliodorophila* species: *P. antennata* (in the states of Paraná, Pará, Rio Grande do Sul and Rondônia) and *P. burlai* (in the states of Santa Cata-

rina, Rio de Janeiro, holotype locality: Rio de Janeiro city, State of Rio de Janeiro, Brazil, and São Paulo, paratypes locality: Cantareira, Parque Estadual da Cantareira and Mairiporã, state of São Paulo, Brazil) (Poppe et al., 2015; Santa-Brígida et al., 2017; 2023; Vilela & Bächli, 2007). Additionally, there are likely new records of *Paraliiodrosophila* species (iNaturalist records, 2024), though these remain unconfirmed due to the identification of such specimens not being fully resolved to a species level.

MATERIAL AND METHODS

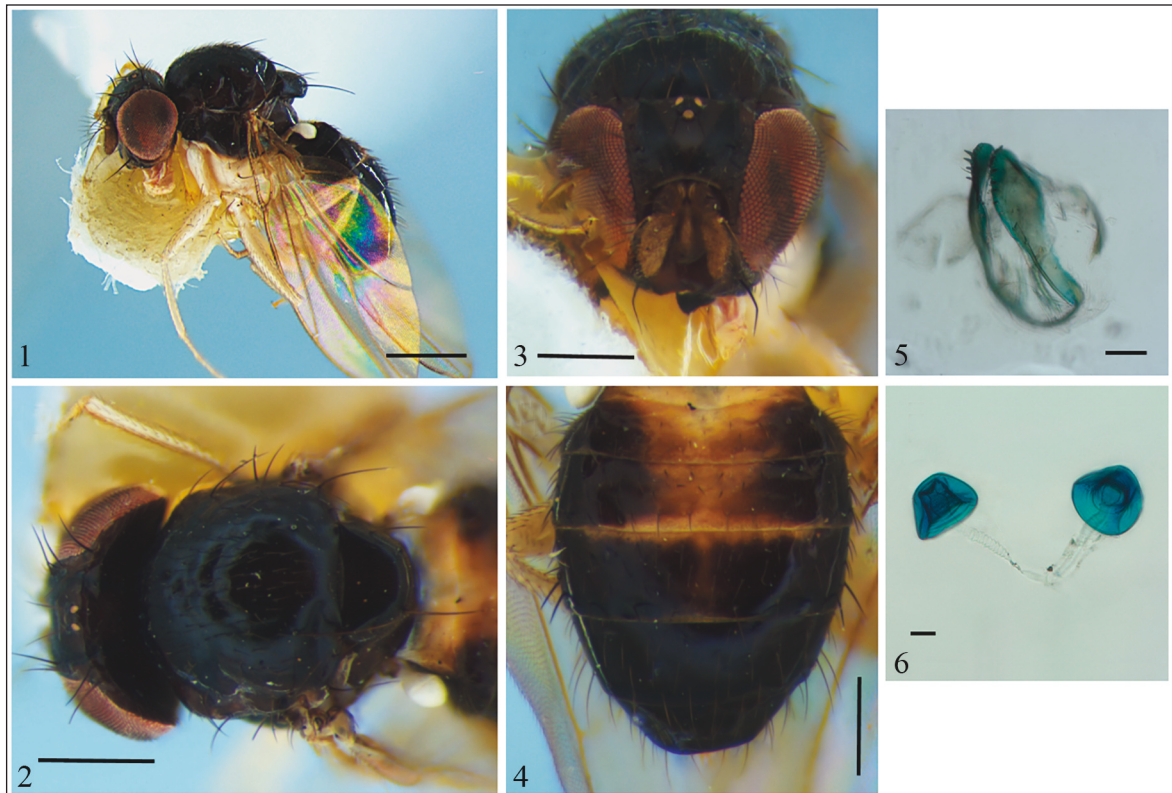
A female specimen of *Paraliiodrosophila* was collected with malaise trap in the “Parque Nacional do Itatiaia”, Rio de Janeiro state, Brazil.

For photography, the specimen was mounted on entomological pins after a drying process, which involved three steps: i) the specimen was

dried on paper towels, with their wings and positions arranged for mounting; ii) they were then bathed in amyl acetate (ISO) for about 20 seconds; iii) the specimen was pinned and before they hardened completely, their wings were adjusted again.

The individual was identified based on external morphology and the analysis of female, which were prepared following a protocol adapted from Bächli et al. (2004) and Mendes & Gottschalk (2019). Morphological descriptive terminology follows Cumming & Wood (2017).

Thus, the apex of the abdomen was removed with the help of minute pins and microsurgical scissors. The extracted portion of the abdomen was clarified with potassium hydroxide (KOH) in a 10% aqueous solution for approximately 24 h at room temperature. The sample was then washed with water and colored with an aqueous solution of methylene blue for approximately 24 h at room temperature. The portion of the abdomen was de-



Figures 1-6. *Paraliiodrosophila burlai* Vilela et Bächli, 2007. Fig. 1: lateral view. Fig. 2: thorax (dorsal view). Fig. 3: head (frontal view). Fig. 4: abdomen (dorsal view). Scale bars: 0.5 mm. Fig. 5: female terminalia, oviscapt valve (lateral view). Fig. 6: spermathecal capsule. Scale bars: 0.1 mm.

hydrated in 70% ethanol and dissected in glycerol using an Olympus CL 6000 stereomicroscope. For the drawings and photomicrographs, the phallic sclerites were mounted on a temporary slide with glycerin gelatin (no-flavor gelatin 10% in solution in 1:1, water:glycerin).

The specimen was photographed pinned an Olympus CL 6000 stereomicroscope with 4x and 10x objective lenses. Photographs of different focal points of the same structure was staked and combined using Helicon Focus. Distribution map was created with QGIS Las Palmas 2.18.10 software (QGIS Development Team, 2016) using data from specimen labels from TaxoDros (2024). Associated data may be found in SiBBr (<https://collectory.sibbr.gov.br/collectory/public/show/col116>) and GBIF (<https://www.gbif.org/pt/publisher/c461e0ec-aaa8-4601-bae9-4b08d6e804f1>).

This pinned specimen was deposited in the Diptera Collection of the Museu de Zoologia da Universidade de São Paulo, Brazil (MZUSP).

RESULTS AND CONCLUSIONS

Genus *Paraliodrosophila* Duda, 1925

Duda, 1925, 1927, 1939. Neave, 1940; Wheeler, 1954, 1970, 1981; Okada, 1967, 1989; Val et al., 1981; Grimaldi, 1991; Ashburner et al., 2005.

Paraliodrosophila burlai Vilela et Bächli, 2007

Paraliodrosophila burlai Vilela et Bächli, 2007: 302, figs. 7–9, 16 C, D, I, 17 C, D, H.

MATERIAL EXAMINED. Brazil • 1 female specimen (Figs. 1–6); Rio de Janeiro, Itatiaia, Parque Nacional do Itatiaia, Administração; 22° 27' 17" S 44° 36' 35" W; 762 m asl; 7–14 Jan. 2016 (Fig. 7); Malaise trap in Rain Forest; Amorim D.S. and Silva V.C. legit; MZUSP, voucher number MZ053543.

The data set '*Paraliodrosophila*_pontos Data.xlsx' associated with this publication is available on

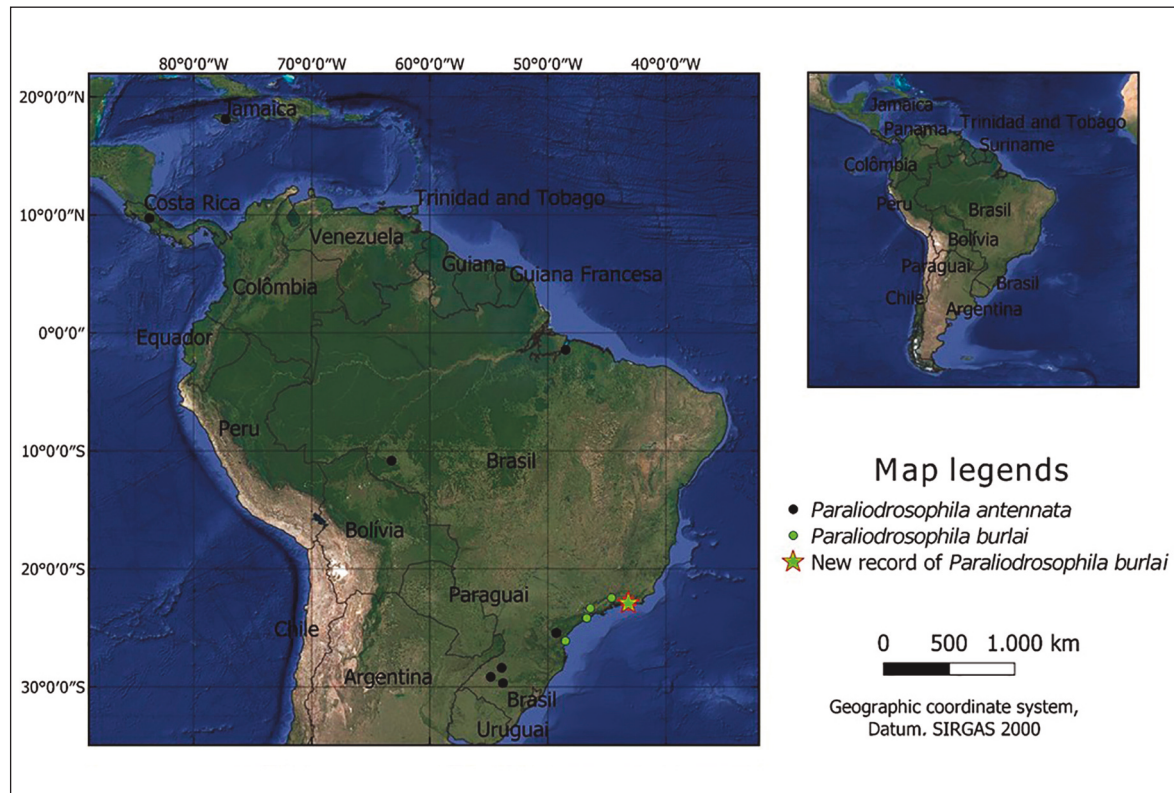


Figure 7. Distribution map of *Paraliodrosophila burlai* Vilela et Bächli, 2007 and *P. antennata* Wheeler, 1957, with records of occurrences marked in Brazil. The map highlights both previously known and the new record in the “Parque Nacional do Itatiaia”, Rio de Janeiro state, Brazil.

Figshare (<https://doi.org/10.6084/m9.figshare.28761719>).

DESCRIPTION. Female. Antenna brownish; pleura whitish with contrasting dark stripe in upper half; cheeks narrow; wing with apex of first costal section distinctly darkened; aedeagus roundish at tip in dorsal view, without an anterodorsal plate.

DISTRIBUTION. This work presents a new distribution record of *P. burlai* based on a female specimen collected in Southeastern Brazil (Santa Catarina, São Paulo and Rio de Janeiro, municipalities of Rio de Janeiro and Itatiaia) (Fig. 2). Additionally, for the first time, high-resolution color photographs of the external morphology and terminalia are provided, along with an updated map of the species' geographic distribution.

Given the currently known disjunct distribution of *P. burlai* in the states of Santa Catarina and Rio de Janeiro, it is expected that species is widely distributed throughout the Atlantic Forest. New records are anticipated to be found in the Atlantic Forest areas of Paraná, São Paulo and Minas Gerais. We can classify *P. burlai* as a rarer species due to the limited distribution records available, which feature unique trait values and contribute to community functional diversity (according to Jain et al., 2014). However, it can also be considered under-sampled, as its niche and resources associations are still unclear.

REMARKS. The color of the examined specimen, particularly on the abdomen (Fig. 4), slightly differs from the original description by Vilela & Bächli (2007), with less extensive median margins both longitudinally and laterally. However, the female terminalia (oviscapt valve) are virtually identical (Fig. 5).

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