

The biting and predaceous midges of Guadeloupe  
(Diptera: Ceratopogonidae). I. Species of the subfamily Ceratopogoninae

William L. Grogan, Jr.  
Florida State Collection of Arthropods  
Florida Department of Agriculture and Consumer Services  
Gainesville, Florida 32614 U.S.A.  
groganw@doacs.state.fl.us

Gustavo R. Spinelli, María M. Ronderos and Carla G. Cazorla  
División Entomología  
Museo de La Plata  
Paseo del Bosque s/n  
1900 La Plata, Argentina  
spinelli@fcnym.unlp.edu.ar

**Abstract.** We provide new records of biting and predaceous midges (Diptera: Ceratopogonidae) from Guadeloupe in the subfamily Ceratopogoninae, including descriptions and illustrations of three new predaceous species in the genera, *Parabezzia* Malloch, *Stilobezzia* Kieffer and *Palpomylia* Meigen, respectively, and the first records of the New World predaceous genus, *Amerohelea* Grogan and Wirth, from the Caribbean region. We also provide the first Guadeloupe records of the biting midges, *Culicoides (Anilomyia) decor* (Williston), *C. (Avaritia) pusillus* Lutz, *C. (Drymodesmyia) bredini* Wirth and Blanton, *C. (D.) poikilonotus* Macfie, *C. (Haematomyidium) hoffmani* Fox, *C. (Hoffmania) insignis* Lutz, *C. rangeli* Ortiz and Mirsa and *C. trilineatus* Fox, and the predaceous midges, *Brachypogon (Brachypogon) bifidus* Spinelli and Grogan, *B. (B.) telesfordi* Spinelli and Grogan, *B. (B.) woodruffi* Spinelli and Grogan, *Monohelea maya* Felipe-Bauer, Huerta and Ibáñez-Bernal, *Stilobezzia (Stilobezzia) diminuta* Lane and Forattini, *S. (S.) thomsenae* Wirth, *Amerohelea galindoi* Grogan and Wirth, *Bezzia (Bezzia) flinti* Spinelli and Wirth, *B. (Homobezzia) venustula* (Williston) and *Palpomylia insularis* Spinelli and Grogan.

**Key words.** Biting midges, Predaceous midges, Diptera, Ceratopogonidae, Guadeloupe, New records, New species, Distribution

## Introduction

The biting and predaceous midge (Diptera: Ceratopogonidae) fauna of the Caribbean region is moderately well known for the Greater Antilles and for several islands in the Lesser Antilles, especially Dominica and Grenada (Borkent and Spinelli 2007). The genus *Culicoides* Latreille includes several common coastal and inland pest species that bite humans and other vertebrates, and, for this reason, members of this genus have received the greatest systematic attention in the Caribbean region during the 20<sup>th</sup> century (Aitken et al. 1975; Wirth and Blanton 1974).

The islands of the Guadeloupe archipelago comprise the largest landmass among the Lesser Antilles. The two largest islands, the eastern Grande Terre is low elevation and semi-arid, whereas the western Basse Terre is mountainous and humid, and are separated by a narrow channel of water, about 50 m. wide. Most humans inhabit Grand Terre where most land is devoted to agriculture, whereas Basse Terre is sparsely populated, mostly forested and much of it is incorporated into national parks. Some groups of insects, such as Coleoptera, have been extensively surveyed on Guadeloupe and over 500 species of beetles are endemic to this archipelago (Peck et al. 2013). However, many nematocerous Diptera families have been poorly sampled or reported from these islands. For example, only five species of Ceratopogonidae have been previously recorded from Guadeloupe: *Atrichopogon penicillatus* Delécolle and Rieb (subfamily Forcipomyiinae), *Dasyhelea guadeloupensis* Delécolle and Rieb and *D. scissurae* Macfie (subfamily Dasyheleinae), *Culicoides (Oecacta) furens* (Poey) and *C. guadeloupensis* Floch and Abonnenc (subfamily Ceratopogoninae) (Borkent and Spinelli 2007).

We have been privileged to study a collection of biting and predaceous midges collected by coleopterists Michael Thomas and Robert Turnbow with blacklight trap from several sites on Basse Terre, Guadeloupe during September 2010, and, by Turnbow during May 2012. This material included a re-

markably diverse assemblage of ceratopogonids, including the first Caribbean records of the New World predaceous genus, *Amerohelea* Grogan and Wirth. In this first article, we review the Guadeloupe ceratopogonids in the subfamily Ceratopogoninae which is to be followed by a second contribution on species in the genus *Dasyhelea* Kieffer (subfamily Dasyheleinae), and a third on species in the genera, *Atrichopogon* Kieffer and *Forcipomyia* Meigen (subfamily Forcipomyiinae). In this first report, we provide descriptions and illustrations of three new predaceous species in the genera, *Parabezzia* Malloch, *Stilobezzia* Kieffer and *Palpomyia* Meigen, respectively, and the first Guadeloupe records of the biting midges, *Culicoides* (*Anilomyia*) *decor* (Williston), *C. (Avaritia) pusillus* Lutz, *C. (Drymodesmyia) bredini* Wirth and Blanton, *C. (D.) poikilonotus* Macfie, *C. (Haematomyidium) hoffmani* Fox, *C. (Hoffmania) insignis* Lutz, *C. rangeli* Ortiz and Mirsa, *C. trilineatus* Fox, and the predaceous midges, *Brachypogon* (*Brachypogon*) *bifidus* Spinelli and Grogan, *B. (B.) telesfordi* Spinelli and Grogan, *B. (B.) woodruffi* Spinelli and Grogan, *Monohalea maya* Felipe-Bauer, Huerta and Ibáñez-Bernal, *Stilobezzia* (*Stilobezzia*) *diminuta* Lane and Forattini, *S. (S.) thomsenae* Wirth, *Amerohelea galindoi* Grogan and Wirth, *Bezzia* (*Bezzia*) *flinti* Spinelli and Wirth, *B. (Homobezzia) venustula* (Williston) and *Palpomyia insularis* Spinelli and Grogan.

## Materials and methods

Specimens were collected in water with detergent and sodium benzoate and preserved in 70% isopropyl alcohol. They were subsequently preserved in 75% ethanol by WLG, cleared in a solution of phenol crystals dissolved in 100% ethanol, then dissected and mounted onto microscope slides in a mixture of the phenol-ethanol solution and Canada balsam by the methods described by Wirth and Marston (1968). Locality data is presented verbatim as provided by the collectors. Holotypes, allotypes and paratypes of our new species are deposited in the Florida State Collection of Arthropods, Gainesville (**FSCA**); paratypes of our new species and other specimens as available are also deposited in the División Entomología, Museo de La Plata, Argentina (**MLPA**); the U. S. National Museum of Natural History, Washington, D. C. (**USNM**); and the Musée zoologique de l'Université Louis Pasteur et de la Ville de Strasbourg, France (**MZSF**).

Morphological terms follow those in the chapter on Ceratopogonidae by Downes and Wirth (1981) in the Manual of Nearctic Diptera (McAlpine et al. 1981), except for modifications of certain wing veins and cells proposed by Szadziewski (1996), which were summarized in a table by Spinelli and Borkent (2004) and included in the chapter on Ceratopogonidae in the recent Manual of Central American Diptera (Borkent et al. 2009). Data for numerical values and ratios are presented as ranges of values, followed by mean and sample size. The LC/T ratio in *Parabezzia* was obtained by dividing the length of the longest talon of the fore, mid and hind leg claws, by the length of their respective tarsomeres 5. Assignment of species to genera, subgenera and/or species groups of *Culicoides* follows the systematic arrangement in the recent Neotropical catalog by Borkent and Spinelli (2007).

## Diptera: Ceratopogonidae

### Subfamily Ceratopogoninae

#### Tribe Culicoidini

##### *Culicoides* (*Anilomyia*) *decor* (**Williston**)

*Ceratopogon decor* (Williston), 1896: 281 (St. Vincent).

*Culicoides decor*: Johannsen 1943: 779 (combination); Wirth and Blanton 1956: 217 (in key to the Neotropical species of *Culicoides covagarcia* group).

*Culicoides* (*Anilomyia*) *decor*: Wirth and Blanton 1970b: 145 (in review of the *C. nigrigenus* group; records from Dominica and St. Lucia); Borkent and Spinelli 2000: 28 (in Neotropical catalog; distribution); Borkent and Spinelli 2007: 62 (in Neotropical catalog; distribution).

**Discussion.** This Neotropical species was previously known only from Dominica, St. Lucia and St. Vincent (type locality) (Borkent and Spinelli 2000, 2007); we provide the first record from Guadeloupe.

**New record.** Guadeloupe, Basse Terre, Pointe a Lezard, 17-V-2012, R. H. Turnbow, BL trap, 1 male.  
**New Guadeloupe record.**

*Culicoides (Avaritia) pusillus* Lutz

*Culicoides pusillus* Lutz, 1913: 52 (Brazil).

*Culicoides (Avaritia) pusillus*: Fox 1955: 218 (in list of New World species assigned to subgenus *Avaritia*); Wirth 1974: 21 (in New World catalog south of the USA; distribution); Wirth and Blanton 1974: 31 (in West Indian *Culicoides*; figs.); Blanton and Wirth 1979: 140 (in review of *Culicoides* of Florida); Wirth et al. 1988: 14 (in Neotropical Wing Atlas); Wirth and Mullens 1992: 1006 (in review of the *C. pusillus* group; wing photo; in key); Borkent and Spinelli 2000: 28 (in New World catalog south of the USA; distribution); Borkent and Spinelli 2007: 63 (in Neotropical catalog; distribution).

**Discussion.** This primarily Neotropical species ranges from Florida, USA and Mexico south to Brazil and northeastern Argentina (Borkent and Spinelli 2000, 2007). *Culicoides pusillus* is considered to be one of three possible Neotropical species that are capable of vectoring bluetongue to domestic and wild ruminants (Sáenz and Greiner 1994; Borkent 2005). Wirth and Blanton (1974) provided records in the Caribbean region from Antigua, Cayman Islands, Cuba, Dominica, Grenada, Jamaica, Puerto Rico and St. Lucia. We provide the first records of *C. pusillus* from Guadeloupe.

**New records.** Guadeloupe, Basse Terre, Bois Malher, 9-IX-2010, MC Thomas & RH Turnbow, Blacklight trap, 2 males, 4 females; same data except Pigeon, 9-IX-2010, 4 males, 6 females; same data except NE Pigeon (16.4404° N 61.74977° W), 23-V-2012, R. H. Turnbow, BL trap, 2 females, 2 males; same data except La Trace du Petit-Malendure, 21-V-2012, R. H. Turnbow, BL trap, 1 male. **New Guadeloupe record.**

*Culicoides (Drymodesmyia) bredini* Wirth and Blanton

*Culicoides bredini* Wirth and Blanton, 1970a: 41 (Dominica); Wirth 1974: 37 (in New World catalog south of the USA; distribution).

*Culicoides (Drymodesmyia) bredini*: Wirth and Blanton 1974: 31 (in West Indian *Culicoides*; figs.); Wirth et al. 1988: 24 (in Neotropical Wing Atlas); Borkent and Spinelli 2000: 30 (in New World catalog south of the USA); Borkent and Spinelli 2007: 65 (in Neotropical catalog; distribution).

**Discussion.** This Neotropical species was previously known only from nearby Dominica; we provide the first records from Guadeloupe.

**New records.** Guadeloupe, Basse Terre, Bois Malher, 9-IX-2010, MC Thomas & RH Turnbow, Blacklight trap, 3 males, 3 females; same data except Corrosol, 8-IX-2010, 1 male, 5 females; same data except Pigeon, 9-IX-2010, 1 male, 1 female; same data except NE Pigeon (16.4404° N 61.74977° W), 23-V-2012, R. H. Turnbow, BL trap, 2 females; same data except Trace des Cretes (D-14), 26-V-2012, 2 females; same data except Trace des Cretes, 26-V-2012, 1 female; same data except 3.2 km E of Mahault, 24-V-2012, 1 male. **New Guadeloupe record.**

*Culicoides (Drymodesmyia) poikilonotus* Macfie

*Culicoides poikilonotus* Macfie, 1948: 82 (Mexico).

*Culicoides (Oecacta) poikilonotus*: Wirth and Blanton 1959: 337 (review of *Culicoides* of Panama; distribution).

*Culicoides (Drymodesmyia) poikilonotus*: Vargas 1960: 40 (in list of New World *Culicoides* in the subgenus *Drymodesmyia*); Wirth et al. 1988: 26 (in Neotropical Wing Atlas); Borkent and Spinelli 2000: 31 (in New World catalog south of the USA); Borkent and Spinelli 2007: 65 (in Neotropical catalog; distribution).

*Culicoides cacozelus* Macfie, 1948: 82 (Mexico).

*Culicoides hertigi* Wirth and Blanton, 1953: 229 (Panama).

**Discussion.** This primarily Neotropical species ranges from Chiapas, Mexico, south through Central America, Colombia, Venezuela and Trinidad to Brazil (Borkent and Spinelli 2007). We provide the first records from Guadeloupe.

**New records.** Guadeloupe, Basse Terre, Bois Malher, 9-IX-2010, MC Thomas & RH Turnbow, Blacklight trap, 2 males. **New Guadeloupe record.**

#### *Culicoides (Haematomyidium) hoffmani* Fox

*Culicoides hoffmani* Fox, 1946: 251 (Trinidad); Fox 1949: 29 (Puerto Rico);

*Culicoides (Oecacta) hoffmani*: Wirth and Blanton 1959: 436 (review of *Culicoides* of Panama; distribution); Wirth 1974: 32 (in New World catalog south of the USA; distribution); Wirth and Blanton 1974: 54 (in West Indian *Culicoides*; distribution).

*Culicoides (Haematomyidium) hoffmani*: Wirth et al. 1988: 48 (in Neotropical Wing Atlas); Borkent and Spinelli 2000: 32 (in New World catalog south of the USA; distribution); Borkent and Spinelli 2007: 67 (in Neotropical catalog; distribution).

**Discussion.** This Neotropical species was originally described from Trinidad, and then subsequently recorded from Puerto Rico (Fox 1949), Virgin Islands (Wirth and Blanton 1956), Panama (Wirth and Blanton 1959), Jamaica (Linley and Kettle 1964) and Costa Rica (Spinelli and Borkent 2004). In their review of West Indian *Culicoides*, Wirth and Blanton (1974) also recorded it from Antigua, Barbados, Cayman Islands, Dominica and Saint Lucia. We provide the first record of this wide-ranging species from Guadeloupe.

**New records.** Guadeloupe, Basse Terre, NE Pigeon (16.14404° N, 61.74977° W), 18-V-2012, R. H. Turnbow, BL trap, 1 male, 1 female; same data except 17-V-2012, 1 female; same data except 23-V-2012, 1 male; same data except Trace des Cretes (D-14), 22-V-2012, 3 males; same data except Pointe a Lezard, 20-V-2012, 1 male. **New Guadeloupe record.**

#### *Culicoides (Hoffmania) insignis* Lutz

*Culicoides insignis* Lutz, 1913: 51 (Brazil).

*Culicoides (Hoffmania) insignis*: Fox 1948: 25 (in new subgenus *Hoffmania*); Wirth and Blanton 1974: 31 (in West Indian *Culicoides*; figs.); Blanton and Wirth 1979: 106 (in review of *Culicoides* of Florida); Wirth et al. 1988: 16 (in Neotropical Wing Atlas); Borkent and Spinelli 2000: 30 (in New World catalog south of the USA); Borkent and Spinelli 2007: 68 (in Neotropical catalog; distribution).

*Culicoides inamollae* Fox and Hoffman, 1944: 110 (Puerto Rico).

*Culicoides painter* Fox, 1946: 257 (Honduras).

**Discussion.** This primarily Neotropical species occurs in the southeastern USA in Alabama, Georgia and Florida (Borkent and Grogan 2009), and in Mexico south through Central America to central Argentina, and in the Caribbean region (Borkent and Spinelli 2007). *Culicoides insignis* is one of three possible

vectors of bluetongue in the Neotropical Region (Sáenz and Greiner 1994; Borkent 2005). We provide the first record of this wide-ranging species from Guadeloupe.

**New records.** Guadeloupe, Basse Terre, Bois Malher, 9-IX-2010, MC Thomas & RH Turnbow, Blacklight trap, 2 males, 3 females; same data except Pigeon, 9-IX-2010, 4 males, 2 females; NE Pigeon (16.14404° N, 61.74977° W), 23-V-2012, R. H. Turnbow, BL trap, 2 females. **New Guadeloupe record.**

### Species Unplaced to Subgenus

#### **Eublepharus species group**

##### **Culicoides rangeli Ortiz and Mirsa**

*Culicoides rangeli* Ortiz and Mirsa, 1952: 126 (Venezuela); Wirth and Blanton, 1959: 423 (in *Culicoides* of Panama; distribution); Wirth and Blanton 1974: 31 (in West Indian *Culicoides*; figs.); Wirth et al. 1988: 44 (in Neotropical Wing Atlas); Borkent and Spinelli 2000: 39 (in New World catalog south of the USA); Borkent and Spinelli 2007: 72 (in Neotropical catalog).

*Culicoides donajii* Vargas, 1954: 28 (Mexico).

*Culicoides patulipalpis* Wirth and Blanton, 1959: 421 (Panama).

**Discussion.** This Neotropical species is known from Oaxaca, Mexico south to Bolivia, Brazil, Ecuador, Trinidad and Venezuela (Borkent and Spinelli 2007). We provide the first records in the Caribbean region from Guadeloupe.

**New records.** Guadeloupe, Basse Terre, Bois Malher, 9-IX-2010, MC Thomas & RH Turnbow, Blacklight trap, 1 female; same data except Corrosol, 8-IX-2010, 2 females; same data except Pigeon, 9-IX-2010, 1 male. **New Guadeloupe record.**

### Species Unplaced to Species Group

##### **Culicoides trilineatus Fox**

*Culicoides trilineatus* Fox, 1946: 250 (Virgin Islands); Fox 1949: 30 (Puerto Rico); Vitale et al. 1981: 146 (in key to species in the *C. debilipalpis* group); Wirth et al. 1988: 50 (in Neotropical Wing Atlas; distribution); Borkent and Spinelli 2000: 42 (in New World catalog south of the USA; distribution); Spinelli et al. 2005: 13 (in review of hematophagous Ceratopogonidae of Argentina; Paraguay record; in key; wing photograph); Borkent and Spinelli 2007: 75 (in Neotropical catalog; distribution).

*Culicoides (Oecacta) trilineatus*: Wirth 1974: 36 (in New World catalog south of the USA; distribution).

**Discussion.** This Neotropical species was originally described by Fox (1946) from the female holotype from St. Thomas, Virgin Islands, and then soon after, Fox (1949) described the male from Puerto Rico. It was also subsequently recorded from Barbados, Dominica, Grenada, St. Croix and Saint Lucia (Wirth and Blanton 1974), and from Paraguay (Spinelli et al. 2005). In the recent past, it was assigned to the subgenus *Oecacta* (Wirth 1974) and to the *debilipalpis* species group (Vitale et al. 1981), but most modern authorities consider it unplaced to subgenus or species group (Borkent and Spinelli 2000, 2007). We provide the first records of *C. trilineatus* from Guadeloupe.

**New records.** Guadeloupe, Basse Terre, Pointe a Lezard, 17-V-2012, R. H. Turnbow, BL trap, 1 male, 1 female; same data except 20-V-2012, 1 male; same data except La Trace du Petit-Malendure, 21-V-2012, 1 male, 1 female. **New Guadeloupe record.**



**Tribe Ceratopogonini****Brachypogon (Brachypogon) bifidus Spinelli and Grogan**

*Brachypogon (Brachypogon) bifidus* Spinelli and Grogan, 1998: 66 (Dominica); Borkent and Spinelli 2000: 45 (in New World catalog south of the USA; distribution); Borkent and Spinelli 2007: 78 (in Neotropical catalog; distribution).

**Discussion.** This small Neotropical predaceous midge was described by Spinelli and Grogan (1998) from Dominica (type locality) and El Salvador. It is unique among other species in the *Brachypogon (B.) impar* complex in having a wing with a darkly infuscated membrane and a dark spot distad of the r-m crossvein and a pale spot beyond the dark spot, males are the only species with parameres having a bifid apex, and the antennal flagellum of females with 12 flagellomeres due to a fusion of 12-13. We provide the first records from Guadeloupe.

**New records.** Guadeloupe, Basse Terre, Corrosol, 8-IX-2010, MC Thomas & RH Turnbow, Blacklight trap, 1 male; same data except NE Pigeon (16.14404° N, 61.74977° W), 17-V-2012, R. H. Turnbow, BL trap, 1 male; same data except 23-V-2012, 1 male; same data except Trace des Cretes (D-14), 22-V-2012, 3 males, 1 female. **New Guadeloupe record.**

**Brachypogon (Brachypogon) telesfordi Spinelli and Grogan**

*Brachypogon (Brachypogon) telesfordi* Spinelli and Grogan, 1998: 71 (St. Vincent; Grenada, Costa Rica); Borkent and Spinelli 2000: 46 (in New World catalog south of the USA; distribution); Borkent and Spinelli 2007: 79 (in Neotropical catalog; distribution).

**Discussion.** Spinelli and Grogan (1998) described this small Neotropical species from St. Vincent (type locality), Grenada and Costa Rica. Females are unique among other members of the *B. impar* complex in that only the distal 3 flagellomeres (11-13) are elongated, the wing has a developed vein  $M_2$  and 13-15 costal setae. Males have the apex of tergite 9 narrowly rounded or pointed and lacks well developed apicolateral processes, a short wing (wing length 0.52-0.58 mm), a very short costa (Costal ratio 0.38-0.46) and 8-9 costal setae. An examination of 6 males from Guadeloupe produced wing lengths of 0.49-0.51 mm, costal ratios 0.41-0.44 and 6-9 costal setae, all of which appear reasonable and probably within parameters for this species. But, unfortunately, our Guadeloupe female is missing its antennal flagellum, and has a slightly larger wing (wing length 0.61 mm) than originally reported for this species (0.54-0.57 mm), but, the costal ratio is 0.46 and it has 12 costal setae, both of which are within reported parameters for this species. In addition, vein  $M_2$  is only obsolete at its base, and the abdomen is yellow with pyriform spermatheca. The only other species of the *impar* group with a yellow abdomen is *B. impar* (Johannsen), but in this species the palpus is pale or whitish and the spermatheca is globose. Therefore, it is highly probable our single female from Guadeloupe is a specimen of *B. telesfordi*.

In addition to comparing our Guadeloupe specimens to the male holotype and female allotype of *B. telesfordi* from St. Vincent in the FSCA, we also examined 2 male paratypes from Grenada. The genitalia of both males are mounted laterally, making it difficult to examine features on this structure, however, one male has 9 costal setae, but the other male only has 3-4 costal setae all of which are located on the stigma, and this suggests that it is actually a specimen of *B. woodruffi*.

**New records.** Guadeloupe, Basse Terre, Bois Malher, 9-IX-2010, MC Thomas & RH Turnbow, Blacklight trap, 3 males; same data except NE Pigeon (16.14404° N, 61.74977° W), 18-V-2012, R. H. Turnbow, BL trap, 1 male, 1 female; same data except 23-V-2012, 1 male; same data except Trace des Cretes (D-14), 22-V-2012, 1 male. **New Guadeloupe record.**

**Brachypogon (Brachypogon) woodruffi Spinelli and Grogan**

*Brachypogon (Brachypogon) woodruffi* Spinelli and Grogan, 1998: 72 (Dominican Republic); Huerta and Borkent 2005: 118 (Mexico records); Borkent and Spinelli 2000: 46 (in New World catalog south of the USA; distribution); Borkent and Spinelli 2007: 79 (in Neotropical catalog; distribution); Spinelli and Marino 2008: 124 (record from Peru); Swanson and Grogan 2011: 536 (records from Cayman Islands and Florida).

**Discussion.** Spinelli and Grogan (1998) described this very small predaceous midge from the Dominican Republic, and soon after, Huerta and Borkent (2005) recorded it from the Yucatan Peninsula, Mexico, and Spinelli and Marino (2008) reported it from Peru. Grogan et al. (2010) listed additional specimens from Florida and the Cayman Islands in the FSCA. Swanson and Grogan (2011) described and illustrated additional details of the male genitalia and listed new records from the USA in Florida and the Cayman Islands, described and illustrated a similar related new species from Alabama and Florida (*B. laneae*), as well as another related species from Florida that they did not name (sp. 9B).

Our identification of a single female from Guadeloupe as this species is somewhat tentative despite that it has an antennal flagellum with only 12 flagellomeres due to fusion of primitive 12-13 and very small flagellomeres 4-7, both of which are characteristics of females of *B. woodruffi*. However, it lacks the partial fusion of flagellomeres 3-4 which is another character of females of *B. woodruffi*. Spinelli and Grogan (1998) also noted that in this species the wings of females only have 6-7 marginal costal setae, whereas males only have 3 marginal costal setae that are located over their coalesced radial cells (stigma). WLG examined 20 females (including the allotype) and 10 males (including the holotype) of *B. woodruffi* from the Cayman Islands, Dominican Republic and Florida and recorded 3-4 costal setae in males and 5-9 costal setae in females. He also examined 5 males and 19 females of *B. laneae* Swanson and Grogan from Florida as well as the male and female of their unnamed species 9B from that state and recorded 3 costal setae for males of both species and 5-10 costal setae in females of *B. laneae* and 5-6 setae in the female of sp. 9D. Our Guadeloupe female has 11-12 costal setae, a greater number than previously recorded for females of this species and the very similar, related *B. ecuadorensis* Spinelli and Grogan that is known from Belize, Colombia, Costa Rica, Ecuador (type locality), Jamaica and Panama, the females of which have 5-9 costal setae. In addition, females of *B. ecuadorensis* also have an antennal flagellum with 12 flagellomeres (12-13 fused), however, flagellomeres 3-4 are not partially fused and flagellomeres 2-9 are all similar in size, the wing lacks vein  $M_2$  and has a slightly shorter costa (Costal Ratio 0.41-46 vs. 0.44-46 in *B. woodruffi*). Finally, males of *B. ecuadorensis* have an aedeagus with median longitudinal wrinkles, a feature not present in males of other species in the *B. woodruffi* complex, and their wing also lacks vein  $M_2$ . We provide the first records of *B. woodruffi* from Guadeloupe.

**New records.** Guadeloupe, Basse Terre, Pigeon, 9-IX-2010, MC Thomas & RH Turnbow, Blacklight trap, 1 male; same data except La Trace du Petit-Malendure, 21-V-2012, R. H. Turnbow, BL trap, 1 female. **New Guadeloupe record.**

**Monohalea maya Felipe-Bauer, Huerta and Ibáñez-Bernal**

*Monohalea maya* Felipe-Bauer, Huerta and Ibáñez-Bernal, 2000: 815 (Mexico); Borkent and Spinelli 2007: 83 (in Neotropical catalog; distribution);

**Discussion.** This Neotropical species was previously known only from the type series from the state of Yucatan, Mexico. Our two females from Guadeloupe have wing lengths of 0.80 and 0.83 mm, which are considerably smaller than the 1.15-1.32 mm recorded for females of *M. maya* by Felipe-Bauer et al. (2000). However, other morphological features of the Guadeloupe females appear identical with females from Mexico, so we are fairly confident of our identification of the Guadeloupe females as this species. We provide the first records of this species in the Caribbean region from Guadeloupe.

**New records.** Guadeloupe, Basse Terre, Corrosol, MC Thomas & RH Turnbow, Blacklight trap, 1 female; same data except Pigeon, 9-IX-2010, 1 female. **New Guadeloupe record.**

*Parabezzia florentinae* **new species**  
(Figs. 1-4, 20)

**Diagnosis.** The only Neotropical species of the *Parabezzia uncinata* group with females having unequal-sized tarsal claws, tarsomeres 5 without ventral swellings, tarsal claws of fore and mid legs long and distinctly unequal-sized, the longest talon of hind claws 1.6 x longer than shorter talon and a wing with setae of the costal fringe uniformly distributed.

**Female.** Head (Fig. 1). Dark brown. Eyes separated by V-shaped space equal to diameter of 1.5 ommatidia at level of interocular seta. Antennal flagellum uniformly brown; antennal ratio 1.10. Clypeus with 12 slender setae. Palpus brown; segment 3 with a few capitate sensilla on inner mesal surface; palpal ratio 3.25. Mandible with 9 coarse apical teeth on inner margin. Thorax. Uniformly dark brown. Scutum with 2 presutural, 5 posterolateral setae. Femora, tibiae dark brown, tarsi (Fig. 2) pale, tarsomeres 5 without ventral swelling; relative proportions of larger/smaller talons of fore, mid and hind claws (Fig. 20) respectively: 54/37-58/35-35/20; LC/T ratios (fore, mid, hind legs) 1.06-1.16-0.85. Wing (Fig. 3) length 0.88 mm; breadth 0.40 mm; membrane slightly infuscated, covered with fine macrotrichia; veins brown; wing sections 53-45-15, R<sub>3</sub> 65; veins M<sub>1</sub>, M<sub>2</sub>, CuA<sub>1</sub>, CuA<sub>2</sub> barely reaching wing margin; one seta on costa proximad of basal arculus; costal fringe long, setae uniformly distributed along the entire costa, distally the setae arising from vein margin; costa extending 0.98 of wing length. Halter pale brown. Abdomen (Fig. 4). Brown. Two ovoid, slightly unequal spermathecae with very short necks, measuring 64 by 59 μm, and 59 by 48 μm.

**Male.** Unknown.

**Distribution.** Guadeloupe; known only from the type locality on Basse Terre.

**Type material.** Holotype female labeled "Guadeloupe, Basse Terre, La Trace du Petit-Malendure, 21-V-2012, R. H. Turnbow, BL Trap" (deposited in FSCA).

**Derivation of specific epithet.** This species is named after our good friend and colleague, Florentina Díaz, in recognition of her valuable contributions to the taxonomy of Patagonian Ceratopogonidae.

**Discussion.** In the Neotropical key in Spinelli and Grogan (1987), this new Guadeloupe species keys to couplet 16 near *P. raccurti* Spinelli and Grogan, the females of which differ from our new species in having three posterolateral setae on scutum, legs including tarsi uniformly brownish, shorter equal-sized fore claws, shorter greatly unequal-sized hind claws, the wing has a longer radial cell and the costa extends to the wing tip, the anterior portion of the costal fringe is sparse and vein M<sub>1</sub> is more sinuous. In the Nearctic key in Grogan and Wirth (1977), *P. florentinae* keys to couplet 13 near *P. eupetiolata* Grogan and Wirth, known only from the holotype female, allotype male and two male paratypes from extreme northeastern New York. As in females of this new species from Guadeloupe, females of this Nearctic species also have five scutellar setae and a similar wing, but, it otherwise differs in having more slender, slightly longer unequal-sized claws with the hind pair much smaller than the fore and mid pair, and the wing has a shorter costa (Costal ratio 0.95 vs. 0.98 in Guadeloupe female). However, this Nearctic species is likely to be a boreal species, and therefore, we consider it highly unlikely that it is conspecific with our new species from Guadeloupe.

Clastrier and Raccurt (1979) described four new species of *Parabezzia* from Haiti, and these are the only previous records of this genus from the Caribbean region. This new Guadeloupe species is a member of the *Parabezzia uncinata* group as defined by Grogan and Wirth (1977) in their revision of the Nearctic species and by Spinelli and Grogan (1987) in their revision of Neotropical species. This is the first record of this predaceous genus from Guadeloupe.



*Stilobezzia* (*Acanthohelea*) *thomasi* **new species**

(Figs. 5-12, 21-23)

**Diagnosis.** The only Neotropical species of *Stilobezzia* (*Acanthohelea*) with a uniformly dark brown thorax and scutellum with 6 large setae. Males have stout parameres with each half bearing an apical, hyaline pointed projection that is adpressed to the ventral surface and anteriorly directed, and their aedeagal sclerites are divided, sinuous, heavily sclerotized with a hyaline L-shaped mesolateral lobe bearing a foot-shaped distolateral projection that is apically pointed.

**Female.** Head (Fig. 5). Dark brown. Eyes very narrowly separated. Antenna with pedicel dark brown, flagellum (Fig. 6) uniformly brown; flagellomeres cylindrical, moderately elongated; antennal ratio 1.02-1.06 (1.04, n=4). Palpus brown; segment 3 with shallow, subapical sensory pit bearing several capitate sensilla; palpal ratio 2.67-3.20 (2.96, n=10). Mandible with 7-9 large teeth on inner margin. Thorax. Uniformly dark brown; scutellum with 6 large setae. Legs (Figs. 7-9) brown, hind leg slightly darker; extreme bases of femora, tibiae slightly paler; hind tibial comb with 6 spines; hind tarsomere 1 with two rows of ventral palisade setae; prothoracic tarsal ratio 2.11-2.50 (2.23, n=10), mesothoracic tarsal ratio 2.25-2.87 (2.70, n=10), metathoracic tarsal ratio 2.33-2.70 (2.48, n=10); claws curved, greatly unequal-sized on all legs, fore claws slightly longer than tarsomere 5, mid and hind claws slightly shorter than their respective tarsomeres 5. Wing (Fig. 10) membrane slightly to moderately infuscated; cubital fork originating distal to level of base of r-m crossvein; macrotrichia on costa, veins  $R_1$  and  $R_3$ , sparse on margins of cells  $r_3$  and  $m_1$ ; second radial cell 2.67-3.80 (3.24, n=7) x longer than first; wing length 1.19-1.40 (1.28, n=11) mm, width 0.45-0.52 (0.49, n=2) mm; costal ratio 0.71-0.75 (0.74, n=6). Halter pale brown. Abdomen. Dark brown; segment 10 and cerci paler. Genitalia (Fig. 11): sternite 8 as long as broad, ventral surface with 6 large setae and short dense setae on posterior half; anterior margin curved, lateral margins sub-parallel, posteromedian excavation V-shaped; sternite 9 divided into moderately broad halves, distal 1/3 slightly broader, apices bearing a slender pointed anteriorly directed process; sternite 10 with 3 pairs of setae, cercus rounded. Two ovoid, slightly unequal spermathecae with short narrow necks, measuring 51-59 (54, n=10) by 37-44 (40, n=10)  $\mu\text{m}$ , and 42-55 (49, n=10) by 32-37 (35, n=10)  $\mu\text{m}$ .

**Male.** Similar to female with the following notable sexual differences. Antennal flagellomere 13 greatly elongated, 1.5 x longer than 12; plume dark brown, dense; antennal ratio 0.87-1.06 (0.96, n=9). Palpal ratio 2.67-3.28 (3.00, n=14). Prothoracic tarsal ratio 1.55-2.08 (1.98, n=14), mesothoracic tarsal ratio 2.44-2.87 (2.62, n=14), metathoracic tarsal ratio 2.07-2.50 (2.24, n=14); claws short, equal sized with bifid apices. Wing membrane and veins without macrotrichia; second radial cell 2.20-3.00 (2.60, n=7) x longer than first; wing length 1.02-1.21 (1.12, n=14) mm, width 0.32-0.40 (0.33, n=13) mm; costal ratio 0.68-0.71 (0.69, n=11). Genitalia (Figs. 12, 21-23): tergite 9 not extending to apex of gonocoxite, distal margin rounded; sternite 9 with curved anterior margin and shallow, rounded posteromedian excavation; cerci divergent, moderately broad, covered with numerous fine and several large setae. Gonocoxite stout, 1.32 x longer than greatest breadth, inner margin with bluntly rounded mesal projection; gonostylus paler, as long as or slightly longer than gonocoxite, proximal portion moderately broad, distal half gently curved, tapering distally to slender pointed apex. Parameres (Fig. 22) separate, slightly divergent distally with curved, heavily sclerotized basal apodeme; distal stem stout, rod-shaped, extending just beyond posterior margin of tergite 9, basal portion moderately sclerotized with ovoid articular pit, distal portion with short, hyaline, pointed, anteriorly directed projection that is adpressed to ventral surface. Aedeagus (Fig. 23) composed of two heavily sclerotized, sinuous sclerites, the tips of which cross each other; with a hyaline L-shaped mesolateral lobe bearing a foot-shaped distolateral projection that is apically pointed.

**Distribution.** Guadeloupe.

**Type material.** Holotype male, allotype female labeled "Guadeloupe, Basse Terre, Trace des Cretes (D-14), 22-V-2012, R. H. Turnbow, BL Trap" (deposited in FSCA). Paratypes, 14 males, 11 females, as follows: same data as holotype, 5 males, 4 females; same data except 26-V-2012, 1 female (missing abdomen); same data except NE Pigeon (16.14404N, 61.74977W), 18-V-2012, 1 male; same data except 3.2 km

E of Mahault, 24-V-2012, 4 females; same data except Corrosol, 8-IX-2010, MC Thomas & RH Turnbow, Blacklight trap, 4 males, 2 females; same data except Pigeon, 9-IX-2010, 4 males.

**Derivation of specific epithet.** We are pleased to name this new species after Michael C. Thomas, one of the collectors of this new species from Guadeloupe and also in recognition of his important contributions to the taxonomy of Coleoptera in the Caribbean Region.

**Discussion.** Adults of *Stilobezzia* (*A.*) *thomasi* greatly resemble those of *S.* (*A.*) *tibialis* Lane and Forattini and *S.* (*A.*) *atrishopogon* Lane and Forattini, but, in both of these species the scutellum only has 4 large setae. In addition, in *S.* (*A.*) *atrishopogon* the fore and mid legs are yellow and the main stem of the parameres exhibits two distal projections, whereas in *S.* (*A.*) *tibialis* the parameres lack distal hyaline projections, the aedeagal sclerites are more slender and lack a mesodorsal lobe, and the distal half of the gonostylus is straight.

Pinned paratypes of *S.* (*A.*) *atrishopogon* and *S.* (*A.*) *tibialis* were also examined by CGC in the collection of Faculdade de Saude Publica, Universidade de Sao Paulo, Brazil.

#### *Stilobezzia* (*Acanthohelea*) **sp.**

**Discussion.** We examined a single small, pale yellowish brown female from Guadeloupe that belongs to the subgenus *Acanthohelea* Kieffer. The head is brown with dark brown flagellomeres, and the eyes are very narrowly separated. The thorax is yellowish brown with pale humeral areas, the scutellum has 4 stout setae and the legs are pale yellowish; the wing membrane is slightly infuscated with abundant macrotrichia on distal portions of cells  $r_3$  and  $m_1$ . The abdomen is yellowish brown and it has two partially collapsed spermathecae with short broad necks. However, because males in the genus *Stilobezzia* often possess important specific characters in their genitalia, we are reluctant to name this species.

**Specimen examined.** Guadeloupe, Basse Terre, Bois Malher, 9-IX-2011, MC Thomas & RH Turnbow, Blacklight trap, 1 female.

#### *Stilobezzia* (*Stilobezzia*) *diminuta* **Lane and Forattini**

*Stilobezzia diminuta* Lane and Forattini, 1958: 209 (Panama); Lane and Forattini 1961: 86 (in key); Clastrier 1991: 308 (Dominica; female; figs.).

*Stilobezzia* (*Stilobezzia*) *diminuta*: Borkent and Spinelli 2000: 54 (in New World catalog south of the USA; distribution); Borkent and Spinelli 2007: 87 (in Neotropical catalog; distribution).

**Discussion.** This very small Neotropical predaceous midge was originally described by Lane and Forattini (1958) from Panama. Subsequently, Clastrier (1991) redescribed and illustrated the female from specimens collected on Dominica, and we compared our Guadeloupe specimens with specimens from that island. We provide the first records of this predaceous midge from Guadeloupe.

**New records.** Guadeloupe, Basse Terre, Corrosol, 8-IX-2010, MC Thomas & RH Turnbow, Blacklight trap, 5 males. **New Guadeloupe record.**

#### *Stilobezzia* (*Stilobezzia*) *thomsenae* **Wirth**

*Stilobezzia* (*Stilobezzia*) *thomsenae* Wirth, 1953: 83 (Florida); Borkent and Spinelli 2000: 55 (in New World catalog south of the USA; distribution); Borkent and Spinelli 2007: 87 (in Neotropical Catalog; distribution); Grogan et al. 2010: 41 (new Florida records; comparison with *S. bulla* Thomsen). *Stilobezzia scutata* Lane and Forattini, 1961: 92 (Panama).

**Discussion.** Wirth's (1953) original description of this species was based on two specimens from Florida, the holotype male from Collier Co., and a female from Citrus Co. about which he stated "...is provisionally referred to *S. (S.) thomsenae*, since it resembles the male in coloration, although it may prove to be a dark specimen of *S. (S.) bulla*." Under "diagnostic characters" for *S. thomsenae*, Wirth (1953) noted that it was "Very closely related to, and almost indistinguishable from *bulla* Thomsen, except for the very characteristic male genitalia." This species is also known from Panama and Yucatan, Mexico (Borkent and Spinelli 2007). Grogan et al. (2010) reported on additional records of this species from Florida and new records from Jamaica in the FSCA and noted that both sexes of *S. thomsenae* lack a fringe of macrotrichia on their anterior wing margin that is present in males and females of their very similar related Nearctic species, *S. bulla* Thomsen. We provide the first records of this primarily Neotropical predaceous midge from Guadeloupe.

**New records.** Guadeloupe, Basse Terre, Bois Malher, 9-IX-2010, MC Thomas & RH Turnbow, Blacklight trap, 4 males, 5 females; same data except Corrosol, 8-IX-2010, 5 males, 4 females; same data except Pigeon, 9-IX-2010, 3 males, 1 female; same data except NE Pigeon (16.14404° N, 61.74977° W), 18-V-2012, R. H. Turnbow, BL trap, 1 male, 1 female; same data except Trace des Cretes (D-14), 22-V-2012, 2 males, 2 females. **New Guadeloupe record.**

*Stilobezzia* (*Stilobezzia*) **sp.**

**Discussion.** We examined a single small, yellowish brown female specimen in the subgenus *Stilobezzia*. The head and flagellomeres are brown and the eyes are narrowly separated. The thorax is bright yellowish brown, the scutellum has two mesal and two lateral stout setae, and the legs are brown. The wing membrane is hyaline and the first radial cell is small. The abdomen is pale yellowish and has one well developed, sclerotized spermatheca with hyaline punctuations and two other rudimentary spermathecae. Because males in the genus *Stilobezzia* usually exhibit important, species specific characters in their genitalia, we are reluctant to name this species.

**Specimen examined.** Guadeloupe, Basse Terre, Bois Malher, 9-IX-2011, MC Thomas & RH Turnbow, Blacklight trap, 1 female.

### Tribe Palpomyiini

*Amerohelea galindoi* **Grogan and Wirth**

*Amerohelea galindoi* Grogan and Wirth, 1981: 1294 (Colombia; Panama, Venezuela); Borkent and Spinelli 2000: 59 (in New World catalog south of the USA; distribution); Borkent and Spinelli 2007: 92 (in Neotropical catalog; distribution).

**Discussion.** This strictly New World predaceous genus is primarily Neotropical with only one species, *A. frontispina* (Dow and Turner), occurring in the Nearctic region as far north as California and Texas (Borkent and Grogan 2009). We provide the first Caribbean records of *Amerohelea* from Guadeloupe.

**New records.** Guadeloupe, Basse Terre, Trace des Cretes (D-14), 22-V-2012, R. H. Turnbow, BL trap, 6 males, 5 females. **New Guadeloupe record.**

*Bezzia* (*Bezzia*) *flinti* **Spinelli and Wirth**

*Bezzia* (*Bezzia*) *flinti* Spinelli and Wirth, 1989: 113 (Dominica).

*Bezzia flinti*: Borkent and Spinelli 2000: 61 (in New World catalog south of the USA; distribution); Borkent and Spinelli 2007: 93 (in Neotropical catalog; distribution).

**Discussion.** Spinelli and Wirth (1989) described this Neotropical species from Dominica. We provide the first records of this predaceous midge from Guadeloupe.

**New records.** Guadeloupe, Basse Terre, Pigeon, 9-IX-2010, MC Thomas & RH Turnbow, Blacklight trap, 2 males; same data except NE Pigeon (16.14404° N, 61.74977° W), 18-V-2012, R. H. Turnbow, BL trap, 1 female; same data except 23-V-2012, 2 females; same data except Trace des Cretes (D-14), 22-V-2012, 1 female. **New Guadeloupe record.**

#### *Bezzia* (*Homobezzia*) *venustula* (Williston)

*Ceratopogon venustulus* Williston, 1896: 278 (St. Vincent).

*Bezzia venustula*: Lane 1958: 27 (combination; in key); Borkent and Spinelli 2000: 62 (in New World catalog south of the USA; distribution); Borkent and Spinelli 2007: 94 (in Neotropical catalog; distribution).

*Bezzia* (*Homobezzia*) *venustula*: Spinelli and Wirth 1991: 7 (in revision of Neotropical *Bezzia* (*Homobezzia*); redescription; figs.; distribution).

*Bezzia concoloripes* Macfie, 1940: 31 (Guyana).

**Discussion.** Williston (1896) originally described this Neotropical species from St. Vincent, and more recently, Spinelli and Wirth (1991) redescribed and illustrated *B. venustula* and noted that it is widely distributed in the Neotropics from Mexico south to Argentina. However, in his synoptic collection of Nearctic ceratopogonids, WLG identified a male from Garner State Park, Uvalde Co., Texas (on the Frio River, about 210 km N of the Rio Grande) as this species which, suggests that as with several other Neotropical species, *B. venustula* ranges north of the Rio Grande into southern Texas. We provide the first records of this common predaceous midge from Guadeloupe.

**New records.** Guadeloupe, Basse Terre, Corrosol, 8-IX-2010, MC Thomas & RH Turnbow, Blacklight trap, 1 female; same data except Pigeon, 9-IX-2010, 1 female; same data except NE Pigeon (16.14404° N, 61.74977° W), 17-V-2012, R. H. Turnbow, BL trap, 1 female; same data except 23-V-2012, 1 female; same data except Trace des Cretes (D-14), 22-V-2012, 1 male, 4 females; same data except La Trace du Petit-Malendure, 21-V-2012, 1 female. **New Guadeloupe record.**

#### *Palpomyia insularis* Spinelli and Grogan

*Palpomyia insularis* Spinelli and Grogan, 1989: 3 (Puerto Rico); Borkent and Spinelli 2000: 63 (in New World catalog south of the USA; distribution); Borkent and Spinelli 2007: 96 (in Neotropical catalog; distribution).

**Discussion.** As noted by Spinelli and Grogan (1989), this Neotropical predaceous midge is a member of the *Palpomyia distincta* group as defined by Grogan and Wirth (1975, 1979). It was originally known from Dominica, Jamaica and Puerto Rico (type locality); we provide the first records of this predaceous midge from Guadeloupe.

**New records.** Guadeloupe, Basse Terre, Bois Malher, 9-IX-2010, MC Thomas & RH Turnbow, Blacklight trap, 2 males, 1 female; same data except Corrosol, 8-IX-2010, 1 male; same data except Trace des Cretes (D-14), 22-V-2012, R. H. Turnbow, BL trap, 1 male, 2 females. **New Guadeloupe record.**

#### *Palpomyia turnbowi* **new species** (Figs. 13-19, 24-27)

**Diagnosis.** The only Neotropical species of *Palpomyia* in the *distincta* group with the following combination of characters: scutum with an anterior tubercle, yellowish legs and a slender fore femur bearing

a single row of 9-12 spines in females, 6-8 spines in males; females with sternite 7 bearing a tuft of 12-20 large setae and posterior portion of sternite 8 with two hyaline plates connected by a sclerotized band; and males with base of parameres contiguous on proximal  $\frac{3}{4}$ , but the distal  $\frac{1}{4}$  are clearly separated, each portion tapering distally to pointed tip.

**Female.** Head (Fig. 13). Very dark brown. Eyes separated by diameter of 2 ommatidia. Antennal flagellum (Fig. 14) uniformly dark brown or with bases of flagellomeres slightly lighter brown; flagellomeres 2-8 moderately short, barrel-shaped, flagellomeres 9-13 cylindrical, 9-11 greatly elongated, 12-13 considerably longer than 9-11; flagellomere 13 slightly longer than 12 with bluntly rounded tip; antennal ratio 1.29-1.35 (1.33, n = 6). Palpus slightly lighter in color than flagellum; segment 3 slightly broader anteriorly, with abundant capitate sensilla on mesal surface; palpal ratio 2.50-3.12 (2.83, n = 7). Mandible with 7-10 (n = 7) large teeth on inner margin. Thorax. Very dark brown. Scutum (Fig. 15) with anterior pointed tubercle, densely covered with short setae, 5 large supralar setae; scutellum with 4 large setae. Legs (Figs. 15-16) yellowish, base of hind tibia light brown; tarsomeres 3-5 dark brown; fore femur slender, armed with single row of 9-12 (n = 7) ventral spines; hind tarsomere 1 with ventral palisade setae in two rows; 5th tarsomeres without ventral setae; prothoracic tarsal ratio 2.11-2.42 (2.19, n = 6), mesothoracic tarsal ratio 3.37-4.00 (3.70, n = 5), metathoracic tarsal ratio 2.46-2.77 (2.61, n = 7). Wing (Fig. 17) membrane slightly infuscated; anterior veins dark brown; M with distance between r-m crossvein and base of  $M_2$  equal to length of r-m; 2<sup>nd</sup> radial cell 1.86-3.00 (2.49, n = 7) x longer than 1<sup>st</sup>; wing length 1.77-2.00 (1.88, n = 7) mm, width 0.51-0.65 (0.59, n = 7) mm; costal ratio 0.74-0.76 (0.76, n = 7). Halter dark brown. Abdomen. Dark brown, with 0-2 pairs of internal gland rods. Genitalia as in Figs. 18, 24. Sternite 7 bearing a tuft of 12-20 large setae. Sternite 8 with proximal portion sclerotized posteriorly, pubescent, with numerous large setae on distal  $\frac{1}{2}$ , anterior margin hyaline, posterior margin gently convex; posterior portion represented by two glabrous, hyaline plates connected by heavily sclerotized area; two large, hyaline setose lobes with broad apices, extending just beyond posterior plates. Sternite 9 moderately sclerotized, divided into pair of very slender, pointed anteromesally directed arms. Sternite 10 triangular, with 5-7 (n = 7) pairs of large setae. Two pyriform, slightly unequal-sized spermathecae with short necks, measuring 51-55 (53, n = 2) by 40-48 (44, n = 2)  $\mu\text{m}$ , and 51 (n = 2) by 37-40 (39, n = 2)  $\mu\text{m}$ ; plus a rudimentary third spermatheca.

**Male.** Similar to female with the following notable sexual differences. Antennal flagellomeres 10-13 with lengths in proportion of 5-15-17-17; plume dark brown, moderately dense, not extending beyond flagellomeres 11. Palpal ratio 2.29-2.42 (2.33, n = 3). Fore femur yellowish to light brown with 6-8 spines; mid, hind femora entirely dark brown; prothoracic tarsal ratio 2.00-2.17 (2.06, n = 3), mesothoracic tarsal ratio 3.29-3.43 (3.38, n = 3), metathoracic tarsal ratio 2.36-2.50 (2.44, n = 3). Wing length 1.20-1.41 (1.34, n = 13) mm, width 0.42-0.47 (0.40, n = 13) mm; costal ratio 0.68-0.75 (0.71, n = 13); 2<sup>nd</sup> radial cell 1.67-2.43 (2.03, n = 3) x longer than 1<sup>st</sup>. Genitalia as in Figs. 19, 25-27. Tergite 9 tapering slightly distally on proximal  $\frac{1}{2}$ , with broad, straight distal margin, cerci stout extending beyond gonocoxites with 2 large subapical setae; sternite 9 short with broad, deep posteromedian excavation. Gonocoxite straight, twice as long as broad, with moderately elongate mesoventral lobe; gonostylus short, 0.6 length of gonocoxite, curved, tapering slightly distally, with stout slightly pointed tip. Parameres (Fig. 26) with heavily sclerotized basal apodemes that are recurved more than 90°; main stem more lightly sclerotized, contiguous on proximal  $\frac{3}{4}$ , distal  $\frac{1}{4}$  narrowly separated, each half with tapered apex. Aedeagus (Fig. 27) broadly triangular, slightly broader than long, heavily sclerotized; pre-aedeagal membrane with sparse short spicules, ventral surface of aedeagus covered with dense long, fine spicules; basal arch extending to 0.3 of total aedeagus length; basal arm very heavily sclerotized, nearly straight, anterolaterally directed; distal portion narrowed progressively, with underlying, broad, hyaline arrowhead-shaped tip.

**Distribution.** Guadeloupe.

**Type material.** Holotype male, allotype female labeled "Guadeloupe, Basse Terre, Trace des Cretes (D-14), 22-V-2012, R. H. Turnbow, BL Trap" (deposited in FSCA). Paratypes, 13 males, 6 females, as follows: same data as holotype, 11 males, 5 females; same data as holotype except 26-V-2012, 1 female; same data except NE Pigeon (16.14404° N, 61.74977° W), 18-V-2012, 2 males.



**Derivation of specific epithet.** We are pleased to name this new species after the collector, Robert H. Turnbow, in recognition of his important contributions to the taxonomy of Coleoptera in the Caribbean Region.

**Discussion.** This new species belongs to the *Palpomyia distincta* group, as it was defined by Grogan and Wirth (1979) with modifications by Spinelli et al. (2009). Both sexes readily differ from the only other species known from Guadeloupe, *P. insularis*, in being darker brown without 1 or more spines on their hind femur and females have two spermathecae.

*Palpomyia turnbowi* is most similar to *P. guyana* Clastrier from French Guiana. However, that species has a greatly swollen fore femur bearing 18-20 spines, a greatly arcuate fore tibia and the two arms of female sternite 9 are mesally directed. The male genitalia of *P. guyana* is somewhat similar to *P. turnbowi* as the aedeagus is in the shape of a quadrangular, densely pilose shield, but, it lacks the hyaline, arrowhead-shaped apex and its gonocoxite lacks an elongate mesoventral lobe. *Palpomyia conifera* Macfie from Brazil (Brasilia, D.F., Goiás and Santa Catarina) also resembles *P. turnbowi*, but, the hind femur and tibia are dark brown, male sternite 9 is larger with a very shallow posteromedian excavation, and the gonostylus is almost as long as the gonocoxite.

### Acknowledgments

We are grateful to Michael Thomas and Robert Turnbow for allowing us to report upon their collection of ceratopogonids from Guadeloupe. We also thank Jean-Claude Delécolle, Heron Huerta and Pablo Marino for their helpful reviews of an earlier draft of the manuscript.

### Literature Cited

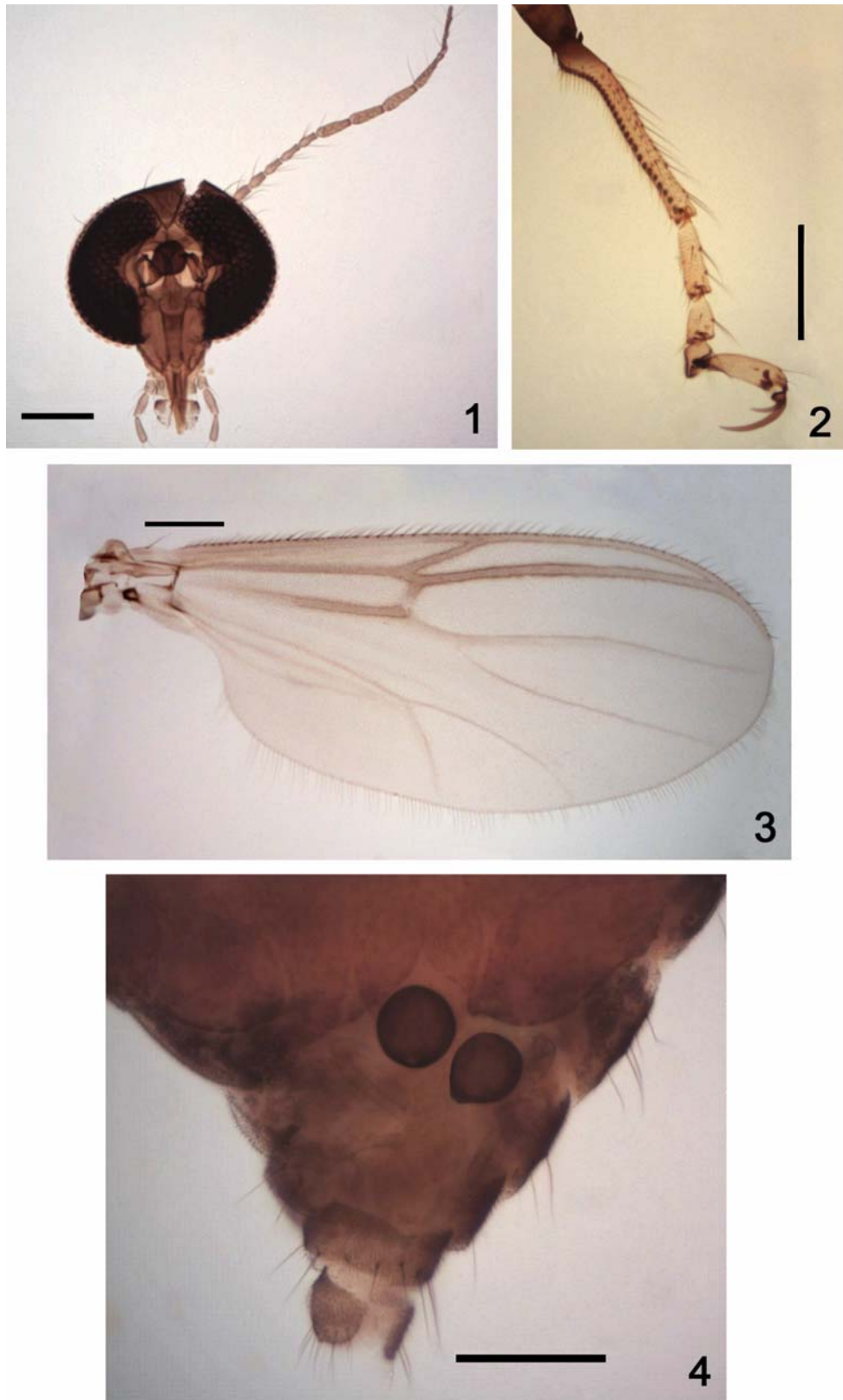
- Aitken, T. H. G., W. W. Wirth, R. W. Williams, J. B. Davies, and E. S. Tikasingh. 1975.** A review of the bloodsucking midges of Trinidad and Tobago, West Indies (Diptera: Ceratopogonidae). *Journal of Entomology (B)* 44: 101-144.
- Blanton, F. S., and W. W. Wirth. 1979.** The sand flies (*Culicoides*) of Florida (Diptera: Ceratopogonidae). *Arthropods of Florida and Neighboring Land Areas* 10: 1-204.
- Borkent, A. 2005.** Ceratopogonidae. Chapter 10. p. 113-126. *In:* W. C. Marquard (ed.). *Biology of Disease Vectors*. 2<sup>nd</sup> edition. Elsevier Press; Amsterdam. 785 p.
- Borkent, A., and W. L. Grogan, Jr. 2009.** Catalog of the New World biting midges north of Mexico (Diptera: Ceratopogonidae). *Zootaxa* 2273: 1-48.
- Borkent, A., and G. R. Spinelli. 2000.** Catalog of the New World biting midges south of the United States of America (Diptera: Ceratopogonidae). *Contributions on Entomology, International*. Associated Publishers; Gainesville, Florida. 4: 1-107.
- Borkent, A., and G. R. Spinelli. 2007.** Neotropical Ceratopogonidae (Diptera: Insecta). *In:* J. Adis, J. R. Arias, G. Rueda-Delgado, and K. M. Wantzen (eds.). *Aquatic biodiversity in Latin America (ABLA)*. Vol. 4. Pensoft; Sofia-Moscow. 198 p.
- Borkent, A., G. R. Spinelli, and W. L. Grogan, Jr. 2009.** Ceratopogonidae (biting midges, purrujas). Chapter 29. p. 407-435. *In:* B. V. Brown, A. Borkent, J. M. Cumming, D. M. Wood, N. E. Woodley, and M. A. Zumbado (eds.). *Manual of Central American Diptera*. Volume 1. NRC Research Press; Ottawa, Ontario, Canada. 714 p.
- Clastrier, J. 1991.** Description de cinq nouveaux *Stilobezzia* apparentés à *S. insolita* Das Gupta & Wirth, originaires des régions afrotropicale, paléarctique et néotropicale (Dipt. Ceratopogonidae). *Bulletin de la Société Entomologique de France* 95: 297-310.
- Clastrier, J., and C. Raccurt. 1979.** Quatre nouveaux *Parabezzia* de la République d'Haiti (Diptera, Ceratopogonidae). *Nouvelle Revue d'Entomologie* 9: 165-175.
- Downes, J. A., and W. W. Wirth. 1981.** Chapter 28. Ceratopogonidae. p. 393-421. *In:* J. F. McAlpine, B. V. Peterson, G. E. Shewell, H. J. Teskey, J. R. Vockeroth, and D. M. Wood (coordinators). *Manual of Nearctic Diptera*. Volume 1. Agriculture Canada Monograph 27: 1-674.

- Felippe-Bauer, M. L., H. Huerta, and S. Ibáñez-Bernal. 2000.** A new species of predaceous midge of the genus *Monohelea* Kieffer from Mexico (Diptera: Ceratopogonidae). *Memorias do Instituto Oswaldo Cruz* 95: 815-818.
- Fox, I. 1946.** A review of the biting midges or *Culicoides* from the Caribbean region (Diptera: Ceratopogonidae). *Annals of the Entomological Society of America* 39: 248-258.
- Fox, I. 1948.** *Hoffmania*, a new subgenus in *Culicoides* (Diptera: Ceratopogonidae). *Proceedings of the Biological Society of Washington* 61: 21-28.
- Fox, I. 1949.** Notes on Puerto Rican biting midges or *Culicoides* (Diptera: Ceratopogonidae). *Bulletin of the Brooklyn Entomological Society* 44: 29-34.
- 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 the University of Puerto Rico* 39: 214-285.
- Fox, I., and W. A. Hoffman. 1944.** New Neotropical biting sand flies of the genus *Culicoides* (Diptera: Ceratopogonidae). *Puerto Rico Journal of Public Health and Tropical Medicine* 20: 108-111.
- Grogan, W. L., Jr., L. J. Hribar, C. S. Murphree, and J. E. Cilek. 2010.** New records of biting and predaceous midges from Florida, including species new to the fauna of the United States (Diptera: Ceratopogonidae). *Insecta Mundi* 0147: 1-59.
- Grogan, W. L., Jr., and W. W. Wirth. 1975.** A revision of the genus *Palpomyia* Meigen of northeastern North America (Diptera: Ceratopogonidae). *Agricultural Experiment Station, University of Maryland, Miscellaneous Publication* 875: v + 49 p.
- Grogan, W. L., Jr., and W. W. Wirth. 1977.** A revision of the Nearctic species of *Parabezzia* Malloch (Diptera: Ceratopogonidae). *Journal of the Kansas Entomological Society* 50: 49-83.
- Grogan, W. L., Jr., and W. W. Wirth. 1979.** The North American predaceous midges of the genus *Palpomyia* Meigen (Diptera: Ceratopogonidae). *Memoirs of the Entomological Society of Washington* 8: 1-125.
- Grogan, W. L., Jr., and W. W. Wirth. 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.
- Huerta, H. and A. Borkent. 2005.** A new species and first record of *Ceratoculicoides* Wirth and Ratanaworabhan from the Neotropical region and new species and records of *Brachypogon* Kieffer from Mexico (Diptera: Ceratopogonidae). *Folia Entomologica Mexicana* 44: 111-119.
- Johannsen, O. A. 1943.** A generic synopsis of the Ceratopogonidae (Heleidae) of the Americas, a bibliography, and a list of the North American species. *Annals of the Entomological Society of America* 36: 763-791.
- Lane, J. 1958.** On Neotropical *Bezzia*. *Revista Brasileira de Entomologia* 8: 25-36.
- Lane, J., and O. P. Forattini. 1958.** Neotropical *Stilobezzia* II. Fourteen new species, chiefly from Panama (Diptera, Ceratopogonidae). *Revista Brasileira de Entomologia* 8: 203-224.
- Lane, J., and O. P. Forattini. 1961.** Neotropical *Stilobezzia*, 1911 III. Key for the adults of this genus and description of one new species (Diptera, Ceratopogonidae). *Revista Brasileira de Entomologia* 10: 83-94.
- Lutz, A. 1913.** Contribuição para o estudo das Ceratopogoninas hematofagas do Brazil. *Memorias do Instituto Oswaldo Cruz* 5: 45-73, pl. 6-8.
- Linley, J. R., and D. S. Kettle. 1964.** A description of the larvae and pupae of *Culicoides furens* (Poey) and *Culicoides hoffmani* Fox (Diptera: Ceratopogonidae). *Annals and Magazine of Natural History (Series 13)* 7: 129-149.
- 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.
- McAlpine, J. F., B. V. Peterson, G. E. Shewell, H. J. Teskey, J. R. Vockeroth, and D. M. Wood (coordinators). 1981.** Manual of Nearctic Diptera. Volume 1. *Agriculture Canada Monograph* 27: 1-674.
- Ortiz, I., and M. Mirsa. 1952.** Sobre las especies Americanas del género "*Culicoides*" Latr., (Díptera, "Ceratopogonidae") con una espermoteca. *Acta Científica Venezolana* 3: 125-128.
- Peck, S. B., R. H. Turnbow, and M. C. Thomas. 2013.** The diversity and distributions of the beetles (Insecta: Coleoptera) of the Guadeloupe Archipelago (Grande-Terre, Basse-Terre, La Désirade, Marie-

- Galante, Les Saintes, and Petite Terre), Lesser Antilles. *Insecta Mundi*: In press
- Sáenz, M. R., and E. C. Greiner. 1994.** *Culicoides* aspirated from cattle in Costa Rica, Honduras, Panama and Puerto Rico, and their role as potential vectors of bluetongue viruses. *Medical and Veterinary Entomology* 8: 15-19.
- Spinelli, G. R., and A. Borkent. 2004.** New species of Central American *Culicoides* Latreille (Diptera: Ceratopogonidae) with a synopsis of species from Costa Rica. *Proceedings of the Entomological Society of Washington* 106: 361-395.
- Spinelli, G. R., and W. L. Grogan, Jr. 1987.** A revision of the Neotropical species of *Parabezzia* (Diptera: Ceratopogonidae). *Biologia Acuatica* 11: 1-45.
- Spinelli, G. R., and W. L. Grogan, Jr. 1989.** Dos especies nuevas de *Palpomyia*, grupo *distincta* de la region Neotropical (Diptera: Ceratopogonidae). *Neotropica* 35: 3-8.
- Spinelli, G. R., and W. L. Grogan, Jr. 1998.** A revision of the Neotropical predaceous midges of *Brachypogon* (*Brachypogon*) Kieffer (Diptera: Ceratopogonidae). *Insecta Mundi* 12: 59-79.
- Spinelli, G. R., W. L. Grogan, Jr., and M. M. Ronderos. 2009.** A revision of the Patagonian predaceous midges of the genus *Palpomyia* Meigen (Diptera: Ceratopogonidae). *Insect Systematics and Evolution* 40: 43-70.
- Spinelli, G. R., and P. I. Marino. 2008.** New species and new records in the subgenus *Brachypogon* (*Brachypogon*) Kieffer from Peruvian Amazonia (Diptera: Ceratopogonidae). *Studies on Neotropical Fauna and Environment* 43: 117-124.
- Spinelli, G. R., M. M. Ronderos, F. Díaz, and P. I. Marino. 2005.** The bloodsucking biting midges of Argentina (Diptera: Ceratopogonidae). *Memorias do Instituto Oswaldo Cruz* 100: 137-150.
- Spinelli, G. R., and W. W. Wirth. 1989.** Las especies neotropicales del genero *Bezzia* (Diptera: Ceratopogonidae). II. Los grupos *nobilis* y *punctipennis*. *Revista de la Sociedad Entomológica Argentina* 45: 109-129.
- Spinelli, G. R., and W. W. Wirth. 1991.** The Neotropical predaceous midges of the genus *Bezzia* (Diptera: Ceratopogonidae) Part IV. The *dentifemur* and *venustula* groups. *Insecta Mundi* 5: 1-17.
- Swanson, D. A., and W. L. Grogan, Jr. 2011.** A new predaceous midge in *Brachypogon* (*Brachypogon*) from Alabama and Florida, U.S.A. and new distribution records for *Brachypogon woodruffi* Spinelli and Grogan (Diptera: Ceratopogonidae). *Proceedings of the Entomological Society of Washington* 113: 531-540.
- Szadziewski, R. 1996.** Biting midges from Lower Cretaceous amber of Lebanon and Upper Cretaceous Siberian amber of Taimyr (Diptera, Ceratopogonidae). *Studia Dipterologica* 3: 23-86.
- Vargas, L. 1954.** Dos nuevas especies de *Culicoides* Mexicanos (Diptera, Heleidae). *Revista del Instituto de Salubridad y Enfermedades Tropicales* 14: 25-30, 2 pl.
- Vargas, L. 1960.** The subgenera of *Culicoides* of the Americas (Diptera, Ceratopogonidae). *Revista de Biologia Tropical* 8: 35-47.
- Vitale, G. C., W. W. Wirth, and T. H. G. Aitken. 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.
- Williston, S. W. 1896.** On the Diptera of St. Vincent (West Indies). *Transactions of the Entomological Society of London* 1896: 253-446, pl. 8-14.
- Wirth, W. W. 1953.** Biting midges of the heleid genus *Stilobezzia* in North America. *Proceedings of the United States National Museum* 103: 57-85.
- Wirth, W. W. 1974.** Family Ceratopogonidae. *In*: A catalog of the Diptera of the Americas south of the United States. Fasc. 14: 1-89.
- Wirth, W. W., and F. S. Blanton. 1953.** Studies in Panama *Culicoides* (Diptera, Heleidae). II. Descriptions of six additional species. *Journal of Parasitology* 39: 229-236.
- Wirth, W. W., and F. S. Blanton. 1956.** Studies in Panama *Culicoides* VII. The species of the pulcaris and cova-garciai groups (Diptera, Heleidae). *Proceedings of the Entomological Society of Washington* 58: 211-227.
- Wirth, W. W., and F. S. Blanton. 1959.** Biting midges of the genus *Culicoides* from Panama (Diptera: Heleidae). *Proceedings of the United States National Museum* 109: 237-482
- Wirth, W. W., and F. S. Blanton. 1970a.** New species of Neotropical *Culicoides* (Diptera: Ceratopogonidae). *Florida Entomologist* 53: 39-45.

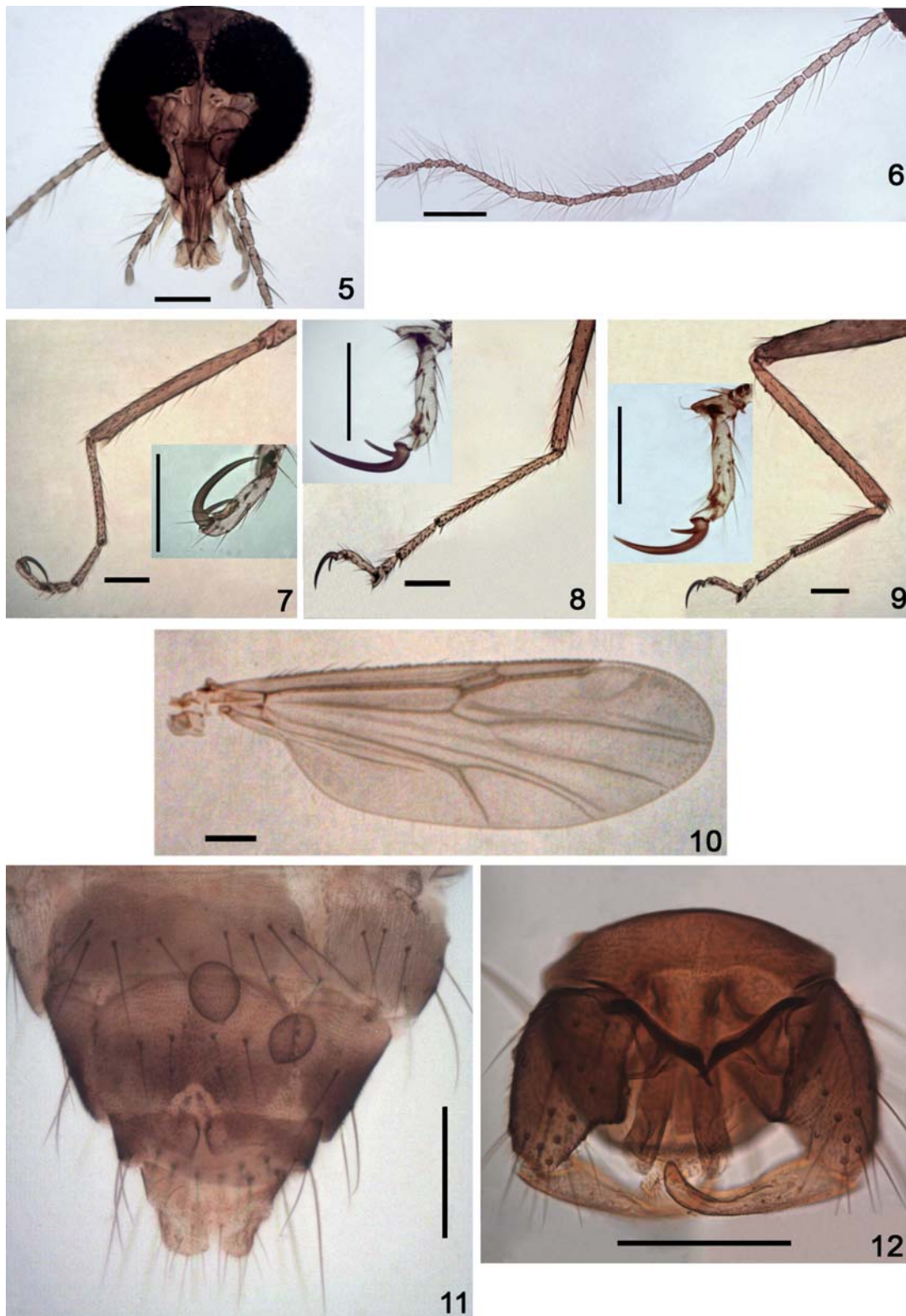
- Wirth, W. W., and F. S. Blanton. 1970b.** A review of the *Culicoides nigrigenus* group, with two new species (Diptera: Ceratopogonidae). *Entomological News* 81: 141-151.
- Wirth, W. W., and F. S. Blanton. 1971.** New Neotropical sandflies of the *Culicoides debilipalpis* group (Diptera: Ceratopogonidae). *Proceedings of the Entomological Society of Washington* 73: 34-43.
- Wirth, W. W., and F. S. Blanton. 1974.** The West Indian sandflies of the genus *Culicoides* (Diptera: Ceratopogonidae). Agriculture Research Service, U. S. D. A. Technical Bulletin 1474, iv + 98 p.
- Wirth, W. W., A. L. Dyce, and G. R. Spinelli. 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., and N. Marston. 1968.** A method for mounting small insects on microscope slides in Canada balsam. *Annals of the Entomological Society of America* 61: 783-784.
- Wirth, W. W., and B. A. Mullens. 1992.** *Culicoides boydi* (Diptera: Ceratopogonidae): A potential vector of hemorrhagic disease viruses to desert bighorn sheep in southern California. *Journal of Medical Entomology* 29: 1006-1010.

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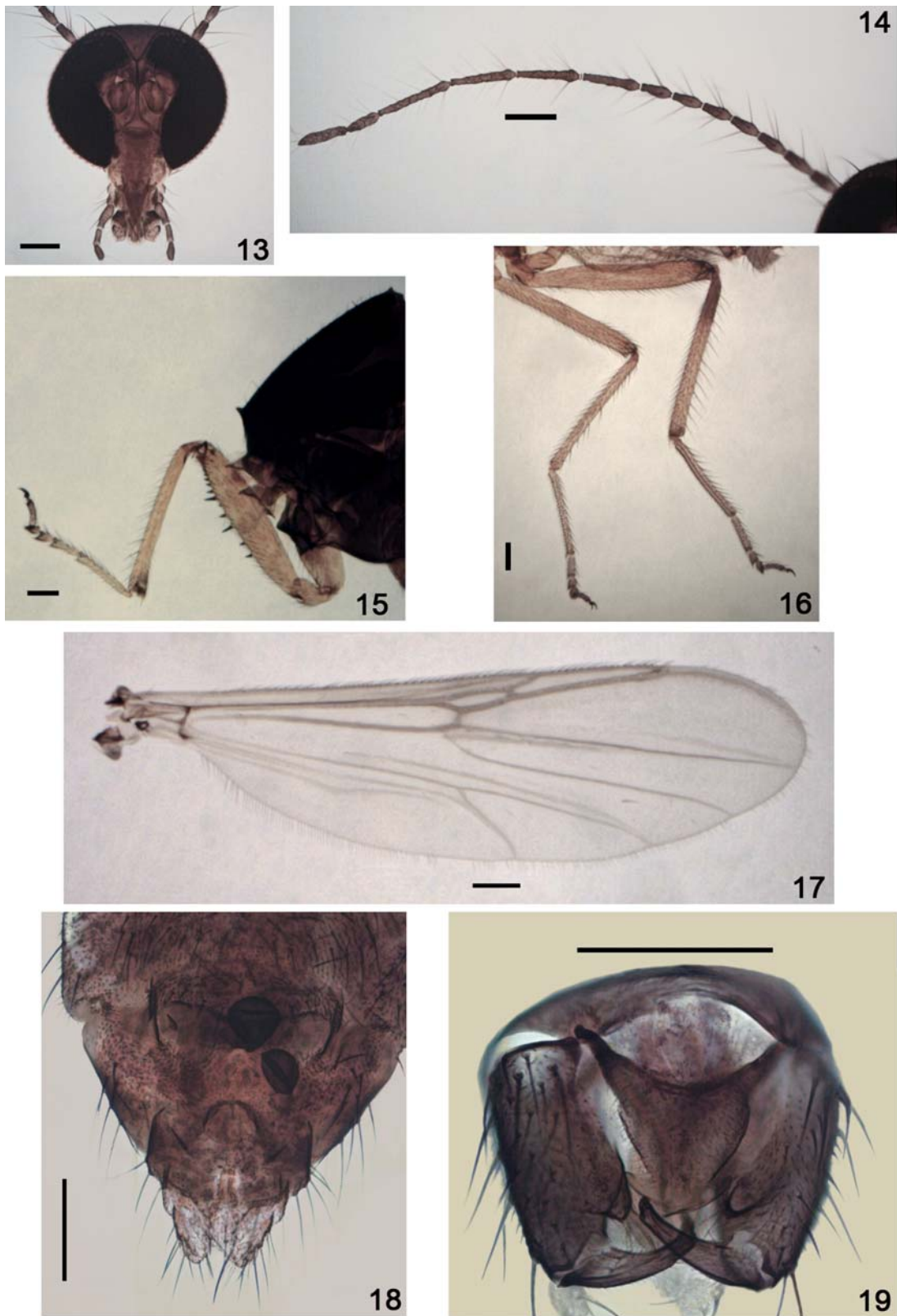


**Figures 1-4.** *Parabezzia florentinae* n. sp., female. **1)** Head. **2)** Tarsus of hind leg. **3)** Wing. **4)** Tip of abdomen and spermathecae in ventral view (scale bars = 0.05 mm).

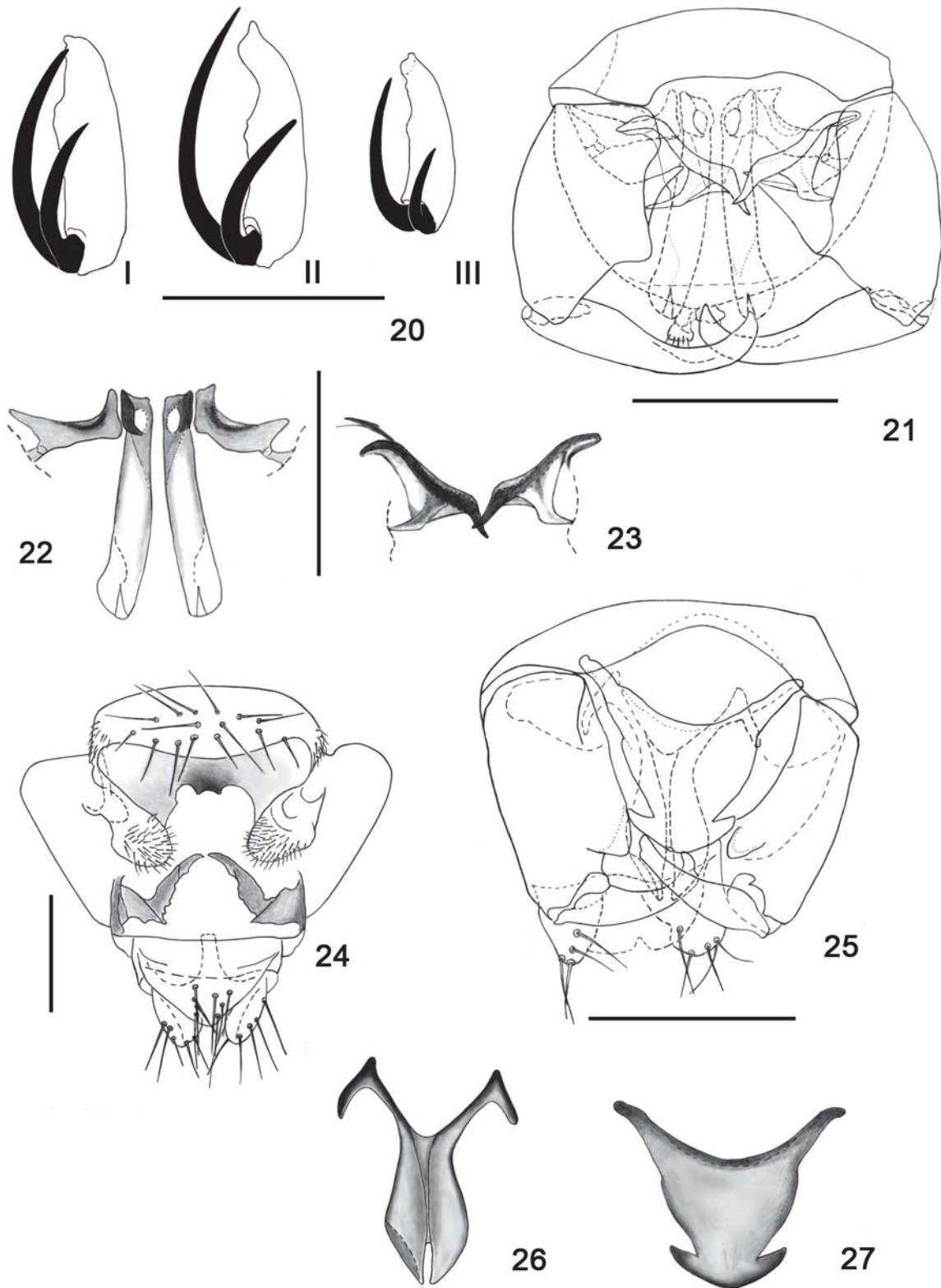




**Figures 5-12.** *Stilobezzia thomasi* n. sp. **5-11**) Female. **5)** Head. **6)** Flagellum. **7)** Tibia and tarsus of fore leg, with detail of tarsomere 5 and claws. **8)** Distal half of tibia and tarsus of mid leg, with detail of tarsomere 5 and claws. **9)** Femur, tibia and tarsus of hind leg, with detail of tarsomere 5 and claws. **10)** Wing; **11)** Genitalia and spermathecae in ventral view. **12)** Male genitalia in ventral view (scale bars = 0.05 mm).



**Figures 13-19.** *Palpomyia turnbowi* n. sp. **13-18)** Female. **13)** Head. **14)** Flagellum. **15)** Scutum and fore leg. **16)** Middle and hind legs. **17)** Wing. **18)** Genitalia and spermathecae in ventral view. **19)** Male genitalia, in ventral view (scale bars = 0.05 mm).



**Figures 20-27.** 20) *Parabezzia florentinae* n. sp., female. 21-23) *Stilobezzia thomasi* n. sp., male. 24) *Palpomyia turnbowi* n. sp., female. 25-27) *Palpomyia turnbowi* n. sp., male. 20) Tarsomeres 5 and tarsal claws. 21, 25) Male genitalia, in ventral view. 22, 26) Parameres. 23, 27) Aedeagus. 24) Female genitalia, in ventral view (scale bars = 0.05 mm).

