



Morphological redescription of the immature and adult stages of *Culex (Culex) acharistus* Root (Diptera: Culicidae)

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Abstract

Culex (Culex) acharistus Root is redescribed in the adult, pupal and larval stages. The male genitalia, pupa, and fourth-instar larvae are illustrated. The paper includes available information on the distribution, bionomics and taxonomy of the species.

Key words: *Culex (Culex) acharistus*, redescription, distribution, bionomics, taxonomy

Introduction

Culex (Culex) acharistus was described by Root (1927) based on the male genitalia of specimens collected in Agua Limpa, Brazil, based on a few morphological characters of the adults. Although the adults were reared from larvae, the larval and pupal exuviae were not preserved and nothing was said about the immature stages. Lane (1953) partially described and illustrated the pupa, but no information was provided about the origin of the material. Stone & Knight (1957) designated a lectotype, which is deposited in the National Museum of Natural History in Washington, DC, as follows: "... a fragmentary male with the thorax and one leg on a pin and the terminalia on a slide...". Bachmann & Casal (1963) recorded the species from Argentina, and described the larva (for the first time) and the pupa, both briefly and with partial drawings. They also described the male genitalia and the cibarial armature of the female. Forattini & Rabello (1965) more fully characterized the pupa. Bram (1967) separated *Cx. acharistus* from closely related species based only on "the presence of minute annulations on the apical third of the dististyle [= gonostylus]" of the male genitalia, and extended the distribution of the species to Chile and Colombia.

Despite the importance of mosquitoes as pests and vectors or potential vectors of arboviruses and parasites, many species of the subgenus *Culex* in the Neotropical Region are poorly known and difficult to identify. During studies carried out in 1988 in Chaco Province of Argentina, *Cx. acharistus* was the most abundant species when cases of Eastern Equine Encephalitis were occurring in horses (Avilés et al. 1989).

The purpose of this paper is to provide a complete description of the adult male and female, pupa and fourth-instar larva of *Cx. acharistus* to foster recognition of the species, particularly females.

Materials and methods

Pin-mounted adults, reared from fourth-instar larvae, from the entomological collections of the Facultad de Ciencias Naturales e Instituto Miguel Lillo (National University of Tucumán), Fundación Miguel Lillo, Tucumán; División Entomología, Museo de La Plata, Buenos Aires and the Centro de Investigaciones Entomológicas de Córdoba (National University of Córdoba) were studied. The larvae, larval and pupal exuviae and the male genitalia are mounted on microscope slides in Canada balsam. Morphological terminology follows Harbach & Knight (1980, 1982). These voucher specimens are deposited in the above mentioned collections. Life stages are indicated as follows: M (male), MG (male genitalia), F (female), P (pupa), Pe (pupal exuviae), L (fourth-instar larva) and Le (larval exuviae). An asterisk following an abbreviation indicates that the life stage was at least partially illustrated in the publication cited. Measurements are given in millimeters, with a range followed by the mean in parentheses; ratios are formatted similarly. Ranges and modes (in parentheses) are provided for counts.

Culex (Culex) acharistus Root

Culex acharistus Root, 1927: 578 (M, F). Type locality: Agua Limpa, Minas Gerais, Brazil (USNM). Lane 1953: 347 (M*, F, P*). Stone & Knight 1957: 42 (lectotype designation), Bachmann & Casal 1963: 39 (M*, P*, L*), Forattini 1965: 142 (M*, F), Forattini & Rabello 1965: 28 (P*), Bram 1967a: 23 (M*, L*).

FEMALE: *Head:* Integument dark brown. Dorsum with dark brown erect scales, sometimes paler in mid-anterior region, and narrow, decumbent, curved pale scales. Coronal suture with narrow decumbent pale scales. Ocular line with a narrow row of white scales. Postgena with abundant, broad, decumbent white scales. Ocular and interocular setae dark. Antenna 1.58–1.95 mm (1.78 mm), pedicel with dark pruinosity, similar length between flagellomeres, dark, no scales on all flagellomeres sometimes base of flagellomere 1 paler. Clypeus dark. Proboscis 1.58–2.12 mm (1.86 mm), mainly dark-scaled, basal 0.75 ventrally white-scaled, labella golden. Maxillary palpus 0.31–0.45 mm (0.38 mm), brown-scaled. *Thorax:* Scutal integument dark brown, scutum with small golden scales on disc and long golden scales on anterolateral area of scutal fossa, antear and prescutellar areas. Pale scales from anterior promontory along lateral margins, as spots on the distal half of scutum and laterally to the dorsocentral setae (easily lost) and also at sides of prescutellar area (sometimes, anterior border of prescutellar area with a band of pale scales). Acrostichal, dorsocentral and supraalar setae dark brown. Pleural integument dark brown, velvety. Antepronotum and postpronotum with narrow pale scales. Spots of broad pale scales as follows: lower proepisternum, upper and lower mesokatepisternum, anterior to upper mesepimeral setae and between on these and lower mesepimeral setae. Postspiracular scales absent. Antepronotum with fine golden and a few strong brown setae. Postpronotum with 3–6 (5) brown setae, remainder of pleural setae golden: 5–7 (6) proepisternal, 6–8 (7) prealar, 3–6 and 3–9 (3) upper and lower mesokatepisternal, respectively, 4–9(6) and 1 upper and lower mesepimeral, respectively. Pre- and postspiracular setae absent. Scutellum with pale scales confined to the lobes; 6, 7 and 5, 6 (5) median and lateral brown scutellar setae. Mesopostnotum with yellowish to brown pruinosity, without scales and setae. *Wing:* Length 3.30–3.94 mm (3.56 mm), with broad brown scales, occasionally mixed with narrow scales along costa, radius, R_{4+5} , cubitus, Cu_1 , Cu_2 , basal third of anal and generally over M_{3+4} . Other veins covered with brown scales with bronze sheen. *Halter:* Whitish to yellowish; capitellum with pale scales, generally reaching the pedicel. *Legs:* Coxal integument paler than scutum; forecoxa with pale scales on basal third, distal 0.75 darker, brown setae between scales; midcoxa pale-scaled dorsally, ventrally without scales, with a longitudinal line of brown setae; hindcoxa with medial of scales and posterior line of golden setae. Trochanters with pale scales. Fore- and midfemur dark-scaled dorsally, pale-scaled ventrally, hindfemur with dark scales on dorsal surface, pale-scaled ventrally except darker on distal 0.2; Fe-1 1.56–2.02 mm (1.73 mm), Fe-2 1.91–2.18 mm (2.02 mm), Fe-3 1.66–2.03 mm (1.77 mm). Foretibia dark-scaled dorsally; midtibia

with pale to golden scales ventrally; hindtibia dark-scaled. Femora and tibia with narrow apical ring of golden scales. Tarsus golden- to dark-scaled, sometimes paler ventrally; joints between tarsomeres with inconspicuous ring of pale scales. Pulvilli golden to dark; unguis dark, simple. *Abdomen*: Tergum I without scales, with golden setae. Tergum II with a basomedial spot of pale scales. Terga III–VII with a complete basal band of pale scales up to 0.3 length of segment, sometimes broader on media or lateral region on terga III–V and terga VI–VII, respectively. Tergum VIII with a complete basal band of pale scales, up to 0.5 length of tergum in midregion, reaching apical extreme laterally. Dark scaling of terga II–VIII brown with golden sheen, with fine golden setae on posterior margin. Sterna mainly pale-scaled, sterna III–VIII with dark scales posteriorly on midline, more scattered laterally. Golden setae more abundant than on tergum.

MALE: Like female except for the sexual differences. *Head*: Dorsum with abundant narrow white scales and broad, curved decumbent scales, mixed with ocular scales. Antenna strongly verticillate, 1.12–1.66 mm (1.37 mm). Proboscis dark-scaled, 1.91–2.37 mm (2.18 mm). Maxillary palpus dark-scaled; length 2.11–3.12 mm (2.71 mm); palpomere 3 with a pale ring on basal third, sometimes with an apical spot of white scales; ventral surface of palpomere 4 and base of palpomere 5 white-scaled ventrally. *Thorax*: Spot of pale scales usually present on posterior half of scutum lateral to dorsocentral setae. Pleural setae: 5 postpronotal, 7–13 proepisternal, 5–7 (6) prealar, 5–7 (6), 5,6 (6) and 5–8 (6) upper and lower mesokatepisternal, respectively, 6–10 (7) upper and 1 lower mesepimeral. Median scutellar setae 6–8 (6) and lateral 4,5 (5). *Wing*: Length 2.94–3.64 mm (3.38 mm). *Legs*: Hindfemur pale-scaled ventrally; Fe-1 1.52–1.90 mm (1.70 mm), Fe-2 1.88–2.09 mm (1.98 mm), Fe-3 1.78–1.97 mm (1.89 mm). Hindtibia sometimes with pale scales ventrally. Joints between fore- and midtarsomeres slightly more evident. Fore- and midunguis with secondary tooth, hindunguis simple. *Abdomen*: Golden setae of sterna more abundant. *Genitalia* (Fig. 1, 2): Gonocoxite short, length approximately 1.7 widest part, external border mainly with short and moderately long setae, few strong setae. Subapical lobe prominent, undivided, setae *a-c*, stout, rodlike, pointed and arranged near a triangle, *b* stouter than *a* and *c*, *a* is shorter than *b* and *c*. Seta *g* foliform, seta *f* filiform and seta *h* stronger than *f* and with hooked apex (Fig. 1a). Gonostylus with normal appearance in lateral view, distal 0.75 slightly broader, apical third with minute annulations (Fig. 1b), with 2 setae at distal third and apical gonostylar claw. *Phallosome*: Not heavily sclerotized, except for paramere and dorsal aedeagal bridge. Ventral arm broad, tapering to apex, laterally bended, dorsolateral margin slightly more sclerotized. Just outside this tooth is a small tubercle. Mesal lobe dorsally placed 0.5 length of VA, a narrow plate ending in 2 or 3 divergent points and a low rounded plate. Well developed lateral lobe present. Dorsal and lateral arm absent. Dorsal process thumblike, tapering toward apex (not pointed), in lateral and mesal view with triangular aspect. *Proctiger*: Apex with a crown of pointed spicules covering apical third of paraproct, basolateral arm bended, bent apex, with 2–4 cercal setae. IX tergal lobe small, with 10–21 setae.

PUPA (Fig. 3): Placement and character of setae as figured; range and modal number of branches in Table 1. *Cephalothorax*: Integument lightly tanned, homogeneously colored, maxillary palpus, distal extreme of legs and postscutal area sometimes slightly darker, metanotum evenly tanned, sometimes lighter laterally. Seta 9-CT conspicuously shorter than other *Cx.* (*Cux.*) species. Trumpet cylindrical, evenly tanned, tracheoid and meatus bordering pinna sometimes darker; length 0.52–0.64 mm (0.59 mm), width 0.07–0.12 mm (0.09 mm), index 4.46–7.87 (6.08). *Abdomen*: Length 2.11–2.74 mm (2.53 mm); integument yellowish to tan, slightly darker in midregion. Tergum I smooth, II–VIII with groups of minute spicules. Seta 1-I fanlike with 13–19 aciculate branches; 6-I,II longer than 7-I,II; setae 8,10,11,13-II, if present, single, 9-VIII fanlike with aciculate branches. *Genital lobe*: Slightly tanned in both sexes, males: length 0.33–0.37 mm (0.34 mm), wrinkled ventrally, with spicules ending in 3 tips; females: spicules limited to the mid-apical region, length 0.18–0.21 mm (0.195 mm). *Paddle*: Length 0.77–0.93 mm (0.87 mm). Yellowish to slightly tan, midrib thick, strong, extending length of paddle. Apical 0.25 of outer margin serrated on more than proximal half. Seta 1-Pa 0.07–0.10 mm (0.09 mm), strong, generally single, seta 2-Pa absent.

TABLE 1. Number of branches for pupal setae of *Culex* (*Culex*) *acharistus* Root (27 specimens, modes in parentheses).

Seta no.	Cephalothorax CT	Abdominal segments									Paddle Pa	
		I	II	III	IV	V	VI	VII	VIII	IX		
0	-	-	1	1	1	1	1	1	1	1	-	-
1	3,4	13–19	8–20	6–10 (8)	3–8 (6)	3–5 (4)	3,4 (3)	2–4 (4)	-	1	1,2 (1)	
2	2,3 (2)	1	1	1	1	1	1	1	-	-	-	
3	3–5 (3)	2	2	1–4 (2)	2	2	1–3 (2)	2	-	-	-	
4	2–4 (4)	3–5 (4)	1–6 (4)	2–6 (3)	3–7 (7)	2–5 (4)	2–4 (2)	1,2 (2)	2	-	-	
5	4–9 (4)	1–3 (2)	2–6 (4)	5–9 (5)	2,3 (2)	2	2	1,2 (2)	-	-	-	
6	3–5 (3)	1	1	2,3 (2)	1–3 (2)	2–4 (2)	2,3 (2)	3–5 (3)	-	-	-	
7	2,3 (2)	1–3 (1)	1,2	2–5 (3)	2–4 (2)	3–5 (3)	1	1	-	-	-	
8	5–9 (5)	-	1	2–5 (3)	2–4 (2)	2–4 (3)	1–4 (3)	2–4 (3)	-	-	-	
9	2	1	1	1	1	1	1	2–4 (3)	4–7 (6)	-	-	
10	4–8 (5)	1	1	2	1,2 (2)	1	1,2 (1)	1	-	-	-	
11	1–3 (2)	1	1	1	1	1	1	1,2 (1)	-	-	-	
12	2,3 (2)	-	-	-	-	-	-	-	-	-	-	
13	-	-	1	-	-	-	-	-	-	-	-	
14	-	-	-	1	1	1	1	1	1	-	-	

Observations. Isolated cases as follow: 9-CT single, 3-I single, 6-I double, 2-II double, 3-II single, 10-III single, 3-IV triple, 10-V double, 3-VII single, 0-VIII double, 4-VIII single, 14-VIII double. A puncture was observed between setae 4,5-III,IV in all specimens examined, and between setae 4,5-V in 85% of the specimens. Seta 9-CT conspicuously shorter and seta 9-VI in an unusual position relative to other *Cx.* (*Cux.*).

LARVA (fourth-instar) (Fig. 4): *Head:* Wider than long, width 1.24 mm, length 0.95 mm, intensely tanned, anterior region of lateralialia lighter. Collar thin, brown. Dorsomentum brown, long teeth mainly with round apex, lateral teeth pointed, with 12–15 (12) teeth on each side of median tooth. Seta 0, 1-C single, seta 3-C usually single, seta 2-C absent, setae 5–7-C fanlike with aciculate branches, 4-C with 1–3 (3) branches, 4-C with 4–6 (5) branches, 7-C with 5–7 (7) branches, 15-C generally double, 6-Mx single, at most as long as 14-C, setae 16,17-C absent. *Antenna:* Length 0.37–0.45 mm (0.40 mm), intensely tanned, darker on distal half, conspicuously aciculate on basal half, aciculate shorter toward apex, absent on distal fourth. Seta 1-A fanlike with 10–14 aciculate branches, inserted 0.45–0.52 (0.48) from base. Setae 2–6-A stout at base. *Thorax:* Integument hyaline, glabrous except for minute spicules near pleural setal groups on pro-, meso- and metathorax. Tubercles of large dorsal setae intensely tanned, tubercles of setae 9–12-M, T with a crown of 1–4 pointed, sclerotized teeth. Setae 1-8-P aciculate, 4,7-P double, setae 9,10-P ≤ 0.5 length of 12-P, 11-P long compared to 11-M,T, setae 9,12-P single. Seta 1-M with 4–10 (4) branches, 5–7-M, 9,10,12-M fanlike with

TABLE 2. Number of branches for fourth-instar larval setae of *Culex (Culex) acharistus* Root (26 specimens, modes in parentheses).

Seta no.	Head		Thorax					Abdominal segments						
	C	P	M	T	I	II	III	IV	V	VI	VII	VIII	X	
0	-	5-10 (9)	-	-	-	1	1	1	1	1	-	1	-	
1	1	1,2 (1)	4-10 (4)	3,4	3-6 (5)	1-3 (2)	1-4 (3)	1	2-5 (5)	1	2-4 (2)	2-7 (4)	2,3 (2)	
2	-	1	2-4 (2)	1	1,2 (1)	1	1	1,2 (1)	1	1	1	1	1	
3	1	1,2 (2)	1,2 (1)	3-6 (5)	1	1	1	1,2 (1)	1	2-6 (4)	1-3 (2)	8-10 (9)	1	
4	1-3 (3)	2	1,2 (2)	2-4 (3)	7-11 (10)	3-6 (5)	1-4 (1)	1,2 (1)	4-6 (4)	2-4 (3)	1	1	3-9 (5)	
5	4-6 (5)	1	1	1-3 (1)	3-6 (4)	2-5 (2)	1-3 (2)	1,2 (2)	2,3 (2)	2	2-4 (3)	2-5 (2)	-	
6	4-6 (5)	1	1	1	2	2	1	1	1	1	9-15	-	-	
7	5-7 (7)	2	1	5-10 (8)	2,3 (2)	3-6 (5)	5-9	6-9	4-9 (6)	1	1	-	Siphon	
8	1,2 (1)	2,3 (2)	5-8 (6)	6-13	-	1	1	1	1,2 (1)	1-4 (3)	4-7	1S-a	2	
9	4-10 (7)	1	5-8 (5)	5-7	1,2 (2)	1	1	1	1	1	2,3	1S-b	2	
10	1-4 (3)	1	1	1	1	1	1	1,2 (1)	1	1	1	1S-c	2	
11	2,3 (3)	2-6 (3)	2,3 (3)	1-4 (3)	1-6 (4)	1-3 (2)	1-3 (2)	2	2	1,2 (2)	1	1S-d	1-4 (4)	
12	2-4 (3)	1	1	1	1-4 (1)	1,2 (1)	1	1	1	1	1	-	-	
13	3-6 (4)	-	8-18 (10)	3-5 (5)	1-3 (1)	9-13 (11)	3-6	3-6 (3)	4,5 (4)	10-21	3-5 (4)	-	Pecten	
14	1,2 (1)	1	8-15	-	-	1,2 (1)	1	1	1	1	1	1	13-21	
15	1-3 (2)	-	-	-	-	-	-	-	-	-	-	Comb scales 40-49	1-A 10-14	

Observations. Isolated cases as follows: 3-C double, 4-P single, 7-P triple, 9-P double, 2-T triple, 10-II double, 11-V single, 12-VII double, 1b-S single. A sclerotized and minutely denticulate plate about 0.02 mm long is present between setae 6,7-I, between seta 6-VIII and the basal margin of the segment, and with variable occurrence on the other segments.

aciculate branches, 10,12-M similar in length, 13-M dendritic. 1-M and 13-T long, 0.28–0.38 and 0.31–0.34 length of 5-M respectively. Seta 2-T single. *Abdomen:* Integument hyaline, segment III with or without some minute spicules. Setae 4,5-I long, ≤ 0.5 length of 3-I. Seta 5-II varies from less to more than 0.5 length of 3-II, 1-IV as long as 6-IV; seta 1-VII sometimes aciculate. *Segment VIII:* Spiculation more evident than other segments. Comb with 40–49 scales arranged in 4 irregular rows, fringed apically and/or marginally. *Siphon:* Length 1.14–1.47 mm (1.30 mm), width 0.29–0.47 (0.40 mm), index 2.85–4.60 (3.30). Intensely tanned including acus, basal margin darker. Pecten on basal 0.33 with 13-21 spines, longest located distally, with 2–5 basal denticles. Seta 1-S in 4 pairs, most basal seta arises distal pecten, setae not aligned. Seta 1d-S shorter

than 1a–c–S: 1a–S 1.59–2.90 (2.22) times longer than 1d–S. Setae 2,6–9–S single. *Segment X*: Saddle complete, length 0.30–0.36 mm (0.34 mm), intensely tanned, spicules more evident on dorsoposterior border. Siphon/saddle index 3.40–4.27 (3.87). Seta 1–X generally double; 2,3–X single; 4–X not attached to saddle, generally in 5 pairs, sometimes with a sixth odd element. Anal papillae long and slender, tapering toward apex, ventral pair shorter than the dorsal one.

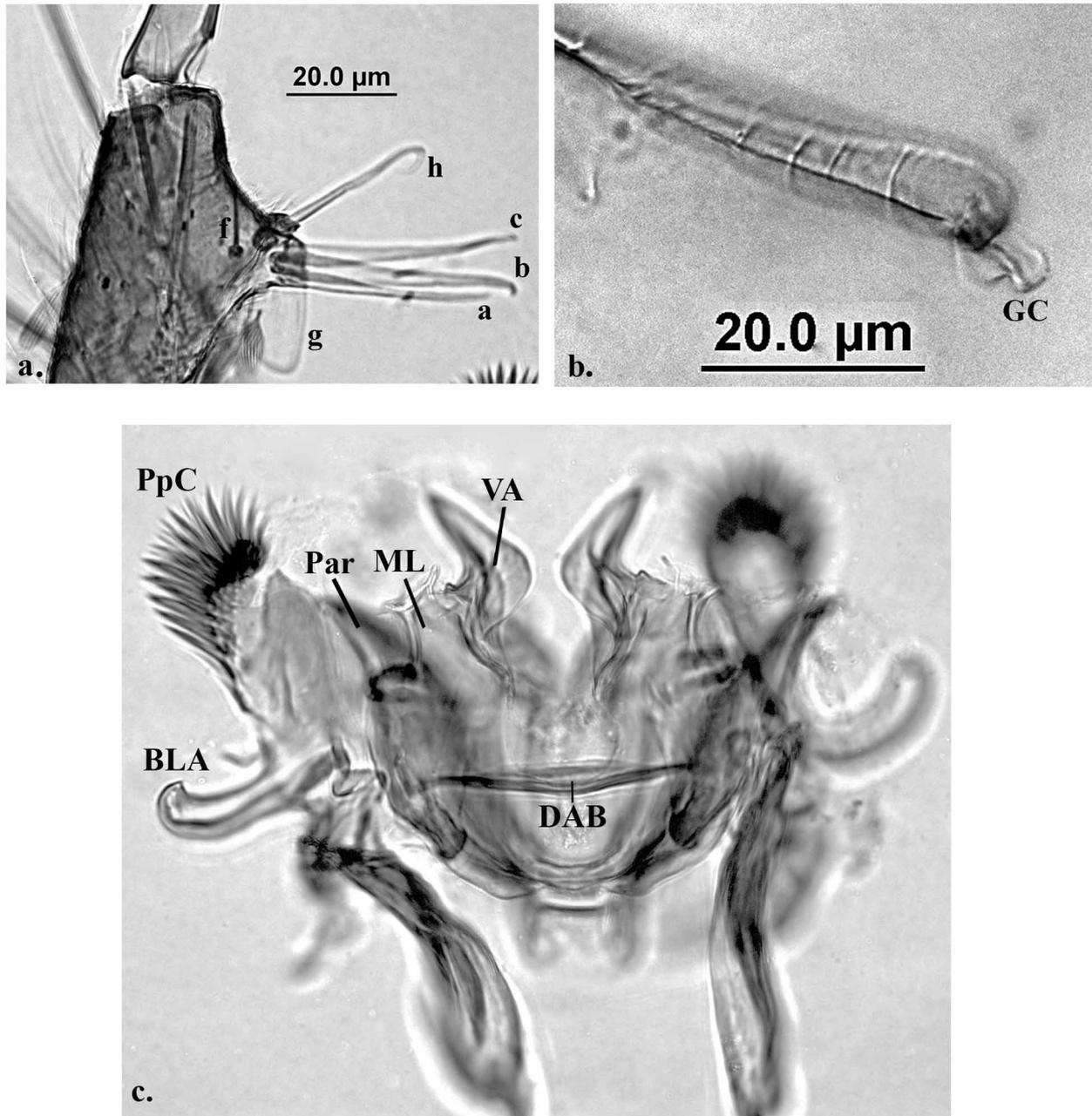


FIGURE 1. Male genitalia structures of *Culex (Culex) acharistus* Root: a: subapical lobe; b: gonostylus (minute annulations); c: phallosome and proctiger. a, b, c, f, g, h = setae of subapical lobe; BLA = basal lateral arm; DAB = dorsal aedeagal bridge; GC = gonostylar claw; ML = mesal lobe; Par = paramere; PpC = paraproct crown; VA = ventral arm.

Material examined. *Culex (Culex) acharistus*: 14M, 23MG, 16F, 33Pe, 32Le, 6L as follows: ARGENTINA, Tucumán Province: Trancas, San Francisco stream (26° 13' 02'' S – 65° 16' 59'' W), 1M, 1MG, 20-IX-1997, Augier coll.; Tafí del Valle (26° 52' 00'' S – 65° 43' 00'' W), 5M, 6MG, 3F, 7Pe, 7Le, 15-I-2001, Molina coll.; Córdoba Province: Río Seco (32° 47' 60'' S – 64° 31' W), 3M, 8MG, 14-XI-1987,

Almirón coll.; Alta Gracia (31° 39' 59'' S – 64° 26' 00'' W), 10F, 14Pe, 14Le, 26-I-1988, Almirón coll.; Villa de Soto, Candelaria River (30° 52' 00'' S – 64° 58' 59'' W), 1F, 1Pe, 1Le, 3-II-1988, Brewer & Almirón coll.; Mina Clavero (31° 43' 00'' S – 65° 01' 00'' W), 1MG, 1Pe, 1Le, 1-X-1995, Harbach coll.; Vaquerías, Vaquerías Stream (31° 08' 28'' S – 64° 28' 46'' W), 2M, 2MG, 1F, 4Pe, 3Le, 19-II-2008, Laurito coll.; Río Negro Province: Meseta de Somuncura (41° 33' 39'' S – 66° 19' 04'' W), 2 M, 4MG, 1F, 4 Pe, 2 L, 7-XII-06, Rossi coll.; Bariloche, Lake Nahuel Huapi (41° 05' 55'' S – 71° 10' 55'' W), 2Pe, 6Le, 4L, III-03, Rossi coll.; Corrientes Province: Mocoretá (30° 36' 59'' S – 57° 58' 00'' W), 1M, 1MG, 17-II-89, Marino coll.

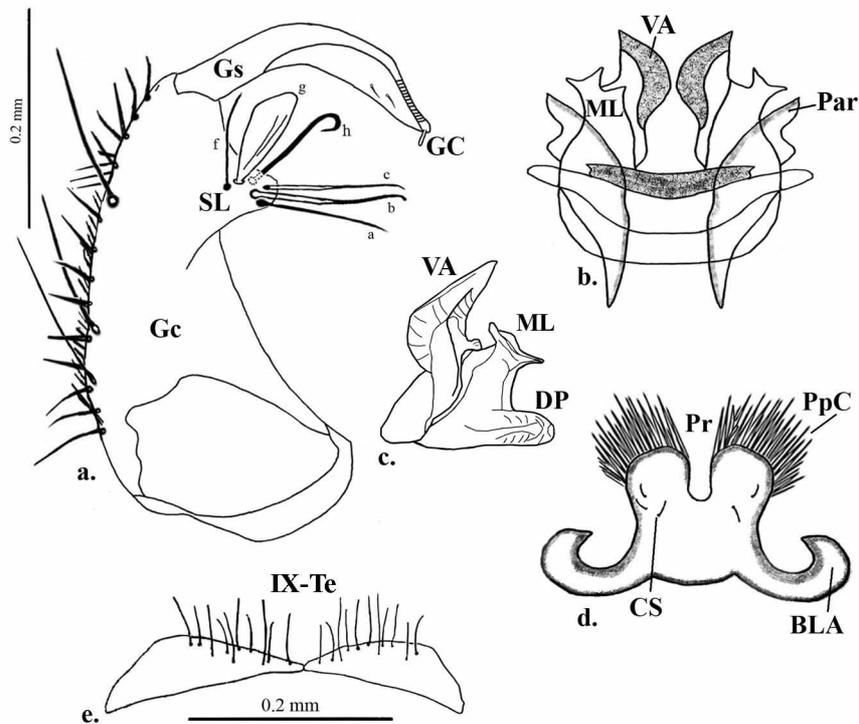


FIGURE 2. Male genitalia structures of *Culex (Culex) acharistus* Root: a: gonocoxopodite (lateral); b: phallosome; c: lateral plate; d: proctiger (dorsal); e: tergum IX (dorsal). a, b, c, f, g, h = setae of subapical lobe; BLA = basal lateral arm; CS = cercal setae; DP = dorsal process; GC = gonostylar claw; Gc = gonocoxite; Gs = gonostylus; ML = mesal lobe; PpC = paraprot crown; Par = paramere; Pr = proctiger; SL = subapical lobe; VA = ventral arm; IX-Te = tergum IX.

Distribution. *Culex acharistus* is known from Brazil, Chile, Argentina (Knight & Stone, 1977) and Colombia (Bram, 1967). In Argentina it is recorded from Córdoba, Corrientes, Jujuy, Neuquén, Río Negro, Tucumán, Chubut (Campos & Maciá, 1998) and Buenos Aires (Rossi, 2000) provinces.

Bionomics. Larvae of *Cx. acharistus* were collected mainly in natural sites, in different climates and seasons of the year as follows (months and climates in parentheses): Brazil: state of Minas Gerais: marshy expansions of mountain streams and side-pools of a small, rapid river in Agua Limpa (March; tropical), state of São Paulo: Salesópolis (July; tropical); Chile: Concepción Province: Concepción (warm temperate), Llanquihue Province: Puerto Montt (warm wet temperate); Argentina: Jujuy Province: La Mendieta (February; tropical mountain range); Tucumán Province: stream San Francisco (September; tropical mountain range), Tafí del Valle (January; tropical mountain range); Córdoba Province: Alta Gracia (January and November; temperate mountain range), Río Seco (November; temperate mountain range), Candelaria River in Villa de Soto (February; temperate mountain range) and marshy expansions of Vaquerías Stream (February; temperate mountain range), Mina Clavero (October; arid mountain range); Neuquén Province: Junín de los Andes (April; humid cold mountain range); Río Negro Province: Colorado River (January; semiarid), Somuncura plateau (982 masl, arid and cold); Chubut Province: Puerto Madryn (February; semiarid); Buenos

Aires Province; Palo Blanco, Berisso (October; temperate). São Paulo city and Palo Blanco are the only urban and semi-urban areas respectively where the species has been found as larvae. Females of *Cx. acharistus* were captured with cylindrical lard-can traps with rabbit, chicken, toad and turtle bait in Córdoba and Cosquín cities (March, April, October and November; mountain range), as well as on humans (Almirón & Brewer, 1995).

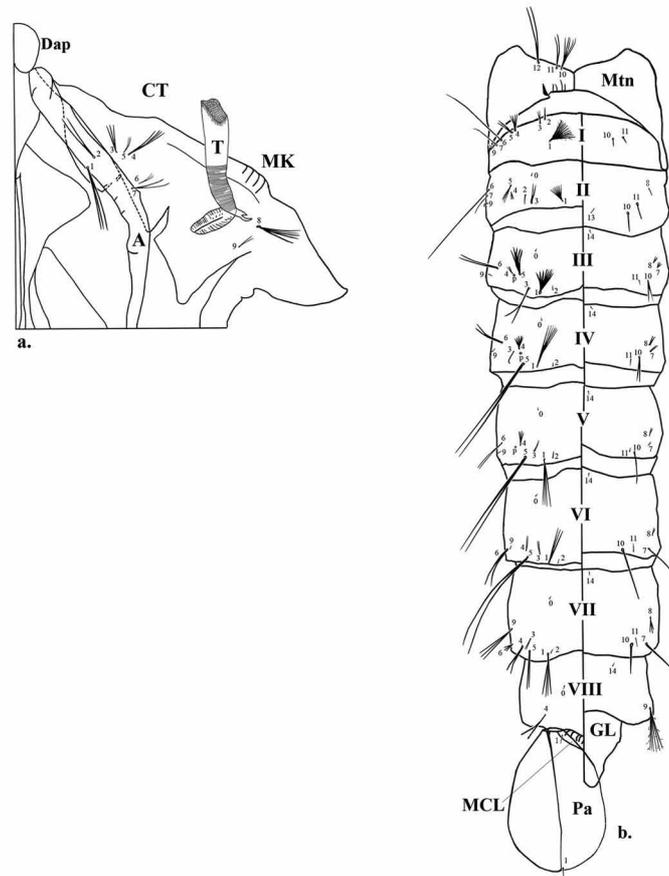


FIGURE 3. Male pupa of *Culex (Culex) acharistus* Root: a: cephalothorax; b: metanotum and abdomen. A = antenna; CT = cephalothorax; Dap = dorsal apotome; GL = genital lobe; MCL = median caudal lobe; MK = median keel; Mtn = metanotum; p = puncture; Pa = paddle; T = trumpet; I–VIII = abdominal segments.

Taxonomy. Females of *Cx. acharistus* are similar to several species, including *Cx. apicinus* Philippi, *Cx. brethesi* Dyar, *Cx. chidesteri* Dyar, *Cx. dolosus* Lynch Arribálzaga, *Cx. pipiens* L. complex, *Cx. bidens* Dyar, *Cx. interfor* Dyar and *Cx. ameliae* Casal. The characters that distinguish *Cx. acharistus* from these species are: the narrow pale scales on scutum and the complete basal pale bands of the terga that cover at least 0.48 of the segment in *Cx. apicinus*; sternum with dark scales and median and posterior patches of white scales present in *Cx. brethesi*; postspiracular scales in *Cx. chidesteri*; scutum with antealar spots of yellowish scales in *Cx. dolosus*; intermixed pale and dark erect scales in the *Cx. pipiens* complex; joints between hindtarsomeres pale-scaled in *Cx. bidens* and *Cx. interfor*, and mesopostnotum with narrow and decumbent bronze scales in *Cx. ameliae*.

Discussion. The shape of the dorsomentum, the insertion of seta 1-A near the middle of the antenna, the sclerotized and minutely denticulate plate of the abdominal segments and the shape of siphon easily distinguish the fourth-instar larva of *Cx. acharistus* from other *Cx. (Cux.)* species. The pupa is very similar to other species of the subgenus, but differs in having the seta 9-CT conspicuously shorter, the seta 9-VI in an unusually position, a long and strong seta 1-Pa and no seta 2-Pa.

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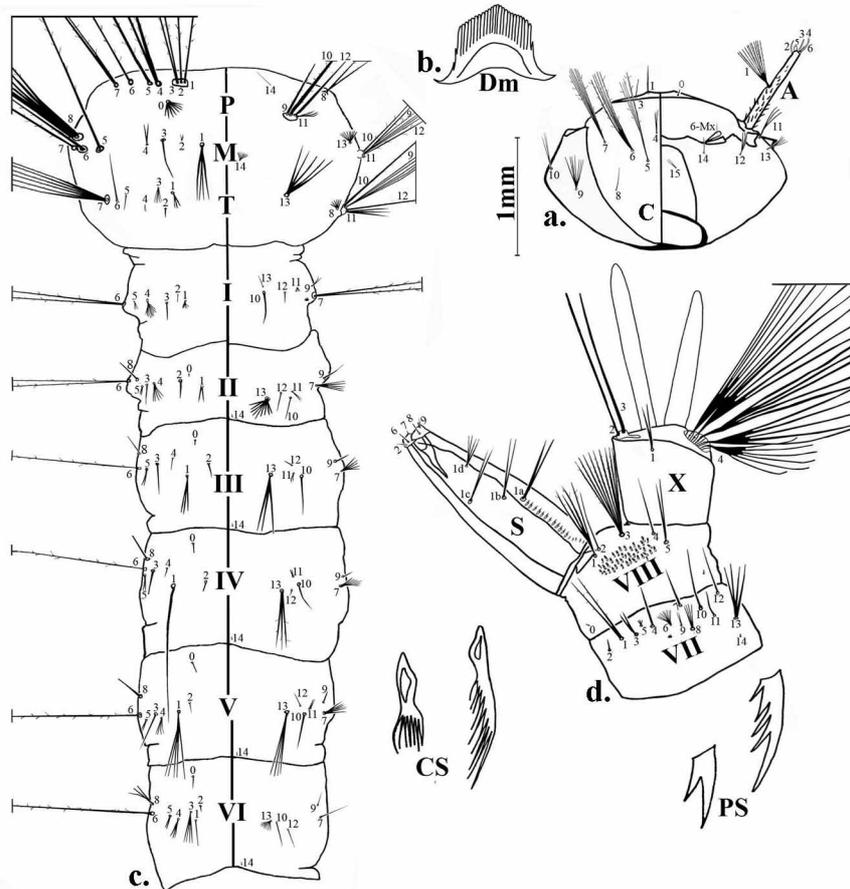


FIGURE 4. Larva of *Culex (Culex) acharistus* Root: a: head; b: dorsomentum; c: thorax and abdominal segments I–VI; d: Abdominal segments VII–X and siphon. A = antenna; C = cranium; CS = comb scales; Dm = dorsomentum; PS = pecten spines; S = siphon; I–X = abdominal segments.

References

- Almirón, W.R. & Brewer, M. (1995) Host preference of Culicidae (Diptera) collected in central Argentina. *Revista de Saúde Pública*, 29, 108–114.
- Avilés, G., Medeot, S., Díaz, G., Bianchi, T.I., Bakos, E., Daffner, J., Almirón, W.R., Brewer, M. & Sabatini, M.S. (1989) Estudios en caballos y mosquitos durante una epizootia por virus de la Encefalitis Equina del Este (EEE) en una zona subtropical de Argentina. *12º Reunión Científica, Sociedad Argentina de Virología*.
- Bachmann, A.O. & Casal, O.H. (1963) Notas sobre *Culex (Culex)* argentinos II. *Revista de la Sociedad Entomológica Argentina*, 25, 39–42.
- Bram, R.A. (1967) Classification of *Culex* subgenus *Culex* in the New World (Diptera: Culicidae). *Proceedings of the United States National Museum*, 120(3557), 1–122.
- Campos, R.E. & Maciá, A. (1998) Culicidae. In: Morrone J.J. & Coscarón S. (Eds.), *Biodiversidad de Artrópodos Argentinos. Una Aproximación Biotaxonómica*. Ediciones Sur, La Plata, pp. 291–303.
- Forattini, O.P. & Rabello, E.X. (1965) Notas sobre Culicidae (Diptera) 6. Novos dados sobre algumas espécies do subgénero *Culex*. *Papéis Avulsos do Departamento de Zoologia*, 17, 27–31.
- Forattini, O.P. (1965) *Entomología Médica*. Editora da Universidad de São Paulo, São Paulo, 506 pp.
- Harbach, R.E. & Knight, K.L. (1980) *Taxonomists' Glossary of Mosquito Anatomy*. Plexus Publishing, Marlton, New

Jersey, 415 pp.

- Harbach, R.E. & Knight, K.L. (1982) Corrections and additions to Taxonomists' glossary of mosquito anatomy. *Mosquito Systematics*, 13, 201–217.
- Knight, K.L. & Stone, A. (1977) *A Catalogue of the Mosquitoes of the World (Diptera: Culicidae)*. Entomological Society of America, Maryland, 611 pp.
- Lane, J. (1953) *Neotropical Culicidae*. Editora da Universidade de São Paulo, São Paulo, 1112 pp.
- Root, F.M. (1927) Studies on Brazilian mosquitoes III. The genus *Culex*. *American Journal of Hygiene*, 7, 574–598.
- Rossi, G.C. (2000) Las especies de mosquitos (Diptera: Culicidae) de la provincia de Buenos Aires, Argentina. *Revista de la Sociedad Entomológica Argentina*, 59, 141–145.
- Stone, A. & Knight, K.L. (1957) Type specimens of mosquitoes in the United States National Museum: IV, The genus *Culex* (Diptera: Culicidae). *Journal of the Washington Academy of Science*, 47, 117–126.