



## Description of the immature stages of *Culex (Culex) ameliae* Casal and *Culex (Culex) articularis* Philippi (Diptera: Culicidae)

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### Abstract

The pupa and the fourth-instar larva of *Culex (Culex) ameliae* Casal and *Cx. (Cux.) articularis* Philippi are described and illustrated for the first time. Information is provided on the distribution, bionomics and taxonomy of the species.

**Key words:** *Culex (Culex) ameliae*, *Culex (Culex) articularis*, description, immature stages

### Introduction

*Culex (Culex) ameliae* was described by Casal (1967) based on the male genitalia and a single morphological character of the adults. The specimens were collected between San Pedro and Eldorado, 10 km from San Pedro, Misiones Province, Argentina. Adults were obtained from individual rearing of larvae and Shannon traps. Although the pupal and larval exuviae of 15 male and 7 female paratypes were preserved, neither immature stage was described, and the adult descriptions were limited to few characters.

*Culex (Culex) articularis* was described by Philippi (1865) based also on the male genitalia and a few morphological characters of adults collected in Casa Pangué, Llanquihue, Chile. Nothing was said about the immature stages.

The purpose of this paper is to provide the first descriptions of the pupa and fourth-instar larva of *Cx. ameliae* and *Cx. articularis*.

### Material and methods

Ten pupal and three larval exuviae of paratypes of *Cx. ameliae* were studied. These specimens are deposited in the Administración Nacional de Laboratorios e Instituto de Salud (ANLIS) “Dr. Carlos G. Malbrán”, Buenos Aires, Argentina, but were relocated to the Centro de Estudios Parasitológicos y de Vectores (CEPAVE) La Plata, Argentina, where there were temporarily available. Material used to describe *Cx. articularis* included three pupal and six larval exuviae obtained by G.C. Rossi. Identification of this material was based on male genitalia removed from a dead pupa (the adults died before emergence).

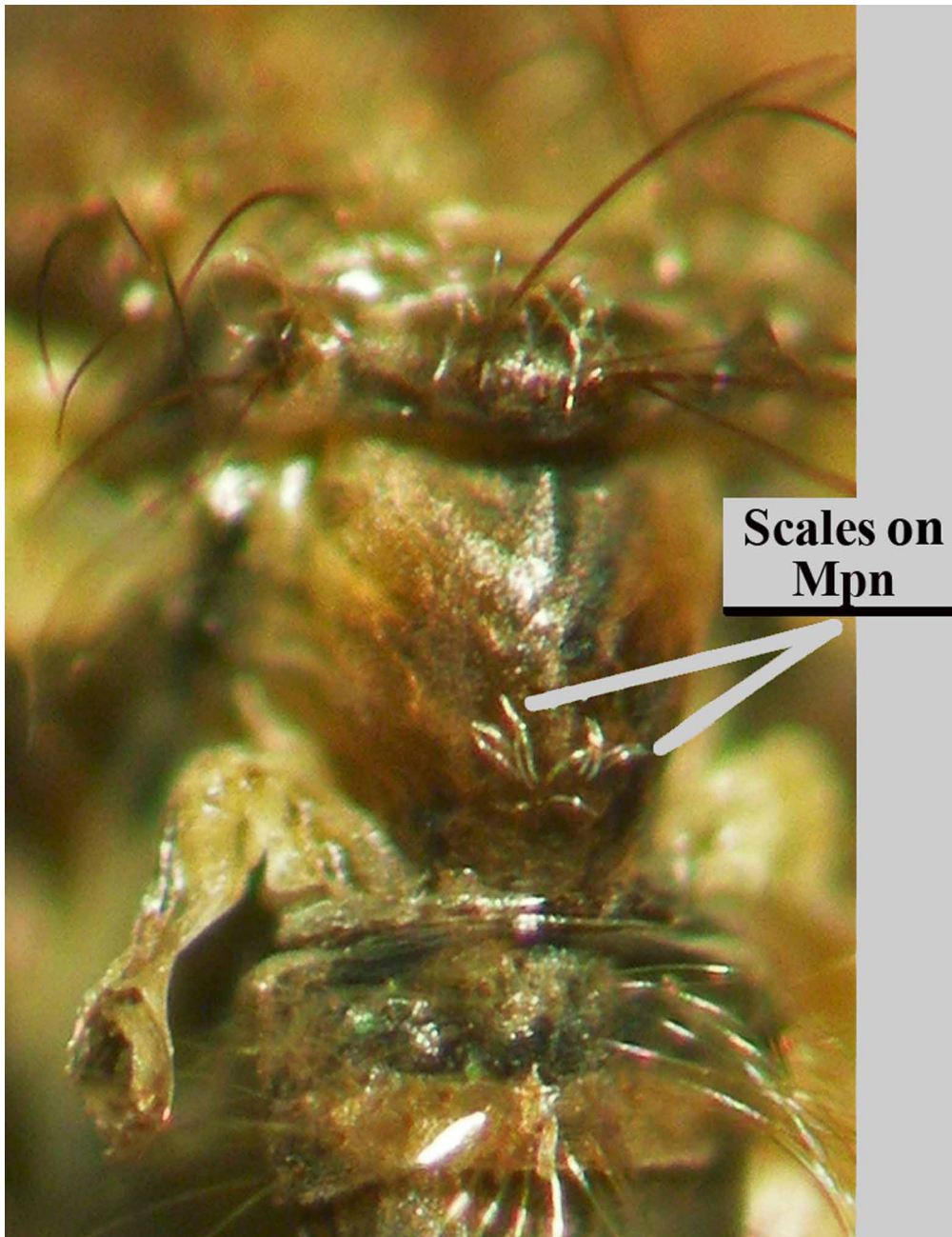
Pupal and larval exuviae were mounted on microscope slides in Canada balsam. Morphological terminology follows Harbach & Knight (1980, 1982). Voucher specimens are deposited in the ANLIS. Life stages are indicated as follows: M (male), F (female), Pe (pupal exuviae), L (fourth-instar larva) and Le (larval exuviae). An asterisk following an abbreviation indicates that the life stage was at least partially illustrated in the publication cited. Mea-

Measurements are given in millimeters with a range. Means and modes in parenthesis are provided only for the pupa of *Cx. ameliae* and the larva of *Cx. articularis*.

### *Culex (Culex) ameliae* Casal

*Culex ameliae* Casal, 1967: 29 (M\*). Type locality: between San Pedro and Eldorado, 10 km from San Pedro, Misiones, Argentina (INM).

Adult males and females of *Cx. ameliae* were well diagnosed by Casal. In addition to the characteristic genitalia in the male, both sexes show a unique character, the presence of short, filiform tan scales on the mesopostnotum (Fig. 1).



**FIGURE 1.** Photograph of the mesopostnotum (Mpn) of the female of *Culex (Culex) ameliae* Casal.

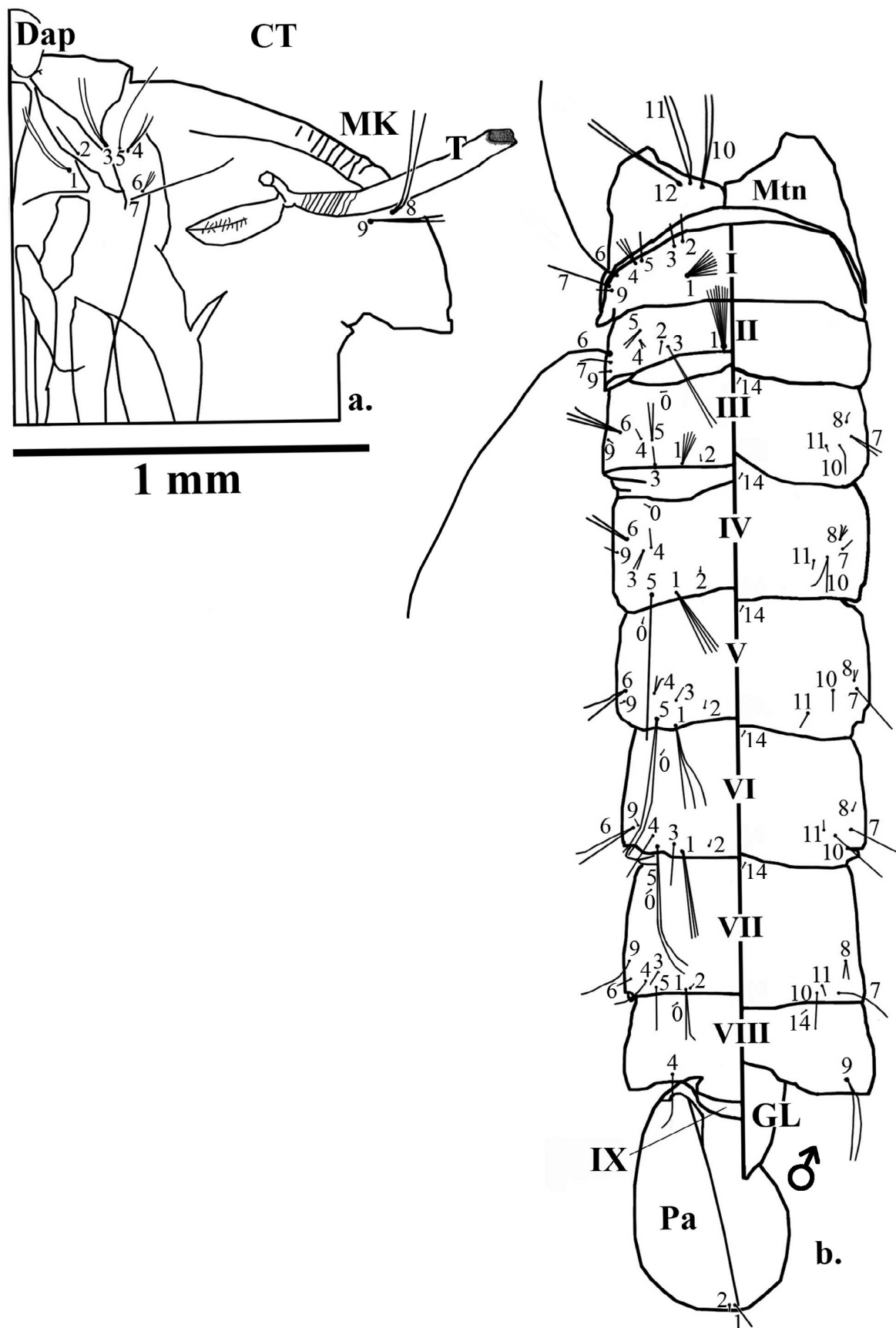
This feature makes the species sufficiently different from other *Cx. (Cux.)*. Harrison & Bickley (1990), when reviewing the presence of ornamentation on the mesopostnotum of Culicidae, mention that only some species of the *Culex* subgenera *Melanoconion* Theobald and *Carrollia* Lutz possess mesopostnotal scales/setae. They did not mention the subgenus *Culex*, which includes 198 species (Mosquito Taxonomic Inventory 2007), some of which exhibit with exceptional and many polymorphic features. There was no mention of *Cx. ameliae*, although Casal (1967) mentioned the character in the original description.

**PUPA** (Fig. 2). Placement and character of setae as figured; range and modal number of branches in Table 1. *Cephalothorax* (Fig. 2a): integument lightly tanned, homogeneously colored, maxillary palpus, distal extreme of legs and posterior of scutum sometimes slightly darker, metanotum evenly tanned, sometimes lighter laterally. Trumpet almost cylindrical, tanned, length 0.76–0.91 mm (0.84 mm), width 0.08–0.13 mm (0.10 mm), index 7–10 (8.45). *Abdomen* (Fig. 2b): length 3.35–4.00 mm (3.57 mm); integument yellowish. Seta 1-I with 8–28 aciculate branches. Setae 4,6,8-IV with secondary short branches at apex. Seta 9-VIII with variable number of branches. *Genital lobe*: slightly tanned in both sexes, males: length 0.20–0.25 mm (0.22 mm); females: length 0.10–0.11 mm. *Paddle*: length 0.85–1.09 mm (0.96 mm), width 0.44–0.63 mm (0.50); index 1.34–1.73 (1.52). Yellowish to slightly tan, midrib strong, extending length of paddle. Seta 2-Pa between 0.25–0.50 length of 1-Pa.

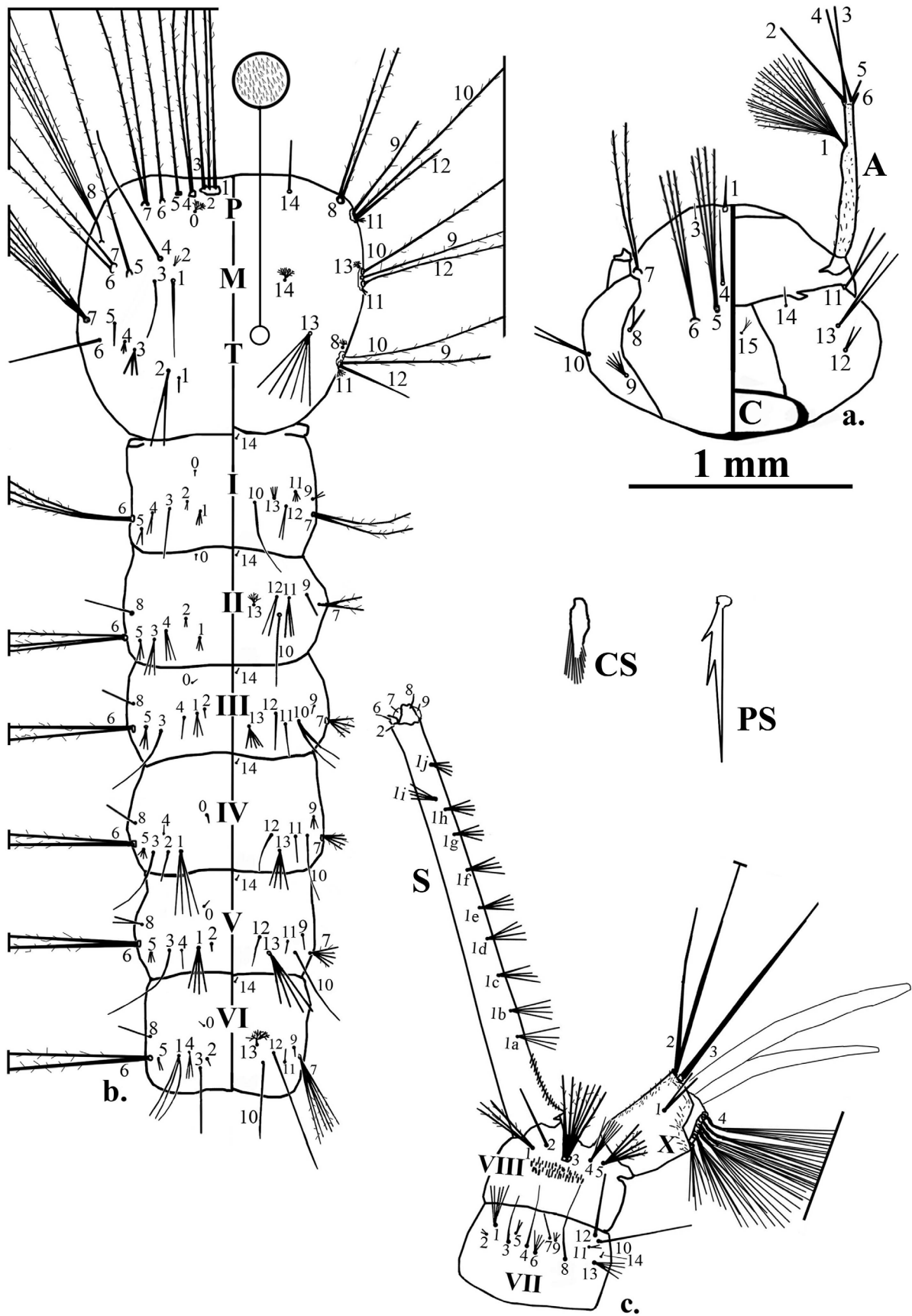
**TABLE 1.** Number of branches for pupal setae of *Culex (Culex) ameliae* Casal (10 specimens, modes in parenthesis).

| Seta no. | Cephalothorax CT | Abdominal segments |         |         |        |        |        |        |        | Paddle Pa |
|----------|------------------|--------------------|---------|---------|--------|--------|--------|--------|--------|-----------|
|          |                  | I                  | II      | III     | IV     | V      | VI     | VII    | VIII   |           |
| 0        | -                | -                  | -       | 1       | 1      | 1      | 1      | 1      | 1      |           |
| 1        | 1–3(3)           | 8–48               | 8–11(9) | 5–10(8) | 4–6(5) | 2–5(5) | 2–4(4) | 2,3(3) | -      | 1         |
| 2        | 1                | 1                  | 1       | 1       | 1      | 1      | 1      | 1      | -      | 1         |
| 3        | 2–3(2)           | 1,2(2)             | 1–3(3)  | 2,3(2)  | 2–5(3) | 1–3(1) | 1–3(1) | 1–3(3) | -      |           |
| 4        | 1–3(2)           | 3,4(4)             | 2–4(2)  | 1–4(2)  | 1–5(1) | 2–4(4) | 1–4(4) | 1,2(2) | 1,2(2) |           |
| 5        | 1–2(2)           | 1                  | 2,3(2)  | 2,4(2)  | 1–5(3) | 1,2(2) | 1,2(2) | 1,2(1) | -      |           |
| 6        | 3–4(3)           | 1                  | 1–3(1)  | 3–5(3)  | 2–4(2) | 2,3(3) | 2,3(2) | 3–6(3) | -      |           |
| 7        | 1–2(1)           | 1                  | 1       | 1–3(2)  | 1–3(1) | 1–4(1) | 1      | 1      | -      |           |
| 8        | 2–4(3)           | 1                  | 1       | 1–5(3)  | 1–3(3) | 1,3(3) | 2,3(3) | 1–3(3) | -      |           |
| 9        | 1–2(1)           | 1                  | 1       | 1       | 1      | 1      | 1      | 1      | 2–10   |           |
| 10       | 2–3(3)           | -                  | -       | 1       | 1,2    | 1      | 1      | 1      | -      |           |
| 11       | 2–3(3)           | -                  | -       | 1       | 1      | 1      | 1      | 1      | -      |           |
| 12       | 2–5(2)           | -                  | -       | -       | -      | -      | -      | -      | -      |           |
| 13       | -                | -                  | -       | -       | -      | -      | -      | -      | -      |           |
| 14       | -                | -                  | -       | 1       | 1      | 1      | 1      | 1      | 1      |           |

**LARVA** (fourth-instar) (Fig. 3). Placement and character of setae as figured; number of branches in Table 2. *Head* (Fig. 3a): slightly wider than long, width 1.35 mm, length 1.00 mm, collar narrow. Dorsomentum with pointed teeth, 6 or 7 teeth on each side of median tooth, lateral teeth slightly longer than the others. Setae 1,3-C single, setae 0,2,16,17-C absent. *Antenna*: length 0.34–0.75 mm, aciculate. Seta 1-A fanlike with 20–22 aciculate branches, inserted 0.46–0.55 mm from base. Setae 2–4-A longer than in other *Culex (Culex)*. *Thorax* (Fig. 3b): integument hyaline, with spicules up to 10 µm long. Seta 4-M subequal to 5-M, longer than in other *Cx. (Cux.)*. Seta 6-M conspicuously longer than 1,3-M. Setae 10-P and 12-M long, 0.21 and 0.19 mm respectively. *Abdomen* (Fig. 3b): integument hyaline, with spicules about 10 µm long. Setae 0,14-I–VI at most 1 µm in length. Setae 1,2-I,II very short. *Segment VIII* (Fig. 3c): seta 4-VIII with 6 branches, comb with 51, 52 scales arranged in 2 rows. *Siphon* (Fig. 3c): length 2.08–2.24 mm, width 0.26–0.28 mm. Pecten with 17–19 spines with 2 basal denticles. Seta 1-S in 10 pairs, most basal arises beyond pecten, 1i-S not in line with the others. *Segment X* (Fig. 3c): saddle complete, length 0.27–0.30 mm, with spicules on dorsal surface and caudal border. Setae 2,3-X strongly developed. Seta 4-X in 6 pairs. Anal papillae long and slender, dorsal pair longer than ventral pair.



**FIGURE 2.** Pupa of *Culex (Culex) ameliae* Casal: a, cephalothorax; b, metanotum and abdomen. CT = cephalothorax; Dap = dorsal apotome; GL = genital lobe; MK = median keel; Mtn = metanotum; Pa = paddle; T = trumpet; I-IX = abdominal segments.



**FIGURE 3.** Larva of *Culex (Culex) ameliae* Casal: a, head; b, thorax and abdominal segments I–VI; c, abdominal segments VII, VIII, X and siphon. A = antenna; C = cranium; CS = comb scale; PS = pecten spine; S = siphon; I–VIII, X = abdominal segments. The positions shown in the figure may not be accurate due to having been drawn from exuviae.

**TABLE 2.** Number of branches for fourth-instar larval setae of *Culex (Culex) ameliae* Casal (3 exuviae).

| Seta no. | Head |  | Thorax |       | Abdominal segments |     |      |      |     |     |       |     |        |        |
|----------|------|--|--------|-------|--------------------|-----|------|------|-----|-----|-------|-----|--------|--------|
|          | H    |  | P      | M     | T                  | I   | II   | III  | IV  | V   | VI    | VII | VIII   | X      |
| 0        | -    |  | 10,11  | -     | -                  | 1   | 1    | 1    | 1   | 1   | 1     | ?   | ?      | -      |
| 1        | 1    |  | 1      | 1     | 1                  | 3,4 | 3    | 1,3  | 4   | 4   | 3,4   | 5,6 | 3      | 2,3    |
| 2        | -    |  | 1      | 3     | 2                  | 2   | 2    | 1,2  | 1   | 1   | 1     | 2   | 1      | 2      |
| 3        | 1    |  | 1      | 1     | 3                  | 1,4 | 1,3  | 1    | 1   | 1   | 1     | 1   | 4,7    | 1      |
| 4        | 1,2  |  | 2      | 1,2   | 3                  | 1,5 | 3,5  | 1,3  | 1   | 1   | 3,4   | 1   | 6      | 12     |
| 5        | 4    |  | 1      | 1     | 1                  | 2   | 2,3  | 3    | 4   | 3   | 2     | 1,2 | 3,5    | -      |
| 6        | 3,4  |  | 1,2    | 1     | 1,2                | 3   | 3    | 2    | 2   | 2   | 2     | 4,6 | -      | Siphon |
| 7        | 2,8  |  | 2,3    | 1     | 1,6                | 1,2 | 2,3  | 4,5  | 4,6 | 5,6 | 6     | 1,6 | 1a-S   | 4      |
| 8        | 2-4  |  | 2      | 5,6   | 9,15               | -   | 1,2  | 1    | 1   | 2   | 1,4   | 1   | 1b-S   | 4      |
| 9        | 5    |  | 1      | 1,4   | 1                  | 2   | 1,4  | 1    | 3   | 1   | 1     | 3   | 1c-S   | 4,5    |
| 10       | 2    |  | 1      | 1     | 1                  | 1   | 1    | 1,2  | 1   | 1   | 1     | 1   | 1d-S   | 3,5    |
| 11       | 2    |  | 3      | 2     | 7                  | 4   | 3,7  | 1,2  | 1   | 1   | 1     | 2   | 1e-S   | 4,5    |
| 12       | 2,3  |  | 1      | 1     | 1                  | 2,3 | 2    | 1    | 1   | 1   | 1     | 1   | 1f-S   | 4,5    |
| 13       | 2    |  | -      | 12,23 | 6                  | 4,7 | 4,18 | 5,12 | 4   | 4   | 22,23 | 4   | 1g-S   | 4      |
| 14       | 1,2  |  | 1      | 14,16 | -                  | 1   | 1    | 1    | 1   | 1   | 1     | 1   | 1h-S   | 4,5    |
| 15       | 3,5  |  | -      | -     | -                  | -   | -    | -    | -   | -   | -     | -   | CS     |        |
|          |      |  |        |       |                    |     |      |      |     |     |       |     | Pecten |        |
|          |      |  |        |       |                    |     |      |      |     |     |       |     | 1-A    |        |
|          |      |  |        |       |                    |     |      |      |     |     |       |     | li-S   | 3,4    |
|          |      |  |        |       |                    |     |      |      |     |     |       |     | lj-S   | 4      |

? = not counted.

**Material examined.** 10Pe, 3Le as follow: ARGENTINA, Misiones Province, between San Pedro and Eldorado, 10 km from San Pedro (26° 24' 49.1'' S – 54° 30' 36.1'' O), 11-III-1966, García & Casal coll. Paratypes have the following numbers: Ga 137-31; Ga 136-21; Ga 131-105; Ga 137-102; Ga 137-104; Ga 131-106; Ga 131-111; Ga 132-104; Ga 132-105; Ga 132-106.

**Distribution.** *Culex ameliae* is known only from Argentina (Walter Reed Biosystematics Unit 2001), and is considered endemic to the type locality (Campos & Maciá 1998).

**Bionomics.** Larvae of *Cx. ameliae* were collected in association with larvae of *Cx. (Melanoconion) intricatus* Brethès, *Cx. (Mel.) bejaranoi* Duret, *Cx. (Cux.) chidesteri* Dyar and *Cx. (Cux.) dolosus* (Lynch Arribáizaga) (Casal 1967). Casal mentioned only that the larvae were collected in a flooded depression.

**Taxonomy.** The larva of *Cx. ameliae* is very similar to the larva of *Cx. chidesteri*. The latter differs from *Cx. ameliae* in the following characters: the length of seta 4-M is less than 0.50 of 5-M, the thorax has spicules longer than 10 µm, the siphon is darker, seta 1a-S is inserted within the pecten and the last pecten spine is more widely separated from the others.

### *Culex (Culex) articularis* Philippi

*Culex articularis* Philippi, 1865: 596 (A). Type locality: Casa Pangué, Llanquihue, Chile (USNM). Stone *et al.* 1959. Dyar 1928: 358 (M\*, F). Lane 1951: 334 (syn. of *archegus* Dyar). Lane 1953: 362 (M\*, F). Forattini 1965: 145 (M\*). Bram 1967: 23 (M\*, L\*; syn., neotype designation).

**PUPA** (Fig. 4): Placement and character of setae as figured; number of branches in Table 3. *Cephalothorax* (Fig. 4a): integument yellowish, homogeneously colored; distal half of maxillary palpus and median keel slightly tan, metanotum yellowish to tan. Trumpet conical to cylindrical, uniformly tanned, length 0.56–0.67 mm, width 0.12–0.17 mm, index 3.94–4.67. *Abdomen* (Fig. 4b): length 2.74–3.62 mm; integument yellowish, medio-apical and basal area of each segment slightly tan. Seta 1-I fanlike with 20–35 aciculate branches. Setae 9-II,IV,VII longer (more than double) than 9-I,III,V,VI. *Genital lobe*: tan, smooth in both sexes, males: length 0.25–0.40 mm, wrin-

kled ventrally; female: length 0.17 mm. *Paddle*: length 0.87–0.92 mm, width 0.69–0.80 mm; index 1.24–1.29; yellowish, smooth, midrib thick and strong, as long as paddle. Seta 2-Pa stronger than 1-Pa.

**TABLE 3.** Number of branches for pupal setae of *Culex (Culex) articularis* Philippi (3 specimens).

| Seta no. | Cephalothorax CT | Abdominal segments |      |     |     |     |     |     |      | Paddle Pa |   |
|----------|------------------|--------------------|------|-----|-----|-----|-----|-----|------|-----------|---|
|          |                  | I                  | II   | III | IV  | V   | VI  | VII | VIII |           |   |
| 0        | -                | -                  | 1    | 1   | 1   | 1   | 1   | 1   | 1    | 1,2       | - |
| 1        | 4,5              | 20–35              | 7–15 | 7,8 | 5–8 | 3–6 | 3,4 | 2–5 | -    | -         | 1 |
| 2        | 3,4              | 1,2                | 1    | 1   | 1   | 1   | 1   | 1   | -    | -         | 1 |
| 3        | 2–4              | 2,3                | 2    | 2   | 3,4 | 1,2 | 1   | 2   | -    | -         | - |
| 4        | 3                | 4,5                | 4    | 1–4 | 1,2 | 4   | 2   | 1,2 | 1,2  | -         | - |
| 5        | 3–5              | 1–3                | 5,6  | 4–8 | 2–5 | 2   | 2   | 1,2 | -    | -         | - |
| 6        | 4                | 1                  | 1    | 1–3 | 5   | 3,4 | 4   | 3   | -    | -         | - |
| 7        | 2–5              | 2                  | 1    | 1,2 | 1,2 | 3,4 | 1   | 1   | -    | -         | - |
| 8        | 6,7              | -                  | -    | 1–3 | 1,2 | 1,2 | 2   | 2   | -    | -         | - |
| 9        | 2                | 1                  | 1,2  | 1   | 1,2 | 1   | 1   | 3,4 | 4–7  | -         | - |
| 10       | 6,7              | a                  | -    | 2,3 | 1,2 | 1   | 1   | 1   | -    | -         | - |
| 11       | 2                | a                  | -    | 1   | 1   | 1   | 1   | 1,3 | -    | -         | - |
| 12       | 2,3              | -                  | -    | -   | -   | -   | -   | -   | -    | -         | - |
| 13       | -                | -                  | -    | -   | -   | -   | -   | -   | -    | -         | - |
| 14       | -                | -                  | -    | 1   | 1   | 1   | 1   | 1   | 1    | -         | - |

<sup>a</sup> = not found, alveolus without seta.

**LARVA** (fourth-instar) (Figs. 5, 6): Placement and character of setae as in Fig. 5; range and modal number of branches in Table 4. *Head* (Fig. 5a): wider (1.40 mm) than long (1.06 mm), oval, heavily tanned, distal half of lateralia lighter. Hypostomal suture extends to collar. Collar narrow, brown. Dorsomentum brown (Fig. 5b), teeth pointed, not sharp, with 7 or 8 teeth on each side of median tooth. Maxilla (Fig. 6): 6-Mx single, 1.53 longer than 14-C. Setae 0,2-C single, in dorsal position, setae 1,3,4-C also single, setae 5–7-C fanlike with aciculate branches, 15-C generally triple, 16,17-C absent. *Antenna*: length 0.56–0.62 mm (0.58 mm), tanned; basal ring darker. Spicules uniformly distributed, shorter and more evident on distal third. Seta 1-A fanlike with 20–26 aciculate branches, inserted 0.39–0.46 mm (0.41 mm) from base. *Thorax* (Fig. 5c): integument hyaline, apparently glabrous, minute spicules 2.5–5.0 µm or shorter, exceptionally up to 10 µm. Tubercles of large dorsal setae tanned, tubercles of setae 9–12-M,T with 2 strong, sclerotized denticles, lateral to seta 12-M and/or 10-T, or with a crown of 5–7 sclerotized denticles. Setae 1–8,12-P aciculate, seta 4-P 0.70 length of 1-P. Seta 1-M quadruple in general, length 0.26–0.34 mm (0.29 mm). Seta 1-T 0.11–0.13 mm (0.12 mm) long, setae 7,9,10-T with aciculate branches. *Abdomen* (Fig. 5c): integument hyaline, covered by minute spicules 2.5–5.0 µm. Setae: 6-I–VI; 7-I; 12-V; 1-VII and 1,3,5-VIII aciculate. *Segment VIII* (Fig. 5d): with more and longer spicules (7.5–10 µm) than the other segments. Comb with 40–50 scales arranged in 4 rows, fringed apically and/or marginally. *Siphon*: length 1.41–1.55 mm (1.50 mm), width 0.31–0.35 (0.32 mm), index 4.03–5.21 (4.68). Uniformly tanned, including acus, basal margin darker. Pecten on basal 0.23 with 10–14 spines, with 2 or 3 basal denticles. Seta 1-S in 5 pairs distal to pecten, seta 1d-S not in line with the others. Length of seta 1a-S 0.87 width of siphon. Setae 2,6,9-S single. *Segment X*: saddle complete, length 0.35–0.40 mm (0.37 mm), tanned, basal margin, dorsal and middle of posterior margin slightly darker. Segment covered with spicules that are more evident on posterior margin. Siphon/saddle index 3.87–4.43 (4.05). Seta 4-X in 6 pairs. Anal papillae slender, tapering toward apex, ventral pair lightly shorter than the dorsal pair.

**Material examined.** 3Pe, 6Le, as follow: ARGENTINA, Río Negro Province, Estancia El Rincón spring of Valcheta stream (40° 59' 26.7'' S – 66° 40' 37.3'' O), 05-XII-2006, Donato coll.

**Distribution.** *Culex articularis* is known from Chile, Argentina, Ecuador and Perú (Walter Reed Biosystematics Unit 2001). In Argentina it is recorded from the provinces of Neuquén, Río Negro (Campos & Maciá 1998) and Chubut (Rossi & Vezzani, unpublished data).

**Bionomics.** Larvae of *Cx. articularis* were collected in Río Negro Province, at 620 m.a.s.l. with dry and cold climate. The environment is a fertile lowland that feeds the most important spring of Valcheta stream (near El Rincón farm). The stream has abundant coastal vegetation of the genus *Cortadeira*. *Culex articularis* was found associated with amphipods of the genus *Hyalella*.

**TABLE 4.** Number of branches for fourth-instar larval setae of *Culex (Culex) articularis* Philippi (6 exuviae, modal number in parenthesis).

| Seta no. | Head   |          | Thorax    |        | Abdominal segments |           |        |        |        |        |        |              |                  |   |
|----------|--------|----------|-----------|--------|--------------------|-----------|--------|--------|--------|--------|--------|--------------|------------------|---|
|          | H      | P        | M         | T      | I                  | II        | III    | IV     | V      | VI     | VII    | VIII         | X                |   |
| 0        | 1      | 9-13(11) | -         | -      | -                  | 1         | 1      | 1      | 1      | 1      | 1      | 1            | -                | - |
| 1        | 1      | 1        | 3-6(4)    | 3-6(3) | 5-8(5)             | 3-5(3)    | 4      | 4      | 4      | 3,4(3) | 3,4(3) | 3-6(5)       | 2,3(2)           |   |
| 2        | 1      | 1        | 1-3(2)    | 1-3(1) | 1                  | 1         | 1      | 1,2    | 1      | 1      | 1      | 1            | 2,3              |   |
| 3        | 1      | 1        | 1         | 3-5(3) | 1,2                | 1,2(1)    | 1      | 1      | 1      | 1      | 2,3(2) | 8,9(9)       | 1                |   |
| 4        | 1      | 2        | 2         | 2-4(2) | 8,9(8)             | 4-6       | 1,2(2) | 1      | 1      | 1-5    | 1      | 1            | 6                |   |
| 5        | 4-6(5) | 1        | 1         | 1-3(1) | 2-5(3)             | 1-3(2)    | 1,2(2) | 1-4(2) | 1,2(1) | 2-4    | 1-5(3) | 3-6(4)       | -                |   |
| 6        | 3-6(3) | 1        | 1         | 1      | 3                  | 3         | 2      | 2      | 2      | 2      | 5-13   | -            | -                |   |
| 7        | 6-9(8) | 2        | 1         | 6-9    | 2                  | 4,5(5)    | 6,7(7) | 7-9(8) | 6-9    | 1,2(1) | 1      | -            | Siphon           |   |
| 8        | 4      | 2        | 4-7(5)    | 7-11   | -                  | 1         | 1      | 1,2(2) | 1,2(2) | 3,4(3) | 4,5(4) | 1S-a         | 3-5(4)           |   |
| 9        | 5-8(8) | 1        | 3-6       | 4,5(5) | 1,2(2)             | 1,2(1)    | 1      | 1      | 1,2(1) | 1      | 2-4(3) | 1S-b         | 3-5(3)           |   |
| 10       | 1,2(2) | 1        | 1         | 1      | 1,2(1)             | 1         | 1      | 1      | 1      | 1      | 1      | 1S-c         | 3,4(4)           |   |
| 11       | 3,4(3) | 3,4(4)   | 3         | 2,3    | 2-4                | 2         | 1,2(1) | 1      | 1-3(1) | 2-4(2) | 1,2(2) | 1S-d<br>1S-e | 3-5(3)<br>3-5(4) |   |
| 12       | 4,5(4) | 1        | 1         | 1      | 2,3(3)             | 1-3       | 1,2(1) | 1-4(2) | 1-4(1) | 1      | 1      | -            | -                |   |
| 13       | 3,4(3) | -        | 10-19     | 5-8(6) | 2,3(3)             | 15-20(18) | 3-5(4) | 3-5(3) | 2-5    | 20-28  | 1-6(5) | -            | Pecten           |   |
| 14       | 1,2(1) | 1,2(1)   | 15,16(15) | -      | -                  | 1         | ?      | ?      | 1      | 1      | ?      | ?            | 10-14            |   |
| 15       | 3-5(3) | -        | -         | -      | -                  | -         | -      | -      | -      | -      | -      | CS<br>40-50  | 1-A<br>20-26(21) |   |

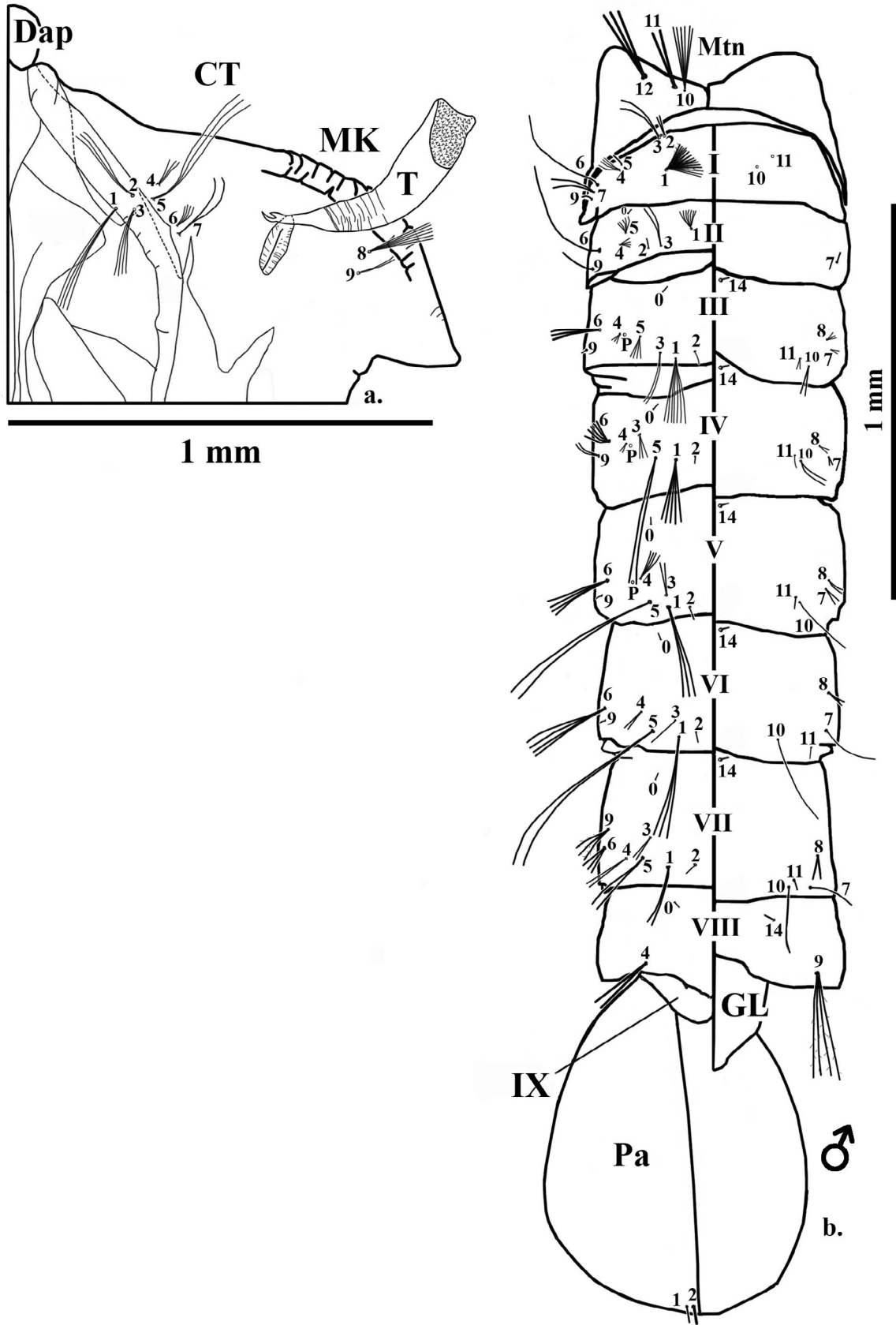
? = not counted.

**Taxonomy.** Larvae of *Cx. articularis* are very similar to several species of the subgenus, including *Cx. eduardoi* Casal & García, *Cx. brethesi* Dyar, *Cx. dolosus* Lynch Arribálzaga, *Cx. cuyanensis* Duret, *Cx. archeagus* Dyar, *Cx. carcinoxenus* de Oliveira Castro and *Cx. foliaceus* Lane. The characters that distinguish *Cx. articularis* from these species are: pecten spines with one subapical denticle, longer antenna and saddle and higher siphon index in *Cx. eduardoi*; setae 0,2-C absent, seta 1-VIII with 7-9 branches and longer saddle in *Cx. brethesi*; conspicuous spicules (10-15 µm) covering the thorax and seta 3-P double in *Cx. dolosus*; setae 16,17-C present and one denticle in pecten spines in *Cx. cuyanensis*; seta 1-S with 5 and 4-X with 4 elements, respectively, in *Cx. archeagus*; *Cx. carcinoxenus* only inhabits crab holes; and siphon index higher than 5 and seta 1-S with 4 elements in *Cx. foliaceus*. Furthermore, the last three species are not recorded from Argentina.

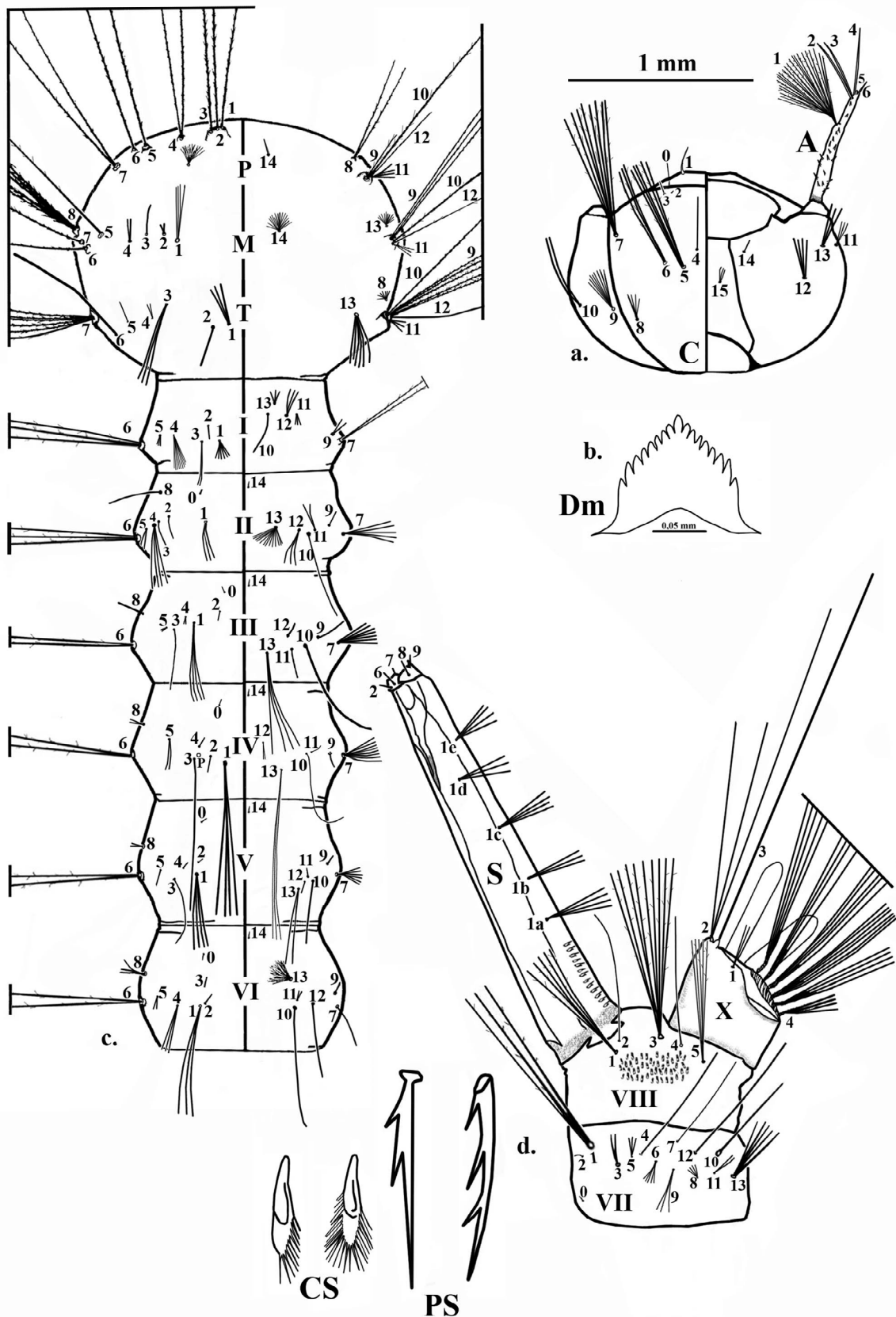
**Discussion.** The fourth-instar larva of *Cx. ameliae* is distinguishable from other *Cx. (Cux.)* by the conspicuously longer seta 4-M, and the pupa by the nearly perfectly cylindrical trumpet.

The dorsal position of setae 0,2-C and the medial and separated location of setae 1,2-T relative to the other dorsal setae of the same segment easily distinguish the fourth-instar larva of *Cx. articularis* from other species of the subgenus. The pupa is very similar to other species of *Cx. (Cux.)*, but differs in trumpet shape, which varies between conical and cylindrical, and having seta 2-Pa stronger than 1-Pa.

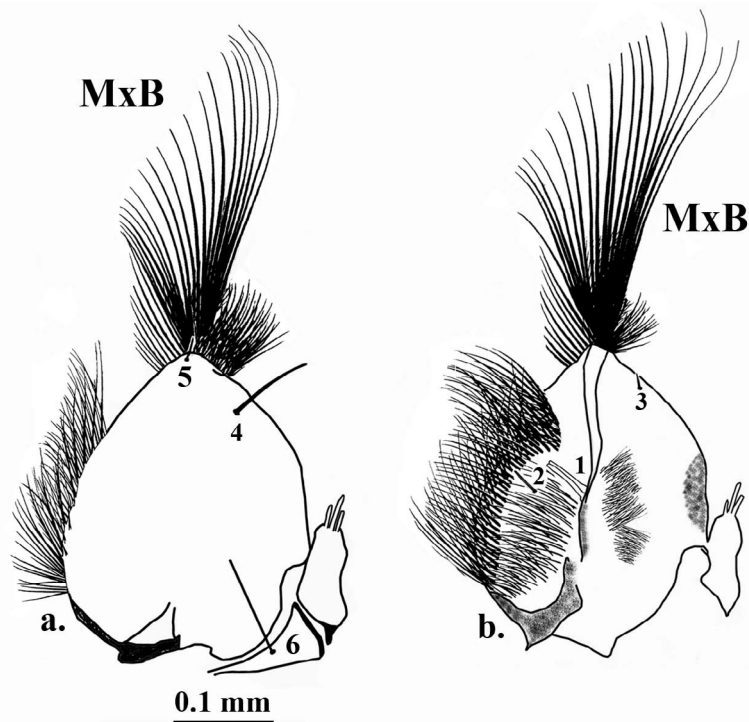




**FIGURE 4.** Pupa of *Culex (Culex) articularis* Philippi: a, cephalothorax; b, metanotum and abdomen. CT = cephalothorax; Dap = dorsal apotome; GL = genital lobe; MK = median keel; Mtn = metanotum; Pa = paddle; T = trumpet; I-IX = abdominal segments.



**FIGURE 5.** Larva of *Culex (Culex) articularis* Philippi: a, head; b, dorsomentum; c, thorax and abdominal segments I–VI; d, abdominal segments VII–VIII, X and siphon. A = antenna; C = cranium; CS = comb scale; Dm = dorsomentum; PS = pecten spine; S = siphon; I–VIII, X = abdominal segments. The positions shown in the figure may not be accurate due to having been drawn from exuviae.



**FIGURE 6.** Maxilla of larva of *Culex (Culex) articularis* Philippi: A, ventral aspect; b, dorsal aspect. MxB = maxillary brush.

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