

NEW SPECIES OF NEOTROPICAL *CULICOIDES*
(DIPTERA: CERATOPOGONIDAE)¹

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ABSTRACT

Three new species of Neotropical biting midges are described: *Culicoides archboldi* from Dominica and Trinidad, *C. bredini* from Dominica, and *C. martinezi* from Trinidad.

In this paper we are describing three new species of *Culicoides* to make the names available for forthcoming reviews of the biting midges of the West Indies and Trinidad. We wish to thank Miss Linda Heath for making the drawings.

Antennal ratio (abbreviated AR) is the combined length of the five elongated distal flagellomeres (for convenience referred to as segments) divided by the combined length of the eight shorter preceding "segments". Palpal ratio (PR) is the length of the third palpal segment divided by its greatest breadth. Proboscis/head ratio (P/H Ratio) is the length of the proboscis measured from the distal end of the labrum-epipharynx to the anterior margin of the tormae, divided by the distance measured from the anterior margin of the tormae to the median hair socket between the eyes. Wing length is measured from the basal arculus to the wing tip; costal ratio (CR) is the length of the costa measured from the basal arculus to the tip of the second radial cell (2RC) divided by the wing length.

Culicoides archboldi Wirth and Blanton, new species

(Fig. 1)

Female. Length of wing 0.89 mm.

Head: Eyes (Fig. 1a) narrowly separated, with strong interfacetal pubescence. Antenna (Fig. 1b) with lengths of flagellar segments in proportion of 30-20-20-20-20-20-21-23-55-55-55-60-70, AR 1.70; five distal segments greatly elongated; distal sensory tufts present on segments 3, 11-14. Palpal segment (Fig. 1c) lengths in proportion of 10-40-42-14-13, PR 2.3; third segment short and moderately swollen, with an open sensory area on an irregular concavity on distal half. Proboscis moderately long, P/H Ratio 0.87; mandible with 18-20 teeth.

Thorax: Uniformly dull dark brown, without prominent pattern; scutum with numerous erect hairs. Legs brown, knee spots blackish; all tibiae with faint, narrow, basal pale bands; hind tibial comb with four spines, the one nearest the spur longest (Fig. 1f).

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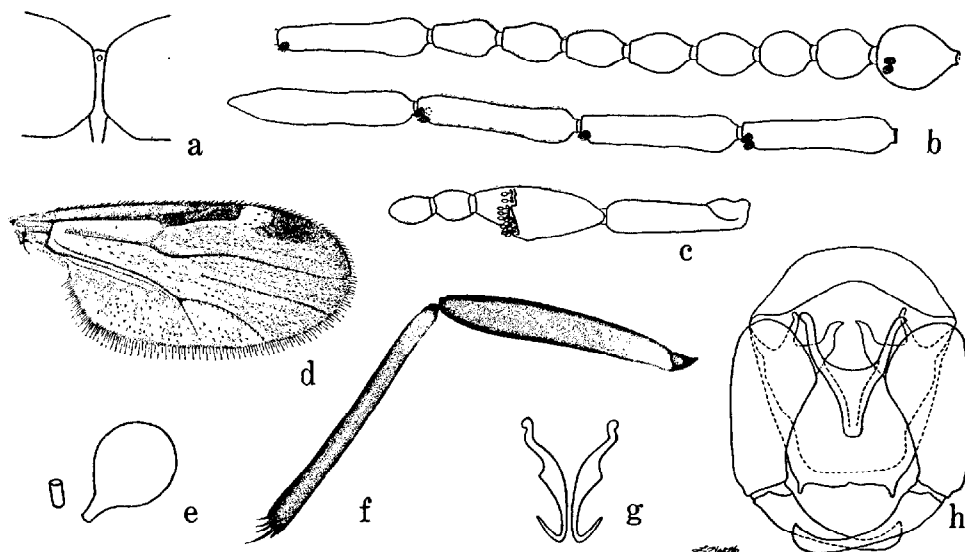


Fig. 1. *Culicoides archboldi*: a, female eye separation; b, female antenna; c, female palpus; d, female wing; e, female spermatheca; f, female hind femur and tibia; g, male parameres; h, male genitalia, parameres removed.

Wing (Fig. 1d): Pattern as figured; dark brown without prominent pattern; radial cells, margins of veins, and an indistinct area midway on anterior margin of cell R5 darker brown; a small pale spot present at anterior margin of cell R5 just past tip of costa. CR 0.74; 2RC with moderately broad lumen; macrotrichia long and coarse, relatively sparse but covering most of wing except in radial field. Halter brownish.

Abdomen: Dark brown. Spermatheca (Fig. 1e) single, short, oval with a long slender neck; measuring 0.053 by 0.035 mm; a sclerotized ring present.

Male.—Similar to the female with the usual sexual differences; antenna with short, sparse plume, last three segments with lengths in proportion of 60-64-66, distal sensory tufts present on 3, 11-14. Genitalia (Fig. 1h): ninth sternite with shallow caudomedian excavation, the ventral membrane not spiculate; ninth tergite short and tapering, with small, slender apicolateral processes, the caudal margin between them nearly straight. Basistyle with ventral root foot-shaped but the posterior heel not well developed, ventral root slender; dististyle slender and curved to bent pointed tip. Aedeagus with basal arch extending to about half of total length, basal arms curved; distal portion tapering to rather stout, rounded, simple tip. Parameres (Fig. 1g) each with small basal knob, proximal portion slender, with distinct dorsal swelling at midlength, without ventral lobe; proximal portion slender and bent ventrocephalad, tapering to blunt-pointed tip.

Distribution.—Dominica, Trinidad.

Types.—Holotype female, allotype male, Clarke Hall, Dominica, 21-29 April 1964, O. S. Flint, light trap (Type no. 70640, USNM). Paratypes, 83 males, 216 females, as follows:

DOMINICA: Clarke Hall, April-May 1964, O. S. Flint, light trap, 14 males, 36 females; August 1964, T. J. Spilman, light trap, 28 males, 10 females; January-March 1965, W. W. Wirth, light trap, 1 male, 13 females; 21 January 1965, W. W. Wirth, Malaise trap, 1 male; 30 March 1966, R. J. Gagné, at light, 1 female. Cabrit Swamp, 23 February 1965, W. W. Wirth, at light, 2 males, 6 females. d'Leau Gommier, 17 March 1956, J. F. G. Clarke, at light, 24 males, 95 females. Fond Figures River, 20 January, 9 February 1965, W. W. Wirth, light trap, 5 males, 7 females. Grand Bay, 13 March 1964, D. F. Bray, at light, 3 females. La Plaine, 17 February 1964, D. F. Bray, at light, 1 female. Layou River mouth, 14 January 1965, W. W. Wirth, light trap, 5 females. Macoucheri, river mouth, 14 January 1965, W. W. Wirth, 10 females. Manets Gutter, 5 March 1965, W. W. Wirth, light trap, 1 male. Pont Casse, May-June 1964, O. S. Flint, at light, 5 males, 20 females; January 1965, W. W. Wirth 2 males, 20 females. South Chiltern Estate, 20 February 1965, W. W. Wirth, light trap, 1 female.

TRINIDAD: No locality, 10, 17 September 1963, R. W. Williams, reared from cocoa pods (nos. 33, 45), 2 females.

Discussion.—This species is dedicated to Mr. John Archbold, in appreciation of his support of the Biological Survey of Dominica and his keen interest in the scientific exploration of the island.

Among the Neotropical species *Culicoides archboldi* is probably most closely related to *C. eublepharus* Macfie. Points of similarity include the narrowly separated hairy eyes; long distal antennal segments and sensorial pattern 3, 11-14; single spermatheca, and the general structure of the male genitalia, especially the shapes of the parameres *C. eublepharus*, however (redescribed by Wirth and Blanton, 1959, Proc. U. S. Nat. Mus. 109: 424 under the name *C. transferrans* Ortiz), has a distinct wing pattern and a definite, round, palpal pit.

Culicoides bredini Wirth and Blanton, new species

(Fig. 2)

Female.—Length of wing 1.00 mm. Head: Eyes (Fig. 2a) contiguous, bare. Antenna (Fig. 2c) with lengths of flagellar segments in proportion of 28-20-20-20-20-20-21-22-47-50-52-52-73, AR 1.60; five distal segments elongated; distal sensory tufts present on segments 3, 5, 7, 11-15. Palpal segments (Fig. 2b) with lengths in proportion of 12-40-40-12-12, PR 1.8; third segment broad, with a round, shallow, sensory pit. Proboscis moderately long, P/H Ratio 0.80; mandible with 12 minute teeth.

Thorax: golden brown above on scutum and scutellum; humeri and lower pleuron dark brown. Legs dark brown; knees with prominent broad pale area covering apices of femora and bases of tibiae on all legs, knee spot blackish on foreleg only; tip of hind tibia narrowly pale; hind tibial comb with four spines, the one nearest the spur longest (Fig. 2f).

Wing (Fig. 2d): Pattern as figured; membrane dark gray due to coarse dark microtrichia; prominent, discrete, small white spots. Pale spot over r-m crossvein extending to costal margin; two poststigmatic pale spots in cell R5 small, round and separate, the hind one lying slightly proximad of the other; distal pale spot in cell R5 small and round, lying near apex of

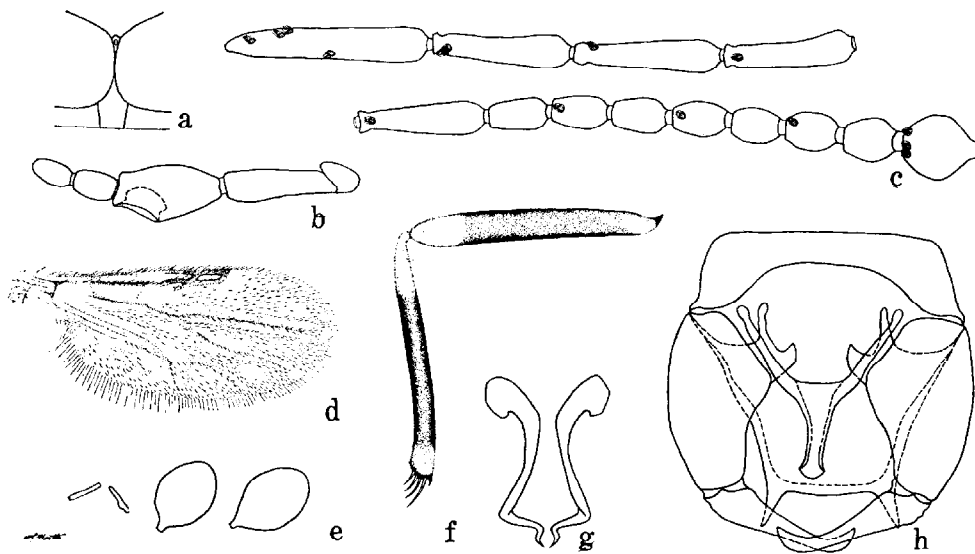


Fig. 2. *Culicoides bredini*: a, female eye separation; b, female palpus; c, female antenna; d, female wing; e, female spermathecae; f, female hind femur and tibia; g, male parameres; h, male genitalia, parameres removed.

cell but well removed from margin; cell M1 with two pale spots, the proximal one broadly extending over base of vein M2 into cell M2; the latter with pale spot lying behind medial fork, another in front of mediocubital fork, and a small round pale spot near wing margin; cell M4 with a large pale spot in distal portion; anal cell with a double (sometimes divided) pale spot in distal portion; apices of veins M1 and M2 with a pale spot at wing margin. CR 0.62; 2RC with broad lumen; macrotrichia long and coarse, moderately sparse, a few extending to base of wing except in radial field. Halter yellowish, base of knob slightly infuscated.

Abdomen: Dark brown. Spermathecae (Fig. 2e) two plus a rudimentary third and a long slender sclerotized ring; the functional ones oval with short necks, subequal, each measuring 0.065 by 0.043 mm.

Male.—Similar to the female with the usual sexual differences; antenna with well developed plume; segments 4-12 fused; last three segments with lengths in proportion of 75-60-75, distal sensory tufts present on 3, 13-15. Genitalia (Fig. 2h): ninth sternite with broad, shallow, caudomedian excavation, the ventral membrane not spiculate; ninth tergite short and tapering, with long, slender, pointed, apicolateral processes, the caudal margin between them straight. Basistyle moderately stout, with short, broad, ventral root and slender dorsal root; dististyle slender and nearly straight, with bent, pointed tip. Aedeagus with basal arch extending to about half total length, the basal arms slender and slightly curved; distal portion slender, with slightly flaring, rounded, simple tip. Parameres (Fig. 2g) each with well developed, lobate, laterally directed basal knob; main portion slender, curved, without ventral lobe, abruptly bent twice near apex and tapering to slender, pointed tip without fringing spines.

Distribution.—Dominica.

Types.—Holotype female, Clarke Hall, Dominica, 28 March 1965, W. W.

Wirth, light trap (Type no. 70641, USNM). Allotype male, same data but collected 2 February 1965. Paratypes, 44 males, 114 females, as follows:

DOMINICA: Antrim Estate, 1000 ft., 15 March 1956, J. F. G. Clarke, 1 female. Cabrit Swamp, 23 February 1965, W. W. Wirth, light trap, 2 males. Clarke Hall, May-June 1964, O. S. Flint, light trap, 3 males, 4 females; July-September 1964, T. J. Spilman, light trap, 7 males, 40 females; October 1964, P. J. Spangler, at light, 1 male; January-March 1965, W. W. Wirth, light trap, 17 males, 33 females. d'Leau Gommier, 17 March 1956, J. F. G. Clarke, at light, 5 males, 11 females. Fond Figues River, 13 March 1965, W. W. Wirth, light trap, 2 females. Macoucheri, 5 March 1965, W. W. Wirth, at light, 2 females. Manets Gutter, 15 March 1965, W. W. Wirth, light trap, 1 male, 4 females. Pont Casse, May-June 1964, O. S. Flint, at light, 6 males, 7 females. South Chiltern Estate, 10 February 1965, W. W. Wirth, light trap, 2 males, 10 females.

Discussion.—This species is named for Mr. J. Bruce Bredin in appreciation of his interest in and support of the Biological Survey of Dominica.

Culicoides bredini has a wing pattern very similar to that of *C. daedaloides* Wirth and Blanton from Panama. In that species, however, the distal pale spot in cell R5 is transverse and meets the anterior wing margin, there is no pale spot lying in front of the mediocubital fork, and the distal pale spot in cell M2 meets the wing margin; the antennal sensorial pattern is 3, 8-10; the scutum bears a prominent pattern of pale patches, and the male parameres are shaped differently.

Culicoides martinezi Wirth and Blanton, new species

(Fig. 3)

Female.—Length of wing 0.81 mm. Head: Eyes (Fig. 3a) broadly separated, bare. Antenna (Fig. 3b) with lengths of flagellar segments in proportion of 24-18-18-20-20-20-20-20-26-28-33-33-50, AR 1.06; distal sen-

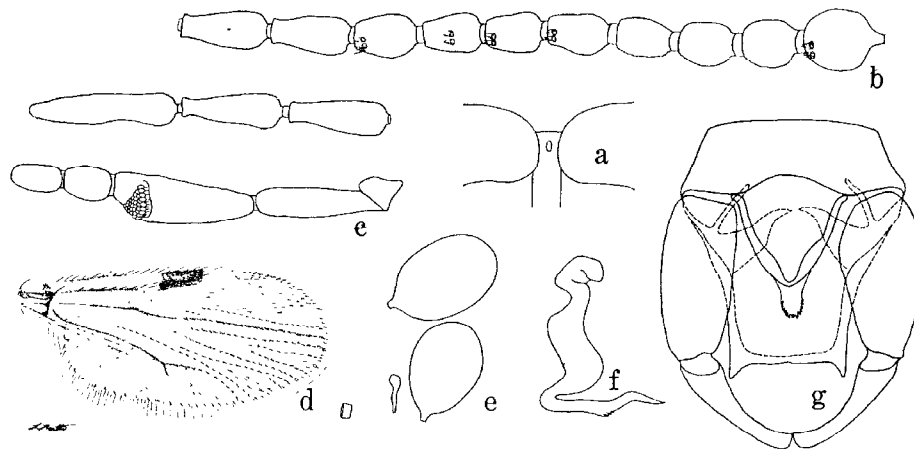


Fig. 3. *Culicoides martinezi*: a, female eye separation; b, female antenna; c, female palpus; d, female wing; e, female spermathecae; f, male parameres; g, male genitalia, parameres removed.

sory tufts present on segments 3, 7-10. Palpal segments (Fig. 3c) with lengths in proportion of 13-36-46-15-18, PR 2.9; third segment slightly swollen, with a shallow round sensory pit. Proboscis moderately long, P/H Ratio 0.97; mandible with 15 teeth.

Thorax: brownish; scutum pruinose grayish brown, with prominent pattern of tiny dark brown punctiform dots at the seta bases. Legs brown, knee spots blackish; fore femur with narrow subapical pale ring; all tibiae with narrow sub-basal pale rings and hind tibia pale on distal fourth; hind tibial comb with 5 spines, the second from the spur longest (Fig. 3f).

Wing (Fig. 3d): pattern as figured; second radial cell included in a very dark spot to its apex; a very small pale spot lying over r-m crossvein, broadly expanded anteriorly across radius to costa; cell R5 with seven small, usually round, pale spots, one lying at extreme base of cell, three arranged in a triangle with apex at wing margin just past end of costa, and three more arranged in a similar triangle in distal portion of cell; cell M1 with three pale spots, the proximal one lying against vein M2 and separated by only a narrow dark line along vein from a smaller pale spot lying at same level in cell M2; cell M2 with an undulating chain of four small pale spots in basal half, and a small round pale spot lying near wing margin; cell M4 with a small round pale spot in midportion; anal cell with two round pale spots in distal portion; apices of veins M1, M2, M3+4 and Cul dark. CR 0.54; macrotrichia moderately numerous on distal half of wing and a few in anal cell. Halter brownish.

Abdomen: dark brown. Spermathecae (Fig. 3e) two plus a rudimentary third and a sclerotized ring; oval with long slender necks, subequal, each measuring 0.065 by 0.033 mm.

Male. Similar to the female with the usual sexual differences; antennal plume well developed. Genitalia (Fig. 3h): ninth sternite with shallow caudomedian excavation, the ventral membrane not spiculate; ninth tergite moderately short, tapering to short, slender, pointed, apicolateral processes, the caudal margin between them not indented. Basistyle with foot-shaped ventral root, dorsal root slender and longer; dististyle slender, gently curving to bent pointed tip. Aedeagus with basal arch as broad as high, extending to 0.75 of total length, distal portion with moderately slender, rounded, spiculate tip. Parameres (Fig. 3g) each with strong basal knob, moderately stout and sinuate in midportion, expanded ventrally in midportion in a broad ventral lobe, distal portion moderately slender, tapering to sharp tip, with lateral fringing barbs well developed.

Distribution. Trinidad.

Types. Holotype female, Macqueripe, Trinidad, 11 January 1956, T. H. G. Aitken light trap (Type no. 70638, USNM). Allotype male, U. S. Naval Station, Trinidad, 9 November 1955, T. H. G. Aitken, light trap. Paratypes, 11 males, 10 females, as follows: -

TRINIDAD: Chaguaramas Naval Station, 21 January 1957, T. H. G. Aitken, light trap, 1 female. Las Cuevas Bay, 19 November 1968, P. Bacon, reared from sand beach, 2 males. Port Delgado Naval Station, 20 October 1955, T. H. G. Aitken, light trap, 6 males, 1 female. Port of Spain, June 1953, 25th Med. Det., light trap, 1 female. U. S. Naval Base, 3 November 1955, T. H. G. Aitken, light trap, 2 males, 6 females. U. S. Navy 83d area, 30 January 1956, T. H. G. Aitken, light trap, 1 female.

Discussion. *Culicoides venezuelensis* Ortiz, a widespread Neotropical species ranging from Costa Rica to Brazil and Chile, is very closely related to *C. martinezi*, with very similar wing and scutal patterns. *C. venezuelensis* is a much larger species (wing 1.37 mm long), the apices of veins M1, M2, M3+4 and Cul have a pale spot at wing margin, the two proximal pale spots in the distal triangle of cell R5 are fused in a double spot, the eyes are narrowly separated, antennal segments 11-15 bear sensory tufts, and the palpal pit is much deeper.

We are pleased to name this species for Mr. Raymond Martinez of the Trinidad Virus Research Laboratory of the Rockefeller Foundation, who has collected much of the Trinidad material studied by Dr. Aitken and ourselves.

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