

Redescription of *Culex (Melanoconion) sacchettae*  
Sirivanakarn and Jakob 1981, with  
description of immature stages (Diptera: Culicidae)<sup>1</sup>

by

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**ABSTRACT.** *Culex (Melanoconion) sacchettae* Sirivanakarn and Jakob, 1981 from southern Brazil is redescribed and compared to the closely related species, *Cx. vomerifer* Komp, 1932 and *Cx. portesi* Senevet and Abonnenc, 1941. Female adults, male adults, male genitalia, pupae and larvae are described and illustrated. Data about known distribution, bionomics and epidemiological importance are presented.

#### INTRODUCTION

From the start of the epidemiological research at the Ribeira Valley region, southern São Paulo State, Brazil, great amount of material of *Culex (Melanoconion) sacchettae* Sirivanakarn and Jakob, 1981, was collected (Forattini et al. 1981). This species was early tentatively identified as *Cx. vomerifer* Komp and posteriorly described as a new one (Sirivanakarn and Jakob 1979, 1981). The original description was based on adult characters and on the male genitalia.

To the above mentioned specimens, some others were added from Paraná State, near the Ribeira Valley. Immature stages were obtained through laboratory rearing and from some collections in natural breeding places. This material provided the opportunity to redescribe this species, including more details of the adult characters and the description of larva and pupa which were unknown until now.

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The characterization of *Cx. sachettae*, as complete as possible, is a matter of epidemiological interest. This species was observed in high densities inside primitive forests of the Tropical Atlantic System. In the artificially man-made open lands, notwithstanding its comparatively lower densities, it was observed to exhibit anthropophilic and endophilic behaviors, and to such a degree that deserves attention (Forattini et al. 1986a, 1986b, 1987a, 1987b; Gomes et al. 1987).

For the descriptions the terminology utilized was that of Harbach and Knight (1980). Measurements were extended to the second decimal point.

*Culex (Melanoconion) sachettae* Sirivanakarn and Jakob

*Culex (Melanoconion) sachettae* Sirivanakarn and Jakob, 1981:191 (female, male genitalia). Type locality: Cananéia, São Paulo State, Brazil.

Adult. A medium dark species resembling *Culex vomerifer*, but differing in some details of the female, as well as in the male genitalia.

FEMALE. Body dark, almost entirely clothed by mainly dark, brownish-black scales. Head. Antenna dark, length about 1.92 mm; flagellum normal, whorls with 6 setae. Proboscis entirely dark-scaled, length 1.60-1.84 mm, mean 1.72 mm. Maxillary palpus entirely covered with dark scales, length 0.29-0.36 mm, mean 0.31 mm, about 0.18 of proboscis length, occasionally with a small supernumerary article at apex of palpomere 4. Vertex (Fig. 1-H) with narrow falcate scales, predominantly pale whitish on the lateral sides, dark in the small median area, a small patch of broad appressed dingy white scales laterally; forked scales numerous, dark; occipital region with some pale whitish falcate scales. Cibarial armature (Fig. 1-A-D and Fig. 3). Dorsal surface distinctly arched. Cibarial bar large, weakly chitinized with posterior margin irregularly serrulate with many different sized triangular strings; about 10-15 cibarial teeth of gradually smaller size laterally where they show a lateral profile roughly triangular; cibarial teeth spatulate, borne on transverse bar; general aspect of teeth, as hyaline rod anteriorly and as enlarged transversal fold posteriorly with irregular serrulated margin; teeth attached to cibarial bar by a triangular expansion; dorsal surface of cibarial bar with small prickles roughly agglomerate, irregular in size and weakly chitinized. Cibarial dome nearly pentagonal, concave cap consists entirely of superficial, sharply pointed denticles. Thorax. Scutum with integument brown or dark brown, covered with very fine falcate scales of uniform size and color, scales dark brown to black with bronzy sheen; scutal setae developed, brownish-black with golden or reddish reflections; acrostichal setae present on promontory and on posterior region but not forming a continuous line (Fig. 1-G). Scutellar scales resemble scutal scales; lateral lobes each with 4 large setae, median lobe with 6 long setae. Antepnotum integument same as scutal integument, without scales and with scattered dark setae. Postpronotum integument brown or dark brown with narrow dark scales similar to scutal scales; posterolateral margin with 4,5 dark setae. Pleural integument pale with distinct darker spots on proepisternum,

postspiracular area, subspiracular area, prealar knob, anterior lower surface and upper corner of mesokatepisternum, lower and upper surface of mesepimeron. Pleural setae dark brown with golden sheen on proepisternum and golden-brown on lower mesokatepisternum: 8-16 upper proepisternal, 3-6 prealar, 5-9 upper mesokatepisternal, 9-15 lower mesokatepisternal, 4-7 upper mesepimeral and 1 lower mesepimeral. Pleura with scales on mesokatepisternum; a small patch of pale spatulate scales on lower posterior border and sometimes with 3,4 colorless scales on upper corner. Wing (Fig. 1-E,F). Length 2.43-2.88 mm, mean 2.66 mm; scales dark; cell  $R_2$  length nearly 6.0 times length of  $R_{2+3}$ ; cell  $M_1$  nearly 0.8 times length of cell  $R_2$ ; subcosta intersects costa at level of  $R_{2+3}$  furcation. Dorsal scaling: appressed spatulate scales on costa, subcosta,  $R$ ,  $R_1$ ,  $R_{4+5}$ , distal 0.7 of  $M_1$ ,  $M_2$ ,  $M_{3+4}$ , mCu, CuA and basal 0.7 of 1A; linear plume scales on  $R_s$ ,  $R_{2+3}$ ,  $M$ ,  $M_{1+2}$  and proximal 0.3 of  $M_1$ ; inclined narrow spatulate scales on  $R_2$ ,  $R_3$  and distal 0.3 of 1A; remigium with appressed spatulate scales and 2,3 distal long setae. Ventral scaling: appressed spatulate scales on costa, subcosta,  $R_s$ ,  $R_{2+3}$ ,  $M$ ,  $M_{1+2}$  and proximal 0.3 of  $M_1$ ; linear plume scales on proximal 0.5 of  $R_1$ , proximal 0.3 of  $R_{4+5}$ ,  $M_{3+4}$ , mCu, CuA beyond mCu and on middle of 1A; inclined narrow spatulate scales on distal 0.5 of  $R_1$ ,  $R_2$ ,  $R_3$ , distal 0.7 of  $R_{4+5}$ , distal 0.7 of  $M_1$ ,  $M_2$  and distal part of 1A; CuA before mCu and proximal 0.5 of 1A without scales. Halter. Scabellum and pedicel pale; capitellum dark. Legs. Anterior surface of forecoxa dark-scaled; anterior surface of midcoxa with longitudinal patch of dark scales; anterior surface of hindcoxa devoid of scales. Antero- and posteroventral surfaces of foretrochanter dark-scaled; midtrochanter with anteroventral surface dark-scaled and posteroventral surface pale-scaled; hindtrochanter with antero- and posteroventral surfaces pale-scaled. Fore- and midfemora mainly dark-scaled, posterior surface of forefemur with indistinct longitudinal stripe of dingy pale scales, posteroventral surface of midfemur with dingy pale scales; hindfemur with complete dorsal stripe of dark scales widening distally on anterior and posterior surfaces of apex; apex clothed with white scales. Tibiae dark; fore- and midtarsi with tarsomere I dark, II-IV bearing indistinct pale basal bands, V paler, hindtarsomere I with narrow basal pale band, hindtarsomeres II-IV bearing basal and apical narrow whitish bands, V entirely white. Abdomen. Tergum I with median posterior patch of dark scales; terga II, VII dark-scaled with basolateral patches of white scales, tergum II occasionally with small number of white scales on median basal portion; terga III-VI dark-scaled with basolateral patches of white scales, sometimes becoming narrow basal pale bands; tergum VIII entirely dark-scaled. Sternum II mainly white-scaled with small number of dark scales on apical portion; sternum III-VII with wide basal white band; sternum VIII with lateral patches of white scales, sometimes with small number of white scales. Genitalia (Fig. 3). Tergum IX narrow, posterolateral margin with 2 plain rather small lobes bearing a few slender scattered setae, 4-6 on each side. Upper vaginal sclerite inverted, U-shaped, well chitinized. Postgenital lobe wide, approximately trapezoid-shaped on distal margin with about 6 long setae on either side of midline setae, mostly on ventral surface. Upper vaginal lip narrow, distinct; insula indistinct, with about 8 clustered setae.

MALE. Like female except for sexual differences as follows: (Fig. 2).

Head. Antenna strongly plumose; length about 1.74 mm. Proboscis dark. Maxillary palpus entirely dark; length about 2.50 mm, extending beyond proboscis tip by length of apical 0.5 of palpomere 4 and palpomere 5; palpomeres 4 and 5 densely setose; palpomere 3 with 11-13 apical setae. Abdomen. Tergum II with small median anterior and basolateral patches of white scales, sometimes entirely dark-scaled; terga III-VII with basal white-scaled bands; tergum VIII (ventral in position) without scales and with a deep V-shaped median posterior emargination, and bearing many long bristles mixed with shorter slender setae (Fig. 2). Sterna with basal white bands; sternum VIII (dorsal in position) with basolateral white patches. Genitalia (Fig. 2). Tergum IX lobes small, rather rounded, widely separate basally and slightly diverging apically, bearing few but long and slender setae inserted on slightly prominent tubercles. Gonocoxite stocky, outer margin convex, inner moderately concave; ventrolateral setae strongly developed, mesal surface with small setae in indistinct rows extending from base to level of subapical lobe, lateral surface with patch of small sparse setae (1sp) at apical region up to level of subapical lobe, dorsomesal margin with a clump of 6-10 minute setae, proximal part of ventrolateral surface without scales; subapical lobe clearly divided, divisions distinctly separated; proximal and distal divisions large, elongate and columnar; proximal division undivided, with 2 long, enlarged and slightly sinuous apical setae (a and b) and 2-4 short basal setae; distal division not divided, bearing 7 setae, 1 long hooked seta (h), 1 short and 1 long saberlike seta (s), 1 wide asymmetrical foliform seta (l) and 3 narrow appressed flat setae (f). Gonostylus slender, curved, moderately widened distally, median ventral surface with a characteristic hyaline triangular expansion, with rhomboid apical angle, and slightly striated, crest slightly wrinkled and extending on ventral surface from that hyaline expansion to apical snout; gonostylar claw short, leaflike. Phallosome with lateral plates and aedeagal sclerites equivalent in length; aedeagal sclerite broad and curved in lateral view, anterior margin thickened, dorsal and broadly fused to base of lateral plate; distal margin of lateral plate slightly curved laterally with ventral and lateral processes developed, ventral one short, blunt and laterally curved, with triangular expansion laterally directed, lateral process longer, slender, slightly peaked and dorsolaterally directed, dorsal process stout and basal to lateral plate; aedeagal sclerites connected by a dorsal aedeagal bridge; paramere and basal plate nearly triangular-shaped with blunted extremities. Proctiger elongate; paraproct distally narrowed, basally expanded at point of articulation with the basal plate and posterolateral margin of tergum X, crown with 7 short, rectangular simple blades; cercal sclerite narrow long, lightly sclerotized, basally larger; 2,3 small cercal setae; tergum X somewhat rectangular, concavo-convex, dorsal surface concave.

PUPA (Fig. 3). General chaetotaxy as figured; range and modal number of branches presented in Table 1. Cephalothorax. Lightly pigmented, pale yellow. Setae 1,4,9-CT frequently with 4 branches (3-6), 9-CT occasionally triple; 2,5-CT usually with 6 branches, 2-CT occasionally with 4; 3,7-CT usually with 3 branches

(2-4), 7-CT rarely double; 8-CT usually with 5 branches (4-6); 10-CT usually with 4 branches (3-6); 11-CT long, single or double or apically bifid with dissimilar branches, one more slender than the other; 12-CT longer than 10, 11-CT, double with one branch long, the other short. Trumpet. Moderately tanned; slender, cylindrical; index 7.40-9.89, mean 8.74; tracheoid area darker, extending almost 0.5 from base; pinna moderately developed, about 0.19 length of trumpet; meatus with short slit. Abdomen. Lightly pigmented, similar in color to cephalothorax, anterior margin of terga II, III a little darker; length 1.71-1.95 mm, mean 1.83 mm. Setae 1-III-V multiple; 2-III-V small and single, mesal to seta 1, 2-VI, VII small and single, lateral to seta 1; 3-I, II, III double; 5-IV-VI shorter than length of following tergum, with 6-9 branches, 5-IV frequently with 7 branches occasionally with 9, 5-V usually with 8 branches, 5-VI normally with 6 branches; 6-III, IV frequently with 4 branches, 6-V, VII usually with 5 branches, 6-VI with 3-5 branches; 9-VII relatively short, double or triple, 9-VIII frequently triple with stronger branches inserted on posterolateral angle. Genital lobe. Lightly pigmented in both female and male; length 0.12-0.14 mm, mean 0.13 mm in female, 0.30-0.31 mm, mean 0.30 mm in male. Paddle. Lightly tanned, midrib and buttress darker; midrib developed except at apex; buttress strong only at base; margins smooth; length 0.49-0.68 mm, mean 0.60 mm, width 0.37-0.48 mm, mean 0.41 mm, index 1.40-1.59, mean 1.49. Seta 1-P single; 2-P single, length about 0.5 of 1-P.

LARVA (Fig. 4). General chaetotaxy as figured; range and modal number of branches in Table 2. Head. Wider than long; length about 0.69 mm, width about 0.99 mm; moderately and variably tanned, area of lateralia around compound eyes lighter, poorly defined darker spots in posterior area of lateralia and in area of dorsal apotome. Median labral plate distinct dorsally, anterior margin concave between insertions of seta 1-C. Labiogula longer than broad, with uniform width; hypostomal suture complete, extending posteriorly from posterior tentorial pit to collar. Collar poorly developed, heavily pigmented. Dorsomentum nearly triangular with a large median tooth, and 6,7, occasionally 8, smaller teeth on either side. Seta 1-C spiniform, dark; 2-C absent; 3-C single and tiny; 4-C small with 5-13 branches; 5-C aciculate with 6-10 branches; 6-C long, single, aciculate; 8,9-C similar, 8-C with 5-8 branches, 9-C with 8-12 branches, usually with 9, occasionally 12, branches; 10-C longer than 8,9-C, usually triple, occasionally double (2-4); 13-C frequently with 8 branches, occasionally with 11 (8-11); 14,15-C similar, inserted nearly at same level, 14-C usually double (2,3), 15-C usually with 5 branches. Antenna. Length 0.62-0.68 mm, mean 0.63 mm; heavily tanned, with dark ring at base. Scape developed; pedicel weak; part of flagellum proximal to seta 1-A curved with scattered spicules, distal part thinner, slightly curved with only a few aciculae lateral to seta 1-A; seta 1-A 0.84 from base; antennal puncture distinct. Seta 1-A large, with 23-30 aciculate branches. Thorax. Integument hyaline, entirely smooth, occasionally with several small and heavy chitinized patches scattered on surface; tubercles of large setae moderately tanned, setae 1-3-P and 9-12-P,M,T inserted on common tubercles. Prothorax. Setae 1,2-P long, single; 3-P about

0.2 of 1,2-P, frequently with 7 aciculate branches (7-12); 4-P double; 5,6-P single; 7-P usually with 5 branches, occasionally with 4 branches (4-6); 8-P usually triple, seldom with 4 branches. Mesothorax. Seta 1-M small, single or double; 2-M longer than 1-M, usually with 5 branches (4-6); 5-M lengthy, single. Metathorax. Seta 1-T small, slender, single; 5-T single; 13-T fanlike with 5-8 branches. Abdomen. Integument hyaline, entirely smooth, occasionally with many small chitinized patches similar to those found on thorax; setae 6-I, II, 7-I and 2,3-VIII inserted on moderately tanned tubercles. Segments I-VI. Setae I-III-VI about 0.5 segment length, 1-III, IV usually with 6 branches, 1-V frequently with 7 branches (5-9); 6-I, II lengthy, with 3 branches unequally developed, 6-III-VI smaller, 6-III with 5-7 branches, 6-IV, V usually with 7 branches (5-8), 6-VI with 5-7 branches, frequently with 6 branches, occasionally with 5; 7-I long, double, with slightly unequal branches, 7-II-VI smaller, many branched, 7-II with 6-9 branches, 7-III with 7-11 branches, 7-IV with 6-10 branches, occasionally with 6, 7-V with 8-13 branches, occasionally with 13, 7-VI frequently with 4 branches. Segment VII. Seta 1-VII fanlike with 6-10 branches, commonly with 8; 4-VII usually with 6 branches (3-6); 7-VII with 4,5 branches; 10-VII with 3-5 branches, rarely with 3; 13-VII with 7-12 branches. Segment VIII. Comb with 20-47 scales, mean 33 scales arranged in 4 irregular rows nearly forming triangle; scales short and small in anterior rows, longer and more developed in posterior rows, all apically fringed; seta 2-VIII commonly with 4 branches. Siphon. Index 6.42-8.03 (width measured at base), mean 6.94; variably tanned, usually moderately tanned; acus dark, long and slender on anterior side of attachment. Pecten of 7-13 spines, mean 10, increasing in size distally, disposed in a row at basal 0.25 of siphon, distal ones spaced farther apart; margin of spines smooth, without denticles. Seta 1-S usually in pairs (in 23 siphons examined, 2 with 5.5, 14 with 6, 6 with 6.5 and 1 with 7), 5 posterior pairs (1a,b,c,d,e-S), 2 anterior pairs (1f, g-S); posterior pairs: length of proximal pair nearly 4.0, that of 2 median pair nearly 3.0 and that of distal pair 1.5-2.0 width of siphon at point of insertion; anterior pairs: proximal pair as long as width of siphon at point of insertion. distal pair shorter; seta 2-S inserted in membrane near base of anterolateral spiracular lobe, slightly curved anteriorly with slender curved secondary branch inserted medially at curved side; posterior median process (PMPc) a slender filamentous projection. Segment X. Saddle complete without acus and without spicules; length 0.28-0.32 mm, mean 0.30 mm, siphon/saddle index 3.42-4.02, mean 3.73. Seta 1-X with 4-7 branches; 2-X with 1 long and 2-4 shorter branches; 3-X long, single; 4-X with 6 paired setae, occasionally with 11 setae, 3 anterior pairs commonly with 9 branches (3-10), 3 posterior pairs with 7-11 branches, frequently with 9, all setae borne on a grid, anterior end of grid attached to saddle. Anal papillae long and slender, gradually tapering to blunt tip, length of dorsal pair nearly 0.8 times length of saddle, ventral pair as long as saddle.

## MATERIALS EXAMINED - 186 specimens

Females. 15 reared from eggs laid by specimens collected in the forest, with associated pupal and larval exuviae (Experimental Station, Pariquera-Acú, Forattini, O. P. et al coll., XI.83); 1 with associated pupal and larval exuviae and 1 with pupal exuviae, collected as immature stages (Fonte Station, Itapitangui, Cananéia, Forattini, O.P. et al coll., VII.83, VII.87); 85 collected as adult stage (Experimental Station, Pariquera-Acú, Forattini, O. P. et al coll., I.78, VII.78, XII.78, I.79, II.79, IV.79, X.79, XI.79, XII.79, I.80, II.80, III.80, VII.80, XI.80, I.81, IV.81, 37; Itapuan, Itapitangui, Cananéia, Forattini, O.P. et al coll., IV.80, V.80, VI.80, VII.80, X.80, XI.80, XII.80, I.81, II.81, III.81, XII.81, II.82, 48). Males. 5 reared from eggs laid by females collected in the forest, with associated pupal exuviae (Experimental Station, Pariquera-Acú, Forattini, O. P. et al coll., XI.83); 1 with associated pupal exuviae collected as immature stage (Fonte Station, Itapitangui, Cananéia, Forattini, O. P. et al coll., XI.87); 62 collected as adult stage (Experimental Station, Pariquera-Acú, Forattini, O. P. et al coll., XII.77, III.78, IV.78, II.79, X.79, XI.79, I.80, II.80, IV.80, XI.80, I.81, V.81, VIII.81, IX.82, X.82, 40; village, Pariquera-Acú, Forattini et al coll., III.79, XII.80, 2; Itapuan, Itapitangui, Cananéia, Forattini et al coll., V.80, XII.80, I.81, II.81, III.81, IV.81, XI.81, 11; Vilarinho, Itapitangui, Cananéia, Forattini et al coll., III.83, IV.83; 2; Bigua Road, Iguape, Forattini, O. P. et al coll., X.82, 3; Paranaguá, Paraná State, Brazil, E. Luz coll. IV.79, 4). Immature stages. 3 larvae reared from eggs laid by females collected in the forest, 2 larval and associated pupal exuviae and 1 larval exuviae without associated adults (Experimental Station, Pariquera-Acú, Forattini et al coll., XI.83). Other specimens. 1 male, holotype of *Cx. sacchettae* (Brocouha, Cananéia, São Paulo State, Brazil, O.S. Lopes coll. IV.76, S. Sirivanakarn det. 1981, caught in CDC miniature light trap); 1 female, allotype of *Cx. sacchettae* (Br 6-301, Bambuzal, Iguape, São Paulo State, Brazil, O. S. Lopes coll. III.76, S. Sirivanakarn det. 1981, caught in CDC miniature light trap); 3 females of *Cx. vomerifer* (Mucambo, Belém, Para State, Brazil, J.M.S. Barata coll. X.85, caught in CDC miniature light trap); 3 females and 3 males of *Cx. portesi* (Bush-Bush Forest, Nariva Swamp, Trinidad, W. I., M. Takahashi coll., T.G. Aitken and P. Galindo det., 2 females and 1 male; Utinga, Belém, Pará State, Brazil, A. Toda coll. and det. 1966, 1 male; Ipean, Belém, Pará State, Brazil, A. Toda coll. and det. 1966, 1 female and 1 male).

## DISTRIBUTION AND BIONOMICS

Until now, *Culex sacchettae* was known only from southern Brazil where its distribution covered the coastal area of the Ribeira Valley in São Paulo State and the nearby region of Paranaguá in Paraná State. Because these areas belong to the Tropical Atlantic System, it is possible that the distribution of the species extends as far as this kind of ecosystem. The primitive extension was along the Brazil coastal region from the Rio Grande do Norte to Rio Grande do Sul States. Presently the more preserved part of the ecosystem is represented by the mountain coastal forests extending from the State of Rio de Janeiro to the southern boundary.

The breeding places are scarcely known as the few immature stages collected were found in small ground pools covered with dense vegetation (*Sphagnum*). Adults were collected both in sylvan environment and human settlements including intradomiciliarly with a high rate of human blood in the indoor collections (Forattini et al. 1987a).

## DISCUSSION

As was stated by Sirivanakarn and Jakob (1981), *Culex sacchettae* may be distinguished from *Cx. vomerifer* and from *Cx. portesi*, though the 3 species are similar in form. *Culex vomerifer* has a more northern distribution, in Central America and northern South America, while *portesi* and *sacchettae* share similar southern distributions.

The adults of *sacchettae* may be distinguished from those of *vomerifer* and *portesi* in that distinct white bands are present on the base and apex of hindtarsomeres 1 to 4 and the fifth is entirely white, whereas in *vomerifer* and *portesi* the hindtarsi are totally dark. In addition, in *sacchettae* there are dark spots on the pleural integument of the proepisternum, postspiracular and subspiracular areas, prealar knob, anterior lower surface and upper corner of the mesokatepisternum and lower and upper surfaces of the mesepimeron, whereas in *vomerifer* these spots are lacking on the dorsal corner of the mesokatepisternum, and in *portesi* are absent on the proepisternum, mesokatepisternum and mesepimeron. All three species have posterior acrostichal setae on the scutum.

The male genitalia of *sacchettae* differ from *vomerifer* mainly in the shape of the leaf of the subapical lobe and the presence of a small clump of 6-10 minute setae on the distal tergomesal margin of the gonocoxite. The same characters serve to distinguish *portesi* from *sacchettae*. In addition, the tergum IX (IX-Te) lobes of *portesi* are nearly spherical and densely covered with long setae, quite different from those of *sacchettae* which are small, rounded and bear a few long, slender setae inserted on slightly prominent tubercles. A hyaline, triangle-shaped expansion of the gonostylus is present in *sacchettae*, as in *vomerifer* and *portesi*. This character was not figured in the original description of *sacchettae*.

Comparing characters of the immature stages of *sacchettae* with the description of *portesi* made by Sirivanakarn and Dégallier (1981), the main distinguishing characters may be considered as follows. The larvae of *sacchettae* have seta 4-C with 5-13(8) branches; 7-VII with 4,5(4); 10-VII with 3-5(4); 13-VII with 7-12(9). In contrast, the larvae of *portesi* have seta 4-C with 4.5 branches; 7-VII with 2-4; 10-VII with 5,6; 13-VII with 5-8 (6). Setae of the pupa of *sacchettae* included 10-CT with 3-6(4) branches; 11-CT single or with a small, slender secondary branch; 5-VI with 6-9(6) branches. The mean trumpet index is 8.74. In *portesi* pupal setae include 10-CT with 8-10 branches; 11-CT with 2; 5-VI with 3-5. The mean trumpet index is 4.4.



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*Cx. (Mel.) sacchettae*

Fig. 1. Female: A - dorsal aspect of cibarial armature  
B - detail of figure A focusing the cibarial teeth  
C,D - others details  
E - dorsal aspect of distal wing scaling  
F - ventral aspect of distal wing scaling  
G - detail of scutum showing posterior acrostichal setae  
H - dorsal aspect of head showing forked and falcate scales

## Figs. 2-4 - Abbreviations used:

|         |   |  |
|---------|---|--|
| a       | - | seta <u>a</u> of pSL                   |
| A       | - | antenna                                |
| AeS     | - | aedeagal sclerite                      |
| b       | - | seta <u>b</u> of pSL                   |
| BP      | - | basal <u>piece</u>                     |
| C       | - | cranium                                |
| CA      | - | cibarial armature                      |
| Ce      | - | cercus                                 |
| CiB     | - | cibarial bar                           |
| CS      | - | comb scale                             |
| CSc     | - | cercal sclerite                        |
| Ct      | - | cibarial tooth                         |
| CT      | - | cephalothorax                          |
| Dm      | - | dorsomentum                            |
| dSL     | - | distal division of subapical lobe      |
| f       | - | flat seta of dSL (=foliform)           |
| Gc      | - | gonocoxite                             |
| Gs      | - | gonostylus                             |
| h       | - | hooked seta of dSL                     |
| IsS     | - | insular seta                           |
| l       | - | leaf                                   |
| lsp     | - | lateral setal patch                    |
| LP      | - | lateral plate                          |
| M       | - | mesothorax                             |
| p       | - | puncture                               |
| P       | - | prothorax                              |
| Pa      | - | paddle                                 |
| Par     | - | paramere                               |
| PGL     | - | postgenital lobe                       |
| PMPc    | - | posterior median process               |
| Ppr     | - | paraproct                              |
| PS      | - | pecten spine                           |
| pSL     | - | proximal division of subapical lobe    |
| s       | - | saberlike seta of dSL (=saber)         |
| S       | - | Siphon                                 |
| T       | - | metathorax                             |
| Tr      | - | trumpet                                |
| UVL     | - | upper vaginal lip                      |
| UVS     | - | upper vaginal sclerite                 |
| I-X     | - | abdominal segments                     |
| VIII-Te | - | tergum VIII                            |
| IX-Te   | - | tergum IX                              |
| IX-TL   | - | ninth tergal lobe                      |
| X-Te    | - | tergum X (=basolateral sclerotization) |

*Cx. (Mel.) sacchettae*

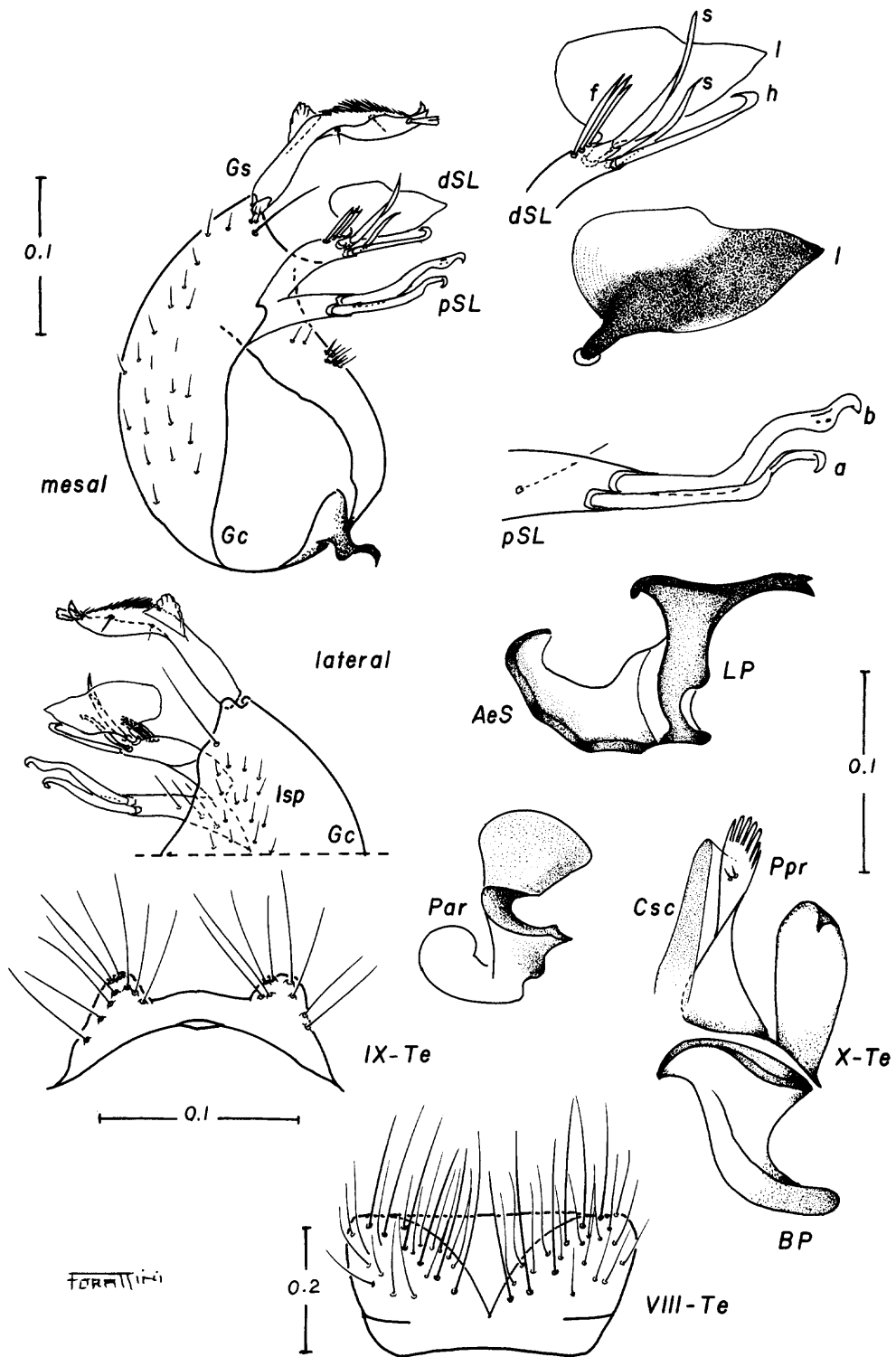


Fig. 2.

*Cx.(Mel.) sacchettae*

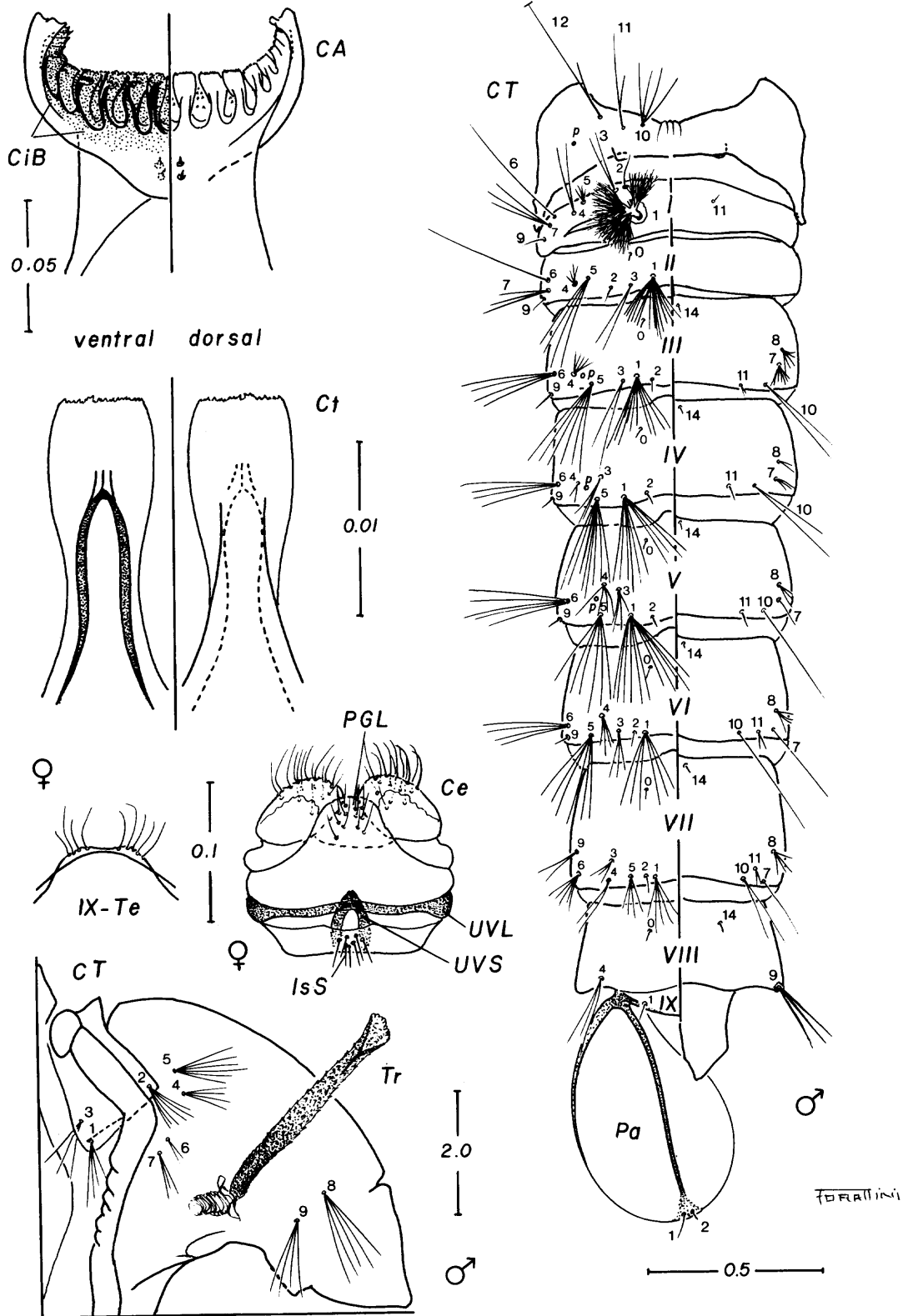


Fig. 3.

FERRARINI

*Cx.(Mel.) sacchettae*

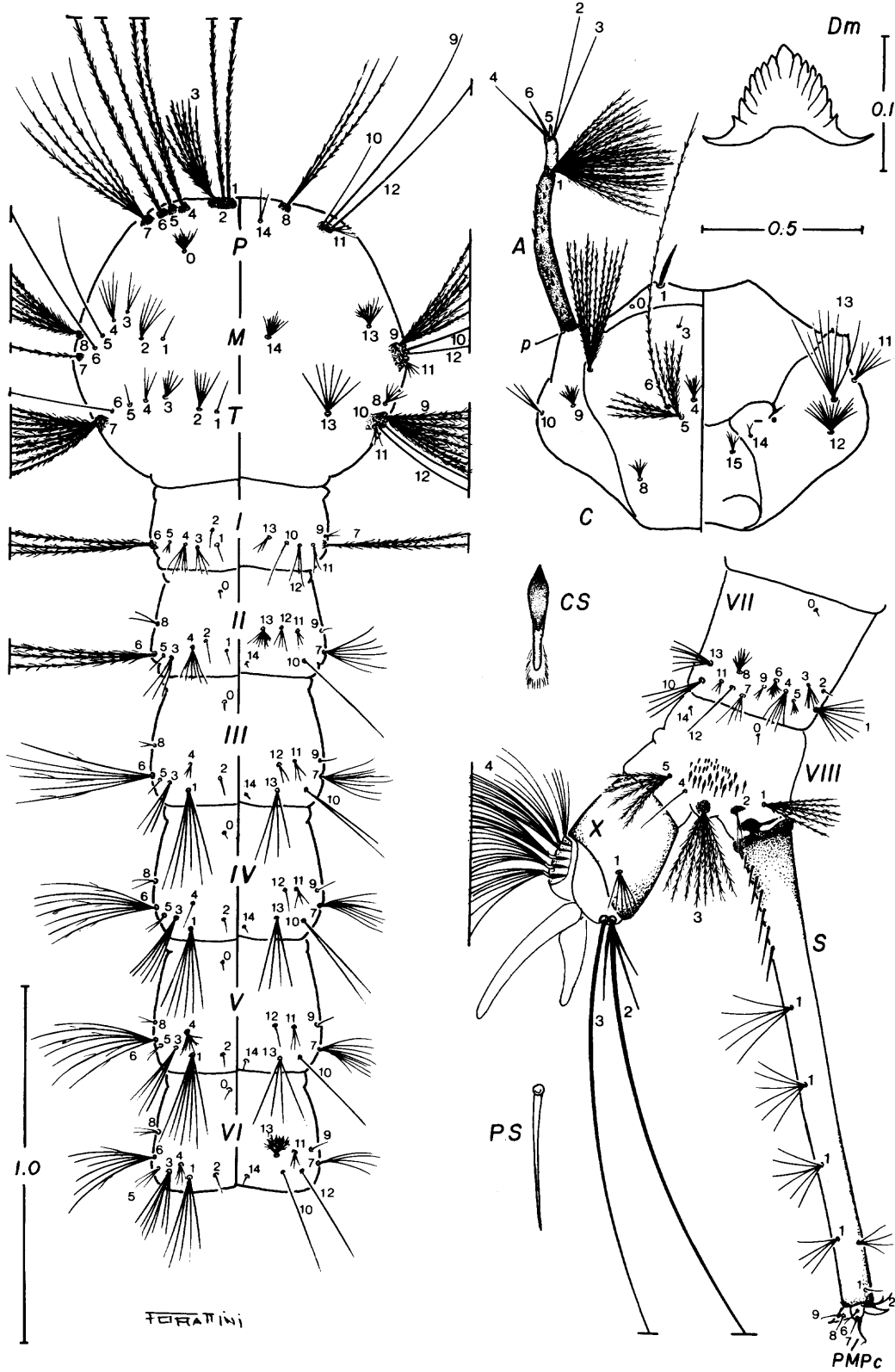


Fig. 4.

Table 1. Number of branches for setae of the pupa of *Culex (Melanoconion) sacchettae*.<sup>a</sup>

| Seta | Abdominal Segments  |          |          |             |          |          |          |        |        |    |   |  |  |  |
|------|---------------------|----------|----------|-------------|----------|----------|----------|--------|--------|----|---|--|--|--|
|      | CT                  | I        | II       | III         | IV       | V        | VI       | VII    | VIII   | IX | P |  |  |  |
| 0    | -                   | -        | 1        | 1           | 1        | 1        | 1        | 1      | 1      | -  | - |  |  |  |
| 1    | 3-5(4) <sup>b</sup> | 5-15(13) | >15      | 6-12(10,11) | 9-15(12) | 7-13(11) | 5-7(6)   | 3-6(5) | -      | 1  | 1 |  |  |  |
| 2    | 4-6(6)              | 1        | 1        | 1           | 1        | 1        | 1        | 1      | -      | -  | 1 |  |  |  |
| 3    | 2-4(3)              | 2        | 2        | 4-6(5)      | 3,4(4)   | 3,4(4)   | 3,4(3)   | 3-5(4) | -      | -  | - |  |  |  |
| 4    | 3-6(4)              | 3,4(4)   | 3-6(4)   | 4-6(5)      | 2-3(2,3) | 4-6(5)   | 3-5(4)   | 3,4(3) | 3,4(3) | -  | - |  |  |  |
| 5    | 6-8(6)              | 1,2(2)   | 2-5(4)   | 5-8(6)      | 6-9(7)   | 6-9(8)   | 6-9(6)   | 3-5(3) | -      | -  | - |  |  |  |
| 6    | 1-3(2)              | 1        | 1        | 3,4(4)      | 3-5(4)   | 4,5(5)   | 3-5(4,5) | 3-7(5) | -      | -  | - |  |  |  |
| 7    | 2-4(3)              | 3-6(3,4) | 3,4(3,4) | 4-6(5)      | 2-4(3)   | 4-6(4)   | 1        | 1      | -      | -  | - |  |  |  |
| 8    | 4-6(5)              | -        | -        | 3-7(5)      | 2,3(2)   | 2-3(2)   | 2-4(3)   | 4-7(4) | -      | -  | - |  |  |  |
| 9    | 3-5(4)              | 1,2(1)   | 1        | 1           | 1        | 1        | 1        | 2,3(2) | 2,3(3) | -  | - |  |  |  |
| 10   | 3-6(4)              | 1        | -        | 2,3(2)      | 1,2(2)   | 1        | 1        | 1-3(2) | -      | -  | - |  |  |  |
| 11   | 1,2(1)              | 1        | -        | 1           | 1        | 1,2(1)   | 1,2(2)   | 1-3(2) | -      | -  | - |  |  |  |
| 12   | 2                   | -        | -        | -           | -        | -        | -        | -      | -      | -  | - |  |  |  |
| 13   | -                   | -        | -        | -           | -        | -        | -        | -      | -      | -  | - |  |  |  |
| 14   | -                   | -        | -        | 1           | 1        | 1        | 1        | 1      | 1      | -  | - |  |  |  |

<sup>a</sup> Based on counts made on 10 specimens. Number of individual setae counted ranged from 12 to 20.

<sup>b</sup> Range (mode)

Table 2. Number of branches for setae of the fourth-instar larva of *Culex (Melanoconion) sacchettae*<sup>a</sup>.

| Seta No. | Head                 |           |              | Abdominal Segments |           |           |          |         |          |        |          |        |         |
|----------|----------------------|-----------|--------------|--------------------|-----------|-----------|----------|---------|----------|--------|----------|--------|---------|
|          | C                    | P         | M            | T                  | I         | II        | III      | IV      | V        | VI     | VII      | VIII   | X       |
| 0        | a1                   | 15-21(17) | -            | -                  | -         | 1         | 1        | 1       | 1        | 1      | 1        | 1      | -       |
| 1        | 1                    | 1         | 1,2(1)       | 1                  | 1         | 1         | 4-6(6)   | 5-8(6)  | 5-9(7)   | 4-6(5) | 6-10(8)  | 5-7(6) | 4-7(6)  |
| 2        | -                    | 1         | 4-6(5)       | 4-7(6)             | 1         | 1         | 1        | 1       | 1        | 1      | 1        | 3-5(4) | 3-5(5)  |
| 3        | 1                    | 7-12(7)   | 2,3(3)       | 4-8(6)             | 4-6(4)    | 3-5(4)    | 4-6(4)   | 4-7(5)  | 4,5(4,5) | 6,7(7) | 5-9(6,7) | 7-9(8) | 1       |
| 4        | 5-13(8) <sup>b</sup> | 2         | 5,6(5)       | 2,4(3)             | 10-15(11) | 6-9(6,7)  | 2-5(3)   | 1,2(1)  | 7-11(8)  | 3-5(4) | 3-6(6)   | 1      | 3-11(9) |
| 5        | 6-10(8)              | 1         | 1            | 1                  | 2,3(3)    | 1         | 1,2(1)   | 1-3(2)  | 1-3(2)   | 2,3(3) | 3-5(4)   | 4-5(5) | -       |
| 6        | 1                    | 1         | 1            | 1                  | 3         | 3         | 5-7(6)   | 5-8(7)  | 5-8(7)   | 5-7(6) | 14-25(*) |        |         |
| 7        | 8-11(10)             | 4-6(5)    | 1            | 7-10(8,9)          | 2         | 6-9(7)    | 7-11(10) | 6-10(8) | 8-13(9)  | 4,5(4) | 4,5(4)   |        |         |
| 8        | 5-8(6)               | 3,4(3)    | 4,5(5)       | 4-8(6)             | -         | 2,3(2)    | 2,3(2)   | 2,3(2)  | 2,3(2)   | 2-5(3) | 8-14(8)  |        |         |
| 9        | 8-12(9)              | 1         | 6,7(6)       | 7-10(8)            | 2-4(3)    | 1         | 1        | 1       | 1        | 1      | 2,3(3)   |        |         |
| 10       | 2-4(3)               | 1         | 1            | 1                  | 1         | 1,2(1)    | 1-3(2)   | 1,2(2)  | 1        | 1      | 3-5(4)   |        |         |
| 11       | 4-7(6)               | 4-8(6)    | 3,4(4)       | 2-5(3)             | 2,3(2)    | 3,4(3)    | 3        | 2,3(3)  | 3,4(3)   | 2-4(3) | 2,3(3)   |        |         |
| 12       | 13-17(16)            | 1         | 1            | 1                  | 3,4(3)    | 3,4(4)    | 2,3(2)   | 1       | 1        | 1      | 1        |        |         |
| 13       | 8-11(8)              | -         | 22-41(28,33) | 5-8(7)             | 3,4(4)    | 16-23(19) | 3,4(4)   | 3-5(4)  | 3-5(4)   | +      | 7-12(9)  |        |         |
| 14       | 2,3(2)               | 2         | 17-27(18)    | -                  | -         | 1         | 1        | 1       | 1        | 1      | -        | 1      | -       |
| 15       | 4-8(5)               | -         | -            | -                  | -         | -         | -        | -       | -        | -      | -        | -      | -       |

a - Based on counts made on 10 specimens. Number of individual setae counted ranged from 11 to 20.

b - Range (mode)

a1 - only alveolus

\* - variable

+ - Not counted

|                |
|----------------|
| 1a-S, 3-7(5)   |
| 1b-S, 5-8(5,6) |
| 1c-S, 5-8(6)   |
| 1d-S, 4-7(5)   |
| 1e-S, 2-5(4)   |
| 1f-S, 1        |
| 2-S, 2         |