

## TWO NEW SPECIES OF THE SPISSIPES SECTION OF *CULEX (MELANOCONION) (DIPTERA: CULICIDAE)*<sup>1</sup>

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**ABSTRACT.** *Culex (Melanoconion) akritos* and *Culex (Melanoconion) ikelos*, two new species in the Spissipes Section, are described from specimens collected in São Paulo State, Brazil. Descriptions and illustrations are provided for the adult male and female of *Culex akritos*, and for the adult male and female, larval, and pupal stages of *Culex ikelos*. Both species are distinguished from *Culex cedecei* Stone and Hair and from *Culex taeniopus* Dyar and Knab. Data on distribution and bionomics are presented.

### INTRODUCTION

During identification of *Culex (Melanoconion)* specimens collected in the Ribeira Valley and in other localities of São Paulo State, Brazil, taxonomic problems arose regarding the identification of *Culex taeniopus* Dyar and Knab. More detailed studies, including type comparison, enabled us to confirm that specimens previously identified as *Cx. taeniopus* represented two new species. The purpose of this paper is to fully describe and name these new species.

### TAXONOMIC TREATMENT

#### *Culex (Melanoconion) akritos*, new species

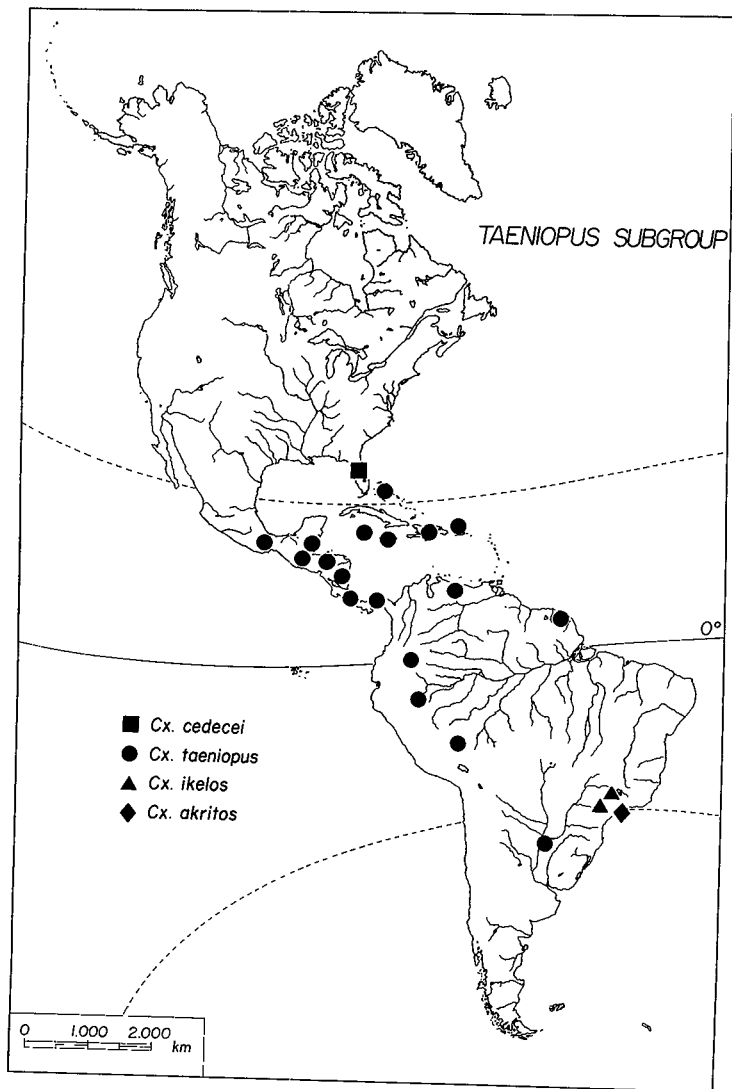
*Culex (Melanoconion) taeniopus* of Forattini et al. 1989:14; Forattini et al. 1991a:129; Forattini and Sallum 1992:72 (in part, specimens from São Paulo State, Brazil).

A medium dark brown species resembling *Culex taeniopus*, but differing in details of female and male genitalia.

**Female.** Body almost entirely covered with dark brown scales, hindtarsomeres 1-4

with basal and apical white rings, 5 entirely white. **Head:** Antenna dark, length about 2.47 mm; pedicel yellowish, light brown on inner area; flagellum normal, whorls with 6 setae. Proboscis dark-scaled; length 2.06-2.33 mm, mean 2.18 mm. Maxillary palpus entirely dark-scaled; length 0.38-0.41 mm, mean 0.40 mm, about 0.20 of proboscis. Vertex with narrow falcate scales, scales black in a small median dorsal area, becoming dingy white laterally and along margin of eyes, a small patch of broad appressed dingy white scales laterally; erect forked scales numerous, black; occiput with some whitish narrow falcate scales. **Cibarium** (Figs. 2C-F; 3): Length about 249  $\mu$ m; cibarial bar concave, dorsal surface and distal margin with small spicules; about 15-20 teeth; tooth length about 18-20  $\mu$ m; line of origin not evident; hollow area of teeth small, more or less restricted to base. Cibarial dome nearly pentagonal, concavo-convex, surface with long, triangular, pointed, posteriorly directed denticles. Six palatal setae situated on lateral edges of anterior hard palate, 3 on each side; anterior pair of palatal setae situated slightly apart from the rest, smaller in size. Sensilla trichodea arranged in linear series of 2-4 elements on each side. **Thorax** (Fig. 2A,B): Integument light brown to brownish black. Scutum with narrow falcate scales, scales

<sup>1</sup> Supported by grant No. 93/3349-9, Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP), Brazil.

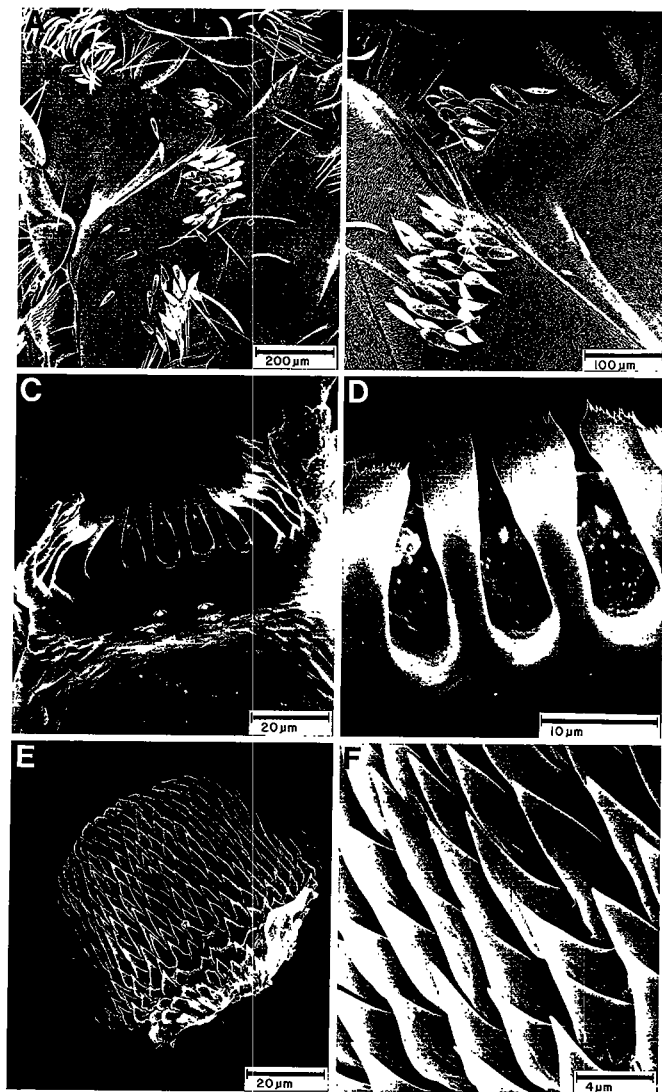


variable in color as follows: some specimens with background scales dark brown with coppery reflections and some light golden scales on supraalar and prescutellar areas; or background scales dark brown and some light golden scales on anterior promontory and/or anteriorly and/or posteriorly on scutal fossa and/or scutal angle and/or along acrostichal area and always on supraalar and prescutellar areas. Scutal setae prominent, variable in color, entirely dark-brown with reddish and golden reflections, or median anterior promontory, median scutal fossal, antealar, supraalar, and dorsocentral setae golden; acrostichal setae absent; 2 pairs of alveoli (setae missing) present on anterior portion of prescutellar area. Prescutellar area with a small triangular, central protuberance. Scutellar scales variable in color, entirely light golden or, occasionally, mixed with dark brown scales; lateral lobes each with 3,4 large setae, median lobe with 6 large setae. Anteprototum without scales, with scattered dark setae. Postprototum with narrow falcate scales, mostly dark brown and with a small patch of white, broad spatulate scales on posteroventral margin; with 4-7 dark setae on posterodorsal margin. Pleural integument light brown to brownish black, postpronotal, proepisternal, postspiracular, prespiracular, and subspiracular areas, anterior region of mesokatepisternum, posterior portion of mesepimeron, and prealar knob slightly darker; pleural setae yellowish, prealar setae and the largest upper proepisternal setae darker; 11-15 upper proepisternal, 6-9 prealar, 7,8 upper mesokatepisternal, 14-16 lower mesokatepisternal, 17-21 upper mesepimeral, and 1 lower mesepimeral. Pleura with small patch of white spatulate scales on postspiracular area and on upper corner and lower posterior margin of mesokatepisternum, occasionally with few white spatulate upper mesepimeral scales. *Wing*: Length 3.39-3.76 mm, mean 3.55 mm; cell  $R_2$ , 4.12-4.96 of vein  $R_{2+3}$ , mean 4.61; cell  $M$ , 0.83 of cell  $R_2$ ; subcosta

intersects costa slightly proximal to furcation of  $R_{2+3}$ . Dorsal scaling: appressed spatulate scales on costa, subcosta,  $R$ ,  $R_1$ ,  $R_{4+5}$ ,  $M_{1+2}$ ,  $M_{3+4}$ ,  $Cu$ ,  $Cu_1$ ,  $Cu_2$ , and 1A; linear plume scales on  $R$ ,  $R_{2+3}$ , proximally on  $R_1$ ,  $M$ , proximally on  $M_1$ ; inclined narrow spatulate scales on  $R$ , and  $R_3$ ; remigium with appressed spatulate scales and 3,4 distal setae. Ventral scaling: appressed spatulate scales on costa, subcosta,  $R$ ,  $R_{2+3}$ , proximally on  $R_1$ , proximal 0.5 of  $R_1$ ,  $M$ , proximal 0.4 of  $M_{1+2}$ ; linear plume scales on proximal 0.3 of  $R_1$ , proximal 0.4 of  $R_{4+5}$ ,  $Cu_1$ ,  $Cu_2$ , and on middle of 1A; inclined narrow spatulate scales on distal 0.7 of  $R_1$ ,  $R_2$ , distal 0.5 of  $R_3$ , distal 0.6 of  $R_{4+5}$ , distal 0.6 of  $M_{1+2}$ ,  $M_{3+4}$ , and distally on 1A;  $Cu$  and proximal 0.5 of 1A devoid of scales. *Halter*: Scabellum, pedicel, and capitellum whitish. *Legs*: Anterior surface of forecoxa with patch of dark scales and a few white scales at base; anterior surfaces of mid- and hindcoxae with vertical line of nearly colorless scales, occasionally hindcoxa with a few colorless scales at base. Antero- and posteroventral surfaces of foretrochanter with dark scales, antero- and posteroventral surfaces of mid- and hindtrochanters with whitish scales. Femora broadly covered with light cream-colored scales on ventral surface, with a few white scales at apex, more evident on hindfemur. Tibiae dark-scaled with a few whitish scales at apex on ventral surface. Fore- and midtarsomeres dark-scaled, hindtarsomeres with distinct white rings on base and apex of 1-4,5 entirely white. *Abdomen*: Tergum I with a postero-medial patch of dark scales; tergum II dark-scaled, with anteromedian and basolateral patches of whitish scales; terga III-VII dark-scaled with basolateral patches of whitish scales, occasionally becoming complete basal bands on terga III-VI; tergum VIII dark-scaled or with pale scales laterally. Sterna II-VII dark-scaled, with basolateral white patches, more evident on posterior sterna; sternum VIII without scales or with whitish

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Fig. 1. Distribution of *Culex akrotos*, *Cx. cedeccei*, *Cx. ikelos*, and *Cx. taeniopus*.



scales anteriorly and dark scales posteriorly. *Genitalia* (Fig. 3): Tergum IX narrowed in middle, with small flattened lobes bearing 11–17 slender setae. Upper vaginal lip distinct and narrow; lower vaginal lip and insula indistinct, with 8,9 clustered insular setae. Upper vaginal sclerite nearly rectangular in outline. Postgenital lobe short, trapezoidal, with 10–15 setae on either side of midline, mostly on ventral surface.

**Male.** Similar to female except for the following sexual differences. *Head:* Antenna strongly verticillate; length about 2.14 mm; maxillary palpus dark-scaled, palpomeres 4,5 with basal white patches; length not measured; palpomeres 4,5 densely setose, palpomere 3 with 14,15 strong setae on outer apical area. *Thorax:* Postspiracular area with, or without, a small patch of white, spatulate scales. *Abdomen:* Terga II–VI dark-scaled, with basal white bands and basolateral white patches (remaining terga removed with genitalia). Sterna II–VI dark-scaled, with basolateral white patches. *Genitalia* (Fig. 3): Tergum IX lobes approximated, thumblike, long, distal part wrinkled, apically rounded, interlobar area straight, setae fine and short. Gonocoxite stocky, outer margin convex, inner nearly straight; ventrolateral setae strongly developed, ventromesal surface with small setae scattered from base to level of subapical lobe, setae stronger basally, lateral surface with patch of short sparse setae (lsp) at level of subapical lobe, tergomesal surface with a small patch of short setae proximal to subapical lobe, proximal part of ventrolateral surface without scales; subapical lobe distinctly divided, divisions approximated, proximal division entire, short, stronger than distal division, forked at apex, proximal portion swollen and wrinkled on mesal side, with 2 long, robust, apically hooked setae (setae *a* and *b*) and bearing a slender, short seta, basal to setae *a* and *b*, on lateral side; seta *a* sinuous, distinctly expanded at mid-length with minute spicules on distal side of

the expanded portion and slightly striated on proximal side, seta *b* long, rodlike, nearly straight; distal division with 8 setae: a long, strong, hooked seta (*h*), a short, pointed, saberlike seta (*s*), a long, strong, saberlike seta (*s*), a long, broad at base, tapered, nearly pointed at apex, evenly tanned, foliiform seta (*l*) and 3 subequal, apically rounded, appressed setae (*f*) and a slender, flexible seta (*f*). Gonostylus slender, curved, widened distally on lateral side, bearing a wrinkled subapical crest on ventral side and a few scattered spicules on basal part of mesal side, widened part with 2 setae on mesal side; apical snout elongate; gonostylar claw short, leaflike. Phallosome with lateral plates and aedeagal sclerites equivalent in length; aedeagal sclerite broad and curved in lateral view; distal part of lateral plate with apical, ventral, and lateral processes, apical process short, broad, apical margin convex and smooth; ventral process short, blunt, and curved laterally; lateral process shorter, tapered, and pointed; base of lateral plate with stout dorsal process. Aedeagal sclerites not connected by dorsal aedeagal bridge. Proctotiger elongate; paraproct narrowed distally, expanded basally, crown with row of about 8 simple blades. Cercal sclerite long and narrow; 2 cercal setae. Tergum X large, somewhat rectangular in outline, with a rounded apical lobe.

**Diagnosis.** *Culex akritos* can be recognized by the following characters. *Adult:* Vertex mostly with narrow decumbent scales, these black in a small mid-dorsal area along coronal suture, scales becoming dingy white laterally and along ocular margin; pedicel of antenna yellowish, light brown on inner portion; scutal scales dark brown with variable patches of light golden scales; pleura with a small patch of white spatulate scales on postspiracular area and on upper corner and lower posterior margin of mesokatepisternum; capitellum whitish; all femora with a few whitish scales at apex, more evident on

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Fig. 2. *Culex (Melanoconion) akritos* female. A,B, Lateral aspect of thorax showing presence of upper mesokatepisternal and postspiracular scales; C,D, dorsal aspect of cibarial armature; E,F, cibarial dome.

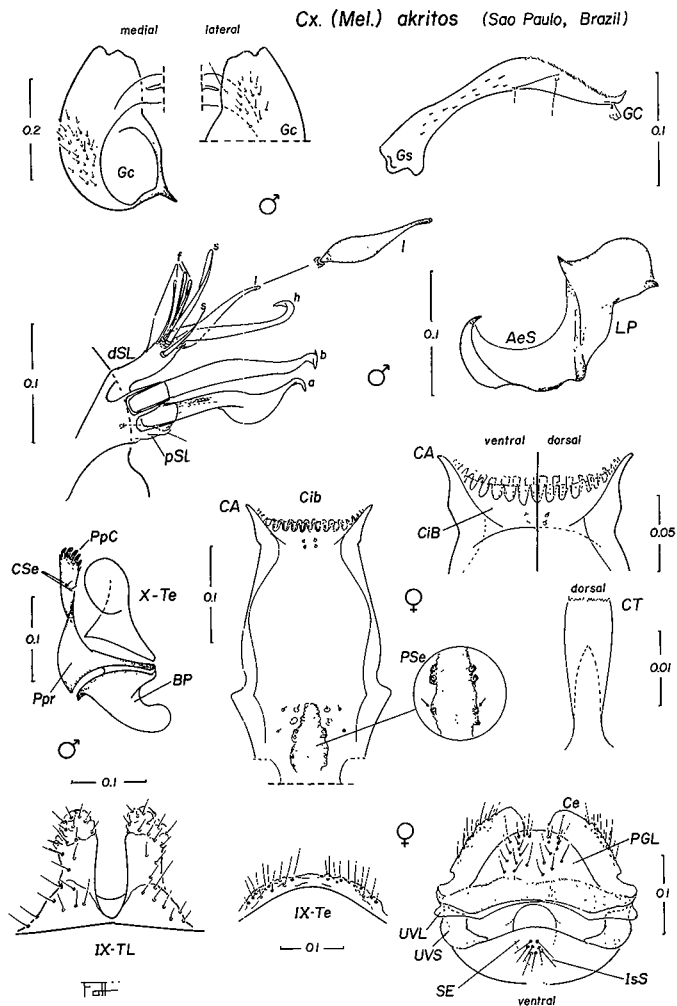


Fig. 3. *Culex (Melanoconion) akritos* female and male genitalia. AeS, aedeagal sclerite; BP, basal piece; CA, cibarial annature; Ce, cercus; CiB, cibarial bar; CSe, cercal seta; CT, cibarial tooth; dSL, distal division of subapical

hindfemur; hindtarsomeres with distinct white rings on base and apex of 1–4.5 entirely white; maxillary palpus of male with small patch of white scales at base of palpomeres 4,5. *Cibarial armature*: Cibarial teeth spatulate-shaped. 15–20; cibarial bar with scattered spicules on dorsal surface and posterior margin; 3 pairs of palatal setae, the anterior pair smaller in size, situated slightly apart from the 2 posterior pairs. *Male genitalia*: Tergum IX lobe large, thumblike, distal part wrinkled, rounded at apex, interlobar area almost straight; proximal division of subapical lobe stronger than distal division, bearing a slender seta near base of setae *a* and *b*, setae *a* and *b* strongly developed; distal division of subapical lobe long, columnar, with a narrow, evenly pigmented foliform seta (*l*), nearly triangular in outline; distal part of lateral plate with apical, lateral, and ventral processes, apical process short, broad, apical margin convex, smooth; ventral process short, blunt and curved; lateral process shorter, tapered, pointed; tergum X large, nearly rectangular, with a rounded apical lobe.

**Type data.** Holotype male, with associated genitalia on slide, bearing the following collection data: BRAZIL, São Paulo State, Pariquera-Açu County, Experimental Station, BR116 Road, 6 October 1986, coll. Forattini et al., collected with battery-powered aspirator (FSP-USP no. E-10517, slide number 6913). Paratypes: 5 males, with associated genitalia on slides; 65 females; 6 females, with associated cibaria on slides; 4 females, with associated genitalia on slide, same data as holotype, but differing as follows: collected on human bait, 19 Dec 1978, 1♀; 3 Jul 1979, 1♀; 4 Dec 1979, 3♀; 16 Jan 1980, 2♀ 1♀ cib; 17 Apr 1980, 1♀; 8 Sept 1986, 2♀; 3 Nov 1986, 7♀ 1♀G; collected in CDC light trap, 15 Oct 1979, 1♀; 4 Dec 1980, 2♀; 12 Mar 1981, 1♂ 1♂G; 7 May 1981, 3♀

1♀G; 10 Dec 1981, 3♀ 1♀G; 7 Apr 1982, 1♀; 8 Sept 1982, 1♀ 1♀G; with battery-powered aspirator, 20 Aug 1981, 2♀; 8 Oct 1986, 1♀; with manual net, 6 Oct 1986, 1♂ 1♂G; in Shannon trap supplemented with light, 19 Jul 1979, 1♀; 6, 9 Aug 1979, 2♀; 15 Oct 1979, 1♀; 8 Nov 1979, 1♀; 19 Nov 1979, 1♀; 3 Dec 1979, 1♀; 14, 17 Jan 1980, 5♀; 21 Jul 1980, 1♀ 1♀ cib; 8 Apr 1981, 1♀; 21 Jan 1980, 1♀; Pariquera-Açu County, Pariquera-Mirim, collected with manual net, 23 May 1984, 1♂ 1♂G; with battery-powered aspirator, 15 Jan 1986, 1♂ 1♂G; Cananã County, Itapoã Farm, on human bait, 28 Jan 1981, 1♀; in Shannon trap supplemented with light, 9 Feb 1981, 1♀; 6 Apr 1981, 1♀; 4 May 1981, 1♀; 1 Mar 1982, 1♀; in CDC-LT, 2 Sept 1981, 1♀; Cananã County, Itapitanguí, Vilarinho Farm, in Shannon trap supplemented with light, 6 Sept 1983, 2♀; 4 Oct 1983, 2♀; in CDC-LT, 5 Sept 1983, 1♀; 3 Oct 1983, 1♀; 6 Dec 1983, 1♂ 1♂G; Iguape County, on human bait, 18.X.1982, 1♀; 3 May 1989, 5♀; in CDC-LT, 8 Sept 1982, 1♀; 16 Nov 1982, 1♀; 9 Sept 1982, 5♀; 20 Mar 1989, 1♀; 3 May 1989, 4♀ 4♀ cib.

**Distribution** (Fig. 1). At present, *Cx. akritus* is known only from the Ribeira Valley, São Paulo State, Brazil.

**Bionomics.** Adults have been collected on human bait, from Shannon traps supplemented with light, with battery-powered aspirators, and with manual nets from human environments and in cultivated areas (Forattini et al. 1989, 1991b).

Calisher et al. (1983) isolated strains of Guama serogroup bunyaviruses and other ungrouped virus (strain 76 V-25880) from specimens that likely represented *Cx. akritus* collected from the coastal region of São Paulo State.

**Etymology.** *Culex akritus* is named for the previously misidentified specimens of *Culex*

lobe: Ge, gonocoxite; GC gonostylar claw; Gs, gonostylus; IsS, insular seta; LP, lateral plate; PGL, postgenital lobe; PpC, paraproct crown; Ppr, paraproct; PSe, palatal seta, pSL, proximal division of subapical lobe; SF, spermathecal eminence; UV1, upper vaginal lip; UV5, upper vaginal sclerite; IX-Ts, tergum IX, IX-TL, tergum IX lobe; X-Ts, tergum X. Scales in mm.

*taeniopus* from the Ribeira Valley. From the Greek adjective *akritos*, meaning "confused."

**Discussion.** *Culex akritos* belongs to a group of species that includes *Cx. taeniopus* and *Culex cedecei* Stone and Hair, recognized as the *Taeniopus* Subgroup of the *Taeniopus* Group of the Spissipes Section of *Culex* (*Melanoconion*) by Sirivanakarn (1983). However, *Cx. akritos* differs from *Cx. cedecei* in having conspicuous white rings on hindtarsomeres 1–4, hindtarsomere 5 entirely white. The hindtarsomeres of *Cx. cedecei* are totally dark or with inconspicuous pale rings on 2–4, hindtarsomere 5 sometimes pale. In addition, the adult of *Cx. akritos* differs from *Cx. taeniopus* and *Cx. cedecei* in having the capitellum of halter white, the pedicel of antenna yellowish, and a patch of broad spatulate white scales on the postspiracular area. In *Cx. taeniopus* and *Cx. cedecei* the capitellum and the pedicel of the antenna are dark and the patch of white scales on the postspiracular area is absent. The cibarial armature of *Cx. akritos* differs from *Cx. taeniopus* in having 15–20 teeth and 3 pairs of palatal setae, with the anterior pair smaller and inserted slightly apart from the posterior pairs. *Culex taeniopus* has 10–15 teeth and 5 palatal setae, the anterior pair not inserted apart from the posterior pairs. The cibarial armature of *Cx. cedecei* has not been studied. By male genital features, *Cx. akritos* differs from *Cx. taeniopus* and *Cx. cedecei* in possessing a prominent subapical crest on the ventral side of the gonostylus, the crest extending from the apical snout to the expanded subapical portion. In *Cx. taeniopus* and *Cx. cedecei*, the crest is evident only in the subapical expanded portion. The proximal division of the subapical lobe of the gonocoxite bears a slender seta near the base of setae *a* and *b* in *Cx. akritos*, which is absent in *Cx. taeniopus* and *Cx. cedecei*. The foliform seta (*l*) of the distal division of the subapical lobe is narrow in *Cx. taeniopus*, but wide and spoonlike in *Cx. cedecei*. In *Cx. akritos*, seta *l* is broad basally, narrowed apically, becoming triangular in outline. The tergum IX lobes are fingerlike, long, and the

interlobar area is concave in *Cx. taeniopus* and *Cx. cedecei*. In contrast, these lobes are shorter, thumblike, rounded at apex, and the interlobar area is almost straight in *Cx. akritos*. The lateral plate of the phallosome of *Cx. akritos* has a long and curved ventral process, which is short, inconspicuous, nearly straight in *Cx. taeniopus* and *Cx. cedecei*.

***Culex* (*Melanoconion*) *ikelos*,  
new species**

A medium dark species resembling *Cx. taeniopus*, differing in details of adult male and female, male genitalia, and immature stages.

**Female.** Almost entirely clothed with brownish black scales with hindtarsomeres 1–4 with white rings, 5 entirely white. **Head:** Antenna dark, length about 2.13 mm; flagellum normal, whorls with 6 setae. Proboscis dark-scaled, length 1.90–2.11 mm, mean 2.01 mm. Maxillary palpus entirely dark-scaled, length 0.34 mm, mean 0.34 mm, about 0.20 of proboscis length, occasionally a small fifth palpomere present. Vertex with narrow falcate scales, these dark in a small median dorsal area, becoming dingy white laterally and along margin of eyes, a small patch of broad appressed dingy white scales laterally, erect forked scales numerous, black; occiput with some pale whitish narrow falcate scales. **Cibarium** (Fig. 4): Length about 226  $\mu$ m; cibarial bar concave, dorsal surface and distal margin with small spicules; 12 teeth; tooth length about 21  $\mu$ m; line of origin not evident; hollow area of teeth small, more or less restricted to base. Cibarial dome nearly pentagonal, concavo-convex, surface with long, triangular, pointed, posteriorly directed denticles. Four palatal setae situated on lateral edges of anterior hard plate, 2 on each side. Sensilla trichodea disposed in linear series of 3 single setae on each side. **Thorax:** Integument light brown to brownish black. Scutum with narrow falcate scales, these variable in color as follows: background scales dark brown with coppery reflection and light golden scales on anterior promontory and/or anteriorly on scutal fossa



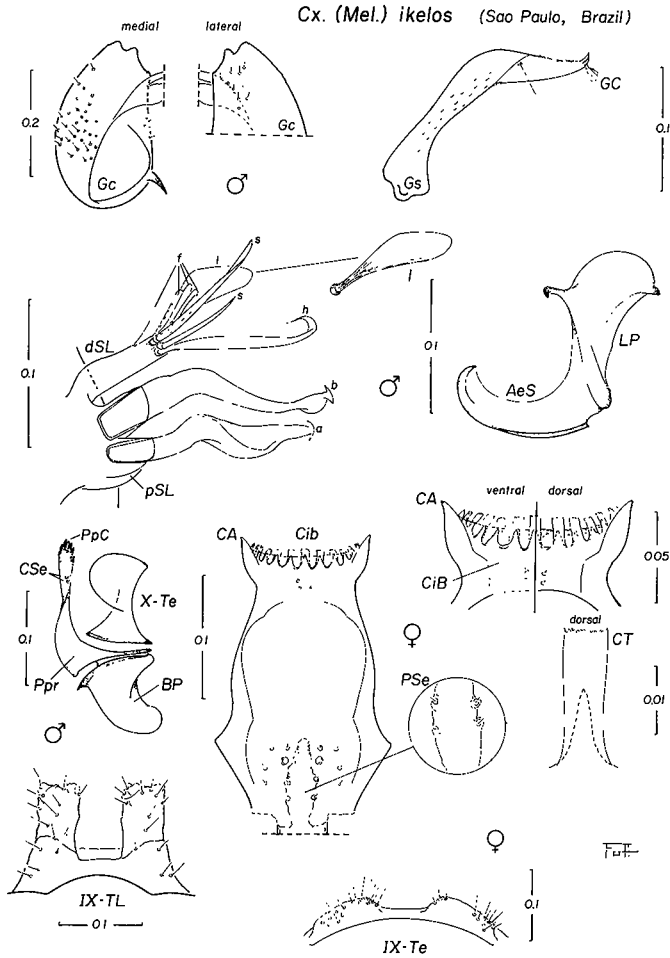


Fig. 4. *Culex (Melanoconium) ikelos* female and male genitalia. Abbreviations same as Fig. 3. Scales in mm.

and/or scutal angle and/or supraalar and prescutellar areas. Scutal setae prominent, dark brown with golden or reddish reflections; acrostichal setae absent; 2 pairs of alveoli (setae missing) present on anterior portion of prescutellar area. Prescutellar area sometimes with a small triangular protuberance. Scutellar scales light golden mixed with some dark brown scales; lateral lobes with 4 large setae, median lobe with 6, 7 large setae. Anteprenotum without scales, with scattered dark setae. Postpronotum with scales same as scutal scales and with a small patch of broad spatulate white scales on posteroventral portion; with 5-8 dark setae on posterodorsal margin. Pleural integument light brown to brownish black, postpronotal, proepisternal, postspiracular, prespiracular, and subspiracular areas, anterior region of mesokatepisternum, posterior portion of mesepimeron, and prealar knob slightly darker; pleural setae yellowish, prealar and the largest upper proepisternal setae darker: 9-11 upper proepisternal, 6, 7 prealar, 5, 6 upper mesokatepisternal, 10, 11 lower mesokatepisternal, 15-22 upper mesepimeral, and 1 lower mesepimeral. Pleura with small patches of white spatulate scales on postspiracular area, on upper corner and lower posterior border of mesokatepisternum. *Wing*: Length 3.26-3.56 mm, mean 3.41 mm; cell  $R_2$  4.28-4.61 of  $R_{2+3}$ , mean 4.45; cell  $M_2$  0.8 of cell  $R_2$ ; subcosta intersects costa slightly proximal to furcation of  $R_{1+2}$ . Dorsal scaling: appressed spatulate scales on costa, subcosta,  $R_1$ ,  $R_{1+2}$ ,  $M_{1+2}$ ,  $M_{3+4}$ ,  $Cu_1$ ,  $Cu_2$ , and 1A; linear plume scales on  $R_2$ ,  $R_{2+3}$ , proximal 0.2 of  $R_1$ ,  $M_1$ , proximally on  $M_{1+2}$ ; inclined narrow spatulate scales on  $R_2$  and distal 0.8 of  $R_1$ ; remigium with appressed spatulate scales and 1-4 distal setae. Ventral scaling: appressed spatulate scales on costa, subcosta,  $R_1$ ,  $R_{2+3}$ , proximally on  $R_2$ , proximal 0.3 of  $R_1$ ,  $M_1$ , proximal 0.4 of  $M_{1+2}$ ; linear plume scales on proximal 0.4 of  $R_1$ , proximal 0.4 of  $R_{2+3}$ ,  $Cu_1$ ,  $Cu_2$ , and on middle of 1A; inclined narrow spatulate scales on distal 0.6 of  $R_1$ ,  $R_2$ , distal 0.7 of  $R_3$ , distal 0.6 of  $R_{4+5}$ , distal 0.6 of  $M_{1+2}$ ,  $M_{3+4}$ , and distally on 1A;  $Cu$  and proximal 0.5 of 1A devoid of scales. *Halter*: Sca-

bellum, pedicel, and capitellum whitish. *Legs*: Anterior surface of forecoxa with patch of dark scales and with a few white scales at base; anterior surfaces of mid- and hindcoxae with vertical line of nearly colorless scales, hindcoxa, occasionally with a patch of nearly colorless scales at base. Antero- and posteroventral surfaces of foretrochanter with dark scales, antero- and posteroventral surfaces of mid- and hindtrochanters with whitish scales. Femora broadly covered with light cream-colored scales on ventral surface and with a small patch of white scales at apex, more evident on hindfemur. Tibiae dark-scaled with a few white scales at apex on ventral surface. Fore- and midtarsomeres dark-scaled, hindtarsomeres 1-4 with white rings on base and apex, 5 entirely white. *Abdomen*: Tergum I with a median posterior patch of dark scales; terga II-VII dark-scaled, with basolateral patches of whitish scales; tergum VIII with dark scales and white scales on lateral areas. Sterna II-VII dark-scaled with basolateral patches of white scales; sternum VIII with scattered white scales. *Genitalia* (Fig. 4): Tergum IX narrowed in middle, with small flattened lobes bearing 11-15 slender setae. Upper vaginal lip distinct and narrow; lower vaginal lip and insula indistinct with 10 clustered insular setae. Upper vaginal sclerite nearly rectangular in outline. Postgenital lobe short, trapezoidal, with 11 setae on either side of midline, mostly on ventral surface.

**Male.** Similar to female except for the following sexual differences. *Head*: Antenna strongly plumose; length about 1.90 mm. Proboscis dark-scaled with a white ring at about 0.75 from base. Maxillary palpus dark-scaled with small patch of white scales at base of palpomeres 4, 5; length about 2.88 mm, exceeding proboscis from about apical 0.3 of palpomere 4; palpomeres 4, 5 densely setose, palpomere 3 with 11-14 strong setae on outer apical area. *Thorax*: Postspiracular area with a patch of white spatulate scales, occasionally absent. *Abdomen*: Tergum II dark-scaled or with a patch of white scales on basolateral areas or with a narrow basal white band; terga III-VII with patches of white scales on basolateral areas, terga III-

VI with basal white bands; tergum VIII with basolateral white patches and a deep V-shaped posteromedian emargination. Sterna II-VII dark-sealed with patches of white scales on basolateral areas; sternum VIII without scales or with few white scales dispersed on median area. *Genitalia* (Fig. 4): Tergum IX lobe large, nearly rectangular in outline, distal part wrinkled with unevenly dispersed slender setae, interlobar area straight. Gonocoxite stocky, outer margin convex, inner nearly straight; ventrolateral setae strongly developed, ventromesal surface with small setae scattered from base to level of subapical lobe, setae stronger basally, lateral surface with a patch of short sparse setae (lsp) at level of subapical lobe, tergomesal surface with a small patch of short setae proximal to subapical lobe, proximal part of ventrolateral surface without scales: subapical lobe distinctly divided, divisions approximated, proximal division entire, short, stronger than distal division, forked at apex with 2 long, robust, apically hooked setae (setae *a* and *b*), seta *a* sinuous, distinctly expanded on subapical part with minute spicules on basal portion of distal surface; seta *b* with basal part expanded, strongly curved at midlength, distal part narrowed; distal division with 8 setae: a long hooked seta (*h*), a short, pointed, saberlike seta (*s*), a long, robust, saberlike seta (*s*), a wide asymmetrical striated foliiform seta (*l*) and 3 subequal appressed setae (*f*) and a slender, flexible seta (*f*). Gonostylus slender, curved, widened distally on lateral side, bearing an inconspicuous subapical crest on ventral side and a few scattered spicules on basal part of mesal side, expanded part with 2 unequal setae on mesal side; apical snout elongate; gonostylar claw short, leaflike. Phallosome with lateral plates and aedeagal sclerites equivalent in length; aedeagal sclerite broad and curved in lateral view; distal part of lateral plate with apical, ventral, and lateral processes, apical process short, broad, apical margin convex and smooth; lateral process short, tapered, and pointed; ventral process longer, pointed, and curved laterally; base of lateral plate with stout dorsal process. Aedeagal sclerites not

connected by dorsal aedeagal bridge. Proctotiger elongate; paraproct narrow distally, expanded basally, crown with row of about 5-7 simple blades. Cercal sclerite long and narrow; 2-4 cercal setae. Tergum X large, nearly rectangular in outline, narrowed at midlength, with a rounded apical lobe.

**Pupa** (Fig. 5). Position and development of setae as figured; range and modal number of branches in Table 1. *Cephalothorax*: Moderately tanned, legs, postscutal area, and metathorax darker. *Trumpet*: Heavily tanned; slender, cylindrical; index 11.32-13.28, mean 12.42; apex and tracheoid area darker; tracheoid area extending almost 0.5 from base; pinna short, U-shaped, about 0.12 of trumpet length; meatus with short slit. *Abdomen*: Moderately tanned, anterior margins of terga darker, more evident on terga II-V; length 2.77-3.16 mm, mean 2.94 mm. Seta I-II well developed with more than 20 branches, setae I-III-V with multiple, simple branches; 3-I usually double, rarely with 5 branches; 3-II,III more frequently double; 5-III-V with 4-8 simple branches; 6-III with 2-5 branches, 6-IV-VI often double; 9-VII with 2,3 simple branches, 9-VIII inserted at caudolateral angle with 2,3 simple branches. *Genital lobe*: Lightly tanned in female, darker in male; length 0.12-0.13 mm, mean 0.13 mm in female, 0.24-0.28 mm, mean 0.27 mm in male. *Paddle*: Lightly tanned, midrib and buttress darker; midrib strong except at apex; buttress developed at base only; margins smooth; length 0.72-0.87 mm, mean 0.83 mm, width 0.47-0.53 mm, mean 0.51 mm, index 1.53-1.63, mean 1.60. Seta 2-P about 0.5 length of 1-P.

**Larva** (Fig. 6). Position and development of setae as figured; range and modal number of branches in Table 2. *Head*: Wider than long; length 0.76-0.78 mm, mean 0.77 mm; width 1.13 mm; moderately tanned, darker on anterior part of dorsal apotome and collar. Dorsomentum nearly triangular with a large median tooth and 7,8 smaller teeth on each side. Antennal length 0.66-0.74 mm, mean 0.70 mm; antenna heavily pigmented, with a dark ring at base. Seta 1-A inserted 0.75 from base, with 24-30 aciculate branches;

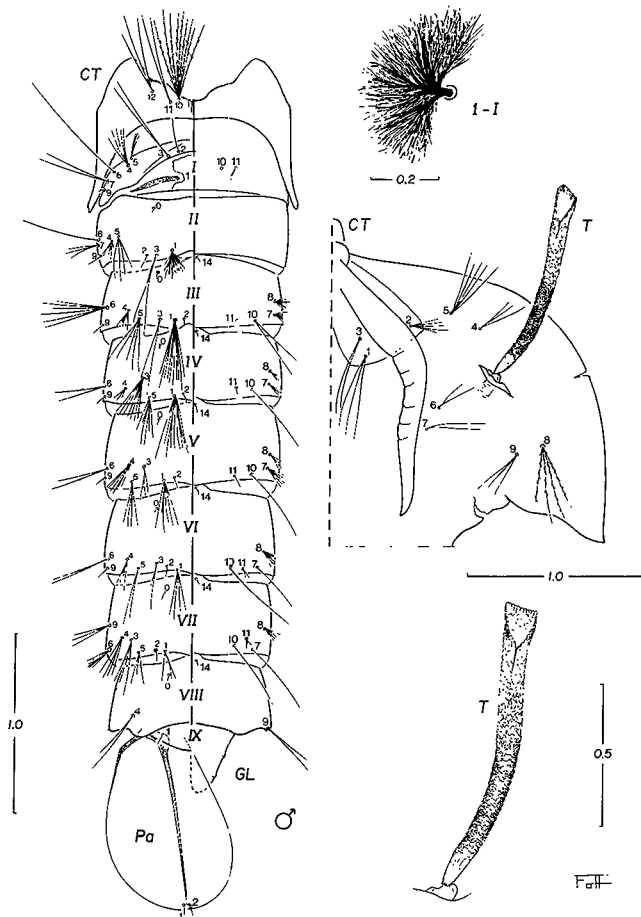
*Cx. (Mel.) ikelos* (Sao Paulo, Brazil)

Fig. 5. *Culex (Melanoconion) ikelos* pupa. CT, Cephalothorax; GL, genital lobe; Pa, paddle; T, trumpet; I-IX, abdominal segments. Scales in mm.

Table 1. Number of branches for setae of the pupa of *Culex (Metameconion) ikkoi*.<sup>1</sup>

Seta no.	Cephalo-thorax CT	Abdominal segments										Paddle				
		I	II	III	IV	V	VI	VII	VIII	IX	P	P				
0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1	3-5(3) <sup>2</sup>	6-10(8)	>20	1	7-10(8,9)	1	4-8(6)	1	4-5(4)	1	3-5(4)	—	—	—	—	—
2	3-6(5)	1	1	1	6-8(7)	1	1	1	2-4(2)	1	1-4(3)	—	—	—	—	—
3	2	5(2)	1-3(2)	1	3,4(3)	1	2,3(3)	1	3-5(4)	1	2,3(2)	—	—	—	—	—
4	2	4(3)	4-6(6)	4-7(5)	3,4(3)	1	5-7(6)	1	2-4(2)	1	2,3(3)	—	—	—	—	—
5	5	5,6(5)	4,5(4)	6-8(6)	4-7(5,6)	1	4,5(4)	1	3-5(4)	1	2,3(3)	—	—	—	—	—
6	2,3(2)	1	1	2-6(6)	2	2,3(2)	1	2,3(2)	1	1-4(2)	1	5-8(6)	—	—	—	—
7	2,3(2)	2-5(3)	1-4(3)	4-6(6)	4-6(4)	1	4-7(7)	1	3-5(3,4)	1	2,3(3)	—	—	—	—	—
8	3-5(3,4)	2	—	6-11(7,8)	3-6(4)	1	3-6(4)	1	3-5(4,5)	1	2,3(3)	—	—	—	—	—
9	3,4(3)	—	—	1	1	1	1	1	1,2(1)	1	2-4(2)	—	—	—	—	—
10	6-15(9,10)	al <sup>3</sup>	—	1-3(2)	2,3(2)	1	1,2(1)	1	1-3(2)	1	2,3(3)	—	—	—	—	—
11	2,3(2)	2	—	1,2(1)	1,2(1)	1	1,2(1)	1	1-3(2)	1	2,3(3)	—	—	—	—	—
12	3,4(3)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

<sup>1</sup> Based on counts made on holotype and four paratypes.<sup>2</sup> Range (mode).<sup>3</sup> Alveolus (= al) only.

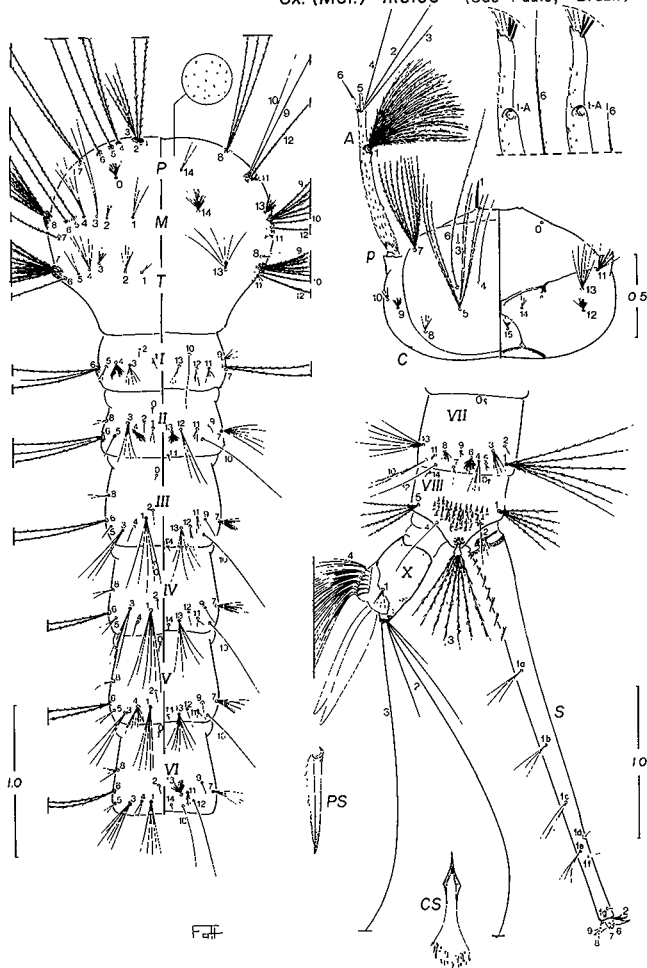
*Cx. (Mel.) ikelos* (Sao Paulo, Brazil)

Fig. 6. *Culex (Melanoconum) ikelos* Iau va. A, Antenna; C, cranium; CS, comb scales; M, mesothorax; p, puncture; P, prothorax; PS, pecten spine; S, siphon; T, metathorax; I-X, abdominal segments. Scales in mm.

Table 2. Number of branches for setae of the fourth-instar larva of *Culex (Macroneocionus) ickeia*.

Seta no.	Head		Thorax			Abdominal segments									
	C	P	M	T	I	II	III	IV	V	VI	VII	VIII	X		
0		18-34(24)													
1	1	1	2,3(3)	2,3(2)	2-4(3)	1,2(2)	5,6(5)	1	1	1	1	1	1	1	
2	1	1	5,6(5)	4-7(5)	1	1	1	5-7(6)	5-7(5)	4-6(5)	5-8(6)	4,5(5)	5	5	
3	1	4-7(6)	1,2(2)	6-8(7)	3-7(5)	4,5(4)	3,4(3)	4,5(4)	2,3(3)	6,7	6-9(8)	6-8(6,7)	3,4(4)	3,4(4)	
4	1	2	3,4(4)	4-6(5)	12-15(14)	7-10(8)	1,2(1)	1	8-11(9)	2,3(2)	3,4(4)	1	1-8(6)	1-8(6)	
5	6,7(7)	1	1,2	1,2	1-4(3)	1,2(1)	1,2(2)	1,3(2)	1-3(2)	2-4(2)	4,5(4)	4,5(4)	1	1	
6	1	1	1	1	3	3	2	2	2	2	19-24 <sup>a</sup>	19-24 <sup>a</sup>	1	1	
7	9-13	2	1	6-8(8)	2	5-7(6)	9-13(9,11)	7-13(9,11)	9-12(10)	4-7(5)	4-6(4)	1b-S,	3,4(3)	3,4(3)	
8	4-6(5,6)	3,4(3)	5-7(6)	6-8(8)	1,2(2)	1,2(2)	2,3(2)	2	2	4	4-6(4)	1b-S,	2-4(3)	2-4(3)	
9	8-10(8)	1	5,6(5)	5-8(6)	3-5(4)	1	1	1	1,2(1)	1	6-12(7)	1c-S,	3	3	
10	3,4(4)	1	1	1	1	1	1,2(1)	1	1	1	2-4(3)	1d-S,	1-3(3)	1-3(3)	
11	5-9(9)	5-8(7)	2,3(3)	2,3(3)	3-6(3,4)	3,4(3)	3	2,3(3)	3,4(3)	1	2,3(2)	1e-S,	2,3(2)	2,3(2)	
12	11-15 <sup>b</sup>	1	1	1	3-5(3)	2,3(3)	1,2(2)	1	1	1	3,4(4)	1f-S,	1	1	
13	6-9(7,8)	—	28-41 <sup>c</sup>	6,7(6)	2-4(3)	25-36 <sup>c</sup>	5,6(5)	4,5(5)	6,7(7)	49-56(49)	5-8 <sup>c</sup>	1 <sup>c</sup> -S,	1	1	
14	3,4(3)	2	20-31(31)	—	—	—	—	—	—	—	—	2-S,	2	2	
15	3-6(5)	—	—	—	—	—	—	—	—	—	—	—	—	—	

<sup>a</sup> Based on counts made on holotype and four paratypes.

<sup>b</sup> Alveolus (= ad) only.

<sup>c</sup> Range (mode).

<sup>d</sup> Mode indefinite.

<sup>e</sup> Three mode.

2.3-A apical in position. Antennal puncture distinct. Seta 2-C absent; 3-C present, minute; 4-C long, single, almost reaching the level of insertion of seta 3-C; 5-C well developed with 6.7 aciculate branches; 6-C long, aciculate. *Thorax*: Integument hyaline with tiny spicules on ventral surface; thoracic segments without patches of black pigment granules under integument. Seta 3-P with 4-7 branches; 1-M with 2.3 long branches; 1-T smaller than 1-M, with 2.3 branches; 13-T well developed with 6.7 sparsely aciculate branches. *Abdomen*: Integument hyaline with tiny spicules on central areas of segments, smooth laterally, spicules more conspicuous on ventral surface and on posterior segments; segments without band of black pigment under integument. Seta 1-I,II weakly developed, 1-I with 2-4 branches. 1-II single or double: 1-III-V well developed with 5-7 simple branches; 6-I,II long with 3 unequal branches, 6-III-VI of nearly equal development, always double, aciculate. Comb with 51-66 scales. basal scales short, distal scales long, all with typical fringe on sides and apex; apical fringe distinct, lateral fringe inconspicuous; scales arranged in 4 irregular rows. *Siphon*: Index 7.86-10.93, mean 9.41; moderately tanned with darkened ring at base, acus attached, long and slender on anterior side of attachment. Pecten of 9-11 spines on basal 0.2 of siphon; ventral edge of spines fringed with numerous closely set denticles. Seta 1-S usually in 7 pairs, 4 posterior pairs and 3 anterior pairs; first proximal posterior pair with length nearly twice as long as width of siphon at point of insertion, 3 distal posterior pairs with length nearly 3 times as long as width of siphon at point of insertion. 3 anterior pairs nearly as long as width of siphon at point of insertion. Seta 2-S inserted in membrane near base of anterolateral spiracular lobe, curved anteriorly with a small curved secondary branch near middle of anterior side. *Segment X*: Saddle complete, without acus and without spicules; length 0.33-0.36 mm, mean 0.35 mm; siphon/saddle index 5.40-6.70, mean 5.94. Seta 2-X with 1 long and 2.3 short branches; 4-X with 6 pairs of setae, 3 anterior pairs

frequently with 6 branches (4-8), 3 posterior pairs often with 6 branches (1-8). Anal papillae long and slender, gradually tapering to blunt tip, dorsal pair about 1.63 length of saddle, ventral pair about 1.62 length of saddle.

**Diagnosis.** *Culex ikelos* can be easily recognized by the following features. *Adult*: Vertex with narrow falcate scales, these dark on a small median dorsal area along coronal suture, dingy white laterally and along margin of eyes; background scales of scutum dark brown, with patches of light golden scales on anterior promontory and/or anteriorly on scutal fossa and/or scutal angle and/or supraalar and prescutellar areas; scutal and pleural integuments similar in color; pleura with small patches of white spatulate scales on postspiracular area (occasionally absent in male) and on upper corner and lower posterior border of mesokatepisternum; capitellum whitish; femora and tibiae with small white patches at apex; hindtarsomeres with white rings on base and apex of 1-4, 5 entirely white. *Male*: Proboscis dark with a white ring at about 0.75 from base; maxillary palpus with small white patches at base of palpomeres 4,5. *Male genitalia*: Tergum IX lobe large, nearly rectangular in outline, distal part wrinkled, interlobar area straight; seta *a* of proximal division of subapical lobe with minute spicules on basal portion of distal surface, seta *b* expanded basally, strongly curved at midlength, narrowed distally; foliiform seta (*l*) of distal division asymmetrical, striated, narrow on basal portion, becoming wide, spatulate on apical portion; lateral plate of phallosome with apical, ventral, and lateral processes; apical process broad, short, distal margin convex and smooth, ventral process long, nearly pointed, and curved; tergum X large, nearly rectangular with a rounded apical lobe. *Larva*: Seta 3-C present, minute; 4-C long, simple; 5-C well developed, aciculate; 6-C long, reaching the apex of antenna; antenna heavily tanned; thoracic integument with tiny spicules on ventral surface, without patches of black pigment granules under integument; 1-M long; 13-T well developed, aciculate; abdominal segments



with tiny spicules on central areas, glabrous laterally, segments without black pigment granules under integument; seta 6-L.II triple, 6-III-VI double; comb with 51-66 scales, scales long, fringed on apex and on sides, arranged in 4 rows; siphonal index 7.86-10.93, siphon moderately tanned, spines of pecten disposed on nearly basal 0.2 of siphon, spines with a basal tooth and a fringe of numerous closely set denticles; seta 1-S in 4 posterior pairs and 3 anterior pairs, posterior pairs with length variable from nearly 2.0 to 3.0 times as long as width of siphon at point of insertion; saddle without conspicuous spicules. *Pupa*: Trumpet heavily tanned, slender, cylindrical, index 11.32-13.28, apex and tracheoid area darker; pinna short; seta 1-II well developed with more than 20 branches; 6-II with 2-5 branches, 6-IV-VI generally double; 9-VII with 2.3 simple branches, 9-VIII inserted at caudolateral angle, with 2.3 simple branches.

**Type data.** Holotype male, with associated larval and pupal exuviae on slide, bearing the following collection data: BRAZIL, São Paulo State, Sorocaba County, Campolim, urban area, 10 January 1988, coll. A. Fernandes, collected as larva from hoof print in pasture (FSP-USP no. E-10518, slide number 6914). Paratypes: 3 males with associated larval and pupal skins on slides; 2 males mounted on slide with associated male genitalia and larval and pupal skins on the same slide; 1 male; 1 female mounted on slide with associated genitalia and larval and pupal skins on the same slide; 1 female with larval and pupal skins on slide; 1 female with pupal skin on slide; 1 female; 1 larval and pupal skins without associated adult; 2 fourth-instar larvae mounted on slides, same data as holotype; 1 female with associated cibarium on slide and 3 males with associated male genitalia on slides, same data as holotype, but differing as follows: Araraquara County, Lupo Farm, collected in CDC-I.T. 18 Jan 1983, coll. E.X. Rabello, 1♂; São João da Boa Vista County, Santa Helena Farm, collected in New Jersey-LT. 5 Jan 1982, 1♂; in CDC-LI. 9 Feb 1982, 1♂; 11 Mar 1982, 1♀.

**Distribution** (Fig. 1). *Culex ikelos* is known only from São Paulo State, Brazil.

**Bionomics.** Immature stages of *Cx. ikelos* were collected from hoof prints that were exposed to full sunlight in pastures, in urban areas. Adults were collected with CDC-I.T and New Jersey-LT in urban areas and in second-growth vegetation.

**Etymology.** From the Greek adjective *ikelos*, meaning "like." *Culex ikelos* is named for the morphological similarity with *Cx. taeniopus*.

**Discussion.** *Culex ikelos* is similar to the other species of the *Taeniopus* Group, but differs from *Cx. taeniopus* and *Cx. cedecei* in having the capitellum of halter white, a patch of broad, spatulate white scales on postspiracular area, which is sometimes absent in males, from *Cx. cedecei* in having conspicuous white ring on hindtarsomeres 1-4, 5 entirely white, from *Cx. akritos* in possessing the pedicel of antenna dark. The cibarial armature of *Cx. ikelos* differs from *Cx. akritos* and *Cx. taeniopus* in possessing 12 teeth and 2 pairs of palatal setae. The male of *Cx. ikelos* has a white ring on the proboscis that, in contrast, is absent in the other three species. The male genitalia of *Cx. ikelos* is similar to those of *Cx. taeniopus*, *Cx. cedecei*, and *Cx. akritos*. However, *Cx. ikelos* differs from them in having an inconspicuous subapical crest on ventral side of gonostylus, which does not reach the expanded portion; the foliform seta (*l*) of the distal division of subapical lobe of gonocoxite is wide, asymmetrical, striated, narrow basally, and spatulate apically; the tergum IX lobes are shorter than those of the other three species, nearly rectangular in outline, the interlobar area is straight; the lateral plate of phallosome has a long, tapered, nearly pointed, and curved ventral process.

Belkin et al. (1970) illustrated and described the larva and pupa of *Cx. taeniopus* (as *Cx. opisthopus*) from Jamaica. Based on their figure and brief description, the larva of *Cx. ikelos* appears to differ from that of *Cx. taeniopus* by (1) having tiny spicules on ventral surface of thoracic integument, and on ventral and dorsal surfaces of abdominal seg-

ments, (2) setae 6-I,II triple, and (3) setae 6-III-VI double. In addition, the pupa of *Cx. ikelos* differs from *Cx. taeniopus* by (1) seta 6-CT double or triple, (2) 10-C<sup>2</sup> with 6-15 branches, (3) 1-II with more than 20 slender branches, 1-III with 9-13 branches, (4) 5-VII branched, not forked, and (5) 6-III usually with 6 branches. The larva and pupa of *Cx. akritos* are unknown. According to Belkin et al. (1970), the illustration and description of the larva of *Cx. opisthopus* by Foote (1954) (considered as *Cx. cedecei* by Pecor et al. 1992) does not agree with their material from Jamaica and Florida, probably because of incorrect association of the stages or the presence of an additional species in Puerto Rico. Therefore, we do not discuss the possible differences between *Cx. cedecei* and *Cx. ikelos*.

#### ACKNOWLEDGMENTS

We are grateful to J. Glick for the loan of type specimens of *Cx. cedecei*, *Cx. taeniopus*, *Cx. opisthopus*, and *Cx. mychonde* deposited in the National Museum of Natural History, Washington, DC; Theresa M. Howard for providing the type specimen of *Melanoconion annulipes* from the Natural History Museum, London; Daniel Marucci for his assistance in taking the scanning electron micrographs; D.C. Flores for his help in finishing the illustrations; and R.P. Domingues for typing the manuscript.

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