Five new species of *Culicoides* Latreille described from Colombia, yielding a new species list and country records (Diptera: Ceratopogonidae)

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The following five new species of Culicoides from Colombia are described, illustrated and placed to subgenus or species group: Culicoides antioquiensis, Culicoides gabrieli, Culicoides inermis, Culicoides micayensis and Culicoides nigrifemur. *C. gabrieli* is also known from Peru. When possible, their position in previously published keys is indicated and their features discussed in light of the most recent revisions. A list of 180 Culicoides species known (114) or suspected of being in Colombia (66) is given in a Table. Of these, 12 including the new species are recorded from Colombia for the first time.

Key words: *Culicoides* - new species - new records - species list - biting midge - Colombia

Species in the genus *Culicoides* Latreille are by far the most notorious members of the 109 currently recognized extant genera of Ceratopogonidae. In the Neotropical region, Borkent and Spinelli (2007) recorded 266 species and Spinelli et al. (2007) described another species from Brazilian Amazonia. Seventy of these species are miserable pests of humans and domestic animals and seven of them serve as vectors of a variety of diseases, summarized by Borkent and Spinelli (2007).

There is no reliable, modern key to the subgenera and species groups of neotropical *Culicoides*. The only review of the genus for the region is the monography by Forattini (1957), but due to the numerous descriptions of new species and nomenclatorial actions by subsequent authors, this revision has not been updated. The easiest guide to species identification is that of Wirth et al. (1988), in which some meristic characters states and photographs of wings are provided. From there readers may refer to keys to subgenera or species groups, or species lists referred to local revisions from Panama (Wirth & Blanton 1959), Amazon Basin (Wirth & Blanton 1973), the Caribbean (Wirth & Blanton 1974), Trinidad and Tobago (Aitken et al. 1975), Florida, USA (Blanton & Wirth 1979), Colombia (Barreto 1986), South Amazon Basin (Spinelli & Wirth 1986), Argentina (Spinelli et al. 2005) and Costa Rica (Spinelli & Borkent 2004), among others.

In his catalog of the *Culicoides* from Colombia, Barreto (1986) recorded 88 species, and since then 14 species have to be added for a total of 102 *Culicoides* species presently known from Colombia. Although this is a relatively large number of species, at present their sanitary importance in Colombia appear to be restricted to the annoyance caused by the female biting habits. None of the recorded species has been irrefutably incriminated as a vector of pathogens, only *Culicoides insignis* Lutz is suspected to be involved in the transmission of the bluetongue virus and the haemorragic fever virus to cattle (Homan et al. 1985), and *Culicoides insinuatus* Ortiz in the transmission of the filaroid *Mansonella ozzardi* to man (Tidwell & Tidwell 1982).

A recent study of the collections of *Culicoides* from the Museo de La Plata, in La Plata, Argentina, and the Instituto Nacional de Salud, in Bogotá, Colombia, revealed the presence of five new species and an additional seven species not recorded yet to Colombia. The purpose of this paper is to provide the descriptions and records of this material, as well as an updated list of the 114 species inhabiting the country with their corresponding distribution. This list includes 66 species not formally recorded and expected to be discovered in Colombia.

**MATERIAL AND METHODS**

All specimens, mounted on microscope slides in Canada balsam, were examined and measured with a binocular compound microscope at 40-400X and drawings of certain diagnostic characters were prepared with an attached camera lucida. Wing photographs were taken with a Pentax Optio S 40, digital camera through a Leitz Wetzlar SM-LUX, binocular microscope.

Terms for structures follow those used in the Manual of Nearctic Diptera (McAlpine et al. 1981). Wing veins follow the system of the Manual of Nearctic Diptera, with modifications proposed by Szadziewski (1996). Names of veins are always in upper case and those of cells in lower case. Pale areas in cell r₃ posterior to or immediately distal to the 2nd radial cell are called poststigmatic pale spots. Ratios used follow Spinelli et al. (1993).

Specimens were deposited, as noted, in the collections of the Instituto Nacional de Salud, Bogotá, Colombia (INS), and the Museo de La Plata, La Plata, Argentina (MLP).
Culicoides (Hoffmania) antioquiensis sp. n., (Figs 1-5, 11, 25)

Diagnosis: Only species in the hylas group with slender third palpal segment, apices of veins M₁, M₂, broadly pale, apex of CuA₁, with small pale spot and apex of CuA₂ dark, spermathecae without sclerotized necks, male tergite 9 with a distinct distal notch, gonostylus with subapical tooth and with V-shaped base of the separate portion of parameres.

Male: Similar to female with usual sexual differences. Wing length 1.19 mm; width 0.41 mm; CR 0.65. Genitalia (Fig. 1): tergite 9 somewhat truncated, distinctly notched posteromedially, cerci pointed; sternite 9 with with shallow posteromedial excavation. Gonocoxite 2.4 times longer than broad; gonostylus yellow, slightly shorter than gonocoxite, nearly straight, with subapical tooth, tip pointed. Parameres (Fig. 2) stout, broadly fused at base, fused portion 1.5 broader than long; separate portion V-shaped at base, each abruptly tapering to terminal filament with very fine fringing hairs distally. Aedeagus triangular, 1.7 times longer than broad, progressively tapering, slender straight distal portion 0.22 times longer than total aedeagus length, apex with rounded papilla.

Female: head dark brown. Eyes (Fig. 11) bare, contiguous by distance equal to diameter of two ommatidia. Flagellum (Fig. 3) brown, bases of flagellomeres pale; AR 1.00; sensilla coeloconica on flagellomeres 1, 9-13. Palpus (Fig. 4) dark brown; third segment cylindrical, slender, sensilla scattered on surface; PR 4.15; P/H ratio 1.23. Mandible with 22 teeth. Scutum dak brown, with sublateral yellowish brown patches; scutellum, postscutellum dark brown. Legs dark brown; foreknee blackish with narrow pale ring on each side; hindknee broadly yellowish on each side of joint; hindfemur dark blackish with narrow pale ring on each side; midknee postscutellum dark brown. Legs dark brown; foreknee blackish with narrow pale ring on each side; hindknee broadly yellowish on each side of joint; hindfemur dark blackish with narrow pale ring on each side; midknee postscutellum dark brown. Legs dark brown; foreknee blackish with narrow pale ring on each side; hindknee broadly yellowish on each side of joint; hindfemur dark blackish with narrow pale ring on each side; midknee postscutellum dark brown. Legs dark brown; foreknee blackish with narrow pale ring on each side; hindknee broadly yellowish on each side of joint; hindfemur dark blackish with narrow pale ring on each side; midknee postscutellum dark brown.

Distribution - Colombia; known only from the type-locality.

Type data and depository - Holotype male, allotype female, Colombia, Antioquia, near Rio Anori, tropic rain forest, IX-1970, DG Young, black light trap (MLP).

Taxonomic discussion - Culicoides antioquiensis sp. n. is a member of the hylas group of the subgenus Hoffmania Fox. This new species keys out in Wirth and Blanton (1968) to couplet 3 where is distinguished from Culicoides heliconia Fox and Hoffman by the dark apex of vein CuA₂ and from Culicoides palpalis Macfie by the small pale area in the apex of vein CuA₂.

The male is very similar to C. palpalis, but in the latter species the tergite IX bears a very small, papilliform caudomedian process, the gonostylus lacks the subapical tooth and the base of the separate portion of parameres is rounded. The female of C. palpalis differs from the new species by the spermathecae with short and slender necks, by the distal pale area in cell r, broadly abutting wing margin and by the large pale spot in cuₐ, broadly connected with the pale line bordering lower margin of CuA₁.

The wing pattern of C. antioquiensis is similar to the one of Culicoides hylas, but the later species has dark mid knee and the third palpal segment bears an irregular sensory pit. The male of C. hylas has a small papilliform on posterior margin of tergite 9 and the fused proximal portion of the parameres is nearly as broad as long.

Etymology - The name of this species refers to Antioquia, the Department of the type-locality.

Culicoides (Cotocriopus) gabrieli sp. n. (Figs 6-10, 12, 13)

Diagnosis: Only species in the subgenus Cotocriopus Bréthes with narrowly separated eyes, five distal elongated flagellomeres, sensilla coeloconica on flagellomeres 1, 5-8, wing with pale areas nearly indistinguishable with macrotrichia very sparse on distal half, male sternite 9 with narrow notch, aedeagus triangular and distal portion of parameres slender without ventral lobe.

Male: Similar to female with usual sexual differences. Palpus (Fig. 8) brown, third segment swollen, with deep sensory pit opening by small pore. Wing length 0.77 (0.74-0.80, n = 2) mm; width 0.29 (0.28-0.30, n = 2) mm; CR 0.54 (n = 2). Genitalia (Fig. 6): tergite 9 subquadrangular, distal margin convex, slender, apicodistal processes slender, subparallel, cerci elongate; sternite 9 with medial, narrow notch. Gonocoxite stout, 1.45 times longer than broad, ventral root stout, dorsal root slender, curved; gonostylus 1.2 times longer than gonocoxite, broad basally, distal portion slender, nearly straight. Parameres (Fig. 7) separate, each with sclerotized basal knob, basal portion slender directed posteromesally, distal portion slender, sinuate, without ventral lobe, tapering to fine point without lateral barbs. Aedeagus triangular, lateral arms strongly sclerotized; basal arch rounded, extending 0.33 of total length; distal portion with lateral pair of pointed processes, tapering to blunt tip.

Female: head dark brown. Eyes (Fig. 12) very narrowly separated, with numerous interommatidial spines.

Flagellum (Fig. 9) uniformly dark brown; flagellomeres...
2-8 short, vasiform, 9-13 subcylindrical; AR 1.30; sensilla coeloconica on flagellomeres 1, 5-8. Palpus brown; segments 3-5 missing; P/H ratio 0.58. Mandible with 14 teeth. Thorax uniformly dark brown. Legs dark brown; forefemur with faint subapical pale rings; fore, hind tibiae with subbasal pale rings; hind tibial comb with four spines, one nearest spur longest. Wing (Fig. 26) length 0.80 mm; width 0.38 mm; CR 0.65; with pale areas very much reduced, nearly indistinguishable over r-m cross-vein, poststigmatic area in r, distally in, m, m, cuₐ, anal cell. Macrotrichia very sparse, scattered on distal half of wing. Halter brown. Abdomen brown. Two pyriform, subequal spermathecae with sclerotized long necks (Fig. 10), each measuring 36 by 29 μ, neck 14 μ; rudimentary third, ring present.

Distribution - Colombia (Chocó), Peru (Cuzco).

Type data and depository - Holotype male, Peru, Cuzco, Kiriguetti, 24-II-2004, J. Williams, at light (MLP); allotype female, Colombia, Chocó, Pié de Pepe, VI-1979, Cavelier, light trap (INS). Paratype, 1 male, same data as holotype (INS).

Taxonomic discussion - C. gabrieli sp. n. is a member of the subgenus Cotocripus Brèthes. There is no available revision of the subgenus for the Neotropics, and according to Borkent and Spinelli (2007) five species are recognized in the region: Culicoides bambusicola Lutz, Culicoides caridei (Brèthes), Culicoides irwini Spinelli and Wirth, Culicoides patagoniensis Ronderos and Spinelli, and Culicoides raposoensis Wirth and Barreto. The wing pattern of C. gabrieli sp. n. is very similar to C. caridei and C. patagoniensis, very similar species from Southern South America. However, the female of these species shows well separated eyes, distinctly shorter flagellomeres 9-13 and the flagellomeres 11-13 bear sensilla coeloconica. The male genitalia of both species is also different, with the apicolateral processes of tergite 9 stouter, the sternites 9 lacking mesal notch, the aedeagus Y-shaped and shorter distal portion of parameres.

The male genitalia of C. bambusicola, a species inhabiting Eastern Brazil and Argentina, and Colombia and Venezuela, is similar to the one of C. gabrieli sp. n.
Nevertheless, the sternite 9 lacks the mesal notch and has stouter parameres. Regarding the female, the wing of *C. bambusicola* exhibits a distal rounded pale area in cell r<sub>5</sub>.

*Culicoides raposoensis*, a species also inhabiting Colombia, differs from *C. gabrieli* sp.n. by the cell r<sub>3</sub> with a distal pale spot abutting wing margin, by the pale apex of the hindtibia, and by the male genitalia with parameres with well developed ventral lobe and aedeagus lacking lateral pointed processes.

**Etymology** - We are pleased to name this species after the Colombian writer Gabriel García Márquez, in recognition of his monumental literary work, the delight of several generations of readers around the World.

*Culicoides (Anilomyia) inermis* sp. n.  
(Figs 13, 16-18, 27)

**Diagnosis**: Only species in the decor group with sensilla coeloconica on flagellomeres 1,5-8 and unarmed mandibles.

**Male**: unknown.

**Female**: head brown. Eyes (Fig. 13) bare, very narrowly contiguous. Flagellum (Fig. 16) uniformly brown; AR 0.91 (0.85-1.07, n = 2); sensilla coeloconica on flagellomeres 1,5-8. Palpus (Fig. 17) brown; third seg-
ment slightly swollen distally, with apical sensory pit; segments 4-5 absent, only a minute stumpy bearing seta posterior to third segment in holotype; PR 1.60 (n = 2); P/H ratio 0.33 (0.30-0.36, n = 2). Mandible without teeth. Thorax brown, scutum without definite pattern; postscutellum with transversal mesal dark brown patch. Legs brown; femora with faint subapical pale rings; tibiae with subbasal pale rings; hind tibial comb with seven spines, second from spur longest. Thorax brown, scutum without definite pattern; postscutellum with transversal mesal dark brown patch. Legs brown; femora with faint subapical pale rings; tibiae with subbasal pale rings; hind tibial comb with seven spines, second from spur longest.

Thorax brown; scutum without definite pattern; postscutellum with transversal mesal dark brown patch. Legs brown; femora with faint subapical pale rings; tibiae with subbasal pale rings; hind tibial comb with seven spines, second from spur longest. Thorax brown, scutum without definite pattern; postscutellum with transversal mesal dark brown patch. Legs brown; femora with faint subapical pale rings; tibiae with subbasal pale rings; hind tibial comb with seven spines, second from spur longest.

**Distribution** - Colombia, known only from the type-locality.


**Taxonomic discussion** - *C. inermis* sp. n. belongs in the *decor* species group of the subgenus Anilomyia, reviewed by for the Neotropics by Wirth and Blanton (1970). The antennal sensillar pattern 1,5-8 is unique in the subgenus. The wing pattern is nearly identical to Culicoides decor (Williston). However, apart from the different distribution of sensilla coeloconica within flagellomeres, *C. inermis* sp. n. is easily distinguished from *C. decor* by the shorter proboscis (P/H ratio 0.85 in *C. decor*), unarmored mandibles (armed in *C. decor*) and by the maxillary palpus bearing only three well developed segments, with apical sensory pit in the third segment (with 5 developed segments in *C. decor*). These extra alar characteristics also distinguish *C. inermis* from other species in the group, all of them with palpus 5-segmented, armed mandibles and P/H ratio ranging from 0.68-0.94.

**Etymology** - This species is named *inermis* referring the unarmed mandibles.

*Culicoides micayensis* sp. n. (eublepharus group) (Figs 20-24)

**Diagnosis:** Only species in the *eublepharus* group with sensilla coeloconica on flagellomeres 1,(6) 8-12, 3rd palpal segment swollen at midlength with distal open sensory area, wing with only moderately distinct pattern of pale spots and with one spermatheca.

**Male:** unknown.

**Female:** head dark brown. Eyes (Fig. 14) with interommatidial spicules, very narrowly separated. Flagellum (Fig. 21) uniformly brown; flagellomeres 2-8 vasiiform, subequal, 9-13 subcylindrical, elongate; AR 1.23 (1.18-1.28, n = 2); sensilla coeloconica on flagellomeres 1,(6) 8-12. Palpus (Fig. 20) brown; third segment swollen at midlength, distal half with open sensory area on irregular concavity; PR 1.70 (n = 2); P/H ratio 0.89 (0.86-0.92, n = 2). Mandible with 20 teeth. Thorax brown; scutum with admedian longitudinal, narrow, slightly paler patches. Legs brown; forefemur with subapical, faint pale ring; tibiae with subbasal pale rings; hind tibial comb with four spines, one nearest spur longest. Wing (Fig. 28) length 0.95 (0.94-0.96, n = 2) mm; width 0.47 (0.46-0.48, n = 2) mm; CR 0.65 (n = 2); brownish infuscated, with only moderately distinct pattern of pale spots; second radial cell in dark spot; pale spot over crossvein r-m small, barely abutting wing margin; poststigmatic pale spot in r, lying slightly obliquely, distal pale spot in r, transverse, not abutting wing margin or M,; two pal spots in m, distal one well separated from wing margin; m, cu, anal cell with distal, rounded pale spots abutting wing margin. Macrotichia present on distal half of wing, few in cu, anal cell, reaching in one row to base of m,. Halter brownish. Abdomen dark brown. One pyriform, partially collapsed spermathecae with sclerotized neck (Fig. 19), measuring 42 by 34 μ, neck 7 μ; rudimentary sperma-theca, ring present.

**Distribution** - Colombia, known only from the type-locality.


**Taxonomic discussion** - *C. micayensis* sp. n. is a member of the eublepharus group and unplaced to subgenus. The following four species of the eublepharus group also have one spermatheca: *Culicoides archboldi* Wirth and Blanton, *Culicoides eublepharus* Macfie, *Culicoides guadeloupensis* Floch and Abonnenc and *Culicoides rangeli* Ortiz and Mira. Of these the most similar is *C. archboldi*, but it is readily distinguished from *C. micayensis* by the sensilla coeloconica on flagellomeres 1,9-12, by the absence of pale spots in cells m, m, cu, and anal cell, and by the long and coarse macrotrichia covering most of wing, reaching in two rows to base of cell m,. The wing pattern of *C. micayensis* sp. n. is similar to the one of *C. tamboensis*, but the later species has two well developed spermathecae and bears sensilla coeloconica on flagellomeres 1,9-12.

**Etymology** - The name of this species refers to Rio Micay, the type-locality.

*Culicoides nigrifemur* sp. n. (covagarciai group) (Figs 22-24)

**Diagnosis:** Only species in the covagarciai species group with third palpal segment slender, head and proboscis equal in length, and entirely dark hindfemur.

**Male:** unknown.

**Female:** head dark brown. Eyes (Fig. 15) bare, contiguous by distance equal to diameter of two ommatidia. Flagellum (Fig. 26) with flagellomeres 1-8 pale brown, 9-13 darker; AR 1.00; sensilla coeloconica on
flagellomeres 1, 9-13. Palpus (Fig. 23) dark brown; 3rd segment slender, with irregular sensory pit; PR 4.30; P/H ratio 1.00. Mandible with 23 teeth. Thorax dark brown. Scutum apparently with mesal pale brown patch; scutellum, postscutellum dark brown. Fore and midlegs dark brown, with knees broadly pale yellow; hindfemur dark to tip, hindtribia pale yellow with mesal broad ring; hind tibial comb with six spines, second from spur longest. Wing (Fig. 29) length 2.26 mm; width 1.04 mm; CR 0.67; with contrasting pattern; pale spot over crossvein r-m broadly abutting wing margin; second radial cell in pale spot; distal pale spot in r, transverse, broodly abutting wing margin; M, straddled by pale spot nearly its midlength; distal pale spot in m, somewhat elongate, broadly separated from wing margin; distal pale spot in m, rounded, broadly abutting wing margin; pale spot in cua, large, rounded, broadly abutting wing margin; anal cell with two distal pale spots; apices of M, M, CuA, CuA, dark; pale spot posterior to medial fork connected with pale spot lying anterior to cubital fork. Macrotibiae sparse on distal half of wing, absent in cua, anal cell. Halter brown. Abdomen dark brown. Two ovoid, slightly unequal spermathecae with short necks (Fig. 24), measuring 62 by 48 μ, and 56 by 46 μ; rudimentary third, ring present.

**Distribution** - Colombia, known only from the type-locality.

**Type data and depository** - Holotype female, Colombia, Cauca, Páramo de Puracé, 28.4 km E Puracé, 3100 m, 18-II-1965, VH Lee, light trap (MLP).

**Taxonomic discussion** - *C. nigrifemur* sp. n. belongs in the *covargarciai* group of the subgenus *Anilomyia*, and is readily distinguished from the species included in that group by the entirely dark brown hindfemur and by the equal length of head and proboscis. Wirth and Blanton (1956a) reviewed the *Culicoides covargarciai* Ortiz species group for the Neotropics, and this new species keys out to *Culicoides marshi* Wirth and Blanton in couplet 2, with the exception that the proboscis of *C. marshi* is longer than its head. Besides that, the eyes are broadly contiguous in *C. marshi*, and only separated by two ommatidia in *C. nigrifemur* sp. n. The wing pattern of *C. nigrifemur* is nearly identical to the one of *C. covargarciai*, but apart from the different length of proboscis and legs coloration, *C. covargarciai* is easily distinguished from *C. nigrifemur* sp. n. by its swollen third palpal segment.

**Etymology** - This species is named *nigrifemur* referring the uniformly dark coloration of the hindfemur.

**New records from Colombia**

*Culicoides castillae* Fox (fluvialis group)

*C. castillae* Fox 1946: 251 (female; Honduras); Forrattini 1957: 499; Wirth and Blanton 1959: 416 (redesc.; synonymy; Panama; distr.); Wirth 1974: 29 (in catalog south to the USA); Wirth et al. 1988: 44 (numerical characters; wing photo; distr.); Borkent and Wirth 1997: 64 (in catalog south to the USA); Borkent and Spinelli 2000: 39 (in catalog south to the USA); Borkent and Spinelli 2007: 72 (in neotropical catalog).

*Culicoides gibsoni* Wirth 1952: 246 (female; Guatemala); Wirth 1955: 111 (male, redesc. female; Guatemala).

*Culicoides flochabonnenci* Ortiz and Mirsa 1952: 267 (female; Venezuela); Ortiz 1953: 801 (in key); Ortiz and León 1955: 574 (male, redesc. female; Ecuador).

**Distribution** - Guatemala to Ecuador, Venezuela, Trinidad.

**New records** - Colombia, Caquetá, Solano, 30-III-1972, CJ Marinkelle, 1 female, light trap (INS); Boyacá, Pauna, Topo Grande, 29-VI-2006, M Suárez, 1 female, CDC + CO2 (INS).

*Culicoides* (Hoffmania) *coutinhoi* Barretto

*C. coutinhoi* Barretto 1944: 96 (male; Brazil); Barbosa 1947: 13 (notes); Ortiz 1950: 449 (notes); Wirth and Blanton 1956a: 314 (female, male redesc.; French Guiana); Forrattini 1957: 239 (erroneous synonym of *lutzi*); Wirth 1974: 24 (in catalog south to the USA); Spinelli and Wirth 1986: 52 (in key; wing photo); Wirth et al. 1988: 14 (numerical characters; distr.); Borkent and Wirth 1997: 65 (in world catalog); Spinelli et al. 1993: 28 (redesc.; distr.); Borkent and Spinelli 2000: 33 (in catalog south to the USA); Borkent and Spinelli 2007: 68 (in neotropical catalog).

**Distribution** - Colombia, French Guiana, Brazil (Amazonas, Pará, São Paulo).

**New record** - Colombia, Caquetá, San Vicente del Caguan, Tres Esquinas, 3-XII-1973, MF Suárez, 1 male (INS).

**Note** - The genitalia and the wing pattern of the specimens here recorded are identical to the ones described and illustrated in the original description by Barretto (1944), as well as in the redescription by Spinelli et al. (1993). The only difference is the halter coloration, but as it was pointed out by Spinelli et al. (1993) this could be a variable character.

*Culicoides* (Haematomyidium) *filiductus* Wirth


**Distribution** - Belize to Colombia.

**New record** - Colombia, Amazonas, Leticia, II-1987, DG Young, 1 female, biting human (INS).

*Culicoides* (Haematomyidium) *germanus* Macfie

*C. germanus* Macfie 1940: 27 (female; Guyana); Wirth and Blanton 1956b: 188 (type redesc.; notes); Forrattini 1957: 381; Wirth 1974: 31 (in catalog south to the USA); Vitale et al. 1981: 148 (in key *debilipalpis* group); Wirth et al. 1988: 48 (numerical characters; distr.); Borkent and Wirth 1997: 69 (in world catalog); Borkent
and Spinelli 2000: 32 (in catalog south to the USA); Borkent and Spinelli 2007: 66 (in neotropical catalog).

*Distribution* - Costa Rica, Colombia, Guyana.

*New record* - Colombia, Tolima, Melgar, El Aguila, 19-II-1980, E Martinez, 1 female, biting human (INS).

**Culicoides leoni** Barbosa (leoni group)

*C. leoni* Barbosa 1952: 17 (female; Ecuador); Wirth and Blanton 1956c: 46 (male, female redesc.); Forattini 1957: 488; Wirth 1974: 33 (in catalog south to the USA); Wirth et al. 1988: 52 (numerical characters; wing photo; distr.); Borkent and Wirth 1997: 73 (in world catalog); Borkent and Spinelli 2000: 39 (in catalog south to the USA); Borkent and Spinelli 2007: 73 (in neotropical catalog).

*Distribution* - Colombia, Ecuador.

**Culicoides (Diphaomyia) mirsae** Ortiz

*C. mirsae* Ortiz 1953: 801 (female; Venezuela); Forattini 1957: 497; Wirth and Blanton 1959: 446 (redesc.; Panama; distr.); Wirth 1974: 34 (in catalog south to the USA); Wirth et al. 1988: 32 (numerical characters; wing photo; distr.); Borkent and Wirth 1997: 74 (in world catalog); Borkent and Spinelli 2000: 30 (in catalog south to the USA); Borkent and Spinelli 2007: 65 (in neotropical catalog).

*Distribution* - Panama, Venezuela, Colombia, Trinidad.

#### TABLE

List of *Culicoides* spp. known or suspected to occur in Colombia. Distributions are arranged North to South and West to East

<table>
<thead>
<tr>
<th>Subgenus</th>
<th>Species</th>
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<tr>
<td><strong>Anilomyia</strong> Vargas</td>
<td>ameliae Brown; Colombia&lt;br&gt;chaverrii Spinelli and Borkent; Costa Rica&lt;br&gt;chrysonotus Wirth and Blanton; El Salvador, Costa Rica, Panama&lt;br&gt;covagarciai Ortiz; Honduras to Colombia, Venezuela&lt;br&gt;efferus Fox; Guatemala to Peru and Bolivia&lt;br&gt;inermis Spinelli; Colombia (NR)&lt;br&gt;luteolaris Wirth and Blanton; Costa Rica, Panama&lt;br&gt;marshi Wirth and Blanton; Costa Rica, Panama, Colombia&lt;br&gt;metagonatus Wirth and Blanton; Nicaragua to Ecuador&lt;br&gt;monicae Spinelli and Borkent; Costa Rica&lt;br&gt;nigrifemur Spinelli; Colombia, (NR)&lt;br&gt;nigrigenus Wirth and Blanton; Mexico (Veracruz) to Colombia, Trinidad, Argentina (Salta)&lt;br&gt;popayanensis Wirth and Lee; Colombia&lt;br&gt;rostratus Wirth and Blanton; Panama&lt;br&gt;trapidoi Wirth and Barreto; Costa Rica, Colombia, Brazil</td>
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<td><strong>Avaritia</strong> Fox</td>
<td>andicola Wirth and Lee; Colombia&lt;br&gt;hermani Spinelli and Borkent; Costa Rica, Panama&lt;br&gt;orjuelai Wirth and Lee; Colombia&lt;br&gt;purancensis Wirth and Lee; Colombia&lt;br&gt;pusilloides Wirth and Blanton; Guatemala and Belize to Panama&lt;br&gt;pusillus Lutz; USA (Florida), Mexico (Chiapas) to northeastern Argentina&lt;br&gt;suarezi Rodriguez and Wirth; Colombia</td>
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<tr>
<td><strong>Cotocripus</strong> Brèthes</td>
<td>bambusicola Lutz; Colombia, Venezuela, Brazil (Bahia, Espirito Santo, Rio de Janeiro, Sao Paulo), Argentina (Misiones, Buenos Aires)&lt;br&gt;gabrieli Spinelli; Colombia, Peru (NR)&lt;br&gt;raposoensis Wirth and Barreto; Colombia</td>
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<td><strong>Culicoides</strong> Latreille</td>
<td>elutus Macfie; Mexico (Chiapas, Oaxaca) to Panama&lt;br&gt;luteovenus Root and Hoffman; Mexico (DF, Oaxaca, Chiapas) to Panama</td>
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<td><strong>Diphaomyia</strong> Vargas</td>
<td>evansi Wirth and Blanton; Honduras, Costa Rica, Panama&lt;br&gt;triarti Fox; Guatemala to Colombia, Venezuela, Tobago, Brazil (Para)&lt;br&gt;marinkeliei Wirth and Lee; Colombia&lt;br&gt;mirsa Ortiz; Panama, Venezuela, Trinidad (NR)&lt;br&gt;ronderosae Spinelli and Borkent; Costa Rica</td>
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<td><strong>Drymodesmyia</strong> Vargas</td>
<td>jamaicensis Edwards; USA (Texas, Florida), Mexico (Yucatán), Central America and Caribbean to Colombia and Venezuela&lt;br&gt;panamensis Barbosa; Mexico (Nayarit, Veracruz, Chiapas) to Costa Rica, Jamaica</td>
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New species and list of Colombian Culicoides • Gustavo R Spinelli et al.

*Glaphiromyia* Vargas

- **pilosus** Wirth and Blanton; Costa Rica, Panama, Brazil (Para)
- **poikilonotus** Macfie; Mexico (Chiapas), Central America, Venezuela and Trinidad to Brazil (Bahia)

*Haematomyidium* Goeldi

- **scopus** Root and Hoffman; Mexico (DF), Costa Rica, Panama
- **annuliductus** Wirth; Costa Rica, Panama
- **bayano** Wirth; Costa Rica, Panama
- **darlingtoni** Wirth and Blanton; Costa Rica, Trinidad
- **dehiliipalis** Lutz; Widespread from USA (Maryland, Kentucky, Nebraska south to Louisiana and Florida), Guatemala and Belize to Argentina
- **eldridgei** Wirth and Barreto; Colombia
- **equatoriensis** Barbosa; Ecuador
- **filiductus** Wirth; Belice to Panamá (NR)
- **germanus** Macfie; Costa Rica, Guyana (NR)
- **ginesi** Ortiz; El Salvador to Panama, Colombia, Venezuela, Trinidad, Brazil (Para), northeastern Argentina
- **glabrior** Macfie; Honduras to Ecuador, Guyana, Surinam, Trinidad, Brazil (Para)
- **imitator** Ortiz; Guatamala to Panama, Venezuela
- **insinuatus** Ortiz and León; Colombia, Ecuador, Peru, Trinidad, Guyana, Brazil (Amazonas, Para, Sao Paulo)
- **limonensis** Ortiz and León; Ecuador, Venezuela, Brazil (Para, Sao Paulo, Santa Catarina)
- **neoparaensis** Tavares and Souza; Ecuador, Brazil (Amazonas, Rio de Janeiro, Santa Catarina)
- **paraensis** (Goeldi); USA (Colorado, Nebraska, Pennsylvania, Wisconsin to Louisiana and Florida) to Argentina
- **quasiparaensis** Clastrier; Honduras and El Salvador to Colombia, Peru, French Guiana, Brazil (Amazonas, Rondonia)
- **spurius** Wirth and Blanton; Costa Rica, Panama
- **youngi** Wirth and Barreto; Colombia

*Hoffmania* Fox

- **aitkeni** Wirth and Blanton; Trinidad, Brazil (Amazonas)
- **annettae** Spinelii and Borkent; Costa Rica
- **antiquiensis** Spinelli; Colombia (NR)
- **batesi** Wirth and Blanton; Guatemala, Colombia, Ecuador, Bolivia, Brazil (Para)
- **bimaculatus** Floch and Abonnenc; Colombia, Brazil (Para), French Guiana
- **brownii** Spinelli; Colombia
- **coutinhoi** Barreto; French Guiana, Brazil (Amazonas, Para, Sao Paulo) (NR)
- **davidi** Spinelli; Costa Rica, Colombia, Trinidad
- **diabolicus** Hoffman; Mexico to Venezuela and Ecuador
- **fernandoi** Tavares and Souza; Colombia, Brazil (Espiritu Santo, Rio de Janeiro, Santa Catarina), Northeastern Argentina, Uruguay
- **filarifer** Hoffman; Mexico (Veracruz, Chiapas) to Northern Brazil
- **foxi** Ortiz; Mexico (Chiapas) to Bolivia, Puerto Rico to Northeastern Argentina
- **franklini** Spinelli; Mexico (Guerrero) to Bolivia, Brazil (Para)
- **fusipalpis** Wirth and Blanton; El Salvador to Ecuador, Bolivia, French Guiana, Guyana, Brazil (Amazonas, Para, Bahia, Rio de Janeiro)
- **heliconiae** Fox and Hoffman; Belize to Ecuador, Venezuela, Grenada, Trinidad and Tobago
- **hylas** Macfie; Mexico (Veracruz) to Peru, Brazil (Amazonas)
- **ignacioid** Forattini; Colombia, Brazil (Minas Gerais, Sao Paulo, Rio de Janeiro), Paraguay
- **insignis** Lutz; USA (Alabama, Georgia, Florida), Mexico (Yucatan, Chiapas), Central America and Caribbean to central Argentina
- **lutzi** Costa Lima; Colombia to French Guiana, northeastern Argentina, Brazil (Roraima, Amazonas, Para, Mato Grosso, Goias, Sao Paulo, Rio de Janeiro, Santa Catarina)
- **maruim** Lutz; Venezuela to French Guiana, Trinidad, coastal Brazil
- **ocumarensis** Ortiz; Mexico (Oaxaca, Tabasco) to northern Brazil (Para, Rondonia)
- **palpalis** Macfie; Mexico (Chiapas) to Peru, Brazil (Amazonas)
- **paraignacioi** Spinelli; Belize to Colombia, French Guiana, Brazil (Amazonas, Para)
- **plaumani** Spinelli; Colombia, Bolivia, Brazil (Amazonas), northeastern Argentina (NR)
- **polypori** Wirth and Blanton; Costa Rica to Colombia, Brazil (Amazonas)
- **pseudodiabolicus** Fox; Mexico (Puente Nacional) to Peru and Northern Brazil
- **ruizi** Forattini; Colombia, Brazil (Amazonas, Goias)
- **tidwelli** Spinelli; Honduras to Colombia, Ecuador
- **travassosi** Forattini; Surinam, Brazil (Amazonas, Para, Mato Grosso)
trinidadensis Hoffman; Coastal; Honduras and El Salvador to Colombia, Ecuador to Surinam, Cuba and Cayman Islands to Trinidad
verecundus Macfie; Mexico (Chiapas) to Ecuador
xanifer Wirth and Blanton; Honduras to Panama

Macfiella Fox

phlebotomus (Williston); Coastal; Mexico (Sinaloa) to Ecuador, Jamaica to Brazil (Maranhao, Ceara, Pernambuco, Goias)

willistoni Wirth and Blanton; Mexico (Sonora), Honduras, Panama

Mataemyia Vargas

avilaensis Ortiz and Mirsa; Venezuela
azureus Wirth and Blanton; Panama
bricenoi Ortiz; Ecuador, Venezuela, Bolivia, Brazil (Amazonas, Para)
dallesiandroi Wirth and Barreto; Costa Rica, Panama, Colombia
davies Wirth and Blanton; Peru, Guyana
dicrourus Wirth and Blanton; Costa Rica to Ecuador
discrepans Ortiz and Mirsa; Venezuela
mojingaensis Wirth and Blanton; Panama
volcanensis Wirth and Blanton; Panama, Colombia

Oecacta Poey

alahialinus Barbosa; Costa Rica, Panama, Colombia, Ecuador

barbosai Wirth and Blanton; USA (Florida) to Ecuador
cancer Hogue and Wirth; Mexico (Sinaloa), El Salvador, Costa Rica
furens (Poey); USA (Massachusetts to Florida and Texas), Mexico (Campeche, Santiago, Sinaloa, Yucatan, Veracruz) and Caribbean to Ecuador and coastal Brazil
gorgasi Wirth and Blanton; Costa Rica to Colombia

Psychophaena Philippi

dahualensis Ortiz and Mirsa; Costa Rica to Chile and Central Argentina

Subgenus unplaced

acotylus group

acotylus Lutz; Mexico (DF), Honduras, Panama, Venezuela, Trinidad, Surinam, Brazil (Mato Grosso, Para)
carsiometas Wirth and Blanton; Panam, Colombia, Brazil (Para)
tereitpalpis Wirth and Barreto; Colombia
carpenteri group

belemensis Wirth and Blanton; Colombia, Brazil (Amazonas, Para)
campesi Ortiz and Leon; Costa Rica, Panama, Colombia, Ecuador
carpenteri Wirth and Blanton; Costa Rica, Panama, Ecuador, Bolivia, Brazil (Amazonas)

daedalus group

antefurcatus Wirth and Blanton; Panama
beaveri Wirth and Barreto; Colombia
commatis Wirth and Blanton; Panama

crescentis Wirth and Blanton; Mexico (Chiapas) to Colombia, Northeastern Argentina
cummingi Spinelli and Borkent; Costa Rica

daeidaloides Wirth and Blanton; Panama, Colombia
daedalus Macfie; USA (Arizona, New Mexico), Mexico (Chiapas) to Colombia
dunni Wirth and Blanton; Costa Rica, Panama
pamposilus Macfie; USA (Arizona, New Mexico), Mexico (Chiapas, Oaxaca) to Venezuela
phaeonotus Wirth and Blanton; Panama
picadoae Spinelli and Borkent; Costa Rica

dasyophrus group

dasyophrus Macfie; Colombia, Ecuador, Venezuela, Guyana, Brazil (Amazonas, Mato Grosso, Para)
rodriguezi Ortiz; Panama, Venezuela

eublepharus group

caldasi Browne; Colombia
caucaensis Wirth and Lee; Colombia
eublepharous Macfie; Mexico (Chiapas), Costa Rica to Ecuador, Venezuela, northern Brazil
florenciae Messersmith; Colombia
micayensis Spinelli; Colombia (NR)
pabloi Browne; Colombia
propriipennis Macfie; Mexico (Chiapas) to Panama, Ecuador, Venezuela and northern Brazil
rangei Ortiz and Mirsa; Mexico (Oaxaca) to Ecuador, Bolivia, Venezuela, Trinidad, Brazil (Amazonas)
tambensis Wirth and Lee; Colombia
zumbadoi Spinelli and Borkent; Costa Rica

fluvialis group

balsapambensis Ortiz and Leon; Costa Rica to Ecuador, Brazil
New species and list of Colombian \textit{Culicoides} \quad \textbullet \quad Gustavo R Spinelli et al.

\begin{itemize}
\item castillae Fox; Guatemala to Ecuador, Venezuela, Trinidad (NR)
\item fernandezii Ortiz; Venezuela$^a$
\item fluviatis Macfie; Honduras to Colombia, Venezuela, Trinidad, Guyana, Brazil (Amazonas, Para)
\item leopoldoi Ortiz; Guatemala and Belize to Bolivia and Northeastern Argentina, Trinidad
\item lichyi Floch and Abonnenc; Venezuela$^a$
\item tetrahymris Wirth and Blanton; Honduras, Costa Rica, Panama, Ecuador, Trinidad, Surinam, northern Brazil$^a$
\item yaracuyensis Ortiz; Venezuela$^a$
\end{itemize}

leoni group\begin{itemize}
\item benarrochi Ortiz and Mirsa; Brazil (Rio de Janeiro), Venezuela, Trinidad$^a$
\item fieldi Wirth and Blanton; Honduras, Costa Rica, Panama
\item gabaldoni Ortiz; Mexico (Tabasco) to Ecuador, Venezuela, Trinidad, Brazil (Bahia), Paraguay, northeastern Argentina
\item glabellus Wirth and Blanton; Honduras to Panama$^a$
\item vernoni Wirth and Blanton; Costa Rica, Colombia, Bolivia, Brazil (Para)
\item leoni Barbosa; Ecuador (NR)
\item trifidus Spinelli and Borkent; Costa Rica$^a$
\end{itemize}

limai group\begin{itemize}
\item galindo Wirth and Blanton; Costa Rica, Panama
\item limai Barretto; El Salvador to Ecuador, Brazil (Para, Mato Grosso, Sao Paulo, Rio de Janeiro, Santa Catarina) to northeastern Argentina
\item santanderi Browne; Colombia
\item tenuilobus Wirth and Blanton; Guatemala to Panama$^a$
\item vernoni Wirth and Blanton; Costa Rica, Colombia, Bolivia, Brazil (Para)
\end{itemize}

monticola group\begin{itemize}
\item andinus Wirth and Lee; Colombia
\item magnipalpis Wirth and Blanton; Panama$^a$
\item monticola Wirth and Lee; Costa Rica to Ecuador
\end{itemize}

pachymerus group\begin{itemize}
\item almirantei Wirth and Blanton; Costa Rica, Panama$^a$
\item atelis Wirth; Panama$^a$
\item caprilesi Fox; Panama, Colombia, Venezuela, Brazil (Para, Mato Grosso) obnoxius Fox; Colombia, Venezuela
\item pachymerus Lutz; Guatemala to Colombia, Brazil (Amazonas)
\item uniradialis Wirth and Blanton; Panama, Colombia
\end{itemize}

reticulatus group\begin{itemize}
\item aureus Ortiz; Mexico (Nayarit), Panama, Bolivia, Venezuela, Paraguay, Brazil (Amazonas), northeastern Argentina$^a$
\item forattini Ortiz; Venezuela$^a$
\item guyanensis Floch and Abonnenc; Panama, Venezuela to French Guiana, Trinidad and Tobago, Brazil (Para, Pernambuco, Sao Paulo)$^a$
\item lani Ortiz; Mexico (Veracruz), Honduras, Costa Rica, Panama, Venezuela, Trinidad, Brazil (Para)$^a$
\item lyrinotatus Wirth and Blanton; Nicaragua, Panama, Brazil$^a$
\item macrostigma Wirth and Blanton; Costa Rica to Colombia
\item paucienfuscatus Barbosa; Costa Rica to Peru and Bolivia, Venezuela, Trinidad, Brazil (Amazonas, Para)
\item pifanoi Ortiz; Belize to Colombia, Venezuela, Trinidad, Brazil (Para, Bahia), Paraguay reticulatus Lutz; Honduras to Colombia, Brazil (Pernambuco, Bahia, Sao Paulo, Rio de Janeiro)
\end{itemize}

stigmalis group\begin{itemize}
\item alvarezi Ortiz; Ecuador, Venezuela$^a$
\item fluviatilis (Lutz); Colombia, Ecuador, Bolivia, Venezuela, Trinidad, Brazil (Amazonas)
\item stigmalis Wirth; Mexico (Oaxaca), Guatemala, Costa Rica, Panama$^a$
\end{itemize}

Miscellaneous unplaced species\begin{itemize}
\item arubae Fox and Hoffman; USA (Texas), Mexico (Yucatán), Aruba and Grenada, to Colombia and Venezuela
\item malarialogiensis Perruolo; Venezuela$^a$
\item pancensis Browne; Colombia
\item trilineatus Fox; Guatemala to Panama, Puerto Rico, Virgin Islands, Dominica, Barbados, Paraguay$^a$
\item unetensis Perruolo; Venezuela$^a$
\item wokei Fox; Costa Rica, Panama$^a$
\end{itemize}

\textit{a}: species not formally recorded, expected to be discovered in Colombia; \textit{b}: species recorded from Colombia, their formal record herein considered doubtful; \textit{NR}: new record for Colombia, although in some instances, the species has been previously recorded from both North and South of Colombia. Also includes the five new species herein described.
New records - Colombia, Boyacá, Otanche, Cota-
deral, 10-4-2006, Y Sosa, 1 female, biting human (INS).

*Culicoides* (Hoffmania) *plauanni* Spinelli

*C. plauanni* Spinelli, in Spinelli et al. 1993: 69 (fe-
male; Argentina); Spinelli and Wirth 1993: 35 (in list Ar-
genitana); Spinelli 1998: 325 (in list Argentina); Spinelli et al. 2005: 139 (in key Argentina); Borkent and Wirth 1997: 79 (in world catalog); Borkent and Spinelli 2000: 34 (in catalog south to the USA); Borkent and Spinelli 2007: 69 (in neotropical catalog); Felippe-Bauer et al. 2008: 36 (records Peru).

**Distribution** - Colombia, Peru, Bolivia, Brazil (Am-
zonas), Northeastern Argentina.

New records - Colombia, Meta, Villavicencio, El Buque, 
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