

Taxonomy of the *Simulium perflavum* species-group
(Diptera: Simuliidae),
with description of a new species from Brazil

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Abstract: The larva, pupa, male, and female of *Simulium trombetense* n. sp. are described and illustrated. This species was collected in the Brazilian Amazon region in the states of Amapá, Amazonas, Pará, and Roraima near the edges of the crystalline basement-rock formation of the Pre-Cambrian Guiana Shield. Keys for larvae, pupae, males, and females of species in the *Simulium perflavum* Species-Group are presented, as well as new observations on adult, pupal, and larval characters. Evidence is given to support the species status of *S. maroniense* Floch and Abonnenc, previously considered synonymous with *S. rorotaense* Floch and Abonnenc.

Introduction

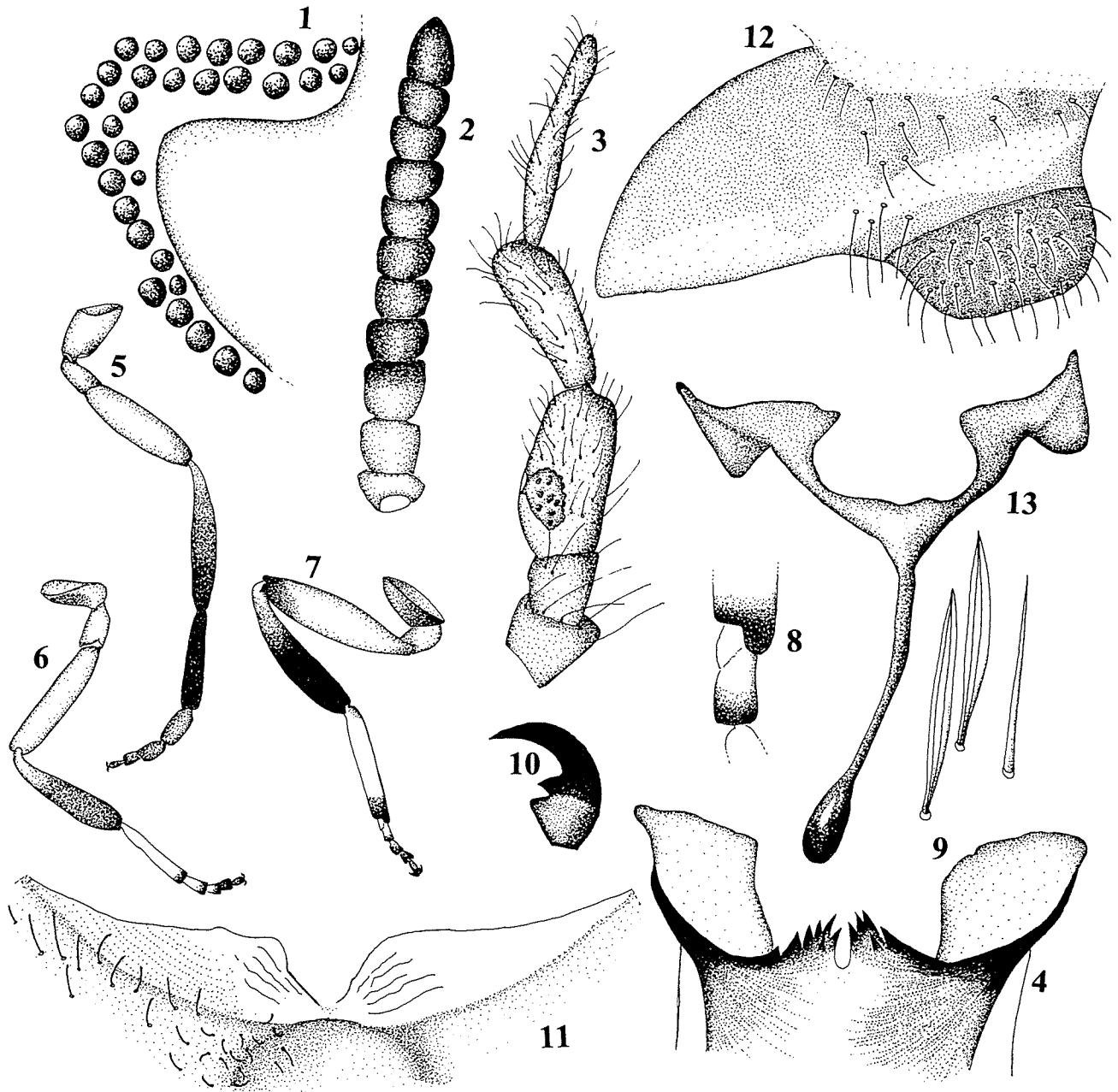
The subgeneric classification of South American black flies is controversial, particularly with regard to the subgenera *Ectemnaspis* and *Psilopelmia* (Coscarón, 1990; Crosskey and Howard, 1997), which are treated by some workers as full genera (Py-Daniel and Sampaio, 1994). Nonetheless, division of these taxa into species-groups shows general agreement. For example, Coscarón (1984) and Crosskey and Howard (1997) recognized the *Simulium perflavum* Species-Group, which is common in Brazil and Venezuela. Miranda Esquivel and Muñoz de Hoyos (1995) suggested that a number of species-groups, including the *S. perflavum* Species-Group, should be elevated to subgenus. However, their only representative for this species-group was *Simulium perflavum* Roubaud, the most autapomorphic member of the group.

The members of the *S. perflavum* Species-Group are *S. kabanayense* Ramírez Perez and Vulcano; *S. perflavum*; *S. rorotaense* Floch and Abonnenc; and *S. suarezi* Ramírez Perez, Rassi and Ramírez (Crosskey and Howard, 1997). We

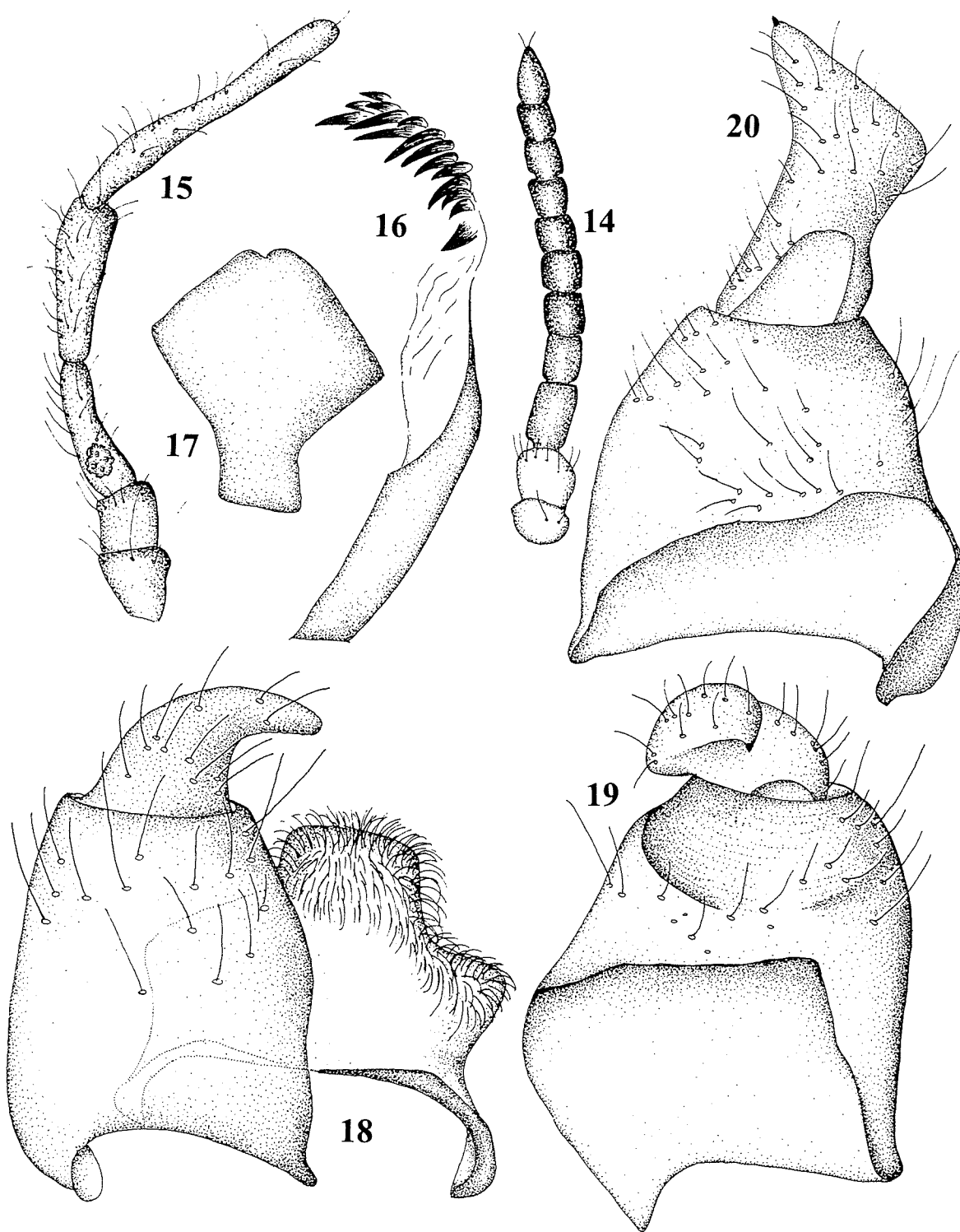
describe a new species in this group, based on larval, pupal, and adult characters, and provide evidence that *Simulium maroniense* Floch and Abonnenc is a good species. Keys are presented to distinguish members of the *S. perflavum* Species-Group, and comments are provided on adult-leg setae, larval antennae, and pupal cephalic trichomes. In the keys, we also include *S. ignacioi* Ramírez Perez and Vulcano, previously considered a synonym of *S. rorotaense* (Shelley *et al.*, 1984, 1997). However, cytological information indicates that it is a good species (N. Hamada, P.H. Adler and M.E. Grillet, unpublished data).

Materials and Methods

Larvae and pupae were fixed in 75% ethanol or Carnoy's solution (1 part glacial acetic acid: 3 parts absolute ethanol). Some pupae were reared to adults. When necessary, structures were clarified in hot 95% lactic acid; clarified genitalia were preserved in glycerine. Euparal- was used as the mounting medium for permanent slides. Nomenclature follows that of Adler (1990), Coscarón (1987), and Py-Daniel (1981).



Figures 1-13. *Simulium trombetense* n. sp., female. (1) Fronto-ocular triangle (frontal view). (2) Antenna (dorsal view). (3) Maxillary palpus (lateral view). (4) Cibarium. (5) Fore leg (lateral view). (6) Middle leg (lateral view). (7) Hind leg (lateral view). (8) Calcipala and pedisulcus (lateral view). (9) Scale-like and filiform setae. (10) Tarsal claw (lateral view). (11) Hypogynial valves (ventral view). (12) Anal lobe and cercus (lateral view). (13) Genital fork (ventral view).



Figures 14-20. *Simulium trombetense* n. sp., male. (14). Antenna (dorsal view). (15) Maxillary palpus (ventrolateral view). (16) Paramere (ventral view). (17) Median sclerite. Gonocoxite and gonostylus: (18) ventral view, with ventral plate; (19) dorsal view; (20) dorsal view, flattened between slide and coverslip.

Larvae, pupae, and adults of *S. maroniense*, *S. perflavum*, and *S. rorotaense* were collected in the states of Amazonas and Roraima (Brazil); those of *S. ignacioi*, *S. kabanayense*, and *S. suarezi* were collected in the state of Bolivar (Venezuela). Characters used to distinguish males of *S. ignacioi*, *S. kabanayense*, and *S. suarezi* are from the original descriptions (Ramírez Perez and Vulcano, 1973; Ramírez Perez et al., 1977) and a subgeneric revision by Coscarón (1984, 1990).

The holotype and paratypes are deposited in the Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, Amazonas, Brazil. Other paratypes are deposited in the Clemson University Arthropod Collection (CUAC), Clemson, SC, U.S.A.; the Museu de Zoologia da Universidade de São Paulo (MZUSP), São Paulo, Brazil; the National Museum of Natural History (NMNH), Washington, D.C., U.S.A., and the Natural History Museum (NHM), London, England.

***Simulium trombetense* Hamada, Py-Daniel, and Adler, New Species**

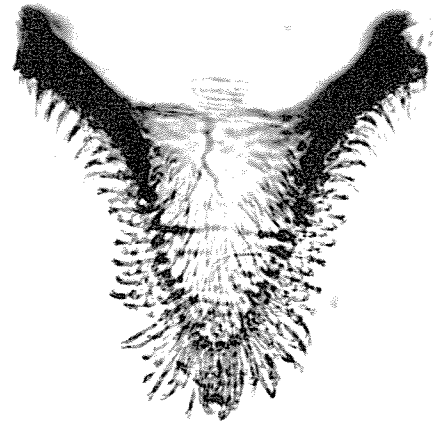
Figures 1-38

[Note: The second author (Py-Daniel) of the species name believes the species should be placed in genus *Ectemnaspis*].

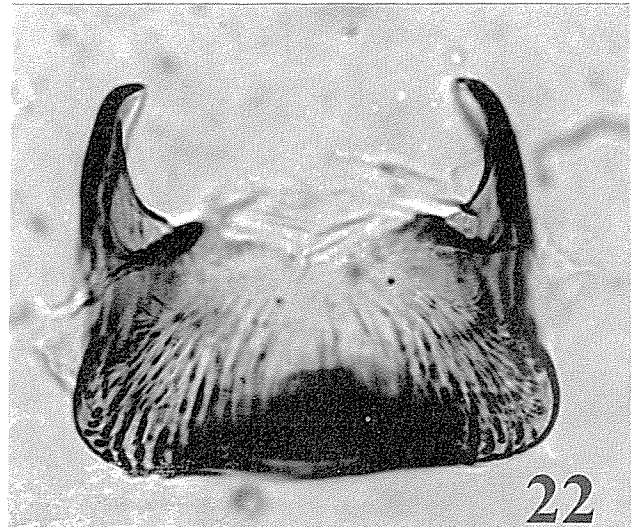
Simulium "X" Hamada, Adler, and McCreddie, 1996.

Simulium "X" Hamada, 1997.

Female (in 80% ethanol): General body color orange; length: body 2.3-2.6 mm ($n = 4$); thorax 1.1-1.2 mm ($n = 6$). Wing: length 2.2 mm ($n = 5$); width 1.1-1.2 mm ($n = 5$). Frons, clypeus, and occiput with silvery blue pruinosity; frons longer than wide; fronto-ocular triangle small (Fig. 1). Antenna (Fig. 2) 0.54-0.59 mm long; pedicel and scape brownish yellow; flagellum brown, with silver pubescence. Palpus yellowish brown; sensory vesicle small, round, with short neck (Fig. 3); palpomere V 1.7-1.8 times as long as III and 1.7 times as long as IV. Mandible with 9-10 external serrations and 24-26 internal teeth; lacinia with 24-25 retrorse teeth. Cibarium (Fig. 4) with 2 anterior submedian elevations, each with group of strong teeth. Pharynx with cluster of sharp teeth proximally. Scutum orange, with brown and golden setae; lateral margin with silver band. Anepisternum brownish orange anteriorly; other regions and katepisternum brown, with silver pruinosity.



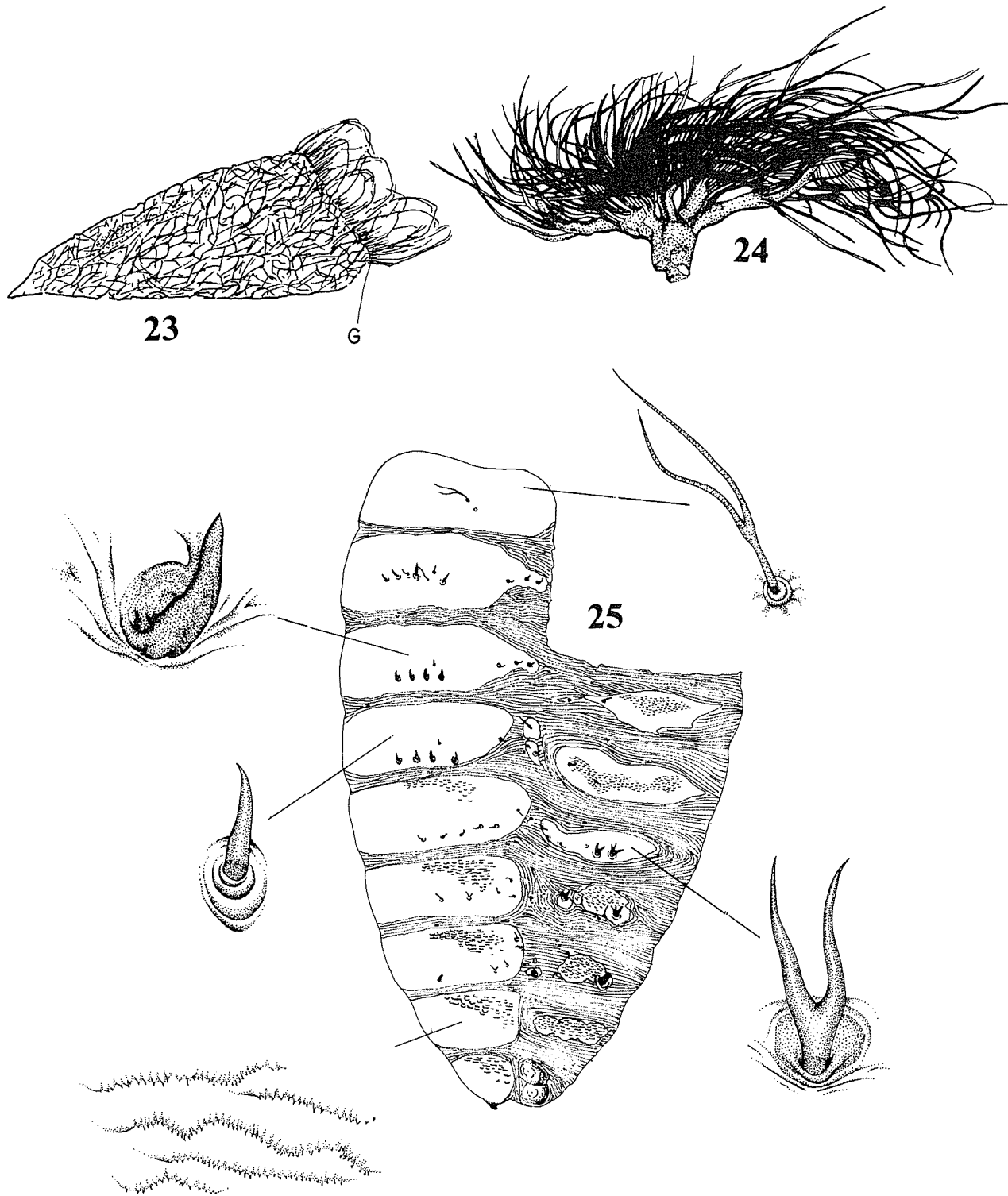
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Figures 21, 22. *Simulium trombetense* n. sp., male. Ventral plate: (21) terminal view; (22) ventral view.

Scutellum orange, with long brown and golden setae; postnotum orange to brownish orange, with silver pruinosity. Wing veins yellowish brown; base of R and Sc with setae. Halter with basal region tan and terminal region yellow to whitish yellow. Fore leg (Fig. 5) from coxa to femur without dark patches, and with tibia and tarsomeres dark brown to black; middle leg (Fig. 6) with coxa, tibia, and tarsomeres bearing dark patches, and other segments without patches; hind leg (Fig. 7) with all segments bearing dark patches; calcipala and pedisulcus (Fig. 8) well developed. Femora and tibiae with filiform and scale-like setae (Fig. 9);



Figures 23-25. *Simulium trombetense* n. sp., pupa. (23) Cocoon (lateral view), G = gill filaments. (24) Gill (lateral view). (25) Abdomen: dorsal view (left side), ventral view (right side).