



The Diptera of Panama. II. A first benchmark for the family Chironomidae

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Abstract

The Chironomidae (Insecta: Diptera) are among a number of aquatic invertebrate groups which have received scant attention in Panama. This paper brings together information from the published literature, personal comments by colleagues, and current research to produce a first benchmark of knowledge about this dipteran family. To date, we have discovered 57 named species in 31 genera distributed among five chironomid subfamilies. In addition, 22 unassociated genera/subgenera (without identified species) are listed. The majority of the taxa recorded belong to the subfamily Chironominae (40 named species in 17 genera, plus 11 unassociated genera/subgenera). Of the 79 total number of species and unassociated taxa of the genus or subgenus rank presented in this paper, 43 are new country records for Panama.

Key words: aquatic insects, checklist, Neotropics, mime midges

Introduction

One of the most perplexing discoveries in biodiversity work is to find that a tropical country, with varied topography, climate, and high numbers of recorded taxa, hosts large taxonomic groups for which no significant study has occurred. Such is the case for Panama (and many other Central American countries). Even though Panama has been visited by countless field biologists drawn to the Canal Zone and to Chiriquí Province in the western highlands, collecting primarily has been in the form of raids—not campaigns, of single samples—not comprehensive seasonal or annual collections, and of non-native, temporary visitors—not trained nationals. This is reflected in the fact that, for these ignored groups, no type material is housed in Panamanian institutions, even though several species have been described based on specimens from Panama. Primarily, this situation can be attributed to the lack of taxonomic training in the colleges and universities that populate Panama and most Central American countries. Costa Rica, with its positive orientation toward national biodiversity and ecotourism, is an exception, at least in part. And, Mexico, and most of the larger countries of South America as well, have more of a traditional education system and taxonomic traditions copied from their Spanish and Portuguese predecessors.

The above view was supported by recent work on caddisflies (Insecta: Trichoptera) during the period 2015–2023 by the Aquatic Invertebrate Research Group (AIRG). A perceptually inadequate number (257 species) of caddisflies compared to Costa Rica and Mexico, had been recorded prior to this period. Further, no Panamanian had previously described a new species of this group from Panama. Since 2015, AIRG has added 2 families, 11

genera, and 278 new species and new country records to the former totals (Armitage *et al.* 2024). And collectively, 24 new species have now been co-authored by two Panamanians. It is estimated that at least several hundred more species will be recorded in the future. However, even with the significant growth of this group, it does not represent a worst-case example. Many other groups of aquatic invertebrates have either never been studied (e.g., ostracods), or have not been seriously studied, some since the late 1800s to early 1900s (e.g., aquatic and semiaquatic moths). Another case in point is the aquatic insect family Chironomidae (Insecta: Diptera), the focus of this article, which has received much attention in the northern latitudes over a long period of time (Wiederholm 1989). In the world, there are probably at least 15,000 species of Chironomidae (Cranston 1995), referred to as midges, non-biting midges or, as recently proposed—mime midges (Zakrzewska *et al.* 2023), making them the most diverse family among the aquatic dipteran insects.

Although there has been some species of chironomids listed in the literature from Panama, the list is not robust, and we believe it does not reflect the true diversity of this group. We note that progress has occurred previously in Costa Rica (Coffman *et al.* 1992; Watson & Heyn 1992), and also more recently due to a biodiversity initiative for Diptera (Epler 2017; Borkent *et al.* 2018). The remainder of Central America requires as much, or more, attention as Panama.

The purpose of this paper is to present what is known from various personal and literature sources, to add what preliminary results we have generated to date, and to produce a first benchmark for this group against which future scientific progress can be measured and compared. This paper also serves as a “first-step” to provide background information for encouraging taxonomic research in this group for Panama by students and others.

Materials and Methods

The Panamanian Environment

The flora and fauna of Panama is species-rich due to its tropical location and topography, and the resulting diversity of microclimates and habitats. In terms of aquatic habitats, Panama contains over 500 rivers and countless creeks and other types of lotic and lentic waterbodies. A more thorough description of its geology, topography, climate, and habitats can be found in Armitage *et al.* (2024). For members of the Chironomidae, an overabundance of habitats and resources exists to override any thought of species diversity being limited by competition.

Methods

Species records based on material we have studied are listed under the “Material examined” subsections below. These include specimens that have been collected since 2015 in Panama by four of the authors (BJA, KCS, TARG, and YPAE), other persons involved in projects executed by the Aquatic Invertebrate Research Group, and researchers interested in the Panamanian fauna. The specimens have been identified by authors of this research (TA and WG). Also included here are specimens housed in the Zoologische Staatssammlung München (ZSM), which we borrowed. Species based on material that we have not studied are listed under the “Material recorded” subsections below. These include records listed in Spies & Reiss (1996); species based on F. Reiss hand-written notes that were not included in the 1996 checklist; and species published after 1996. The species records derived from Spies & Reiss (1996) are of two types: 1) those published prior to 1996; 2) those based on unpublished material in the ZSM collection examined by those authors and included in their publication. In the annotated checklist presented below, published information are provided for each precisely determined and named species (or for a named species with which it is compared), including a country which its holotype comes from [given in square brackets]; other countries, including those situated within the subtropical ecozones of America, are listed under the subheading “Distribution in Neotropics.”

A list of the chironomid species and unassociated genera (i.e., genera without identified species) recorded for Panama from all sources are given in Table 2. The paragraphs for each genus that follow are, in part, taken or modified from Bello-González *et al.* (2024a) or Spies *et al.* (2009). An asterisk symbol is used in both Table 2 and the annotated list below to indicated new species or unassociated genera records for Panama. Any references to “Holbrook Air Force Base” should be interpreted to mean “Albrook Air Force Base”.

Recently collected specimens were primarily captured in Malaise traps and UV-light traps, although a minor subset came from sweep-netting and hand-picking. Specimens were stored in 80% ethanol and later slide mounted in Euparal or Canada balsam prior to examination.

Information about the locations of the sample sites for recently collected and identified material included in this paper, as well as for those found in the literature or obtained from personal communications are provided in Table 1 and Figure 1 (see the Figure legend). Graphics in Figure 1 were produced employing QGIS 3.2—Firenze software.

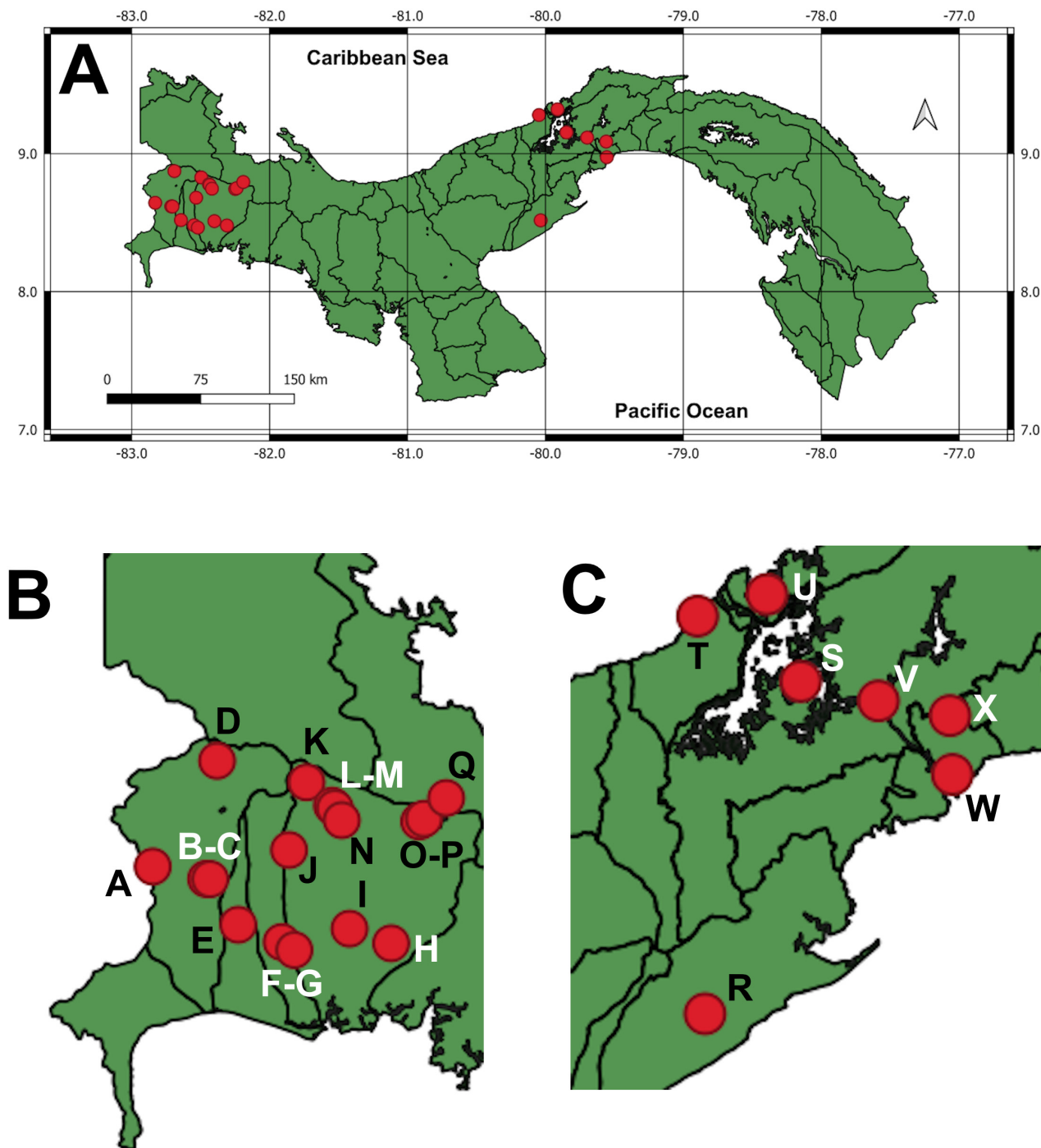


FIGURE 1. Maps of Panama overlaid with a major watershed (cuenca) layer showing collection sites from which chironomids have been identified to date (red dots). A. Panama; B. western Panama; C. central Panama. The map codes in figures 1B and 1C refer to the codes listed in Table 1. Western Panama sites are from current collecting, while those sites around the Canal Zone are from the literature or personal communications.

Results

To date, we have discovered 57 named species in 31 genera distributed among five chironomid subfamilies. In addition, we have identified 22 unassociated genera/subgenera. The majority of the taxa recorded belong to the subfamily Chironominae (40 named species in 17 genera, plus 11 unassociated genera/subgenera). Of the 79 species and unassociated genera and/or subgenera presented in this paper, 43 are recorded for the first time in Panama.

TABLE 1. Chironomid location data. The letter code matches locations labelled in Figs 1B and 1C. Locations around the Canal Zone, or close by, are derived from either literature or personal communications. Locations in the western area of Panama are derived from current projects of the Aquatic Invertebrate Research Group.

Administrative Unit				
	Watershed (Cuenca)—stream/location	Latitude	Longitude	Altitude m a.s.l.
Chiriqui Province				
A	102—Quebrada sin nombre, Landis	8.64377	-82.82975	755
B	102—afluente sin nombre de Río Cueta	8.61765	-82.71330	540
C	102—Quebrada La Vuelta	8.61710	-82.70415	492
D	102—Quebrada Norte	8.87361	-82.69051	1709
E	104—Río Güigala	8.51845	-82.64280	209
F	106—Río Chirigagua	8.48139	-82.54788	128
G	108—Río Platanal	8.46416	-82.52030	84
H	108—Quebrada Grande, Gualaca	8.47944	-82.30944	70
I	108—Río David	8.51083	-82.40028	108
J	108—Río Majagua	8.68093	-82.53276	840
K	108—Quebrada sin nombre	8.82786	-82.49534	1765
L	108—Quebrada Grande, Boquete (157-G)	8.77758	-82.43942	1122
M	108—Quebrada Grande, Boquete	8.77195	-82.43308	1200
N	108—Quebrada Jaramillo Abajo	8.74600	-82.41804	1060
O	108—Presa Fortuna (Fortuna Dam - Río Chiriqui)	8.74396	-82.24933	1046
P	108—Quebrada Honda	8.74985	-82.23885	1132
Ngäbe-Buglé Comarca				
Q	093—Quebrada Martínez	8.79484	-82.19047	480
Panamá Oeste Province				
R	138—Naranjal	8.51667	-80.03333	678
S	115—Barro Colorado Island	9.15410	-79.84660	164
Colon Province				
T	115—Camp Pina	9.28018	-80.04570	9
U	115—Colon	9.32151	-79.91137	21
V	115—Río Agua Salud—Gamboa	9.11646	-79.69651	49
Panamá Province				
W	115—Albrook AFB—Curundu	8.97457	-79.55410	6
X	115—Las Cumbres	9.08755	-79.55822	347

TABLE 2. List of Chironomidae taxa currently known from Panama. * - new Panama record.

Subfamily (Tribe) Species	Source
Chironominae (Chironomini)	
<i>Axarus dorneri</i> (Malloch, 1915)	Spies & Reiss (1996)
<i>Beardius aciculatus</i> Andersen <i>et</i> Saether, 1996 *	current research
<i>Beardius breviculus</i> Reiss <i>et</i> Sublette, 1985	Spies & Reiss (1996)
<i>Chironomus calligraphus</i> Goeldi, 1905	Spies & Reiss (1996)
<i>Cladopelma forcipes</i> (Rempel, 1939)	Spies & Reiss (1996)
<i>Cryptochironomus</i> spp. *	current research
<i>Cryptotendipes</i> sp. *	current research
<i>Demicryptochironomus</i> sp. *	current research
<i>Dicrotendipes baru</i> Epler, 1996 *	current research
<i>Dicrotendipes californicus</i> (Johannsen, 1905)	Spies & Reiss (1996)
<i>Dicrotendipes hulberti</i> Epler, 2016	Epler (2016)
<i>Endotribelos</i> sp. *	current research
<i>Goeldichironomus amazonicus</i> (Fittkau, 1968)	Spies & Reiss (1996)
<i>Goeldichironomus carus</i> (Townes, 1945)	Spies & Reiss (1996)
<i>Goeldichironomus fluctuans</i> Reiss, 1974	Spies & Reiss (1996)
<i>Goeldichironomus holoprasinus</i> (Goeldi, 1905)	Spies & Reiss (1996)
<i>Lauterborniella agrayloides</i> (Kieffer, 1911)	Spies & Reiss (1996)
<i>Oukuriella</i> spp.*	Reiss, hand-written notes
<i>Parachironomus directus</i> (Dendy <i>et</i> Sublette, 1959)	Spies & Reiss (1996)
<i>Parachironomus longistilus</i> Paggi, 1977 *	Reiss, hand-written notes
<i>Paratendipes</i> sp. *	current research
<i>Polypedilum (Polypedilum)</i> spp. *	current research
<i>Polypedilum (Tripodura) pterospilis</i> Townes, 1945	Spies & Reiss (1996)
<i>Polypedilum (Urespedilum) microzoster</i> Sublette <i>et</i> Sasa, 1994 *	current research
<i>Stenochironomus (Petalopholeus) fittkai</i> Borkent, 1984	Spies & Reiss (1996)
<i>Stenochironomus (Petalopholeus) gladius</i> Borkent, 1984	Spies & Reiss (1996)
<i>Stenochironomus (Petalopholeus) quadrinotatus</i> Borkent, 1984	Spies & Reiss (1996)
<i>Xenochironomus xenolabis</i> Kieffer in Thienemann <i>et</i> Kieffer, 1916	Spies & Reiss (1996)
<i>Xestochironomus comptus</i> Sublette <i>et</i> Wirth, 1972	Spies & Reiss (1996)
<i>Xestochironomus subletti</i> Borkent, 1984	Spies & Reiss (1996)
<i>Zavreliella longiseta</i> Reiss, 1990	Spies & Reiss (1996)
Chironominae (Pseudochironomini)	
<i>Pseudochironomus</i> spp. *	current research
<i>Riethia</i> spp. *	current research
Chironominae (Tanytarsini)	
<i>Cladotanytarsus (Cladotanytarsus)</i> sp. *	current research
<i>Nandeva tropica</i> Wiedenbrug, Reiss <i>et</i> Fittkau, 1998	Sæther & Roque (2004)
<i>Rheotanytarsus baculus</i> Kyerematen <i>et</i> Andersen, 2002 *	current research
<i>Rheotanytarsus foliatus</i> Kyerematen <i>et</i> Andersen, 2002 *	current research
<i>Rheotanytarsus kusii</i> Kyerematen <i>et</i> Andersen, 2002 *	current research
<i>Rheotanytarsus scutulatus</i> Kyerematen <i>et</i> Andersen, 2002 *	current research
<i>Skutzia quetzali</i> Pinho, Mendes <i>et</i> Andersen, 2009	Pinho <i>et al.</i> (2009)
<i>Stempellina</i> spp. *	current research
<i>Tanytarsus capitatus</i> Sublette <i>et</i> Sasa, 1994 *	current research

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TABLE 2. (Continued)

Subfamily (Tribe) Species	Source
<i>Tanytarsus cotopaxi</i> Gilka <i>et</i> Zakrzewska, 2013 *	current research
<i>Tanytarsus deimos</i> Gilka, Dantas <i>et</i> Andersen, 2024	Gilka <i>et al.</i> (2024)
<i>Tanytarsus fastigatus</i> Reiss, 1972 *	current research
<i>Tanytarsus hastatus</i> Sublette <i>et</i> Sasa, 1994	Sanseverino (2006)
<i>Tanytarsus jatai</i> Trivinho-Strixino, Wiedenbrug <i>et</i> Silva, 2015 *	current research
<i>Tanytarsus kiche</i> Vinogradova, Riss <i>et</i> Spies, 2009	Vinogradova <i>et al.</i> (2009)
<i>Tanytarsus ligulatus</i> Reiss, 1972 *	current research
<i>Tanytarsus marianae</i> Reis, Lin <i>et</i> Ferreira-Keppler, 2022 *	current research
<i>Tanytarsus paraligulatus</i> Reiss, 1972 *	current research
Orthocladiinae	
<i>Antillocladius arcuatus</i> Saether, 1982 *	current research
<i>Bryophaenocladus carus</i> (Roback, 1962)	Spies & Reiss (1996)
<i>Cardiocladius moreloensis</i> Andersen, Hagenlund <i>et</i> Pinho, 2016 *	current research
<i>Cricotopus oris</i> Roback, 1962	Spies & Reiss (1996)
<i>Cricotopus tanis</i> Roback, 1962	Spies & Reiss (1996)
<i>Limnophyes</i> spp. *	current research
<i>Mesosmittia truncata</i> Saether, 1985	Spies & Reiss (1996)
<i>Metriocnemus</i> sp. *	Reiss, hand-written notes
<i>Parametriocnemus lundbeckii</i> (Johannsen, 1905) *	current research
<i>Paraphaenocladus exagitans longipes</i> Saether <i>et</i> Wang, 1995 *	current research
<i>Pseudosmittia forcipata</i> (Goetghebuer, 1921) *	current research
<i>Stictocladus acutus</i> Saether <i>et</i> Cranston, 2012 *	current research
<i>Thienemanniella spreta</i> (Roback, 1962)	Spies & Reiss (1996)
Podonominae	
<i>Parochlus kiefferi</i> (Garrett, 1925) *	current research
Tanypodinae (Clinotanypodini)	
<i>Coelotanypus humeralis</i> (Loew, 1866)	Spies & Reiss (1996)
<i>Coelotanypus naelis</i> Roback, 1963	Spies & Reiss (1996)
<i>Coelotanypus scapularis</i> (Loew, 1866)	Spies & Reiss (1996)
<i>Naelotanypus</i> sp. *	Reiss, hand-written notes
Tanypodinae (Pentaneurini)	
<i>Ablabesmyia</i> sp. *	Reiss, hand-written notes
<i>Denopelopia</i> sp.	Spies & Reiss (1996)
<i>Labrundinia panamensis</i> Silva in Silva <i>et al.</i> 2014	Silva <i>et al.</i> (2014)
<i>Larsia</i> sp. *	Reiss, hand-written notes
<i>Nilotanypus</i> sp. *	Reiss, hand-written notes
<i>Thienemannimyia</i> sp. *	Reiss, hand-written notes
<i>Zavreliomyia</i> sp. *	Reiss, hand-written notes
Tanypodinae (Procladiini)	
<i>Procladius</i> sp. *	Reiss, hand-written notes
Tanypodinae (Tanypodini)	
<i>Tanypus</i> sp. *	Reiss, hand-written notes
Telmatogetoninae	
<i>Thalassomya bureni</i> Wirth, 1949	Spies & Reiss (1996)

Annotated Species List

Family Chironomidae Newman, 1834

Subfamily Chironominae Newman, 1834

Tribe Chironomini Newman, 1834

Genus *Axarus* Roback, 1980

A genus of ~15 species that occur in the Neotropical, Nearctic, Palaearctic, and the Australasian regions. Ten species are known from South America (Andersen & Mendes 2002a; Andersen *et al.* 2018; Pinho *et al.* 2019). The larvae occur in littoral to sublittoral soft sediments in lakes and rivers (Epler *et al.* 2013).

Axarus dorneri (Malloch, 1915)

Malloch, 1915: 471 (*Chironomus*) [USA: Texas]; Townes (1945: 96 as *Xenochironomus dorneri* (Malloch) new combination), Spies & Reiss (1996: 74 as *Chironomus dorneri* Malloch, *nomen dubium*).

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 1 male, 22 December 1928, leg C.H. Curran (Townes 1945). As previous except 2 males, 6 February–25 March 1986, light trap, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Distribution in Neotropics. Panama.

Note. The species was described based on a female from Texas and was regarded as a *nomen dubium* by Spies & Reiss (1996). However, Townes (1945: 96) described a male as *Xenochironomus dorneri* (Malloch) based partly on a specimen from Barro Colorado Island, but he admits that he “can not be sure that the male and female described above are the same species or that either of them are Malloch’s *dorneri*. There seems to be a number of Neotropical species closely related to *dorneri*, but the material available is scanty. The male specimen described and figured above is the only available male that can possibly be Malloch’s *dorneri*.” Since Roback (1963a: 236) and Sublette (1966: 25) the species has generally been considered to be a member of *Axarus*. Following Townes (1945) we list the species as *A. dorneri* (Malloch). However, the material from Panama should be re-examined.

Genus *Beardius* Reiss *et* Sublette, 1985

A genus with >30 named species that occur mainly in tropical areas in the Neotropical region with a few species in the southern parts of the Nearctic region (Jacobsen & Perry 2000; Pinho *et al.* 2013). The larvae have been found associated with macrophytes or submerged wood in both standing and flowing waters (Epler *et al.* 2013).

Beardius aciculatus Andersen *et* Sæther, 1996 *

Andersen *et* Sæther, 1996: 40 [Costa Rica].

Material examined. Panama, Chiriquí Province, Cuenca 104, Bugaba District, La Concepción, Rio Güigala, Vias del Ferrocarril, Antiguo Puente, 1 male, 12 March 2021, UV light trap, leg Y. Aquirre & T. Ríos.

Distribution in Neotropics. Costa Rica, Mexico, Panama.

Beardius breviculus Reiss *et* Sublette, 1985

Reiss *et* Sublette, 1985: 189 [Panama; holotype in U.S. National Museum]; Spies & Reiss (1996: 68).

Material recorded. Panama, Panamá Oeste Province, Naranjal, male (holotype), 1 October 1956, leg F.S. Blanton; Colon Province, Camp Pina, 2 males (paratypes), 29 April 1954 (Reiss & Sublette 1985).

Distribution in Neotropics. Panama.

Genus *Chironomus* Meigen, 1803

One of the most species-rich and common chironomid genera, with ~300 described species from all zoogeographical regions except Antarctica. The larvae graze on detritus or are filter-feeders, predominantly in soft sediments of standing water, rarely in flowing water (Epler *et al.* 2013).

Chironomus calligraphus Goeldi, 1905

Goeldi, 1905: 136 [Brazil]; Spies & Reiss (1996: 69).

Syn.: *Tendipes (Tendipes) aversa* Roback, 1962: 6 [Panama; holotype in Academy of Natural Sciences of Philadelphia].

Material recorded. Panama, Panamá Province, Curundu, Albrook (Holbrook (sic.)) Air Force Base, male and female (holotype and allotype of *Tendipes (T.) aversa* Roback), 28 December 1967, at light, leg C. Earl Smith; as previous except 9 males, 14 females (paratypes), 25 December 1957–7 January 1958 (Roback 1962).

Distribution in Neotropics. ?Argentina, Brazil, Colombia, Panama, Uruguay, ?Virgin Islands.

Chironomus spp.

Material examined. Panama, Chiriquí Province, Cuenca 102, Renacimiento District, Reserva Privado Landis, Quebrada sin nombre, 1 male, 15–30 December 2021, Malaise trap, leg M. Landis. Chiriquí Province, Cuenca 102, Tierras Altas District, Mount Totumas Cloud Forest and Biological Reserve, Quebrada Norte, 2 males, 26–28 December 2017, Malaise trap, leg B. Armitage & J. Dietrich. Chiriquí Province, Cuenca 108, Gualaca District, Quebrada Grande, 5 males, 27 February 2019, UV light trap, leg Y. Aquirre. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Grande, Valle Escondido, Condo unit 157-G, 3 males, June 2022, UV light trap, leg T.I. Arefina-Armitage. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 2 males, 28 November 2018, UV light trap, leg K. Castillo; as previous except 10 males, February–March 2019.

Genus *Cladopelma* Kieffer, 1921

A genus of ~20 described species that occur in all zoogeographical regions except Antarctica and Oceania. The larvae live in streams and larger rivers, lakes, and ponds as well as brackish water and hot springs (Epler *et al.* 2013).

Cladopelma forcipes (Rempel, 1939)

Rempel, 1939: 211 (*Chironomus (Cryptochironomus)*) [Brazil]; Spies & Reiss (1996: 69).

Material recorded. Panama, Colon Province, Gamboa, 1 male, 26 January 1984, leg W. Nentwig, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Distribution in Neotropics. Brazil, Colombia, Costa Rica, Guatemala, Mexico, Nicaragua, Panama.

Note. The species was collected in connection with a study on the feeding ecology of the tropical spitting spider *Scytodes longipes* (Nentwig 1985).

Genus *Cryptochironomus* Kieffer, 1918

A genus of 57 described species distributed in all zoogeographical regions, except Antarctica. Four species are described from South America (Silva *et al.* 2010). Keys to the Neotropical males, pupae and larvae were given by Silva *et al.* (2010). The larvae occur in various substrata in lakes, streams and rivers (Epler *et al.* 2013).

Cryptochironomus spp. *

Material examined. Panama, Chiriquí Province, Cuenca 102, Tierras Altas District, Mount Totumas Cloud Forest and Biological Reserve, Quebrada Norte, 3 males, 26–28 December 2017, Malaise trap, leg B. Armitage & J. Dietrich. Chiriquí Province, Cuenca 108, Gualaca District, Quebrada Grande, 1 male, 27 February 2019, UV light trap, leg Y. Aquirre. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 3 males, 28 November 2018, UV light trap, leg K. Castillo; as previous except 3 males, February–March 2019.

Genus *Cryptotendipes* Lenz, 1941

A genus of 23 described species, most of which occur in the Nearctic and Palearctic regions. A single named species, *C. daktylos* (Walley *in* Curran, 1934) is recorded from Guyana in South America (Spies & Reiss 1996). The larvae inhabit sediments of sand and mud in lakes and rivers (Epler *et al.* 2013).

Cryptotendipes sp. *

Material examined. Panama, Chiriquí Province, Cuenca 108, Boquete District, Quebrada Grande, Valle Escondido, Condo unit 157-G, 5 males, 3 April 2022, UV light trap, leg B. Armitage.

Genus *Demicryptochironomus* Lenz, 1941

A genus of 31 described species distributed in all zoogeographical regions, except Oceania and Antarctica. Larvae assigned to *Demicryptochironomus* have been recorded from Brazil (Roque *et al.* 2004; Trivinho-Strixino 2011). A key to adult males was given by Yan *et al.* (2008). The larvae occur in sandy or muddy sediments in lakes, streams, and rivers, where they have been reported to be predatory, especially on oligochaetes (Epler *et al.* 2013).

Demicryptochironomus sp. *

Material examined. Panama, Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 3 males, 14 November 2018, UV light trap, leg K. Castillo; as previous except 1 male, 6 February 2019.

Genus *Dicrotendipes* Kieffer, 1913

A genus of ~85 described species that occur in all zoogeographical regions except Antarctica. The genus was revised by Epler (1988). The larvae inhabit the littoral sediments of standing waters and can be common in lentic habitats (Epler *et al.* 2013).

***Dicrotendipes baru* Epler, 1996 ***

Epler, 1996: 13 [Costa Rica].

Material examined. Panama, Chiriquí Province, Cuenca 108, David District, San Pablo Viejo, Rio Platanal, puente vía Interamericana antes de llegar a la entrada de Bagala, 1 male, 12 April 2021, leg Y. Aquirre & T. Ríos. Chiriquí Province, Cuenca 108, Gualaca District, Quebrada Grande, 4 males, 27 February 2019, UV light trap, leg Y. Aquirre.

Distribution in Neotropics. Costa Rica, Panama.

***Dicrotendipes californicus* (Johannsen, 1905)**

Johannsen, 1905: 217 (*Chironomus*) [USA: California]; Epler (1988: 61), Spies & Reiss (1996: 70).

Material recorded. Panama, Chiriqui Province, Presa Fortuna, holding pond above Aoki Camp, 1 male, 25 May 1985, light trap, leg R.W. Flowers (Epler 1988). Panamá Oeste Province, Canal Zone, Barro Colorado Island, 1 male, February–March 1986, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Distribution in Neotropics. Panama.

***Dicrotendipes hulberti* Epler, 2016**

Epler, 2016: 78 [USA: Florida].

Material recorded. Panama, Colon Province, Canal Zone, Gamboa, Rio Agua Salud, 1 male, July 1967, light trap, leg W.W. Wirth (Epler 2016).

Distribution in Neotropics. Florida, Panama.

***Dicrotendipes* spp.**

Material examined. Panama, Chiriquí Province, Cuenca 104, Bugaba District, La Concepción, Rio Güigala, Vias del Ferrocarril, Punte Antigua, 1 male, 13 March 2021, UV light trap, leg Y. Aquirre & T. Ríos. Chiriquí Province, Cuenca 108, David District, San Pablo Viejo, Rio Platanal, puente vía Interamericana antes de llegar a la entrada de Bagala, 1 male, 12 April 2021, leg Y. Aquirre & T. Ríos. Chiriquí Province, Cuenca 108, Gualaca District, Quebrada Grande, 2 males, 27 February 2019, leg Y. Aquirre. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Grande, Valle Escondido, Condo unit 157-G, 6 males, 3 June 2022, leg T.I. Arefina-Armitage; as previous except 7 males, 5 April 2023.

Genus *Endotribelos* Grodhaus, 1987

A genus of 14 described species, all occurring in South America, except *E. redimiculum* Qi, Shi, Lin *et* Wang, 2013 from China. The larvae of four unknown morphotypes from Brazil are described by Trivinho-Strixino & Pepinelli (2015) and keys to male adults and larvae of all species are also provided. The larvae are associated with aquatic macrophytes, decayed leaves, wood and fruits in lotic and lentic habitats.

***Endotribelos* sp. ***

Materials examined. Panama, Chiriqui Province, Cuenca 102, Tierras Altas District, Mount Totumas Cloud Forest and Biological Reserve, Quebrada Norte, 8 males, 26–28 December 2017, Malaise trap, leg B. Armitage & J. Dietrich.

Genus *Goeldichironomus* Fittkau, 1965

A genus of 15 named species mainly distributed in the Neotropical region (tropical and subtropical Central and South America), but several species reach their northern limits in southeastern USA (Donato & Andersen 2022). The larvae of *Goeldichironomus* are mostly found in sediments, on plants or in floating mats of vegetation in lentic habitats, in fresh to brackish water, and in oligotrophic to hypereutrophic conditions (Epler *et al.* 2013).

Goeldichironomus amazonicus (Fittkau, 1968)

Fittkau, 1968: 260 (*Siolimyia*) [Brazil]; Wirth (1979: 135), Reiss & Sublette (1985: 192), Spies & Reiss (1996: 70).

Material recorded. Panama, Colon Province, Canal Zone, Gamboa, Rio Agua Salud, 1 male, July 1967, light trap, leg W.W. Wirth; as previous except Gamboa, Pipeline Road, 1 male, July 1967, light trap, leg W.W. Wirth; Panamá Oeste Province, Canal Zone, Barro Colorado Island, 1 male, 24 May 1964, light trap, leg S. & D. Duckworth (Wirth 1979).

Distribution in Neotropics. Brazil, Florida, Mexico, Nicaragua, Panama, Peru, West Indies.

Goeldichironomus carus (Townes, 1945)

Townes, 1945: 118 (*Tendipes*) [Venezuela]; Conteras-Lichtenberg (1982: 176), Reiss & Sublette (1985: 192), Spies & Reiss (1996: 70).

Material recorded. Panama, Panamá Province, Las Cumbres, 23 November 1977, leg R.W. Flowers (Conteras-Lichtenberg 1982).

Distribution in Neotropics. Colombia, Costa Rica, Florida, Panama, Venezuela.

Goeldichironomus fluctuans Reiss, 1974

Reiss, 1974: 105 [Brazil]; Spies & Reiss (1996: 70).

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 1 male, 22 February 1986, light trap, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Distribution in Neotropics. Brazil, Panama.

Goeldichironomus holoprasinus (Goeldi, 1905)

Goeldi, 1905: 135 (*Chironomus*) [Brazil]; Roback (1962: 8 as *Tendipes (Tendipes) fulvipilus* (Rempel)), Reiss & Sublette (1985: 193), Spies & Reiss (1996: 70).

Syn.: *Chironomus fulvipilus* Rempel, 1939: 210 [Brazil].

Material recorded. Panama, Panamá Province, Curundu, Albrook (Holbrook (sic.)) Air Force Base, 9 males 46 females, 25 December 1957–7 January 1958, at light, leg C. Earl Smith (Roback 1962).

Distribution in Neotropics. Brazil, Costa Rica, Florida, Panama, Venezuela, West Indies.

Genus *Lauterborniella* Thienemann *et* Bause, 1913

A genus with a single named species, *L. agrayloides* (Kieffer, 1911) distributed in the Neotropical, Nearctic, and Palearctic regions. Other species referred to as *Lauterborniella* in the literature belong either to *Zavreliella* Kieffer,

1920 or to *Kribiodorum* Kieffer, 1921, or their generic affinities are unclear (Epler *et al.* 2013). The larvae are mobile amongst submerged vegetation in small bodies of standing water (Epler *et al.* 2013). In Brazilian streams they have also been found in accumulations of litter attached to stones (Sanseverino & Nessimian 2001).

***Lauterborniella agrayloides* (Kieffer, 1911)**

Kieffer, 1911: 51 (*Tanytarsus*) [Germany]; Spies & Reiss (1996: 70).

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 1 male, 22 February 1986, light trap, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Distribution in Neotropics. Panama.

Genus *Oukuriella* Epler, 1986

A genus of >20 species restricted to the Neotropical region. The larvae can be found associated with freshwater sponges or submerged wood in streams and rivers (Fusari *et al.* 2014). Species associated with sponges were revised by Fusari *et al.* (2014).

Oukuriella* spp.

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 2 males, February–March 1986, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Genus *Parachironomus* Lenz, 1921

The genus has a worldwide distribution with at least 30 species in the Holarctic region and 20 species in the Neotropical region (Trivinho-Strixino *et al.* 2010; Epler *et al.* 2013). The adults of the Neotropical species were revised by Spies *et al.* (1994). Larvae are found in lentic and lotic water bodies under a wide range of conditions, including leaf miners in submerged macrophytes; they also live in association with Bryozoa or are ectoparasites on other invertebrates (Epler *et al.* 2013).

***Parachironomus directus* (Dendy *et* Sublette, 1959)**

Dendy *et* Sublette, 1959: 514 (*Tendipes* (*Cryptochironomus*)) [USA: Alabama]; Spies & Reiss (1996: 71).

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 2 males, February–March 1986, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Distribution in Neotropics. Panama.

***Parachironomus longistilus* Paggi, 1977**

Paggi, 1977: 200 [Argentina]; Spies & Reiss (1996: 71 as *P. supparilis* (Edwards, 1931)), see Spies *et al.* (1994: 81), Spies (2008: 174).

Material recorded. Panama, Colon Province, Gamboa, 1 male, 2 January 1984, leg W. Nentwig, det. F. Reiss [ZSM] (M. Spies, pers. comm.). Panamá Oeste Province, Canal Zone, Barro Colorado Island, 1 male, 22 February 1986, light trap, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Distribution in Neotropics. Argentina, Panama.

Notes. Spies *et al.* (1994) treated *Parachironomus supparilis* (Edwards, 1931) as a “superspecies”. However, Spies (2008) stated that the treatment of *P. supparilis* (Edwards) as a superspecies is untenable and split the species in three separately valid species: *P. supparilis* (Edwards) distributed in the southern Andean eastern slope south to Tierra del Fuego, *P. valdiviensis* Spies, 2008 from two localities in southern and central Chile and *P. longistilus* Paggi, 1977 distributed from northeast Argentina north to southeast U.S.A. One of the specimens from Panama was collected in connection with a study on the feeding ecology of the tropical spitting spider *Scytodes longipes* (Nentwig 1985).

Parachironomus sp.

Material examined. Panama, Chiriquí Province, Cuenca 108, Boquete District, Quebrada Grande, Valle Escondido, Condo unit 157-G, 4 males, 31 March 2022, leg B. Armitage; as previous except 1 male, 13 May 2022.

Genus *Paratendipes* Kieffer, 1911

A genus of nearly 40 named species that occur in the Afrotropical and Oriental regions and in the Holarctic realm (Qi *et al.* 2009). For South America there are only records of unnamed species (Roque *et al.* 2004; Trivinho-Strixino 2011). The larvae are found in lakes, ponds, small water bodies, bogs, and hot springs and in streams and rivers in soft sediments and sandy bottoms (Epler *et al.* 2013).

Paratendipes sp. *

Material examined. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 1 male, February–March 1986, leg H. Malicky [ZSM].

Genus *Polypedilum* Kieffer, 1912

Asheum Sublette *et* Sublette, 1983, as subgenus.

The largest genus of Chironomidae, with >500 described species that occur in all zoogeographical regions except Antarctica. Based on imaginal characters, eight subgenera were recognized by Sæther *et al.* (2010), namely *Tripedilum* Kieffer, 1921; *Polypedilum* s. str.; *Pentapedilum* Kieffer, 1913; *Tripodura* Townes, 1945; *Uresipedilum* Oyewo *et* Sæther, 1998; *Cerobregma* Sæther *et* Sundal, 1999; *Kribionympha* Kieffer, 1921; and *Probolum* Andersen *et* Sæther, 2010. However, the delimitation of the subgenera was questioned by Yamamoto & Yamamoto (2015) and Cranston *et al.* (2016). The position of *Asheum* is unclear but it is usually treated as a subgenus within *Polypedilum* (see Pinho & Silva 2020). The larva of *Polypedilum* occur in virtually all still and flowing waters, except in the Arctic and at high elevation. They are mostly found in sediments, mining water plants or specializing in plant-held waters (phytotelmata) (Epler *et al.* 2013).

Polypedilum (*Polypedilum*) spp.

Material examined. Panama, Chiriqui Province, Cuenca 102, Renacimiento District, Reserva Privado Landis, Quebrada sin nombre, 4 males, 30 December 2021–15 January 2022, Malaise trap, leg M. Landis. Chiriquí Province, Cuenca 102, Bugaba District, Quebrada La Vuelta, San Andrés Bugaba, Finca la Esperanza, 1 male, 8–21 April 2022, Malaise trap, leg Y. Aquirre & T. Rios. Chiriquí Province, Cuenca 108, Gualaca District, Quebrada Grande, 8 males, 27 February 2019, light trap, leg Y. Aquirre. Chiriquí Province, Cuenca 108, Boquete District, Quebrada

Jaramillo Abajo, 8 males, 28 November 2018, light trap, leg K. Castillo. Veraguas Province, Cuenca 108, Boquete District, Quebrada Honda, 3 males, 18 February 2018, leg B. Armitage; as previous except 5 males, 6 February 2019. Panamá Oeste Province, Barro Colorado Island, 8 males, 22 February 1986, leg H. Malicky [ZSM].

***Polypedilum (Tripodura) pterospilis* Townes, 1945**

Townes, 1945: 40 [USA: Texas]; Roback (1962: 6), Spies & Reiss (1996: 72).

Material recorded. Panama, Panamá Province, Albrook (Holbrook (sic.)) Air Force Base, Curundu, 1 male, 28 December 1957, leg C. Earl Smith (Roback 1962).

Distribution in Neotropics. Panama.

Polypedilum (Tripodura) spp.

Material examined. Panama, Chiriquí Province, Cuenca 102, Renacimiento District, Reserva Privado Landis, Quebrada sin nombre, 5 males, 30 December 2021–15 January 2022, Malaise trap, leg M. Landis. Chiriquí Province, Cuenca 102, Bugaba District, Quebrada La Vuelta, San Andrés Bugaba, Finca la Esperanza, 2 males, 8–21 April 2022, Malaise trap, leg Y. Aquirre & T. Rios. Chiriquí Province, Cuenca 104, Bugaba District, La Concepción, Río Güigala, Vías del Ferrocarril, Puente Antiguo, 1 male, 13 March 2021, light trap, leg Y. Aquirre & T. Rios. Chiriquí Province, Cuenca 108, David District, San Pablo Viejo, Río Platanal, puente vía Interamericana antes de llegar a la entrada de Bagala, 29 males, 12 April 2021, leg Y. Aquirre & T. Rios. Chiriquí Province, Cuenca 108, Gualaca District, Quebrada Grande, 8 males, 27 February 2019, light trap, leg Y. Aguirre. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 25 males, 28 November 2018, light trap, leg K. Castillo. Panamá Oeste Province, Barro Colorado Island, 8 males, 22 February 1986, leg H. Malicky [ZSM].

***Polypedilum (Uresipedilum) microzoster* Sublette et Sasa, 1994 ***

Sublette et Sasa, 1994: 43 [Guatemala].

Material examined. Panama, Chiriquí Province, Cuenca 108, David District, San Pablo Viejo, Río Platanal, puente vía Interamericana antes de llegar a la entrada de Bagala, 1 male, 12 April 2021, leg Y. Aquirre & T. Rios. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Grande, Valle Escondido, Condo unit 157-G, 1 male, 12 April 2021, light trap, leg B. Armitage; as previous except 17 males, March–April 2022.

Distribution in Neotropics. Guatemala, Panama.

Genus *Stenochironomus* Kieffer, 1919

A genus of >100 described species that occur in all zoogeographical regions except Antarctica. The genus was revised by Borkent (1984), describing *Petalopholeus* as a new subgenus. South American species were treated by Dantas *et al.* (2016). The larvae are obligate miners in living or dead vegetation including woody parts of plants, in both lentic and lotic situations (Epler *et al.* 2013).

***Stenochironomus (Petalopholeus) fittkaui* Borkent, 1984**

Borkent, 1984: 109 [Brazil]; Spies & Reiss (1996: 73).

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 1 male, 10 March 1986, light trap, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Distribution in Neotropics. Brazil, Panama.

***Stenochironomus (Petalopholeus) gladius* Borkent, 1984**

Borkent, 1984: 108 [Costa Rica]; Spies & Reiss (1996: 73).

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 1 male, 10 March 1986, light trap, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Distribution in Neotropics. Costa Rica, Panama.

***Stenochironomus (Petalopholeus) quadrinotatus* Borkent, 1984**

Borkent, 1984: 114 [Costa Rica]; Spies & Reiss (1996: 73).

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 1 female (paratype), 25 February 1967 (Borkent 1984). As previous except 1 male, 10 March 1986, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Distribution in Neotropics. Costa Rica, Ecuador, Panama.

***Stenochironomus* spp.**

Material examined. Panama, Chiriquí Province, Cuenca 102, Tierras Altas District, Mount Totumas Cloud Forest and Biological Reserve, Quebrada Norte, 1 male, 26–28 December 2017, Malaise trap, leg B. Armitage & J. Dietrich. Chiriquí Province, Cuenca 102, Bugaba District, Quebrada La Vuelta, San Andrés Bugaba, Finca la Esperanza, 21 males, February–April 2022, Malaise trap, leg Y. Aquirre & T. Ríos. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 3 males, 14–28 November 2018, UV light trap, leg K. Castillo; as previous except 1 male, 6. March 2019.

Genus *Xenochironomus* Kieffer, 1921

A genus with ~20 species distributed in the Neotropical, Nearctic, Palaearctic, Oriental, and Australasian regions. The genus was revised by Fusari *et al.* (2013). The larvae of almost all species are obligate miners in freshwater sponges in standing and flowing waters (Epler *et al.* 2013).

***Xenochironomus xenolabis* Kieffer in Thienemann *et* Kieffer, 1916**

Kieffer in Thienemann *et* Kieffer, 1916: 526 [Sweden]; Spies & Reiss (1996: 74).

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 1 male, 2 March 1986, light trap, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Distribution in Neotropics. Panama.

Genus *Xestochironomus* Sublette *et* Wirth, 1972

A genus of more than ten described species that occur only in the Neotropical and Nearctic regions (Pinho & Souza 2013; Bello-González *et al.* 2016). Known larvae are miners in immersed wood in running waters (Epler *et al.* 2013).

Xestochironomus comptus Sublette *et* Wirth, 1972

Sublette *et* Wirth, 1972: 10 [Jamaica]; Borkent (1984: 25), Spies & Reiss (1996: 74).

Material recorded. Panama, Colon Province, Canal Zone, Gamboa, Rio Agua Salud, 1 male, July 1967, light trap, leg W.W. Wirth (Sublette & Wirth 1972).

Distribution in Neotropics. Costa Rica, Jamaica, Panama.

Xestochironomus subletti Borkent, 1984

Borkent, 1984: 25 [USA: Texas]; Spies & Reiss (1996: 74).

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 1 male, February–March 1986, light trap, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Distribution in Neotropics. Panama.

Xestochironomus sp.

Material examined. Panama, Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 3 males, 28 November 2018, UV light trap, leg K. Castillo; as previous except 2 males, 6 February 2019.

Genus *Zavreliella* Kieffer, 1920

A genus with ~15 species; according to Fusari *et al.* (2017), 13 of these are known from tropical South America. The genus was revised by Reiss (1990). The larvae build transportable cases and move among submerged vegetation in standing water but can also be found in sediments in flowing waters (Epler *et al.* 2013).

Zavreliella longiseta Reiss, 1990

Reiss, 1990: 112 [Brazil]; Spies & Reiss (1996: 74).

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 3 males, February–March 1986, light trap, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Material examined. Panama, Chiriquí Province, Cuenca 108, Gualaca District, Quebrada Grande, 1 male, 27 February 2019, UV light trap, leg Y. Aquirre. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Grande, Valle Escondido, near tennis courts, 1 male, 27 February 2019, UV light trap, leg B. Armitage.

Distribution in Neotropics. Brazil, Costa Rica, Mexico, Panama.

Tribe Pseudochironomini Sæther, 1977

Genus *Pseudochironomus* Malloch, 1915

A genus of ~20 described species from the Neotropical, Nearctic and Western Palaearctic regions. Eleven species are described from the Neotropical region (Paggi & Rodriguez-Garay 2015; Shimabukuro *et al.* 2017; Trivinho-Strixino & Shimabukuro 2018; Andersen 2023; Andersen *et al.* 2023). Larvae favour sandy or gravelly littoral sediments, primarily in meso- or oligotrophic lakes or in large, slow flowing rivers (Epler *et al.* 2013).

Pseudochironomus spp. *

Material examined. Panama, Chiriquí Province, Cuenca 102, Tierras Altas District, Mount Totumas Cloud Forest and Biological Reserve, Quebrada Norte, 1 male, 26–28 December 2017, Malaise trap, leg B. Armitage & J. Dietrich. Chiriquí Province, Cuenca 104, Bugaba District, La Concepción, Rio Güigala, Vías del Ferrocarril, Punte Antigua, 2 males, 12 March 2021, leg Y. Aguirre & T. Ríos. Chiriquí Province, Cuenca 108, David District, San Pablo Viejo, Rio Platanal, puente vía Interamericana antes de llegar a la entrada de Bagala, 2 males, 12 April 2021, leg Y. Aguirre & T. Ríos. Chiriquí Province, Cuenca 108, Gualaca District, Quebrada Grande, 4 males, 27 February 2019, light trap, leg Y. Aguirre. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Grande, Valle Escondido, Condo unit 157-G, 2 males, 31 March 2022, light trap, leg T.I. Arefina-Armitage; as previous except 2 males, 7 April 2022. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 2 males, 6 March 2019, light trap, leg K. Castillo.

Genus *Riethia* Kieffer, 1917

A transantarctic genus of more than 20 named species that occurs in South and Central America (Trivinho-Strixino & Shimabukuro 2018; Andersen & Sanz-laParra 2023; Andersen *et al.* 2024), and the Austro-Pacific region (Cranston 2019a). In South America larva of *R. truncatocaudata* (Edwards, 1931) occurs in habitats characterised by high amounts of fine organic particles in both lotic and lentic systems (Trivinho-Strixino *et al.* 2009).

Riethia spp. *

Material examined. Panama, Chiriquí Province, Cuenca 108, Gualaca District, Quebrada Grande, 3 males, 27 February 2019, light trap, leg Y. Aguirre. Panamá Oeste Province, Canal Zone, Barro Colorado Island, 15 males, 22 February 1986, leg H. Malicky [ZSM].

Tribe Tanytarsini Zavřel, 1917

Genus *Cladotanytarsus* Kieffer, 1921

A genus divided into two subgenera, *Cladotanytarsus s. str.* Kieffer, 1921 and *Lenziella* Kieffer, 1922, with 73 and 7 described valid species respectively (Giřka 2011; Puchalski *et al.* 2018; Giřka & Puchalski 2018). Except for Antarctica, the genus is distributed in all zoogeographical regions including Oceania (Giřka & Dobosz 2015). No named species are recorded from South America, but larval morphotypes have been reported from Brazil (Roque *et al.* 2004). Larvae construct sessile cases of fine detritus and have been found in streams and larger rivers, lakes, and ponds, as well as in brackish water and hot springs (Epler *et al.* 2013).

Cladotanytarsus (Cladotanytarsus) sp. *

Material examined. Panama, Chiriquí Province, Cuenca 108, David District, San Pablo Viejo, Rio Platanal, puente vía Interamericana antes de llegar a la entrada de Bagala, 1 male, 12 April 2021, UV light trap, leg Y. Aguirre & T. Ríos.

Genus *Nandeva* Wiedenbrug, Reiss *et* Fittkau, 1998

A genus with seven described extant species that occur in the Neotropical and Australasian regions; the geographical distribution of all *Nandeva* has been recently analysed by Andersen *et al.* (2011) and Giřka *et al.* (2016). The only described larvae were found in semi-immersed leaf litter packs in a tropical stream in Australia (Cranston 2019b).

***Nandeva tropica* Wiedenbrug, Reiss *et* Fittkau, 1998**

Wiedenbrug, Reiss *et* Fittkau, 1998: 64 [Brazil]; Sæther & Roque (2004: 68); Andersen *et al.* (2011: 55, fig. 25).

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 1 male, 6 February–25 March 1986, leg H. Malicky [ZSM] (Sæther & Roque 2004).

Distribution in Neotropics. Brazil, Panama, Venezuela.

Note. The species was originally described based on pupa exuviae only. Sæther & Roque (2004: 68) described the male, and Andersen *et al.* (2011: 55, fig. 25) illustrated the male superior volsella. However, there are no direct association between the pupal exuviae and the male. According to Sæther & Roque (2004) the males they described are all from the same localities and collected at the same dates as the pupal exuviae types and they assumed that they belong to *N. tropica*. Further, the specimen from Panama has a less distinct banding pattern on the posterior tergites, is lacking the antenna and could conceivably belong to a separate species.

Genus *Rheotanytarsus* Thienemann *et* Bause, 1913

A genus with ~100 species distributed in all zoogeographical regions except Antarctica. The Central American and Mexican species were reviewed by Kyerematen & Andersen (2002); the *Rheotanytarsus pellucidus* group was revised by Kyerematen *et al.* (2000). The larvae are rheobiotic, occurring in streams, large rivers, and the littoral of lakes where wave action simulates the action of flowing water (Epler *et al.* 2013).

***Rheotanytarsus baculus* Kyerematen *et* Andersen, 2002 ***

Kyerematen *et* Andersen, 2002: 27 [Costa Rica].

Material examined. Panama, Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 1 male, 28 November 2018, UV light trap, leg K. Castillo; as previous except 1 male, 6 February 2019. Ngäbe Buglé Comarca, Cuenca 93, Bosque Protector Palo Seco, Alto del Valle, Quebrada Martínez, detrás de la Caseta de MiAmbiente, 1 male, 13–29 September 2019, Malaise trap, leg Y. Aguirre & T. Ríos; as previous except 2 males, 29 September–11 October 2019.

Distribution in Neotropics. Costa Rica, Panama.

Note. Prior to the present paper, this species was known from a single site in Costa Rica, where males were collected in a Malaise trap situated close to a small, fast flowing stream with substrate of stones and gravel (Kyerematen & Andersen 2002).

***Rheotanytarsus foliatus* Kyerematen *et* Andersen, 2002 ***

Kyerematen *et* Andersen, 2002: 35 [Costa Rica].

Material examined. Panama, Chiriquí Province, Cuenca 102, Bugaba District, Quebrada La Vuelta, San Andrés Bugaba, Finca la Esperanza, 1 male, 8–22 April 2022, Malaise trap, leg Y. Aguirre & T. Ríos. Chiriquí Province, Cuenca 104, Bugaba District, La Concepción, Rio Güigala, Vías del Ferrocarril, Puente Antiguo, 1 male, 12 March 2021, UV light trap, leg Y. Aguirre & T. Ríos. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 1 male, 14 September 2018, UV light trap, leg K. Castillo; as previous except 2 males, 28 November 2018; as previous except 3 males, 15 January 2019; as previous except 3 males, 6 February 2019; as previous except 1 male, 27 November 2019.

Distribution in Neotropics. Costa Rica, Mexico, Panama.

Note. Adult males are photophilous, sampled mostly using light traps, at rivers.

***Rheotanytarsus kusii* Kyerematen et Andersen, 2002 ***

Kyerematen et Andersen, 2002: 37 [Mexico].

Material examined. Panama, Chiriquí Province, Cuenca 104, Bugaba District, La Concepción, Río Güigala, Vías del Ferrocarril, Puente Antiguo, 2 males, 12 March 2021, UV light trap, leg Y. Aguirre & T. Ríos. Chiriquí Province, Cuenca 108, David District, San Pablo Viejo, Río Platanal, puente vía Interamericana antes de llegar a la entrada de Bagala, 1 male, 12 February 2021, UV light trap, leg Y. Aguirre & T. Ríos; as previous except 19 males, 12 April 2021. Chiriquí Province, Cuenca 108, Gualaca District, Río Majagua, Potrerillos, Banquito de Palmira, 1 male, 20 June–4 July 2019, Malaise trap, leg Y. Aguirre & T. Ríos. Chiriquí Province, Cuenca 108, Boquete District, Quebrada sin nombre, 5 km NE Volcán Barú cráter, 3 males, 8 May 2017, UV light trap, leg E. Álvarez, E. Pérez & T. Ríos.

Distribution in Neotropics. Mexico, Panama.

Note. So far known from a single male recorded from a fast-flowing lowland river with stony and sandy substratum in Mexico (Kyerematen & Andersen 2002). Adult males are photophilous - both Mexican and Panamanian specimens were mostly sampled using light traps, at rivers and streams. Probably one of the most common *Rheotanytarsus* species in Panama.

***Rheotanytarsus scutulatus* Kyerematen et Andersen, 2002 ***

Kyerematen et Andersen, 2002: 39 [Costa Rica].

Material examined. Panama, Chiriquí Province, Cuenca 102, Tierras Altas District, Mount Totumas Cloud Forest and Biological Reserve, Quebrada Norte, 3 males, 26–28 December 2017, Malaise trap, leg B. Armitage & J. Dietrich. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Grande, Valle Escondido, Condo unit 157-G, 1 male, 18 March 2022, UV light trap, leg B. Armitage. Chiriquí Province, Cuenca 108, Boquete District, Quebrada sin nombre, 5 km NE Volcán Barú crater, 16 males, 8 May 2017, leg E. Álvarez, E. Pérez & T. Ríos.

Distribution in Neotropics. Costa Rica, Panama.

Note. Originally known from a single site close to a small, fast flowing stream with substrate of stones and gravel in Costa Rica (Kyerematen & Andersen 2002). Adult males are photophilous.

***Rheotanytarsus* spp.**

Material examined. Panama, Chiriquí Province, Cuenca 102, Bugaba District, afluyente sin nombre de Río Cueta, San Andrés Bugaba, Finca la Esperanza, 1 male, 18–21 April 2022, Malaise trap, leg Y. Aguirre & T. Ríos. Chiriquí Province, Cuenca 104, Bugaba District, La Concepción, Río Güigala, Vías del Ferrocarril, Puente Antiguo, 4 males, 12 March 2021, UV light trap, leg Y. Aguirre & T. Ríos. Chiriquí Province, Cuenca 106, Boquerón District, Río Chirigagua, puente antes de llegar al Hotel Los Delfines, 2 males, 12 April 2021, UV light trap, leg Y. Aguirre & T. Ríos. Chiriquí Province, Cuenca 108, Boquete District, Quebrada sin nombre, 5 km NE Volcán Barú cráter, 14 males, 8 May 2017, UV light trap, leg E. Álvarez, E. Pérez & T. Ríos. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Grande, Valle Escondido, Condo unit 157-G, 1 male, 7 April 2022, UV light trap, leg T.I. Arefina-Armitage. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 2 males, 28 November 2018, UV light trap, leg K. Castillo; as previous except 1 male, 6 February 2019.

Genus *Skutzia* Reiss, 1985

A genus of six species that occur in the Neotropical, Nearctic, and Oriental regions. The genus was revised by Pinho *et al.* (2009). The larvae are unknown. However, they can be expected to construct transportable cases of sand grains and small wood- or plant remains, as seen in the larvae of other species in the subtribe Zavreliina Sæther, 1977.

***Skutzia quetzali* Pinho, Mendes *et* Andersen, 2009**

Pinho, Mendes *et* Andersen, 2009: 204 [Mexico].

Material examined. Panama, Colon Province, Gamboa, 1 male, 9 August 1983, leg W. Nentwig; as previous except 1 male, 27 December 1983 (Pinho *et al.* 2009).

Distribution in Neotropics. Mexico, Panama.

Note. The specimens from Panama were collected in connection with a study on the feeding ecology of the tropical spitting spider *Scytodes longipes* (Nentwig 1985).

Genus *Stempellina* Thienemann *et* Bause, 1913

A genus of at least 20 species that occur in all zoogeographical regions except Antarctica. The larvae construct long, curved, tapered, transportable cases of fine sand and silt. They are eurytopic, occurring in springs, streams, larger rivers, lakes, brackish water, moorland pools, and in thermal springs (Epler *et al.* 2013).

***Stempellina* spp. ***

Material examined. Panama, Chiriquí Province, Cuenca 104, Bugaba District, La Concepción, Rio Güigala, Vias del Ferrocarril, Punte Antigua, 1 male, 12 March 2021, UV light trap, leg Y. Aguirre & T. Ríos. Chiriquí Province, Cuenca 108, Gualaca District, Quebrada Grande, N of confluence with Rio Cochea, 1 male, 27 February 2019, UV light trap, leg Y. Aguirre.

Genus *Tanytarsus* Wulp, 1874

Syn.: *Nimbocera* Reiss, 1972 (see Sanseverino *et al.* 2010).

Syn.: *Caladomyia* Säwedel, 1981 (see Lin *et al.* 2018).

A species-rich genus with approximately 400 described extant species that occur in all zoogeographical regions except Antarctica, including 100 species known from the Neotropics (Dantas *et al.* 2022, 2023; Dantas & Gilka 2024). A molecular phylogeny of the genus was presented by Lin *et al.* (2018), placing *Caladomyia* as a junior synonym of *Tanytarsus*. The larvae are found in all types of freshwaters, with some marine, and at least one terrestrial species. The freshwater species usually construct long, soft tubes that are fixed to the bottom substrate (Epler *et al.* 2013).

***Tanytarsus capitatus* Sublette *et* Sasa, 1994 ***

Sublette *et* Sasa, 1994: 54 [Guatemala].

Material examined. Panama, Chiriqui Province, Cuenca 102, Tierras Altas District, Mount Totumas Cloud Forest and Biological Reserve, Quebrada Norte, 1 male, 26–28 December 2017, Malaise trap, leg B. Armitage & J. Dietrich.

Distribution in Neotropics. Costa Rica, Guatemala, Panama.

***Tanytarsus cotopaxi* Gilka *et* Zakrzewska, 2013 ***

Gilka *et* Zakrzewska, 2013: 456 [Ecuador].

Material examined. Panama, Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 1 male, 14 September 2018, UV light trap, leg K. Castillo; as previous except 3 males, 28 November 2018; as previous except 2 males, 15 January 2019; as previous except 5 males, 6 February 2019.

Distribution in Neotropics. Ecuador, Panama.

Note. Adult males are photophilous.

Tanytarsus deimos Gilka, Dantas *et* Andersen, 2024

Gilka, Dantas *et* Andersen, 2024: 590 [Mexico].

Material examined. Panama, Chiriquí Province, Cuenca 106, Boquerón District, Río Chirigagua, puente antes de llegar al Hotel Los Delfines, 1 male (paratype), 12 April 2021, UV light trap, leg Y. Aguirre & T. Ríos. Ngäbe Buglé Comarca, Cuenca 93, Bosque Protector Palo Seco, Alto del Valle, Quebrada Martínez, detrás de la Caseta de MiAmbiente, 1 male (paratype), 9 April 2019, UV light trap, leg Y. Aguirre & T. Ríos.

Distribution in Neotropics. Mexico, Panama.

Note. Adult males were found at streams and rivers, photophilous.

Tanytarsus fastigatus Reiss, 1972 *

Reiss, 1972: 75 [Chile].

Material examined. Panama, Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 2 males, 28 November 2018, UV light trap, leg K. Castillo; as previous except 1 male, 6 March 2019.

Distribution in Neotropics. Argentina, Brazil, Chile, Panama.

Tanytarsus hastatus Sublette *et* Sasa, 1994

Sublette *et* Sasa, 1994: 56 [Guatemala]; Sanseverino (2006: 80).

Material recorded. Panama, Panamá Oeste Province, Barro Colorado Island, 2 males, February–March 1986, leg H. Malicky [ZSM] (Sanseverino 2006).

Distribution in Neotropics. Brazil, Colombia, Ecuador, Guatemala, Mexico, Panama, Peru, Venezuela. The species is known also from the USA (California).

Tanytarsus jatai Trivinho-Strixino, Wiedenbrug *et* Silva, 2015 *

Trivinho-Strixino, Wiedenbrug *et* Silva, 2015: 95 [Brazil].

Material examined. Panama, Chiriquí Province, Cuenca 108, David District, San Pablo Viejo, Río Platanal, puente vía Interamericana antes de llegar a la entrada de Bagala, 1 male, 12 April 2021, UV light trap, leg Y. Aguirre & T. Ríos.

Distribution in Neotropics. Brazil, Panama.

Tanytarsus kiche Vinogradova, Reiss *et* Spies, 2009

Vinogradova, Reiss *et* Spies, 2009: 14 [Mexico].

Material recorded. Panama, Panamá Oeste Province, Barro Colorado Island, 1 male, March 1986, leg H. Malicky [ZSM] (Vinogradova *et al.* 2009).

Material examined. Panama, Chiriquí Province, Cuenca 108, Gualaca District, Quebrada Grande, 2 males, 27 February 2019, UV light trap, leg Y. Aguirre.

Distribution in Neotropics. Belize, Costa Rica, Guatemala, Mexico, Nicaragua, Panama.

Tanytarsus ligulatus Reiss, 1972 *

Reiss, 1972: 81 [Brazil].

Material examined. Panama, Chiriquí Province, Cuenca 104, Bugaba District, La Concepción, Rio Güigala, Vias del Ferrocarril, Punte Antigua, 1 male, 12 March 2021, UV light trap, leg Y. Aguirre & T. Ríos.

Distribution in Neotropics. Brazil, Panama.

Tanytarsus marianae Reis, Lin *et* Ferreira-Keppler, 2022 *

Reis, Lin *et* Ferreira-Keppler, 2022: 429 [Brazil].

Material examined. Panama, Chiriquí Province, Cuenca 102, Bugaba District, afluyente sin nombre de Rio Cueta, San Andrés Bugaba, Finca la Esperanza, 1 male, 8–21 April 2022, Malaise trap, leg Y. Aguirre & T. Ríos.

Distribution in Neotropics. Brazil, Panama.

Tanytarsus paraligulatus Reiss, 1972 *

Reiss, 1972: 82 [Chile].

Material examined. Panama, Chiriquí Province, Cuenca 108, David District, San Pablo Viejo, Rio Platanal, puente vía Interamericana antes de llegar a la entrada de Bagala, 2 males, 12 April 2021, UV light trap, leg Y. Aguirre & T. Ríos.

Distribution in Neotropics. Southern and central Chile, Panama.

Tanytarsus spp.

Material examined. Panama, Chiriquí Province, Cuenca 102, Bugaba District, Quebrada La Vuelta, San Andrés Bugaba, Finca la Esperanza, 1 male, 7–21 February 2022, Malaise trap, leg Y. Aguirre & T. Ríos; as previous except 2 males, 8–22 April 2022. Chiriquí Province, Cuenca 108, Gualaca District, Quebrada Grande, N of confluence with Rio Cochea, 2 males, 27 February 2019, UV light trap, leg Y. Aguirre. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 2 males, 6 February 2019, UV light trap, leg K. Castillo; as previous except 1 male, 6 March 2019.

Subfamily Orthocladiinae Kieffer, 1911

Genus *Antillocladius* Sæther, 1981

A genus of 30 named species that occur mostly in the Neotropical region, but are also found in the Nearctic, Palaearctic, and Oriental regions (Ashe & O'Connor 2012; Andersen & Hagenlund 2017). The genus was reviewed by Mendes *et al.* (2004, 2011) and Mendes & Andersen (2008). Known larvae from South America appear to be terrestrial or semi-terrestrial as they have been collected in moss and lichens on stones and tree trunks; a North American species has been found in seeps near streams and impoundments (Mendes *et al.* 2004; Andersen *et al.* 2013).

***Antillocladius arcuatus* Saether, 1982 ***

Sæther, 1982: 474 [USA: South Carolina].

Material examined. Panama, Veraguas Province, Cuenca 108, Boquete District, Quebrada Honda, 8 males, 18 February 2018, UV light trap, leg B. Armitage.

Distribution in Neotropics. Brazil, Costa Rica, Panama, Venezuela.

Genus *Bryophaenocladus* Thienemann, 1934

A species-rich genus with ~123 named species that occur in all zoogeographical regions, except Antarctica and Oceania. Neotropical and Mexican species were reviewed by Wang *et al.* (2006). The larvae of most species are terrestrial or semi-terrestrial, but a few are aquatic (Andersen *et al.* 2013).

***Bryophaenocladus carus* (Roback, 1962)**

Roback, 1962: 5 (*Cantomyia*) [Panama; holotype in Academy of Natural Sciences of Philadelphia, Type no.: 6834]; Spies & Reiss (1996: 75), Ashe & O'Connor (2012: 141).

Material recorded. Panama, Panamá Province, Canal Zone, Curundu, Albroom (Holbrook (sic.)) Air Force Base, 1 male (holotype), 25 December 1957, at light, leg C. Earl Smith; as previous except 1 female (allotype); as previous except 4 males, 1 female (paratypes), 25–28 December 1957 (Roback 1962).

Distribution in Neotropics. Brazil, Panama, ?St. Vincent.

Genus *Cardiocladius* Kieffer, 1912

A genus of 20 named species that occur in all zoogeographical regions except Antarctica and Oceania. The Neotropical species were reviewed by Andersen *et al.* (2016). The larvae live in fast-flowing waters and are often associated with the immature stages of blackflies (Simuliidae), on which they are reported to be predaceous (Andersen *et al.* 2013).

***Cardiocladius moreloensis* Andersen, Hagenlund *et* Pinho, 2016 ***

Andersen, Hagenlund *et* Pinho, 2016: 277 [Mexico].

Material examined. Panama, Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 14 males, 14 November 2018, UV light trap, leg K. Castillo.

Distribution in Neotropics. Mexico, Panama.

Genus *Cricotopus* Wulp, 1874

Syn.: *Paratrichocladius* Santos Abreu, 1918 (see Cranston & Krosch 2015).

A genus of ~270 named species that occur in all zoogeographical regions except Antarctica. Seven subgenera are recognized, namely *Cricotopus* s. str.; *Isocladius* Kieffer, 1909; *Maurius* Lehmann, 1981; *Nostocladus* Ashe *et* Murray, 1980; *Oliveiriella* Wiedenbrug *et* Fittkau, 1997; *Paratrichocladius* Santos Abreu, 1918; and *Pseudocricotopus* Nishida, 1987 (see Ashe & O'Connor 2012; Andersen *et al.* 2013; Cranston & Krosch 2015). The larvae inhabit all types of freshwaters including saline coastal waters. They are frequently associated with aquatic plants, including algae, and some mine living parts of aquatic macrophytes (Andersen *et al.* 2013).

***Cricotopus oris* Roback, 1962**

Roback, 1962: 4 [Panama; holotype in Academy of Natural Sciences of Philadelphia, Type no.: 6833]; Spies & Reiss (1996: 76), Ashe & O'Connor (2012: 257).

Material recorded. Panama, Panamá Province, Canal Zone, Curundu, Albrook (Holbrook (sic.)) Air Force Base, 1 male (holotype), 25 December 1957, at light, leg C. Earl Smith (Roback 1962).

Distribution in Neotropics. Panama.

Note. Ashe & O'Connor (2012) consider the species as a subgenerically unplaced valid species of *Cricotopus*.

***Cricotopus tanis* Roback, 1962**

Roback, 1962: 2 [Panama; holotype in Academy of Natural Sciences of Philadelphia, Type no.: 6832]; Spies & Reiss (1996: 76), Ashe & O'Connor (2012: 228).

Material recorded. Panama, Panamá Province, Canal Zone, Curundu, Albrook (Holbrook (sic.)) Air Force Base, 1 female (holotype), 29 December 1957, at light, leg C. Earl Smith; as previous except 1 male (allotype); as previous except 9 males, 42 females (paratypes), 25 December 1957–4 January 1958 (Roback 1962).

Distribution in Neotropics. Panama.

***Cricotopus* spp.**

Material examined. Panama, Chiriquí Province, Cuenca 102, Tierras Altas District, Mount Totumas Cloud Forest and Biological Reserve, Quebrada Norte, 3 males, 26–28 December 2017, Malaise trap, leg B. Armitage & J. Dietrich. Chiriquí Province, Cuenca 108, Gualaca District, Quebrada Grande, 5 males, 27 February 2019, light trap, leg Y. Aguirre. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 28 males, 28 November 2018, light trap, leg K. Castillo; as previous except 6 males, 6 February 2019.

***Limnophyes* Eaton, 1875**

A genus of >90 named species that occur in all zoogeographical regions except Oceania. Sæther (1990a, b) revised the Holarctic, Afrotropical, and Neotropical species of the genus. The larvae are eurytopic, including aquatic, semiterrestrial, and terrestrial habitats (Andersen *et al.* 2013).

***Limnophyes* spp. ***

Material examined. Panama, Chiriquí Province, Cuenca 102, Tierras Altas District, Mount Totumas Cloud Forest and Biological Reserve, Quebrada Norte, 3 males, 26–28 December 2017, Malaise trap, leg B. Armitage & J. Dietrich. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 3 males, 28 November 2018, light trap, leg K. Castillo. Veraguas Province, Cuenca 108, Boquete District, Quebrada Honda, 6 males, 18 February 2018, leg B. Armitage.

Genus *Mesosmittia* Brundin, 1956

A genus of 18 named species that occur in the Neotropical, Nearctic, Palaearctic, Afrotropical, and Oriental regions. The Neotropical and Mexican species were reviewed by Andersen & Mendes (2002b). The immatures are likely terrestrial (Andersen *et al.* 2013).

***Mesosmittia truncata* Sæther, 1985**

Sæther, 1985: 51 [Panama; holotype in British Museum of Natural History, Type no.: BM 1979-125]; Spies & Reiss (1996: 77), Ashe & O'Connor (2012: 371).

Material recorded. Panama, Colon, Canal Zone, 1 male (holotype), 2–14 July 1979, canopy fogging, leg E. Broadhead *et al.* (Sæther 1985).

Distribution in Neotropics. Panama.

Note. Based on material collected in Zuruquí, Costa Rica, Epler (2017) could not separate *Mesosmittia truncata* from *M. patrihortae* Sæther, 1986 and considered *M. truncata* to be a junior synonym of *M. patrihortae*.

Genus *Metriocnemus* Wulp, 1874

A genus of ~75 named species that occur in all zoogeographical regions except Antarctica and Oceania. Three subgenera are recognized, namely *Metriocnemus* s. str.; *Crymaleomyia* Ashe *et* O'Connor, 2000; and *Inermipupa* Langton *et* Cobo, 1997 (see Ashe & O'Connor 2012). A review of the genus was given by Sæther (1995). The larvae occur in mosses, phytotelmata, springs, ditches, streams, and lakes and a few species are hygropetric (Andersen *et al.* 2013).

***Metriocnemus* sp. ***

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 1 male, February–March 1986, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Genus *Parametriocnemus* Goetghebuer, 1932

A genus of 35 named species that occur in all zoogeographical regions except Antarctica and the Neotropical region. The genus is recorded from South America based on unnamed larvae from Brazil, Colombia, Peru, and Venezuela (Roback & Coffman 1983; Ospina-Torres *et al.* 1999; Trivinho-Strixino 2011). Larvae of *Parametriocnemus* are found in springs and relatively fast flowing cold streams and rivers (Andersen *et al.* 2013).

***Parametriocnemus lundbeckii* (Johannsen, 1905) ***

Johannsen, 1905: 302 (*Metriocnemus*) [Greenland].

Material examined. Panama, Chiriquí Province, Cuenca 102, Tierras Altas District, Mount Totumas Cloud Forest and Biological Reserve, Quebrada Norte, 7 males, 26–28 December 2017, Malaise trap, leg B. Armitage & J. Dietrich. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 3 males, 14 November 2018, UV light trap, leg K. Castillo.

Distribution in Neotropics. Guatemala, Panama, St. Vincent.

Genus *Paraphaenocladus* Thienemann, 1924

One named species, *P. exagitans* Johannsen, 1905, has been recorded from Costa Rica and Guatemala (Sublette & Sasa 1994; Sæther & Wang 1995). The latter authors suggest that all South American records of the genus likely belong to the subspecies *P. e. longipes* Sæther & Wang, 1995. Larval habitats vary from terrestrial to lentic and lotic aquatic habitats (Andersen *et al.* 2013).

***Paraphaenocladus exagitans longipes* Sæther et Wang, 1995 ***

Sæther et Wang, 1995: 52 [Costa Rica].

Material examined. Panama, Chiriquí Province, Cuenca 102, Tierras Altas District, Mount Totumas Cloud Forest and Biological Reserve, Quebrada Norte, 4 males, 26–28 December 2017, Malaise trap, leg B. Armitage & J. Dietrich. Veraguas Province, Cuenca 108, Boquete District, Quebrada Honda, 1 male, 18 February 2018, leg B. Armitage.

Distribution in Neotropics. Brazil, Costa Rica, Guatemala, Panama, St. Vincent, Trinidad.

Genus *Pseudosmittia* Edwards, 1932

A genus of >100 described species that occur in all zoogeographical regions, except Antarctica. Andersen *et al.* (2010) reviewed the Neotropical species, and a revision of the genus was given by Ferrington & Sæther (2011). Most larvae appear to be semiterrestrial to semiaquatic (Andersen *et al.* 2013).

***Pseudosmittia forcipata* (Goetghebuer, 1921) ***

Goetghebuer, 1921: 87 (*Camptocladus*) [Belgium].

Material examined. Panama, Chiriquí Province, Cuenca 102, Tierras Altas District, Mount Totumas Cloud Forest and Biological Reserve, Quebrada Norte, 1 male, 26–28 December 2017, Malaise trap, leg B. Armitage & J. Dietrich. Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 1 male, 14 November 2018, UV light trap, leg K. Castillo.

Distribution in Neotropics. Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Mexico, Panama, Peru, St. Vincent, Venezuela.

Genus *Stictocladus* Edwards, 1931

A genus of 18 named species that occur in the Nearctic, Neotropical, and Australasian zoogeographical regions. Eleven species are recorded from South America (Sæther & Cranston 2012). The larvae are hyporheic in sand (Andersen *et al.* 2013).

***Stictocladus acutus* Sæther et Cranston, 2012 ***

Sæther et Cranston, 2012: 128 [Peru].

Material examined. Panama, Chiriquí Province, Cuenca 108, Boquete District, Quebrada Jaramillo Abajo, 2 males, 28 November 2018, UV light trap, leg K. Castillo.

Distribution in Neotropics. Bolivia, Ecuador, Panama, Peru.

Genus *Thienemanniella* Kieffer, 1911

A genus of ~55 named species that occur in all zoogeographical regions except Antarctica. The Neotropical species were reviewed by Wiedenbrug *et al.* (2013). The larvae occur in most lotic habitats, from fast-flowing streams to slow-flowing ditches and rivers (Andersen *et al.* 2013).

***Thienemanniella spreta* (Roback, 1962)**

Roback, 1962: 2 (*Corynoneura* (*Thienemanniella*)) [Panama; holotype in Academy of Natural Sciences of Philadelphia, Type no.: 6831]; Spies & Reiss (1996: 78), Ashe & O'Connor (2012: 624).
Syn.: *Thienemanniella sanctivincenta* Sæther, 1981: 37 [St. Vincent].

Material recorded. Panama, Panamá Province, Canal Zone, Curundu, Albrook (Holbrook (sic.)) Air Force Base, 1 male (holotype), 29 December 1957, at light, leg C. Earl Smith (Roback 1962).

Distribution in Neotropics. Guatemala, Panama, St. Vincent.

Subfamily Podonominae Thienemann *et* Edwards, 1937

Genus *Parochlus* Enderlein, 1912

A genus of 48 named species that occurs in all zoogeographical regions except the Afrotropical and Oriental regions and Oceania. South America is the most diverse region with 27 named species, while two species, *P. crozetensis* Serra-Tosio, 1986 and *P. steinenii* (Gercke, 1889) are known from Antarctica (Ashe & O'Connor 2009). The larvae are found mostly in torrents and mountain streams, but also in lakes (Brundin 1966; Sæther & Andersen 2013).

***Parochlus kiefferi* (Garrett, 1925) ***

Garrett, 1925: 8 (*Paratanypus*) [Canada].

Material examined. Panama, Chiriqui Province, Cuenca 102, Tierras Altas District, Mount Totumas Cloud Forest and Biological Reserve, Quebrada Norte, 1 male, 26–28 December 2017, Malaise trap, leg B. Armitage & J. Dietrich.

Distribution in Neotropics. Costa Rica, Mexico, Panama.

Note. The species belongs to the *Parochlus araucanus* group, a group of species that cannot be identified with certainty based on male adults alone. The group is distributed in continental South America and apparently only *Parochlus kiefferi* has spread to the Holarctic region through the mountains in Central America (see Bello-González *et al.* 2024b). Awaiting more material from Panama, including immatures, we list the species as *P. kiefferi* (Garret).

Subfamily Tanypodinae Skuse, 1889

Tribe Clinotanypodini Lipina, 1928

Genus *Coelotanypus* Kieffer, 1913

A genus of ~20 described species that occur in the Neotropical, Nearctic, Afrotropical, and Australasian regions. A key to the males of the Neotropical species was given by Paggi & Zilli (2018). The larvae inhabit benthic sediments of lakes, including artificial impoundments, slow flowing reaches of rivers, and old riverbeds (Cranston & Epler 2013). The genus can be very abundant in Amazonian flood-plain lakes and in wetlands in southern Brazil (Fonseca Leal *et al.* 2004; Panatta *et al.* 2007).

***Coelotanypus humeralis* (Loew, 1866)**

Loew, 1866: 3 (*Tanypus*) [Cuba]; (Roback 1964: 3), Spies & Reiss (1996: 81), Ashe & O'Connor (2009: 141).

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 2 males 1 female, April 1940; as previous except 1 male 1 female, 31 August 1940; as previous except 1 male, September–October 1940; as previous except 1 female, July 1941 (Roback 1964).

Distribution in Neotropics. Cuba, Panama.

Coelotanypus naelis Roback, 1963

Roback, 1963b: 170 [Surinam]; Roback (1965: 40), Spies & Reiss (1996: 81), Ashe & O'Connor (2009: 142).

Material Recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 6 females, July 1941 (Roback 1965).

Distribution in Neotropics. Mexico, Panama, Surinam.

Coelotanypus scapularis (Loew, 1866)

Loew, 1866: 2 (*Tanypus*) [USA: District of Columbia]; Roback (1965: 40), Spies & Reiss (1996: 81), Ashe & O'Connor (2009: 142).

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 1 female, 16 January 1935; Panamá Province, Curundu, Albroom (Holbrook (sic.)) Air Force Base, 1 male, 3 August 1957, leg C. Earl Smith (Roback 1965).

Distribution in Neotropics. ?Argentina, ?Bolivia, Mexico, Nicaragua, Panama, ?Venezuela.

Note. Roback (1962: 1) recorded *Coelotanypus neotropicus* (Kieffer, 1917) from Panama. However, Roback (1965: 40) calls his own earlier record of *C. neotropicus* a misidentification of *C. scapularis* (Loew); see also note 49 in Spies & Reiss (1996: 93).

Genus *Naelotanypus* Roback, 1982

The only included species, *N. viridis* Roback, 1982, is known from Colombia (Roback 1982) and Surinam. Other life stages have not been associated directly, but tentatively assigned females from Surinam and Panama are in the collection at Zoologische Staatssammlung München (ZSM).

Naelotanypus sp. *

Material recorded. Panama, Colon Province, Canal Zone, Gamboa, male, 26 January 1984, leg W. Nentwig, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Note. The genus is monotypic and F. Reiss has written “? *viridis*” in his notes. The specimen was collected in connection with a study on the feeding ecology of the tropical spitting spider *Scytodes longipes* (Nentwig 1985).

Tribe Pentaneurini Hennig, 1950

Genus *Ablabesmyia* Johannsen, 1905

A genus of nearly 100 described species that occur in all zoogeographical regions, except Antarctica; it is currently the most speciose genus in Tanypodinae. Four subgenera, *Ablabesmyia* s. str., *Asaya* Roback, 1985, *Karelia* Roback, 1971, and *Sartaia* Roback, 1983 are recognized (see Ashe & O'Connor 2009). Most Neotropical species probably belong in *Ablabesmyia* s. str., but as pointed out by several authors, many South American species cannot be assigned to subgenus with certainty (see Neubern *et al.* 2013). Many of the recently described species are thus not assigned

to subgenus. The Neotropical species were reviewed by Neubern *et al.* (2013). The larvae occur in a wide variety of habitats, including small and large standing and flowing waters from cold temperate to warm tropical climate zones (Cranston & Epler 2013).

Ablabesmyia sp. *

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, male, February–March 1986, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Genus *Denopelopia* Roback *et Rutter*, 1988

A genus of six species that occur in the Neotropical and Oriental regions. Currently, three species are known from Southern and Central America and Florida (Roback & Rutter 1985; Silva *et al.* 2014; Dantas *et al.* 2016). Unnamed material at ZSM includes an adult male from Panama (Spies & Reiss 1996). The larvae have been found in ditches and ponds with dense macrophyte stands and can tolerate low dissolved oxygen and high iron concentrations (Cranston & Epler 2013).

Denopelopia sp. *

Material Recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, male, February–March 1986, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Genus *Labrundinia* Fittkau, 1962

A genus of ~40 named species distributed in the Neotropical, Nearctic, Palaearctic, and Oriental regions. The genus was revised by Silva *et al.* (2014). The larvae live in small, standing water bodies as well as in streams and rivers (Cranston & Epler 2013).

***Labrundinia panamensis* Silva *in* Silva *et al.*, 2014**

Silva *in* Silva *et al.*, 2014: 99 [Panama; holotype in Zoologische Staatssammlung München].

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 1 male, 10 March 1986, leg H. Malicky (Silva *et al.* 2014).

Distribution in Neotropics. Panama.

Labrundinia spp.

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, 4 males, February–March 1986, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Genus *Larsia* Fittkau, 1962

A genus of ~30 named species that occur in all zoogeographical regions except Antarctica. Neubern & Silva (2011) described two new species from the Neotropical region and presented a checklist of the *Larsia* species of the world.

In the Southern Hemisphere the larvae are associated with both lotic and lentic warm waters (Cranston & Epler 2013).

Larsia sp. *

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, male, February–March 1986, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Genus *Nilotanypus* Kieffer, 1923

A genus of 12 named species distributed in all zoogeographical regions except Antarctica and Oceania. Three species are described from Brazil (Andersen & Pinho 2019; Shimabukuro *et al.* 2021). The larvae inhabit flowing waters, especially areas with sandy beds (Cranston & Epler 2013).

Nilotanypus sp. *

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, male, February–March 1986, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Genus *Thienemannimyia* Fittkau, 1957

A genus of ~20 named species occurring in the Nearctic, Palaearctic, Afrotropical, and Oriental regions. Unnamed species were reported from Costa Rica by Watson & Heyn (1992). The larvae are found in both lotic and lentic waters (Cranston & Epler 2013).

Thienemannimyia sp. *

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, male, February–March 1986, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Genus *Zavrelimyia* Fittkau, 1962

Syn.: *Paramerina* Fittkau, 1962.

Recently Silva & Ekrem (2016) formally placed the genus *Paramerina* Fittkau as a synonym of *Zavrelimyia* Fittkau. The genus now comprises ~50 named species that occur in all zoogeographical regions except Antarctica. Larvae of *Zavrelimyia* s. str. are, with few exceptions, more or less cold stenothermic and in temperate regions of the Holarctic primarily inhabitants of sandy or detritus rich sediments of springs and lentic habitats of stream sections close to springs. Larvae of *Zavrelimyia* (*Paramerina*) are eurythermic, living in a variety of standing waters of all sizes, but are also present in small lotic habitats including pools in rivers (Cranston & Epler 2013).

Zavrelimyia sp. *

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, male, February–March 1986, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Tribe Procladiini Roback, 1971

Genus *Procladius* Skuse, 1889

The second most speciose genus of Tanypodinae, with ~70 named species that occur in all zoogeographical regions except Antarctica. Four subgenera are recognized, namely *Procladius* s. str., *Holotanypus* Roback, 1982, *Laurotanypus* Oliveira, Messias *et* Silva-Vasconcellos, 1992, and *Psilotanypus* Kieffer, 1906 (see Ashe & O'Connor 2009; Dantas & Hamada 2018). The larvae prefer muddy substrate of standing or slow-flowing water bodies, especially ponds and small lakes, but a few also inhabit the profundal zone of large, deep lakes (Cranston & Epler 2013).

Procladius sp. *

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, male, February–March 1986, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Tribe Tanypodini Skuse, 1889

Genus *Tanypus* Meigen, 1803

A genus of >30 named species that occur in all zoogeographical regions except Antarctica and Oceania. Two subgenera are recognized, namely *Tanypus* s. str. and *Apelopia* Roback, 1971 (see Ashe & O'Connor 2009). The larvae live in sediments in standing and slowly flowing waters, especially in temperate to warm regions, where they can tolerate high salinity (Cranston & Epler 2013).

Tanypus sp. *

Material recorded. Panama, Panamá Oeste Province, Canal Zone, Barro Colorado Island, male, February–March 1986, leg H. Malicky, det. F. Reiss [ZSM] (M. Spies, pers. comm.).

Subfamily Telmatogetoninae Wirth, 1949

Genus *Thalassomya* Schiner, 1856

A genus of 12 named species that occur in all zoogeographical regions except Antarctica. The larvae live in the intertidal marine zone, particularly in the warmer seas of the world (Cranston & Ashe 2013).

Thalassomya bureni Wirth, 1949

Wirth, 1949: 167 [USA: Florida]; Wirth (1969: 573), Spies & Reiss (1996: 83), Ashe & O'Connor (2009: 336).

Material recorded. Panama (Wirth 1969).

Distribution in Neotropics. Florida, Mexico, Panama, “West Indies”.

Note. Wirth (1969) states that the species is distributed “to Panama and the West Indies”.

Discussion

Reiss (1982) recorded only 80 species from Central America and the West Indies based on literature but estimated that 1,500–2,000 species were probably present in these areas. Spies *et al.* (2009) offered an increment in the number of genera, particularly in the Tanypodinae, and suggested that 1,000 species might occur in Central America.

More work has been done in Costa Rica, led by W.P. Coffman, Carlos de la Rosa, Charles Watson, John Epler and others, but even their efforts are far from complete. Coffman *et al.* (1992) sampled 13 streams in Guanacaste Province in northwestern Costa Rica, recording 266 species based on pupal exuviae. However, to date only a few, if any, of these have been associated with their adult stages and given formal Latin names. Epler (2017) identified 137 species of chironomids, mostly undescribed, new species from a small area with mainly cloud forest. However, these are primarily terrestrial, semi-terrestrial, or phytotelmatic species in the subfamily Orthocladiinae. The absence of lentic and lotic aquatic systems (Borkent *et al.* 2018) in the 4-hectare plot sampled precluded a potential larger number of species in the subfamilies Chironominae and Tanypodinae, among others. Even with these deficiencies, these papers at least show the potential diversity of chironomids in Costa Rica. As work in other groups, such as caddisflies, has shown, there is a great deal of similarity in the faunas of aquatic groups between Costa Rica and Panama. Therefore, we assume that Panama will eventually mimic the diversity of chironomids in its northwestern neighbour.

Similar efforts to our beginnings in Panama have already borne fruit in Colombia. Until recently, only 39 species distributed among 18 genera and 3 subfamilies were recorded from that country (Mendes & Pinho 2016; Dantas *et al.* 2022). Attempting to fill in gaps and unknowns in the western Amazon basin, several papers have been recently produced which extend our knowledge of the Chironomidae in that country (Ospina-Torres *et al.* 2018; Dantas *et al.* 2019, 2022).

Prior to this paper, our research group had limited productivity with dipterans in general, producing only two papers—an annotated checklist of tipulids (Armitage & Rios 2019) and a new species and species group of chironomids (Giłka *et al.* 2024). The fact is that no one has actively worked on Panama material at any time. Thus, our foray into studying this group is confronted by great unknowns. Spies & Reiss (1996) and our own collecting were primary sources for the chironomid taxa listed herein. Even so, 51 genera and 78 total species and unassociated genera are well short of perceived reality. We hope that, going forward, our involvement with chironomids in Panama will be reflected by new species descriptions, expanded species lists fuelled in part by new country records, and better information about the surficial and altitudinal distributions of genera and species. A concomitant goal includes the training, involvement, and independent productivity by native Panamanians.

With a perceived base of species, however incomplete, in Costa Rica and a growing base in Colombia, this is an opportune time to begin sustained work on the Chironomidae in Panama. Although the Darien Gap, separating Panama and Colombia, has proven formidable in separating the caddisfly faunas of those two countries, we are nonetheless encouraged by the current activity to our southeast (Colombia) and by the past, and hopefully future, activity to our northwest (Costa Rica). The immediate task ahead is two-fold: 1) to analyse and describe material already on hand, and 2) to begin training Panamanians in the systematics and biology of this important group of organisms. Further identifications and new descriptions toward a second benchmark are proceeding.

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