

Article

An Overview of the Tabanidae (Diptera) of Uruguay

Tiago Kütter Krolow ¹, Christian R. González ^{2,*}, María Martínez ³, Alejo Menchaca ⁴, Anderson Saravia ⁴, Steve Mihok ⁵, Pablo Parodi ⁴ and Rodrigo F. Krüger ⁶

¹ Laboratório de Entomologia, Universidade Federal do Tocantins (UFT), Porto Nacional 77500-000, Brazil; tkkrolow@gmail.com

² Instituto de Entomología, Facultad de Ciencias Básicas, Universidad Metropolitana de Ciencias de la Educación, Santiago 7760197, Chile

³ Sección Entomología, Facultad de Ciencias, Universidad de la República, Iguá 4225, Montevideo 11400, Uruguay; mm@fcien.edu.uy

⁴ Instituto Nacional de Investigación Agropecuaria, Plataforma de Investigación en Salud Animal, Tacuarembó 45000, Uruguay; amenchaca@inia.org.uy (A.M.); asaravia@inia.org.uy (A.S.); pparodi@inia.org.uy (P.P.)

⁵ Independent Scientist, 388 Church Street, Russell, ON K4R 1A8, Canada

⁶ Laboratório de Ecologia de Parasitos e Vetores (LEPAV), Departamento de Microbiologia e Parasitologia, Instituto de Biologia, Universidade Federal de Pelotas (UFPel), Capão do Leão 96010-900, Brazil; rfkruger@gmail.com

* Correspondence: christian.gonzalez@umce.cl

Abstract

The Tabanidae fauna of Uruguay has historically received limited attention, with most records dating from the 19th and early 20th centuries and concentrated near Montevideo. Here, we provide an updated synthesis of the Uruguayan Tabanidae fauna based on a comprehensive review of the literature, examination of historical material, recent field surveys, and validated records from citizen science. We recognized 52 valid species in 15 genera and six tribes, representing approximately 1% of the world diversity of the family. Four species are currently considered to be endemic to Uruguay. Since the last national revision, species richness has increased by 12%, largely through overlooked bibliographic records, the re-examination of museum specimens, and new distributional data. The fauna is dominated by the subfamily Tabaninae, particularly the tribes Diachlorini and Tabanini, whereas Pangoniinae is poorly represented. Males are described for 62% of the species, but immature stages are known for fewer than 20%, highlighting significant gaps in knowledge. Distributional data reveal a strong spatial bias: nearly half of the species are known from a single department, and four departments still lack records. A comparison with the Brazilian Pampa suggests that only slightly more than half of the species are shared, indicating that the regional fauna remains incompletely documented. Primary-type specimens are predominantly housed in European institutions, reflecting the historical development of Neotropical dipterology and the absence of resident specialists. Overall, our results suggest that the apparent modest diversity of Uruguayan Tabanidae likely reflects historical sampling bias, rather than true faunal impoverishment. Expanded field surveys and integrative taxonomic approaches are essential to clarify species limits, document immature stages, and better understand the biogeography of horse flies in the Pampa biome.



Academic Editor: Christophe Piscart

Received: 23 April 2026

Revised: 1 June 2026

Accepted: 2 June 2026

Published: 12 June 2026

Copyright: © 2026 by the authors.

Licensee MDPI, Basel, Switzerland.

This article is an open access article distributed under the terms and conditions of the [Creative Commons Attribution \(CC BY\)](https://creativecommons.org/licenses/by/4.0/) license.

Keywords: biodiversity inventory; faunistic; horse flies; taxonomy; citizen science

1. Introduction

Tabanids are robust flies known worldwide for their blood-sucking habits, with females commonly threatening the comfort and tranquility of humans in bathing areas, parks, forests, and rural zones. The problem is not exclusive to humans; many domestic and wild animals suffer from aggressive and incessant attacks from some species. Tabanids have been recorded attacking all sorts of vertebrates, such as lizards, snakes, alligators, ducks, and various mammals [1–8]. In English-speaking countries, they are known as horse flies and deer flies, while in South America, they are popularly called *tábanos* and *Moscas de los caballos* in Spanish and *mutucas* in Brazilian Portuguese.

Whereas most females must feed on blood to ensure oogenesis, a few specialized taxa have females that are not hematophagous. All males and females visit flowers and feed on floral nectar, although their role in pollination is still a neglected topic [9,10]. Even though rarely documented, males can sometimes be collected in forest canopies when they swarm at great heights [11] or through light traps [12]. Males are occasionally caught in conventional tabanid traps [13], but can be caught with innovative approaches, such as the use of ground-based targets mimicking water [14]. However, knowledge about males is still rudimentary; in most entomological collections, there are few specimens among numerous females. Because of this, unlike the vast majority of Diptera groups, their taxonomy is still largely based on female characters.

Owing to the hematophagous behavior of horse flies, this taxon has been the subject of epidemiological studies, especially as a vector of pathogens to equines and bovines. Despite their relevance to animal health [15–17], few studies have been dedicated to the subject. In recent years, with the advent of modern molecular tools, a new wave of studies has been developed, especially in South America [18–23]. However, the accurate assessment of this epidemiological risk is strictly dependent on a robust taxonomic foundation. In Uruguay, this baseline remains paradoxically underdeveloped.

Tabanidae are distributed across almost the entire globe, except for Antarctica. It is a highly rich taxon, with over 4700 species and 200 genera worldwide [24]. In the Neotropical region there are more than 1200 species in about 70 genera [25,26]. To date, Uruguay has recorded 47 species in 14 genera. This inventory is modest compared to neighboring Argentina and Brazil, which have 140 and 509 species, respectively [27,28]. Traditionally, Uruguay's modest richness has been attributed to its ecological homogeneity; however, recent evidence suggests this may be an artifact of historical sampling bias.

Historical Synopsis of Tabanidae Taxonomy in Uruguay

Although the species *Tabanus occidentalis* Linnaeus, 1758 [29] and *Chrysops variegatus* (De Geer, 1776) [30] were described in the 18th century, their formal records for Uruguay are much more recent. In fact, the first records of Tabanidae for Uruguay come from the 19th century through the emblematic work of Wiedemann in 1828 [31], in which seven species with type-localities for Uruguay were described, namely: *Pangonia sorbens* Wiedemann, 1828:93 (= *Fidena sorbens*), *Haematopota exstincta* Wiedemann, 1828:214 (= *Acanthocera exstincta*), *Tabanus flavus* Wiedemann, 1828:163 (= *Catachlorops flavus*), *Tabanus psolopterus* Wiedemann, 1828:181 (= *Catachlorops psolopterus*), *Tabanus theotaenia* Wiedemann, 1828:136 (= *Stibasoma theotaenia*), *Tabanus impressus* Wiedemann, 1828:126 = *Tabanus fuscus* Wiedemann, 1819, and *Tabanus pungens* Wiedemann, 1828:175. In the following decades, Walker [32] described *Tabanus varipes* Walker, 1837, and Macquart [33,34] described *Tabanus trigonophora* Macquart, 1838:301 (= *Dasybasis trigonophora*), *Tabanus angustus* Macquart, 1838:140, *Tabanus hildarii* Macquart, 1838: 301 = *Tabanus fuscofasciatus* Macquart, 1838, and *Tabanus pictipennis* Macquart, 1850:336 = *Catachlorops circumfusus* (Wiedemann), 1830.

The 20th century was also productive, and four researchers were fundamental to this. The first of them was Juan Brèthes, a French researcher who settled in Buenos Aires, and published the “Catálogo de los dípteros de las repúblicas del Plata” [35], which described six species from Uruguay, followed by the German Otto Kröber with five species [36–38], the Brazilian Adolpho Lutz with four species [39,40] and the Argentinian Sixto Coscarón with two species [41,42].

Almost half of the records of Tabanidae species from Uruguay come from the vicinity of Montevideo, typically as a result of naturalists visiting South America in the 19th and early 20th centuries. Historically, Uruguay has never had resident tabanid taxonomists or large-scale inventory projects on this taxon; in fact, the few works specifically dedicated to the topic have been developed in the 21st century, especially in the last decade. The first step was the work of Coscarón & Martínez [43], who updated a Checklist of Tabanidae from Uruguay. They found 43 species belonging to 14 genera. Lucas et al. [44] conducted the first trapping inventory with modern traps focused on the diversity and seasonality of Tabanidae. For this, systematic collections were made in Tacuarembó over 20 months, in addition to non-systematic collections in Colonia, Paysandú, and Tacuarembó. As a result, 16 species were identified, of which three were new records for the country, in addition to one new undescribed species. Finally, Krolow et al. [45] revised the genus *Tabanus* Linnaeus for Uruguay, and described *Tabanus tacuarembensis* Krolow, Lucas & Henriques, the undescribed species of Lucas et al. [44]. This paper also updated the number of species to 47, allocated to 14 genera. *Tabanus tacuarembensis* is an emblematic species, as it clearly demonstrates the lack of studies on Tabanidae in Uruguay. It is an abundant species in Paysandú and Tacuarembó, but was only described in 2022, after 90 years without any new species being detected.

The objective of this study is to provide a comprehensive synthesis of the Tabanidae of Uruguay, integrating historical data with recent field surveys and citizen science records, to identify knowledge gaps and establish a baseline for future epidemiological and biogeographical research in the Pampa biome.

2. Materials and Methods

2.1. Data Sources and Literature Review

The data used in our analyses come from Brèthes [35], Lutz [39,40], Kröber [36–38,46–48], Stone [49], Ruffinelli & Carbonell [50], Fairchild [51,52], Coscarón [27,41,42,53–60], Coscarón & Philip [61], Coscarón & Fairchild [62], Fairchild & Burger [63], Martínez [64], Chainey et al. [65], Bentancourt et al. [66], Coscarón & Papavero [25], Henriques [67], Coscarón & Martínez [43], Lucas et al. [44], Krolow et al. [45,68] and Gorayeb [69].

2.2. Taxonomic Identification and Specimen Examination

We also used the citizen science tool, INaturalist (<https://www.inaturalist.org/home>, accessed on 1 April 2026), to search for new records for Uruguay. This involved searching with the filters “Tabanidae” and “Uruguay,” then identifying the species to the lowest possible taxonomic level and counting the new records. A third source of data comes from the identification of material loaned by Facultad de Ciencias, Montevideo (FCE).

2.3. Data Management and Statistical Analysis

Primary data were structured and curated in a standardized database (Supplement Table S1). All statistical computing and graphical representations were performed using R software v.4.3.1 [70]. To evaluate the completeness of the national inventory and sampling effort efficiency, species accumulation curves were generated using the vegan package v.2.6-4 [71]. Data wrangling, cleaning, and advanced visualizations were implemented

through the tidyverse suite [72], supplemented by the magrittr and janitor packages for pipeline optimization and taxonomic nomenclature cleaning.

2.4. Acronyms of the Institutions

The acronyms of the institutions mostly follow the proposal by Evenhuis [73]; the complete list is provided below:

AMNH—USA, NY, New York, American Museum of Natural History.

CUIC—USA, NY, Ithaca, Cornell University.

FCE—Uruguay, Montevideo, Facultad de Ciencias, Colección de Entomología.

FSCA—USA, FL, Gainesville, Division of Plant Industry, Florida State Collection of Arthropods.

IOC (FIOC)—Brazil, RJ, Rio de Janeiro, Fundação Instituto Oswaldo Cruz.

ISTH—Germany, Hamburg, Institut für Schiffs und Tropenkrankheiten.

MACN—Argentina, Buenos Aires, Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”.

MLPA—Argentina, La Plata, Universidad Nacional de La Plata, Museo de La Plata.

MNHN—France, Paris, Muséum National d’Histoire Naturelle.

MZUSP—Brazil, SP, São Paulo, Museu de Zoologia da Universidade de São Paulo.

NHMUK (NHM)—UK, London, The Natural History Museum [formerly British Museum (Natural History)].

NHRS—Sweden, Stockholm, Naturhistoriska riksmuseet.

NMW (NHMW)—Austria, Wien, Naturhistorisches Museum Wien.

SMNS—Germany, Stuttgart, Staatliches Museum für Naturkunde.

ZMHB—Germany, Berlin, Museum für Naturkunde der Humboldt-Universität.

ZMUC—Denmark, København [=Copenhagen], University of Copenhagen, Zoological Museum.

ZMUA—Instituut voor Taxonomische Zoologie, Universiteit van Amsterdam, Amsterdam.

ZMKU—Zoologiske Museum, Copenhagen.

3. Results and Discussion

3.1. Uruguayan Tabanidae Fauna

Uruguayan Tabanidae (Figure 1) represent about 1% of the world fauna. A total of 52 valid species in three subfamilies, six tribes and 15 genera are recorded, with four species (7.5%) endemic to the country (Table 1). The subfamily Tabaninae is the most diverse with 36 species (69%), of which three are endemic to Uruguay (Figure 2). The second is Chrysopsinae, with 11 species (21%) and one endemic species (Figure 2). The least diverse is Pangoniinae, with five species (10%) and no endemic species (Figure 2).

Table 1. Taxonomic composition of Tabanidae in Uruguay.

Subfamily/Tribe	Genus	Number of Species	Endemic Species
Chrysopsinae			
Chrysopsini	<i>Chrysops</i> Meigen	11	1
Pangoniinae			
Pangoniini	<i>Esenbeckia</i> Rondani	1	0
Scepsini	<i>Scepsis</i> Walker	1	0
Scionini	<i>Fidena</i> Walker	3	0
Tabaninae			
Diachlorini	<i>Catachlorops</i> Lutz	4	0
	<i>Chlorotabanus</i> Lutz	1	0
	<i>Acanthocera</i> Macquart	1	0

Table 1. Cont.

Subfamily/Tribe	Genus	Number of Species	Endemic Species
Tabanini	<i>Dasybasis</i> Macquart	4	0
	<i>Dichelacera</i> Macquart	3	0
	<i>Lepiselaga</i> Macquart	2	0
	<i>Stenotabanus</i> Lutz	1	1
	<i>Stibasoma</i> Schiner	1	0
	<i>Stypommia</i> Enderlein	1	0
	<i>Poeciloderas</i> Lutz	2	0
	<i>Tabanus</i> Linnaeus	16	2
	15	52	4



Figure 1. Some Tabanidae of Uruguay: (A) Chrysopsini, *Chrysops* sp., photo Luis Vescia da Rosa; (B) Sepsini, *Sepsis appendiculata* (Macquart), photo Martín Ramírez; (C) Scionini, *Fidena marginalis* (Wiedemann), photo Martin Abreu; (D) Diachlorini, *Catachlorops circumfusus* (Wiedemann), photo Tapuia Gonçalves; (E) Diachlorini, *Lepiselaga albitarsis* Macquart, photo Javier Chiavone; (F) Tabanini, *Tabanus acer* Brèthes, photo Martin Abreu.

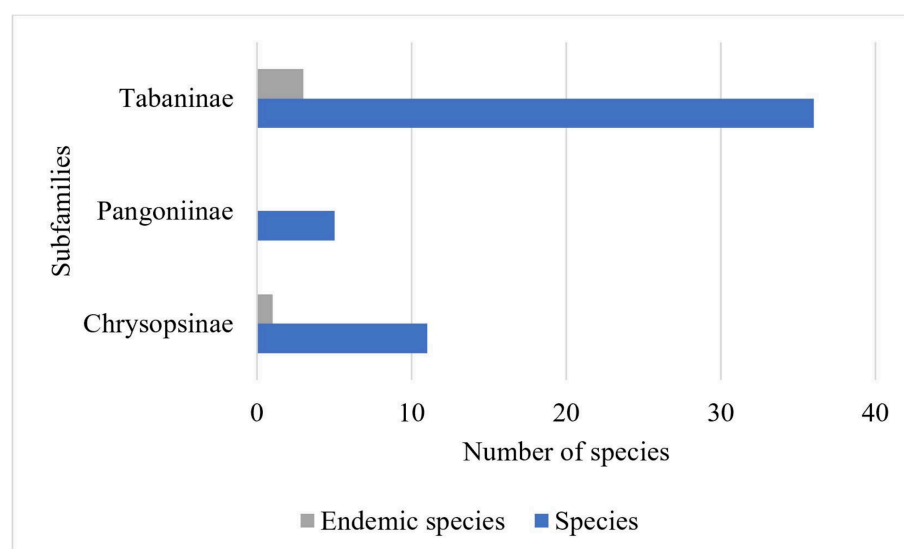


Figure 2. Number of species of Tabanidae in Uruguay by subfamilies.

As expected, the most diverse tribes were Diachlorini and Tabanini, belonging to the subfamily Tabaninae, both with 18 species each (35%) (Figure 3). Next, the tribe Chrysopsini has 11 species (21%) and only one endemic species (Figure 3), while Scionini has three species (6%). Pangoniini and Sepsini have only one species for Uruguay (Figure 3).

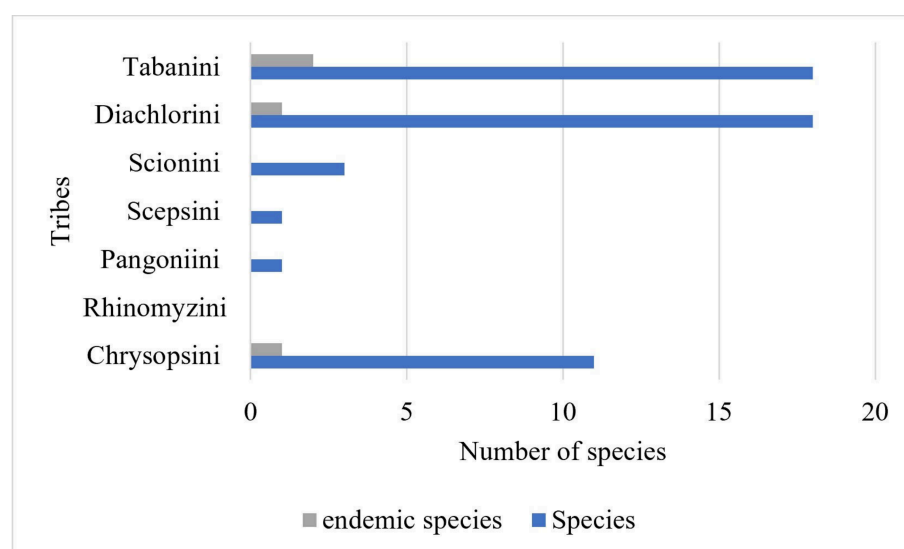


Figure 3. Number of species of Tabanidae in Uruguay by tribe.

Tabanus Linnaeus is the most diverse genus with 16 species (31%), followed by *Chrysops* Meigen with 11 spp. (21%), *Catachlorops* Lutz 4 spp. (8%), *Dasybasis* Macquart 4 spp. (8%), *Fidena* Walker 3 spp. (6%), and *Dichelacera* Macquart 3 spp. (6%) (Table 1). Another two genera have two species, while seven other genera are represented by only one species in Uruguay (Table 1). No genus is endemic to Uruguay, although four species are (Table 2): *Chrysops trisignatus* Kröber, 1926, *Stenotabanus brunnipennis* Kröber, 1930, *T. tacuarembensis* Krolow, Lucas & Henriques, 2022 and *Tabanus varipes* Walker, 1837.

The current inventory represents a 12% increase in species richness (from 46 to 52 spp.) compared to the last national synthesis [45]. These additions comprise species recovered from the literature, citizen science (iNaturalist), and entomological collection material.

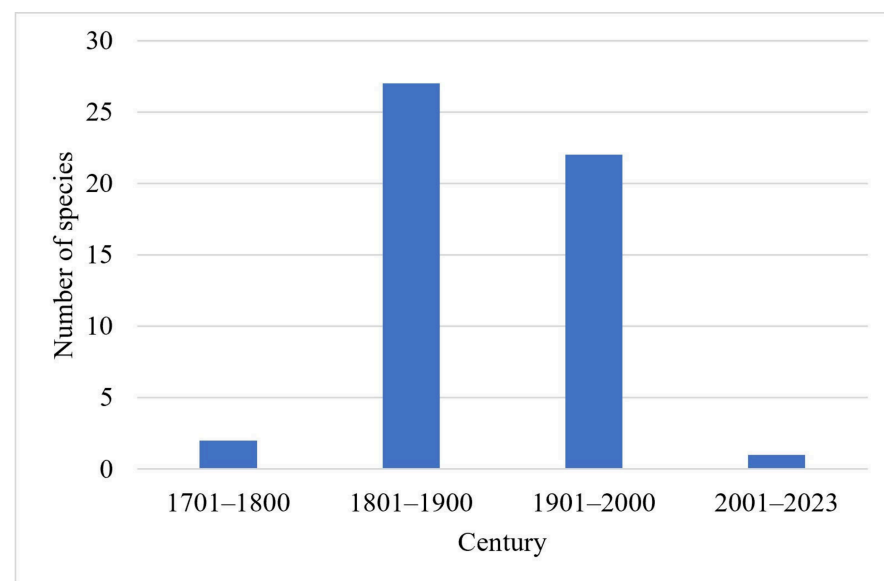
Table 2. Comments on the endemic species of Tabanidae in Uruguay.

Endemic Species	Type Depository	Comment
<i>Chrysops trisignatus</i>	ZMHB	Holotype ♂ from Montevideo (Coscarón & Papavero, 2009) [25]. According to Henriques (2016: 166) [67], another female from Tacuari river (Melo Department) determined by Fairchild is deposited in the AMNH.
<i>Stenotabanus brunnipennis</i>	ISTH	Holotype (ISTH—destroyed) from Montevideo (Coscarón & Papavero, 2009) [25]. According to Chainey et al. (1999: 81) [65], no other specimens are known.
<i>Tabanus tacuarembensis</i>	MZUSP	This species is abundant in Tacuarembó, less than 120 and 250 km from the borders of Brazil and Argentina, respectively. More samples from these regions may modify the endemicity status.
<i>Tabanus varipes</i>	NHMUK	It is probably not a Neotropical species, see Fairchild (1956: 31) [51]. We decided to keep it because the type specimen is available in Krolow et al. (2022:448–449, Figure 1) [45] for comparison with possible new specimens, and new collections from Isla Gorriti may reveal its true status.

3.2. Authors of Uruguayan Species of Tabanidae

Only two species are attributed to 18th-century authors, but neither was recorded at that time: *Tabanus occidentalis* Linnaeus, 1758 and *Chrysops variegatus* (De Geer, 1776). The first records of Tabanidae in Uruguay were made in the 19th century by Wiedemann (1828) in *Aussereuropäische zweiflügelige Insekten* [31]. The first species described for Uruguay was *Pangonia sorbens* by Wiedemann (1828: 93), currently *Fidena sorbens* (Wiedemann).

The most prolific periods of tabanid species description for Uruguay were the 19th century (26 species, 50%) and the 20th century (23 species, 44%) (Figures 4–6). The years with the highest number of described species (Figure 5) were 1828 (9 spp.), 1910 (6 spp.) and 1838 (5 spp.); this occurred in direct association with the publications of the researchers with the highest number of described species: Wiedemann (13 spp.), Brèthes (6 spp.) and Macquart (8 spp.) (Table 3). Together, they described 54% of recognized species in Uruguay. Despite the 21st century providing only three species recorded in Uruguay (Figures 4–6), the species discovery curve (Figure 6) shows a non-asymptotic trend, suggesting that the taxonomic inventory of Uruguayan Tabanidae remains incomplete.

**Figure 4.** Number of Uruguayan species of Tabanidae per century of description.

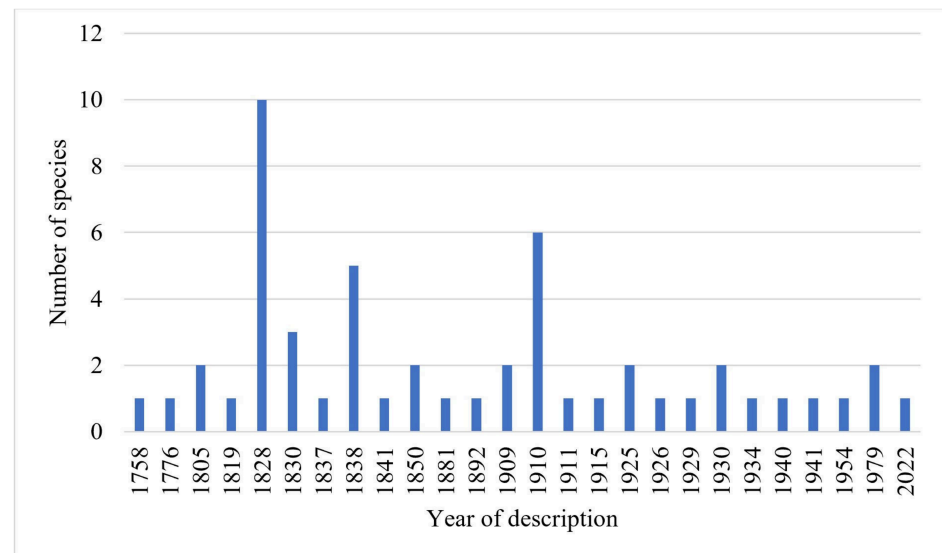


Figure 5. Number of Uruguayan species of Tabanidae and period of description.

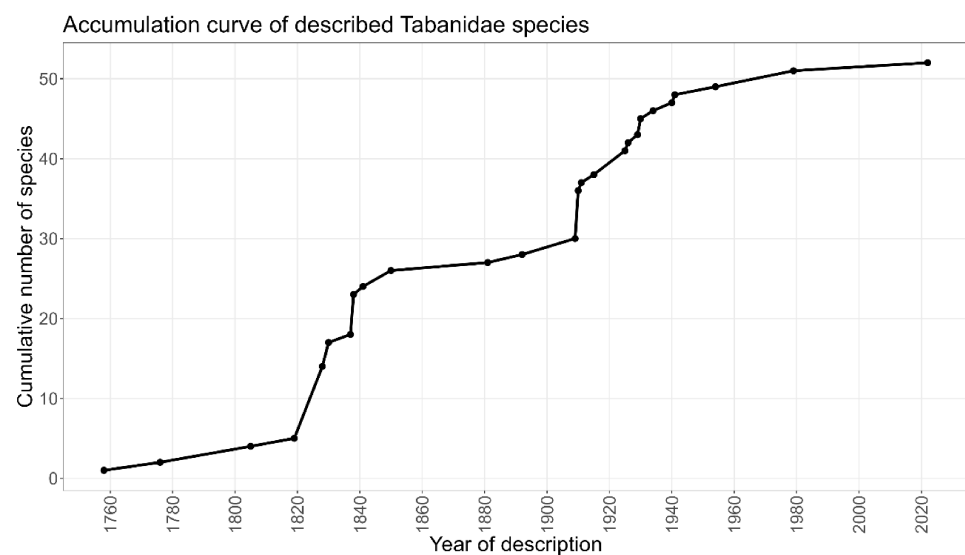


Figure 6. Accumulation curve of Tabanidae species recorded in Uruguay by year (1758–2026), based on the year of description of each species.

Table 3. Nationality and gender of authors (only the first author) who described the Uruguayan species of Tabanidae.

First Author	Centurie(s)	Gender	Origin	Species	Percentage
Wiedemann	19th	man	Europe	13	25%
Macquart	19th	man	Europe	8	15%
Brèthes	20th	man	Europe	6	12%
Kröber	20th	man	Europe	6	12%
Lutz	20th	man	Brazil	4	8%
Coscarón	20th	man	Argentina	2	4%
Enderlein	20th	man	Europe	2	4%
Fabricius	19th	man	Europe	2	4%
Pechuman	20th	man	USA	2	4%
Bigot	19th	man	Europe	1	2%
De Geer	18th	man	Europe	1	2%
Krolow	21st	man	Brazil	1	2%
Linnaeus	18th	man	Europe	1	2%
Philip	20th	man	USA	1	2%
Walker	19th	man	Europe	1	2%
Wulp	19th	man	Europe	1	2%

The taxonomy of Tabanidae in Uruguay is predominantly composed of European researchers who worked during the 18th, 19th and 20th centuries. A total of 16 researchers of different nationalities first authored the descriptions of Uruguayan species (Table 3). Europeans were predominant, both in the number of authors (11) and in the number of species (42). Brazilians were second, with two authors and five species. Although the predominance of European researchers in the 18th and 19th centuries is easily explained and expected, as observed by Krolow et al. [68], Uruguay never had a taxonomist specializing in Tabanidae. Consequently, no Uruguayan researcher was the first author of some of the species recorded for the country.

Despite some peaks in descriptions made by European researchers, there is no current growth curve. This may reflect a more limited fauna, restricted to a single biome, or be associated with other factors: for example, the absence of a resident taxonomist expert in Tabanidae, few dipterologists, few scientific collections, non-systematized samples, lengthy gaps between samples, insufficient revisions, and difficulty accessing specimens deposited in foreign collections [45]. This suggests that future research could considerably expand the species richness of the country.

3.3. Type Specimens

The primary types of Tabanidae species that occur in Uruguay are mostly deposited in European institutions: 37 primary types in 10 institutions (Table 4). In second and third place, the neighboring countries Argentina and Brazil have six and five primary types, respectively, in two collections each (Table 4). Only one primary type has an unknown repository institution. Four European collections hold most of the 50% of the primary types: NMW (10), MNHN (8), ZMHB (7), and NHMUK (4) (Table 5).

Table 4. Primary types of Uruguayan Tabanidae species by country/region.

Location	Number of Collections	Primary Types	Percentage
Europe	10	37	71%
Argentina	2	6	12%
Brazil	2	5	10%
USA	3	3	6%
Unknown	1	1	2%

Table 5. Primary-type deposit locations of Uruguayan Tabanidae, with acronyms and numbers.

Location	Acronym	Number of Types
Europe	NMW	10
Europe	MNHN	8
Europe	ZMHB	7
Argentina	MACN	5
Brazil	IOC	4
Europe	NHMUK	4
Argentina	MLPA	2
Europe	SMNS	2
USA	CUIC	1
USA	FSCA	1
Europe	ISTH	1
USA	MCZ	1
Brazil	MZUSP	1
Europe	NHRS	1
Unknown	Unknown	1
Europe	ZMUC	1
Europe	ZMUA	1
Europe	ZMKU	1

In addition, of the 52 primary types, 31 are holotypes (two lost/destroyed), 13 are lectotypes, 1 is a neotype and 8 are syntypes (Table 6). The descriptions based on females represent 90%, while another 10% were described by males (Table 6).

Table 6. Primary type of Uruguayan species of Tabanidae with numbers by sex and condition.

Primary Type	Number of Types	Female	Male	Female/Male	Lost/Destroyed
Holotype	30	27	4	-	2
Lectotype	13	13	-	-	-
Neotype	1	1	-	-	-
Syntype	8	6	2	2	-
Total	52	47	6	2	2

3.4. Male and Immature Specimens

Most horse fly species are only known from females; therefore, most of the family taxonomy is based on this sex. A significant sex bias persists in the taxonomic knowledge of the group: while 62% of the species have described males (Figure 7), the immature stages remain unknown for more than 80% of the national fauna (Figure 8), highlighting a critical bottleneck for ecological and life-history studies.

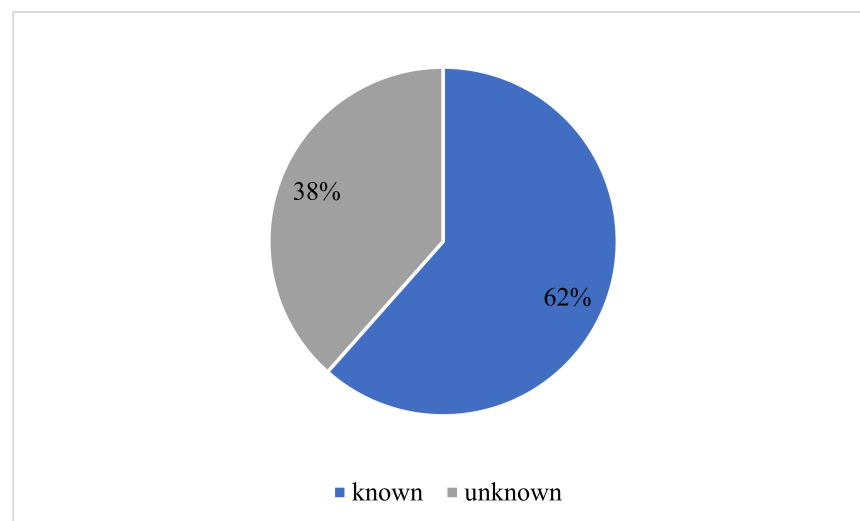


Figure 7. Number of Uruguayan species of Tabanidae with males described.

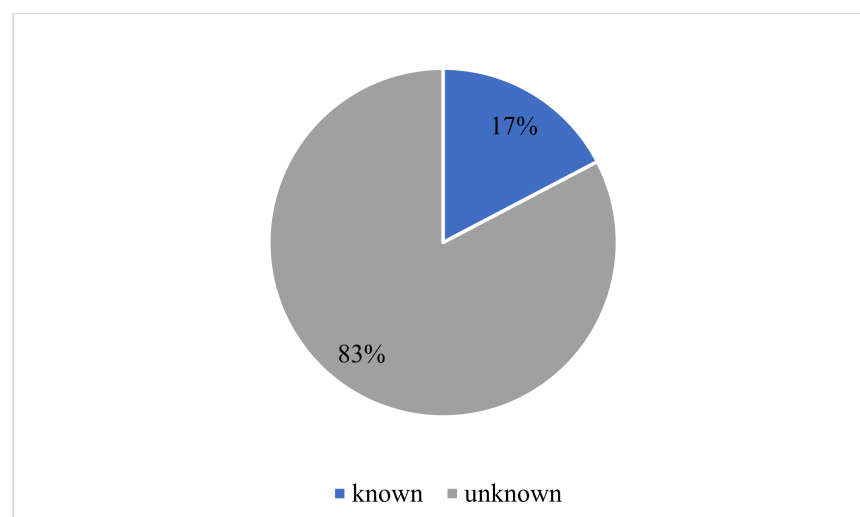


Figure 8. Number of Uruguayan species of Tabanidae with known immature specimens.

3.5. Tabanidae Distribution

According to Coscarón & Martínez [43], until that moment, almost 50% of the distribution records of Tabanidae species in Uruguay originated from the 19th and 20th centuries and were concentrated in the vicinity of Montevideo. Lucas et al. [44] expanded collections and records to the Departments of Colonia, Paysandú, and Tacuarembó. Here, we provide new records of distribution for 20 species and 28 new records for departments (Appendix A, Table A1). The departments with more species recorded are Montevideo (22 spp.), Tacuarembó (16 spp.) and Artigas (14 spp.), while four departments are still without records: Canelones, Florida, Lavalleja and San José. Twenty species are known from only one department, and another four have no known locality; however, two species, *T. fuscofasciatus* and *T. triangulum*, appear to be more common or more easily captured, with records in nine departments.

Based on the updates made in this study, Uruguay now has 52 species in 15 genera distributed across a single biome, the Pampa. The Brazilian Pampa occupies a large part of the southern half of the state of Rio Grande do Sul. Recently, Krolow et al. [68] indicated the presence of 43 species in the Brazilian Pampa, of which seven are endemic. Unfortunately, there is no synthesis of Tabanidae distribution data for the Argentine Pampa. The data are scattered across a vast bibliography, lacking up-to-date data.

However, comparing the list of species recorded for the Uruguayan and Brazilian Pampas, it is possible to observe that only slightly more than 50% of the species are shared by both countries (Figure 9). When all the species present in the Pampa of both countries are added together, the list reaches 71 species. This indicates that many species recorded for only one of the countries may be present in both, and that with the expansion of collections and studies in the Pampa, the number of species tends to increase in each of them.

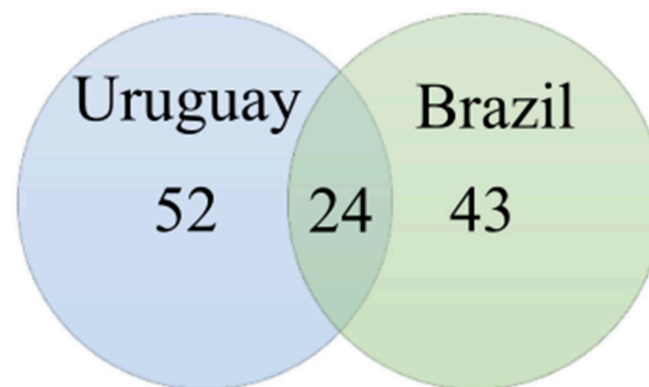


Figure 9. Venn diagram showing the number of species recorded for the Brazilian and Uruguayan Pampas, and the number of species shared.

3.6. Updated Records of Uruguayan Tabanidae

Through a new examination of bibliographic data (see in Section 2), the identification of specimens collected in the 1980s and deposited in the FCE collection and the use of the citizen science tool—INaturalist, we updated the list of Tabanidae species from Uruguay (Appendix A, Table A1) from 46 species recognized in Krolow et al. [45] to 52, a 12% increase in local richness. The six new records for Uruguay came from: bibliography, *Chrysops lutzi* Kröber, 1925 [74] recorded by Stone [49] and *Dichelacera rubricosa* (Wulp), 1881 [75] by Coscarón [55]; Inaturalist, *Fidena marginalis* (Wiedemann), 1830 [76] (Figure 1C) and *Lepiselaga crassipes* (Fabricius), 1805 [77] (Figure 10); identification, *Tabanus charrua* Coscarón, 1979 [41] and *Tabanus platensis* Brèthes, 1910 [78]. In addition, 20 species had their distribution records expanded in one or more departments.



Figure 10. Diachlorini, *Lepiselaga crassipes* (Fabricius, 1805), photo Mauricio Silvera.

3.7. Unrecognized Tabanidae

Tabanus curticornis Kröber, 1931. Type locality: Uruguay, Montevideo. Holotype female destroyed (ISTH). No other specimens recorded, brief description, and no illustrations. For Coscarón & Papavero [25], it is an unrecognized Tabanidae.

3.8. Future Perspectives and Gaps

Much of the perspective for advancing knowledge on the Uruguayan tabanofauna is associated with its potential relevance to livestock production. Horse flies may cause direct losses due to the intense irritation produced by their painful bites, which affects animal welfare and productivity, and indirect losses through their potential role in the mechanical transmission of pathogens such as *Anaplasma* and *Babesia* [20,23]. The detection of pathogens in horse flies does not constitute confirmation that these insects are competent vectors of bovine anaplasmosis or babesiosis, parasitic diseases that together cause bovine morbidity and mortality. Rather it suggests that horse flies may play an as yet unrecognized role in pathogen transmission in the absence or reduced activity of the primary biological vector, the tick *Rhipicephalus microplus* (Canestrini, 1888) (Acari: Ixodidae). This possibility is particularly relevant for anaplasmosis but still requires experimental confirmation by researchers in vector biology in Uruguay.

Within this context, the Instituto Nacional de Investigación Agropecuaria (INIA) supported the First South American Symposium of Tabanidae (Diptera)—SIMTAB, which brought together researchers from Uruguay, Brazil, Canada, and Chile working on the group (Figure 11). The scientific sessions were organized around the central theme “*Live-stock production and mechanical vectors: challenges and solutions with a focus on Tabanidae*”, providing a forum to discuss the role of horse flies in animal health and livestock production (Figure 11A,D,E).



Figure 11. Activities during the I South-American Symposium of Tabanidae (Diptera)—I Simpósio Sul-Americano de Tabanidae (Diptera) (SIMTAB), held in January 2025 at the experimental station La Estanzuela, in Colonia del Sacramento, Uruguay, with support from the Instituto Nacional de

Investigación Agropecuaria (INIA). (A) Official banner of the I SIMTAB, artwork by MSc Anderson Saravia. (B) Field inspection of aquatic vegetation for the search of immature horse flies; Dr. Pablo Parodi and Dr. Tiago Krolow are kneeling while Dr. Christian González is standing. Photo by R.F. Krüger. (C) Installation of an Nzi trap; from left to right: Dr. Tiago Krolow, Dr. Christian González, Dr. Steve Mihok, Dr. Pablo Parodi, and MSc Anderson Saravia. Photo by R.F. Krüger. (D) Speakers and organizers of the I SIMTAB in front of the INIA facilities; from left to right: Dr. Tiago Krolow, Dr. Christian González, MSc Anderson Saravia, Dr. Rodrigo F. Krüger, Dr. Pablo Parodi, and Dr. Steve Mihok. Photo by INIA. (E) One of the scientific presentation sessions during the symposium. Photo by T.K. Krolow.

Building on current knowledge and recent regional articulation on the I SIMTAB (Figure 11), future research should prioritize a structured eco-epidemiological framework capable of linking vector diversity, behavior, and pathogen dynamics under real production conditions. The first major gap concerns the lack of standardized, comparable data on species composition and abundance across production systems and regions, which limits the identification of key vector species and their temporal dynamics. Addressing this gap requires coordinated sampling strategies, including the use of standardized traps and host-based collections, coupled with robust taxonomic validation and integration with molecular tools.

A second critical gap lies in the absence of experimental evidence for the efficiency of mechanical transmission by Tabanidae, particularly for pathogens of veterinary relevance such as *Anaplasma*, *Babesia*, and *Trypanosoma*. Future studies should therefore incorporate controlled transmission experiments, integrating parameters such as feeding interruption, vector density, survival, and environmental conditions, in order to determine whether horse flies act merely as carriers or as epidemiologically relevant agents under specific scenarios.

Additionally, there is limited understanding of the behavioral ecology of horse flies in livestock systems of the Pampa biome, including feeding site preference, daily and seasonal activity patterns, and host–vector interaction dynamics. These parameters are essential to quantify exposure and to develop realistic models of transmission risk. Experimental approaches focusing on hematophagy under controlled and field conditions are particularly needed to bridge this gap.

From a sanitary perspective, advancing knowledge will depend on the integration of individual-based pathogen detection with anatomical resolution (e.g., mouthparts versus gut), allowing the distinction between contamination and potential transmission signals. This approach, combined with exploratory analyses of salivary and intestinal proteins, may provide a basis for future biomarkers of vector exposure and contribute to a more refined interpretation of eco-epidemiological patterns.

Finally, there is a clear need to move beyond descriptive studies toward predictive and operational frameworks, integrating environmental, biological, and management variables. The development of spatial and temporal risk models, along with decision-support tools applicable to livestock systems, will be essential to translate scientific evidence into practical recommendations. In parallel, future research should also address the quantification of direct and indirect economic losses associated with horse flies and evaluate the effectiveness of integrated control strategies, including physical, behavioral, and environmentally sustainable approaches.

Together, these perspectives define a research agenda, building in the SIMTAB I, that shifts from isolated observations toward an integrated understanding of horse flies as potential mechanical vectors, linking biodiversity, behavior, and pathogen transmission within the context of livestock production systems.

3.9. Identification of Tabanidae

This study listed 15 genera with confirmed occurrence in Uruguay. However, identifying the tabanids of Uruguay remains a challenge, either due to the high probability of recording new genera and species already confirmed in the Argentine and Brazilian Pampas, or due to the absence of modern keys or revisions for certain genera.

In this sense, we point out here (Table 7) the main articles that allow or assist in the identification of species for each of the 15 genera.

Table 7. Identification keys for the genus of Tabanidae of Uruguay.

Genus	References
<i>Chrysops</i> Meigen	[36] good plates and illustrations for Neotropical species; [42] key to Argentinian species
<i>Esenbeckia</i> Rondani	[79] key to Neotropical species
<i>Scepsis</i> Walker	[57] redescription of species (monotypic)
<i>Fidena</i> Walker	[69] revision of genus
<i>Acanthocera</i> Macquart	[59] Argentinian species; [80] revision and key for Neotropical species
<i>Catachlorops</i> Lutz	[56] key to Argentinian species
<i>Chlorotabanus</i> Lutz	[58] Argentinian species
<i>Dasybasis</i> Macquart	[61] key to Argentinian species
<i>Dichelacera</i> Macquart	[55] key to Argentinian species
<i>Lepiselaga</i> Macquart	[53] Argentinian species
<i>Stenotabanus</i> Lutz	[65] revision for Neotropical species
<i>Stibasoma</i> Schiner	[79,81] revision for Neotropical species
<i>Stypommia</i> Enderlein	No keys
<i>Poeciloderas</i> Lutz	[62] key to Argentinian species
<i>Tabanus</i> Linnaeus	A rich taxon with different keys for many groups of species, probably a paraphyletic genus

4. Conclusions

The present synthesis identifies 52 valid species of Tabanidae for Uruguay, representing a 12% increase in national species richness compared to previous records. This update, achieved through the re-evaluation of historical collections, bibliographic reassessment, and the integration of validated citizen science data, demonstrates that the Uruguayan tabanid fauna is more diverse than historically perceived. The apparent modest richness previously attributed to the country is likely an artifact of the Wallacean Shortfall—a significant geographic sampling bias—rather than a reflection of true faunal impoverishment within the Pampa biome.

The historical development of tabanid taxonomy in Uruguay, characterized by early descriptions by European dipterists and the absence of sustained local specialization, has resulted in a dataset that is spatially and temporally fragmented. In this context, the modest richness currently attributed to the country likely reflects historical and institutional contingencies as well as the biological reality.

A comparison with the Brazilian Pampa reinforces this interpretation. Given the ecological continuity of the biome, the limited overlap in recorded species between both countries is more plausibly explained by differences in sampling intensity than by a sharp biogeographic turnover. Therefore, we consider the Uruguayan fauna to represent a partially documented component of the broader Pampa assemblage.

Significant biological gaps persist: males remain undescribed for a considerable fraction of species, and immature stages are known for fewer than 20% of species. Expanding field surveys, targeting larval habitats, and incorporating integrative taxonomic approaches will be essential for refining species limits and clarifying regional patterns. The apparent simplicity of the Uruguayan tabanid fauna should thus be interpreted cautiously, as it likely reflects incomplete knowledge rather than intrinsically low diversity.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/taxonomy6020036/s1>, Table S1: Updated taxonomic data on the Uruguayan tabanid fauna.

Author Contributions: Conceptualization, T.K.K., C.R.G. and R.F.K.; Methodology, T.K.K.; Software, R.F.K.; Validation, T.K.K., C.R.G., M.M., A.M., A.S., S.M., P.P. and R.F.K.; Formal Analysis, T.K.K. and R.F.K.; Investigation, T.K.K., C.R.G., M.M., A.M., A.S., S.M., P.P. and R.F.K.; Supervision, T.K.K., C.R.G., M.M., A.M., A.S., S.M., P.P. and R.F.K.; Project Administration, A.M. and R.F.K.; Funding Acquisition, T.K.K., A.M. and R.F.K. All authors have read and agreed to the published version of the manuscript.

Funding: TKK thanks to Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), grant N° 305447/2025-4 (Research Productivity Grant-PQ). This research was partially supported by the Plataforma de Investigación en Salud Animal of the Instituto Nacional de Investigación Agropecuaria (INIA, Uruguay).

Data Availability Statement: All data used in this study are not subject to any legal or commercial restriction.

Acknowledgments: Enrique Morelli and Vitor Cezar Pacheco da Silva from FCE for loan of specimens.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

Table A1. List of species of Tabanidae for Uruguay. Including data about distribution, new records and additional comments.

N°	Species	Uruguayan Department's Previous Records	Uruguayan Department's New Records	Distribution	Comments
1	<i>Chrysops berta</i> Pechuman	Río Negro	-	Argentina, Brazil, Uruguay (Río Negro)	Henriques (2016: 163) [67]
2	<i>Chrysops brevifascia</i> Lutz	Artigas, Tacuarembó	-	Argentina, Bolivia, Brazil, Paraguay, Uruguay (Artigas, Tacuarembó)	Coscarón & Martínez (2019: 41) [43] and Lucas et al. (2020) [44]
3	<i>Chrysops flinti</i> Coscarón	Montevideo	-	Argentina, Uruguay (Montevideo)	Coscarón (1979: 376) [42]. Paratypes (MLPA) from Montevideo, Carrasco
4	<i>Chrysops lutzi</i> Kröber	Montevideo	Durazno	Argentina, Brazil, Paraguay, Peru, Uruguay (Durazno, Montevideo)	Previous records in Stone (1944: 126) [49], as <i>crucians</i> subspecies. New record from FCE
5	<i>Chrysops lynchii</i> Brèthes	Río Negro, Treinta y Tres	Soriano	Argentina, Bolivia, Brazil, Paraguay, Uruguay (Río Negro, Soriano, Treinta y Tres)	New record from FCE
6	<i>Chrysops nigricorpus</i> Lutz	Montevideo	Artigas	Argentina, Brazil, Paraguay, Uruguay (Artigas, Montevideo)	New record from FCE
7	<i>Chrysops patricia</i> Pechuman	Tacuarembó	-	Argentina, Bolivia, Brazil, Paraguay, Uruguay (Tacuarembó)	Previous records summarized in Coscarón & Martínez (2019: 41) [43]
8	<i>Chrysops trisignatus</i> Kröber	Cerro Largo, Montevideo	-	Uruguay (Cerro Largo, Montevideo)	Fairchild (1967: 340) [82]
9	<i>Chrysops uruguayensis</i> Lutz	Tacuarembó	-	Argentina, ?Paraguay, Uruguay (Tacuarembó)	Lutz (1909: 687) [40]. Lectotype (IOC) from Tacuarembó

Table A1. Cont.

N°	Species	Uruguayan Department's Previous Records	Uruguayan Department's New Records	Distribution	Comments
10	<i>Chrysops varians</i> Wiedemann	Montevideo, Rivera, Treinta y Tres	-	Argentina, Brazil, Colombia, Ecuador, Guyana, Panama, Paraguay, Perú, Trinidad, Uruguay (Montevideo, Rivera, Treinta y Tres), Venezuela	Previous records in Coscarón & Martínez (2019: 42) [43]
11	<i>Chrysops variegatus</i> (De Geer)	Without locality	-	Neotropical	Henriques (2016: 166) [67]. In a list without locality
12	<i>Esenbeckia esenbeckii</i> (Wiedemann)	Without locality		Argentina, Brazil, Paraguay, Uruguay	Coscarón (1976: 104) [57], without locality
13	<i>Scepsis appendiculata</i> (Macquart)	Maldonado, Montevideo	-	?Argentina, Brazil, Uruguay (Maldonado, Montevideo)	Previous records in Coscarón & Martínez (2019: 42) [43]. Records of living specimens in the Inat: https://www.inaturalist.org/observations/263157307 ; https://www.inaturalist.org/observations/262045756 accessed on 1 April 2026
14	<i>Fidena abominata</i> Philip	Without locality	-	Argentina, Brazil, Uruguay	Coscarón (1998: 349) [27]. In a list without locality
15	<i>Fidena marginalis</i> (Wiedemann)	-	Rocha	Brazil, Uruguay (Rocha)	First record for country by https://www.inaturalist.org/observations/264871220 accessed on 1 April 2026. Male undescribed, first record from https://www.inaturalist.org/observations/201851013 accessed on 1 April 2026. Species treated in Gorayeb (2025: 247-249) [69]
16	<i>Fidena sorbens</i> (Wiedemann)	Artigas, Montevideo, Rocha, Salto	-	Argentina, Bolivia, Brazil, Paraguay, Uruguay (Artigas, Montevideo, Rocha, Salto)	Wiedemann (1828: 93) [31]. Lectotype (NMW) from Montevideo. Various records see in Coscarón & Martínez (2019: 42) [43]
17	<i>Acanthocera exstincta</i> (Wiedemann)	Artigas, Montevideo	-	Argentina, Uruguay (Artigas, Montevideo)	Wiedemann (1828: 214) [31]. Lectotype (NMW) from Montevideo. Another record in Coscarón & Martínez (2019: 42) [43]
18	<i>Catachlorops flavus</i> (Wiedemann)	Montevideo	-	Argentina, Brazil, Paraguay, Uruguay (Montevideo)	Wiedemann (1828: 163) [31]. Lectotype (NMW) from Montevideo
19	<i>Catachlorops circumfusus</i> (Wiedemann)	Maldonado, Tacuarembó	-	Brazil, Paraguay, Uruguay (Maldonado, Tacuarembó)	Maldonado is type-locality of <i>Tabanus pictipennis</i> Macquart, 1850, actually a synonym of <i>C. circumfusus</i> . Lucas et al. (2020: 2) [44]
20	<i>Catachlorops psolopterus</i> (Wiedemann)	Montevideo	-	Brazil, Uruguay (Montevideo)	Wiedemann (1828: 181) [31]. Lectotype (NMW) from Montevideo

Table A1. Cont.

N°	Species	Uruguayan Department's Previous Records	Uruguayan Department's New Records	Distribution	Comments
21	<i>Catachlorops muscosus</i> (Enderlein)	Tacuarembó	-	Argentina, Brazil, Uruguay (Tacuarembó)	Coscarón & Martínez (2019: 43) [43]
22	<i>Chlorotabanus parviceps</i> (Kröber)	Rivera, Rocha	-	Argentina, Brazil, Guyana, Paraguay, Perú, Uruguay (Rivera, Rocha)	Coscarón (1976: 50) [58]
23	<i>Dasybasis alticola</i> (Enderlein)	Rocha	-	Argentina, Uruguay (Rocha)	Coscarón & Martínez (2019: 43) [43]
24	<i>Dasybasis missionum</i> (Macquart)	Colonia, Tacuarembó	Rocha, Soriano	Argentina, Brazil, Uruguay (Colonia, Rocha, Soriano, Tacuarembó)	Lucas et al. (2020: 4) [44]. New record from FCE
25	<i>Dasybasis ornatissima</i> (Brèthes)	Tacuarembó	-	Argentina, Uruguay (Tacuarembó)	Lucas et al. (2020: 4) [44]
26	<i>Dasybasis trigonophora</i> (Macquart)	Montevideo	?Soriano	Argentina, Uruguay (Montevideo, ?Soriano)	Macquart (1838: 185) [33]. Holotype (MNHNP) from Montevideo. We identified a series of specimens from Soriano (FCE) as <i>Dasybasis aff. trigonophora</i>
27	<i>Dichelacera multiguttata</i> Lutz	Tacuarembó	-	Argentina, Brazil, Uruguay (Tacuarembó)	Henriques (2016: 168) [67]
28	<i>Dichelacera rubricosa</i> (Wulp)	-	Rivera	Argentina, Brazil, Uruguay (Rivera)	New record by Coscarón (1974: 238) [55]
29	<i>Dichelacera unifasciata</i> Macquart	Cerro Largo, Rivera, Tacuarembó	-	Argentina, Bolivia, Brazil, Paraguay, Uruguay (Cerro Largo, Rivera, Tacuarembó)	Coscarón & Martínez (2019: 43) [43] and Lucas et al. (2020) [44]
30	<i>Lepiselaga albitarsis</i> Macquart	Artigas, Rocha	-	Argentina, Brazil, Paraguay, Uruguay (Artigas, Rocha)	Coscarón & Martínez (2019: 43–44) [43]
31	<i>Lepiselaga crassipes</i> (Fabricius)	-	Artigas	Mexico to Uruguay (Artigas)	First record for country by https://www.inaturalist.org/observations/108513901 accessed on 1 April 2026
32	<i>Stenotabanus brunnipennis</i> Kröber	Montevideo	-	Uruguay (Montevideo)	Kröber (1930: 78) [38]. Holotype (ISTH—destroyed) from Montevideo
33	<i>Stibasoma theotaenia</i> (Wiedemann)	Montevideo	-	Argentina, Brazil, Paraguay, Uruguay (Montevideo)	Wiedemann (1828: 136) [31]. Lectotype (NMW) from Montevideo. See Turcatel et al. (2010: 36) [81]
34	<i>Stypommia minor</i> (Macquart)	Montevideo, Rocha	Artigas, Flores, Soriano	Argentina, Uruguay (Artigas, Flores, Montevideo, Rocha, Soriano)	Previous records in Coscarón & Martínez (2019: 43) [43]. New record from FCE
35	<i>Poeciloderas lindneri</i> (Kröber)	Cerro Largo, Colonia, Montevideo, Río Negro, Paysandú, Tacuarembó, Treinta y Tres	Artigas, Soriano	Argentina, Brazil, Paraguay, Uruguay (Artigas, Cerro Largo, Colonia, Montevideo, Paysandú, Río Negro, Soriano, Tacuarembó, Treinta y Tres)	Montevideo is type-locality of <i>Agelanius maculipennis</i> Enderlein, actually a synonym of <i>P. lindneri</i> . Previous records in Coscarón & Martínez (2019: 44) [43] and Lucas et al. (2020) [44]. New record from FCE

Table A1. Cont.

N°	Species	Uruguayan Department's Previous Records	Uruguayan Department's New Records	Distribution	Comments
36	<i>Poeciloderas quadripunctatus</i> (Fabricius)	Artigas, Cerro Largo, Río Negro, Tacuarembó	-	Mexico to Argentina, Uruguay (Artigas, Cerro Largo, Río Negro, Tacuarembó)	Previous records in Coscarón & Martínez (2019: 44) [43] and Lucas et al. (2020) [44]
37	<i>Tabanus acer</i> Brèthes	Cerro Largo, Maldonado, Tacuarembó	Soriano	Argentina, Brazil, Uruguay (Cerro Largo, Maldonado, Soriano, Tacuarembó)	Previous records in Coscarón & Martínez (2019: 44) [43] and Lucas et al. (2020) [44]. New record from FCE
38	<i>Tabanus angustus</i> Macquart	Cerro Largo, Maldonado, Montevideo, Tacuarembó	Soriano	Argentina, Uruguay (Cerro Largo, Maldonado, Montevideo, Soriano, Tacuarembó)	Macquart (1838: 140) [33]. Holotype (MNHN) from Montevideo. Previous records in Coscarón & Martínez (2019: 44) [43]. New record from FCE
39	<i>Tabanus campestris</i> Brèthes	Paysandú, Río Negro, Tacuarembó	Artigas, Soriano	Argentina, Uruguay (Artigas, Paysandú, Río Negro, Soriano, Tacuarembó)	"Uruguay" is type-locality of <i>Atylotus rubescens</i> Bigot, actually <i>T. campestris</i> . Previous records in Coscarón & Martínez (2019: 44) [43] and Lucas et al. (2020) [44]. New record from FCE
40	<i>Tabanus charrua</i> Coscarón	-	Uruguay (Río Negro)	Argentina, Bolivia, Uruguay (Río Negro)	First record for country from FCE
41	<i>Tabanus claripennis</i> (Bigot)	Artigas, Colonia, Montevideo, Río Negro, Rocha, Tacuarembó	Soriano	West Indies, Costa Rica to Paraguay, Argentina, Brazil, Chile, Uruguay (Artigas, Colonia, Montevideo, Río Negro, Rocha, Soriano, Tacuarembó)	Previous records in Coscarón & Martínez (2019: 44) [43] and Lucas et al. (2020) [44]. New record from FCE
42	<i>Tabanus corpulentus</i> Brèthes	Without locality	-	Argentina, Brazil, Paraguay, Uruguay	Coscarón (1998: 352) [27]. In a list without locality
43	<i>Tabanus fuscofasciatus</i> Macquart	Cerro Largo, Colonia, Montevideo, Paysandú, Río Negro, Rivera, Tacuarembó	Artigas, Soriano	Argentina, Bolivia, Brazil, Paraguay, Uruguay (Artigas, Cerro Largo, Colonia, Montevideo, Paysandú, Río Negro, Rivera, Soriano, Tacuarembó)	Previous records in Coscarón & Martínez (2019: 44–45) [43] and Lucas et al. (2020) [44]. New record from FCE
44	<i>Tabanus fuscus</i> Wiedemann	Montevideo, Tacuarembó	-	Argentina, Brazil, Uruguay (Montevideo, Tacuarembó)	Montevideo is type-locality of <i>Tabanus impressus</i> Wiedemann and <i>Tabanus monochroma</i> Wiedemann, synonyms of <i>T. fuscus</i> . Previous records in Coscarón & Martínez (2019: 45) [43] and Lucas et al. (2020) [44]
45	<i>Tabanus occidentalis</i> Linnaeus	Montevideo	-	Mexico to Argentina, Uruguay (Montevideo)	Brèthes (1907: 284) [35]

Table A1. Cont.

N°	Species	Uruguayan Department's Previous Records	Uruguayan Department's New Records	Distribution	Comments
46	<i>Tabanus ornativentris</i> (Kröber)	Río Negro	-	Argentina, Bolivia, Brazil, Uruguay (Río Negro)	Henriques (2016: 181) [67] as <i>Tabanus nebulosus</i> ssp. <i>ornativentris</i> (Kröber, 1929) [46]. Species revalidated by Krolow et al. (2024) [68]
47	<i>Tabanus platensis</i> Brèthes	-	Artigas, Río Negro, Soriano	Argentina, Uruguay (Artigas, Río Negro, Soriano)	First record for country from FCE. Specimens identified as <i>T. aff. platensis</i> in Lucas et al. (2020) [44] remain undetermined. See discussion in Krolow et al. (2022: 449–451) [45]
48	<i>Tabanus pungens</i> Wiedemann	Artigas, Montevideo, Tacuarembó, Treinta y Tres	Soriano	U.S.A. (Texas), Neotropics (except West Indies and Chile), Trinidad, Uruguay (Artigas, Montevideo, Soriano, Tacuarembó, Treinta y Tres)	Wiedemann (1828: 175) [31]. Holotype (NMW) from Montevideo. Previous records in Coscarón & Martínez (2019: 45) [43] and Lucas et al. (2020) [44]. New record from FCE
49	<i>Tabanus sorbillans</i> Wiedemann	Río Negro	Soriano	Brazil, Colombia, Paraguay, Trinidad, Uruguay (Río Negro, Soriano), Venezuela	Henriques (2016: 183) [67]. New record from FCE
50	<i>Tabanus tacuarembensis</i> Krolow, Lucas & Henriques	Paysandú, Tacuarembó	-	Uruguay (Paysandú and Tacuarembó)	Krolow et al. (2022: 453–455) [45]
51	<i>Tabanus triangulum</i> Wiedemann	Artigas, Cerro Largo, Colonia, Montevideo, Río Negro, Rivera, Rocha, Tacuarembó	Soriano	Argentina, Bolivia, Brazil, Paraguay, Uruguay (Artigas, Cerro Largo, Colonia, Montevideo, Río Negro, Rivera, Rocha, Soriano, Tacuarembó)	Previous records in Coscarón & Martínez (2019: 45) [43] and Lucas et al. (2020) [44]. New record from FCE
52	<i>Tabanus varipes</i> Walker	Maldonado	-	Uruguay (Maldonado)	Walker (1837: 33) [32]. Holotype (BMNH) from Uruguay, Isla de Gorriti. Krolow et al. (2022: 448–449, Figures) [45].

References

1. Fairchild, G.B. Tabanidae. In *Aquatic Biota of South America, Part 1, Arthropoda*; Hurlbert, S.H., Rodriguez, C., Santos, N.D., Eds.; San Diego State University: San Diego, CA, USA, 1981; pp. 290–301.
2. Medem, F. Horse flies (Diptera: Tabanidae) as ectoparasites on caimans (Crocodylia: Alligatoridae) in eastern Colombia. *Cespedesia* **1981**, *10*, 123–191.
3. Philip, C.B. A collection of four species of tabanid flies taken from an anaconda snake in Peru in May, 1984. *Pan-Pac. Entomol.* **1986**, *62*, 23.
4. Henriques, A.L.; Ferreira-Keppler, R.L.; Vidal, J.F.; Rafael, J.A. *Betrequia ocellata* Oldroyd (Diptera, Tabanidae, Rhinomyzini) blood feeding on *Caiman crocodilus* (Linnaeus) (Crocodylia, Alligatoridae) in Manaus, Brazil. *Rev. Bras. Zool.* **2000**, *17*, 609–613. [CrossRef]
5. Ferreira, R.L.M.; Henriques, A.L.; Rafael, J.A. Activity of tabanids (Insecta: Diptera: Tabanidae) attacking the reptiles *Caiman crocodilus* (Alligatoridae) and *Eunectes murinus* (Linn.) (Boidae) in the Central Amazon, Brazil. *Mem. Inst. Oswaldo Cruz* **2002**, *97*, 133–136. [CrossRef]
6. Limeira-De-Oliveira, F.; Rafael, J.A.; Henriques, A.L. *Phorcotabanus cinereus* (Wiedemann, 1821) (Diptera: Tabanidae) an ornithophilic species of tabanid in Central Amazon, Brasil. *Mem. Inst. Oswaldo Cruz* **2002**, *97*, 839–842. [CrossRef] [PubMed]
7. Gorayeb, I.S.; Campos, C.E.C. Tabanidae (Diptera) of the Amazon. XXII. First record of horse flies attacking golden tegu, *Tupinambis teguixin* Linnaeus 1758 (Reptilia: Squamata: Teiidae). *Bol. Mus. Para. Emílio Goeldi Ciênc. Nat.* **2018**, *13*, 157–160. [CrossRef]

8. Ferreira-Keppeler, R.L.; Guerrero, J.C.H.; Martins, R.T.; Rafael, K.A. Tabanidae (Diptera: Insecta) attacking *Tapirus terrestris* (Linnaeus) (Mammalia: Tapiridae) in Central Amazon, Brazil. *An. Acad. Bras. Cienc.* **2025**, *97*, e20241265. [\[CrossRef\]](#)
9. Pechuman, L.L.; Teskey, H.J. Tabanidae. In *Manual of Nearctic Diptera*; McAlpine, J.F., Wood, D.M., Eds.; Research Branch Agriculture Canada: Ottawa, ON, Canada, 1989; pp. 463–478.
10. Johnson, S.D.; Morita, S.I. Floral deception in an orchid pollinated by long proboscis flies. *Bot. J. Linn. Soc.* **2006**, *152*, 271–278. [\[CrossRef\]](#)
11. Corbet, P.S.; Haddow, A.J. Diptera swarming high above the forest canopy in Uganda, with special reference to Tabanidae. *Trans. R. Entomol. Soc. Lond.* **1962**, *114*, 267–284. [\[CrossRef\]](#)
12. Krolow, T.K.; Henriques, A.L.; Rafael, J.A. Tabanidae (Diptera) no dossel da floresta amazônica atraídos por luz e descrição de machos de três espécies. *Acta Amazon.* **2010**, *40*, 605–612. [\[CrossRef\]](#)
13. Buestán, J.; Brito Vera, G.A. Atypical case of sex ratio disruption in Tabanidae collections with Malaise traps in Ecuadorian forests. *Biologia* **2024**, *80*, 117–123. [\[CrossRef\]](#)
14. Horváth, G.; Pereszlényi, Á.; Egri, Á.; Fritz, B.; Guttmann, M.; Lemmer, U.; Gomard, G.; Kriska, G. Horsefly reactions to black surfaces: Attractiveness to male and female tabanids versus surface tilt angle and temperature. *Parasitol. Res.* **2020**, *119*, 2399–2409. [\[CrossRef\]](#)
15. Krinsky, W.L. Animal disease agents transmitted by horse flies and deer flies (Diptera: Tabanidae). *J. Med. Entomol.* **1976**, *13*, 225–275. [\[CrossRef\]](#)
16. Foil, L.D. Tabanids as vectors of disease agents. *Parasitol. Today* **1989**, *5*, 88–96. [\[CrossRef\]](#)
17. Baldacchino, F.; Desquesnes, M.; Mihok, S.; Foil, L.D.; Duvallet, G.; Jittapalapong, S. Tabanids: Neglected subjects of research, but important vectors of disease agents! *Infect. Genet. Evol.* **2014**, *28*, 596–615. [\[CrossRef\]](#)
18. Bilheiro, A.B.; Camargo, J.S.A.A.; Zamarchi, T.B.O.; Tonholo, C.; Bassin, H.C.M.; Sussuarana, I.T.A.; Henriques, A.L.; Camargo, L.M.A. Survey of *Trypanosoma* (Kinetoplastida: Trypanosomatidae) infection in Monte Negro municipality, State of Rondonia, Western Amazon, with first record of *T. evansi* in the state. *Rev. Soc. Bras. Med. Trop.* **2019**, *52*, e20190270. [\[CrossRef\]](#)
19. Rodrigues, G.D.; Blodorn, E.; Zafalon-Silva, A.; Domingues, W.; Marques, R.; Krolow, T.K.; Greif, G.; Campos, V.F.; Krüger, R.F. Molecular detection of *Trypanosoma kaiowa* in *Tabanus triangulum* (Diptera: Tabanidae) from the Coastal Plain of Rio Grande do Sul, Southern Brazil. *Acta Parasitol.* **2021**, *67*, 518–522. [\[CrossRef\]](#) [\[PubMed\]](#)
20. Rodrigues, G.D.; Lucas, M.; Ortiz, H.G.; Gonçalves, L.S.; Blodorn, E.; Domingues, W.B.; Nunes, L.S.; Saravia, A.; Parodi, P.; Riet-Correa, F.; et al. Molecular of *Anaplasma marginale* Theiler (Rickettsiales: Anaplasmataceae) in horseflies (Diptera: Tabanidae) in Uruguay. *Sci. Rep.* **2022**, *12*, 22460. [\[CrossRef\]](#)
21. Ramos, J.R.R.; Franco, C.S.; Luz, S.P.; Marques, J.; Souza, K.M.; Nascimento, L.F.N.; Neves, G.B.; Moreira, R.S.; Miletti, C. First record of *Trypanosoma evansi* DNA in *Dichelacera alcornis* and *Dichelacera januarii* (Diptera: Tabanidae) flies in South America. *Parasit. Vectors* **2023**, *16*, 4. [\[CrossRef\]](#) [\[PubMed\]](#)
22. González, C.R.; Reyes, C.; Castillo, A.; Valderrama, L.; Llanos, L.; Fernández, J.; Eastwood, G.; Cancino-Faure, B. Molecular evidence of pathogens and endosymbionts in the black horse fly *Osca lata* (Diptera: Tabanidae) in Southern Chile. *PLoS Negl. Trop. Dis.* **2024**, *18*, e0012525. [\[CrossRef\]](#) [\[PubMed\]](#)
23. Morales, D.F.; Parodi, P.; Reis, L.F.F.; Nascimento, M.C.; Rodrigues, G.D.; Nunes, L.S.; Menchaca, A.; Riet-Correa, F.; Krolow, T.K.; Lucas, M.; et al. First molecular detection of *Babesia bigemina* in horseflies from Uruguay. *Acta Trop.* **2025**, *264*, 107595. [\[CrossRef\]](#)
24. Evenhuis, N.L.; Pape, T. (Eds.) Systema Dipterorum (version 3.1, May 2021). In *Species 2000 & ITIS Catalogue of Life*; Naturalis: Leiden, The Netherlands, 2026.
25. Coscarón, S.; Papavero, N. Catalogue of Neotropical Diptera. *Tabanidae*. *Neotrop. Diptera* **2009**, *16*, 1–199.
26. Henriques, A.L.; Krolow, T.K.; Rafael, J.A. Corrections and additions to Catalogue of Neotropical Diptera (Tabanidae) of Coscarón and Papavero (2009). *Rev. Bras. Entomol.* **2012**, *56*, 277–280. [\[CrossRef\]](#)
27. Coscarón, S. Tabanidae (Diptera-Insecta). In *Biodiversidad de Artrópodos Argentinos: Una Perspectiva Biotaxonómica*; Morrone, J.J., Coscarón, S., Eds.; Sur: La Plata, Argentina, 1998; pp. 341–352.
28. Krolow, T.K.; Oliveira, L.P.; Henriques, A.L. Tabanidae. Catálogo Taxonômico da Fauna do Brasil. Available online: <http://fauna.jbrj.gov.br/fauna/faunadobrasil/1914> (accessed on 31 March 2026).
29. Linnaeus, C. *Systema Naturae per Regna Tria Naturae*, 10th ed.; Stockholm, Sweden, 1758; Volume 1.
30. De Geer, C. *Mémoires Pour Servir à L'histoire des Insectes*; P. Hesselberg: Stockholm, Sweden, 1776; Volume 6.
31. Wiedemann, C.R.W. *Aussereuropäische Zweiflügelige Insekten*; Hamm, Germany, 1828; Volume 1.
32. Walker, F. Descriptions of Diptera collected by Capt. P.P.; King, R.N., F.R.S. in the survey of the Straits of Magellan. *Trans. Linn. Soc. Lond.* **1837**, *17*, 331–359. [\[CrossRef\]](#)
33. Macquart, P.J.M. *Diptères Exotiques Nouveaux ou Peu Connus*; Paris, France, 1838; Volume 1, pp. 5–221.
34. Macquart, P.J.M. Diptères exotiques nouveaux ou peu connus. 4e. supplément [part.]. *Mem. Soc. (R.) Sci. Agric. Arts Lille* **1850**, *1849*, 309–465.
35. Brèthes, J. Catálogo de los Dípteros de las Repúblicas del Plata. *An. Mus. Nac. B. Aires* **1907**, *16*, 277–305.

36. Kröber, O. Die *Chrysops*-Arten Süd-und Mittelamerikas nebst den Arten der Inselwelt und Mexikos. *Konowia* **1926**, *4*, 319–375.
37. Kröber, O. Dreizehn neue neotropische *Tabanus* Arten. *Konowia* **1931**, *10*, 291–300.
38. Kröber, O. Neue Tabaniden und Zusätze zu bereits beschriebenen. *Zool. Anz.* **1930**, *90*, 69–86.
39. Lutz, A. Bemerkungen über die Nomenklatur und Bestimmung der brasilianischen Tabaniden. *Zentralblatt Bakteriolog.* **1907**, *44*, 137–144.
40. Lutz, A. Tabaniden Brasiliens und einiger Nachbarstaaten. In *Zoologische Jahrbücher (Suppl. 10)*; Georg Fischer: Schaffhausen, Switzerland, 1909; pp. 619–692.
41. Coscarón, S. Notas sobre tabánidos argentinos XV. El género *Tabanus* Linnaeus. *Obra Cent. Mus. La Plata* **1979**, *6*, 251–278.
42. Coscarón, S. Notas sobre tabánidos argentinos XVI. El género *Chrysops* Meigen (Diptera, Insecta). *Acta Zool. Lilloana* **1979**, *35*, 365–392.
43. Coscarón, S.; Martínez, M. Checklist of Tabanidae (Insecta: Diptera) from Uruguay. *Rev. Soc. Entomol. Argent.* **2019**, *78*, 40–46. [\[CrossRef\]](#)
44. Lucas, M.; Krolow, T.K.; Riet-Correa, F.; Barros, A.T.M.; Krüger, R.F.; Saravia, A.; Miraballes, C. Diversity and seasonality of horse flies (Diptera: Tabanidae) in Uruguay. *Sci. Rep.* **2020**, *10*, 401. [\[CrossRef\]](#)
45. Krolow, T.K.; Lucas, M.; Henriques, A.L. Revisiting the tabanid fauna (Diptera: Tabanidae) of Uruguay: Notes on the species of the genus *Tabanus* Linnaeus, with the description of a new species. *Neotrop. Entomol.* **2022**, *51*, 447–457. [\[CrossRef\]](#)
46. Kröber, O. Über einige kleinere Gattungen der südamerikanischen Tabanini. *Zool. Anz.* **1929**, *83*, 47–63.
47. Kröber, O. Die Ausbeute der Deutschen Chaco-Expedition 1925/26. Diptera. XI–XIII. *Konowia* **1929**, *8*, 170–193.
48. Kröber, O. Catalogo dos Tabanidae da America do Sul e Central, incluindo o Mexico e as Antilhas. *Rev. Entomol.* **1934**, *4*, 222–276, 291–333.
49. Stone, A. Some Tabanidae from Venezuela. *Bol. Entomol. Venez.* **1944**, *3*, 125–138.
50. Ruffinelli, A.; Carbonell, C.S. Segunda lista de insectos y otros artrópodos de importancia económica en el Uruguay. *Rev. Asoc. Ing. Agron.* **1953**, *94*, 33–82.
51. Fairchild, G.B. Synonymical notes on Neotropical flies of the family Tabanidae (Diptera). *Smithson. Misc. Collect.* **1956**, *131*, 1–38.
52. Fairchild, G.B. The Adolpho Lutz Collection of Tabanidae (Diptera). I. The described genera and species, condition of the collection, and selection of lectotypes. *Mem. Inst. Oswaldo Cruz* **1961**, *59*, 185–250. [\[CrossRef\]](#) [\[PubMed\]](#)
53. Coscarón, S. Notas sobre tabánidos argentinos—VI. El género *Lepiselaga* Macq. *Rev. Soc. Entomol. Argent.* **1968**, *30*, 51–59.
54. Coscarón, S. Notas sobre tabánidos argentinos.—VII. Los tábanos del delta del Paraná. *Physis* **1968**, *28*, 39–53.
55. Coscarón, S. Notas sobre tabánidos argentinos. X. El género *Dichelacera* Macq. *Rev. Soc. Entomol. Argent.* **1974**, *34*, 229–242.
56. Coscarón, S. Notas sobre tabánidos argentinos.—XIII. El género *Catachlorops* Lutz en la Argentina. *Physis* **1975**, *34*, 23–31.
57. Coscarón, S. Contribución al conocimiento de los Tabanidae Neotropicales, II. Los Pangoniini del Sur de Sudamérica y datos sobre la tribu Sepsidini. *Rev. Mus. La Plata* **1976**, *12*, 75–116.
58. Coscarón, S. Notas sobre tabánidos argentinos XIV. Sobre os géneros *Diachlorus* Osten Sacken, *Stibasoma* Schiner, *Stypommisa* Enderlein, *Cryptotylus* Lutz y *Chlorotabanus* Lutz (Diptera). *Rev. Soc. Entomol. Argent.* **1976**, *35*, 39–50.
59. Coscarón, S. Notas sobre tabánidos argentinos XVII. Los géneros *Phaeotabanus* Lutz y *Acanthocera* Macquart en la Argentina (Tabanidae: Diptera). *Rev. Soc. Entomol. Argent.* **1978**, *37*, 27–32.
60. Coscarón, S. El género *Fidena* Walker 1850 en Argentina y Chile (Diptera: Tabanidae). *Acta Entomol. Chil.* **2001**, *25*, 51–72.
61. Coscarón, S.; Philip, C.B. Revisión del género “*Dasybasis*” Macquart en la región neotropical. *Rev. Mus. Argent. Cienc. Nat. Bernardino Rivadavia Entomol.* **1967**, *2*, 15–266.
62. Coscarón, S.; Fairchild, G.B. El género *Poeciloderas* Lutz en Argentina (Tabanidae: Diptera). *Physis* **1976**, *35*, 293–301.
63. Fairchild, G.B.; Burger, J.F. A catalog of the Tabanidae (Diptera) of the Americas south of the United States. *Mem. Am. Entomol. Inst.* **1994**, *55*, 1–249.
64. Martínez, M. Relevamiento de Artrópodos. In *Cuenca Superior del Arroyo Lunarejo*. (Coord. Berrini, R.), Ministerio de Vivienda, Ordenamiento Territorial y Medio Ambiente (MVOTMA)—Dirección Nacional de Medio Ambiente (DINAMA); Sociedad Zoológica del Uruguay (SZU): Montevideo, Uruguay, 1998; pp. 121–142.
65. Chainey, J.E.; Hall, M.J.R.; Gorayeb, I.S. *Stenotabanus* Lutz (Diptera: Tabanidae): An identification guide to the South American species. *Mem. Entomol. Int.* **1999**, *14*, 75–134.
66. Bentancourt, C.; Scatoni, I.; Morelli, E. *Insectos del Uruguay*; Facultad de Agronomía & Facultad de Ciencias, Universidad de la República: Montevideo, Uruguay, 2009.
67. Henriques, A.L. Tabanidae (Diptera) of the American Museum of Natural History Collection. *Zootaxa* **2016**, *4137*, 151–186. [\[CrossRef\]](#) [\[PubMed\]](#)
68. Krolow, T.K.; Carmo, D.D.D.; Oliveira, L.P.; Henriques, A.L. The Tabanidae (Diptera) in Brazil: Historical aspects, diversity and distribution. *Zoologia* **2024**, *41*, e23074. [\[CrossRef\]](#)
69. Gorayeb, I.S. *Revisão Taxonômica do Grupo Fidena (Diptera: Tabanidae) da Região Neotropical*; Museu Paraense Emílio Goeldi: Belém, Brazil, 2024; pp. 1–417.

70. R Core Team. *R: A Language and Environment for Statistical Computing*; R Foundation for Statistical Computing: Vienna, Austria, 2022. Available online: <https://www.R-project.org> (accessed on 1 April 2026).
71. Oksanen, J.; Blanchet, F.G.; Kindt, R.; Legendre, P.; Minchin, P.R.; O'Hara, R.B.; Simpson, G.L. *vegan: Community Ecology Package*; R Package Version 2.6-4. 2022. Available online: <https://cran.r-project.org/package=vegan> (accessed on 1 April 2026).
72. Wickham, H.; Averick, M.; Bryan, J.; Chang, W.; McGowan, L.D.A.; François, R.; Grolemund, G.; Hayes, A.; Henry, L.; Hester, J.; et al. Welcome to the Tidyverse. *J. Open Source Softw.* **2019**, *4*, 1686. [\[CrossRef\]](#)
73. Evenhuis, N.L. The Insect and Spider Collections of the World Website. Available online: <http://hbs.bishopmuseum.org/codens/> (accessed on 31 March 2026).
74. Kröber, O. Die *Chrysops*-Arten Süd-und Mittelamerikas nebst den Arten der Inselwelt und Mexikos. *Konowia* **1925**, *4*, 210–256.
75. Wulp, F.M. van der Amerikaanshe Diptera. *Tijdschr. Entomol.* **1881**, *24*, 141–168.
76. Wiedemann, C.R.W. *Aussereuropäische Zweiflügelige Insekten*; Schulzischen Buchhandlung: Hamm, Germany, 1830; Volume 2.
77. Fabricius, J.C. *Systema Antliatorum Secundum Ordines, Genera, Species*; Brunsvigae: Brunswick, Germany, 1805.
78. Brèthes, J. Dípteros nuevos ó poco conocidos de Sud-América. *An. Mus. Nac. B. Aires* **1910**, *20*, 469–484.
79. Wilkerson, R.C.; Fairchild, G.B. A review of the South American species of *Esenbeckia*, subgenus *Esenbeckia* (Diptera: Tabanidae). *J. Nat. Hist.* **1983**, *17*, 519–567. [\[CrossRef\]](#)
80. Henriques, A.L.; Rafael, J.A. Revisão do gênero neotropical *Acanthocera* Macquart (Diptera, Tabanidae). *Acta Amaz. Manaus* **1993**, *23*, 403–440. [\[CrossRef\]](#)
81. Turcatel, M.; de Carvalho, C.J.B.; Rafael, J.A. A taxonomic revision of *Stibasoma* Schiner, 1867 (Diptera: Tabanidae). *Zootaxa* **2010**, *2368*, 1–39. [\[CrossRef\]](#)
82. Fairchild, G.B. Notes on Neotropical Tabanidae. IX. The species described by Otto Kröber. *Stud. Entomol. Sao Paulo* **1967**, *9*, 329–379.

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.