

## A NEW *CULICOIDES* OF THE *STIGMALIS* GROUP (DIPTERA: CERATOPOGONIDAE)

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Notes are presented on the three known Neotropical species of the *Culicoides stigmalis* group of bloodsucking midges: *alvarezii* Ortiz, *fluviatilis* (Lutz), *stigmalis* Wirth, and on *deanei* n. sp., which is described from the state of Rio de Janeiro, Brazil. A diagnosis is given for the group, as well as a key for identification and comparative photographs of the female wings.

Key words: Neotropical bloodsucking midges – *Culicoides stigmalis* group – *C. deanei* n. sp.

The discovery of a new and unusual species of *Culicoides* from southern Brazil allied to *C. fluviatilis* (Lutz) prompts us to re-examine the taxonomic status of the related species, and to offer some notes and a key for their separation.

The earliest known species belonging to this group was described from the Rio Negro, Brazil, by Lutz (1914) as *Johannseniella fluviatilis*. Dunn (1934) recorded *Culicoides fluviatilis* (Lutz) from Panama, but although he established the correct generic combination, the species he was dealing with was probably the one described later by Wirth (1952) as *Culicoides stigmalis*. When Lane (1945) examined Lutz' types in the collection of the Instituto Oswaldo Cruz he placed *fluviatilis* in the genus *Lasiohelea* Kieffer, now regarded as a subgenus of *Forcipomyia* Meigen. Fox (1946) incorrectly placed *fluviatilis* in the genus *Serromyia* Meigen, under which genus *Johannseniella* had been placed in synonymy. Forattini (1957) omitted *fluviatilis* from his monograph of the Neotropical *Culicoides*, but treated the species under the name *pachymerus* Lutz, based on the examination of slides from Lutz' collection mislabelled as *pachymerus*. Forattini also incorrectly synonymized *Culicoides scorzai* Ortiz (1956) from Venezuela under *pachymerus*. It was not until 1958 that Ortiz gave *fluviatilis* careful study, reviewing its shifting status, and correcting Forattini's identification and synonymy.

Ortiz (1958) grouped the Neotropical species of *Culicoides* with elongated 2nd radial cell and gave a key for their separation, including 5 rather diverse species. We find that 3 of these, *fluviatilis* (Lutz), *stigmalis* Wirth, and *alvarezii* Ortiz (1957), form a compact group charac-

terized by similarities in wing pattern, arrangement of antennal sensilla, spermathecae, general habitus and coloration. The earliest name given to a group containing these species was the *stigmalis* Group proposed by Wirth & Blanton (1959), and continued by Aitken et al. (1975) and Wirth & Blanton (1973). The group is characterized as follows:

The *stigmalis* Group: Moderately large species with pollinose, blackish scutum and usually bare, very poorly marked wing; 2nd radial cell long and narrow, forming a blackish stigma; antenna with sensillar pattern 3,8-10; 4 tibial spines; 2 spermathecae; male genitalia with ventral root of basistyle foot-shaped; apicolateral processes short; aedeagus with high, rounded basal arch and broad apex; paramere with simple basal knob, stem straight or curving without ventral lobe, the apex fringed.

*Included Species:*

- alvarezii* Ortiz, 1957: 161. Venezuela.
- fluviatilis* (Lutz), 1914: 82 (*Johannseniella*). Brazil. Synonym: *scorzai* Ortiz, 1956: 93. Venezuela.
- stigmalis* Wirth, 1952: 245. Guatemala.
- deanei* Felipe-Bauer & Wirth, new species. Brazil.

Key to Species of *Culicoides stigmalis* Group

1. Wing (Figs. 2-4) with veins bordering 2nd radial cell blackish, forming a prominent stigma, pale spots over r-m crossvein and at end of costa prominent; palpus brown . . . . . 2
- Wing (Fig. 1) nearly unicolorous, without prominent black stigma, veins bordering 2nd radial cell only slightly darkened; pale

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- spots over r-m crossvein and at end of costa not prominent; palpus yellowish . . . . . *alvarezi* Ortiz
- 2. Wing membrane without macrotrichia (Figs. 3-4); costa shorter, costal ratio 0.61-0.64; antennal ratio 0.90-1.00; smaller species, wing length 0.90-0.95mm . . . . . 3
- Wing membrane with evenly scattered, small but distinct, spinelike macrotrichia (Fig. 2), costa longer, costal ratio 0.70; antennal ratio 0.80; larger species, wing length 1.12mm . . . *fluviatilis* (Lutz)
- 3. Wing with broad pale area at proximal portions of medial and anal cells and a pale band extending pale spot over r-m crossvein to posterior wing margin at tip of anal cell (Fig. 3); sensilla coeloconica often present on antennal segment 7, as well as on 3,8-10; eyes hairy; male 9th tergum with distinct caudomedian notch and longer, tapering apicolateral processes (Fig. 10) . . . . . *deanei* n.sp.
- Wing without posterior pale areas at base of wing

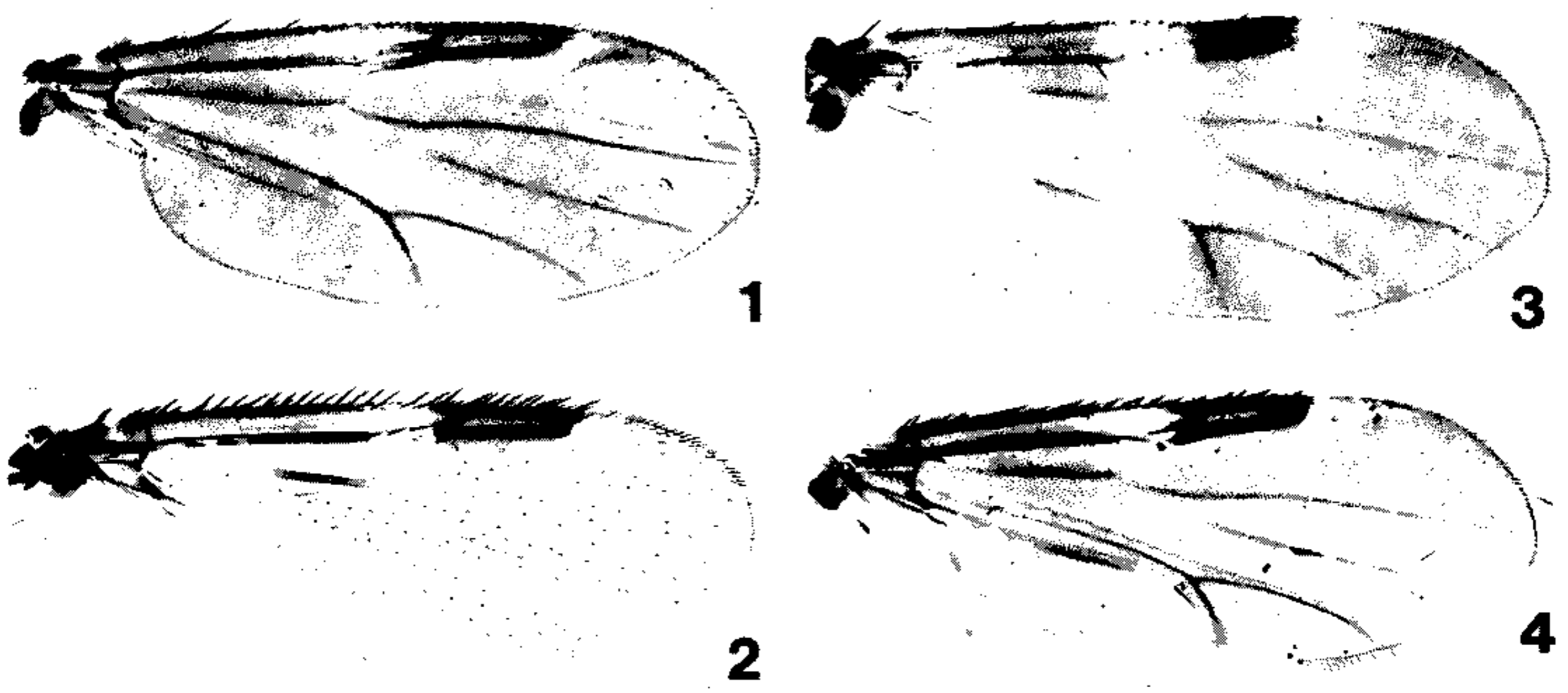
and across tip of anal cell (Fig. 4); antennal sensory pattern always 3,8-10; eyes bare; male 9th tergum with straight caudal margin and short, slender, apicolateral processes . . . . . *stigmalis* Wirth

*Culicoides deanei* Felipe-Bauer and Wirth, new species. (Figs. 1-16)

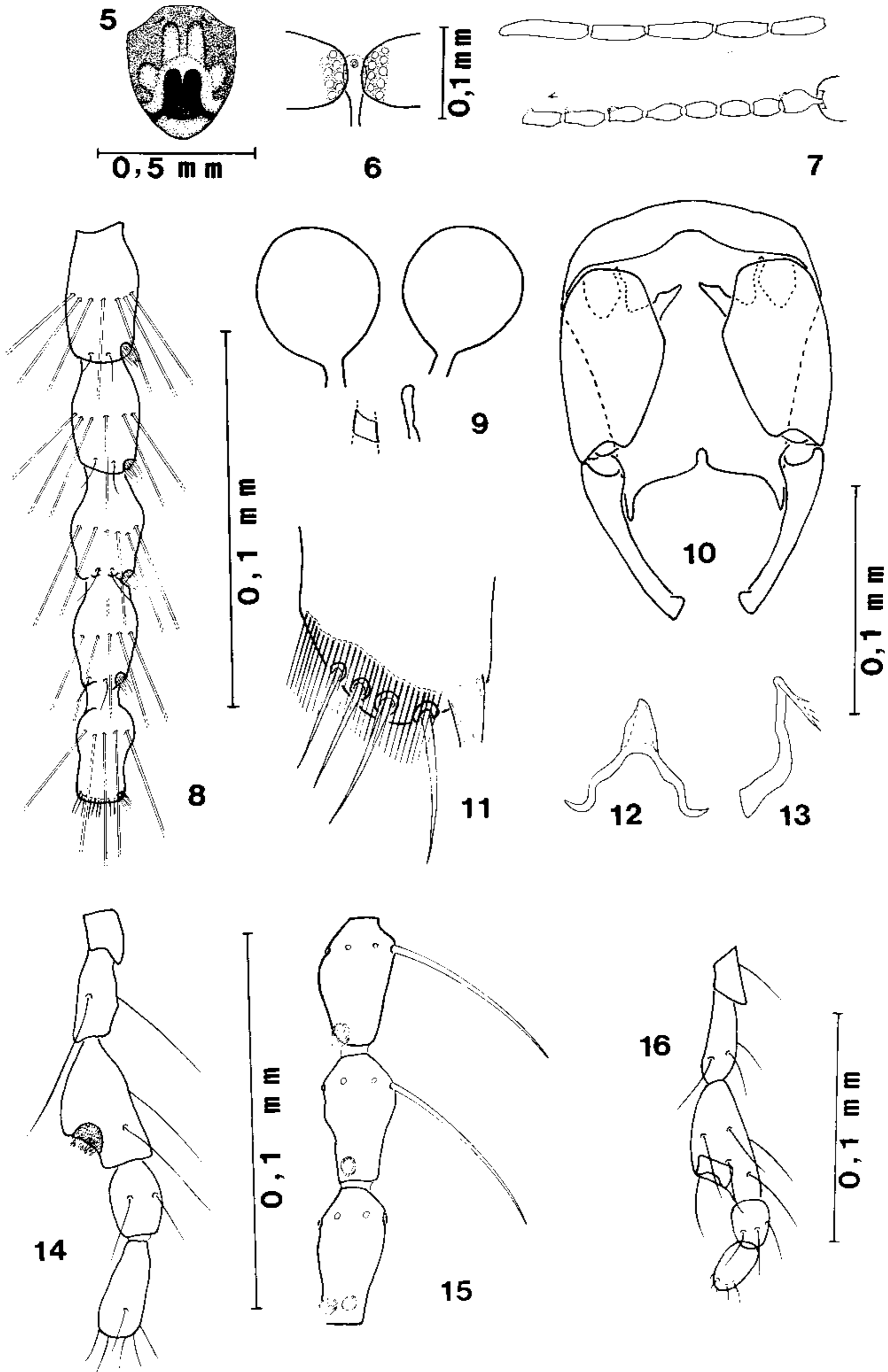
*Type locality* – Jacarepaguá, Rio de Janeiro, Brazil.

*Female:* Wing length 0.93 (0.90-0.95, n=9) mm; breadth 0.38 (0.35-0.41, n=9) mm.

*Head:* Dark brown. Eyes (Fig. 6) narrowly separated by the width of 1 ommatidial facet, with long interfacetal hairs. Antenna (Fig. 7, 15) with lengths of flagellar segments in proportion of 18-13-14-15-16-16-17-18-21-21-25-25-34; antennal ratio 1.00 (0.92-1.12, n=12); sensilla coeloconica present on 3,7-10 or as often on 3,8-10, single on 7-9, double on 3,10 or as often 3,8-10. Palpus (Fig. 16) with lengths of segments in proportion of 9-17-21-8-13; third segment swollen distally, with a large, moderately deep, round sensory pit; palpal ratio 2.0 (1.9-2.2, n=13). Proboscis short, P/H ratio 0.59 (0.54-0.66, n=13); mandible with 15 teeth.



Photographs of wings of female *Culicoides* of the *stigmalis* group. Fig. 1: *alvarezi*. Fig. 2: *fluviatilis*. Fig. 3: *deanei*. Fig. 4: *stigmalis*.



*Culicoides deanei* n.sp. Fig. 5: scutal pattern. Fig. 6: eye separation. Fig. 7: ♀ antenna. Fig. 8: ♂ antenna, segments 8-12. Fig. 9: spermathecae. Fig. 10: ♂ genitalia, aedeagus and parameres removed. Fig. 11: hind tibial comb. Fig. 12: aedeagus. Fig. 13: parameres. Fig. 14: ♂ palpus. Fig. 15: ♀ antenna, segments 8-10. Fig. 16: ♀ palpus.



TABLE I

Mean values of numerical characters of females of the *Culicoides stigmalis* Group

Species	Wing Length (mm)	Costal Ratio	Antennal Ratio	Antennal Sensory Pattern	Palpal Ratio	P/H Ratio
<i>alvarezi</i>	1,07	0,71	0,81	3,8 - 10	2,3	0,57
<i>deanei</i>	0,93	0,61	1,00	3,(7) 8 - 10	2,0	0,59
<i>fluviatilis</i>	1,12	0,70	0,80	3,8 - 10	2,4	0,60
<i>stigmalis</i>	0,90	0,64	0,90	3,8 - 10	2,2	0,62

**Thorax:** Dark brown; scutum (Fig. 5) without prominent pattern, but with a submedian anterior and a pair of lateral pale spots. Legs brown, femora and tibiae unicolorous dark brown, tarsi paler; hind tibial comb (Fig. 11) with 4 spines, the 2 nearest the spur longest, subequal. Wing (Fig. 3) with pattern as figured; second radial cell blackish, very long, about 3 times as long as broad, forming an elongate stigma; only 3 pale areas, 1st at base of wing extending from base of broadly from vein M1+2 to posterior wing margin, 2nd lying over r-m crossvein and extending as a pale band across tip of anal cell to wing margin, and the 3rd a small poststigmatic pale spot just past end of costa; veins in radial field dark brown, posterior veins slightly infuscated; macrotrichia absent; costal ratio 0.61 (0.59-0.64, n = 12). Halter pale, base of the knob pale brown.

**Abdomen:** Dark brown. Spermathecae (Fig. 9) 2 plus rudimentary 3rd and sclerotized ring; subspherical with short well-sclerotized necks; slightly unequal, measuring 0.039 by 0.033 mm and 0.037 by 0.031 mm, plus necks 0.005 mm long.

**Male:** Wing length 0.93 mm; breadth 0.38 mm; costal ratio 0.62. Similar to female with usual sexual differences; antenna (Fig. 8) with sensory tuft present on segments 3,8-12, single; last 3 segments with lengths in proportion 41-36-38. Palpus as in Fig. 9. Genitalia (Fig. 10): Ninth sternum narrow with small, moderately deep caudomedian excavation, ventral membrane bare; 9th tergum broad, about as long as basal breadth, tapering slightly to widely spaced, moderately long, tapered, pointed, apicolateral processes, the caudal margin between them with distinct mesal cleft. Basistyle about twice as long as basal breadth, ventral root moderately broad and only slightly foot-shaped, the "heel" poorly developed, dorsal root slender; dististyle long and slender, slightly curved, with blunt tip. Aedeagus (Fig. 12) with basal arms slender and irregularly curved, basal arch to 0.6 total length; distal process moderately broad, tapering to blunt tip. Parameres (Fig. 13) with large basal knob and stout basal third; midportion mod-

erately slender and slightly sinuate, abruptly bent ventromesad at distal third and tapering to slender, laterally fringed, bladelike tip.

#### Distribution: Brazil

**Types:** Holotype ♀, Represa dos Ciganos, Estr. Grajaú-Jacarepaguá (22°55' S 43°26' W), Rio de Janeiro, BRASIL, 20-XI-84, M.L. Felipe-Bauer col., biting man. Allotype ♂, Pau da Fome, Jacarepaguá, Rio de Janeiro, BRASIL, IX-73, Tavares & Ruiz col., light trap. Paratypes, 5 ♂♂, 16 ♀♀, as follows: 5 ♂♂, same data as allotype except XI-73, III-73 and VII-77, I-78, Tavares col.; 7 ♀♀, same data as holotype; 7 ♀♀, same data as holotype except 25-IX-84; 1 ♀, same data as allotype; 1 ♀, same data as allotype except XI-73. [Holotype (n° 137), allotype (n° 138) and part of paratypes (n° 139-151) in Instituto Oswaldo Cruz (I.O.C.), Rio de Janeiro, Brazil; 8 paratypes: 1 ♀, same data as holotype except 25-IX-84, 2 ♂♂, same data as allotype except I-78, XI-73 and 1 ♀, same data as allotype, deposited in National Museum of Natural History, Smithsonian Institution, Washington, D.C., U.S.A.; 2 ♀♀, same data as holotype, 2 ♂♂, same data as allotype except VII-77, Tavares col., 1 pair deposited in Museo de La Plata, Argentina, and the other in Dept<sup>o</sup> de Epidemiologia, Faculdade de Saúde Pública, Universidade de São Paulo, São Paulo, Brazil.]

**Material examined:** 1635 ♀♀, same data as holotype except 2,16-II-84; 13,26-III-84; 3,16-IV-84; 29-V-84; 18,26-VI-84; 10,24-VII-84; 13-VIII-84; 18,25-IX-84; 9,23-X-84; 26-XI-84; 11-XII-84; 22-I-85 and 4,28-II-85 in I.O.C. (in alcohol 70%).

**Discussion:** The species is named for Leonidas de Mello Deane in recognition of his contributions to medical entomology.

*Culicoides deanei* is the sister-species of the Central American *C. stigmalis* Wirth, replacing it in southern Brazil. The two other species of the *stigmalis* group, *fluviatilis* (Lutz) and *alvarezi* Ortiz, occur in the Amazonian area between *stigmalis* and *deanei*.

## RESUMO

Um novo *Culicoides* do grupo *stigmalis* (Diptera: Ceratopogonidae) — São apresentadas notas sobre as três espécies conhecidas de *Culicoides* neotropicais do grupo *stigmalis*: *alvarezi* Ortiz, *fluviatilis* (Lutz), *stigmalis* Wirth e sobre *deanei* sp.n., a qual é descrita para o Estado do Rio de Janeiro, Brasil. São apresentadas diagnose do grupo, chave sistemática para a identificação e fotografias das asas das fêmeas das espécies do grupo.

Palavras-chave: Maruins neotropicais — *Culicoides stigmalis* group — *C. deanei* sp.n.

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