



FAMILY CERATOPOGONIDAE

GUSTAVO SPINELLI^{1,3} & MARTA WOLFF²

¹División Entomología, Museo de La Plata, Paseo del Bosque s/n, 1900 La Plata, Argentina. E-mail: spinelli@fcnym.unlp.edu.ar

²Grupo de Entomología, Instituto de Biología, Universidad de Antioquia, Medellín-Colombia. E-mail: martha.wolff@udea.edu.co

³Corresponding author: E-mail: spinelli@fcnym.unlp.edu.ar

Abstract

Two hundred and thirty five species of Ceratopogonids arranged in 28 genera are listed for Colombia, mostly *Culicoides* (112 species) and *Forcipomyia* (50 species). For each listed species, information on type locality, type category and sex, location of type material, species distribution, localities for Colombia and main references, is provided. Localities are not specified for 17 species in which the literature searching was negative. *Forcipomyia squamitibia* Lutz and *Bezzia clavipennis* are excluded from the list.

Key words: catalogue, Ceratopogonidae, Colombia, distribution, localities, species list

Introduction

The Ceratopogonidae are commonly known as biting midges, no-see-ums or punkies, in Spanish as manta blanca, polvorines, or jejenos (which also may refer to Simuliidae), and in Portuguese as maruim or mosquito pólvora. Adult females of *Leptoconops* Skuse *Culicoides* Latreille and *Forcipomyia* Meigen (only in the subgenus *Lasiohelea* Kieffer) are haematophagous on vertebrates, needing the blood to develop their eggs. They are nasty biters that pester humans and domestic animals and, in some instances, transmit harmful diseases (Borkent & Spinelli 2007). On the other hand, this group of flies provides important services in a wide array of ecosystems. Some species are important pollinators of such plants as cacao and rubber trees, and the larvae of many are important predators of other organisms in semiaquatic and aquatic habitats. The adults of most biting midges actually suck blood from other insects and may even be important vectors of viruses that kill caterpillars (Borkent *et al.* 2009).

Borkent and Spinelli (2007), in their catalog of the Neotropical ceratopogonids, listed 1093 species and 132 new species were subsequently described. From the 1225 species that inhabit the Neotropics, 235 arranged in 28 genera are reported from Colombia, mostly *Culicoides* (112 species) and *Forcipomyia* (50 species) (Table 1).

We are presenting here the updated catalog of the Ceratopogonidae of Colombia (Table 1). Under the heading for each generic name, citations for keys to species or the most recent revision of the species in that group are provided. In some instances these are only for a species group or a limited geographical area. When a reference is not given, the most recent references are those of the genus and/or species themselves. For each listed species, the following information is included: type locality, type category and sex, location of type material, species distribution, localities for Colombia (between brackets) and main references. The latter include the original description, those mentioning Colombian localities, lists and catalogs. The literature searching for localities of 17 species reported for Colombia was negative, and for these species the first report for the country is included. Specific epithets of synonyms are accompanied by type locality, type category and sex, and location of type material. Two species were erroneously recorded for Colombia, *Forcipomyia squamitibia* Lutz by Marino & Spinelli (2002) and *Bezzia clavipennis* in the original description by Spinelli & Wirth (1989b), and they are excluded from the list.

Acronyms used for the depositories

- BMNH—Department of Entomology, Natural History Museum, London, SW7 5BD, United Kingdom.
- CAIM—Colección de Insectos con Importancia Médica. Laboratorio de Entomología, INBRE, Francisco de P. Miranda No. 177, Col. Unidad Lomas Plateros, México D.F. 11340, Mexico.
- CASC—Department of Entomology, California Academy of Sciences, Golden Gate Park, San Francisco, California, 94118, USA.
- CNCI—Canadian National Collection of Insects, Eastern Cereal and Oilseed Research Centre, Agriculture 8 Canada, K.W. Neatby Building, Ottawa, Ontario, K1A 0C6, Canada.
- CUIC—Department of Entomology, Comstock Hall, Cornell University, Ithaca, New York, 14853–0999, USA.
- DEFS—Departamento de Epidemiologia, Faculdade de Saúde Pública, Universidade de São Paulo, Av. Dr. Arnaldo, 715, 01.255, São Paulo, SP, Brazil.
- FIOC—Instituto Oswaldo Cruz, Departamento de Entomologia, Caixa Postal 926, 20010 Rio de Janeiro, Rio de Janeiro, Brazil.
- FSCA—Florida State Collection of Arthropods, Florida Department of Agriculture and Consumer Services Division of Plant Industry, 1911 SW 34th Street, Gainesville, Florida, 32608-1268, USA.
- HNHM—Zoological Dept., Hungarian Natural History Museum, Baross utca 13, H–1088, Budapest, Hungary.
- ICNC—Universidad Nacional de Colombia. Carrera 30#45-03. Código postal 111321. Instituto de Ciencias Naturales. Edificio 425.
- INHC—Instituto Nacional de Higiene, Caracas, Venezuela.
- INMA—Departamento de Artropodología Sanitaria, Instituto Nacional de Microbiología “Dr. Carlos G. Malbrán”, Ciudad de Buenos Aires, Argentina.
- MCZC—Entomology Department, Museum of Comparative Zoology, Harvard University, 26 Oxford St., Cambridge, Massachusetts, 02138, USA.
- MHNL—Museo de Historia Natural La Salle, Caracas, Venezuela.
- MLPA—Museo de la Plata, Division Entomología, Universidad de La Plata, Paseo del Bosque, 1900 La Plata, Argentina.
- MNHN—Museum National d'Histoire Naturelle, 45, rue Buffon, Paris, 75005, France.
- MUNS—Museo Nacional, Santiago, Chile.
- UNCE—Universidad Central del Ecuador. Cuidadela Universitaria, Quito, Ecuador.
- UNPR—School of Tropical Medicine, University of Puerto Rico, San Juan, Puerto Rico.
- USNM—United States National Entomological Collection, Dept. of Entomology, U.S. National Museum of Natural History, Washington, DC 20560, USA.
- ZMHB—Museum für Naturkunde der Humboldt Universität zu Berlin, Invalidenstrasse 43, Berlin 1040, Germany.

List of abbreviations

- cat.—catalogue
- comm.—comments
- distr.—Geographical Distribution
- m—meters
- km—kilometers
- mon.—monotypy
- orig. des.—original designation
- preocc.—preoccupied
- refs.—references
- rev.—revision
- Rt.—route
- sub. des.—subsequent designation
- F (f#)—Female
- HT—Holotype

LT—Lectotype
M (m#)—Male
NW—northwest
ST—Syntype
T—Type

Catalogue of Ceratopogonidae of Colombia

(The names of those species of *Leptoconops* and *Culicoides* which are known to bite humans are underlined>).

Family **Ceratopogonidae** Newman, 1834

Subfamily **Leptoconopinae** Noè, 1907

Genus **Leptoconops** Skuse

Leptoconops Skuse, 1889: 288. Type species, *Leptoconops stygius* Skuse (mon.). Refs.: Ronderos, 1988 (key to females from Argentina); Ronderos & Spinelli, 1992 (key to females); Wirth & Atchley, 1973 (key to subgenera of females, other than *Proleptoconops*; key to Nearctic females).

Tersesthes Townsend, 1893: 370. Type species, *Tersesthes torrens* Townsend (orig. des.).

Mycterotypus Noè, 1905: 114. Type species, *Mycterotypus bezzii* Noè, sub. des. by Carter, 1921:3.

Protersesthes Kieffer, 1921b: 107. Type species, *Tersesthes brasiliensis* Lutz (orig. des.).

Subgenus **Megaconops** Wirth & Atchley

Megaconops Wirth & Atchley, 1973: 18 (as subgenus of *Leptoconops*). Type species, *Leptoconops floridensis* Wirth (orig. des.).

floridensis Wirth, 1951a: 282. Type locality: USA, Florida, Escambia Co., Santa Rosa Island. T F (UNFL). Distr.: USA (Florida), Jamaica, Colombia (Valle del Cauca (Bahia Buenaventura, “Bella Vista”)). Refs.: Wirth, 1951a: 282; Wirth & Atchley, 1973: 18; Borkent & Spinelli, 2007: 44.

Subfamily **Forcipomyiinae** Lenz, 1934

Genus **Atrichopogon** Kieffer

Atrichopogon Kieffer, 1906a: 53 (as subgenus of *Ceratopogon*). Type species, *Ceratopogon exilis* Coquillett (= *Ceratopogon levis* Coquillett), Coquillett, 1910: 512 (des.). Refs.: Huerta, 1996 (key to males and females from Mexico); Ingram & Macfie, 1931 (key males and females from Patagonia and southern Chile); Macfie, 1939b (key to males and females from the Neotropical Region).

Subgenus **Atrichopogon** Kieffer

auricoma Kieffer, 1917b: 300. Type locality: Colombia, Magdalena, Aracataca. T F (HNHM, lost). Distr.: Colombia (Magdalena (Aracataca)). Refs.: Kieffer 1917b: 300; Borkent & Spinelli, 2007: 44; Borkent, 2015: 18 (cat.).

columbianus Kieffer, 1917b: 300). Type locality: Colombia, Magdalena, Aracataca. T F (HNHM, lost). Distr.: Colombia (Magdalena (Aracataca)). Refs.: Kieffer 1917b: 300; Borkent & Spinelli, 2007: 45; Borkent, 2015: 20 (cat.).

Genus **Forcipomyia** Meigen

Forcipomyia Meigen, 1818: 73, 75. Type species, *Tipula bipunctata* Linnaeus, Westwood, 1840: 126 (des.). Generic name first published in synonymy with *Ceratopogon* but available under I.C.Z.N Code Article 11(e). Refs.: Debenham, 1987 (key to males and females to subgenera from Australasian Region which includes all Neotropical subgenera other than *Rhynchoforcipomyia* and *Saliohelea*); Ingram & Macfie, 1931 (key to males and females from Patagonia and southern Chile); Wirth & Ratanaworabhan, 1978 (key to females to subgenera; their genus A near *Lepidohelea* = *Pedilohelea*). *Tetrastoma* Philippi, 1865: 630. Type species, *Tetrastoma fusca* Philippi (mon.).

Subgenus **Caloforcipomyia** Saunders

Caloforcipomyia Saunders, 1957: 680 (as subgenus of *Forcipomyia*). Type species, *Forcipomyia caerulea* Saunders (orig. des.). Refs.: Utmar & Wirth, 1976 (key to New World males and females).

caerulea Saunders, 1957: 681. Type locality: Brazil, Rio de Janeiro. HT F (# 6504 CNCI). Distr.: Panama, Colombia (Antioquia (Río Anorí), Valle del Cauca (Río Raposo)), Dominica, Brazil (Pará, Rio de Janeiro). Refs.: Saunders, 1957: 681; Utmar & Wirth, 1976: 115; Borkent & Spinelli, 2007: 48.

eukosma Macfie, 1939b: 148. Type locality: Brazil, Santa Catarina, Nova Teutonia. LT M (BMNH). Distr.: Colombia (Valle del Cauca (Río Raposo)), Dominica, Brazil (Pará, São Paulo, Rio de Janeiro, Santa Catarina). Refs.: Macfie, 1939b: 148; Utmar & Wirth, 1976: 119; Borkent & Spinelli, 2007: 48.

glauc Macfie, 1934: 144. Type locality: Great Britain, Norfolk, Hickling Broad. HT M (BMNH). Distr.: Europe, North America (Alberta to Nova Scotia to Arkansas and Florida) to Colombia (?) and southern Brazil. Refs.: Macfie, 1934: 144; Utmar & Wirth, 1976: 123; Borkent & Spinelli, 2007: 48.

hatoensis Utmar & Wirth, 1976: 131. Type locality: Panama, Chiriquí, El Hato. HT M (# 72216 USNM). Distr.: Mexico (Sinaloa), Costa Rica, Panama, Colombia (Antioquia (Río Anorí; Río Truando), Caquetá (Tres Esquinas)). Refs.: Utmar & Wirth, 1976: 131; Borkent & Spinelli, 2007: 48.

hermosa Utmar & Wirth, 1976: 117. Type locality: Brazil, Pará, Belém. HT M (DEFS). Distr.: Costa Rica, Panama, Colombia (Antioquia (Río Anorí), Valle del Cauca (Río Raposo)), Jamaica, Panama, Brazil (Amazonas, Pará). Refs.: Utmar & Wirth, 1976: 117; Borkent & Spinelli, 2007: 48.

remigera Utmar & Wirth, 1976: 121. Type locality: Colombia, Valle del Cauca (Río Raposo). HT M (# 72212 USNM). Distr.: Panama, Colombia (Valle del Cauca (Río Raposo)), French Guiana, Brazil (Pará). Refs.: Utmar & Wirth, 1976: 121; Borkent & Spinelli, 2007: 48; Borkent, 2015: 30 (cat.).

sabalitensis Utmar & Wirth, 1976: 127. Type locality: Costa Rica, Puntarenas, Sabalito. HT M (# 72215 USNM). Distr.: Honduras to Colombia (Antioquia (Camp Teresita, Río Truando)), Brazil (Paraná, Santa Catarina), northeastern Argentina. Refs.: Utmar & Wirth, 1976: 127; Borkent & Spinelli, 2007: 48.

Subgenus **Euprojoannisia** Brèthes

Euprojoannisia Brèthes, 1914: 155. Type species, *Euprojoannisia platensis* Brèthes (orig. des.). Refs.: Bystrak & Wirth, 1978 (key to Nearctic larvae, pupae, males, females); Huerta, 1996 (key to males and females from Mexico).

blantoni Soria & Bystrak, 1975: 3. Type locality: Brazil, Bahia, Ilhéus (CEPEC). HT M (DEFS). Distr.: Eastern USA to Colombia (Valle del Cauca (Palmira)), Ecuador, and Brazil (Bahia). Refs.: Soria & Bystrak, 1975: 3; Soria & Wirth, 1979: 79; Borkent & Spinelli, 2007: 49.

Subgenus **Forcipomyia** Meigen

Refs.: Huerta, 1996 (key to females from Mexico); Marino & Spinelli, 1999 (key to species groups); Marino & Spinelli, 2001

(key to males and females from Patagonia); Marino & Spinelli, 2002 (key to *squamitibia* group); Wirth, 1982a (key to *argenteola* group).

argenteola Species Group

argenteola Macfie, 1939b: 146. Type locality: Brazil, Santa Catarina, Nova Teutonia. ST F (BMNH). Distr.: Colombia (Valle del Cauca (Palmira)); Brazil (Rio de Janeiro, Santa Catarina), Paraguay, Argentina (Misiones). Refs.: Macfie, 1939b: 146; Soria & Wirth, 1979: 79; Borkent & Spinelli, 2007: 49.

calatheae Wirth, 1982a: 573. Type locality: Dominica, Calabishie, swamp at mouth of Hodges river. HT F (# 76582 USNM). Distr.: Colombia (Antioquia (San Jeronimo)), Dominica, Brazil (Bahia, Santa Catarina), northern Argentina. Refs.: Wirth, 1982a: 573; Borkent & Spinelli, 2007: 49.

genualis Species Group

genualis (Loew), 1866: 128 (*Ceratopogon*). Type locality: Cuba. HT F (MCZC). Distr.: USA (Louisiana to Florida), Bahamas, Mexico (Yucatán, Chiapas) to Colombia. Locality in Colombia (Valle del Cauca (Palmira)), Galápagos Islands, Cayman Islands, Cuba to Argentina (Buenos Aires province); São Tomé. Refs.: Loew, 1866: 128; Wirth & Soria, 1975: 22; Soria & Wirth, 1979: 79; Borkent & Spinelli, 2007: 50.

propinqua (Williston), 1896: 279 (*Ceratopogon*). Type locality: St. Vincent. HT M (BMNH).

raleighi Macfie, 1938: 160. Type locality: Trinidad and Tobago, St. Augustine. LT M (BMNH).

harpegonata Wirth & Soria, 1975: 19. Type locality: Puerto Rico, Mayaguez, Penn Farm. HT M (# 69493 USNM). Distr.: Costa Rica, Bahamas, Jamaica, Puerto Rico, Colombia (Chocó (Río Truando, Camp Teresita); Valle del Cauca (Río Raposo; Palmira)), Trinidad and Tobago to Brazil (Amazonas, Pará, Bahia). Refs.: Wirth & Soria, 1975: 19; Soria & Wirth, 1979: 79; Borkent & Spinelli, 2007: 50.

squamitibia Species Group

catarinensis Marino & Spinelli, 2002: 309. Type locality: Brazil, Santa Catarina, Nova Teutonia. HT M (MLPA). Distr.: Mexico, Costa Rica, Colombia (Antioquia (Tamesis)), Brazil. Refs.: Marino & Spinelli, 2002: 309; Borkent & Spinelli, 2007: 51.

Subgenus **Lasiohelea** Kieffer

Centrorhynchus Lutz, 1913: 62 (preocc. *Centrorhynchus* Steven or Fisher Waldheim, 1829). Type species, *Centrorhynchus stylifer* Lutz (orig. des.).

Lasiohelea Kieffer, 1921b: 115. Type species, *Atrichopogon pilosipennis* Kieffer (= *Ceratopogon velox* Winnertz) (orig. des.). Refs.: Aitken *et al.*, 1975 (species in Trinidad and Tobago); Ronderos & Spinelli, 1999 (rev. of Neotropical species).

stylifer (Lutz), 1913: 63 (*Centrorhynchus*). Type locality: Brazil, São Paulo, Tatuí. LT F (# 3699 FIOC). Distr.: Belize to Colombia (Valle del Cauca (Palmira)), Ecuador, Trinidad and Tobago, Venezuela to Northeastern Argentina. Refs.: Lutz, 1913: 63; Soria & Wirth, 1979: 79; Borkent & Spinelli, 2007: 52.

Subgenus **Lepidohelea** Kieffer

Lepidohelea Kieffer, 1917b: 364. Type species, *Ceratopogon chrysolophus* Kieffer (orig. des.). Refs.: Wirth, 1991c (key to species groups; key to males and females of *bicolor* group); Wirth & Spinelli, 1992 (males and females of *seminole* subgroup); Wirth & Spinelli, 1993 (key to males and some females of *annulatipes* group).

annulatipes Macfie, 1939b: 154. Type locality: Brazil, Santa Catarina, Nova Teutonia. HT M (BMNH). Distr.:

Colombia (Antioquia (near Río Anorí), Valle del Cauca (Río Raposo)), Brazil (Pará, Bahia, Santa Catarina). Refs.: Macfie, 1939b: 154; Wirth & Spinelli, 1993: 111; Borkent & Spinelli, 2007: 52.

convexipenis Wirth & Spinelli, 1993: 116. Type locality: Colombia, Valle del Cauca (Río Raposo). HT M (USNM). Distr.: Colombia (Antioquia (Turbo, Río León), Valle del Cauca (Río Raposo)); Refs.: Wirth & Spinelli, 1993: 116; Borkent & Spinelli, 2007: 52; Borkent, 2015: 47 (cat.).

euthystyla Wirth & Spinelli, 1993: 117. Type locality: Colombia, Valle del Cauca (Río Raposo). HT M (USNM). Distr.: Panama, Colombia (Antioquia (Turbo, Río León; near Río Anorí), (Valle del Cauca (Río Raposo))). Refs.: Wirth & Spinelli, 1993: 117; Borkent & Spinelli, 2007: 52; Borkent, 2015: 47 (cat.).

hobbsi Wirth & Spinelli, 1993: 121. Type locality: Dominica, 2 km W Pont Casse. HT M (USNM). Distr.: Mexico (Tabasco) to Colombia (Meta (Finca Barbascal)), Jamaica to Grenada. Refs.: Wirth & Spinelli, 1993: 121; Borkent & Spinelli, 2007: 53.

luteigenua Wirth & Spinelli, 1992: 353. Type locality: Costa Rica, Limón, Siquirres, Hacienda Theobroma. HT F (USNM). Distr.: USA (Florida) to Colombia (Antioquia (Tamesis)) and Brazil (Bahia). Refs.: Wirth & Spinelli, 1992: 353; Borkent & Spinelli, 2007: 53.

Subgenus **Microhelea** Kieffer

Microhelea Kieffer, 1917b: 364. Type species, *Atrichopogon microtomus* Kieffer, sub. des. by Kieffer, 1921a: 7, with explanatory notation on erroneous previous type designation. Refs.: Clastrier & Wirth, 1995 (key to females in *ixodoidea* group); Huerta, 1996 (key to males and females from Mexico); Wirth, 1972 (key to females in *fuliginosa* group).

Phasmidohelea Mayer, 1937: 233. Type species, *Phasmidohelea crudelis* Mayer (= *Ceratopogon fuliginosus* Meigen) (orig. des.).

antioquiae Clastrier & Wirth, 1995: 142. Type locality: Colombia, Antioquia (near Río Anorí). HT F (USNM). Distr.: Colombia (Antioquia (near Río Anorí)). Refs.: Clastrier & Wirth, 1995: 142; Borkent & Spinelli, 2007: 54; Borkent, 2015: 49 (cat.).

belemensis Clastrier & Wirth, 1995: 140. Type locality: Brazil, Pará, Belém, APEG Forest. HT F (FIOC). Distr.: Colombia (Valle del Cauca (Río Raposo; Oleoducto de Pacific, 10 km NW Dagua)), Brazil (Pará). Refs.: Wirth, 1971: 239 (record of *F. obesa* from Colombia); Clastrier & Wirth, 1995: 140; Borkent & Spinelli, 2007: 54.

colombiana Clastrier & Wirth, 1995: 102. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM). Distr.: Costa Rica, Colombia (Antioquia (near Río Anorí), Valle del Cauca (Río Raposo)). Refs.: Clastrier & Wirth, 1995: 102; Borkent & Spinelli, 2007: 54; Borkent, 2015: 50 (cat.).

fuliginosa (Meigen), 1818: 86 (*Ceratopogon*). Type locality: Germany, T?. Distr.: Widespread in the Palaearctic, Oriental, Afrotropical, Nearctic and Neotropical regions. In the Neotropics south to Argentina and Uruguay. Locality in Colombia (Valle del Cauca (Palmira)). Refs.: Meigen, 1818: 86; Soria & Wirth, 1979: 79; Borkent & Spinelli, 2007: 54.

crudelis Knab, 1914: 66 (preocc. by *Forcipomyia crudelis* (Karsch), 1886). Type locality: Mexico, La Oaxagena, near Santa Lucrecia. HT F (# 18420 USNM).

tropica (Kieffer), 1917b: 297 (*Ceratopogon*). Type locality: Costa Rica, San Mateo, Higueto. T F (HNHM, lost).

insignipalpis Macfie, 1949: 109. Type locality: Mexico, Chiapas, San Cristobal, north of Aurora. HT F (BMNH). Distr.: Mexico (Chiapas), Costa Rica, Panama, Colombia (Valle del Cauca (Oleoducto de Pacific, 10 km NW Dagua), Caquetá (Tres Esquinas)), Brazil (Pará). Refs.: Macfie, 1949: 109; Wirth, 1972: 573; Borkent & Spinelli, 2007: 54.

penultimata Wirth, 1972: 573. Type locality: Brazil, Santa Catarina, Nova Teutonia. HT F (# 71148 USNM). Distr.: Belize and Jamaica to Colombia (Valle del Cauca (Río Raposo)), Brazil (Santa Catarina). Refs.: Wirth, 1972: 573; Borkent & Spinelli, 2007: 55.

raposoensis Clastrier & Wirth, 1995: 144. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)). Refs.: Clastrier & Wirth, 1995: 144; Borkent & Spinelli, 2007: 55; Borkent, 2015: 51 (cat.).

squamosa Lutz, 1914: 87. Type locality: Brazil, Río de Janeiro, Mangueiros. ST M (FIOC). Distr.: Colombia (Valle del Cauca (Río Raposo; Oleoducto de Pacífico, 10 km NW Dagua)), Bolivia, Brazil (Amazonas, Bahia, Rio de Janeiro, Santa Catarina), Argentina (Mendoza). Refs.: Lutz, 1914: 87; Wirth, 1972: 569; Borkent & Spinelli, 2007: 55.

valleensis Clastrier & Wirth, 1995: 145. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)). Refs.: Clastrier & Wirth, 1995: 145; Borkent & Spinelli, 2007: 55; Borkent, 2015: 51 (cat.).

vernoni Clastrier & Wirth, 1995: 138. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)). Refs.: Clastrier & Wirth, 1995: 138; Borkent & Spinelli, 2007: 55; Borkent, 2015: 52 (cat.).

willistoni Wirth, 1971: 242. Type locality: Puerto Rico, El Verde, Luquillo Mts. HT F (# 71146 USNM). Distr.: Jamaica, Puerto Rico, Colombia (Cauca, Tambo, Finca Carpenteria), Brazil (Santa Catarina). Refs.: Wirth, 1971: 242; Clastrier & Wirth, 1995: 134; Borkent & Spinelli, 2007: 55.

Subgenus **Pedilohalea** de Meillon & Wirth

Pedilohalea de Meillon & Wirth, 1980: 9 (as subgenus of *Forcipomyia*). Type species, *Forcipomyia clastrieri* Dessart (orig. des.). Refs.: de Meillon & Wirth, 1980 (key to males, some females).

aitkeni de Meillon & Wirth, 1980: 12. Type locality: Brazil, Pará, Belém. HT M (# 67551 USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)), Brazil (Pará). Refs.: de Meillon & Wirth, 1980: 12; Borkent & Spinelli, 2007: 55.

raposoi de Meillon & Wirth, 1980: 21. Type locality: Brazil, Pará, Belém. HT M (# 67237 USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)), Brazil (Pará). Refs.: de Meillon & Wirth, 1980: 21; Borkent & Spinelli, 2007: 55; Borkent, 2015: 53 (cat.).

spangleri de Meillon & Wirth, 1980: 21. Type locality: Guatemala, Suchitepequez, San Antonio Suchitepequez. HT M (# 65711 USNM). Distr.: Mexico (Yucatán), Guatemala, Panama, Colombia (Valle del Cauca (Río Raposo)), Ecuador. Refs.: de Meillon & Wirth, 1980: 21; Borkent & Spinelli, 2007: 55.

spilmani de Meillon & Wirth, 1980: 22. Type locality: Dominica, Clarke Hall. HT M (# 73565 USNM). Distr.: Panama, Colombia (Valle del Cauca (Río Raposo)), Dominica, Trinidad and Tobago, Brazil (Santa Catarina). Refs.: de Meillon & Wirth, 1980: 22; Borkent & Spinelli, 2007: 55.

Subgenus **Pterobosca** Macfie

Pterobosca Macfie, 1932a: 266. Unavailable name; proposed after 1930 without type species designation.

Pterobosca Macfie, 1940d: 16. Type species, *Ceratopogon aeshnosuga* de Meijere (orig. des.).

incubans (Macfie), 1937: 111 (*Pterobosca*). Type locality: Belize, Cayo District, Mtn. Pine Ridge, on *Argia ulmea*. HT F (BMNH). Distr.: Mexico (San Luis Potosí, Veracruz), Puerto Rico, Colombia (Risardala (La Virginia en Pantano)) to Argentina (Buenos Aires). Refs.: Macfie, 1937: 111; Wirth, 1956: 363; Borkent & Spinelli, 2007: 56.

Subgenus **Rhynchoforcipomyia** Wirth & Dow

Rhynchoforcipomyia Wirth & Dow, 1972: 863 (as subgenus of *Forcipomyia*). Type species, *Forcipomyia messersmithi* Wirth & Dow (orig. des.). Refs.: Wirth & Dow, 1972 (key to females).

brachyrhyncha Wirth & Dow, 1972: 867. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (# 71168 USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)), Trinidad and Tobago. Refs.: Wirth & Dow, 1972: 867; Borkent & Spinelli, 2007: 56; Borkent, 2015: 54 (cat.).

messersmithi Wirth & Dow, 1972: 864. Type locality: El Salvador, Cuscatlán, San Pedro Perulapán. HT F (# 71167 USNM). Distr.: Mexico (Veracruz), Jamaica, Central America to Colombia (Valle del Cauca (Río Raposo)). Refs.: Wirth & Dow, 1972: 864; Borkent & Spinelli, 2007: 57.

puracensis Wirth & Dow, 1972: 867. Type locality: Colombia, Cauca, Parámo de Purace, 28 km S Purace. HT F (# 71165 USNM). Distr.: Colombia (Cauca (Parámo de Purace, 28 km S Purace)). Refs.: Wirth & Dow, 1972: 867; Borkent & Spinelli, 2007: 57; Borkent, 2015: 54 (cat.).

zeteki Wirth & Dow, 1972: 870. Type locality, Panama, Canal Zone, Barro Colorado I. HT F (# 71166 USNM). Distr.: Panama, Colombia (Valle del Cauca (Río Raposo)). Refs.: Wirth & Dow, 1972: 870; Borkent & Spinelli, 2007: 57.

Subgenus **Saliohelea** Wirth & Ratanaworabhan

Saliohelea Wirth & Ratanaworabhan, 1978: 494 (as subgenus of *Forcipomyia*). Type species, *Forcipomyia leei* Wirth & Ratanaworabhan (orig. des.).

leei Wirth & Ratanaworabhan, 1978: 498. Type locality: Colombia (Valle del Cauca (Río Raposo)). HT F (# 70440 USNM). Distr.: Eastern USA and Caribbean to Colombia (Antioquia (Río Anorí), Valle del Cauca (Río Raposo)) and southern Brazil (Amazonas, Pará, Bahia, Rio de Janeiro). Refs.: Wirth & Ratanaworabhan, 1978: 498; Borkent & Spinelli, 2007: 57; Borkent, 2015: 55 (cat.).

Subgenus **Thyridomyia** Saunders

Thyridomyia Saunders, 1925: 268. Type species, *Thyridomyia palustris* Saunders (= *Ceratopogon monilicornis* Coquillett) (orig. des.). Refs.: Wirth, 1970 (key to males and females).

colombiae Wirth, 1970: 435. Type locality: Colombia, Valle del Cauca (Río Raposo). HT M (# 70662 USNM). Distr.: Mexico (Veracruz), Costa Rica, Panama, Trinidad and Tobago, Colombia (Valle del Cauca (Río Raposo)). Refs.: Wirth, 1970: 435; Borkent & Spinelli, 2007: 58; Borkent, 2015: 56 (cat.).

jipajapae Wirth, 1970: 437. Type locality: Panama, Canal Zone, Gamboa, rain forest on “Pipeline road”. HT M (# 70661 USNM). Distr.: Costa Rica to Colombia (Valle del Cauca (Río Raposo)) and Ecuador, Trinidad and Tobago. Refs.: Wirth, 1970: 437; Borkent & Spinelli, 2007: 58.

nana (Macfie), 1939b: 171 (*Lasiohelea*). Type locality: Brazil, Santa Catarina, Nova Teutonia. HT F (BMNH). Distr.: Mexico (Veracruz), Jamaica through Caribbean to Colombia (Valle del Cauca (Río Raposo)) and southern Brazil (Santa Catarina). Refs.: Macfie, 1939b: 171; Wirth, 1970: 432; Borkent & Spinelli, 2007: 58.

nodosa Saunders, 1959: 43. Type locality: Costa Rica, Finca Theobroma, near Siquirres. HL (CNCI). Distr.: USA (Arizona, Kansas, Mississippi, Florida), Mexico (Baja California, Sonora, Sinaloa, San Luis Potosí), Costa Rica, Colombia (Valle del Cauca (Río Raposo)). Refs.: Saunders, 1959: 43; Wirth, 1970: 434; Borkent & Spinelli, 2007: 58.

Subgenus **Warmkea** Saunders

Warmkea Saunders, 1957: 671 (as subgenus of *Forcipomyia*). Type species, *Forcipomyia bicolor* Saunders (= *Forcipomyia lesliei* Wirth) (orig. des.). Refs.: Wirth & Soria, 1980 (key to males and females).

aeria Saunders, 1957: 675. Type locality: Puerto Rico, Mayaguez. HT F (CNCI). Distr.: Puerto Rico, Colombia (Antioquia (Río Anorí), Valle del Cauca (Río Raposo)), Argentina (Tucumán). Refs.: Saunders, 1957: 675; Wirth & Soria, 1980: 143; Borkent & Spinelli, 2007: 59.

galindoi Wirth & Soria, 1980: 146. Type locality: Panama, Canal Zone, Barro Colorado island. HT M (#76102 USNM). Distr.: Panama, Colombia (Antioquia (Río Anorí), Valle del Cauca (Río Raposo)), Ecuador, Brazil (Pará). Refs.: Wirth & Soria, 1980: 146; Borkent & Spinelli, 2007: 59.

lesliei Wirth, 1974: 12. New name for *bicolor*. Distr.: Jamaica, Haiti to Venezuela, Colombia (Valle del Cauca (Río Raposo; Oleoducto de Pacifico, 10 km NW Dagua)). Refs.: Saunders, 1957: 672; Wirth & Soria, 1980: 148; Borkent & Spinelli, 2007: 59.

bicolor Saunders, 1957: 672 (preocc. *Forcipomyia bicolor* Lutz, 1914). Type locality: Puerto Rico, Mayaguez. HT F (CNCI).

louriei (Macfie), 1935a: 49 (*Lasiohelea*). Type locality: Brazil, Piauí, Tutóia. HT F (BMNH). Distr.: Colombia (Antioquia (Río Anorí), Valle del Cauca (Río Raposo)), Bolivia, Trinidad and Tobago, Brazil (Pará, Maranhão, Santa Catarina). Refs.: Macfie, 1935: 49; Wirth & Soria, 1980: 151; Borkent & Spinelli, 2007: 59.

narthekephora Macfie, 1939b: 166. Type locality: Brazil, Santa Catarina, Nova Teutonia. HT M (BMNH).

spinosa Saunders, 1957: 676. Type locality: Puerto Rico, Mayaguez. HT F (CNCI). Distr.: Puerto Rico, Dominica, Trinidad and Tobago to Colombia (Valle del Cauca (Río Raposo)), Guyana and Brazil (Pará, Bahia, Rio de Janeiro). Refs.: Saunders, 1957: 676; Wirth & Soria, 1980: 153; Borkent & Spinelli, 2007: 59.

tuberculata Saunders, 1957: 677. Type locality: Trinidad and Tobago, North Range. HT F (CNCI). Distr.: Costa Rica, Colombia (Antioquia (Río Anorí), Valle del Cauca (Río Raposo)), Trinidad and Tobago and Tobago, Brazil (Amazonas, Pará), Argentina (Buenos Aires). Refs.: Saunders, 1957: 677; Wirth & Soria, 1980: 157; Borkent & Spinelli, 2007: 59.

Subfamily **Dasyheleinae** Lenz, 1934

Genus **Dasyhelea** Kieffer

Dasyhelea Kieffer, 1911c: 5. Type species, *Dasyhelea halophila* Kieffer (mon.). Refs.: Huerta, 1996 (key to males and females from Mexico); Ingram & Macfie, 1931 (key males and females from Patagonia and southern Chile); Spinelli & Wirth, 1984c (key to males and females of *cineta* group); Díaz *et al.*, 2010 (rev. of *patagonica* group); Díaz *et al.*, 2014 (phylogeny of *mutabilis* group in the Neotropics).

Pseudoculicoides Malloch, 1915a: 309. Type species, *Ceratopogon mutabilis* Coquillett, (orig. des.).

columbiana (Kieffer), 1917b: 304 (*Culicoides*). Type locality: Colombia, Magdalena, Aracataca. T F (HNHM, lost). Distr.: Colombia (Magdalena (Aracataca)). Refs.: Kieffer 1917b: 304; Borkent & Spinelli, 2007: 60; Borkent, 2015: 63 (cat.).

santaemarthae (Kieffer), 1917b: 306 (*Culicoides*). Type locality: Colombia, Magdalena, Santa Marta. T F (HNHM, lost). Distr.: Colombia (Magdalena (Santa Marta)). Refs.: Kieffer 1917b: 306; Borkent & Spinelli, 2007: 61; Borkent, 2015: 71 (cat.).

Subfamily **Ceratopogoninae** Newman, 1834

Tribe **Culicoidini** Kieffer, 1911

Genus **Culicoides** Latreille

Culicoides Latreille, 1809: 251. Type species, *Culicoides punctatus* Latreille (= *Ceratopogon punctatus* Meigen) (mon). Refs.: Aitken *et al.*, 1975 (key to females from Trinidad and Tobago); Blanton & Wirth, 1979 (key to larvae, males and females from Florida (USA)); Forattini, 1957 (key to females of all species); Huerta, 1996 (key to females from Mexico); Ortíz & León, 1955 (key to females from Ecuador); Ronderos, 1988 (key to females from Argentina); Ronderos & Spinelli, 1998 (key to males and females from the Yacyretá Dam, between Paraguay and Argentina); Spinelli & Wirth, 1986b (key to females south of the Amazon Basin); Wirth & Blanton, 1959 (key to females and some males from Panama); Wirth & Blanton, 1973 (key to females and some males from Amazon Basin); Wirth & Blanton, 1974 (key to females and some males from the Caribbean); Wirth *et al.*, 1988 (some meristic character states and photographs of wings of all species); Spinelli *et al.*, 2005 (key to males and females from Argentina).

Padrosia Rafinesque, 1815: 130 (unnecessary replacement name for *Culicoides* Latreille). Type species, *Culicoides punctatus* Latreille (= *Ceratopogon punctatus* Meigen), automatic.

Comm.: There is no reliable key to the subgenera and species groups of Neotropical *Culicoides*. For species outside of local areas for which revisions are available (as listed above), the easiest guide to species identification is that of Wirth *et al.* (1988). From there readers may refer to keys to subgenera or species groups referred to below.

Subgenus **Anilomyia** Vargas

Anilomyia Vargas, 1960: 37 (as subgenus of *Culicoides*). Type species, *Culicoides covagarciai* Ortíz (orig. des.). Refs.: Wirth & Blanton, 1956b (key to males and females of *covagarciai* group); Wirth & Blanton, 1970c (key to key to males and females of *nigrigenus* group).

ameliae Browne, 1980: 543. Type locality: Colombia, Cauca, Munchique, 2000 m. HT F (USNM). Distr.: Colombia (Cauca (Munchique)). Refs.: Browne, 1980: 543; Wirth *et al.*, 1988: 20; Borkent & Spinelli, 2007: 62; Spinelli *et al.*, 2009: 87; Borkent, 2015: 76 (cat.).

covagarciai Ortíz, 1950a: 457. Type locality: Venezuela, Caracas. HT F (INHC). Distr.: Honduras to Colombia (Valle del Cauca (Cali, Pance, Estación El Topacio, Peñas Blancas (Finca El Rosal))), Venezuela. Refs.: Ortiz, 1950a: 457; Barreto, 1986: 142; Borkent & Spinelli, 2007: 62; Spinelli *et al.*, 2009: 87.

beebei Fox, 1952: 366. Type locality: Venezuela, Rancho Grande. HT F (UNPR).

efferus Fox, 1952: 365. Type locality: Peru, Río Charape. HT F (UNPR). Distr.: Guatemala to Colombia (Valle del Cauca (Cali, Pance, Estacion El Topacio, Peñas Blancas)), Peru and Bolivia. Refs.: Fox, 1952: 365; Barreto, 1986: 142; Borkent & Spinelli, 2007: 62; Spinelli *et al.*, 2009: 87.

inermis Spinelli, Santamaría, Cabrera, Ronderos & Suárez, 2009: 84. Type locality: Colombia, Cauca, López, Río Micay. HT F (MLPA). Distr.: Colombia (Cauca (López, Río Micay)). Refs.: Spinelli *et al.*, 2009: 84; Borkent, 2015: 88 (cat.).

marshi Wirth & Blanton, 1956b: 220. Type locality: Panama, Bocas del Toro, Almirante. HT F (# 62957 USNM). Distr.: Costa Rica, Panama, Colombia (Valle del Cauca (Río Raposo; Cali, Pance, El Topacio)). Refs.: Wirth & Blanton, 1956b: 220; Barreto, 1986: 142; Borkent & Spinelli, 2007: 63; Spinelli *et al.*, 2009: 87.

metagonatus Wirth & Blanton, 1956b: 221. Type locality: Panama, Cerro Campana. HT F (# 62957 USNM). Distr.: Nicaragua to Colombia (Valle del Cauca (Río Raposo)) and Ecuador. Refs.: Wirth & Blanton, 1956b: 221; Barreto, 1986: 142; Borkent & Spinelli, 2007: 63; Spinelli *et al.*, 2009: 87.

nigrifemur Spinelli, Santamaría, Cabrera, Ronderos & Suárez, 2009: 85. Type locality: Colombia, Cauca, Parámo de Puracé, 28.4 km E Puracé, 3100 m. HT F (MLPA). Distr.: Colombia (Cauca (Parámo de Puracé, 28.4 km E Puracé, 3100 m)). Refs.: Spinelli *et al.*, 2009: 85; Borkent, 2015: 94 (cat.).

nigrigenus Wirth & Blanton, 1956b: 222. Type locality: Panama, Bocas del Toro, Almirante. HT F (# 62824 USNM). Distr.: Mexico (Veracruz) to Colombia (Valle del Cauca (Río Raposo)), Trinidad and Tobago, Argentina (Salta). Refs.: Wirth & Blanton, 1970c: 151; Barreto, 1986: 143; Borkent & Spinelli, 2007: 63; Spinelli *et al.*, 2009: 87.

popayanensis Wirth & Lee, 1967: 10. Distr.: Type locality: Colombia, Cauca, 28.4 km E Puracé, 3100 m. HT F (# 69399 USNM). Distr.: Colombia (Cauca (28.4 km E Puracé, 3100 m)). Refs.: Wirth & Lee, 1967: 10; Barreto, 1986: 143; Wirth *et al.*, 1988: 22; Borkent & Spinelli, 2007: 63; Spinelli *et al.*, 2009: 87; Borkent, 2015: 98 (cat.).

trapidoi Wirth & Barreto, 1978: 554. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (# 71153 USNM). Distr.: Costa Rica, Colombia (Valle del Cauca (Río Raposo)), Brazil. Refs.: Wirth & Barreto, 1978: 554; Barreto, 1986: 143; Wirth *et al.* 1988: 22; Borkent & Spinelli, 2007: 63; Spinelli *et al.*, 2009: 87; Borkent, 2015: 105 (cat.).

Subgenus **Avaritia** Fox

Avaritia Fox, 1955: 218 (as subgenus of *Culicoides*). Type species, *Ceratopogon obsoletus* Meigen (orig. des.). Refs.: Rodríguez & Wirth, 1986 (rev. of *andicola* group); Wirth & Mullens, 1992 (key to males and females in *pusillus* group).

andicola Wirth & Lee, 1967: 5. Type locality: Colombia, Cauca, Parámo de Puracé, Lago Buey, 3250 m. HT F (# 69396 USNM). Distr.: Colombia (Cauca (Parámo de Puracé, Lago Buey, 3250 m; 28.4 km E Puracé, 3100 m)). Refs.: Wirth & Lee, 1967: 5; Barreto, 1986: 143; Wirth *et al.*, 1988: 14; Borkent & Spinelli, 2007: 63; Spinelli *et al.*, 2009: 87; Borkent, 2015: 76 (cat.).

orjuelai Wirth & Lee, 1967: 6. Type locality: Colombia, Cauca, Parámo de Puracé, 18 km E. Puracé, 3320 m. HT F (# 69397 USNM). Distr.: Colombia (Cauca (Parámo de Puracé, Lago Buey, 3250 m; 28.4 km E Puracé, 3100 m)). Refs.: Wirth & Lee, 1967: 6; Barreto, 1986: 143; Wirth *et al.*, 1988: 14; Borkent & Spinelli, 2007: 63; Spinelli *et al.*, 2009: 87; Borkent, 2015: 96 (cat.).

puracensis Wirth & Lee, 1967: 7. Type locality: Colombia, Cauca, Parámo de Puracé, Lago Buey, 3250 m. HT F (# 69398 USNM). Distr.: Colombia (Cauca (Parámo de Puracé, Lago Buey, 3250 m; 28.4 km E Puracé, 3100 m; 18 km E Puracé, 3320 m)). Refs.: Wirth & Lee, 1967: 7; Barreto, 1986: 143; Wirth *et al.*, 1988: 14; Borkent & Spinelli, 2007: 63; Spinelli *et al.*, 2009: 87; Borkent, 2015: 99 (cat.).

pusillus Lutz, 1913: 52. Type locality: Brazil, Río de Janeiro, Manguinhos. ST F, M (FIOC). Distr.: USA (Florida), Mexico (Chiapas) to northeastern Argentina. Locality in Colombia (Valle del Cauca (Candelaria, Finca San Luis)). Refs.: Lutz, 1913: 52; Barreto, 1986: 143; Borkent & Spinelli, 2007: 63; Spinelli *et al.*, 2009: 87.

suarezi Rodríguez & Wirth, 1986: 313. Type locality: Colombia, Cundinamarca, Bogotá, D.E., Monserrate, 3230 m. HT F (USNM). Distr.: Colombia (Cundinamarca (Bogotá, D.E., Monserrate, 3230 m)). Refs.: Rodríguez & Wirth, 1986: 313; Barreto, 1986: 143; Wirth *et al.*, 1988: 14; Borkent & Spinelli, 2007: 63; Spinelli *et al.*, 2009: 87; Borkent, 2015: 103 (cat.).

Subgenus **Cotocripus** Brèthes

Cotocripus Brèthes, 1912: 451. Type species, *Cotocripus caridei* Brèthes (mon.).

bambusicola Lutz, 1913: 62. Type locality: Brazil, Rio de Janeiro, Petrópolis. HT F (# 2982 FIOC). Distr.: Colombia (Valle del Cauca (área de Cali, Pance; Candelaria)), Venezuela, Brazil (Bahia, Espírito Santo, Rio de

Janeiro, São Paulo), Argentina (Misiones, Buenos Aires). Refs.: Lutz, 1913: 62; Lee, 1968: 81; Barreto, 1986: 145; Borkent & Spinelli, 2007: 64; Spinelli *et al.*, 2009: 87.

bahiensis Barbosa, 1947: 11. Type locality: Brazil, Bahia. ST F,M (USNM).

gabrieli Spinelli, Santamaría, Cabrera, Ronderos & Suárez, 2009: 82. HT M (MLPA). Type locality: Peru, Cuzco, Kirigueti. Distr.: Colombia (Chocó (Pié de Pepe)), Peru. Refs.: Spinelli *et al.*, 2009: 82; Borkent, 2015: 85 (cat.).

raposoensis Wirth & Barreto, 1978: 561. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (# 71157 USNM). Distr.: Colombia (Valle del Cauca (Río Raposo; Río Micay, Casa de Suárez)). Refs.: Wirth & Barreto, 1978: 561; Barreto, 1986: 148 (as *raposensis*); Wirth *et al.*, 1988: 54; Borkent & Spinelli, 2007: 64; Spinelli *et al.*, 2009: 87; Borkent, 2015: 100 (cat.).

Subgenus **Diphaomyia** Vargas

Diphaomyia Vargas, 1960: 40 (as subgenus of *Culicoides*). Type species, *Culicoides baueri* Hoffman (orig. des.).

iriartei Fox, 1952: 368. Type locality: Venezuela, Zulia, La Salina. HT F (UNPR). Distr.: Guatemala to Colombia (?), Venezuela, Tobago, Brazil (Pará). Refs.: Fox, 1952: 368; Wirth & Blanton, 1973: 441; Barreto, 1986: 143; Borkent & Spinelli, 2007: 64; Spinelli *et al.*, 2009: 87.

vargasi Wirth & Blanton, 1953a: 74. Type locality: Panama, Los Santos, Las Tablas. HT F (# 61502 USNM).

lisicarruni Moncada, Carrasquilla & Spinelli, in Moncada *et al.*, 2010: 978. Type locality: Colombia, Cundinamarca, Chingaza National Natural Park, Monterredondo Station edge of Babilonia River, 3200 m. HT F (ICNC). Distr.: Colombia (Cundinamarca (Chingaza National Natural Park, Monterredondo Station edge of Babilonia River, 3200 m)). Refs.: Spinelli *et al.*, 2010: 978; Borkent, 2015: 91 (cat.).

marinkellei Wirth & Lee, 1967: 13. Type locality: Colombia, Cauca, Parámo de Puracé, Lago Buey, 3250 m. HT F (# 69400 USNM). Distr.: Colombia (Cauca (Parámo de Puracé, Lago Buey, 3250 m; 18 km E Puracé, 3320 m)). Refs.: Wirth & Lee, 1967: 13; Barreto, 1986: 143; Wirth *et al.*, 1988: 32; Borkent & Spinelli, 2007: 64; Spinelli *et al.*, 2009: 87; Borkent, 2015: 92 (cat.).

mirsaе Ortíz, 1953: 801. Type locality, Venezuela, ST F (INHC). Distr.: Panama, Colombia (Boyacá (Otanche, Cortaderal)), Venezuela, Trinidad and Tobago. Refs.: Ortíz, 1953: 801; Borkent & Spinelli, 2007: 65; Spinelli *et al.*, 2009: 87.

Subgenus **Drymodesmyia** Vargas

Drymodesmyia Vargas, 1960: 40 (as subgenus of *Culicoides*). Type species, *Culicoides copiosus* Root & Hoffman (orig. des.). Refs.: Wirth & Hubert, 1960: 646 (key to females and some males, as *copiosus* group).

jamaicensis Edwards, 1922: 165 (as variety of *loughnani*). Type locality: Jamaica, Kingston. ST F, M (BMNH). Distr.: USA (Texas, Florida), Mexico (Yucatán), Central America and Caribbean to Colombia (?) and Venezuela. Refs.: Edwards, 1922: 165; Wirth *et al.*, 1988: 26; Borkent & Spinelli, 2007: 65; Spinelli *et al.*, 2009: 87.

pilosus Wirth & Blanton, 1959: 332. Type locality: Panama, Bocas del Toro, Almirante. HT F (# 63164 USNM). Distr.: Costa Rica, Panama, Colombia (?) Brazil (Pará). Refs.: Wirth & Blanton, 1959: 332; Wirth & Blanton, 1973: 445; Barreto, 1986: 143; Borkent & Spinelli, 2007: 65; Spinelli *et al.*, 2009: 88.

poikilonotus Macfie, 1948: 82. Type locality: Mexico, Chiapas, El Vergel. HT F (BMNH). Distr.: Mexico (Chiapas), Central America, Colombia (?), Venezuela and Trinidad and Tobago to Brazil (Bahia). Refs.: Macfie, 1948: 82; Aitken *et al.*, 1975: 136; Barreto, 1986: 143; Borkent & Spinelli, 2007: 65; Spinelli *et al.*, 2009: 88.

cacozelus Macfie, 1948: 85. Type locality: Mexico, HT F (BMNH).

hertigi Wirth & Blanton, 1953b: 229. Type locality: Panama, Coclé, Río Hato. HT F (# 61504 USNM).

Subgenus **Haematomyidium** Goeldi

Haematomyidium Goeldi, 1905: 137. Type species, *Haematomyidium Paráense* Goeldi (orig. des). Refs.: Vitale *et al.*, 1981 (key to females of *debilipalpis* group); Wirth & Felipe-Bauer, 1989 (key to *paraensis* group).

debilipalpis Lutz, 1913: 60. Type locality: Brazil, São Paulo, Anhemby and Formoso (Serra da Bocaina). ST F (FIOC, lost). Distr.: Widespread from USA (Maryland, Kentucky, Nebraska south to Louisiana and Florida), Guatemala and Belize to Argentina. Localities in Colombia (Antioquia (?), Magdalena (?), Valle del Cauca (Río Raposo)). Refs.: Lutz, 1913: 60; Wirth & Blanton, 1974: 15; Barreto, 1986: 146; Borkent & Spinelli, 2007: 66; Spinelli *et al.* 2009: 88.

ichesi Ronderos & Spinelli, 1995: 77. Type locality: Argentina, Misiones, Posadas, Arroyo Zaimán. HT F (MLPA).

eldridgei Wirth & Barreto, 1978: 561. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (# 71157 USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)). Refs.: Wirth & Barreto, 1978: 561; Wirth *et al.*, 1988: 46; Barreto, 1986: 146; Borkent & Spinelli, 2007: 66; Spinelli *et al.*, 2009: 88; Borkent, 2015: 83 (cat.).

filiductus Wirth, *in* Vitale *et al.*, 1981: 155. Type locality: Panama, Panamá Prov., Bayano Field Station. HT F (# 76107 USNM). Distr.: Belize to Colombia (Amazonas (Leticia)). Refs.: Vitale *et al.*, 1981: 155; Borkent & Spinelli, 2007: 66; Spinelli *et al.*, 2009: 86.

germanus Macfie, 1940c: 27. Type locality: Guyana, New River. HT F (BMNH). Distr.: Costa Rica, Colombia (Tolima (Melgar, El Aguila)), Guyana. Refs.: Macfie, 1940c: 27; Borkent & Spinelli, 2007: 66; Spinelli *et al.*, 2009: 86.

ginesi Ortíz, 1951: 586. Type locality: Venezuela, Yaracuy, San Felipe. HT F (INHC). Distr.: El Salvador to Panama, Colombia (?), Venezuela, Trinidad and Tobago, Brazil (Pará), Northeastern Argentina. Refs.: Ortíz, 1951: 586; Wirth *et al.*, 1988: 48; Borkent & Spinelli, 2007: 66; Spinelli *et al.*, 2009: 88.

glabrior Macfie, 1940c: 27 (as variety of *debilipalpis*). Type locality: Guyana, New River. HT F (BMNH). Distr.: Honduras to Colombia (?), Ecuador, Guyana, Surinam, Trinidad and Tobago, Brazil (Pará). Refs.: Macfie, 1940c: 27; Barreto, 1986: 147; Borkent & Spinelli, 2007: 66; Spinelli *et al.*, 2009: 88.

grahambelli Forattini, 1956: 35. Type locality, Panama, Cerro Cefa. HT F (DEFS).

insinuatus Ortíz & León, 1955: 577. Type locality: Ecuador, Napo-Pastaza, Nuevo Rocafuerte. HT F (UNCE). Distr.: Colombia (Amazonas (Leticia, Santa Sofia, Río Arará y Puerto Arica, Río Putumayo), Vaupés (Mitú; Caño Cuduyari)), Ecuador, Peru, Trinidad and Tobago, Guyana, Brazil (Amazonas, Pará, (?) São Paulo). Refs.: Ortíz & León, 1955: 577; Tidwell *et al.*, 1980a: 125; Tidwell & Tidwell, 1982: 1139; Barreto, 1986: 147; Borkent & Spinelli, 2007: 67; Spinelli *et al.*, 2009: 88.

paraensis (Goeldi), 1905: 137 (*Haematomyidium*). Type locality: Brazil, Pará, Belém. NT F (FIOC). Distr.: USA (Colorado, Nebraska, Pennsylvania, Wisconsin to Louisiana and Florida) to Argentina. Localities in Colombia (Amazonas (Leticia; Arará, vic. Leticia), Antioquia (Río Anorí Valley, Buenos Aires, 690 m; Providencia; Tiroteos, 590 m), Caquetá (Tres Esquinas), Meta (Villavicencio, El Buque), Tolima (Mariquita, Florazul; Vereda, La Guardia, Finca Bélgica; Melgar, El Aguila), Valle del Cauca (Cali; Buchitolo; Navarro, Vaupés (San José de Inambú; San Pablo; Ortega)). Refs.: Goeldi, 1905: 137; Barreto, 1974: 124; Wirth & Blanton, 1973: 443; Barreto, 1986: 147; Wirth & Felipe-Bauer, 1989: 553; Borkent & Spinelli, 2007: 67; Spinelli *et al.*, 2009: 88.

undecimpunctatus Kieffer, 1917b: 307. Type locality: Argentina, San Pablo. T F (HNHM, lost).

quasiparaensis Clastrier, 1971: 286. Type locality: French Guiana, Cayena, Bosque Cabassou. HT F (MNHN). Distr.: Honduras and El Salvador to Colombia (Antioquia (Río Anorí Valley, Buenos Aires, 690 m; La Tirana, 320 m), Putumayo (Puerto Leguizamo, Santa Cecilia), Valle del Cauca (Candelaria, Finca San Luis)), Peru, French Guiana, Brazil (Amazonas, Rondônia). Refs.: Clastrier, 1971: 286; Barreto, 1986: 148; Wirth & Felipe Bauer, 1989: 561; Borkent & Spinelli, 2007: 67; Spinelli *et al.*, 2009: 88.

youngi Wirth & Barreto, 1978: 562. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (# 71159 USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)). Refs.: Wirth & Barreto, 1978: 562; Barreto, 1986: 148; Wirth *et al.*, 1988: 50; Borkent & Spinelli, 2007: 67; Spinelli *et al.*, 2009: 88; Borkent, 2015: 107 (cat.).

Subgenus **Hoffmania** Fox

Hoffmania Fox, 1948: 21 (as subgenus of *Culicoides*). Type species, *Culicoides inamollae* Fox & Hoffman (= *Culicoides insignis* Lutz) (orig. des.). Refs.: Spinelli *et al.*, 1993 (key to species groups; key to males and females of *guttatus* group); Wirth & Blanton, 1968a (key to males and females in *hylas* group); Felipe-Bauer *et al.*, 2009 (key to females in *hylas* group).

antioquiensis Spinelli, Santamaría, Cabrera, Ronderos & Suárez, 2009: 82. Type locality: Colombia, Antioquia, near Río Anorí. HT M (MLPA). Distr.: Colombia (Antioquia (near Río Anorí)). Refs.: Spinelli *et al.*, 2009: 82; Borkent, 2015: 76 (cat.).

batesi Wirth & Blanton, 1973: 426. Type locality: Brazil, Pará, Belém, APEG Forest. HT F (USNM). Distr.: Guatemala, Colombia (Cauca (López, Río Micay, Casa de Suárez), Chocó (Rt. 25; Curiche; Teresita), Valle del Cauca (Río Raposo)), Ecuador, Bolivia, Brazil (Pará). Refs.: Wirth & Blanton, 1973: 426; Wirth *et al.*, 1988: 14; Spinelli *et al.*, 1993: 18; Borkent & Spinelli, 2007: 67; Spinelli *et al.*, 2009: 88.

sanmartini Wirth & Barreto, 1978: 553. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (# 71152 USNM).

brownei Spinelli, *in* Spinelli *et al.* 1993: 24. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM). Distr.: Colombia (Boyacá (Palagua, Puerto Boyacá), Valle del Cauca (Río Raposo)). Refs.: Spinelli *et al.* 1993: 24; Borkent & Spinelli, 2007: 68; Spinelli *et al.*, 2009: 88; Borkent, 2015: 79 (cat.).

couthoi Barreto, 1944: 96. Type locality: Brazil, São Paulo, Juquiá, Prainha. HT M (DEFS). Distr.: Colombia (Caquetá (San Vicente del Caguán, Tres Esquinas)), French Guiana, Brazil (Amazonas, Pará, São Paulo). Refs.: Barreto, 1944: 96; Borkent & Spinelli, 2007: 68; Spinelli *et al.*, 2009: 86.

davidi Spinelli, *in* Spinelli *et al.*, 1993: 30. Type locality: Colombia, Chocó, Rt. 25. HT F (USNM). Distr.: Costa Rica, Colombia (Chocó (Rt. 25)), Trinidad and Tobago. Refs.: Spinelli *et al.*, 1993: 30; Borkent & Spinelli, 2007: 68; Spinelli *et al.*, 2009: 88; Borkent, 2015: 82 (cat.).

diabolicus Hoffman, 1925: 294. Type locality: Panama, Cabima. ST F (USNM). Distr.: Mexico to Venezuela, Colombia (Cauca (López, Río Micay, Casa de Suárez), Chocó (Rt. 25; Curiche), Meta (Puerto López; San Martín, Barbascal), Boyacá (Puerto Boyacá)) and Ecuador. Refs.: Hoffman, 1925: 294; Macfie, 1932b: 487; Barreto, 1986: 143; Wirth *et al.*, 1988: 14; Spinelli *et al.*, 1993: 32; Borkent & Spinelli, 2007: 68; Spinelli *et al.*, 2009: 88.

fernandoi Tavares & Souza, 1979: 611. Type locality: Brazil, Rio de Janeiro, Sumidouro, Sitio Peri-Ceci. HT M (FIOC). Distr.: Colombia (Meta (Finca Barbascal)), Brazil (Espírito Santo, Rio de Janeiro, Santa Catarina), northeastern Argentina, Uruguay. Refs.: Tavares & Souza, 1979: 611; Spinelli *et al.*, 1993: 36; Borkent & Spinelli, 2007: 68; Spinelli *et al.*, 2009: 88.

filarifer Hoffman, 1939: 172. Type locality: Mexico, Chiapas, El Vergel, near Huixtla. HT F (USNM). Distr.: Mexico (Veracruz, Chiapas) to northern Brazil. Localities in Colombia (?). Refs.: Hoffman, 1939: 172; Barreto, 1986: 144 Spinelli *et al.*, 1993: 37; Borkent & Spinelli, 2007: 68; Spinelli *et al.*, 2009: 88.

foxi Ortíz, 1950b: 461. Type locality: Puerto Rico, Camp Tortuguero. HT M (UNPR). Distr.: Mexico (Chiapas) to Bolivia, Puerto Rico to northeastern Argentina; Colombia (Caquetá (Los Alicángaros), Cauca (Tambo, Finca Carpentería), Chocó (Teresita), Magdalena (?); Meta (Finca Barbascal; Restrepo, El Retiro, Refugio Macarena), Putumayo (Puerto Leguizamo; Puerto López), Valle del Cauca (Pance; Río Raposo; oleoducto de Pacific, 10 km NW Dagua)). Refs.: Ortíz, 1950b: 461; Forattini, 1957: 205; Wirth & Blanton, 1973: 434; Wirth & Blanton, 1974: 14; Barreto, 1986: 144; Spinelli *et al.*, 1993: 41; Borkent & Spinelli, 2007: 68; Spinelli *et al.*, 2009: 88.

franklini Spinelli, in Spinelli *et al.*, 1993: 45. Type locality: Panama, Canal Zone, Summit Gardens. HT F (USNM). Distr.: Mexico (Guerrero) to Colombia (Chocó (Teresita), Valle del Cauca (Río Raposo)), Bolivia, Brazil (Pará). Refs.: Spinelli *et al.*, 1993: 45; Borkent & Spinelli, 2007: 68; Spinelli *et al.*, 2009: 88.

fusipalpis Wirth & Blanton, 1973: 435. Type locality: Brazil, Pará, Belém. HT F (USNM). Distr.: El Salvador to Colombia (Caquetá (Los Alicángaros), Putumayo (Puerto Leguizamo), Valle del Cauca (Río Raposo)), Ecuador, Bolivia, French Guiana, Guyana, Brazil (Amazonas, Pará, Bahia, Rio de Janeiro). Refs.: Wirth & Blanton, 1973: 435; Aitken *et al.*, 1975: 125; Barreto, 1986: 144; Borkent & Spinelli, 2007: 68; Spinelli *et al.*, 2009: 88.

heliconiae Fox & Hoffman, 1944: 108. Type locality: Venezuela, Maracay. HT F (UNPR). Distr.: Belize to Colombia (Antioquia (?), Caquetá (Tres Esquinas, Los Alicángaros), Huila (Suaza, San Calixto), Valle del Cauca (Cali, Pance, Peñas Blancas; Río Raposo)), Ecuador, Venezuela, Grenada, Trinidad and Tobago, Brazil (Amazonas, Pará). Refs.: Fox & Hoffman, 1944: 108; Wirth & Blanton, 1968: 207; Wirth & Blanton, 1973: 439; Wirth & Blanton, 1974: 14; Barreto, 1986: 144; Wirth *et al.*, 1988: 18; Borkent & Spinelli, 2007: 68; Spinelli *et al.*, 2009: 88.

rozeboomi Barbosa, 1947: 26. Type locality: Panama, Balboa, Canal Zone. HT M (USNM).

hylas Macfie, 1940c: 26. Type locality: Guyana, New River. ST F (BMNH). Distr.: Mexico (Veracruz) to Colombia (Caquetá (Tres Esquinas), Cauca (López, Río Micay, San Antonio, Casa de Suárez), Valle del Cauca (Río Raposo)), Peru, Brazil (Pará). Refs.: Macfie, 1940c: 26; Wirth & Blanton, 1968: 203; Wirth & Blanton, 1973: 439; Barreto, 1986: 144; Borkent & Spinelli, 2007: 68; Spinelli *et al.*, 2009: 88.

insignis Lutz, 1913: 51. Type locality: Brazil, Bahia and Rio de Janeiro. LT M (# 5092 FIOC). Distr.: USA (Alabama, Georgia, Florida), Mexico (Yucatán, Chiapas), Central America and Caribbean to central Argentina. Localities in Colombia (Amazonas (Sofía), Antioquia (El Hatillo, Barbosa; Caucasia, Hacienda La Candelaria), Boyacá (Palagua, Puerto Boyacá), Cauca (11 km N Santander de Quilchao; Puerto López), Chocó (Condoto, Opogodó), César (San Alberto, 120 km N Bucaramanga), Huila (San Agustín), Magdalena (La Gloria), Meta (Finca Barbascal; Restrepo, El Retiro, Refugio Macarena), Putumayo (Puerto Leguizamo), Calderón), Valle del Cauca (Cali, Candelaria, Pance; Palmira; Río Raposo)). Refs.: Lutz, 1913: 51; Wirth & Blanton, 1956: 319; Forattini, 1957: 223; Wirth & Blanton, 1973: 440; Wirth & Soria, 1981: 79; Barreto, 1986: 144; Spinelli *et al.*, 1993: 53; Borkent & Spinelli, 2007: 68; Spinelli *et al.*, 2009: 88.

inamollae Fox & Hoffman, 1944: 110. Type locality: Puerto Rico, Mayaguez. HT F (UNPR).

painteri Fox, 1946: 257. Type locality: Honduras, Puerto Castilla. HT F (UNPR).

lutzi Costa Lima, 1937: 419. Type locality: Brazil, Pará, Abaeté. ST F (# 2408 FIOC). Distr.: Colombia (Amazonas (Sofía), Boyacá (Palagua, Puerto Boyacá), Meta (Finca Barbascal; Refugio Macarena), Putumayo (Puerto Leguizamo)) to French Guiana, northeastern Argentina, Brazil (Roraima, Amazonas, Pará, Mato Grosso, Goiás, São Paulo, Rio de Janeiro, Santa Catarina). Refs.: Costa Lima, 1937: 419; Wirth & Blanton, 1973: 442; Barreto, 1986: 144; Spinelli *et al.*, 1993: 59; Borkent & Spinelli, 2007: 68; Spinelli *et al.*, 2009: 88.

ocumarensis Ortíz, 1950a: 455. Type locality: Venezuela, Miranda, Ocumare del Tuy. HT F (INHC). Distr.: Mexico (Oaxaca, Tabasco) to Colombia (Amazonas (Sofía), Antioquia (Caucasia, Finca La Candelaria; Barbosa, El Establo; Turbo, Río León), Boyacá (Puerto Boyacá), Caquetá (Tres Esquinas), Cauca (López, Río Micay, San Antonio, Casa de Suárez; Puerto López), César (San Alberto, 120 km N Bucaramanga), Meta (Finca Barbascal), Valle del Cauca (Río Raposo)), Venezuela, Peru and northern Brazil (Pará, Rondônia). Refs.: Ortíz, 1950a: 455; Spinelli *et al.*, 1993: 63; Borkent & Spinelli, 2007: 69; Spinelli *et al.*, 2009: 88.

palpalis Macfie, 1948: 78. Type locality: Mexico, Chiapas, San Cristobal. HT F (BMNH). Distr.: Mexico (Chiapas) to Colombia (Caquetá (Los Alicángaros)), Venezuela, Peru, Brazil (Amazonas). Refs.: Macfie, 1948: 78; Wirth & Blanton, 1973: 443; Barreto, 1986: 144; Borkent & Spinelli, 2007: 69; Spinelli *et al.*, 2009: 88.

paraignacioi Spinelli, in Spinelli *et al.*, 1993: 66. Type locality: Colombia, Antioquia, near Río Anorí. HT F (USNM). Distr.: Belize to Peru, Colombia (Antioquia (near Río Anorí), Caquetá (Los Alicángaros), Chocó (Curiche; Rt. 25; Teresita), Guaviare (San José del Guaviare, Trocha Oriental), Putumayo (Puerto Leguizamo)),

French Guiana, Brazil (Amazonas, Pará). Refs.: Spinelli *et al.*, 1993: 66; Borkent & Spinelli, 2007: 69; Spinelli *et al.*, 2009: 88; Borkent, 2015: 97 (cat.).

plaumanni Spinelli, *in* Spinelli *et al.*, 1993: 69. Type locality: Argentina, Chaco, Parque Nacional El Chaco. HT F (MLPA). Distr.: Colombia (Meta (Villavicencio, El Buque)), Peru, Bolivia, Brazil (Amazonas) northeastern Argentina. Refs.: Spinelli *et al.*, 1993: 69; Borkent & Spinelli, 2007: 69; Spinelli *et al.*, 2009: 91.

polypori Wirth & Blanton, 1968: 212. Type locality: Panama, Canal Zone, Barro Colorado Island. HT F (# 69916 USNM). Distr.: Honduras to Colombia (Valle del Cauca (Río Raposo)), Brazil (Amazonas). Refs.: Wirth & Blanton, 1968: 212; Barreto, 1986: 144; Wirth *et al.*, 1988: 20; Borkent & Spinelli, 2007: 69; Spinelli *et al.*, 2009: 88.

pseudodiabolicus Fox, 1946: 256. Type locality: Trinidad and Tobago, Cumuto Village. HT F (UNPR). Distr.: Mexico (Veracruz) to Colombia (Antioquia (near Río Anorí), Caquetá (Los Alicángaros; Tres Esquinas), Cauca (López, Río Micay), Chocó (Curiche; Rt. 25; Teresita), Meta, Boyacá (Puerto Boyacá), Putumayo (Puerto Leguizamo), Valle del Cauca (Río Raposo)), Venezuela, Peru and Northern Brazil. Refs.: Fox, 1946: 256; Wirth & Blanton, 1973: 445; Barreto, 1986: 144; Spinelli *et al.*, 1993: 71; Borkent & Spinelli, 2007: 69; Spinelli *et al.*, 2009: 88.

ruizi Forattini, 1954: 189. Type locality: Brazil, Goiás, Aruana. HT F (DEFS). Distr.: Colombia (Intendencia de Arauca), Brazil (Amazonas, Goiás). Refs.: Forattini, 1954: 189; Wirth *et al.*, 1988: 18; Spinelli *et al.*, 1993: 74; Borkent & Spinelli, 2007: 69; Spinelli *et al.*, 2009: 88.

tidwelli Spinelli, *in* Spinelli *et al.* 1993: 74. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM). Distr.: Honduras to Colombia (Cauca (López, Río Micay), Chocó (Curiche; Teresita), Valle del Cauca (Río Raposo; Oleoducto de Pacífico, 9 km N Dagua)), Ecuador. Refs.: Spinelli *et al.*, 1993: 74; Borkent & Spinelli, 2007: 69; Spinelli *et al.*, 2009: 88; Borkent, 2015: 104 (cat.).

trinidadensis Hoffman, 1925: 286. Type locality: Trinidad and Tobago, Port of Spain, Caronia River. HT F (USNM). Distr.: Coastal; Honduras and El Salvador to Colombia (Antioquia (Currulao), Chocó (Curiche), Valle del Cauca (Río Raposo, Bahía Buenaventura, Bella Vista)), Ecuador to Surinam, Cuba and Cayman Islands to Trinidad and Tobago. Refs.: Hoffman, 1925: 286; Wirth & Blanton, 1974: 14; Barreto, 1986: 145; Wirth *et al.*, 1988: 18; Spinelli *et al.*, 1993: 78; Borkent & Spinelli, 2007: 69; Spinelli *et al.*, 2009: 89.

oliveri Fox & Hoffman, 1944: 108. Type locality: Haiti, Mariani. HT M (UNPR).

wokei Barbosa, 1947: 28 (preocc. *Culicoides wokei* Fox, 1947). Type locality: Panama, Balboa. LT M (USNM).

diminutus Barbosa, 1951: 163. New name for *wokei*.

verecundus Macfie, 1948: 76. Type locality: Mexico, Chiapas, El Vergel. ST F, M (BMNH). Distr.: Mexico (Chiapas) to Panama, Colombia (Valle del Cauca (Río Raposo)), Ecuador and Brazil (Amazonas, Pará). Refs.: Macfie, 1948: 76; Barreto, 1986: 145; Borkent & Spinelli, 2007: 69; Spinelli *et al.*, 2009: 89.

Subgenus **Macfiella** Fox

Macfiella Fox, 1955: 217 (as subgenus of *Culicoides*). Type species: *Ceratopogon phlebotomus* Williston (orig. des).

phlebotomus (Williston), 1896: 281 (*Ceratopogon*). Type locality: St. Vincent. HT F (BMNH). Distr.: Coastal; Mexico (Sinaloa) to Colombia (Valle del Cauca (Río Raposo)), Ecuador, Jamaica to Brazil (Maranhão, Ceará, Pernambuco, Goiás). Refs.: Williston, 1896: 281; Barreto, 1986: 145; Borkent & Spinelli, 2007: 69; Spinelli *et al.*, 2009: 89.

amazonius Macfie, 1935: 52. Type locality: Brazil, Piauí, Tutóia. ST FM (BMNH).

Subgenus **Mataemyia** Vargas

Mataemyia Vargas, 1960: 43 (as subgenus of *Culicoides*). Type species, *Culicoides mojingaensis* Wirth & Blanton (orig.des.).

Refs.: Wirth & Soria, 1981 (key males and females to some species, as *discrepans* group).

dalessandroi Wirth & Barreto, 1978: 556. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (# 71154 USNM). Distr.: Costa Rica, Panama, Colombia (Antioquia (Río Anorí), Boyacá (Puerto Boyacá), Meta (Finca Barbascal), Valle del Cauca (Río Raposo)). Refs.: Wirth & Barreto, 1978: 556; Barreto, 1986: 146; Wirth *et al.*, 1988: 36; Borkent & Spinelli, 2007: 70; Spinelli *et al.*, 2009: 89; Borkent, 2015: 81 (cat.).

dicrourus Wirth & Blanton, 1955b: 123. Type locality: Panama, Canal Zone, Loma Borracho. HT F (# 62810 USNM). Distr.: Costa Rica to Colombia (Valle del Cauca (Río Raposo)), Ecuador. Refs.: Wirth & Blanton, 1955b: 123; Wirth & Soria, 1981: 110; Barreto, 1986: 146; Borkent & Spinelli, 2007: 70; Spinelli *et al.*, 2009: 89.

volcanensis Wirth & Blanton, 1959: 389. Type locality: Panama, Chiriquí, Volcán. HT F (# 63168 USNM). Distr.: Panama, Colombia (?). Refs.: Wirth & Blanton, 1959: 389; Wirth, 1974: 38; Borkent & Spinelli, 2007: 70; Spinelli *et al.*, 2009: 89.

Subgenus **Oecacta** Poey

Oecacta Poey, 1853: 238. Type species, *Oecacta furens* Poey (mon.).

alahialinus Barbosa, 1952: 11 (1953: 12). Type locality: Ecuador, Esmeralda, Limones. HT F (UNCE). Distr.: Costa Rica, Panama, Colombia (Valle del Cauca (Río Raposo)), Ecuador. Refs.: Barbosa, 1952: 11; Barreto, 1986: 145; Borkent & Spinelli, 2007: 70; Spinelli *et al.*, 2009: 89.

barbosai Wirth & Blanton, 1956a: 161. Type locality: Panama, Canal Zone, Mojinga Swamp. HT F (# 63157 USNM). Distr.: USA (Florida) to Colombia (Valle del Cauca (Río Raposo)), Ecuador. Refs.: Wirth & Blanton, 1956a: 161; Wirth & Blanton, 1974: 15; Barreto, 1986: 145; Borkent & Spinelli, 2007: 70; Spinelli *et al.*, 2009: 89.

furens (Poey), 1853: 238 (*Oecacta*). Type locality: Cuba, north coast, probably La Habana. Type most probably lost. Distr.: USA (Massachusetts to Florida and Texas), Mexico (Campeche, Sinaloa, Yucatán, Veracruz) and Caribbean to Colombia (Magdalena (?); Valle del Cauca (Río Raposo)), Ecuador and coastal Brazil. Refs.: Poey, 1853: 238; Wirth & Blanton, 1974: 15; Barreto, 1986: 145; Borkent & Spinelli, 2007: 70; Spinelli *et al.*, 2009: 89.

maculithorax (Williston), 1896: 277 (*Ceratopogon*). Type locality: St. Vincent. HT F (BMNH).

birabeni Cavalieri, 1966: 59. Venezuela, Sucre, Cariaguaito. HT F (INMA).

gorgasi Wirth & Blanton, 1953b: 232. Type locality: Panama, Los Santos, Las Tablas. HT F (# 61507 USNM). Distr.: Costa Rica to Colombia (?). Refs.: Wirth & Blanton, 1953b: 232; Wirth, 1974: 42; Borkent & Spinelli, 2007: 70; Spinelli *et al.*, 2009: 89.

Subgenus **Psychophaena** Philippi

Psychophaena Philippi, 1865: 628. Type species, *Psychophaena pictipennis* Philippi (= *Culicoides venezuelensis* Ortíz & Mirsa) (mon.).

venezuelensis Ortíz & Mirsa, 1950: 137. Type locality, Venezuela, Miranda, Los Chorros. HT F (INHC). Distr.: Costa Rica to Chile and Central Argentina; Colombia (Valle del Cauca (Cali, Pance; Río Raposo)). Refs.: Ortíz & Mirsa, 1950: 137; Barreto, 1986: 148; Borkent & Spinelli, 2007: 71; Spinelli *et al.*, 2009: 89.

pictipennis (Philippi), 1865: 628 (*Psychophaena*) (preocc. *Culicoides pictipennis* (Staeger, 1839). Type locality: Chile, Santiago, San Cristóbal. LHT F (MUNS).

ortizi Fox, 1952: 366. Type locality, Venezuela, Zulia, La Salina. HT F (UNPR).

Subgenus unplaced, *acotylus* Species Group

acotylus Lutz, 1913: 69. Type locality: Brazil, Mato Grosso, Río Tapajós, Salto Augusto. HT F (# 2984 FIOC). Distr.: Mexico to Colombia (?), Venezuela, Trinidad and Tobago, Surinam, Brazil (Mato Grosso, Pará). Refs.: Lutz, 1913: 69; Wirth, 1974: 27; Barreto, 1986: 145; Borkent & Spinelli, 2007: 71; Spinelli *et al.*, 2009: 89.

carsiomelas Wirth & Blanton, 1955a: 100. Type locality: Panama, Canal Zone, Mojinga Swamp. HT F (# 62806 USNM). Distr.: Panama, Colombia (Valle del Cauca (Río Raposo)), Brazil (Pará). Refs.: Wirth & Blanton, 1955a: 100; Barreto, 1986: 146; Wirth *et al.*, 1988: 38; Borkent & Spinelli, 2007: 71; Spinelli *et al.*, 2009: 89.

teretipalpis Wirth & Barreto, 1978: 557. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (# 71156 USNM). Distr.: Colombia (Antioquia (Río Anorí), Valle del Cauca (Río Raposo)). Refs.: Wirth & Barreto, 1978: 557; Barreto, 1986: 148; Wirth *et al.*, 1988: 38; Borkent & Spinelli, 2007: 71; Spinelli *et al.*, 2009: 89; Borkent, 2015: 104 (cat.).

Subgenus unplaced, *carpenteri* Species Group

belemensis Wirth & Blanton, 1973: 427. Type locality: Brazil, Pará, Belém. HT F (USNM). Distr.: Colombia (?), Brazil (Amazonas, Pará). Refs.: Wirth & Blanton, 1973: 427; Wirth *et al.*, 1988: 32; Borkent & Spinelli, 2007: 71; Spinelli *et al.*, 2009: 89.

camposi Ortíz & León, 1955: 580. Type locality: Ecuador, Pichincha, San Miguel de los Colorados, Zapallo Grande. HT F (UNCE). Distr.: Costa Rica, Panama, Colombia (Putumayo (Puerto Leguizamo), Valle del Cauca (Río Raposo)), Ecuador. Refs.: Ortíz & León, 1955: 580; Wirth & Blanton, 1973: 428; Barreto, 1986: 145; Wirth *et al.*, 1988: 32; Borkent & Spinelli, 2007: 71; Spinelli *et al.*, 2009: 89.

fairchildi Wirth & Blanton, 1955a: 102. Type locality: Panama, Canal Zone, Madden Dam. HT F (# 62801 USNM).

Subgenus unplaced, *daedalus* Species Group

beaveri Wirth & Barreto, 1978: 557. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (# 71155 USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)). Refs.: Wirth & Barreto, 1978: 557; Barreto, 1986: 145; Wirth *et al.*, 1988: 28; Borkent & Spinelli, 2007: 71; Spinelli *et al.*, 2009: 89.

crescentis Wirth & Blanton, 1959: 317. Type locality: Panama, Canal Zone, Mojinga Swamp. HT F (# 63159 USNM). Distr.: Mexico (Chiapas) to Colombia (?), northeastern Argentina. Refs.: Wirth & Blanton, 1959: 317; Wirth *et al.*, 1988: 28; Borkent & Spinelli, 2007: 71; Spinelli *et al.*, 2009: 89.

daedaloides Wirth & Blanton, 1959: 330. Type locality: Panama, Bocas del Toro, Amirante. HT F (# 63163 USNM). Distr.: Panama, Colombia (Valle del Cauca (Río Raposo)), northwestern Argentina. Refs.: Wirth & Blanton, 1959: 330; Barreto, 1986: 148; Borkent & Spinelli, 2007: 71; Spinelli *et al.*, 2009: 89.

daedalus Macfie, 1948: 83. Type locality, Mexico, Chiapas, El Vergel. HT M (BMNH). Distr.: USA (Arizona, New Mexico), Mexico (Chiapas) to Colombia (?). Refs.: Macfie, 1948: 83; Wirth *et al.*, 1988: 28; Borkent & Spinelli, 2007: 71; Spinelli *et al.*, 2009: 89.

Subgenus unplaced, *dasyphrus* Species Group

dasyphrus Macfie, 1940c: 27. Type locality: Guyana, New River. ST M, F (BMNH). Distr.: Colombia (Meta (Refugio Macarena)), Ecuador, Venezuela, Guyana, Brazil (Amazonas, Mato Grosso, Pará). Refs.: Macfie, 1940c: 27; Wirth & Blanton, 1973: 430; Barreto, 1986: 146; Wirth *et al.*, 1988: 50; Borkent & Spinelli, 2007: 72; Spinelli *et al.*, 2009: 89.

Subgenus unplaced, *eublepharus* Species Group

caldasi Browne, 1980: 535. Type locality: Colombia, Valle del Cauca, Cali, Peñas Blancas, Finca El Rosal, 1800 m. HT F (USNM). Distr.: Colombia (Valle del Cauca (Cali, Peñas Blancas, Finca El Rosal, 1800 m)). Refs.: Browne, 1980: 535; Barreto, 1986: 145; Wirth *et al.*, 1988: 42; Borkent & Spinelli, 2007: 72; Spinelli *et al.*, 2009: 89; Borkent, 2015: 79 (cat.).

caucaensis Wirth & Lee, 1967: 19. Type locality: Colombia, Cauca, 28.4 km E Puracé, 3100 m. HT F (# 69403 USNM). Distr.: Colombia (Cauca (28.4 km E Puracé, 3100 m)). Refs.: Wirth & Lee, 1967: 19; Barreto, 1986: 146; Wirth *et al.*, 1988: 42; Borkent & Spinelli, 2007: 72; Spinelli *et al.*, 2009: 89; Borkent, 2015: 80 (cat.).

eublepharus Macfie, 1948: 86. Type locality: Guyana, New River. HT F (lost). Distr.: Mexico (Chiapas), Costa Rica, Colombia (Antioquia (Río Anorí), Caquetá (Tres Esquinas)) to Ecuador, Venezuela, northern Brazil. Refs.: Macfie, 1948: 86; Wirth & Blanton, 1973: 431; Barreto, 1986: 146; Wirth *et al.*, 1988: 44; Borkent & Spinelli, 2007: 72; Spinelli *et al.*, 2009: 89.

transferrans Ortíz, 1953: 801. Type locality: Venezuela, Amazonas, head Río Orinoco. HT F (INHC).

florenciae Messersmith, 1972: 167. Type locality: Colombia, Caquetá, Florencia, Ríohacha, 1000 m. HT F (# 73147 USNM). Distr.: Colombia (Caquetá (Florencia), Guajira (Ríohacha, 1000 m), Valle del Cauca (Cali, Peñas Blancas, Finca El Rosal, 1800 m)). Refs.: Messersmith, 1972: 167; Browne, 1980: 533; Barreto, 1986: 146; Wirth *et al.*, 1988: 44; Borkent & Spinelli, 2007: 72; Spinelli *et al.*, 2009: 89; Borkent, 2015: 84 (cat.).

micayensis Spinelli, Santamaría, Cabrera, Ronderos & Suárez, 2009: 85. HT F (MLPA). Type locality: Colombia, Cauca, López, Río Micay. Distr.: Colombia (Cauca (López, Río Micay)). Refs.: Spinelli *et al.*, 2009: 85; Borkent, 2015: 93 (cat.).

pabloi Browne, 1980: 541. Type locality: Colombia, Valle del Cauca, Cali, Pance, 1600 m. HT F (USNM). Distr.: Colombia (Valle del Cauca (Cali, Pance, 1600 m; Peñas Blancas)). Refs.: Browne, 1980: 541; Barreto, 1986: 147; Wirth *et al.*, 1988: 44; Borkent & Spinelli, 2007: 72; Spinelli *et al.*, 2009: 89; Borkent, 2015: 96 (cat.).

rangeli Ortíz & Mirsa, 1952b: 126. Type locality: Venezuela, Miranda, Los Chorros. HT F (INHC). Distr.: Mexico (Oaxaca) to Colombia. Locality in Colombia (Valle del Cauca (Cali, Peñas Blancas; Río Raposo)), Ecuador, Bolivia, Venezuela, Guadeloupe, Trinidad and Tobago, Brazil (Amazonas). Refs.: Ortíz & Mirsa, 1952b: 126; Barreto, 1986: 148; Borkent & Spinelli, 2007: 72; Spinelli *et al.*, 2009: 89.

donajii Vargas, 1954: 28. Type locality: Mexico, Oaxaca. HT M (CAIM).

patulipalpis Wirth & Blanton, 1959: 421. Type locality: Panama, Panama prov., Cerro Campana. HT F (# 63170 USNM).

tamboensis Wirth & Lee, 1967: 20. Type locality: Colombia, Cauca, El Tambo, Finca Carpentería, 2500 m. HT F (# 69404 USNM). Distr.: Colombia (Cauca (El Tambo, Finca Carpentería, 2500 m), Valle del Cauca (Cali, Pance)). Refs.: Wirth & Lee, 1967: 20; Barreto, 1986: 148; Wirth *et al.*, 1988: 44; Borkent & Spinelli, 2007: 72; Spinelli *et al.*, 2009: 89; Borkent, 2015: 104 (cat.).

Subgenus unplaced, *fluvialis* Species Group

balsapambensis Ortíz & León, 1955: 569 (as variety of *pifanoi*). Type locality: Ecuador, Bolívar, Balsapamba. ST F (UNCE). Distr.: Costa Rica to Colombia (Valle del Cauca (Cali, Pance)), Ecuador, Brazil. Refs.: Ortíz & León, 1955: 569; Barreto, 1986: 145; Borkent & Spinelli, 2007: 72; Spinelli *et al.*, 2009: 89.

castillae Fox, 1946: 251. Type locality: Honduras, Puerta Castilla. HT F (UNPR). Distr.: Guatemala to Colombia (Boyacá (Pauna, Topo Grande), Caquetá (Solano)), Ecuador, Venezuela, Trinidad and Tobago. Refs.: Fox, 1946: 251; Borkent & Spinelli, 2007: 72; Spinelli *et al.*, 2009: 86.

gibsoni Wirth, 1952: 246. Type locality: Guatemala, Chimaltenango, San Pedro Yepocapa. HT F (# 61407 USNM). *flochabonnenci* Ortíz & Mirsa, 1952a: 267. Type locality: Venezuela, Miranda, Los Chorros. HT F (INHC).

fluvialis Macfie, 1940c: 25. Type locality: Guyana, New River. HT F (BMNH). Distr.: Honduras to Colombia (?), Venezuela, Trinidad and Tobago, Guyana, Brazil (Amazonas, Pará). Refs.: Macfie, 1940c: 25; Wirth *et al.*, 1988: 44; Borkent & Spinelli, 2007: 72; Spinelli *et al.*, 2009: 86.

leopoldoi Ortíz, 1951: 579. Type locality: Venezuela, Miranda, Ocumare del Tuy. HT F (INHC). Distr.: Guatemala and Belize to Bolivia and northeastern Argentina, Trinidad and Tobago, Colombia (Valle del Cauca (Río Raposo)). Refs.: Ortíz, 1951: 579; Barreto, 1986: 147; Borkent & Spinelli, 2007: 72; Spinelli *et al.*, 2009: 90.

Subgenus unplaced, *leoni* Species Group

fieldi Wirth & Blanton, 1956c: 50. Type locality: Honduras, Lancetilla. HT F (# 63130 USNM). Distr.: Honduras, Costa Rica, Panama, Colombia (Valle del Cauca (Río Raposo)). Refs.: Wirth & Blanton, 1956c: 50; Barreto, 1986: 146; Borkent & Spinelli, 2007: 73; Spinelli *et al.*, 2009: 90.

gabaldoni Ortíz, 1954: 221. Type locality: Venezuela, Yaracuy, San Felipe. HT F (INHC). Distr.: Mexico (Tabasco) to Colombia (Valle del Cauca (Río Raposo)), Ecuador, Venezuela, Trinidad and Tobago, Brazil (Bahia), Paraguay, northeastern Argentina. Refs.: Ortíz, 1954: 221; Barreto, 1986: 146; Borkent & Spinelli, 2007: 73; Spinelli *et al.*, 2009: 90.

glabellus Wirth & Blanton, 1956c: 47. Type locality: Panama, Bocas del Toro, Almirante. HT F (# 63129 USNM). Distr.: Honduras to Colombia (Putumayo (Puerto Leguizamo), Valle del Cauca (Río Raposo)), Ecuador, Trinidad and Tobago, Brazil (Bahia, Pará). Refs.: Wirth & Blanton, 1956c: 47; Wirth & Blanton, 1973: 437; Barreto, 1986: 147; Borkent & Spinelli, 2007: 73; Spinelli *et al.*, 2009: 90.

leoni Barbosa, 1952: 17 (1953: 19). Type locality: Ecuador, Santo Domingo. HT F (UNCE). Distr.: Colombia (Boyacá (Pauna, Topo Grande; Aguasal)), Ecuador. Refs.: Barbosa, 1952, 17 (1953: 19); Borkent & Spinelli, 2007: 73; Spinelli *et al.*, 2009: 87.

Subgenus unplaced, *limai* Species Group

galindoi Wirth & Blanton, 1953a: 73. Type locality: Panama, Canal Zone, Mojinga Swamp. HT F (# 61501 USNM). Distr.: Costa Rica, Panama, Colombia (Valle del Cauca (Río Raposo)). Refs.: Wirth & Blanton, 1953a: 73; Barreto, 1986: 147; Borkent & Spinelli, 2007: 73; Spinelli *et al.*, 2009: 87; Borkent, 2015: 85 (cat.).

limai Barretto, 1944: 99. Type locality, Brazil, São Paulo, Moji das Cruzes. HT M (DEFS). Distr.: El Salvador to Colombia (Meta (Restrepo, El Retiro)), Ecuador, Brazil (Pará, Mato Grosso, São Paulo, Rio de Janeiro, Santa Catarina) to northeastern Argentina. Refs.: Barretto, 1944: 99; Forattini, 1954: 223; Forattini, 1957: 335; Barretto, 1986: 147; Borkent & Spinelli, 2007: 73; Spinelli *et al.*, 2009: 90.

santanderi Browne, 1980: 536. Type locality: Colombia, Valle del Cauca, Cali, Pance, Finca Topacio, 1600 m. HT F (USNM). Distr.: Colombia (Valle del Cauca (Cali, Pance, Finca Topacio, 1600 m)). Refs.: Browne, 1980: 536; Barreto, 1986: 148; Wirth *et al.*, 1988: 34; Borkent & Spinelli, 2007: 73; Spinelli *et al.*, 2009: 90; Borkent, 2015: 101 (cat.).

vernoni Wirth & Blanton, 1973: 448. Type locality: Brazil, Pará, Belém. HT F (USNM). Distr.: Costa Rica, Colombia (Valle del Cauca (Cali, Peñas Blancas, El Rosal 1850 m; Río Raposo)), Bolivia, Brazil (Pará). Refs.: Wirth & Blanton, 1973: 448; Barreto, 1986: 148; Borkent & Spinelli, 2007: 73; Spinelli *et al.*, 2009: 90.

Subgenus unplaced, *monticola* Species Group

andinus Wirth & Lee, 1967: 17. Type locality: Colombia, Cauca, El Tambo, Finca Carpentería, 2500 m. HT F (# 69402 USNM). Distr.: Colombia (Cauca (El Tambo, Finca Carpentería, 2500 m; 18 km E Puracé, 3320 m; 28.4 km E Puracé, 3100 m)). Refs.: Wirth & Lee, 1967: 17; Barreto, 1986: 145; Wirth *et al.*, 1988: 32; Borkent & Spinelli, 2007: 73; Spinelli *et al.*, 2009: 90; Borkent, 2015: 76 (cat.).

monticola Wirth & Lee, 1967: 15. Type locality: Colombia, Cauca, El Tambo, Finca Carpentería, 2500 m. HT F (# 69401 USNM). Distr.: Costa Rica, Panama, Colombia (Cauca (El Tambo, Finca Carpentería, 2500 m), Valle del Cauca (Peñas Blancas, 1800 m; Pance)), Ecuador. Refs.: Wirth & Lee, 1967: 15; Barreto, 1986: 147; Wirth *et al.*, 1988: 34; Borkent & Spinelli, 2007: 73; Spinelli *et al.*, 2009: 90; Borkent, 2015: 93 (cat.).

pichindensis Browne, 1980: 538. Type locality: Colombia, Valle, Peñas Blancas, 1800 m. HT F (USNM).

Subgenus unplaced, *pachymerus* Species Group

caprilesi Fox, 1952: 364. Type locality: Venezuela, Mount Marahuaca. HT F (UNPR). Distr.: Panama, Colombia (Vaupés (Mitú; Caño Cuduyarí)), Venezuela, Brazil (Pará, Mato Grosso). Refs.: Fox, 1952: 364; Marinkelle & Germán, 1970: 107; Wirth & Blanton, 1973: 428; Barreto, 1986: 145; Wirth *et al.*, 1988: 52; Borkent & Spinelli, 2007: 74; Spinelli *et al.*, 2009: 90.

kintzi Wirth & Blanton, 1953a: 72. Type locality: Panama, Canal Zone, Fort Sherman, Mojinga Swamp. HT F (# 61498 USNM).

obnoxius Fox, 1952: 365. Type locality: Venezuela, Mount Marahuaca. HT F (UNPR). Distr.: Colombia (Antioquia (Río Anorí)), Venezuela. Refs.: Fox, 1952: 365; Wirth *et al.*, 1988: 54; Borkent & Spinelli, 2007: 74; Spinelli *et al.*, 2009: 90.

pachymerus Lutz, 1914: 83. Type locality: Brazil, Manaus, Río Negro. ST F (FIOC). Distr.: Guatemala to Colombia (Huila (Neiva), Tolima (Honda)), Brazil (Amazonas). Refs.: Lutz, 1914: 83; Barreto, 1986: 147; Borkent & Spinelli, 2007: 74; Spinelli *et al.*, 2009: 90.

uniradialis Wirth & Blanton, 1953a: 70. Type locality: Panama, Canal Zone, Fort Sherman, Mojinga Swamp. HT F (# 61497 USNM). Distr.: Panama, Colombia (Antioquia (Río Anorí), Valle del Cauca (Río Raposo)). Refs.: Wirth & Blanton, 1953a: 70; Wirth & Blanton, 1973: 430; Barreto, 1986: 148; Wirth *et al.*, 1988: 54; Borkent & Spinelli, 2007: 74; Spinelli *et al.*, 2009: 90.

Subgenus unplaced, *reticulatus* Species Group

dipus Santarem & Felipe-Bauer, 2014: 261. Type locality: Colombia, Valle, Río Raposo. HT F (CCER). Distr.: Colombia (Valle del Cauca (Río Raposo)), Panama. Refs.: Santarem & Felipe-Bauer, 2014: 261; Borkent, 2015: 82 (cat.).

macrostigma Wirth & Blanton, 1953b: 230. Type locality: Panama, Canal Zone, Fort Sherman, Mojinga Swamp. HT F (# 61505 USNM). Distr.: Costa Rica to Colombia (?). Refs.: Wirth & Blanton, 1953b: 230; Wirth *et al.*, 1988: 40; Borkent & Spinelli, 2007: 74; Spinelli *et al.*, 2009: 90.

paucienfuscatus Barbosa, 1947: 23. Type locality: Brazil, Amazonas, Manaus. HT F (USNM). Distr.: Costa Rica to Peru and Bolivia, Venezuela, Trinidad and Tobago, Brazil (Amazonas, Pará). Localities in Colombia (Caquetá (Tres Esquinas), Meta (Refugio Macarena)). Refs.: Barbosa, 1947: 23; Wirth & Blanton, 1973: 444; Barreto, 1986: 147; Borkent & Spinelli, 2007: 74; Spinelli *et al.*, 2009: 90.

pifanoi Ortiz, 1951: 588. Type locality: Venezuela, Maracay, San Felipe. HT F (INHC). Distr.: Belize to Colombia (Valle del Cauca (Río Raposo)), Venezuela, Trinidad and Tobago, Brazil (Pará, Bahia), Paraguay. Refs.: Ortiz, 1951: 588; Barreto, 1986: 147; Borkent & Spinelli, 2007: 74; Spinelli *et al.*, 2009: 90.

tricoloratus Wirth & Blanton, 1953b: 233. Type locality: Panama, Panamá Prov., Pacora. HT F (# 61499 USNM).

Subgenus unplaced, *stigmalis* Species Group

Refs.: Felipe-Bauer & Wirth, 1987 (key to males and females).

fluviatilis (Lutz), 1914: 82 (*Johannseniella*). Type locality: Brazil, Amazonas, Río Negro, São Gabriel. ST F (FIOC).

Distr.: Colombia (Vaupés (Mitú; Caño Cuduyarí)), Ecuador, Bolivia, Venezuela, Trinidad and Tobago, Brazil (Amazonas). Refs.: Lutz, 1914: 82; Barreto, 1986: 149; Borkent & Spinelli, 2007: 75; Spinelli *et al.*, 2009: 90. *scorzai* Ortíz, 1956: 93. Type locality: Venezuela, Bolívar, Río Guayaraca. HT F (INHC).

Miscellaneous Unplaced Species of *Culicoides*

arubae Fox & Hoffman, 1944: 109. Type locality: Aruba. HT F (UNPR). Distr.: USA (Texas), Mexico (Yucatán), Aruba and Grenada, to Colombia (Magdalena (?)) and Venezuela. Refs.: Fox & Hoffman, 1944: 109; Wirth & Blanton, 1974: 15; Barreto, 1986: 148; Borkent & Spinelli, 2007: 75; Spinelli *et al.*, 2009: 90.

pancensis Browne, 1980: 537. Type locality, Colombia, Valle del Cauca, Cali, Pance, Finca Topacio, 1600 m. HT F (USNM). Distr.: Colombia (Valle del Cauca (Cali, Pance, Finca Topacio, 1600 m)). Refs.: Browne, 1980: 537; Barreto, 1986: 149; Wirth *et al.* 1988: 58; Borkent & Spinelli, 2007: 75; Spinelli *et al.*, 2009: 90; Borkent, 2015: 97 (cat.).

Tribe Ceratopogonini

Genus **Allohelea** Kieffer

Allohelea Kieffer, 1917b: 364. Type species, *Sphaeromias pulchripennis* Kieffer (orig. des.).

neotropica Wirth, 1991a: 503. Type locality: Jamaica, Westmoreland Parish, Negril, Crystal Waters. HT F (USNM). Distr.: Belize, Panama, Colombia (Valle del Cauca (Río Raposo)), Jamaica. Refs.: Wirth 1991a: 503; Borkent & Spinelli, 2007: 76.

Genus **Alluaudomyia** Kieffer

Alluaudomyia Kieffer, 1913: 12. Type species, *Alluaudomyia imparunguis* Kieffer (mon.). Refs.: Huerta, 1996 (key to males and females from Mexico); Spinelli & Wirth, 1984b (key to males and females).

Neoceratopogon Malloch, 1915b: 310. Type species, *Ceratopogon bellus* Coquillett (orig. des.).

Isoecaeta Garrett, 1925: 9. Type species, *Isoecaeta poeyi* Garrett (= *Ceratopogon bellus* Coquillett) (orig. des.).

caribbeana Spinelli & Wirth, 1984b: 678. Type locality: Belize, Nattieville. HT F (USNM). Distr.: USA (California to Texas, Florida), Central America, circum-Caribbean from Mexico (Yucatán, Morelos, Sinaloa) to Colombia (Meta (Puerto López)) and Venezuela. Refs.: Spinelli & Wirth, 1984c: 678; Borkent & Spinelli, 2007: 76.

distispinulosa Spinelli & Wirth, 1984b: 682. Type locality: Brazil, Amazonas, Manaus. HT F (USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)), Bolivia, Venezuela, Brazil (Amazonas). Refs.: Spinelli & Wirth, 1984b: 682; Borkent & Spinelli, 2007: 76.

leei Spinelli & Wirth, 1984b: 687. Type locality: Colombia, Meta, Finca Barbascal. HT F (USNM). Distr.: Colombia (Meta (Finca Barbascal)), Bolivia. Refs.: Spinelli & Wirth, 1984b: 687; Borkent & Spinelli 2007: 76; Borkent, 2015: 111 (cat.).

nubeculosa Spinelli & Wirth, 1984b: 689. Type locality: Brazil, Amazonas, Río Solimões. HT F (USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)), Brazil (Amazonas, Pará). Refs.: Spinelli & Wirth, 1984b: 689; Borkent & Spinelli, 2007: 76.

sexpunctata Spinelli & Wirth, 1984b: 695. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F

(USNM)]. Distr.: Colombia (Valle del Cauca (Río Raposo)). Refs.: Spinelli & Wirth, 1984b: 695; Borkent & Spinelli, 2007: 77; Borkent, 2015: 113 (cat.).

spinellii Wirth & Grogan, 1988: 21. New name for *tripunctata*. Distr.: Colombia (Valle del Cauca (Río Raposo)). Refs.: Wirth & Grogan, 1988: 21; Borkent & Spinelli, 2007: 77; Borkent, 2015: 113 (cat.).

tripunctata Spinelli & Wirth, 1984b: 697 (preocc. *Alluaudomyia tripunctata* Chaudhuri, Das Gupta & Chaudhuri, 1972). Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM).

youngi Spinelli & Wirth, 1984b: 699. Type locality: Colombia, Antioquia (near Río Anorí). HT F (USNM). Distr.: Panama, Colombia (Antioquia, (near río Anorí)). Refs.: Spinelli & Wirth, 1984b: 699; Borkent & Spinelli, 2007: 77; Borkent, 2015: 114 (cat.).

Genus **Baeohelea** Wirth & Blanton

Baeohelea Wirth & Blanton, 1970b: 95. Type species, *Baeohelea nana* Wirth & Blanton (orig. des.).

nana Wirth & Blanton, 1970b: 95. Type locality: Dominica, Pont Casse. HT F (# 70647 USNM). Distr.: Costa Rica to Ecuador, St. Kitts, Dominica. Locality in Colombia (Valle del Cauca (Río Raposo)). Refs.: Wirth & Blanton, 1970b: 95; Borkent & Spinelli, 2007: 78.

Genus **Brachypogon** Kieffer

Brachypogon Kieffer, 1899: 69. Type species, *Ceratopogon vitiosus* Winnertz (orig. des.). Refs.: Spinelli & Wirth, 1993 (key to subgenera as part of larger key to genera).

Subgenus **Brachypogon** Kieffer

Refs.: Spinelli & Grogan, 1998 (key to males and females).

bimaculatus Spinelli & Grogan, 1998: 67. Type locality: Colombia, Valle del Cauca (Río Raposo). HT M (FSCA). Distr.: Mexico (Yucatán), Colombia (Valle del Cauca (Río Raposo)), Peru, Brazil (Mato Grosso). Refs.: Spinelli & Grogan, 1998: 67; Borkent & Spinelli, 2007: 78; Borkent, 2015: 116 (cat.).

ecuadorensis Spinelli & Grogan, 1998: 68. Type locality: Ecuador, Loja, Catamayo. HT M (USNM). Distr.: Belize, Colombia (Valle del Cauca (Río Raposo)), Costa Rica, Ecuador, Jamaica, Panama. Refs.: Spinelli & Grogan, 1998: 68; Borkent & Spinelli, 2007: 78.

impar (Johannsen), 1938: 223 (*Ceratopogon*). Type locality: Puerto Rico, El Yunque trail. HT F (CUIC). Distr.: Colombia (Meta (Finca Barbascal)), Venezuela, Puerto Rico, Brazil (Santa Catarina). Refs.: Johannsen, 1938: 223; Spinelli & Grogan, 1998: 69; Borkent & Spinelli, 2007: 79.

monicae Spinelli & Grogan, 1998: 70. Type locality: Colombia, Valle del Cauca (Río Raposo). HT M (USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)). Refs.: Spinelli & Grogan, 1998: 70; Borkent & Spinelli, 2007: 79; Borkent, 2015: 117 (cat.).

Subgenus **Isohelea** Kieffer

Isohelea Kieffer, 1917b: 295. Type species, *Ceratopogon lacteipennis* Zetterstedt (misidentified, =*Psilohelea sociabilis* Goetghebuer) (orig. des.). Refs.: Spinelli & Grogan, 1994 (key to males and females).

hugoi Spinelli & Grogan, 1994: 2. Type locality: Colombia, Nariño, 20 km E Pasto. HT F (CASC). Distr.: Colombia (Nariño (20 km E Pasto)). Refs.: Spinelli & Grogan, 1994: 2; Borkent & Spinelli, 2007: 79; Borkent, 2015: 118 (cat.).

Genus **Downshelea** Wirth & Grogan

Downshelea Wirth & Grogan, 1988: 50. Type species, *Monohelea stonei* Wirth (orig. des.). Refs.: Lane & Wirth, 1964 (key to males and females).

chiapasi (Lane & Wirth), 1964: 219 (*Monohelea*). Type locality: Nicaragua, Villa Somoza. HT M (# 66348 USNM). Distr.: Nicaragua to Colombia (Valle del Cauca (Río Raposo)). Refs.: Lane & Wirth, 1964: 219; Borkent & Spinelli, 2007: 80.

colombiae (Lane & Wirth), 1964: 220 (*Monohelea*). Type locality: Colombia, Valle del Cauca (Río Raposo). HT M (# 67563 USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)). Refs.: Lane & Wirth, 1964: 220; Borkent & Spinelli, 2007: 80; Borkent, 2015: 123 (cat.).

fuscipennis (Lane & Wirth), 1964: 221 (*Monohelea*). Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (# 67564 USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)). Refs.: Lane & Wirth, 1964: 221; Borkent & Spinelli, 2007: 80; Borkent, 2015: 123 (cat.).

grogani Huerta, Felipe-Bauer & Spinelli, 2012: 64. Type locality: Mexico, Oaxaca, Municipio San Juan Guichicovi, Localidad El Zacatal. HT M (CAIM). Distr.: Mexico (Veracruz, Oaxaca, Quintana Roo), Belize and Colombia (Valle del Cauca (Río Raposo)). Refs.: Huerta *et al.*, 2012: 64.

stonei (Wirth), 1953: 148 (*Monohelea*). Type locality: USA, Louisiana, Baton Rouge. HT M (# 61094 USNM). Distr.: Eastern North America (Ontario, Massachusetts to Florida), Caribbean to Colombia (Valle del Cauca (Río Raposo)) and Trinidad and Tobago. Refs.: Wirth, 1953: 148; Lane & Wirth, 1964: 222; Borkent & Spinelli, 2007: 81.

Genus **Echinohelea** Macfie

Echinohelea Macfie, 1940b: 187. Type species: *Echinohelea ornatipennis* Macfie (orig. des.). Refs.: Wirth, 1994 (key to males and females).

Subgenus **Echinohelea** Macfie

lanei Wirth, 1951b: 319. Type locality: USA, Virginia, Falls Church. HT M (# 60973 USNM). Distr.: USA (Virginia, Michigan and Massachusetts to Florida), Panama, Colombia (Valle del Cauca (Río Raposo; Río Micay, Casa de Suárez)), Trinidad and Tobago, Brazil (Pará, Rondônia). Refs.: Wirth, 1951b: 319; Wirth, 1994: 234; Borkent & Spinelli, 2007: 81.

leei Wirth, 1994: 237. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)). Refs.: Wirth, 1994: 237; Borkent & Spinelli, 2007: 81; Borkent, 2015: 124 (cat.).

neotropica Wirth, 1994: 237. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM). Distr.: Panama, Colombia (Antioquia (near río Anorí), Chocó (Camp Teresita, Río Truando), Valle del Cauca (Río Micay, Casa de Suárez; Río Raposo)), Ecuador, Brazil (Amazonas, Pará, Rio de Janeiro). Refs.: Wirth, 1994: 237; Borkent & Spinelli, 2007: 81; Borkent, 2015: 124 (cat.).

smartii Macfie, 1940b: 190. Type locality: Guyana, Mazaruni. HS F (BMNH). Distr.: Colombia (Valle del Cauca (Río Raposo)), Guyana. Refs.: Macfie, 1940b: 190; Wirth, 1994: 241; Borkent & Spinelli, 2007: 81.

Genus **Leptohelea** Wirth & Blanton

Leptohelea Wirth & Blanton, 1970a: 12. Type species, *Leptohelea micromyx* Wirth & Blanton (orig. des.).

micronyx Wirth & Blanton, 1970a: 12. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (# 70652 USNM). Distr.: Costa Rica, Colombia (Valle del Cauca (Río Raposo)). Refs.: Wirth & Blanton, 1970a: 12; Borkent & Spinelli, 2007: 82; Borkent, 2015: 127 (cat.).

Genus **Monohelea** Kieffer

Monohelea Kieffer, 1917b: 294. Type species, *Monohelea hieroglyphica* Kieffer, (orig. des.). Refs.: Lane & Wirth, 1964 (key to males and females).

mayeri Ortiz, 1950c: 202. Type locality: Venezuela, Miranda, Ocumare del Tuy. HT F (MHNL). Distr.: Costa Rica to Colombia (Valle del Cauca (Río Raposo)), Venezuela, Trinidad and Tobago. Refs.: Ortiz, 1950c: 202; Lane & Wirth 1964: 230; Borkent & Spinelli, 2007: 83.

Genus **Nannohelea** Grogan & Wirth

Nannohelea Grogan & Wirth, 1980: 374. Type species, *Ceratopogon bourioni* Clastrier (orig. des.).

clastrieri Grogan & Wirth, 1980: 381. Type locality: Colombia, Valle del Cauca (Río Raposo). HT M (# 76099 USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)). Refs.: Grogan & Wirth, 1980: 381; Borkent & Spinelli, 2007: 83; Borkent, 2015: 130 (cat.).

Genus **Parabezzia** Malloch

Parabezzia Malloch, 1915a: 358. Type species, *Parabezzia petiolata* Malloch, (orig. des.). Refs.: Spinelli & Grogan, 1987 (key to females and some males).

unguis Wirth, 1965: 228. Type locality: USA, Arizona, Pima County, Sabino Canyon. HT F (# 66669 USNM). Distr.: USA (Arizona, Texas) to Colombia (Valle del Cauca (oleoducto de Pacific, 10 km NW Dagua)). Refs.: Wirth, 1965: 228; Spinelli & Grogan, 1987: 32; Borkent & Spinelli, 2007: 84.

Genus **Parastilobezzia** Wirth & Blanton

Parastilobezzia Wirth & Blanton, 1970a: 10. Type species, *Parastilobezzia leei* Wirth & Blanton (orig. des.).

leei Wirth & Blanton, 1970a: 10. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (# 70651 USNM). Distr.: Costa Rica, Colombia (Valle del Cauca (Río Raposo)). Refs.: Wirth & Blanton, 1970a: 12; Borkent & Spinelli, 2007: 84; Borkent, 2015: 132 (cat.).

Genus **Stilobezzia** Kieffer

Stilobezzia Kieffer, 1911a: 118. Type species, *Stilobezzia festiva* Kieffer (orig. des.). Refs.: Huerta, 1996 (key to males and females from Mexico); Ingram & Macfie, 1931 (key males and females from Patagonia and southern Chile); Lane & Forattini, 1961 (key to males and females from Neotropical Region north of Patagonia and southern Chile); Wirth & Grogan, 1988 (key to subgenera, as part of generic key).

Hartomyia Malloch, 1915a: 339. Type species, *Ceratopogon pictus* Coquillett (= *Stilobezzia coquilletti* Kieffer) (orig. des.).

Subgenus **Acanthohelea** Kieffer

Acanthohelea Kieffer, 1917a: 198. Type species, *Acanthohelea pruinosa* Kieffer (mon.).

maia Lane & Forattini, 1958: 204. Type locality: Panama, Prov. Panamá, Almirante, Bocas del Toro. HT M (DEFS). Distr.: Panama, Colombia (?). Refs.: Lane & Forattini, 1958: 204; Borkent & Spinelli, 2007: 85.

Tribe **Heteromyiini** Wirth, 1962

Genus **Clinohelea** Kieffer

Clinohelea Kieffer, 1917b: 295. Type species, *Ceratopogon variegatus* Winnertz (= *Ceratopogon unimaculata* Macquart) (orig. des.).

Subgenus **Ceratobezzia** Kieffer

Ceratobezzia Kieffer, 1917b: 326. Type species, *Ceratobezzia fallax* Kieffer (orig. des.).

fallax Kieffer, 1917b: 326. Type locality: Paraguay. T F (HNHM, lost). Distr.: El Salvador to Colombia (Meta (Indostán)), Venezuela, Brazil (Amazonas, Pará, Mato Grosso, São Paulo), Paraguay, Northeastern Argentina. Refs.: Kieffer, 1917b: 326; Spinelli & Duret, 1993: 41; Borkent & Spinelli, 2007: 88.

barrettoi Lane & Duret, 1954: 249. Type locality: Brazil, São Paulo, Ribeirão Preto. HT F (# 10433 DEFS).

Subgenus **Clinohelea** Kieffer

Refs.: Spinelli & Duret, 1993 (key to males and females).

horacioi Lane, 1944: 257. Type locality: Brazil, São Paulo, São Roque. HT F (# 4984 DEFS). Distr.: Mexico (Yucatán, Tabasco, Morelos) to northeastern Argentina. Localities in Colombia (Valle del Cauca (Río Raposo), Meta (Indostán), Chocó (Vuelta)). Refs.: Lane, 1944: 257; Spinelli & Duret, 1993: 45; Borkent & Spinelli, 2007: 88.

muzoni Spinelli & Duret, 1993: 46. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM). Distr.: Colombia (Valle del Cauca (Río Raposo), Chocó (Río Sucio)). Refs.: Spinelli & Duret, 1993: 46; Borkent & Spinelli, 2007: 88; Borkent, 2015: 143 (cat.).

nigripes Macfie, 1939b: 205. Type locality: Brazil, Santa Catarina, Nova Teutonia. HT F (BMNH). Distr.: Costa Rica to Colombia (Boyacá (Puerto Boyacá), Valle del Cauca (Río Raposo)), Brazil (São Paulo, Santa Catarina), northeastern Argentina. Refs.: Macfie, 1939b: 205; Spinelli & Duret, 1993: 47; Borkent & Spinelli, 2007: 88.

Genus **Heteromyia** Say

Heteromyia Say, 1825: plate 35. Type species, *Heteromyia fasciata* Say (mon.). Refs.: Duret & Lane, 1955 (key to males and females).

Pachyleptus Walker, 1856: 426. Type species, *Pachyleptus fasciatus* Walker (= *Heteromyia nigra* Kieffer) (mon.).

clavata Williston, 1900: 225 (female; Mexico). Type locality: Mexico, Veracruz. HT F (BMNH). Distr.: Mexico (Veracruz) to Colombia (Atlántico (Barranquilla)), Brazil (Amazonas), northeastern Argentina. Refs.: Williston, 1900: 225; Borkent & Spinelli, 2007: 89.

rufa Kieffer, 1917b: 325. Type locality: Colombia (Barranquilla). T F (HNHM, lost).

caloptera Kieffer, 1919: 192. Unnecessary new name for *H. rufa* Kieffer, not Loew, 1861.

Tribe **Sphaeromiini** Newman, 1834

Genus **Pellucidomyia** Macfie

Pellucidomyia Macfie, 1939a: 99. Type species, *Pellucidomyia ugandae* Macfie (orig. des.). Refs.: Wirth, 1960 (World key to males and females).

Macfiehelea Lane, 1946: 208. Type species, *Macfiehelea oliveirai* Lane (orig. des.).

lanei Wirth & Ratanaworabhan, 1971: 446. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (# 70678 USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)), Jamaica. Refs.: Wirth & Ratanaworabhan, 1971: 446; Borkent & Spinelli, 2007: 89; Borkent, 2015: 145 (cat.).

wirthi (Lane), 1956b: 437 (*Macfiehelea*). Type locality: Panama, Canal Zone, Mindi Dairy. HT F (USNM). Distr.: USA (Texas) to Colombia (Meta (Finca Barbascal)). Refs.: Lane, 1956b: 437; Wirth & Ratanaworabhan, 1971b: 446; Borkent & Spinelli, 2007: 89.

Genus **Lanehelea** Wirth & Blanton

Lanehelea Wirth & Blanton, 1972: 433. Type species, *Lanehelea leei* Wirth and Blanton (orig. des.).

leei Wirth & Blanton, 1972: 434. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (# 71181 USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)). Refs.: Wirth & Blanton, 1972: 434; Borkent & Spinelli, 2007: 91; Borkent, 2015: 154 (cat.).

spinifemur Wirth & Blanton, 1972: 436. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (# 71181 USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)). Refs.: Wirth & Blanton, 1972: 436; Borkent & Spinelli, 2007: 91; Borkent, 2015: 154 (cat.).

Genus **Neobezzia** Wirth & Ratanaworabhan

Neobezzia Wirth & Ratanaworabhan, 1972a: 477. Type species: *Neobezzia clavipes* Wirth & Ratanaworabhan (orig. des.). Refs.: Wirth & Ratanaworabhan, 1972a (key to females).

annicola (Macfie), 1940c: 30 (*Bezzia*). Type locality: Guyana, New River. HT F (BMNH). Distr.: Belize to Colombia (Valle del Cauca (Río Raposo)), Brazil (Amazonas, Rondônia, Mato Grosso, São Paulo). Refs.: Macfie, 1940c: 30; Wirth & Ratanaworabhan, 1972a: 481; 1972a: 434; Borkent & Spinelli, 2007: 91.

blantoni Wirth & Ratanaworabhan, 1972a: 482. Type locality: Panama, Gamboa, Canal Zone (Río Agua Salud). HT F (# 71476 USNM). Distr.: Nicaragua to Colombia (Valle del Cauca (Río Raposo)), Brazil (Amazonas, Pará, Rondônia), northeastern Argentina. Refs.: Wirth & Ratanaworabhan, 1972a: 482; Borkent & Spinelli, 2007: 91.

Tribe **Palpomyiini** Enderlein, 1936

Genus **Amerohelea** Grogan & Wirth

Amerohelea Grogan & Wirth, 1981: 1280. Type species, *Amerohelea galindoi* Grogan & Wirth (orig. des.). Refs.: Grogan & Wirth, 1981 (key to females); Huerta, 1996 (key to females from Mexico).

fasciata Grogan & Wirth, 1981: 1283. Type locality: Belize, Augustine. HT F (# 76569 USNM). Distr.: Mexico (Sonora, Morelos, Tabasco, Chiapas) to Colombia (Valle del Cauca (Río Raposo)). Refs.: Grogan & Wirth, 1981: 1283; Borkent & Spinelli, 2007: 92.

frontispina (Dow & Turner), 1976: 138 (*Bezzia*). Type locality: USA, Texas, Gillespie Co., Fredericksburg. HT F (# 76578 USNM). Distr.: USA (California to Texas) south to Colombia (Valle del Cauca (Río Raposo)) and Venezuela. Refs.: Dow & Turner, 1976: 138; Grogan & Wirth, 1981: 1301; Borkent & Spinelli, 2007: 92.

galindoi Grogan & Wirth, 1981: 1294. Type locality: Colombia Valle del Cauca (Río Raposo). HT F (# 76574 USNM). Distr.: Panama, Colombia (Valle del Cauca (Río Raposo)), Venezuela, Guadeloupe, northern Argentina. Refs.: Grogan & Wirth, 1981: 1294; Borkent & Spinelli, 2007: 92; Borkent, 2015: 157 (cat.).

ronderosi Grogan & Wirth, 1981: 1298. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (# 76576 USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)). Refs.: Grogan & Wirth, 1981: 1298; Borkent & Spinelli, 2007: 92; Borkent, 2015: 157 (cat.).

spinellii Grogan & Wirth, 1981: 1292. Type locality: Colombia, Valle del Cauca (Río Micay, Casa de Suárez). HT F (# 76573 USNM). Distr.: Colombia (Valle del Cauca (Río Micay, Casa de Suárez, Río Raposo)). Refs.: Grogan & Wirth, 1981: 1292; Borkent & Spinelli, 2007: 92; Borkent, 2015: 157 (cat.).

Genus **Bezzia** Kieffer

Bezzia Kieffer, 1899: 69. Type species, *Ceratopogon ornatus* Meigen (orig. des.). Refs.: Huerta, 1996 (key to males and females from Mexico); Spinelli & Wirth, 1989a (key to subgenera and species groups for males and females, key to males and females of *nobilis* and *punctipennis* groups); Spinelli & Wirth, 1989b (key to females and some males of *glabra* and *brevicornis* groups); Spinelli & Wirth, 1990 (key to males and females of *gibbera* group); Spinelli & Wirth, 1991 (key to males and females of *dentifemur* and *venustula* groups).

dentifemur Spinelli & Wirth, 1991: 3. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM). Distr.: Belize, Colombia (Valle del Cauca (Río Raposo)), Trinidad and Tobago, Brazil (Pará). Refs.: Spinelli & Wirth, 1991: 3; Borkent & Spinelli, 2007: 93; Borkent, 2015: 159 (cat.).

filiducta Spinelli & Wirth, 1991: 3 (as *filiductus*). Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM) Distr.: Honduras, Colombia (Valle del Cauca (Río Raposo)). Refs.: Spinelli & Wirth, 1991: 3; Borkent & Spinelli, 2007: 93; Borkent, 2015: 160 (cat.).

fusca Spinelli & Wirth, 1991: 9. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM). Distr.: Honduras, Colombia (Valle del Cauca (Río Raposo)). Refs.: Spinelli & Wirth, 1991: 9; Borkent & Spinelli, 2007: 93; Borkent, 2015: 160 (cat.).

grogani Spinelli & Wirth, 1990: 19. Type locality: Panama, Canal Zone, Fort Davis. HT F (USNM). Distr.: Mexico (Morelos), Panama, Colombia (Valle del Cauca (Río Raposo), Meta (Finca Barbascal)). Refs.: Spinelli & Wirth, 1990: 19; Borkent & Spinelli, 2007: 94.

jubata Spinelli & Wirth, 1990: 20. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM). Distr.: Colombia (Antioquia (near Río Anorí), Valle del Cauca (Río Raposo; Bahía, Buenaventura, Bella Vista)). Refs.: Spinelli & Wirth, 1990: 20; Borkent & Spinelli, 2007: 94; Borkent, 2015: 161 (cat.).

leei Spinelli & Wirth, 1990: 21. Type locality, Colombia, Valle del Cauca (Río Raposo). HT F (USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)). Refs.: Spinelli & Wirth, 1990: 21; Borkent & Spinelli, 2007: 94; Borkent, 2015: 161 (cat.).

megatheca Spinelli & Wirth, 1990: 22. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)), Brazil (Rondônia). Refs.: Spinelli & Wirth, 1990: 22; Borkent & Spinelli, 2007: 94; Borkent, 2015: 162 (cat.).

raposoensis Spinelli & Wirth, 1991: 4. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM). Distr.: Mexico (Yucatán), Colombia (Valle del Cauca (Río Raposo)). Refs.: Spinelli & Wirth, 1991: 4; Borkent & Spinelli, 2007: 94; Borkent, 2015: 163 (cat.).

setigera Spinelli & Wirth, 1990: 24. Type locality: Colombia, Valle del Cauca, Oleoducto Pacífico (10 km NW

Dagua). HT F (USNM). Distr.: El Salvador, Colombia (Antioquia (near Río Anorí), Valle del Cauca (Oleoducto Pacífico (10 NW Dagua; Río Raposo))). Refs.: Spinelli & Wirth, 1990: 24; Borkent & Spinelli, 2007: 94; Borkent, 2015: 164 (cat.).

snowi Lane, 1958: 34. Type locality: Guatemala. HT F (# 11769 DEFS). Distr.: Guatemala, Panama, Colombia (Valle del Cauca (Río Raposo)), Trinidad and Tobago, Brazil (Pará). Refs.: Lane, 1958: 34; Spinelli & Wirth, 1991: 10; Borkent & Spinelli, 2007: 94.

venustula (Williston), 1896: 278 (*Ceratopogon*). Type locality: St. Vincent. HT F (BMNH). Distr.: Widespread, from Mexico (Veracruz, Morelos, Chiapas) to Argentina. Localities in Colombia (Valle del Cauca (Oleoducto Pacífico (10 NW Dagua; Río Raposo))). Refs.: Williston, 1896: 278; Spinelli & Wirth, 1991: 7; Borkent & Spinelli, 2007: 94.

concoloripes Macfie, 1940c: 31. Type locality: Guyana, New River. HT F (BMNH).

Genus **Pachyhelea** Wirth

Pachyhelea Wirth, 1959: 50. Type species, *Ceratopogon magnus* Coquillett (= *Ceratopogon pachymerus* Williston) (orig. des.).

albidiventris (Kieffer), 1917b: 316 (*Sphaeromias*). Type locality: Colombia, Atlántico, Barranquilla. T F (HNHM, lost). Distr.: Colombia (Atlántico (Barranquilla)). Refs.: Kieffer, 1917b: 316; Borkent & Spinelli, 2007: 95; Borkent, 2015: 165 (cat.).

Genus **Palpomyia** Meigen

Palpomyia Meigen, 1818: 82. Type species, *Ceratopogon flavipes* Meigen (mon.). Generic name first published in synonymy with *Ceratopogon* but available under ICZN Code Article 11(e). Refs.: Ingram & Macfie, 1931 (key males and females from Patagonia and southern Chile); Lane, 1960 (key to females).

columbiana Kieffer, 1917b: 323. Type locality: Colombia, Magdalena (Sierra San Lorenzo). T F (HNHM, lost). Distr.: Colombia (Magdalena (Sierra San Lorenzo)). Refs.: Kieffer, 1917b: 323; Borkent & Spinelli, 2007: 96; Borkent, 2015: 167 (cat.).

hispidula Borkent, in Borkent & Wirth, 1997: 132. New name for *multispinosa*. Distr.: El Salvador to Colombia (Valle del Cauca (Río Raposo)). Refs.: Borkent & Wirth, 1997: 132; Borkent & Spinelli, 2007: 96.

multispinosa Spinelli & Grogan, 1989: 6 (preocc. *Palpomyia multispinosa* (Pierce), 1966). Type locality: El Salvador, San Vicente, Santo Domingo. HT F (USNM).

microchela Kieffer, 1917b: 321. Type locality: Colombia, Magdalena (Sierra San Lorenzo). T F (HNHM, lost). Distr.: Colombia (Magdalena (Sierra San Lorenzo)). Refs.: Kieffer, 1917b: 321; Borkent & Spinelli, 2007: 96; Borkent, 2015: 169 (cat.).

Genus **Phaenobezzia** Haeselbarth

Phaenobezzia Haeselbarth, 1965: 297. Type species, *Probezziia pistiae* Ingram & Macfie (orig. des.). Refs.: Spinelli & Wirth, 1986 (key to males and females).

ateles (Macfie), 1940a: 78 (*Bezzia*). Type locality, Brazil, Bahia, Mundo Novo. HT M (BMNH). Distr.: Colombia (Valle del Cauca (Río Raposo)), Ecuador, Brazil (Bahia). Refs.: Macfie, 1940a: 78; Spinelli & Wirth, 1986: 232; Borkent & Spinelli, 2007: 97.

astyla Spinelli & Wirth, 1986: 232. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM).

Tribe **Stenoxenini** Coquillett, 1899

Genus **Paryphoconus** Enderlein

Paryphoconus Enderlein, 1912: 57. Type species, *Paryphoconus angustipennis* Enderlein (orig. des.). Refs.: Huerta, 1996 (key to females from Mexico); Spinelli & Wirth, 1984a (key to females).

angustipennis Enderlein, 1912: 57. Type locality, Brazil, Santa Catarina. HT F (ZMHB). Distr.: Colombia (Valle del Cauca (Río Raposo)), Peru, Venezuela, Brazil (Goiás, São Paulo, Santa Catarina), northeastern Argentina. Refs.: Enderlein, 1912: 57; Wirth & Ratanaworabhan, 1972b: 1371; Borkent & Spinelli, 2007: 97.

anomalicornis Kieffer, 1917b: 333. Type locality: Colombia, Magdalena, Santa Marta and Paraguay (Puerto Max). T F (HNHM, lost). Distr.: Mexico (San Luis Potosí) to Colombia (Magdalena (Santa Marta), Valle del Cauca (Río Raposo)), Venezuela, Brazil (Amazonas), Paraguay, northeastern Argentina. Refs.: Kieffer, 1917b: 333; Wirth & Ratanaworabhan, 1972b: 1372; Borkent & Spinelli, 2007: 97; Borkent, 2015: 173 (cat.).

brunneipennis Spinelli & Wirth, 1984a: 890. Type locality: Brazil, Amazonas, Río Solimões. HT F (USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)), Brazil (Amazonas). Refs.: Spinelli & Wirth, 1984a: 890; Borkent & Spinelli, 2007: 98.

latipennis Spinelli & Wirth, 1984a: 898. Type locality: Colombia, Valle del Cauca (Río Raposo). HT F (USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)), Venezuela. Refs.: Spinelli & Wirth, 1984a: 898; Borkent & Spinelli, 2007: 98; Borkent, 2015: 173 (cat.).

leei Spinelli & Wirth, 1984a: 898. Type locality, Colombia, Valle del Cauca (Río Raposo). HT F (USNM). Distr.: Colombia (Valle del Cauca (Río Raposo)), Venezuela. Refs.: Spinelli & Wirth, 1984a: 898; Borkent & Spinelli, 2007: 98; Borkent, 2015: 173 (cat.).

oliveirai Lane, 1956a: 303. Type locality: Brazil, Pará, Cachimbo. HT F (# 11526 FIOC). Distr.: Colombia (Amazonas (Leticia)), Brazil (Amazonas, Pará). Refs.: Lane, 1956a: 303; Spinelli & Wirth, 1984a: 902; Borkent & Spinelli, 2007: 98.

subflavus Macfie, 1940c: 23. Type locality: Guyana, New River. HT F (BMHN). Distr.: Colombia (Valle del Cauca (Río Raposo)), Guyana, Brazil (Amazonas, Pará, Rondônia). Refs.: Macfie, 1940c: 23; Wirth & Ratanaworabhan, 1972b: 1376; Borkent & Spinelli, 2007: 98.

travassosi Lane, 1956a: 304. Type locality, Brazil, Pará, Cachimbo. HT F (# 11525 FIOC).

Acknowledgements

To Estrategia de Sostenibilidad 2013-2014 University of Antioquia for the grants (MW). Thanks to Biologist Carolina Henao Sepulveda for her dedication and support to this project.

TABLE 1. Ceratopogonidae species recorded from Colombia.

Subfamily	Tribe	Genus	Subgenus	Species Group	Species	Author
Leptoconopinae		<i>Leptoconops</i>	<i>Megaconops</i>		<i>floridensis</i>	Wirth, 1951
Forcipomyiinae		<i>Atrichopogon</i>	<i>Atrichopogon</i>		<i>auricoma</i>	Kieffer, 1917
					<i>columbianus</i>	Kieffer, 1917
		<i>Forcipomyia</i>	<i>Caloforcipomyia</i>		<i>caerulea</i>	Saunders, 1957
					<i>eukosma</i>	Macfie, 1939

...Continued on next page

TABLE 1. (Continued)

Subfamily	Tribe	Genus	Subgenus	Species Group	Species	Author
					<i>glauca</i>	Macfie, 1934
					<i>hatoensis</i>	Utmar & Wirth, 1976
					<i>hermosa</i>	Utmar & Wirth, 1976
					<i>remigera</i>	Utmar & Wirth, 1976
					<i>sabalitensis</i>	Utmar & Wirth, 1976
			<i>Euprojoannisia</i>		<i>blantoni</i>	Soria & Bystrak, 1975
			<i>Forcipomyia</i>	<i>argenteola</i>	<i>argenteola</i>	Macfie, 1939
					<i>calatheae</i>	Wirth, 1982
				<i>genualis</i>	<i>genualis</i>	(Loew, 1866)
					<i>harpegonata</i>	Wirth & Soria, 1975
				<i>squamitibia</i>	<i>catarinensis</i>	Marino & Spinelli, 2002
			<i>Lasiohelea</i>		<i>stylifer</i>	(Lutz, 1913)
			<i>Lepidohelea</i>		<i>annulatipes</i>	Macfie, 1939
					<i>convexipenis</i>	Wirth & Spinelli, 1993
					<i>eusthystyla</i>	Wirth & Spinelli, 1993
					<i>hobbsi</i>	Wirth & Spinelli, 1993
					<i>luteigenua</i>	Wirth & Spinelli, 1992
			<i>Microhelea</i>		<i>antioquiae</i>	Clastrier & Wirth, 1995
					<i>belemensis</i>	Clastrier & Wirth, 1995
					<i>colombiana</i>	Clastrier & Wirth, 1995
					<i>fuliginosa</i>	(Meigen, 1818)
					<i>insignipalpis</i>	Macfie, 1949
					<i>penultimata</i>	Wirth, 1972
					<i>raposoensis</i>	Clastrier & Wirth, 1995
					<i>squamosa</i>	Lutz, 1914
					<i>valleensis</i>	Clastrier & Wirth, 1995
					<i>vernoni</i>	Clastrier & Wirth, 1995
					<i>willistoni</i>	Wirth, 1971
			<i>Pedilohelea</i>		<i>aitkeni</i>	de Meillon & Wirth, 1980
					<i>raposoi</i>	de Meillon & Wirth, 1980
					<i>spangleri</i>	de Meillon & Wirth, 1980
					<i>spilmani</i>	de Meillon & Wirth, 1980
			<i>Pterobosca</i>		<i>incubans</i>	(Macfie, 1937)
			<i>Rhynchoforcipomyia</i>		<i>brachyrhyncha</i>	Wirth & Dow, 1972
					<i>messersmithi</i>	Wirth & Dow, 1972
					<i>puracensis</i>	Wirth & Dow, 1972
					<i>zeteki</i>	Wirth & Dow, 1972
			<i>Saliohelea</i>		<i>leei</i>	Wirth & Ratanaworabhan, 1978

...Continued on next page

TABLE 1. (Continued)

Subfamily	Tribe	Genus	Subgenus	Species Group	Species	Author
			<i>Thyridomyia</i>		<i>colombiae</i>	Wirth, 1970
					<i>jipajapae</i>	Wirth, 1970
					<i>nana</i>	(Macfie, 1939)
					<i>nodosa</i>	Saunders, 1959
			<i>Warmkea</i>		<i>aeria</i>	Saunders, 1957
					<i>galindoi</i>	Wirth & Soria, 1980
					<i>lesliei</i>	Wirth, 1974
					<i>louriei</i>	(Macfie, 1935)
					<i>spinosa</i>	Saunders, 1957
					<i>tuberculata</i>	Saunders, 1957
Dasyheleinae		<i>Dasyhelea</i>			<i>columbiana</i>	(Kieffer, 1917)
					<i>santaemarthae</i>	(Kieffer, 1917)
Ceratopogoninae	Culicoidini	<i>Culicoides</i>	<i>Anilomyia</i>		<i>ameliae</i>	Browne, 1980
					<i>covagarciai</i>	Ortiz, 1950
					<i>efferus</i>	Fox, 1952
					<i>inermis</i>	Spinelli <i>et al.</i> , 2009
					<i>marshi</i>	Wirth & Blanton, 1956
					<i>metagonatus</i>	Wirth & Blanton, 1956
					<i>nigrifemur</i>	Spinelli <i>et al.</i> , 2009
					<i>nigrigenus</i>	Wirth & Blanton, 1956
					<i>popayanensis</i>	Wirth & Lee, 1967
					<i>trapidoi</i>	Wirth & Barreto, 1978
			<i>Avaritia</i>		<i>andicola</i>	Wirth & Lee, 1967
					<i>orjuelai</i>	Wirth & Lee, 1967
					<i>puracensis</i>	Wirth & Lee, 1967
					<i>pusillus</i>	Lutz, 1913
					<i>suarezi</i>	Rodriguez & Wirth, 1986
			<i>Cotocripus</i>		<i>bambusicola</i>	Lutz, 1913
					<i>gabrieli</i>	Spinelli <i>et al.</i> , 2009
					<i>raposoensis</i>	Wirth & Barreto, 1978
			<i>Diphaomyia</i>		<i>iriartei</i>	Fox, 1952
					<i>lisicarruni</i>	Moncada <i>et al.</i> , 2010
					<i>marinkellei</i>	Wirth & Lee, 1967
					<i>mirsae</i>	Ortiz, 1953
			<i>Drymodesmyia</i>		<i>jamaicensis</i>	Edwards, 1922
					<i>pilosus</i>	Wirth & Blanton, 1959
					<i>poikilonotus</i>	Macfie, 1948
			<i>Haematomyidium</i>		<i>debilipalpis</i>	Lutz, 1913
					<i>eldridgei</i>	Wirth & Barreto, 1978
					<i>filiductus</i>	Wirth, 1981
					<i>germanus</i>	Macfie, 1940

...Continued on next page

TABLE 1. (Continued)

Subfamily	Tribe	Genus	Subgenus	Species Group	Species	Author
					<i>ginesi</i>	Ortiz, 1951
					<i>glabrior</i>	Macfie, 1940
					<i>insinuatus</i>	Ortiz & Leon, 1955
					<i>paraensis</i>	(Goeldi, 1905)
					<i>quasiparaensis</i>	Clastrier, 1971
					<i>youngi</i>	Wirth & Barreto, 1978
			<i>Hoffmania</i>		<i>antioquensis</i>	Spinelli <i>et al.</i> , 2009
					<i>batesi</i>	Wirth & Blanton, 1973
					<i>brownei</i>	Spinelli <i>et al.</i> , 1993
					<i>coutinhoi</i>	Barreto, 1944
					<i>davidi</i>	Spinelli <i>et al.</i> , 1993
					<i>diabolicus</i>	Hoffman, 1925
					<i>fernandoi</i>	Tavares & Souza, 1979
					<i>filarifer</i>	Hoffman, 1939
					<i>foxi</i>	Ortiz, 1950
					<i>franklini</i>	Spinelli <i>et al.</i> , 1993
					<i>fusipalpis</i>	Wirth & Blanton, 1973
					<i>heliconiae</i>	Fox & Hoffman, 1944
					<i>hylas</i>	Macfie, 1940
					<i>insignis</i>	Lutz, 1913
					<i>lutzi</i>	Costa-Lima, 1937
					<i>ocumarensis</i>	Ortiz, 1950
					<i>palpalis</i>	Macfie, 1948
					<i>paraignacioi</i>	Spinelli <i>et al.</i> , 1993
					<i>plaumanni</i>	Spinelli <i>et al.</i> , 1993
					<i>polypori</i>	Wirth & Blanton, 1968
					<i>pseudodiabolicus</i>	Fox, 1946
					<i>ruizi</i>	Forattini, 1954
					<i>tidwelli</i>	Spinelli <i>et al.</i> , 1993
					<i>trinidadensis</i>	Hoffman, 1925
					<i>verecundus</i>	Macfie, 1948
			<i>Macfiella</i>		<i>phlebotomus</i>	(Williston, 1896)
			<i>Mataemyia</i>		<i>dalessandroi</i>	Wirth & Barreto, 1978
					<i>dierourus</i>	Wirth & Blanton, 1955
					<i>volcanensis</i>	Wirth & Blanton, 1959
			<i>Oecacta</i>		<i>alahialinus</i>	Barbosa, 1952
					<i>barbosai</i>	Wirth & Blanton, 1953
					<i>furens</i>	(Poey, 1853)
					<i>gorgasi</i>	Wirth & Blanton, 1953
			<i>Psychophaena</i>		<i>venezuelensis</i>	Ortiz & Mirsa, 1950
			<i>unplaced</i>	acotylus	<i>acotylus</i>	Lutz, 1913

...Continued on next page

TABLE 1. (Continued)

Subfamily	Tribe	Genus	Subgenus	Species Group	Species	Author
					<i>carsiomelas</i>	Wirth & Blanton, 1955
					<i>teretipalpis</i>	Wirth & Barreto, 1978
			<i>unplaced</i>	carpenteri	<i>belemensis</i>	Wirth & Blanton, 1973
					<i>camposi</i>	Ortiz & Leon, 1955
			<i>unplaced</i>	daedalus	<i>beaveri</i>	Wirth & Barreto, 1978
					<i>crescentis</i>	Wirth & Blanton, 1959
					<i>daedaloides</i>	Wirth & Blanton, 1959
					<i>daedalus</i>	Macfie, 1948
			<i>unplaced</i>	dasyophrus	<i>dasyophrus</i>	Macfie, 1940
			<i>unplaced</i>	eublepharus	<i>caldasi</i>	Browne, 1986
					<i>caucaensis</i>	Wirth & Lee, 1967
					<i>eublepharus</i>	Macfie, 1948
					<i>florenciae</i>	Messersmith, 1972
					<i>micayaensis</i>	Spinelli <i>et al.</i> , 2009
					<i>pabloi</i>	Browne, 1980
					<i>rangeli</i>	Ortiz & Mirsa, 1952
					<i>tamboensis</i>	Wirth & Lee, 1967
			<i>unplaced</i>	fluvialis	<i>balsapambensis</i>	Ortiz & Leon, 1955
					<i>castillae</i>	Fox, 1946
					<i>fluvialis</i>	Macfie, 1940
					<i>leopoldoi</i>	Ortiz, 1951
			<i>unplaced</i>	leoni	<i>fieldi</i>	Wirth & Blanton, 1956
					<i>gabaldoni</i>	Ortiz, 1954
					<i>glabellus</i>	Wirth & Blanton, 1956
					<i>leoni</i>	Barbosa, 1952
			<i>unplaced</i>	limai	<i>galindoi</i>	Wirth & Blanton, 1953
					<i>limai</i>	Barreto, 1944
					<i>santanderi</i>	Browne, 1980
					<i>vernoni</i>	Wirth & Blanton, 1973
			<i>unplaced</i>	monticola	<i>andinus</i>	Wirth & Lee, 1967
					<i>monticola</i>	Wirth & Lee, 1967
			<i>unplaced</i>	pachymerus	<i>caprilesi</i>	Fox, 1952
					<i>obnoxius</i>	Fox, 1952
					<i>pachymerus</i>	Lutz, 1914
					<i>uniradialis</i>	Wirth & Blanton, 1953
			<i>unplaced</i>	reticulatus	<i>diplus</i>	Santarem & Felipe-Bauer, 2014
					<i>macrostigma</i>	Wirth & Blanton, 1953
					<i>paucienfuscatus</i>	Barbosa, 1947
					<i>pifanoi</i>	Ortiz, 1951
					<i>reticulatus</i>	Lutz, 1913
			miscellaneous unplaced		<i>arubae</i>	Fox & Hoffman, 1944

...Continued on next page

TABLE 1. (Continued)

Subfamily	Tribe	Genus	Subgenus	Species Group	Species	Author
					<i>pancensis</i>	Browne, 1980
	Ceratopogoni ni	<i>Allohelea</i>			<i>neotropica</i>	Wirth, 1991
		<i>Alluaudomyia</i>			<i>caribbeana</i>	Spinelli & Wirth, 1984
					<i>distispinulosa</i>	Spinelli & Wirth, 1984
					<i>leei</i>	Spinelli & Wirth, 1984
					<i>nubeculosa</i>	Spinelli & Wirth, 1984
					<i>sexpunctata</i>	Spinelli & Wirth, 1984
					<i>spinellii</i>	Wirth & Grogan, 1988
					<i>youngi</i>	Spinelli & Wirth, 1984
		<i>Baeohelea</i>			<i>nana</i>	Wirth & Blanton, 1970
		<i>Brachypogon</i>	<i>Brachypogon</i>		<i>bimaculatus</i>	Spinelli & Grogan, 1998
					<i>ecuadorensis</i>	Spinelli & Grogan, 1998
					<i>impar</i>	(Johansen, 1938)
					<i>monicae</i>	Spinelli & Grogan, 1998
			<i>Isohelea</i>		<i>hugoi</i>	Spinelli & Grogan, 1998
		<i>Downeshelea</i>			<i>chiapasi</i>	(Lane & Wirth, 1964)
					<i>colombiae</i>	(Lane & Wirth, 1964)
					<i>fuscipennis</i>	(Lane & Wirth, 1964)
					<i>grogani</i>	Huerta <i>et al.</i> , 2012
					<i>stonei</i>	(Wirth, 1953)
		<i>Echinohelea</i>	<i>Echinohelea</i>		<i>lanei</i>	Wirth, 1951
					<i>leei</i>	Wirth, 1994
					<i>neotropica</i>	Wirth, 1994
					<i>smarti</i>	Macfie, 1940
		<i>Leptohelea</i>			<i>micronyx</i>	Wirth & Blanton, 1970
		<i>Monohelea</i>			<i>mayeri</i>	Ortiz, 1950
		<i>Nannohelea</i>			<i>clastrieri</i>	Grogan & Wirth, 1980
		<i>Parabezzia</i>			<i>unguis</i>	Wirth, 1965
		<i>Parastilobezzia</i>			<i>leei</i>	Wirth & Blandon, 1970
		<i>a</i>				
		<i>Stilobezzia</i>	<i>Acanthohelea</i>		<i>maia</i>	Lane & Forattini, 1958
	Heteromyiini	<i>Clinohelea</i>	<i>Ceratobezzia</i>		<i>fallax</i>	kieffer, 1917
			<i>Clinohelea</i>		<i>horacioi</i>	Lane, 1944
					<i>muzoni</i>	Spinelli & Duret, 1993
					<i>nigripes</i>	Macfie, 1939
		<i>Heteromyia</i>			<i>clavata</i>	Williston, 1900
	Sphaeromyiini	<i>Pellucidomyia</i>			<i>lanei</i>	Wirth & Ratamaworabham, 1971
					<i>wirthi</i>	(Lane, 1956)
		<i>Lanehelea</i>			<i>leei</i>	Wirth & Blandon, 1972
					<i>spinifemur</i>	Wirth & Blandon, 1972
		<i>Neobezzia</i>			<i>amnicola</i>	(Macfie, 1940)

...Continued on next page

TABLE 1. (Continued)

Subfamily	Tribe	Genus	Subgenus	Species Group	Species	Author
					<i>blantoni</i>	Wirth & Ratamaworabham, 1972
	Palpomyiini	<i>Amerohelea</i>			<i>fasciata</i>	Grogan & Wirth, 1981
					<i>frontispina</i>	(Dow & Turner, 1976)
					<i>galindoi</i>	Grogan & Wirth, 1981
					<i>ronderosi</i>	Grogan & Wirth, 1981
					<i>spinellii</i>	Grogan & Wirth, 1981
		<i>Bezzia</i>			<i>dentifemur</i>	Spinelli & Wirth, 1991
					<i>filiducta</i>	Spinelli & Wirth, 1991
					<i>fusca</i>	Spinelli & Wirth, 1991
					<i>grogani</i>	Spinelli & Wirth, 1990
					<i>jubata</i>	Spinelli & Wirth, 1990
					<i>leei</i>	Spinelli & Wirth, 1990
					<i>megatheca</i>	Spinelli & Wirth, 1990
					<i>raposoensis</i>	Spinelli & Wirth, 1991
					<i>setigera</i>	Spinelli & Wirth, 1990
					<i>snowi</i>	Lane, 1958
					<i>venustula</i>	(Williston, 1896)
		<i>Pachyhelea</i>			<i>albidiventris</i>	(Kieffer, 1917)
		<i>Palpomyia</i>			<i>columbiana</i>	Kieffer, 1917
					<i>hispidia</i>	Borkent, 1997
					<i>microchela</i>	Kieffer, 1917
		<i>Phaenobezzia</i>			<i>ateles</i>	(Macfie, 1940)
	Stenoxenini	<i>Paryphoconus</i>			<i>angustipennis</i>	Enderlein, 1912
					<i>anomalicornis</i>	Kieffer, 1917
					<i>brunneipennis</i>	Spinelli & Wirth, 1984
					<i>latipennis</i>	Spinelli & Wirth, 1984
					<i>leei</i>	Spinelli & Wirth, 1984
					<i>oliverai</i>	Lane, 1956
					<i>subflavus</i>	Macfie, 1940

References

- Aitken, T.H.G., Wirth, W.W., Williams, R.W., Davies, J.B. & Tikasingh, E.S. (1975) A review of the bloodsucking midges of Trinidad and Tobago, West Indies (Diptera: Ceratopogonidae). *Journal of Entomology (B)*, 44, 101–144.
- Barbosa, F.A.S. (1947) *Culicoides* (Diptera: Heleidae) da região neotropical. *Anais da Sociedade de Biologia de Pernambuco*, 7, 3–30. [Nov.]
- Barbosa, F.A.S. (1951) A change of specific name in the genus *Culicoides* (Diptera, Heleidae). *Proceedings of the Entomological Society of Washington*, 53, 163.
- Barbosa, F.A.S. (1952) *Novos subsídios para o conhecimento dos Culicoides neotrópicos* (Diptera: Heleidae). Ph.D. Thesis, Univ. Recife, Recife (Brasil): Imprensa Industrial, 21 pp.
- Barreto, P. (1986) Catálogo de los *Culicoides* (Diptera, Ceratopogonidae) de Colombia. *Colombia Médica*, 17, 140–150.
- Barreto, M.P. (1944) Sobre o género *Culicoides* Latreille, 1809, com a descrição de três novas espécies (Diptera, Ceratopogonidae). *Anais da Faculdade de Medicina (da Universidade) de São Paulo*, 20, 89–105, pls. 1–4.
- Blanton, F.S. & Wirth, W.W. (1979) The sand flies (*Culicoides*) of Florida (Diptera: Ceratopogonidae). *Arthropods of Florida and neighboring land areas*, 10, i–xv + 1–204.

- Borkent, A. (2015) *World species of biting midges (Diptera: Ceratopogonidae)*, 241 pp. Available from: <http://www.inhs.illinois.edu/files/1114/2384/5200/CeratopogonidCatalog.pdf> (accessed 1 February 2015)
- Borkent, A. & Spinelli, G.R. (2007) *Neotropical Ceratopogonidae* (Diptera: Insecta). In: Adis J., Arias J.R., Rueda-Delgado G., Wantzen K.M. (Eds.), *Aquatic Biodiversity in Latin America (ABLA)*. Vol. 4. Pensoft, Sofia-Moscow, pp. 1–198.
- Borkent, A., Spinelli, G.R. & Grogan, W.L. (2009) Ceratopogonidae (Biting midges, parrujas). In: Browne, V., Borkent, A., Cumming, J.M., Wood, D.M., Woodley, N.E. & Zumbado, M.A. (Eds.), *Manual of Central American Diptera*. Vol. 1. NRC Research Press, Ottawa, Ontario, 714 pp.
- Borkent, A. & Wirth, W.W. (1997) World species of biting midges (Diptera: Ceratopogonidae). *Bulletin of the American Museum of Natural History*, 233, 1–257.
- Brèthes, J. (1912) Descripción de un nuevo género y especie nueva de Chironomidae (Dipt). *Anales del Museo Nacional de Buenos Aires*, 15, 451–453.
- Brèthes, J. (1914) Descripción de seis Cécidomyidae (Dipt.) de Buenos Aires. *Anales del Museo Nacional de Buenos Aires*, 26, 151–156.
- Browne, J.E. (1980) New species of biting midges of the genus *Culicoides* from Colombia and the first description of the male of *C. florenciae* (Diptera: Ceratopogonidae). *Journal of Medical Entomology*, 17, 533–544.
<http://dx.doi.org/10.1093/jmedent/17.6.533>
- Bystrak, P.G. & Wirth, W.W. (1978) The North American species of *Forcipomyia*, subgenus *Euprojoannisia* (Diptera: Ceratopogonidae). *United States Department of Agriculture, Technical Bulletin*, 1591, 1–51.
- Carter, H.F. (1921) A revision of the genus *Leptoconops* Skuse. *Bulletin of Entomological Research*, 12, 128. [June]
- Cavaleri, F. (1966) Notas sobre Ceratopogonidae (Diptera, Nematocera) V. Descripción de una nueva especie de Venezuela: *Culicoides (Oeacta) birabeni* sp. n. *Physis*, 26, 59–63.
- Chaudhuri, P.K., Das Gupta, S.K. & Chaudhuri, D.K. (1972) Biting midges of the genus *Alluaudomyia* Kieffer from India (Diptera: Ceratopogonidae). *Oriental Insects*, 6, 83–110.
<http://dx.doi.org/10.1080/00305316.1972.10434057>
- Clastrier, J. (1971) Deux nouveaux *Culicoides* (Diptera, Ceratopogonidae) de la Guyane Française. *Annales de Parasitologie*, 46, 285–294.
- Clastrier, J. & Wirth, W.W. (1995) Révision des *Forcipomyia* du sous-genre *Microhelea* de la région Néotropical, parasites de phasmes (Diptera: Ceratopogonidae). *Annales de la Société Entomologique de France*, 31, 97–150.
- Coquillett, D.W. (1899) A new dipterous family related to the Chironomidae. *Entomological News*, 10, 60–61.
- Coquillett, D.W. (1910) The Type species of the North American genera of Diptera. *Proceedings of the United States National Museum*, 37, 499–647.
<http://dx.doi.org/10.5479/si.00963801.37-1719.499>
- Costa Lima, A. da (1937) Chave das espécies de *Culicoides* da região neotropical (Diptera: Ceratopogonidae). *Memórias do Instituto Oswaldo Cruz*, 32, 411–422.
<http://dx.doi.org/10.1590/S0074-02761937000300003>
- Debenham, M.L. (1987) The biting midge genus *Forcipomyia* (Diptera: Ceratopogonidae) in the Australasian Region (exclusive of New Zealand). I. Introduction, key to subgenera, and the *Thyridomyia* and *Trichohelea* groups of subgenera. *Invertebrate Taxonomy*, 1, 35–119.
<http://dx.doi.org/10.1071/IT9870035>
- De Meillon, B. & Wirth, W.W. (1980) A new subgenus of *Forcipomyia*, with descriptions of eight new species (Diptera: Ceratopogonidae). *Proceedings of the Entomological Society of Washington*, 82, 9–24.
- Díaz, F., Ronderos, M.M. & Spinelli, G.R. (2005) The immatures of the Neotropical species *Culicoides venezuelensis* Ortíz and Mirsa (Diptera: Ceratopogonidae). *Transactions of the American Entomological Society*, 131, 375–385.
- Díaz, F., Spinelli, G.R., Donato, M. & Ronderos, M.M. (2014) A taxonomic revision of the Patagonian species of the *Dasyhelea mutabilis* species group with a phylogenetic analysis of New World species (Diptera: Ceratopogonidae). *Journal of Natural History*, 48, 2117–2175.
<http://dx.doi.org/10.1080/00222933.2014.909062>
- Díaz, F., Spinelli, G.R. & Ronderos, M.M. (2010) A revision of the species allied to *Dasyhelea patagonica* Ingram & Macfie (Diptera: Ceratopogonidae). *Journal of Natural History*, 44, 2825–2849.
<http://dx.doi.org/10.1080/00222933.2010.512424>
- Dow, M.I. & Turner, E.C. (1976) A revision of the Nearctic species of the genus *Bezzia* (Diptera: Ceratopogonidae). *Occasional Papers from the Department of Entomology, Virginia Polytechnic Institute and State University, Research Division Bulletin*, 103, 1–162.
- Duret, J. P. & Lane, J. (1955) Novas *Heteromyia* da Argentina (Diptera. Ceratopogonidae). *Dusenja*, 6, 35–40.
- Edwards, F.W. (1922) On some Malayan and other species of *Culicoides*, with a note on the genus *Lasiohelea*. *Bulletin of Entomological Research*, 13, 161–167.
<http://dx.doi.org/10.1017/S0007485300028030>
- Enderlein, G. (1912) *Paryphocomus*, eine neue Chironomidengattung aus Brasilien. *Stettiner Entomologische Zeitung*, 73, 57–60.
- Enderlein, G. (1936) Ordnung: Zweiflügler, Diptera. Abt. 16. In: Brohmer, P., Ehrmann, P., Ulmer, G. (Eds.), *Die Tierwelt Mitteleuropas 6: Insekten III Teil*. Quelle & Meier, Leipzig.
- Ewen, A.B. & Saunders, L.G. (1958) Contributions toward a revision of the genus *Atrichopogon* based on characters of all

- stages (Diptera, Heleidae). *Canadian Journal of Zoology*, 36, 671–724.
<http://dx.doi.org/10.1139/z58-061>
- Felippe-Bauer, M.L., Pinto Damasceno, C., Py-Daniel, V. & Spinelli, G.R. (2009) *Culicoides baniwa* sp. nov. From the Brazilian Amazon region with a synopsis of the *hylas* species group (Diptera: Ceratopogonidae). *Memórias do Instituto Oswaldo Cruz*, 104, 851–857.
<http://dx.doi.org/10.1590/S0074-02762009000600005>
- Felippe-Bauer, M.L. & Wirth, W.W. (1987) A new *Culicoides* of the *stigmalis* group (Diptera: Ceratopogonidae). *Memórias do Instituto Oswaldo Cruz*, 82, 415–419.
<http://dx.doi.org/10.1590/S0074-02761987000300014>
- Forattini, O.P. (1954) Nova espécie de *Culicoides* (Diptera, Ceratopogonidae) do Brasil Central. *Arquivos da Faculdade de Higiene e Saúde Pública da Universidade de São Paulo*, 8, 189–192.
<http://dx.doi.org/10.11606/issn.2358-792X.v8i2p189-192>
- Forattini, O.P. (1956) A new *Culicoides* from Panama (Diptera, Ceratopogonidae). *Proceedings of the Entomological Society of Washington*, 58, 35–36.
- Forattini, O.P. (1957) *Culicoides* da região neotropical (Diptera, Ceratopogonidae). *Arquivos da Faculdade de Higiene e Saúde Pública da Universidade de São Paulo*, 11, 159–526.
<http://dx.doi.org/10.11606/issn.2358-792X.v11i2p161-526>
- Forattini, O.P. (1958) Nova espécie de *Leptoconops* s. str. da região neotropical (Diptera, Ceratopogonidae). *Revista Brasileira de Entomologia*, 8, 37–41.
- Fox, I. (1946) A review of the species of biting midges or *Culicoides* from the Caribbean Region (Diptera: Ceratopogonidae). *Annals of the Entomological Society of America*, 39, 248–258.
<http://dx.doi.org/10.1093/aesa/39.2.248>
- Fox, I. (1947) Two new Central American biting midges or *Culicoides* (Diptera: Ceratopogonidae). *Kuba*, 3, 90–91. [June]
- Fox, I. (1948) *Hoffmania*, a new subgenus in *Culicoides* (Diptera: Ceratopogonidae). *Proceedings of the Biological Society of Washington*, 61, 21–28.
- Fox, I. (1952) Six new Neotropical species of *Culicoides* (Diptera: Ceratopogonidae). *Annals of the Entomological Society of America*, 45, 364–368.
<http://dx.doi.org/10.1093/aesa/45.3.364>
- Fox, I. (1955) A catalogue of the bloodsucking midges of the Americas (*Culicoides*, *Leptoconops*, and *Lasiohelea*) with keys to the subgenera and Nearctic species, a geographic index, and bibliography. *Journal of Agriculture of the University of Puerto Rico*, 39, 214–285.
- Fox, I. & Hoffman, W.A. (1944) New Neotropical biting sand flies of the genus *Culicoides* (Diptera: Ceratopogonidae). *Puerto Rico Journal of Public Health and Tropical Medicine*, 20, 108–111.
- Garrett, C.B.D. (1925) *Seventy new Diptera*. Cranbrook, British Columbia, 16 pp.
- Goeldi, E. (1905) Os mosquitos no Pará. Reunião de quatro trabalhos sobre os mosquitos indígenas, principalmente as espécies que molesta o homem. *Memórias do Museu Goeldi (Museu Paraense) de Historia Natural e Ethnographie*, 4, 1–154, pls. 1–5.
- Grogan, W.L. & Wirth, W.W. (1980) *Nannohelea*, a new genus of biting midges of the tribe Ceratopogonini, related to *Baeohelea* Wirth and Blanton (Diptera: Ceratopogonidae). *Journal of Kansas Entomological Society*, 53, 373–385.
- Grogan, W.L. & Wirth, W.W. (1981) A new American genus of predaceous midges related to *Palpomyia* and *Bezzia* (Diptera: Ceratopogonidae). *Proceedings of the Biological Society of Washington*, 94, 1279–1305.
- Haeselbarth, E. (1965) *Phaenobezzia*, a new genus of biting midges (Diptera: Ceratopogonidae), with a review of the African species. *Zeitschrift für Angewandte Zoologie*, 52, 297–324.
- Hoffman, W.A. (1925) A review of the species of *Culicoides* of North and Central America and the West Indies. *American Journal of Hygiene*, 5, 274–301.
- Hoffman, W.A. (1939) *Culicoides filariferus*, new species. *Puerto Rico Journal of Public Health and Tropical Medicine*, 15, 172–176.
- Huerta, H. (1996) Los Ceratopogónidos colectados por Alfonso Dampf en Chiapas, México (Diptera: Ceratopogonidae). Thesis. Universidad Nacional Autónoma de México, México City, xi + 199 pp.
- Huerta, H., Felippe-Bauer, M.L. & Spinelli, G.R. (2012) A new species and new records of *Downeshelea* Wirth & Grogan in Neotropical México (Diptera: Ceratopogonidae). *Zootaxa*, 3394, 64–68.
- Iches, L. (1906) Sobre cinco dípteros nuevos del Chaco Austral. *Boletín de Ministerio de Agricultura y Ganadería, Argentina*, 6, 262–273.
- Ingram, A. & Macfie, J.W.S. (1931) Ceratopogonidae. In: *Diptera of Patagonia and South Chile, based mainly on material in the British Museum (Natural History). Part II. Fasc. 4*. British Museum (Natural History), London, pp. 155–232.
- Johannsen, O.A. (1938) New species of Nemosera from Puerto Rico. *Journal of Agriculture of the University of Puerto Rico*, 22, 219–225.
- Karsch, F. (1886) Ein neues märkisches Dipteron (*Ceratopogon crudelis* n. sp.). *Berliner Entomologische Zeitschrift*, 30, xvii–xviii.
- Kieffer, J.J. (1899) Description d'un nouveau genre et tableau des genres européens de la famille des Chironomides (Dipt.). *Bulletin de la Société Entomologique de France*, 1899, 66–70.
- Kieffer, J.J. (1906) Diptera. Fam. Chironomidae. In: Wytzman, P. (Ed.), *Genera Insectorum*, Fasc. Bruxelles 42, pp. 1–78 pp.,

pls. 1–4.

- Kieffer, J.J. (1911a) Description de nouveaux chironomides de l'Indian Museum de Calcutta. *Records of the Indian Museum*, 6, 113–177, pls. 6–7.
- Kieffer, J.J. (1911b) Les chironomides de Tendipedidae de l'Himalaya et d'Assam. *Records of the Indian Museum*, 6, 319–349.
- Kieffer, J.J. (1911c) Nouvelles descriptions de chironomides obtenus d'éclosion. *Bulletin de la Société d'Histoire Naturelle de Metz*, 27, 1–60. [Jan]
- Kieffer, J.J. (1913) Chironomidae et Cecidomyidae. In: Alluaud, C.A. & Jeannel, R. (Eds.), *Voyage de Ch. Alluaud et R. Jeannel en Afrique orientale (1911-1912). Resultats scientifiques. Diptera*, 5, pp. 1–43. [Paris]
- Kieffer, J.J. (1917a) Chironomides d'Australie conservés au Musée National Hongrois de Budapest. *Annales Historico-Naturales Musei Nationalis Hungarici*, 15, 175–228.
- Kieffer, J.J. (1917b) Chironomides d'Amérique conservés au Musée National Hongrois de Budapest. *Annales Historico-Naturales Musei Nationalis Hungarici*, 15, 292–364.
- Kieffer, J.J. (1919) Observations sur les chironomides (Dipt.) décrits par J.R. Malloch. *Bulletin de la Société Entomologique de France*, 1919, 191–194.
- Kieffer, J.J. (1921a) Chironomides de l'Afrique Équatoriale. *Annales de la Société Entomologique de France*, 90, 1–56.
- Kieffer, J.J. (1921b) Sur quelques Diptères piqueurs de la tribu des Ceratopogoninae. *Archives de l'Institut Pasteur de l'Afrique du Nord*, 1, 107–115. [March]
- Knab, F. (1914) Ceratopogoninae sucking the blood of caterpillars. *Proceedings of the Entomological Society of Washington*, 16, 63–66.
- Lane, J. (1944) As espécies neotropicais do gênero *Clinohelea* Kieffer, 1917 (Diptera, Ceratopogonidae). *Revista de Entomologia*, 15, 249–261.
- Lane, J. (1946) New Neotropical Ceratopogonidae (Heleidae). (Diptera, Nemosera). *Revista de Entomologia*, 17, 202–215.
- Lane, J. (1948) Novas Ceratopogonídeos do Brasil (Diptera, Ceratopogonidae) (Heleidae). *Arquivos da Faculdade de Higiene e Saúde Pública da Universidade de São Paulo*, 1, 225–239, figs. 1–8.
- Lane, J. (1956a) On "*Paryphocomus*" and *Stenoxenus* (Diptera, Ceratopogonidae). *Revista Brasileira de Biologia*, 16, 299–308.
- Lane, J. (1956b) The genus "*Macfiehelea*" Lane, 1946 (Diptera, Ceratopogonidae). *Revista Brasileira de Biologia*, 16, 435–438.
- Lane, J. (1958) On Neotropical *Bezzia*. *Revista Brasileira de Entomologia*, 8, 25–36.
- Lane, J. (1960) Additional data on "*Palpomyia*" (Diptera, Ceratopogonidae). *Revista Brasileira de Biologia*, 20, 381–389.
- Lane, J. & Duret, J.P. (1954) *Clinohelea* da Argentina e do Brasil (Diptera, Ceratopogonidae). *Dusenya*, 5, 247–253.
- Lane, J. & Forattini, O.P. (1958) Neotropical *Stilobezzia* II. Fourteen new species, chiefly from Panama (Diptera, Ceratopogonidae). *Revista Brasileira de Entomologia*, 8, 203–224.
- Lane, J. & Forattini, O.P. (1961) Neotropical *Stilobezzia*, 1911 III. Key for the the adults of this genus and description of one new species (Diptera, Ceratopogonidae). *Revista Brasileira de Entomologia*, 10, 83–94.
- Lane, J. & Wirth, W.W. (1964) The biting midge genus *Monohalea* Kieffer in the Neotropical region (Diptera, Ceratopogonidae). *Studia Entomologica*, 7, 209–236.
- Latreille, P.A. (1809) *Genera crustaceorum et insectorum secundum ordinem naturalem in familias disposita, iconibus exemplisque plurimis explicata. Vol. 4.* Paris and Strasbourg, 399 pp., 4 pls.
- Lee, V.H. (1968) Parthenogenesis and autogeny in *Culicoides bambusicola* Lutz (Ceratopogonidae, Diptera). *Journal of Medical Entomology*, 5, 91–93.
- Lenz, F. (1934) 13a. Heleidae (Ceratopogonidae). In: Lindner, E. (Ed.), *Die Fliegen der palaearktischen Region. 3 (Lfg. 78)*. Schweizerbart, Stuttgart, pp. 95–133.
- Loew, H. (1861) Diptera Americae septentrionalis indigena. *Berliner Entomologische Zeitschrift*, 5, 307–359.
- Loew, H. (1866) Diptera Americae septentrionalis indigena. *Berliner Entomologische Zeitschrift*, 9, 127–186.
<http://dx.doi.org/10.1002/mmnd.18650090303>
- Lutz, A. (1913) Contribuição para o estudo das Ceratopogoninas hematófagas do Brazil. Parte sistemática. Segunda Memória. *Memórias do Instituto Oswaldo Cruz*, 5, 45–73, pls. 6–8.
<http://dx.doi.org/10.1590/s0074-02761913000100005>
- Lutz, A. (1914) Contribuição para o conhecimento das "Ceratopogoninas" do Brasil. Tercera memória. Aditamento terceiro e descrição de espécies que não sugam sangue. *Memórias do Instituto Oswaldo Cruz*, 6, 81–99, pls. 8–9.
- Macfie, J.W.S. (1932a) Ceratopogonidae from the wings of dragonflies. *Tijdschrift voor Entomologie*, 75, 265–283.
- Macfie, J.W.S. (1932b) Some new or little known Ceratopogonidae. *Annual Magazine of Natural History*, 9, 485–499.
<http://dx.doi.org/10.1080/00222933208673523>
- Macfie, J.W.S. (1934) A new British *Forcipomyia* (Diptera, Ceratopogonidae). *Entomologist's Monthly Magazine*, 70, 144. [June]
- Macfie, J.W.S. (1935) Ceratopogonidae (Dipt.) from the river Amazon. *Stylops*, 4, 49–56.
<http://dx.doi.org/10.1111/j.1365-3113.1935.tb00555.x>
- Macfie, J.W.S. (1937) Notes on Ceratopogonidae (Diptera). *Proceedings of the Royal Entomological Society of London (B)*, 6, 111–118.
<http://dx.doi.org/10.1111/j.1365-3113.1937.tb00451.x>
- Macfie, J.W.S. (1938) Notes on Ceratopogonidae (Diptera). *Proceedings of the Royal Entomological Society of London (B)*, 7, 157–166.
<http://dx.doi.org/10.1111/j.1365-3113.1938.tb01271.x>

- Macfie, J.W.S. (1939a) 5. Ceratopogonidae. In: *Ruwenzori Expedition 1934-5. 1 (5)*. British Mus. (Nat. Hist.), London, pp. 81–102.
- Macfie, J.W.S. (1939b) A report on a collection of Brazilian Ceratopogonidae. *Revista de Entomologia*, 10, 137–219.
- Macfie, J.W.S. (1940a) Ceratopogonidae (Diptera) from north-eastern Brazil. *Proceedings of the Royal Entomological Society of London (B)*, 9, 73–79.
- Macfie, J.W.S. (1940b) Ceratopogonidae (Diptera) from British Guiana and Trinidad. Part 2. *Proceedings of the Royal Entomological Society of London (B)*, 9, 187–195.
- Macfie, J.W.S. (1940c) A report on a collection of Ceratopogonidae (Diptera) from British Guiana. *Entomologist's Monthly Magazine*, 76, 23–32.
- Macfie, J.W.S. (1940d) The genera of Ceratopogonidae. *Annals of Tropical Medicine and Parasitology*, 34, 13–30.
- Macfie, J.W.S. (1948) Some species of *Culicoides* (Diptera, Ceratopogonidae) from the state of Chiapas, Mexico. *Annals of Tropical Medicine and Parasitology*, 42, 67–87.
- Macfie, J.W.S. (1949) Notes on Ceratopogonidae. *Proceedings of the Royal Entomological Society of London (B)*, 18, 109–115. <http://dx.doi.org/10.1111/j.1365-3113.1949.tb01431.x>
- Malloch, J.R. (1915a) The Chironomidae, or midges, of Illinois, with particular reference to the species occurring in the Illinois River. *Bulletin of the Illinois State Laboratory of Natural History*, 10, 275–543, 24 pls.
- Malloch, J.R. (1915b) Some additional records of Chironomidae for Illinois and notes on other Illinois Diptera. *Bulletin of the Illinois State Laboratory of Natural History*, 11, 305–363, pls. 80–84.
- Marinkelle, C.J. & Germán, E. (1970) Mansonelliasis in the Comisaria del Vaupés. *Tropical and Geographical Medicine*, 22, 101–111.
- Marino, P.I. & Spinelli, G.R. (1999) The species groups of the subgenus *Forcipomyia* (*Forcipomyia*) in the Neotropics, with a description of a new species of the *genualis* group (Diptera: Ceratopogonidae). *Transactions of the American Entomological Society*, 125, 445–452. [Dec.]
- Marino, P.I. & Spinelli, G.R. (2001) Las especies del subgénero *Forcipomyia* (*Forcipomyia*) en la Patagonia (Diptera, Ceratopogonidae). *Revista de la Sociedad Entomológica Argentina*, 60, 99–124.
- Marino, P.I. & Spinelli, G.R. (2002) A revision of the *Forcipomyia squamitibia* group in the Neotropics with the description of three new species (Diptera: Ceratopogonidae). *Insect Science and its Application*, 22, 307–319. <http://dx.doi.org/10.1017/s1742758400020944>
- Mayer, K. (1937) Beitrag zur Kenntnis der deutschen Ceratopogoniden. (Dipt.) IX. *Stettiner Entomologische Zeitung*, 98, 301–304.
- Meigen, J.G. (1818) *Systematische Beschreibung der bekannten europäischen zweiflügeligen Insekten. Vol. 1*. Bei Friedrich Wilhelm Forstmann, Aache, xxxvi + 333 pp., pls. 1–11.
- Messersmith, D.H. (1972) A new species of *Culicoides* from Colombia (Diptera: Ceratopogonidae). *Proceedings of the Entomological Society of Washington*, 74, 165–169.
- Moncada, L., Carrasquilla, M.C., Spinelli, G.R., Lotta, I. & Matta, N. (2010) Description of *Culicoides lisicarruni* (Diptera: Ceratopogonidae), a new species from Cundinamarca, Colombia. *Memórias do Instituto Oswaldo Cruz*, 105, 978–980. <http://dx.doi.org/10.1590/S0074-02762010000800005>
- Newman, E. (1834) Attempted division of British insects into natural orders. *Entomological Magazine*, 2, 379–431.
- Noè, G. (1905) Un nuovo genere appartenente alla famiglia Chironomidae. *Rendiconti, Accademia Nazionale dei Lincei*, 14, 114–120.
- Noè, G. (1907) Due nuove specie di ditteri appartenenti ad un genere nuovo. *Archivio Zoologico Italiano; Pubblicato Sotto gli Auspicii Della Unione Zoologica*, 3, 101–164, pls. 1–3.
- Ortíz, I. (1950a) Estudios en *Culicoides* IV. Revisión de las especies americanas del sub-género Hoffmania Fox 1948, con la descripción de dos nuevas especies. *Revista de Sanidad y Asistencia Social*, 15, 437–460.
- Ortíz, I. (1950b) Estudios en *Culicoides* V. Informes sobre una nueva especie y lista de los machos cuyas genitales son conocidas. *Revista de Sanidad y Asistencia Social*, 15, 461–465.
- Ortíz, I. (1950c) Descripción de *Stilobezzia glauca venezuelensis* n. vr. y *Monohalea mayeri* n. sp. *Memórias de la Sociedad de Ciencias Naturales La Salle*, 10, 199–204.
- Ortíz, I. (1951) Estudios en *Culicoides* (Diptera, Ceratopogonidae) 9. Sobre los caracteres diferenciales entre *Culicoides paraensis* (Goeldi, 1905), *C. stellifer* (Coquillett, 1901), y *C. lanei* (Ortíz, 1950). Descripción de cuatro nuevas especies con la redescipción de algunas otras poco conocidas. *Revista de Sanidad y Asistencia Social*, 16, 573–591.
- Ortíz, I. (1953) Nueva contribución al conocimiento de los caracteres morfológicos externos de las hembras americanas del género *Culicoides* Ltr. (Diptera, Ceratopogonidae) con una espermateca. Descripción de dos nuevas especies de Venezuela: *Culicoides transferrans* (*C. oublepharus* [sic] Ortíz, 1952) y *Culicoides mirsae*. *Revista de Sanidad y Asistencia Social*, 18, 797–806.
- Ortíz, I. (1954) Sobre dos nuevos dípteros hematófagos del género *Culicoides* (Nematocera, Ceratopogonidae). *Archivos Venezolanos de Patología Tropical y Parasitología Médica*, 2, 221–226.
- Ortíz, I. (1956) Sobre un pequeño díptero de la región del Auyantepuy. *Boletín Venezolano de Laboratorio Clínico*, 1, 93–96.
- Ortíz, I. & León, L.A. (1955) Los *Culicoides* (Diptera: Ceratopogonidae) de la República del Ecuador. *Boletín de Informaciones Científicas Nacionales*, 7, 564–594. [January–February]
- Ortíz, I. & Mirsa, M. (1950) Estudios en *Culicoides* (Diptera, Ceratopogonidae) VIII.- Sobre una nueva especie del grupo *haematopotus*: *Culicoides venezuelensis* n. sp. *Archivos Venezolanos de Patología Tropical y Parasitología Médica*, 2,

- Ortíz, I. & Mirsa, M. (1952a) *Culicoides* de Venezuela - Redescrición de 10 especies con la descripcón de algunos sexos no conocidos. *Revista de Sanidad y Asistencia Social*, 17, 257–279.
- Ortíz, I. & Mirsa, M. (1952b) Sobre las especies Americanas del género "*Culicoides*" Latr., (Diptera, "Ceratopogonidae") con una espermateca. *Acta Científica Venezolana*, 2, 125–128.
- Philippi, R.A. (1865) Aufzählung der chilenischen Dipteren. *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft*, 15, 595–782. [in Wien]
- Poey, F. (1853) *Memórias sobre la historia natural de la Isla de Cuba, acompañadas de sumarios latinos y extractos en francés. Vol. 1. pt. 4.* Havanna, 80 pp. [pp. 201–280]
- Rafinesque, C.S. (1815) *Analyse de la nature ou tableau de l'univers et des corps organisés. Le nature est mon guide, et Linnéus mon maitre.* Privately published, Palermo, 224 pp.
- Rodríguez, M.C. de & Wirth, W.W. (1986) A new species of man-biting *Culicoides* from the high Andes of Colombia (Diptera: Ceratopogonidae). *Florida Entomologist*, 69, 311–314.
<http://dx.doi.org/10.2307/3494934>
- Ronderos, M.M. (1988) *Estudio sistemático de los géneros hematófagos de Ceratopogonidae (Diptera: Nematocera) de la República Argentina.* Ph.D. Thesis, Univ. Nac. La Plata, Argentina, 135 pp. + 49 pls.
- Ronderos, M.M. & Spinelli, G.R. (1992) A key to the Neotropical *Leptoconops* (Diptera: Ceratopogonidae), with the description of a new species from Argentina. *Revista de la Sociedad Entomológica Argentina*, 51, 41–45.
- Ronderos, M.M. & Spinelli, G.R. (1995) Redescrición de *Culicoides lahillei* y descripcón de *Culicoides ichesi*, n. sp. de la Argentina, Paraguay y Uruguay (Diptera: Ceratopogonidae). *Neotrópica*, 41, 77–81.
- Ronderos, M.M. & Spinelli, G.R. (1998) Las especies de *Culicoides* en el área de influencia de la represa de Yacretá (Diptera: Ceratopogonidae). *Revista de la Sociedad Entomológica Argentina*, 57, 79–83.
- Ronderos, M.M. & Spinelli, G.R. (1999) On the subgenus *Forcipomyia* (*Lasiohelea*) in the Neotropical Region (Diptera: Ceratopogonidae). *Transactions of the American Entomological Society*, 125, 151–161. [June]
- Santarem A.M.N., Lopes Da Trindade R., Do Nascimento Da Silva, T., Castellon, E.G., Antunes de Melo-Patiú. C. & Felipe-Bauer, M.L. (2014) New neotropical *Culicoides* and redescription of *Culicoides reticulatus* Lutz (Diptera: Ceratopogonidae). *Zootaxa*, 3795 (3), 255–274.
<http://dx.doi.org/10.11646/zootaxa.3795.3.2>
- Saunders, L.G. (1925) On the life history, morphology and systematic position of *Apelma* Kieff. and *Thyridomyia* n. g. (Diptera, Nemat. Ceratopogoninae). *Parasitology*, 17, 252–277.
<http://dx.doi.org/10.1017/S0031182000004704>
- Saunders, L.G. (1957) Revision of the genus *Forcipomyia* based on characters of all stages (Diptera, Ceratopogonidae). *Canadian Journal of Zoology*, 34, 657–705. [1956]
<http://dx.doi.org/10.1139/z56-065>
- Saunders, L.G. (1959) Methods for studying *Forcipomyia* midges, with special reference to cacao-pollinating species (Diptera, Ceratopogonidae). *Canadian Journal of Zoology*, 37, 3–51.
<http://dx.doi.org/10.1139/z59-005>
- Say, T. (1825) *American entomology, or descriptions of the insects of North America. Vol. 2.* S. A. Mitchell, Philadelphia, 121 pp., 18 pls. [pls. 19–36]
- Skuse, F.A.A. (1889) Diptera of Australia. Part VI. - The Chironomidae. *Proceedings of the Linnean Society of New South Wales*, 4, 215–311, pls. 11–14.
- Soria, S. & Bystrak, P.G. (1975) A new species of *Forcipomyia* (Diptera, Ceratopogonidae) described in all stages, with an account of its role as a cacao pollinator. *Revista Theobroma*, 5, 3–11.
- Soria, S. & Wirth, W.W. (1979) Ceratopogonid midges (Diptera: Nematocera) collected from cacao flowers in Palmira, Colombia: an account of their pollinating abilities. *Revista Theobroma*, 9, 77–84.
- Spinelli, G.R. & Duret, J.P. (1993) Las especies neotropicales de *Clinohoelea* (Diptera: Ceratopogonidae). *Graellsia*, 49, 39–50.
- Spinelli, G.R., Greiner, E.C. & Wirth, W.W. (1993) The Neotropical bloodsucking midges of the *Culicoides guttatus* group of the subgenus *Hoffmania* (Diptera: Ceratopogonidae). *Contributions of the American Entomological Insitute*, 27, 1–91.
- Spinelli, G.R. & Grogan, W.L. (1987) A revision of the Neotropical species of *Parabozzia* (Diptera: Ceratopogonidae). *Biología Acuática*, 11, 1–45.
- Spinelli, G.R. & Grogan, W.L. (1989) Dos especies nuevas de *Palpomyia*, grupo *distincta* de la región Neotropical (Diptera: Ceratopogonidae). *Neotrópica*, 35, 3–8.
- Spinelli, G.R. & Grogan, W.L. (1994) Two new Neotropical species of the subgenus *Isohelea* of *Brachypogon*, with the description of the female of *B. (I.) misionensis* and a key to the Neotropical species (Diptera: Ceratopogonidae). *Revista de la Sociedad Entomológica Argentina*, 53, 1–8.
- Spinelli, G.R. & Grogan, W.L. (1998) A revision of the Neotropical predaceous midges of *Brachypogon* (*Brachypogon*) Kieffer (Diptera: Ceratopogonidae). *Insecta Mundi*, 12, 59–79.
- Spinelli, G.R., Ronderos, M.M., Díaz, F. & Marino, P.I. (2005) The bloodsucking biting midges of Argentina (Diptera: Ceratopogonidae). *Memórias do Instituto Oswaldo Cruz*, 100, 137–150.
<http://dx.doi.org/10.1590/S0074-02762005000200006>
- Spinelli, G.R., Santamaría, E., Cabrera, O.L., Ronderos, M.M. & Suárez, M.F. (2009) Five new species of *Culicoides* Latreille described from Colombia, yielding a new species list and country records (Diptera: Ceratopogonidae). *Memórias do*

Instituto Oswaldo Cruz, 104, 81–92.

<http://dx.doi.org/10.1590/S0074-02762009000100013>

- Spinelli, G.R. & Wirth, W.W. (1984a) A review of the Neotropical predaceous midge genus *Paryphoconus* (Diptera: Ceratopogonidae). *Proceedings of the Biological Society of Washington*, 97, 882–908.
- Spinelli, G.R. & Wirth, W.W. (1984b) The Neotropical predaceous midges of the genus *Alluaudomyia* (Diptera: Ceratopogonidae). *Proceedings of the Entomological Society of Washington*, 86, 673–702.
- Spinelli, G.R. & Wirth, W.W. (1984c) Las especies Neotropicales del género *Dasyhelea*, grupo *cincta* (Diptera: Ceratopogonidae). *Limnobiós*, 2, 586–608.
- Spinelli, G.R. & Wirth, W.W. (1986a) The Neotropical species of *Phaenobezzia* (Diptera: Ceratopogonidae). *Florida Entomologist*, 69, 231–236.
<http://dx.doi.org/10.2307/3494765>
- Spinelli, G.R. & Wirth, W.W. (1986b) Clave para la identificación de las especies del género *Culicoides* Latreille presentes al sur de la cuenca Amazónica. Nuevas citas y notas sinonímicas (Diptera: Ceratopogonidae). *Revista de la Sociedad Entomológica Argentina*, 44, 49–73.
- Spinelli, G.R. & Wirth, W.W. (1989a) Las especies Neotropicales del género *Bezzia* (Diptera: Ceratopogonidae). II. Los grupos *nobilis* y *punctipennis*. *Revista de la Sociedad Entomológica Argentina*, 45, 109–129.
- Spinelli, G.R. & Wirth, W.W. (1989b) The Neotropical predaceous midges of the genus *Bezzia* (Diptera: Ceratopogonidae) Part I. The *glabra* and *brevicornis* groups. *Limnobiós*, 2, 762–778.
- Spinelli, G.R. & Wirth, W.W. (1990) Neotropical predaceous midges of the genus *Bezzia* (Diptera: Ceratopogonidae) Part III. The *gibbera* group of species. *Insecta Mundi*, 4, 11–32.
- Spinelli, G.R. & Wirth, W.W. (1991) The Neotropical predaceous midges of the genus *Bezzia* (Diptera: Ceratopogonidae) Part IV. The *dentifemur* and *venustula* groups. *Insecta Mundi*, 5, 1–17.
- Spinelli, G.R. & Wirth, W.W. (1993) Los Ceratopogonidae de la Argentina (Insect: Diptera). In: Castellanos, Z. (Ed.), *Fauna de agua dulce de la República Argentina. Volumen 38. Diptera Fascículo 3. Ceratopogonidae*. Profadu-Conicet, Buenos Aires, 124 pp.
- Staeger, R.C. (1839) Systematisk fortegnelse over de i Danmark hidtil fundne Diptera. *Naturhistorisk Tidsskrift*, 2, 549–600.
- Tavares, O. & Souza, M.A. de (1979) Sobre algumas espécies do gênero *Culicoides* Latreille, 1809 do Estado do Rio de Janeiro, Brasil (Diptera, Ceratopogonidae). *Revista Brasileira de Biologia*, 39, 611–613.
- Tidwell, M.A. & Tidwell, M. (1982) Development of *Mansonella ozzardi* in *Simulium amazonicum*, *S. argentiscutum* and *Culicoides insinuatus*. *American Journal of Tropical Medicine and Hygiene*, 31, 1137–1141.
- Tidwell, M.A., Tidwell, M., Hoyos, P.M., Corredor, A. & Barreto, P. (1980) Vectores de *Onchocerca volvulus* y *Mansonella ozzardi* en Colombia. *Acta Médica del Valle*, 11, 119–30.
- Townsend, C.H.T. (1893) An interesting blood-sucking gnat of the family Chironomidae. *Psyche*, 6, 369–371.
<http://dx.doi.org/10.1155/1893/58983>
- Utmar, J.A. & Wirth, W.W. (1976) A revision of the new world species of *Forcipomyia*, subgenus *Caloforcipomyia* (Diptera: Ceratopogonidae). *Florida Entomologist*, 59, 109–133.
<http://dx.doi.org/10.2307/3493959>
- Vargas, L. (1954) Dos nuevas especies de *Culicoides* Mexicanos (Diptera, Heleidae). *Revista del Instituto de Salubridad y Enfermedades Tropicales*, 14, 25–32.
- Vargas, L. (1960) The subgenera of *Culicoides* of the Americas (Diptera, Ceratopogonidae). *Revista de Biología Tropical*, 8, 35–47.
- Vitale, G. C., Wirth, W.W. & Aitken, T.H.G. (1981) New species and records of *Culicoides* reared from arboreal habitats in Panama, with a synopsis of the *debilipalpis* group (Diptera: Ceratopogonidae). *Proceedings of the Entomological Society of Washington*, 83, 140–159.
- Walker, F. (1856) Diptera. In: Saunders, W.W. (Ed.), *Insecta Saundersiana: Or characters of undescribed insects in the collection of William Wilson Saunders. Vol. 1*. London, pp. 415–474.
- Westwood, J.O. (1840) Order XIII. Diptera Aristotle (Antliata Fabricius. Halteriptera Clairv.). In: Westwood, J.O. (Ed.), *An introduction to the modern classification of insects; founded on the natural habits and corresponding organisation of the different families. Vol. 2. Synopsis of the genera of British insects*. Longman, Orme, Brown, Green, London, pp. 125–154.
- Williston, S.W. (1896) On the Diptera of St. Vincent (West Indies). *Transactions of the Entomological Society of London*, 1896, 253–446, pls. 8–14.
- Williston, S.W. (1900) Supplement (Part). In: Godman, F.D. & Salvin, O. (Eds.), *Biologia Centrali-Americana. Zoologia-Insecta-Diptera. Vol. 1*. Taylor & Francis, London, pp. 217–248.
- Wirth, W.W. (1951a) A new biting midge of the genus *Leptoconops* from Florida, with new records of other American species (Diptera, Heleidae). *Proceedings of the Entomological Society of Washington*, 53, 281–284.
- Wirth, W.W. (1951b) New species and records of Virginia Heleidae (Diptera). *Proceedings of the Entomological Society of Washington*, 53, 313–326.
- Wirth, W.W. (1952) Two new species of anthropophilic *Culicoides* from Guatemala (Diptera: Heleidae). *Journal of Parasitology*, 38, 245–247.
<http://dx.doi.org/10.2307/3274042>
- Wirth, W.W. (1953) American biting midges of the heleid genus *Monohelea*. *Proceedings of the United States National Museum*, 103, 135–154.

<http://dx.doi.org/10.5479/si.00963801.103-3320.135>

- Wirth, W.W. (1959) *Pachyhelea*, a new genus of American Ceratopogonidae related to *Palpomyia* (Diptera). *Bulletin of the Brooklyn Entomological Society*, 54, 50–52.
- Wirth, W.W. (1960) The genus *Pellucidomyia* Macfie (Diptera, Ceratopogonidae). *Bulletin of the Brooklyn Entomological Society*, 55, 1–3.
- Wirth, W.W. (1962) A reclassification of the *Palpomyia-Bezzia-Macropeza* groups, and a revision of the North American Sphaeromiini (Diptera, Ceratopogonidae). *Annals of the Entomological Society of America*, 55, 272–287.
<http://dx.doi.org/10.1093/aesa/55.3.272>
- Wirth, W.W. (1965) A revision of the genus *Parabezzia* Malloch (Diptera, Ceratopogonidae). *Proceedings of the Entomological Society of Washington*, 67, 215–230.
- Wirth, W.W. (1970) The neotropical *Forcipomyia* midges of the subgenus *Thyridomyia* Saunders (Diptera, Ceratopogonidae). *Studia Entomologica*, 13, 429–440.
- Wirth, W.W. (1971) A review of the "stick-ticks", neotropical biting midges of the *Forcipomyia* subgenus *Microhelea* parasitic on walking stick insects (Diptera: Ceratopogonidae). *Entomological News*, 82, 229–245.
- Wirth, W.W. (1972) The neotropical *Forcipomyia* (*Microhelea*) species related to the caterpillar parasite *F. fuliginosa* (Diptera: Ceratopogonidae). *Annals of the Entomological Society of America*, 65, 564–577.
<http://dx.doi.org/10.1093/aesa/65.3.564>
- Wirth, W.W. (1974) 14. Family Ceratopogonidae. In: Papavero, N. (Ed.), *A catalog of the diptera of the Americas south of the United States*. Museu de Zoologia, São Paulo, 89 pp.
- Wirth, W.W. (1976) *Forcipomyia pictoni* Macfie and descriptions of two new related species from Florida (Diptera: Ceratopogonidae). *Florida Entomologist*, 59, 77–84.
<http://dx.doi.org/10.2307/3493176>
- Wirth, W.W. (1978) New species and records of intertidal biting midges of the genus *Dasyhelea* Kieffer from the Gulf of California (Diptera: Ceratopogonidae). *Pacific Insects*, 18, 191–198.
- Wirth, W.W. (1982) The cacao-pollinating midges of the *Forcipomyia argenteola* group (Diptera: Ceratopogonidae). *Proceedings of the Entomological Society of Washington*, 84, 568–585.
- Wirth, W.W. (1991a) The predaceous midge genus *Allohelea* Kieffer in the western hemisphere (Diptera: Ceratopogonidae). *Florida Entomologist*, 74, 491–505.
<http://dx.doi.org/10.2307/3495403>
- Wirth, W.W. (1991b) New and little-known species of *Forcipomyia* (Diptera: Ceratopogonidae) associated with cocoa pollination in Brazil. *Proceedings of the Entomological Society of Washington*, 93, 163–175.
- Wirth, W.W. (1991c) *Forcipomyia bicolor* and related species of the subgenus *Lepidohelea* in Brazil (Diptera: Ceratopogonidae). *Florida Entomologist*, 74, 506–517.
<http://dx.doi.org/10.2307/3495404>
- Wirth, W.W. (1994) The western hemisphere species of the predaceous midge genus *Echinohelea*, with descriptions of six new species (Diptera: Ceratopogonidae). *Insecta Mundi*, 8, 227–242.
- Wirth, W.W. & Atchley, W.R. (1973) A review of the North American *Leptoconops* (Diptera: Ceratopogonidae). *Graduate Studies Texas Tech University*, 5, 1–57.
- Wirth, W.W. & Barreto, P. (1978) New species of *Culicoides* biting midges (Diptera: Ceratopogonidae) from Colombia. *Journal of Medical Entomology*, 14, 553–564.
<http://dx.doi.org/10.1093/jmedent/14.5.553>
- Wirth, W.W. & Blanton, F.S. (1953a) Studies in Panama *Culicoides* (Diptera: Heleidae): I, Descriptions of six new species. *Journal of the Washington Academy of Sciences*, 43, 69–77.
<http://dx.doi.org/10.2307/3273942>
- Wirth, W.W. & Blanton, F.S. (1953b) Studies in Panama *Culicoides* (Diptera, Heleidae). II. Descriptions of six additional new species. *Journal of Parasitology*, 39, 229–236.
<http://dx.doi.org/10.2307/3273942>
- Wirth, W.W. & Blanton, F.S. (1955a) Studies in Panama *Culicoides* (Diptera, Heleidae) IV. Descriptions of three new species. *Bulletin of the Brooklyn Entomological Society*, 50, 100–106. [October]
- Wirth, W.W. & Blanton, F.S. (1955b) Studies in Panama *Culicoides* (Diptera, Heleidae) V. Descriptions of three new species of the subgenus *Oecacta* Poey. *Bulletin of the Brooklyn Entomological Society*, 50, 121–127.
- Wirth, W.W. & Blanton, F.S. (1956a) A new species of salt-marsh sand fly from Florida, the Bahamas, Panama and Ecuador: its distribution and taxonomic differentiation from *Culicoides furens* (Poey) (Diptera, Heleidae). *Florida Entomologist*, 39, 157–162.
<http://dx.doi.org/10.2307/3492592>
- Wirth, W.W. & Blanton, F.S. (1956b) Studies in Panama *Culicoides* VII. The species of the *pulicaris* and *cova-garciai* group (Diptera, Heleidae). *Proceedings of the Entomological Society of Washington*, 58, 211–227.
- Wirth, W.W. & Blanton, F.S. (1956c) Studies in Panama *Culicoides* (Diptera, Heleidae). IX. Two new species related to *leoni* Barbosa and *reevesi* Wirth. *Bulletin of the Brooklyn Entomological Society*, 51, 45–52.
- Wirth, W.W. & Blanton, F.S. (1959) Biting midges of the genus *Culicoides* from Panama (Diptera: Heleidae). *Proceedings of the United States National Museum*, 109, 237–482.
<http://dx.doi.org/10.5479/si.00963801.109-3415.237>

- Wirth, W.W. & Blanton, F.S. (1968) A revision of the neotropical biting midges of the *hylas* group of *Culicoides* (Diptera: Ceratopogonidae). *Florida Entomologist*, 51, 201–215.
<http://dx.doi.org/10.2307/3493420>
- Wirth, W.W. & Blanton, F.S. (1970a) New genera of Neotropical Ceratopogonidae (Diptera). *Florida Entomologist*, 53, 7–14.
<http://dx.doi.org/10.2307/3493107>
- Wirth, W.W. & Blanton, F.S. (1970b) Notes on *Brachypogon* Kieffer (Diptera, Ceratopogonidae), a new species, and two new Neotropical genera of the tribe Ceratopogonini. *Florida Entomologist*, 53, 93–104.
<http://dx.doi.org/10.2307/3493452>
- Wirth, W.W. & Blanton, F.S. (1970c) A review of the *Culicoides nigrigenus* group, with two new species (Diptera: Ceratopogonidae). *Entomological News*, 81, 141–151.
- Wirth, W.W. & Blanton, F.S. (1972) *Lanehelea*, a new neotropical genus of Sphaeromiini (Diptera: Ceratopogonidae). *Studia Entomologica*, 15, 433–438.
- Wirth, W.W. & Blanton, F.S. (1973) A review of the maruins or biting midges of the genus *Culicoides* (Diptera: Ceratopogonidae) in the Amazon Basin. *Amazoniana*, 4, 405–470.
- Wirth, W.W. & Blanton, F.S. (1974) *The West Indian sandflies of the genus Culicoides (Diptera: Ceratopogonidae)*. Agricultural Research Service, United States Department of Agriculture, Technical Bulletin, 1474, iv + 98 pp.
- Wirth, W.W. & Dow, M.I. (1972) Studies on the genus *Forcipomyia* 4. *Rhynchoforcipomyia*, a new neotropical subgenus in the *Trichohelea* complex (Diptera: Ceratopogonidae). *Annals of the Entomological Society of America*, 65, 862–872.
<http://dx.doi.org/10.1093/aesa/65.4.862>
- Wirth, W.W., Dyce, A.L. & Spinelli, G.R. (1988) An atlas of wing photographs, with a summary of the numerical characters of the Neotropical species of *Culicoides* (Diptera: Ceratopogonidae). *Contributions of the American Entomological Institute*, 25, 1–72
- Wirth, W.W. & Felipe-Bauer, M.L. (1989) The neotropical biting midges related to *Culicoides paraensis* (Diptera: Ceratopogonidae). *Memórias do Instituto Oswaldo Cruz*, 84, 551–565.
<http://dx.doi.org/10.1590/S0074-02761989000800096>
- Wirth, W.W. & Grogan, W.L. (1988) *The predaceous midges of the world (Diptera: Ceratopogonidae; Tribe Ceratopogonini)*. *Flora and Fauna Handbook*. 4. E.J. Brill, Leiden, xv + 160 pp.
- Wirth, W.W. & Hubert, A.A. (1960) Ceratopogonidae (Diptera) reared from cacti, with a review of the *copiosus* group of *Culicoides*. *Annals of the Entomological Society of America*, 53, 639–658.
<http://dx.doi.org/10.1093/aesa/53.5.639>
- Wirth, W.W. & Lee, V.H. (1967) New species of *Culicoides* from high altitudes in the Colombian Andes (Diptera: Ceratopogonidae). *Proceedings of the United States National Museum* 124, 1–22.
<http://dx.doi.org/10.5479/si.00963801.124-3626.1>
- Wirth, W.W. & Ratanaworabhan, N.C. (1971) Notes on Neotropical *Pellucidomyia* (Diptera, Ceratopogonidae). *Annals of the Entomological Society of America*, 64, 446–448.
<http://dx.doi.org/10.1093/aesa/64.2.446>
- Wirth, W.W. & Ratanaworabhan, N.C. (1972a) *Neobezzia*, a new neotropical biting midge genus of the tribe Sphaeromiini (Diptera: Ceratopogonidae). *Journal of the Kansas Entomological Society*, 45, 476–490.
- Wirth, W.W. & Ratanaworabhan, N.C. (1972b) A revision of the tribe Stenoxenini (Diptera: Ceratopogonidae). *Annals of the Entomological Society of America*, 65, 1368–1388.
<http://dx.doi.org/10.1093/aesa/65.6.1368>
- Wirth, W.W. & Ratanaworabhan, N.C. (1978) Studies on the genus *Forcipomyia*. V. Key to subgenera and description of a new subgenus related to *Euprojoannisia* Brèthes (Diptera: Ceratopogonidae). *Proceedings of the Entomological Society of Washington*, 80, 493–507.
- Wirth, W.W. & Soria, S.J. (1975) A new Neotropical *Forcipomyia* midge closely related to *F. (F.) genualis* (Loew) (Diptera: Ceratopogonidae). *Revista Theobroma*, 5, 19–27.
- Wirth, W.W. & Soria, S.J. (1980) Studies on the genus *Forcipomyia* VI. The Neotropical species of the subgenus *Warmkea* (Diptera: Ceratopogonidae). *Revista Theobroma*, 9, 137–161.
- Wirth, W.W. & Soria, S.J. (1981) Two *Culicoides* biting midges reared from inflorescences of *Calathea* in Brazil and Colombia, and a key to the species of the *discrepans* group (Diptera: Ceratopogonidae). *Revista Theobroma*, 11, 107–117.
- Wirth, W.W. & Spinelli, G.R. (1992) Immature stages of *Forcipomyia seminole* Wirth and a related new neotropical species (Diptera: Ceratopogonidae). *Florida Entomologist*, 75, 349–356.
<http://dx.doi.org/10.2307/3495856>
- Wirth, W.W. & Spinelli, G.R. (1993) The American species of the *annulatifipes* group of the subgenus *Lepidohelea*, genus *Forcipomyia* (Diptera: Ceratopogonidae). *Insecta Mundi*, 6, 109–125. [1992]