

Eighty-five years awaiting for description: a new species of *Tabanus* Linnaeus (Diptera: Tabanidae) from the Paraná State, in Brazil

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ABSTRACT

The largest genus within the family Tabanidae (Diptera: Brachycera), *Tabanus* Linnaeus, has a worldwide distribution and includes medium to large conspicuous flies. Although the species are difficult to identify and a large number have already been described, several new Neotropical species have been reported for science in the past few years. Taxonomy, the science that describes and catalogs biodiversity, depends on collections, as these preserve specimens for later purposes, allowing examination and checking by specialists. In this paper we describe a new species, *Tabanus argentistrigatus* sp. n. based on two specimens stored in the collection of the Museum of Zoology of the São Paulo University since 1938. The new species is only known from one location in the state of Paraná, which is now highly anthropized.

Introduction

The family Tabanidae (Diptera: Brachycera) includes common, easily found flies, popularly known as horse flies, deer flies and clegs. They possess worldwide distribution, being notably absent in the Antarctic continent and in high altitudes. With nearly 4500 valid species (Evenhuis and Pape, 2023) they constitute one of the families of Diptera with higher number of species worldwide (Pape et al., 2011). They are mostly hematophagous, with females needing blood to nourish their eggs, and some may act as vectors of diseases (Mullens, 2019). They also may act as pollinators (Johnson and Morita, 2006) and, due to the habitat restriction of their larvae, some species may be used as bioindicators of environmental quality and recover (Husseneder et al., 2022; Van de Meutter et al., 2016).

Tabanus Linnaeus constitute the genus with higher number of species within the family, with 1350 species described worldwide and 77 in Brazil (Coscarón and Papavero, 2009; Evenhuis and Pape, 2023; Krolow and Henriques, 2023). In fact, several species today harbored in other genera were originally described as *Tabanus*, and nearly one third of valid names for Tabanidae are still included within the genus

(Evenhuis and Pape, 2023). The genus is most likely not monophyletic (Burger, 2009) and this, associated with the great number of species, makes the taxonomy of the genus a daunting task. Taxonomic revisions addressing the genus have focused on some well defined species groups (e.g. Carmo and Henriques, 2019; Fairchild, 1983, 1984), but several species lacks revision. It is generally recognized in the literature that, given the large, conspicuous size of these flies and the large number of species, there are probably few unknown species left to be described (Chvála et al., 1972). Nevertheless, in the past 4 years, 7 new species have been added to the South-American fauna (e.g. Carmo and Henriques, 2019; Henriques et al., 2022; Krolow et al., 2022).

Entomological collections have a crucial role in taxonomy, the science responsible for describing and classifying biodiversity. Sometimes new species are found in field expeditions, a practice that will and should continue to be undertaken. However, every so often, specimens may wait decades for examination in collections around the world. Some of these are unknown and come from habitats that were once forested and are now completely degraded and anthropized. Examining the Tabanidae collection from the Museu de Zoologia da Universidade de São Paulo (MZUSP), we found two specimens of *Tabanus* collected in

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1938 in the Brazilian state of Paraná and bearing labels of “holotype” and “paratype” by Alexander Fairchild, the most prominent specialist in the taxonomy of Neotropical Tabanidae during the twentieth century. Despite bearing type labels, these specimens were never described. Here we describe this as a new species, *Tabanus argentistrigatus* sp.n, contributing to the knowledge of tabanid fauna in Brazil.

Methods

Morphological terms used in this work are based on the proposal of Cumming and Wood (2017) and Chainey, (2017). For the first article of the flagellum the term basal plate is preferred, since it is widely used in Tabanidae literature and also represents an apomorphic condition seen in the Tabaninae + Chrysopsinae clade (Carmo et al., 2022). For the proper determination of the specimen, we used taxonomical works for *Tabanus* available in the literature (e.g. Coscarón, 1979; Fairchild, 1942, 1983, 1984, 1986).

Specimens were examined in a Leica MZ75 stereomicroscope. Photos from the dorsal and lateral habitus were taken with a camera Olympus TG-6, while photos from frons and lateral head were taken in a Leica M205C with a camera Leica V412 attached. Photos were stacked on Helicon Focus 8 and plates organized with GIMP 2.10.

The specimens terminalia were not dissected and studied, since terminalia characters are usually of limited taxonomic value for Tabanidae identification below the genus level (Krolow and Henriques, 2009, 2010). Since there are only two, very old specimens from a single, highly anthropized location, the gain of studying the terminalia was not enough to justify the damage to the specimens.

Results

Tabanus argentistrigatus sp.n.

Figs. 1A-H

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Diagnosis: The new species differ from the other Neotropical *Tabanus* by the following combination of characters: large size, about 20 mm, reddish brown integument, with a single prominent middorsal abdominal stripe of golden setulae. Additionally, the wing, including calypters, is yellowish fumose, with a narrow, yellow, nearly indiscernible pterostigma. The flagellum is light yellow with sparse black setulae, basal plate slender, shorter to the same size of style. Frons broad and parallel.

Holotype female (Figs. 1A-D, F): Length 19 mm, reddish brown integument. Frons moderately broad (FI = 3.6) and parallel (DI = 1.2), with brown integument covered with yellow pruinosity, white near vertex, and with mixed black and golden setulae. Vertex slightly sunken, with shiny brown area, no vestiges of ocelli. Occiput with mostly golden setulae, a few black near the eye margin. Frontal callus drop shaped, yellowish brown, not touching the eyes margins. Median callus a dorsal extension of the frontal callus, narrow and almost reaching the eye triangle. Subcallus and clypeus yellowish pruinose, gena darker, both clypeus and gena covered with short dark brown setulae. Palpi enlarged at base, yellowish pruinose with black setulae. Both proboscis and stylets shorter than half the head height, prementum yellow, labella dark brown with sparse black setulae and wholly pruinose. Antennae wholly yellow, scape with black setulae. Pedicel with a short spike, not surpassing scape height. Basal plate slender, with similar size to the style. Style with four segments, with short, sparse black setulae, some golden setulae at the apex of the fourth. Mesonotum reddish brown with gray pruinosity and mixed black and golden setulae.

Notopleuron concolorous, mostly with black setulae, but some golden dorsally. Scutellum mostly with black setulae, golden at the apex. Pleura light brown, yellow pruinose, mostly with dark brown setulae with a light brown tuft dorsally at anepisternum near to the axillary sclerites. Legs mostly yellowish brown, except by the darker tarsi. All coxae and femora with black setulae. Fore tibia with golden setulae ventrally. Mid and hind tibia with mixed black and golden setulae. Wings including calypters, yellowish fumose, pterostigma yellow, almost inconspicuous. Abdomen very long, nearly twice the length of the mesonotum, reddish brown, with black setulae, golden setulae laterally and on a dorsomedial stripe from segments 1 to 7, paler on the last segments. Sternites with black setulae, with few golden setulae at the middle of segments 1 to 7.

Male. Unknown.

Type material. Holotype female: [Brazil]• Paraná, Curitiba (Sic), (Parolim) [25°27'39"S, 49°16'02"W]; XI.938 [1938]; Coll. Claretiano; *Tabanus argentistrigatus* Fairchild Holotype [Handwritten]; MZ01411; Holótipo [on lateral] *Tabanus argentistrigatus* Carmo & Henriques [red label]. Paratype: 1♀; Same data as holotype; *Tabanus argentistrigatus* Fairchild Paratype [Handwritten]; This sp. never published GBF 1959 [On verse, handwritten]; Parátipo [on lateral] *Tabanus argentistrigatus* Carmo & Henriques [yellow label].

Paratype variations: Length = 18.3 mm. Frontal index = 3.3. Divergence Index = 1.1. Basal plate broader than holotype. R4 with a very short appendix.

Etymology. From Latin, *argentum* (silver) + *strigatus* (color band). The name refers to the abdominal stripe with light setulae, contrasting with the brown integument of the specimens. This is the name intended by Fairchild, as indicated by his labels left in the specimens (Figs. 1F and G). Despite observing that the setulae on the abdominal stripe are not silver, we decided to keep the name as intended by Fairchild, since the setulae on the stripe are paler on the last segments. Also, it is possible to see a flash of silver depending to the incidence of light. We decided to keep the name as a way to honoring this researcher, who was the first to recognize the new species, although without describing it.

Discussion

Describing new species of *Tabanus* may be a difficult task. The great number of species, several of them with poor and insufficient descriptions, sometimes may constitute a barrier to determine if an undetermined specimen constitutes a new taxon or an already known one. Species groups, with striking morphological similarity, are useful taxonomic tools, but not all Neotropical *Tabanus* species are currently arranged in such groups. The new species presented here, however, has some conspicuous morphological traits that stand it aside from all other Neotropical species.

The species described here is rather large (both holotype and paratype reaching 20 mm length), and it differ from all other Neotropical species with similar size by the presence of a conspicuous abdominal middorsal stripe on tergites 1 - 7 and the absence of a well marked prescutellar pilose spot (see Fairchild, 1984). *Tabanus* species with conspicuous dorsal abdominal stripes, as seen in the studied specimens, are mostly included in the groups *Tabanus lineola* Fabricius (for a revision of the group see Fairchild, 1983) and *Tabanus trivittatus* Fabricius (see Carmo and Henriques, 2019; Fairchild, 1976) but is easily differentiated from such groups by the largest body and absence of dorsolateral bands and dark beard. It lacks an inflated subcallus, a synapomorphic feature for the *T. trivittatus* group. Other species with abdominal dorsomedial stripes includes the recently described *T. tacuaremoensis* Krolow et al. (2022), but is easily distinguished from this species by the larger size, narrower frontal callus, the yellow fumose wing with yellow

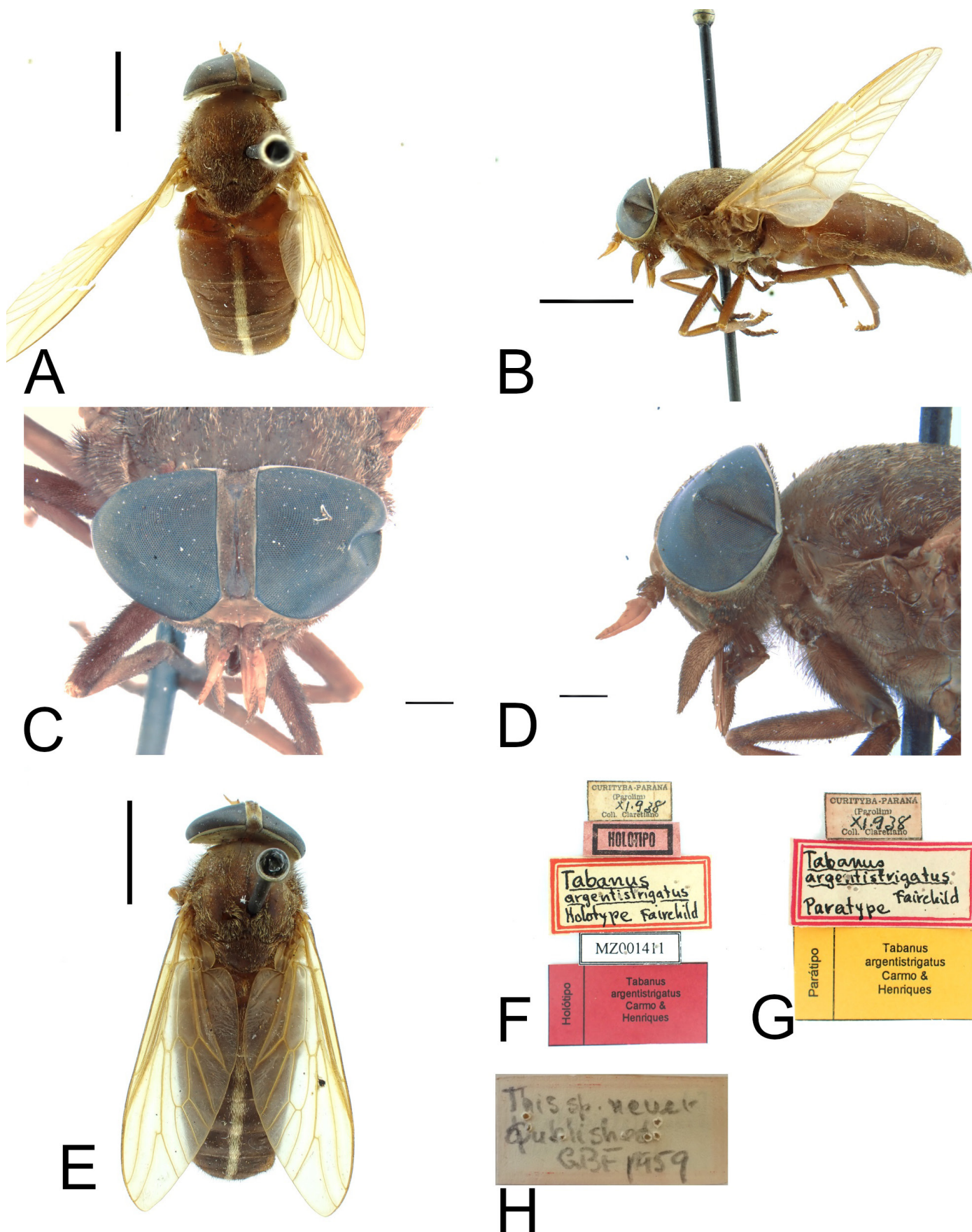


Figure 1 *Tabanus argentistrigatus* sp.n. **Holotype female.** A. Dorsal habitus. B. Lateral habitus. C. Frons. D. Head, lateral view. **Paratype female.** E. Dorsal habitus. **Labels.** F. Holotype. G. Paratype. H. Paratype, verse. **Scale bars.** A, B, E = 5 mm; C, D = 1 mm.

veins and the appendix at the bifurcation of R_{4+5} absent or very short. *Tabanus rondoniense* Henriques *et al.*, 2022 differ from the new species presented here, by the presence of a black scutellar spot, fumose area of the wing restricted to anterior margin, and abdominal stripe formed by a series of connected triangles. Poorly known species of *Tabanus* with distribution in southern South America includes *T. charrua* Coscarón, *T. melanogaster* Brèthes, *T. platensis* Brèthes, *T. maculivervis* Macquart, and *T. primitivus* Walker. All of these have been recently reviewed by Krolow *et al.* (2022) which supplies photos for all the types. All these species are very different from *Tabanus argentistrigatus* sp.n.

The locality in both specimens studied here, is marked as "Parana/Curytiba/Parolin". This is, in the present day, an urban area in the Center of the Brazilian city of Curitiba. This area was originally covered by mixed ombrophilous forest which extended from southern São Paulo to Rio Grande do Sul and the province of Misiones in Argentina. Unfortunately, only 3% of the original cover of this forest is still preserved today (Vaz *et al.*, 2022).

Conclusion

The new species described here expand our knowledge about the genus *Tabanus* in a region of particularly degraded type of vegetation in the Atlantic forest, the mixed ombrophilous forest. The new species is marked by diverse morphological features, not seen in other species of *Tabanus* in the region, making its identification relatively easy. Despite being collected in the beginning of the past century, and studied by Fairchild in 1959, this species remained unknown to science for 85 years, highlighting the importance of Museums and entomological collections in the discovery and preservation of biodiversity.

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Conflicts of interest

The authors declare no conflicts of interest.

Author contribution statement

DDDC Conceptualization, illustration of specimens, species description and taxonomy, manuscript first draft, discussion of results. ALH Manuscript revision, species description and taxonomy, discussion of results.

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