

The Subgenus *Dendromyia* Theobald: A Review with Redescriptions of Four Species (Diptera: Culicidae)

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A morphological study of larval, pupal and adult life stages (including genitalia characters) was performed in order to evaluate the classification of the subgenus Dendromyia, genus Wyeomyia Theobald. Six species are included: Wy. ypsipola Dyar, Wy. jocosa (Dyar & Knab), Wy. testei Senevet & Abonnenc, Wy. complosa (Dyar), Wy. luteoventralis Theobald and Wy. trifurcata Clastrier, the first four of which are redescribed. The descriptions include illustrations of the male and female genitalia, fourth-instar larva and pupa. The result firmly supports Dendromyia as a monophyletic group, with well defined characters. Keys for the identification of all life stages of species included in Dendromyia are provided.

Key words: *Wyeomyia* - *Dendromyia* - mosquito taxonomy - mosquito - Culicidae

Motta and Lourenço-de-Oliveira (1995) re-described the type species of *Dendromyia*, *Wy. luteoventralis* Theobald, and considered only other five species as having morphological, biological and biochemical (Motta et al. 1998) similarities suggestive of a monophyletic group: *Wy. luteoventralis* Theobald, *Wy. ypsipola* Dyar, *Wy. jocosa* (Dyar & Knab), *Wy. testei* Senevet & Abonnenc, *Wy. trifurcata* Clastrier and *Wy. complosa* (Dyar). The many unrelated *Wyeomyia* species previously included in the subgenus *Dendromyia* (Lane & Cerqueira 1942, Lane 1953, Judd 1996) were excluded from the subgenus. The present paper is part of a series involving the characterization of species and subgenera of *Wyeomyia* (Motta and Lourenço-de-Oliveira 1995, Motta et al. 1998, Lourenço-de-Oliveira et al. 1999). In this paper, four species belonging to subgenus *Dendromyia*, *Wy. ypsipola*, *Wy. jocosa*, *Wy. testei* and *Wy. complosa*, are redescribed in all life stages for a better interpretation and application of the subgeneric name.

MATERIALS AND METHODS

The material examined during this study came from collections made at different localities in Brazil and Peru. This material is deposited at Instituto Oswaldo Cruz (IOC), Rio de Janeiro. Other material examined was from the entomological collections of the Faculdade de Saude Pública, São Paulo (FSP-USP) and the United State National Museum

(USNM), Smithsonian Institution, Washington, DC. For the geographic distribution of each species, the findings of other workers and those recorded by Knight and Stone (1977) and Knight (1978) were also included. Illustrations and keys for the identification of the species of *Dendromyia* were based on direct observation of morphological characters, except for *Wy. trifurcata*, for whose morphological characters were taken from the original description and the illustrations given by Clastrier (1973). The holotype and the other specimens of *Wy. trifurcata*, recorded as being in the collection of the author (Knigh & Stone 1977) and possibly transferred to the Musée National d'Histoire Naturelle, Paris, were not available for this study.

Except for letter designations applied to the lobes of gonostylus (Belkin et al. 1970), the morphological terminology follows Harbach and Knight (1980). An asterisk (*) following the abbreviations of life stages or sex indicates that at least some portion of these were figured in the cited paper. The illustrations are based on specimens deposited in IOC and USNM.

KEY TO SPECIES OF *DENDROMYIA*

Females

1. Clypeus with scales2
Clypeus without scales 3
- 2 (1). Midtarsomeres II-IV with white scales on one side, V usually completely white; postspiracular area with white scales *complosa*
Midtarsomeres dark; postspiracular area with bronzy scales *jocosa*
- 3 (1). Midtarsomeres dark 4
At least one midtarsomere with white scales 5

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- 4 (3). Occiput and vertex with a triangular spot or longitudinal stripe of white scales; scutum covered with darkish scales with blue-greenish reflections *luteoventralis*
Occiput and vertex without white scales; scutum with bronzy reflections..... *trifurcata*¹
- 5 (3). Midtarsomeres II-V covered with white scales on one side *ypsipola*
Midtarsomeres I, II and occasionally base of III covered with white scales, IV and V dark..... *testei*

Male genitalia

1. Gonocoxite with apical tufts of setae; tergum IX with 8-11 long setae on each lobe...
..... *ypsipola*
Gonocoxite without apical tufts of setae; setae of tergum IX with different shape and less numerous..... 2
- 2 (1). Setae of apico-lateral tufts on tergum VIII long, almost twice as long as gonocoxite... 3
Tergum VIII without apico-lateral tufts, apical setae as long as or slightly longer than gonocoxite 4
- 3 (2). Tergum IX with short and slender setae; lobe A,E of gonostylus single *trifurcata*
Tergum IX with long, broad, foliform setae; lobe A,E bifurcated distally *complosa*
- 4 (2). Tergum IX with small, hair-like setae.. *testei*
Tergum IX with different setae 5
- 5 (4). Tergum IX with stout setae, obtuse apically..... *luteoventralis*
Tergum IX with broad foliform setae, pointed at apex *jocosa*

Pupae

1. Paddle sharply narrowed from the middle to apex *luteoventralis* *ypsipola*
Paddle gradually narrowed from base to apex..... 2
- 2 (1). Seta 1-I with dendritic branches only at apex; paddle short, less than half length of seta 9-VIII *trifurcata*
Seta 1-I with dendritic branches throughout length; paddle as long as or slightly shorter than seta 9-VIII 3
- 3 (2). Seta 6-III on level with seta 4-III; seta 5-CT usually with 2 branches (2,3).....
..... *complosa*
Seta 6-III anterior to seta 4-III; seta 5-CT usually with more than 4 or 5 branches..... 4

- 4 (3). Seta 3-II very long, almost reaching anterior margin of next segment; seta 3-III laterad of 1-III *jocosa*
Seta 3-II nearly half length of next segment; setae 3-III mesad of 1-III *testei*

Larvae

1. Seta 15-C long, similar in length to 14-C; pecten restricted to distal third of siphon, usually comprised of less than 4 spines.....
..... *trifurcata*
Seta 15-C short, 1/7 length of seta 14-C; pecten not restricted to distal third of siphon, comprised for 5 spines 2
- 2 (1). Siphon with dorsal accessory setae (2a-S) slender, hair-like, single or double; seta 15-C nearly on level with 14-C *complosa*
Siphon with dorsal accessory setae strong, heavily sclerotized; seta 15-C anterior to seta 14-C 3
- 3 (2). Seta 6-P with 11-18 branches, seta 5-P usually with 9 (7-10) branches *testei*
Seta 6-P usually with 3 or fewer branches; seta 5-P usually single (1,2) 4
- 4 (3). Seta 4-VIII usually with 4 (4,5) branches; laciniarastrum with 4 teeth; one of dorsal accessory setae (2a-S) borne beyond basal half of siphon *jocosa*
Seta 4-VIII usually with 2 (1-3) branches; laciniarastrum with more than 6 teeth; dorsal accessory setae (2a-S) restricted to basal half of siphon 5
- 5 (4). Laciniarastrum (LR2) with relatively few setae, in a single row; maxillary pilose area restricted to apical half; maxillary palpus with 3 teeth *luteoventralis*
Laciniarastrum (LR2) with numerous setae in several rows; maxillary pilose area extending to base of maxilla; maxillary palpus with 4 teeth *ypsipola*

WYEOMYIA SUBGENUS DENDROMYIA

Adult: occiput and vertex dark, generally with a triangular or irregular stripe of scales with white scales or whitish reflections (except for *Wy. jocosa* and *Wy. trifurcata*). Clypeus bare or with bronzy scales. Proboscis length 1.9-2.3 mm (around 0.8 length of forefemur); maxillary palpus short (0.14-0.17 length of proboscis). Antepre-notum dark-scaled, same color of scutum, without metallic reflection (whitish scales may be present ventrally); scutum dark-scaled with blue-greenish reflection (except in *Wy. trifurcata*); anterior promontory with whitish scales; pleural sclerites usually yellowish, covered with whitish scales; mesopostnotum with

¹ After Clastrier, 1973

numerous setae of different lengths, without patch of scales. Wing with moderately broad spatulate scales on most veins. Abdomen with line of demarcation between dark and whitish scales nearly straight.

Female genitalia: sternum VIII with posterior margin almost straight, with a V-shaped notch at middle; cerci without scales.

Male genitalia: paraproct with 1 or 2 apical teeth and 2-6 setae; gonocoxite short; tergal surface with 3 strong, long setae; gonostylus without stem, basally divided into 2-4 main lobes; aedeagus roughly rounded or oval with submedian tergal arms not joined.

Pupa: seta 2-III-VII near posterior margin of tergum and mesad of seta 1; seta 6-II very long, reaching beyond anterior margin of segment III; 6-VII ventral. Paddle moderately short, spiculate on margin, tip more or less pointed.

Larva: hypostomal sutures complete; occipital foramen with dorsolateral slit-like extensions on either side; apical process of maxilla strongly developed, tooth-like, maxillary palpus not fused to maxilla; seta 14-C developed, posterior or on level with seta 15-C. Integument smooth, setae 11-P,M,T spine-like and pigmented, 13-T developed; 2-I-VII short, single; 2-III-VII mesad to seta 1; 9-I-VI short, single; 13-I far cephalad of setae 9. Comb with free scales, without sclerotized plate. Pecten with spines arranged in median ventral row; seta 1-S with aciculate branches; dorsal accessory setae 2a-S strong, well pigmented, single (except in *Wy. complosa*).

Eggs (Fig 1): elongate, shaped like grains of rice (data from eggs of *Wy. luteoventralis*, *Wy. ypsipola* and *Wy. testei*).

Distribution: species of *Dendromyia* occur in the Amazon Region and Tropical Forests of Central America. Species are known from Mexico, Nicaragua and Panama in Central America and in the northern South America in Bolivia, Peru, Ecuador, Colombia, Venezuela, Guyana, Surinam, French Guyana and Brazil (States of Mato Grosso, Rondônia, Amazonas, Pará and Maranhão).

SPECIES TREATMENTS

Wyeomyia (Dendromyia) ypsipola Dyar, 1922

Wyeomyia (Shropshirea) ypsipola Dyar, 1922: 97 (male*). Canal Zone (USNM); Dyar 1923: 169; Dyar & Shannon 1924: 481; Bonne & Bonne-Wepster 1925: 91.

Miamyia (Shropshirea) ypsipola of Dyar 1925: 117; Dyar 1928: 63 (male*, female, L).

Wyeomyia (Dendromyia.) ypsipola of Lane & Cerqueira 1942: 596 (male*, female); Lane 1953: 959 (male*, female, P* L*); Bruijning 1959 (male*, female, L*); Harbach & Peyton 1993: 14;

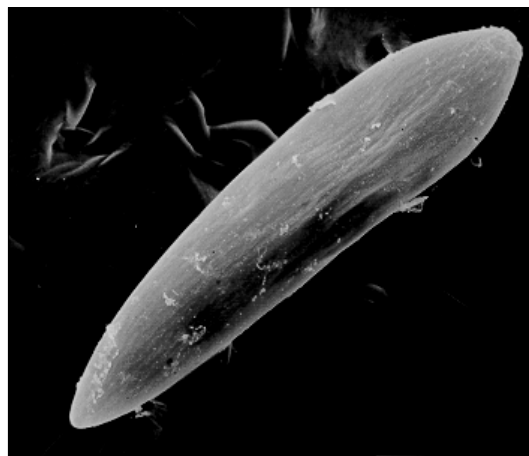


Fig. 1: *Wyeomyia testei*, egg without exochorion, (SEM, measures 554.1 x 125 μ m)

Motta & Lourenço-de-Oliveira 1995: 382; Judd 1996: 141.

Wyeomyia (Prosopolepis) ypsipola of Heinemann & Belkin 1978a: 189, 1978b: 446.

Female - Head: vertex dark, scales broad with blue-greenish reflection; occiput and vertex with white scales, forming a roughly triangular spot or irregular longitudinal stripe (not always present); area behind of eyes and postgena covered with broad white scales; ocular line with white scales, ocular setae dark; 2 long, dark interocular setae. Proboscis dark-scaled, expanded at apex; length 1.9-2.2 mm (mean 2 mm), about 0.8 length of forefemur; basal labial setae long, brown. Maxillary palpus same color as proboscis, about 0.17 length of proboscis. Clypeus ovate, darkish brown, pruinose, bare. *Antenna*: pedicel brown, pruinose, with some narrow bronzy scales on inner surface; flagellum moderately verticillate, slightly shorter than proboscis. *Thorax*: integument brown. Anteprenotum covered with darkish scales with blue-greenish reflections, with long black setae dorsally. Postpronotum largely covered with broad whitish scales. Scutum with brown integument, covered with moderately broad darkish scales with dull bluish and hint green reflections, except for a few white scales on middle of anterior promontory; setae of anterior promontory long, dark; supraalar setae strong, numerous, darkish. Scutellum densely covered with scales concolorous with scutum; 3 or 4 long brownish setae on each lobe. Mesopostnotum brown, without scales, with 12-17 strong setae of different lengths, most of them long. Pleural sclerites pale, yellowish, densely covered with whitish scales with hint yellow; setae pale, bronzy; upper proepisternal area with white scales; 2 or 3 bronzy prespiracular setae; 4 or 5 yellowish

lower mesokatepisternal setae inserted below and above upper margin of mesomeron; 4 or 5 strong, brownish prealar setae; 9-12 yellowish upper mesepimeral setae. *Wing*: length 3.2-3.7 mm (mean 3.5 mm). Upper and lower calypters without seta; scales of veins brown, moderately broad. Veins R_s , R_{2+3} , R_2 , R_3 , R_{4+5} , M , M_{1+2} , M_1 , M_2 and M_{3+4} with both lateral anterior and appressed scales moderately broad and spatulate; CuA and 1A with narrow appressed scales. *Halter*: scabellum yellowish; pedicel yellowish, dark-scaled on one side; capitellum with dark scales. *Legs*: coxae and trochanters with yellowish integument, covered with whitish scales, setae long, pale. Femora and tibiae covered with dark scales; all femora with a stripe of whitish scales ventrally; foretibia with light scales ventrally; mid- and hindtibiae with a strip of whitish scales ventrally; fore- and hindtarsomeres dark-scaled, midtarsomeres II-V white-scaled on one side. *Ungues* simple. *Abdomen*: terga largely covered with broad scales. Terga dark-scaled with blue-green reflections, lateral margins whitish; sterna with whitish scales; the colors separated on sides in nearly straight line. Tergum I with numerous long yellowish setae; tergum VIII with bronzy setae. *Genitalia* (Fig. 2): tergum VIII (not figured) with posterior margin straight, rounded aspect on lateral and anterior margins; sternum VIII (Fig. 2-F) with posterior and lateral margins slightly, concave, with a V-shaped notch at middle; median setae roughly distributed in "V"; covered with spatulate scales, setae long. Tergum IX (Fig. 2-E) narrow, spiculose, posterior margin with one seta on either side. Cerci (Fig. 2-A) short, rounded, borne obliquely to sagittal plane of body, latero-apically with moderately long setae. Postgenital lobe (Fig. 2-B,C) extends beyond apices of cerci, broader than long, slightly emarginate in middle; dorsal surface with about 6 long setae and numerous minute setae latero-distally; ventral surface with a median roughly triangular area with small setae arising from conspicuous alveoli. Upper and lower vaginal lips normal. Insula (Fig. 2-D) covered with very small setae, with a central protuberance with a row of 6 setae on margin, of each side, these setae with tip toward to inside; middle area bare. Three spermathecal capsules, one smaller than others.

Male: similar to female except for the following sexual differences. *Antenna*: slightly more verticillate than in female. Clypeus and pedicel very pruinose. Proboscis length 1.7-2 mm (mean 1.9 mm); 0.8 length of forefemur. Maxillary palpus darkish, 0.12 length of proboscis. *Wing*: length 3.0-3.2 mm (mean 3.1 mm). *Legs*: mid- and hindfemora and -tibiae with a stripe of whitish scales ventrally; foretibia dark. Fore- and hindtarsomeres dark;

midtarsomere I with whitish scales ventrally, mainly at base; midtarsomere II usually 50% white-scaled at apex (50% - 100%); III, IV and V white on one side. *Genitalia* (Figs. 3 and 4): tergum VIII covered with minute setae and broad scales; distal margin with strong, long setae uniformly distributed; sternum with numerous broad scales, setae shorter and less numerous; tergum IX (Fig. 4-B) with lobes roughly triangular, interlobar space broad, each lobe bearing 8-11 long setae. Proctiger (in lateral view) (Fig. 3-E) with basal sclerotization (tergum X) bearing about 2 setae; paraproct sclerotized dorsoapically with 2 teeth apically and about 3 small subapical cercal setae. Gonocoxite (Fig. 3-A, C) short, ovate; inner surface with minute setae; tuft of long filiform setae distally; outer surface with the tuberculus of the long seta; 3 long tergomesal setae. Median basal lobe sclerotized, with about 9 short setae. Gonostylus (Fig. 3-A-C) short, without stem, divided basally into 3 lobes: lobe C curved, simple with 2 pointed processes at apex; lobe A,E narrow, Y-shaped, bifurcate into digitiform processes, one processes with 5 short, strong setae and another with 4 short, thinner setae at apex; lobe M with round apex with numerous short setae apically. Aedeagus (Fig. 3-D) rounded in tergal view; apical tergal arms joined in part forming 2 processes with rugose margins; submedian tergal arms not joined; median sternal plate simple, membranous and rugose laterally.

Pupa: number of branches of setae in Table I. *Cephalothorax*: pale; seta 5-CT almost as long as 1-CT, usually with 4 (2-5) aciculate branches. Trumpet slightly tanned; short, cylindrical, trumpet index about 4. *Abdomen*: pale, median anterior margin of sterna darkish; seta 1-I strongly developed; 2-II-VII very close to posterior margin of terga, 2-II between and almost on level with setae 1 and 3; 2-III mesad to seta 1, which is mesad to seta 3; 2-IV-VII mesad to seta 1; 3-I long, 3-IV far anterior to seta 1 and almost on level with seta 4; 3-V-VII slightly anterior to seta 1; 5-IV-VI single, longer than following tergum, slightly aciculate; 6-II single, long; 6-III-VII short, 6-VII inserted ventrally; 7-V usually with 3 (1-4) branches; 9-VII, VIII aciculate, 9-VII strongly developed, almost as long as paddle, 9-VIII with 24-30 branches considerably longer than paddle; 11-VII usually with 3 (2-4) branches. *Paddle*: pale, moderately long, index 3.5-4.7 (mean 4.3), narrowed and strongly produced beyond midlength, spiculose at margin; spicules better developed distally.

Larva: number of branches of setae in Table II. *Head*: wider than long, pale. *Maxilla*: elongate, with a prominent apical tooth (AT); dorsomesal surface with about 7 teeth (*laciniarastrium*, LR) progressively longer apically; setae of LR 2 with

numerous long and moderately long setae, distributed in several rows; maxillary pilose area extending to base of maxilla; maxillary brush with numerous long similar setae. Setae 2-4,6-Mx single; 1-Mx spiniform, bifid at tip, sometimes moderately long; 3-Mx posterior and longer than 1-Mx; 4-Mx inserted apically at same level of maxillary brush;

maxillary palpus with 4 apical teeth. *Mandible*: 3 or 4 mandibular sweeper setae in 2 groups. Dorsomentum generally with 8 teeth on each side of a prominent median tooth. *Cranium*: hypostomal sutures complete; occipital foramen with dorsolateral slit-like extension on either side, margins heavily pigmented laterally. Seta 1-C stout, curved;

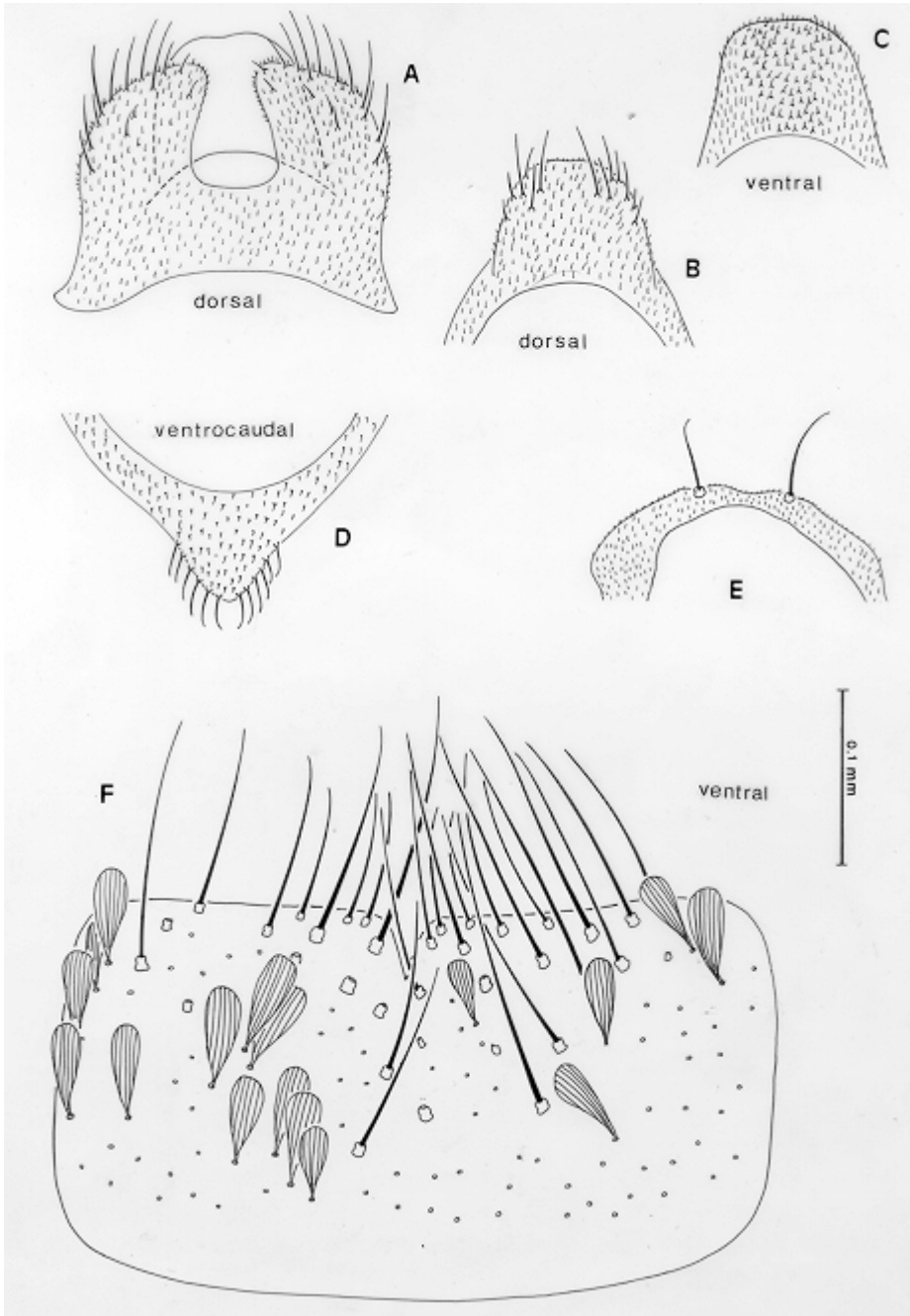


Fig. 2: *Wyeomyia ypsipola*, female genitalia. A: cerci, postgenital lobe; B, C: postgenital lobe; D: insula; E: tergum IX; F: sternum VIII

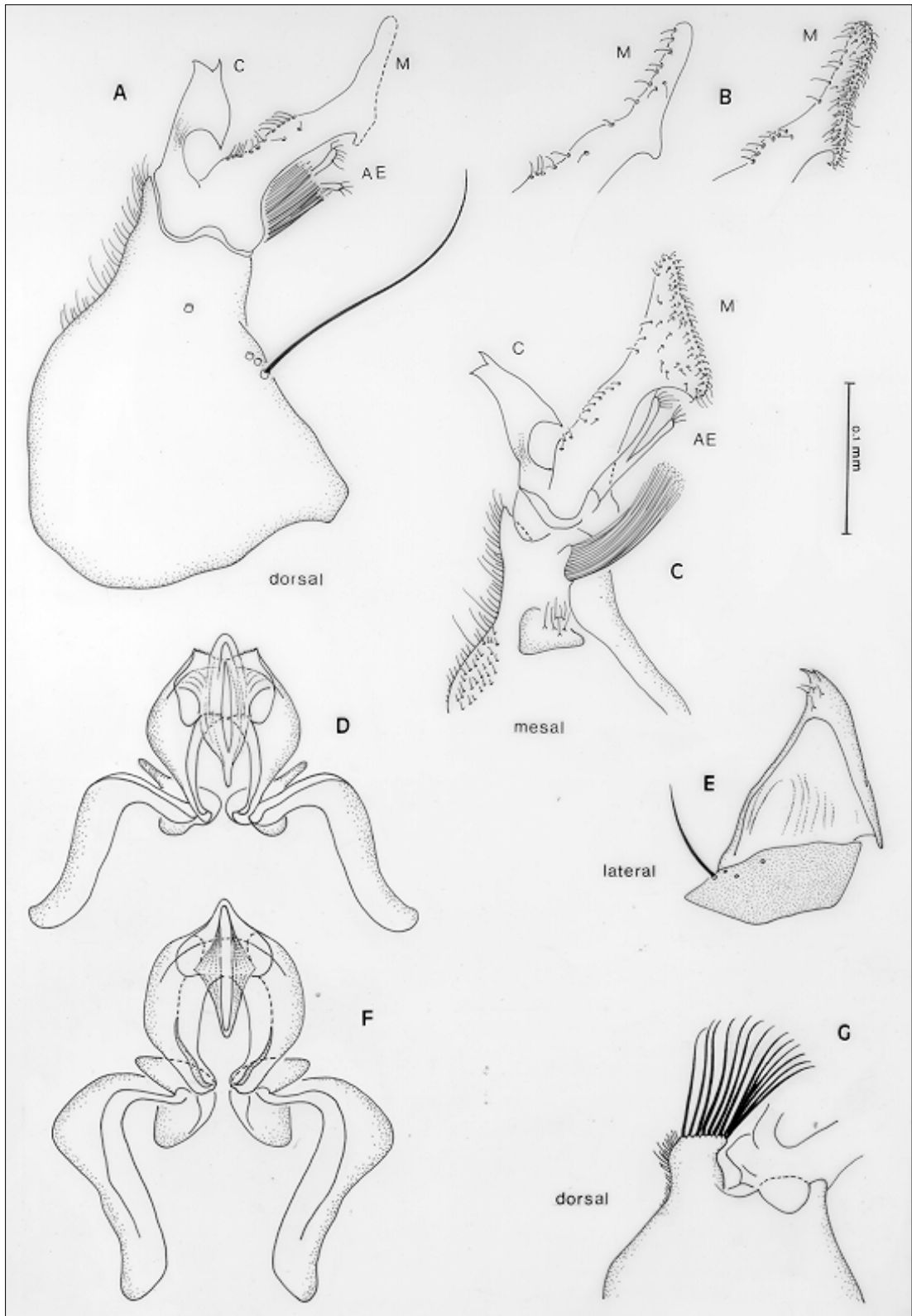


Fig. 3: *Wyeomyia ypsipola*, male genitalia. A: gonocoxite, gonostylus (lobes C, M, A,E); D: aedeagus; E: proctiger; F: aedeagus; G: gonocoxite

TABLE I

Range of numbers of branches for pupal setae of *Wyeomyia (Dendromyia) ypsipola* (mode in parentheses)

Setae no.	Cephalotorax	Abdominal segments							
		I	II	III	IV	V	VI	VII	VIII
0	-	-	1	1	1	1	1	1	1
1	1-3(2)	D	1	1	1-3(2)	1-3(2)	1-3(2)	1	-
2	1,2(2)	1	1	1	1	1	1	1,2(1)	-
3	1-3(2)	1	1	2-5(3)	3,4	2,3(3)	1-3(2)	1	-
4	2-4(2)	4-6(4,5)	1-5	1-3(2)	2,3(2)	2-4(3)	1-3(2)	1	1-3(1)
5	2-5(4)	1	1-3(2)	1-3(2)	1	1	1	1-3(1)	-
6	1-4(1)	1	1	1-3(2)	1-3(3)	1-4(2)	1-3(2)	1,2(1)	-
7	2-4(3)	1-3(3)	1-3(2)	2,3(2)	1-3(2)	1-4(3)	1,2(2)	1-3(1)	-
8	1	-	-	2-4(4)	2-4(2)	2-4(3)	2-4(3)	3,4,6(3)	-
9	1,2(2)	1	1-2(1)	1	1	1	1	15-17,20-23	24-27,30
10	1	-	1,2	1,2(2)	1-3(2)	2,3(2)	1,2(2)	1,2(1)	-
11	1	-	1	1,2	1-3(1)	1,2(1)	1-3(2)	2-4(3)	-
12	2,3(2)	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	1

4-6-C single; 7-C single or double, all simple; 11,14-C long, acuminate, 14-C posterior to 15-C. *Antenna*: short, cylindrical setae single; 1-A very close to apex. *Thorax*: integument smooth. Setae 4,7-P and 7,13-T on individual pigmented basal plates; pleural groups 9-12-P,M,T on common basal plates; 11-P,M,T spiniform. Seta 1-P single or double, usually double, borne close to and slightly laterad of seta 2; 4-P short, about 0.5 length of 7-P, heavily acuminate, usually with 13 (10-14) branches; seta 13-T well developed, branched (12-18). *Abdomen*: integument smooth. Seta 1-I,II very small, usually triple, 1-III longer and single, 1-IV-VI longer still and generally with more branches on each succeeding posterior segment, 1-IV-VII slightly barbed; 2-I-VII short, single, 2-III-VII far mesad of seta 1; 3-I short, 3-II longer with 3-5 branches, 3-III,IV longer still, 3-V very long, single and developed like 3-VII, 3-VII acuminate; 4-II with 1 or 2 branches, 4-VIII simple; 5-I-VI usually double, 5-I short, 5-II double, 5-II-VI longer, 5-VIII with 3 branches; 6-III double, 6-IV with usually 4 (3-5) branches; 8-V with 3 or 4 branches; 13-I far cephalad of seta 9, more strongly developed than 13-II-V, VII. Segment VIII with a comb of 14-19 (14, 15) spine-like scales. *Siphon*: index 3.3-4.7 (mean 4.1); slightly spiculose; pecten with 4-7 spines in ventral median row from near base of seta 1-S to apex; setae 1-S near base, out of line with ventral accessory setae (1a-S); 1a-S a straight row of usually 4 setae; 4 (3,4) dorsal accessory setae (2a-S) in a straight row, most basal seta very small, other 3 lanceolate, strongly pigmented, sometimes forked at apex; 2-S single. *Segment X*: setae 1-4 acuminate.

Material examined: 17 male Le Pe G, 1 male G, 2 female Le Pe G, 5 female Le Pe, 6 female Pe. TRINIDAD: Cumutu, 20 Jul 1942, D. G. Dow coll., J. Lane det., larva from *Heliconia* sp., 1 male Le Pe G, FSP-USP; BRAZIL: State of Rondônia, Machadinho, MA-32 Road, 31 Feb 1987, R. Lourenço-de-Oliveira coll., M. A. Motta and M. G. Castro det., larvae from Aracea 1 male G; 1 male Le Pe G; 1 female Le Pe, 1 female Pe; Itapoã do Oeste, the old road to Mibrasa, Apr 1987, T. Fernandes coll., M. G. Castro and M. A. Motta det., larvae from Aracea, 2 female Le Pe; Ariquemes, Vila Marechal Rondon, Jul 1987, R. Lourenço-de-Oliveira coll., M. G. Castro and R. Lourenço-de-Oliveira det., larvae from Aracea, 2 female Pe; Porto Velho, São Miguel, Jul 1995, D. C. Lima coll., M. A. Motta det., larvae from *Heliconia* sp., 1 male Le Pe G; State of Pará, Belém, the road to Mosqueiro Island, Nov 1992, M. A. Motta coll., M. A. Motta and R. Lourenço-de-Oliveira det., larvae from *Heliconia* sp., 2 male Le Pe G; the same data of above except Mar 1993, larvae from *Heliconia* sp. and *Calathea* sp, 1 female Le Pe G, 2 male Le Pe G; Belém, Nov 1994, O. V. Silva coll., M. A. Motta det., larvae from *Heliconia* sp., 5 male Le Pe G; State of Maranhão, São Luis, Vinhais, Jul 1994, R. Lourenço-de-Oliveira coll., M. A. Motta det., larvae from *Heliconia* sp., 1 female Le Pe G, 2 female Pe, 5 male Le Pe G; State of Amazonas, Tefé, Santo Antônio Farm, Aug 1994, R. Lourenço-de-Oliveira coll., M. A. Motta det., larvae from *Heliconia* sp. and Aracea (*tajá*), 1 female Pe, 1 female Le Pe; PERU: Iquitos, Munichis, Dec 1995, C. F. Mendoza coll., M. A. Motta det., larvae from *Heliconia* sp., 1 female Le Pe, (IOC).

Bionomics: *Wy. ypsipola* has been collected on human bait in the forest during the day-time. Immature stages were found in the axils of *Heliconia* sp., *Calathea* sp. and Aracea. Like *Wy. luteoventralis*, and the others species of *Dendromyia*, the larvae of *Wy. ypsipola* have aggressive behavior, killing but not eating prey. **Distribution:** *Wy. ypsipola* is known from Panama, Guyana, Colombia, Peru (Iquitos), Bolivia, Brazil, Trinidad and Surinam. **Systematics:** *Wy. ypsipola* is undoubtedly most closely related specie to *Wy. luteoventralis*, because the immature stages are very similar. *Wy. ypsipola* is easily distinguished from *Wy. luteoventralis* as well as from the other *Dendromyia* species in the external characters

of the adults and male genitalia. In the female, it is distinguishable from *Wy. luteoventralis*, *Wy. trifurcata* and *Wy. testei* by having midtarsomeres II-V white-scaled on one side; differs from *Wy. jocosa* and *Wy. complosa* in having the clypeus bare. In the male genitalia, *Wy. ypsipola* differs from the other *Dendromyia* species in having the gonostylus with a tuft of long setae apically and the lobes of tergum IX roughly triangular with 8-11 long setae on each. In the pupa *Wy. ypsipola* differs from *Wy. trifurcata*, *Wy. testei*, *Wy. jocosa* and *Wy. complosa* in having the paddle strongly narrowed from the middle to the apex; it is similar to *Wy. luteoventralis* except for slight variations in setal branches of the following setae: 7-V usually with 3 (1-4) branches; 11-VII usually with 3 (2-4) branches and 9-VIII with 24-30 branches. The paddle index is

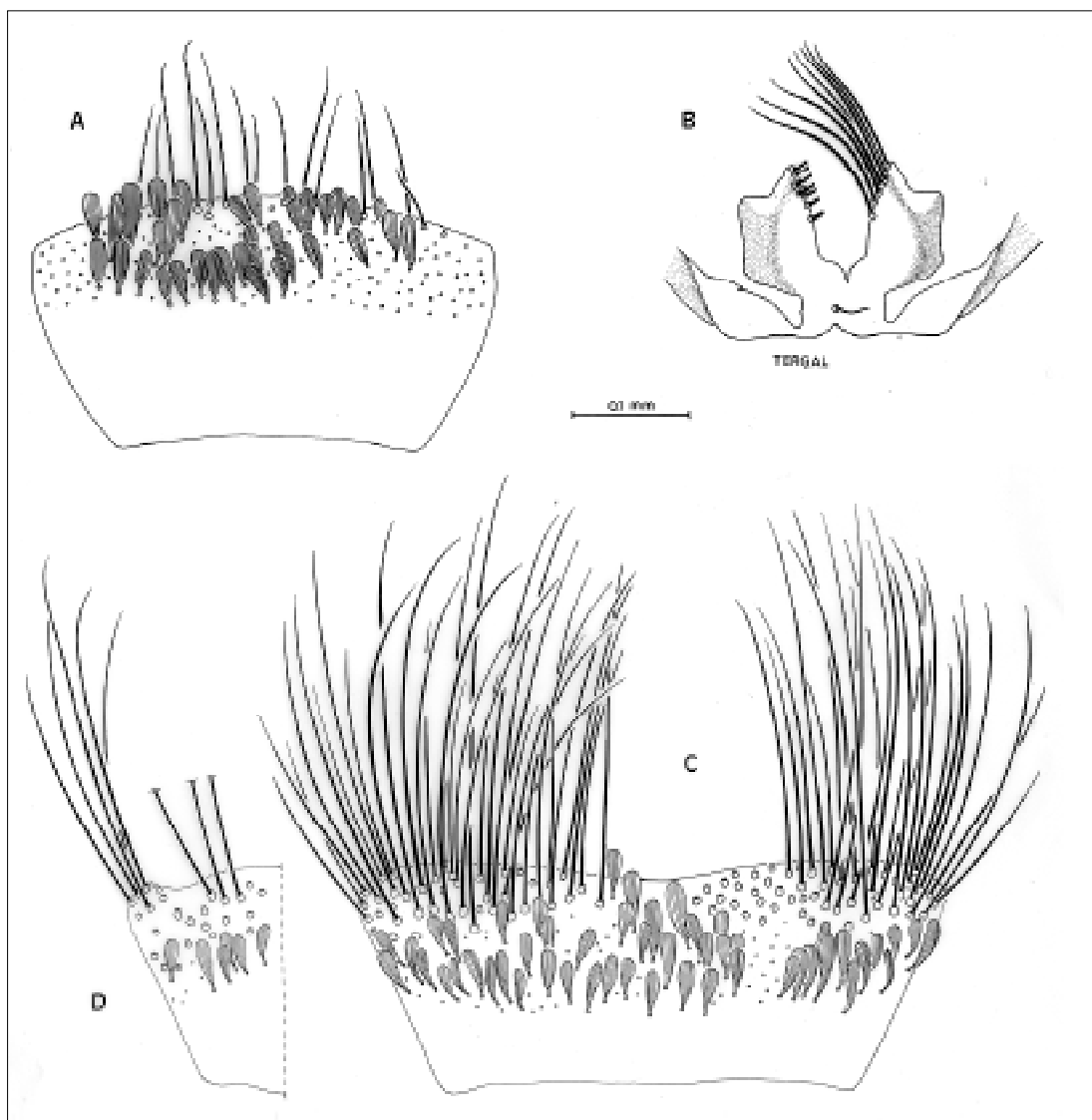


Fig. 4: *Wyeomyia ypsipola*, male genitalia. A: sternum VIII; B: tergum IX; C, D: tergum VIII

TABLE II
Range of numbers of branches for setae of 4th-larval instar of *Wyeomyia (Dendromyia) ypsipola* (mode in parentheses)

Setae no.	Head		Antenna		Thorax		Abdominal segments									
	C	Head	P	M	T	I	II	III	IV	V	VI	VII	VIII	X		
0	-	-	9-12(10)	-	-	-	1	1	1	1	1	1	-	-		
1	1	1	1,2(2)	1-3(2)	1,2(1)	1,3,4(3)	2,3	1	1	2-4(3)	3	3,4(3)	3-5(4)	2,3(2)		
2	-	1	1	1	2,3(2)	1	1	1,2(1)	1	1	1	1	1	4-7(5)		
3	1	1	1	1	3-5(4)	3,4	3-5	2,3(2)	2,3(3)	1,2(1)	1,2(1)	1	1	3-5(4)		
4	1	1	10-14(13)	2,3(3)	1-3(1)	5-7(6,7)	1,2	2,3(2)	2	4-8(8)	2,3	1	1	4-6(6)		
5	1	1	1,2(1)	1	1	1-3(1)	2	2,3(2)	2,3(2)	2,3(2)	2	2-4	1	-		
6	1	1	2	1	3,4(4)	7-12(8)	7-10(10)	2	3-5(4)	3,4(3)	2-4(3)	6,7(6)	3	-		
7	1	1	10-14(11)	2-4(3)	9-13(12)	6-9(8)	4-7(6)	5-9(8)	3-6(5)	4-8(7)	5-7(5,6)	3-5(4)	-	-		
8	2,3(2)	-	5-9(5)	4-7(5)	3-5(5)	1,2(1)	1,2(1)	2-4(3)	1-4(3)	3,4	4-6	6-8(6)	-	-		
9	3-5(5)	-	7-10(9)	4,5	9-14(11)	1,2(1)	1	1	1	1	1	2,3(3)	-	-		
10	2-4(2,3)	-	1-3(2)	1-3(1)	1,2(1)	2,3(3)	2,3(2)	2-4(3)	2,3(2)	3-7(4)	3,4(3)	3-5(3,4)	-	-		
11	3-5(3)	-	1	1	1	3,4,6(3)	2-4(4)	2-4(3)	2-4(3)	2-4(3)	2-4(4)	3-5(3)	-	-		
12	3-5(3,4)	-	1,2(1)	1,2(1)	1	-	3-6(5)	1	1	1	4,6(6)	3,4(3)	-	-		
13	2,3(2)	-	-	5-8(6)	12-18	4-6(4)	1	2	2	2-4(2,3)	5,6(5)	2-4(3)	-	-		
14	2	-	2,3	4-7(6)	-	-	-	-	-	-	-	-	-	-		
15	3,4(4)	-	-	-	-	-	-	-	-	-	-	-	-	-		

3.5-4.7 (mean 4.3). In larva *Wy. ypsipola* differs from *Wy. trifurcata* in having seta 15-C short, about 1/7 the length of 14-C; from *Wy. complosa* in having seta 2a-S strong and heavily sclerotized; from *Wy. testei* in having seta 6-P with at maximum of 3 branches; from *Wy. jocosa* in having the *laciniarastrum* with 7 teeth; it is similar to *Wy. luteoventralis*, except for some differences: the *laciniarastrum* (LR2) has numerous setae distributed in several rows, the maxillary pilose area extends to the base of the maxilla and the maxillary palpus has 4 teeth (as figured by Harbach and Peyton 1993 and Motta and Lourenço-de-Oliveira 1995). In Belém, two forms of *Wy. ypsipola* were found: the typical form that occurs in Panama and all localities searched in Brazil, and another restricted to Belém. The Belém form is distinguished from the typical form only in the male genitalia by the presence of a capitate process bearing a row of setae at the dorso-apical margin of the gonocoxite (Fig. 3-G); aedeagus with the apical tergal arms joined and moderately pointed apically, and the median sternal plate membranous with lozenge-shaped rugose area (Fig. 3-F); and the posterior margin of tergum VIII with a lateral lobe bearing setae (Fig. 4-D). No differences in the morphological characters of the females, larvae and pupae of the two forms were observed. A decision as to the taxonomic status of the Belém form cannot be made without careful reexamination of morphological characters of all available material in museums, study of additional immature specimens and a complementary biochemical or molecular analysis.

Wyeomyia (Dendromyia) jocosa (Dyar & Knab, 1908)

Prosopolepis jocosa Dyar & Knab, 1908: 64 (female). Caldera, Panama (USNM).

Wyeomyia (Dendromyia) jocosa of Lane & Cerqueira 1942: 616; Lane 1953: 996 (male*, female); Barreto & Lee 1969: 417 (new distribution); Motta & Lourenço-de-Oliveira 1995: 384; Harbach & Peyton 1993: 14.

Wyeomyia prolepidis Dyar & Knab 1919: 1 (syn.).

Dendromyia (Melanolepis) prolepidis of Dyar 1928: 73 (male*, female, L*).

Dendromyia (Melanolepis) favor Dyar & Núñez Tovar 1928. In Dyar 1928: 73 (female); Lane 1953: 996 (syn.).

Wyeomyia (Prosopolepis) jocosa Heinemann & Belkin 1978a:189.

Female: Head: vertex covered with broad, brown scales with blue-greenish reflections; occiput dark, scales with whitish reflections on median area which do not form a conspicuous spot; ocular line with some white scales, setae dark; 2 long dark interocular setae; side behind eyes and postgena

with broad white scales. Proboscis covered with dark brown scales, expanded distally, length 2.1-2.2 mm (mean 2.1 mm), about 0.8 length of forefemur; basal labial setae long, bronzy. Maxillary palpus same color as proboscis, about 0.17 length of proboscis. Clypeus ovate, darkish brown, densely covered with small, bronzy scales. *Antenna*: pedicel brown, pruinose with some bronzy scales on inner surface, flagellum slightly verticillate, little shorter than proboscis. *Thorax*: integument brown. Anteprenotum covered only by darkish scales with blue-green reflections, same color as scutum, long, dark setae dorsally. Postpronotum dark-scaled in a narrow dorsal area, remainder of postpronotum white-scaled. Scutal integument brown, covered with broad brown scales with blue-green reflections, except for a group of white scales on middle of anterior promontory; setae on anterior promontory dark; supraalar setae long, dark. Scutellum with scales concolorous with scutum. Mesopostnotum dark brown with a tuft of about 10 setae of different lengths and some whitish scales among setae. Pleural sclerites brown, largely covered with whitish scales, setae yellowish and bronzy; upper proepisternum densely covered by whitish scales; 2 dark prespiracular setae, 4 pale lower mesokatepisternal setae inserted below and above upper margin of mesomeron; 3 or 4 darkish supraalar setae; about 12 yellowish upper mesepimeral setae; *Wing*: length 3.7-3.8 mm (mean 3.8 mm). Upper calypter without setae. Scales of veins moderately broad, brown. R_s with appressed scales ligulate, R_{2+3} , R_2 , R_3 , M_{1+2} , M , M_1 , M_2 and Cu with moderately broad lateral anterior appressed scales; 1A with long spatulate scales. *Halter*: scabellum yellowish; pedicel yellowish, dark-scaled dorsally; capitellum dark-scaled. *Legs*: coxae and trochanters with pale integument with whitish scales, yellowish and bronzy setae. Femora and tibiae dark with a stripe of white scales ventrally. Tarsomeres dark. *Abdomen*: terga densely covered with broad brown scales with blue-greenish reflections, lateral margins whitish; sterna with whitish scales; colors separated on sides in nearly straight line. Terga I and VIII with numerous long, bronzy setae. *Genitalia* (Fig. 5): tergum VIII (not figured) with straight posterior margin, rounded laterally; covered with broad scales and short setae. Sternum VIII (Fig. 5-E) with antero- and posterolateral corners rounded, posterior margin with a small V-shaped notch at middle, covered with broad scales and moderately long setae similarly distributed. Tergum IX (Fig. 5-D) narrow, with 3 or 2 submarginal setae on either side of midline. Cercus (Fig. 5-A) short, borne obliquely to sagittal plane of body, numerous setae on dorsal surface distally. Postgenital lobe (Fig. 5-B) extends

beyond apex of cerci, broader than long, slightly invaginate in middle, dorsal surface with median area covered with very short setae arising from conspicuous alveoli; ventral surface with short setae. Upper and lower vaginal lips normal. Insula (Fig. 5-C) covered with very short setae, with a central protuberance having about 7 strong setae distally on each side, these setae with tip toward to inside; middle area bare. Three spermathecal capsules of different sizes.

Male: similar to female except for the following sexual differences. *Head*: proboscis length 1.8-1.9 mm (mean 1.8 mm), 0.8 length of forefemur. Maxillary palpus darkish, 0.11 length of proboscis. *Genitalia* (Fig. 6): tergum VIII (Fig. 6-H) with strong setae distally same length as gonocoxite, these setae do not form a conspicuous tuft; sternum VIII (Fig. 6-G) with setae shorter and less numerous than on tergum; tergum IX (Fig. 6-E) with very small interlobar space, each lobe with 4 strong setae, weakly sclerotized, foliform with pointed apex. Proctiger (Fig. 6-F) with 2 small subapical cercal setae and a basal sclerotization (tergum X); paraproct sclerotized dorsoapically with 2 teeth. Gonocoxite (Fig. 6-A) short, outer surface with numerous short setae, the tuberculus of the long seta; 3 long, strong tergomeres. Basal mesal lobe lightly sclerotized, with row of about 6 short setae and 2 long strong distal ones. Gonostylus (Fig. 6-A-C) short, without stem, divided basally into 3 lobes: lobe C narrow, long and slightly curved, sharp at apex; lobe M longer, broad, cylindrical, with rounded apex and numerous short setae distally; lobe A,E slender, bifurcate distally into 2 digitiform appendages: one with 2 setae and the other with 1 seta apically. Aedeagus (Fig. 6-D) ovate in tergal view; apical tergal arms joined, forming a bridge; submedian tergal arms not joined; median sternal plate simple, membranous.

Pupa (Fig. 7): number of branches of setae in Table III. *Cephalothorax*: very pale; seta 5-CT nearly as long as seta 1-CT, with aciculate branches. *Trumper*: darker than cephalothorax, cylindrical, index 3.4-4.3 (mean 3.9). *Abdomen*: pale, median anterior margin of sterna II-VII darker; seta 1-I strongly developed, divided into numerous branches throughout length; 1-III mesad to 3-III; 2-II-VII very close to posterior margin of terga; 2-II between and nearly on level with setae 1 and 3; 2-III mesad to seta 1-III and 1-III mesad to seta 3-III; 3-I slightly aciculate; 3-IV far anterior to seta 1-IV and obviously anterior to 4-IV; 5-IV-VI very long, single, aciculate; 6-II usually single and long, extending beyond anterior margin of segment III, 6-VII ventral; 9-VII, VIII aciculate; 9-VII strongly developed, nearly same length as paddle; 9-VIII very long, longer than paddle; seta 11-II usually

absent. *Genital lobe*: light brown, nearly same length as segment VIII in male. *Paddle*: pale, long, gradually narrowed from base to apex; inner and outer margins lined with small spicules that are longer and denser at tip.

Larva (Fig. 8): number of branches of setae in Table IV. *Head*: slightly rounded, wider than long, pale. Maxilla (Fig. 9-A,B) elongate with a prominent AT; dorsomesal surface with 4 teeth (LR), progressively longer apically; dorsal surface with numerous long apicolateral setae; maxillary brush com-

prised of some long apicolateral setae. Seta 2,6-Mx simple, setae 3, 4-Mx not found; seta 1-Mx spiniform, bifid at tip. Maxillary palpus not fused to maxilla. Mandible (Fig. 9-C,D): mandibular sweeper formed of 2 groups, one with 5 and the other with 4 long setae. Dorsomentum (Fig. 9-E) usually with 8 teeth on each side of a prominent median tooth. Hypostomal suture complete; occipital foramen with dorsolateral slit-like extension on either side, margins heavily pigmented laterally. Seta 1-C stout, curved; 4-6-C simple, 7-C

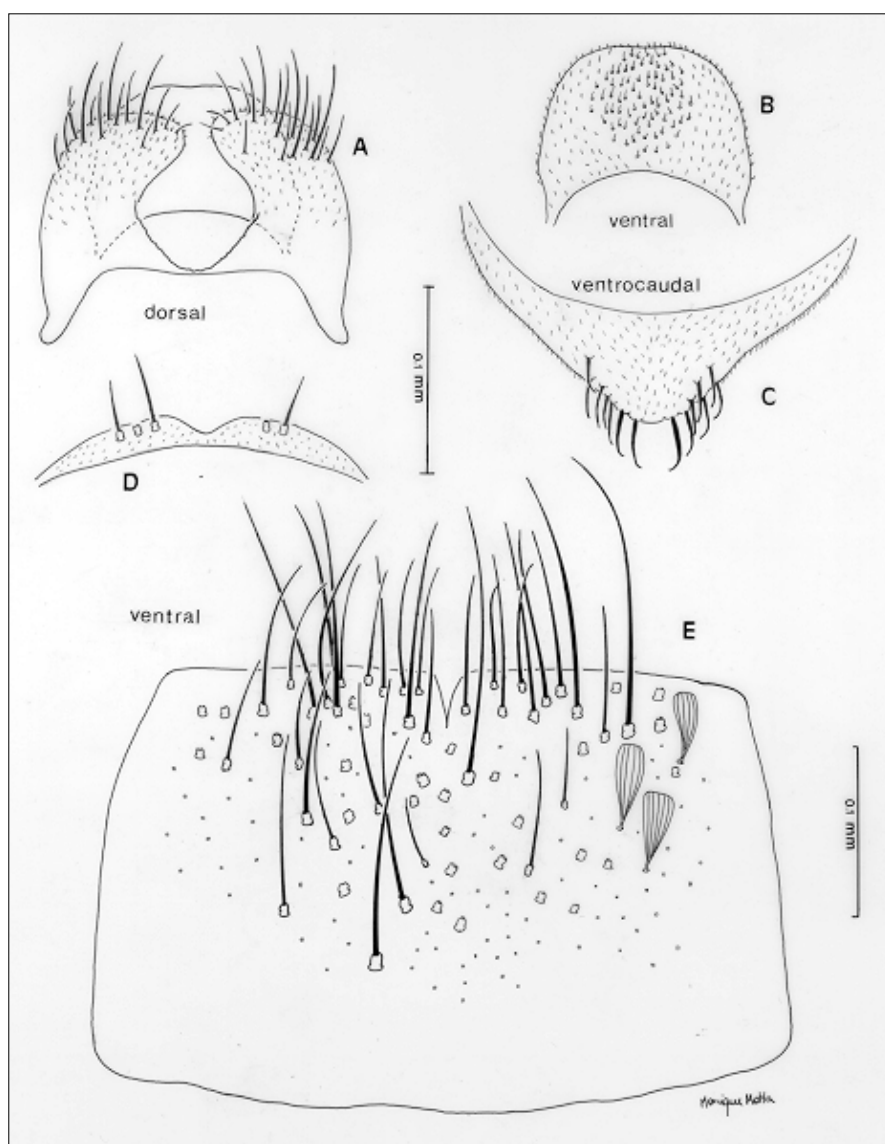


Fig. 5: *Wyeomyia jocosu*, female genitalia. A: cerci, postgenital lobe; B: postgenital lobe; C: insula; D: tergum IX; E: sternum VIII

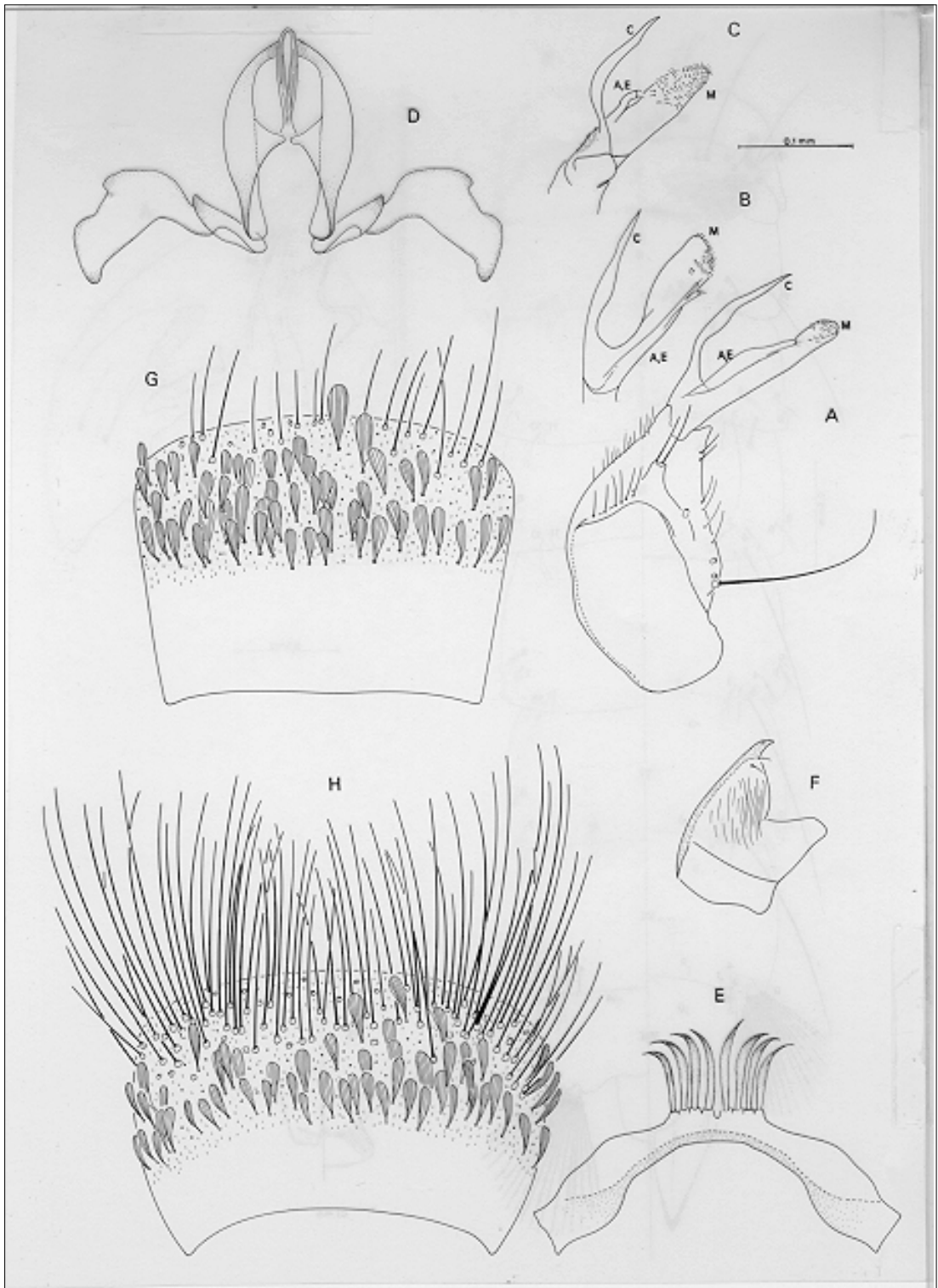


Fig. 6: *Wyeomyia jocosu*, male genitalia. A: gonocoxite, gonostylus (lobes C, M, A,E); B, C: aspects of gonostylus; D: aedeagus; E: tergum IX; F: proctiger; G: sternum VIII; H: tergum VIII

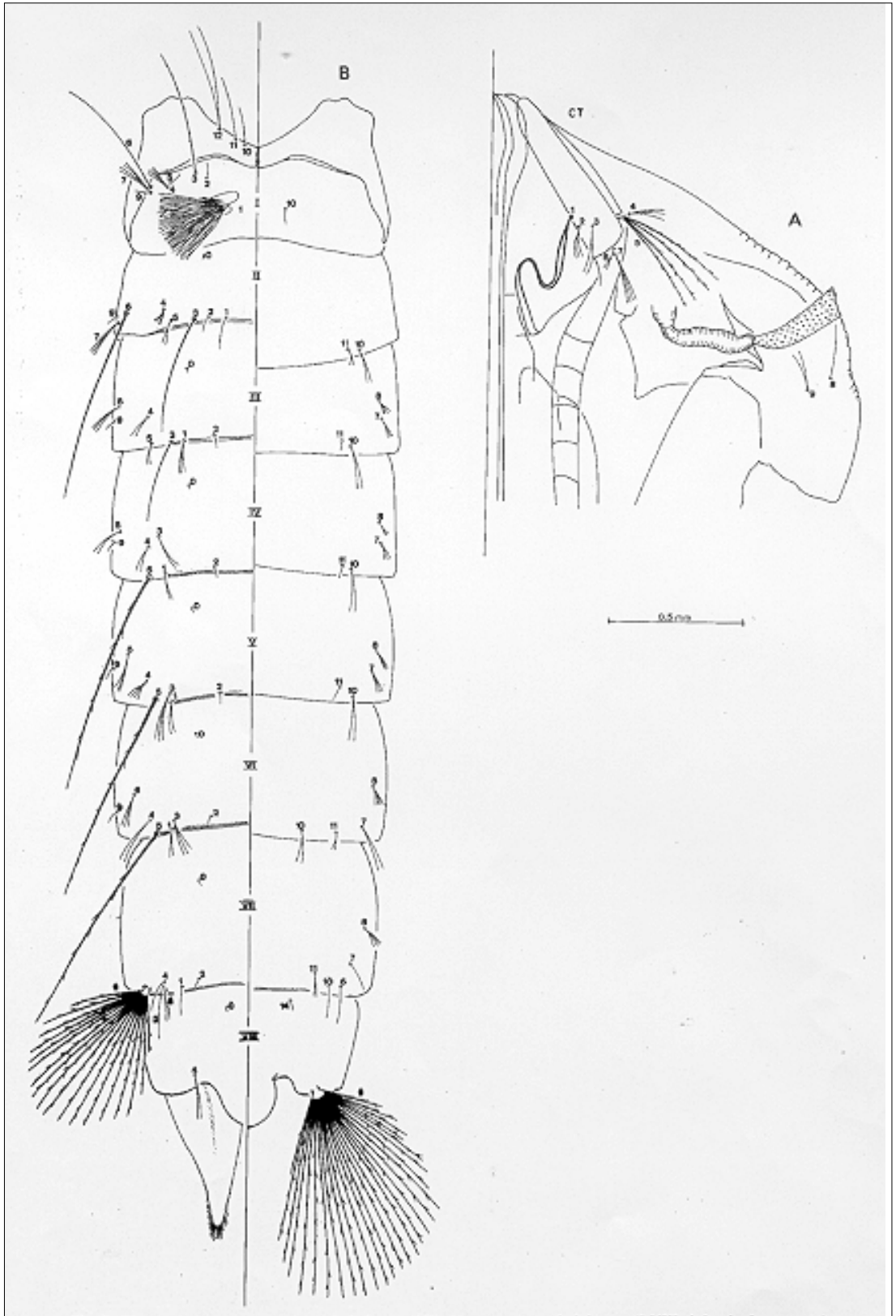


Fig. 7: *Wyeomyia jocosu*, pupa. A: cephalothorax (CT); B: metanoto and abdomen (I-VIII abdominal segments)

TABLE III

Range of numbers of branches for pupal setae of *Wyeomyia (Dendromyia) jocosa* (mode in parentheses)

Setae no.	Cephalo-thorax	Abdominal segments							
		I	II	III	IV	V	VI	VII	VIII
0	-	-	1	1	1	1	1	1	1
1	2	D	1,2(1)	1-5(3,4)	1-3(2,3)	1-3(2)	1,2(2)	1,2(1)	-
2	2,3	1,2(1)	1	1	1	1	1	1	-
3	2,3(2)	1,2(1)	1	1	2-5(2)	3,4(3)	2-4(2,3)	1,2(1)	-
4	2-4(3)	4-6(4)	1-5(4)	2,3(2)	2,3(2)	3-5(4)	2,3(2)	1,2(1)	1-3(2)
5	3-5(4)	1,2(1)	1-4(2)	1,2(2)	1	1	1	2,3(2)	-
6	1,2	1,2(1)	1,2(1)	2-5(3)	2-4(2)	2,3(3)	2-4(2,3)	1	-
7	3-6(4)	3-5(4)	2-4(3)	2-6(3)	2-4(3)	3-5(4)	2,3(2)	1,2(1)	-
8	1,2(1)	-	-	3,4(4)	2-4(3)	2-4(3)	3-5(4)	4-6(4)	-
9	2,3(2)	1	1	1	1	1	1	15-21(18)	20-27,32
10	1	1	1-3(2)	2,3(2)	2,3(2)	2,3(2)	1,2(2)	1,2(1)	-
11	1,2(1)	-	1-3	1,2(1)	1,2(1)	1	2-4(2)	1-4(2)	-
12	1,2(2)	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	1

slightly aciculate, 11-C long, aciculate, 15-C very small; 14-C posterior to 15-C. *Antenna*: short, cylindrical, setae single, 1-A very close to apex. *Thorax*: integument smooth. Setae 4-P, 5,6-M, 7,13-T on individual pigmented basal plates; pleural groups 5-7-P, 9-12-P,M,T on common basal plates; 11-P,M,T spiniform. Seta 1-P usually single, inserted close and slightly lateral to setae 2,3-P; 4-P with 8-13 aciculate branches; 5-P usually single; 6-P with 2,3 long branches; 14-M developed, longer than seta 13-M; 13-T well developed, long, aciculate; 5-7,9,10,12-P; 5,6,8,9,10,12-M and 7,9,10,12,13-T aciculate. *Abdomen*: integument smooth. Seta 1-I very small, usually single; 1-III longer, 1-IV,V longer still, double, 1-VI smaller with more branches; 2-II-VII very small, single, 2-III mesad to seta 1; 3-I short, 3 gradually longer on following segments; 4-I,II,V short with numerous branches, 4-III,IV single, short, 4-VI,VII long; 5-I short, 5-II-V longer, usually with 3 or 4 branches, 5-VI longer than 5-II-V; 6-I-VI long, aciculate, inserted on slightly pigmented tuberculous; 7-I,II long, aciculate, inserted on slightly pigmented basal plate, 7-II-VI short with numerous branches; 12-II,VI with numerous branches, 12-III-V short, usually single; 13-I moderately long, usually with 4 or 5 branches, anterior to seta 9-I, 13-II-IV usually single or double, 13-V long, double, 13-VI short with 8 branches. Segment VIII: setae 2,4,5-VIII long, aciculate. Comb with 15 (11-18) spiniform scales, in one irregular row (similar to *Wy. luteoventralis*), scales with minute spicules laterally. *Siphon*: index 4.1 - 4.9 (mean 4.6) slightly spiculose, pale. Pecten with 9 (6-10) spines on ventral median row; spines elongate with minute spi-

cules laterally; seta 1-S inserted near basal third with 5 (3-6) aciculate branches; only one pair of seta 1a-S usually with 2 (2,3) branches, nearly on level with seta 1-S; 3 dorsal accessory setae (2a-S) in line, strongly pigmented, with apices nearly bifurcate or lanceolate. *Segment X*: saddle incomplete, pale. Setae 1-4-X aciculate; 4-X short, nearly 1/3 length of seta 1-X.

Material examined: 2 male Le Pe G, 7 Le Pe, 1 male G, 2 male, 5 female. PANAMA: Canal Zone, Chiva Chiva, 10 Nov 1965, A. Quinonez coll., 1 male Le Pe G, 1 male Le Pe, larvae from *Heliconia*; Canal Zone, Fort Clayton, 21 Nov 1965, A. Quinonez and R. X. Schick coll., larvae from Aracea (*Montrichardia* ?) 1 male Le Pe G; Fort Clayton, "Lake", 19 Nov 1965, A. Quinonez and R. X. Schick coll., larvae from Aracea (*Montrichardia arborescens*), 1 male Le Pe, 1 female Le Pe; Canal Zone, Nuevo Emperador, 23 Nov 1965, A. Quinonez coll., larvae from Aracea (*Dieffenbachia* ?) 1 female Le Pe; Nuevo Emperador, 7 Dec 1965, A. Quinonez coll., larvae from *Heliconia*, 2 male Le Pe; Canal Zone, Culebra, 13 Dec 1965, A. Quinonez coll., larvae from Marantacea (*Calathea*), 1 male Le Pe; same data as above except: larvae from *Heliconia* 1 male G; Canal Zone "Camp. Gaillard", 26 Dec 1925, D. Baker coll., 1 male; Culebra, 19 Dec 1925, D. Baker coll., 1 male; Culebra, 24 Nov 1924, coll. J. B. Shropshire coll., 2 female; Culebra, 2 Dec 1920, C.S. Ludlow coll. 2 female; Canal Zone, Monte Lirio, 10 Dec 1921, J. B. Shropshire coll. 1 female, (USNM).

Distribution: known from Panama, Venezuela, Mexico and Colombia.

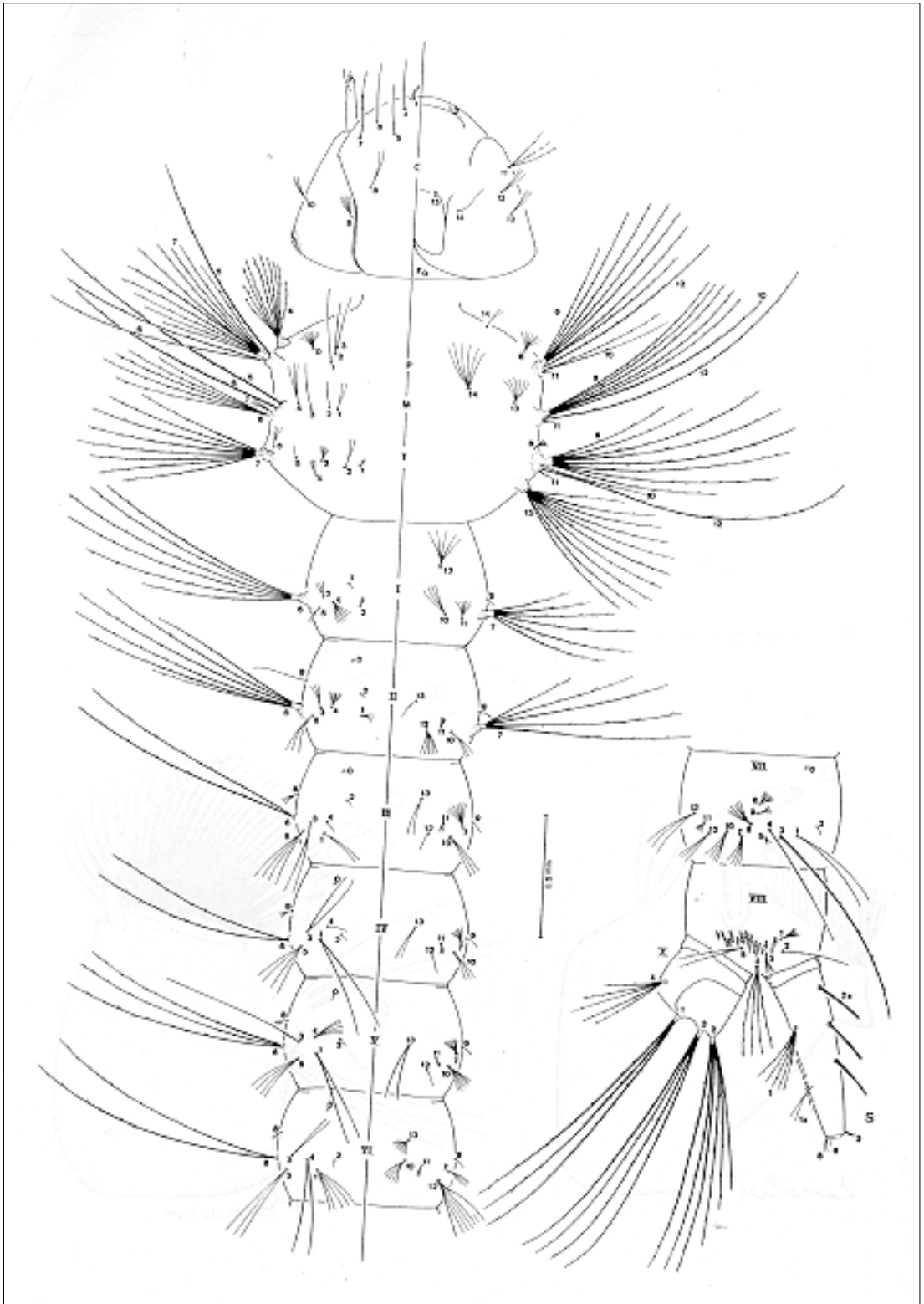


Fig. 8: *Wyeomyia jocosu*, larva. C: cranium; P: prothorax; M: mesothorax; T: metathorax; I-X abdominal segments; S: siphon

TABLE IV
Range of numbers of branches for setae of 4th-larval instar of *Wyeomyia (Dendromyia) jocosa* (mode in parentheses)

Setae no.	Head C	Antenna		Thorax		Abdominal segments												
		P	M	T	I	II	III	IV	V	VI	VII	VIII	X					
0	-	7-10(8,9)	-	-	-	I	I	I	I	I	I	I	I	I	I	I	I	I
1	1	1	2,3(2)	2-4(2,3)	1,2(1)	3-5(3,4)	2,3(2)	2	2	2	2	2	2	2	2	2	2	2
2	-	1	1	1-3(2)	3-5	1	1	1	1	1	1	1	1	1	1	1	1	1
3	1	1	1	4-6(5)	2-4(3)	2-4(3)	1,2(2)	1	1	1	1	1	1	1	1	1	1	1
4	1	1	1	1-3(3)	6-10(7,8)	5-8(6)	1,2(2)	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1,2(1)	1-4(2)	2-5(3)	3,4(4)	3-5(3,4)	3-5(4)	3-5(4)	3-5(4)	3-5(4)	3-5(4)	3-5(4)	3-5(4)	3-5(4)	3-5(4)	3-5(4)
6	1	1	1	2-5(3)	5-8(6,7)	4-7(5)	2-4(2)	2-5(2,4)	2-4(2,3)	2-4(2,3)	2-4(2,3)	2-4(2,3)	2-4(2,3)	2-4(2,3)	2-4(2,3)	2-4(2,3)	2-4(2,3)	2-4(2,3)
7	1,2(1)	1	1	7-9(7)	4-8(6)	4-7(5)	7-11(8)	6-9(7)	7-9(8)	7-9(8)	7-9(8)	7-9(8)	7-9(8)	7-9(8)	7-9(8)	7-9(8)	7-9(8)	7-9(8)
8	2,3(2)	1	1	4-5(5)	1,2	1,2	3,4(3)	3,4(3)	3,4(3)	3,4(3)	3,4(3)	3,4(3)	3,4(3)	3,4(3)	3,4(3)	3,4(3)	3,4(3)	3,4(3)
9	4-7(5,6)	1	1	8-11(9)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10	2-4(3)	1	1	1	3-6(4)	3-5(3)	3-5(3)	3-5(3)	3-5(3)	3-5(3)	3-5(3)	3-5(3)	3-5(3)	3-5(3)	3-5(3)	3-5(3)	3-5(3)	3-5(3)
11	3,4(3)	1	1	1	5-9(7)	4-6(4)	3,4	2-4(3)	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3
12	2-4(3)	1	1	1	4-7(5)	4-7(5)	1	1	1	1	1	1	1	1	1	1	1	1
13	2-4(3)	1	1	1	10-16(10)	3-6(4,5)	2,3(2)	2-4(2)	2,3(2)	2,3(2)	2,3(2)	2,3(2)	2,3(2)	2,3(2)	2,3(2)	2,3(2)	2,3(2)	2,3(2)
14	1,2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15	2-5(4)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Bionomics: we did not find immature stages or adults of *Wy. jocosa* in the localities where we collected the other species of *Dendromyia* in Brazil and Peru. Heinemam and Belkin (1978a), in Panama, collected larvae of *Wy. jocosa* in Aracea (*Montrichardia* sp. and *Dieffenbachia* sp.), as well as in axils and bracts of *Heliconia* sp. and *Calathea* sp. There are no available data on the biting habits of *Wy. jocosa*.

Systematics: *Wy. jocosa* is more closely related to *Wy. luteoventralis* and *Wy. ypsipola* than to the other species of *Dendromyia*, mainly based on similarities in the immature stages. In the female, *Wy. jocosa* differs from *Wy. luteoventralis*, *Wy. ypsipola*, *Wy. testei* and *Wy. trifurcata* by having scales on the clypeus and from *Wy. complosa* in having the midtarsomeres dark. In the male genitalia, *Wy. jocosa* differs from *Wy. ypsipola* in having the gonocoxite without an apical tuft of long setae; from *Wy. complosa* and *Wy. trifurcata* in having tergum VIII without an apicolateral tuft of long, strong setae; from *Wy. testei* and *Wy. luteoventralis* in having tergum IX with broad, foliform setae with pointed apices. In the pupa, *Wy. jocosa* differs from *Wy. luteoventralis* and *Wy. ypsipola* in having the paddle gradually narrowed toward the apex; from *Wy. trifurcata* in having seta 1-I branched at different levels; from *Wy. complosa* in having seta 6-III anterior to seta 4-III and seta 5-CT usually with more than 3 branches; it differs from *Wy. testei* in having seta 3-II very long, almost the same length as the next abdominal segment, and seta 3-III lateral to seta 1-II. In the larva, *Wy. jocosa* differs from *Wy. trifurcata* in having seta 15-C short, about 0.14 the length of 14-C; from *Wy. complosa* in having seta 2a-S strong and seta 6-P with 2 or 3 branches; and from *Wy. luteoventralis* and *Wy. ypsipola* in having seta 4-VIII usually with 2 branches and the maxilla with 4 teeth on LR.

***Wyeomyia (Dendromyia) testei* Senevet & Abonnenc, 1939**

Wyeomyia (Den.) testei Senevet & Abonnenc, 1939: 269 (male*, L*). Saut-Tigre (Inini), French Guyana (FMP - Faculté de Médecine de Paris, Laboratoire de Parasitologie et de Mycologie); Belkin 1968: 43 (holotype localization); Lane & Cerqueira 1942: 608 (male*); Lane 1953: 982 (male*); Harbach & Peyton 1993: 14; Motta & Lourenço-de-Oliveira 1995: 384.

Wyeomyia (Prosopolepis) testei of Heinemann & Belkin 1978b: 409, 446.

Female - Head: vertex covered with broad dark scales with blue-green reflections; occiput and vertex usually with a spot of light scales in median area in triangular shape or irregular longitudinal

stripe; area behind eyes and postgena with broad white scales; ocular line with white scales and dark setae; 2 interocular setae long, dark. Proboscis covered with dark scales, expanded distally; length 1.9 - 2.3 mm (mean 2.1 mm), about 0.8 length of forefemur; basal labial setae bronzy. Maxillary palpus same color as proboscis, about 0.14 length

of proboscis. Clypeus ovate, pruinose, darkish. *Antenna*: pedicel brownish, pruinose with bronzy scales; flagellum slightly verticillate, slight shorter than proboscis. *Thorax*: integument brown. Anteprenotum covered only with dark scales with blue-greenish reflections, similar to scutal scales; numerous dark, long, strong setae dorsally.

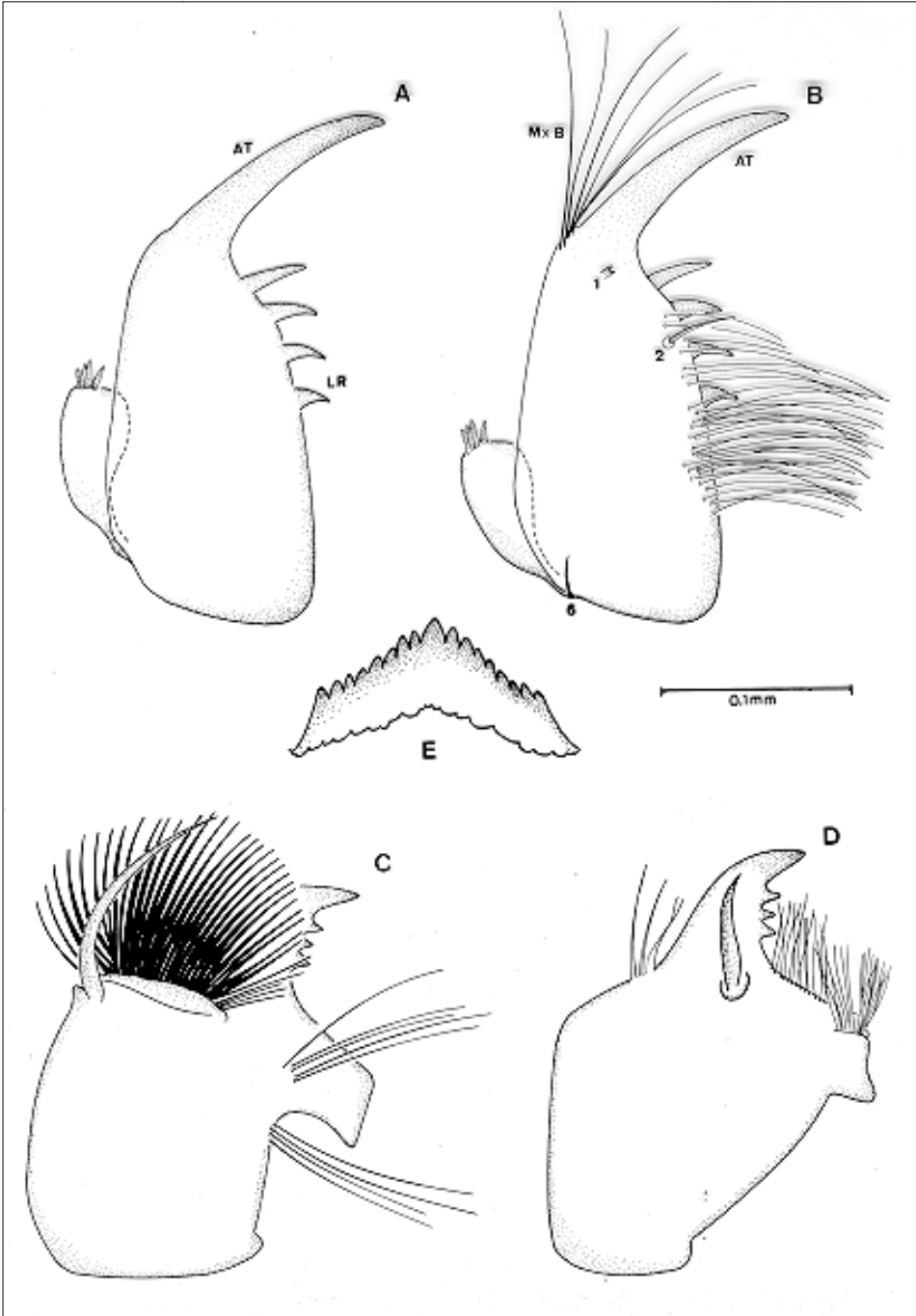


Fig. 9: *Wyeomyia jocosu*, larval mouthparts. A, B: maxillae; C, D: mandible (A, C: ventral; B, D: dorsal views); E: dorsentum

Postpronotum densely covered with whitish scales. Scutum with darkish brown integument, densely covered with darkish scales with blue and green reflections, except one group of white scales on middle of anterior promontory; setae of anterior promontorial and median scutal fossal area dark; supraalar setae long, dark. Scutellum darkish-scaled, same color as scutal scales; 5 or 6 long setae on each lobe. Mesopostnotum brown, with a tuft of 13 (11-16) setae of different lengths, 1 or 2 longer and stronger, reaching median scutellar setae, sometimes with light scales in tuft. Pleural sclerites with yellowish integument, densely covered with whitish scales, pleural setae yellowish; upper proepisternal area with whitish scales; 2 (2-4) dark prespiracular setae; 5 (4-6) yellowish lower mesokatepisternal setae inserted below and above upper margin of mesomeron; 5 (5-7) long, yellowish prealar setae; 10 (8-13) yellowish upper mesepimeral setae. *Wing*: length 3.1 - 3.8 mm (mean 3.5 mm). Upper calypter without setae. Scales of veins brown, moderately broad. Veins R_{2+3} , R_2 , R_3 , M_{1+2} , M_1 , M_2 , Cu and 1A with both lateral anterior and appressed scales moderately broad, R_s and M with long, spatulate scales. *Halter*: scabellum yellowish, pedicel yellowish, dark-scaled dorsally, capitellum with dark scales. *Legs*: coxae and trochanters with yellowish integument, partially covered with whitish scales, setae long, pale. Femora and tibiae with a stripe of whitish scales ventrally. Fore- and hindtarsomeres dark, except for some whitish scales in line ventrally on hindtarsomere I; midtarsomeres I and II covered with white scales on one side; III, IV and V dark; midtarsomere III sometimes with a few white scales at base on one side. Ungues simple. *Abdomen*: terga densely covered with brown scales with blue-greenish reflections and brown setae; tergum I with numerous long yellowish setae; lateral margins whitish; sterna covered with whitish scales; colors separated on sides in nearly straight line. *Genitalia* (Fig. 10): tergum VIII (not figured) with posterior margin rounded, anterior margin almost straight; densely covered with scales and numerous setae. Sternum VIII (Fig. 10-F) with anterolateral corners rounded; posterior margin more or less straight with a V-shaped notch at middle; densely covered with whitish scales, median setae distributed in "V". Tergum IX (Fig. 10-E) spiculose, narrow with one short setae on one side. Cerci (Fig. 10-A) short, borne obliquely to sagittal plane of body, lateroapically with moderately long setae; postgenital lobe (Fig. 10-B,C) nearly as long as cerci, slightly invaginated in middle, dorsal surface with short setae apically; ventral surface with median area with minute setae arising from conspicuous alveoli. Upper and lower vaginal lips a

little broader than usual. Insula (Fig. 10-D) covered with very short setae, with a protuberance in middle (similar to a lobe) with a marginal row of about 15 uniformly distributed setae of different lengths, apical setae longer than lateral ones. Three spermathecal capsules.

Male: similar to female except for the following sexual differences. Antenna slightly more verticillate. Proboscis about 0.8 length of forefemur. Maxillary palpus 0.12 length of proboscis. *Wing*: 2.6-3.0 mm (mean 2.8 mm). *Legs*: tibiae whitish ventrally. Midtarsomeres I, II and III with obvious stripe of white scales ventrally, IV and V dark. *Genitalia* (Fig. 11): tergum VIII (Fig. 11-G) covered with broad scales and numerous minute setae; distally, strong, long setae nearly same length as gonocoxite, not forming a distinct tuft; sternum VIII (Fig. 11-F) with short, less numerous setae; covered with broad scales. Tergum IX (Fig. 11-D) with interlobar space narrow and plain, lobes not prominent, each lobe with 3 short, slender setae. Proctiger (Fig. 11-E) (in lateral view) with 5 or 6 small subapical cecal setae apically and a basal sclerotization (tergum X). Paraproct esclerotized, dorsoapically with only 1 tooth. Gonocoxite (Fig. 11-A) short; inner surface with minutes setae; sternal surface with numerous scales and 1 long, strong seta; tergal surface with 3 long setae. Basal mesal lobe lightly sclerotized, with 20 short and 2 strong setae apically. Gonostylus (Fig. 11-A, B) short, without stem, divided basally into 2 principal lobes: lobe C narrow, with sharp apex, bearing a membranous process at midlength; lobe M, the principal extension of stem of gonostylus, roughly cylindrical, apex nearly digitiform with numerous setae of different sizes; lobe M bears lobe A,E, which is expanded distally, with a row of short setae apically and a strong pointed apicolateral tooth. Aedeagus (Fig. 11-C) rounded, apicotergal arms not joined, slightly denticulate; submedian tergal arms not joined, mediansternal plate with membranous, expanded apicolateral fringed process. *Pupa* (Fig. 12): number of branches of setae in Table V. *Cephalothorax*: brownish; dorsal area more pigmented than mesothoracic wing; seta 5-CT nearly as long as 1-CT, usually with 5 aciculate branches. *Trumpet*: slightly darker than cephalothorax, cylindrical, index 3.7 - 4.5 (mean 4.2). *Abdomen*: brownish; metathorax and segments I-IV darker than the other abdominal segments; anterior margin of sterna I-VII darker. Seta 1-I strongly developed, with numerous branches at base; 2-II-VII near to posterior margin of terga, 2-II between or nearly on level with setae 1 and 3; 2-III-VII more mesad than seta 1; 3-III mesad and a little longer than seta 1; 3-IV far anterior to seta 1; 3-IV nearly anterior to seta 1; 3-V-VII slightly anterior to seta

1; 5-IV-VI longer than following tergum, aciculate; 6-II long, extending beyond margin of following tergum, usually single, 6-III-VII small, usually single, 6-VII inserted ventrally; 9-VII, VIII well developed with numerous aciculate branches, 9-VIII longer than paddle; seta 11-II usually absent. *Genital lobe*: darker than abdomen. In male mod-

erately long, nearly same length as paddle, rugose; paddle pale, short, tip more or less pointed, inner and outer margins lined with small spicules that become longer and denser at tip.

Larva (Fig. 13): number of branches of setae in Table VI. *Head*: pale, slightly wider than long. *Maxilla* (Fig. 14-A,B) elongate, with a prominent

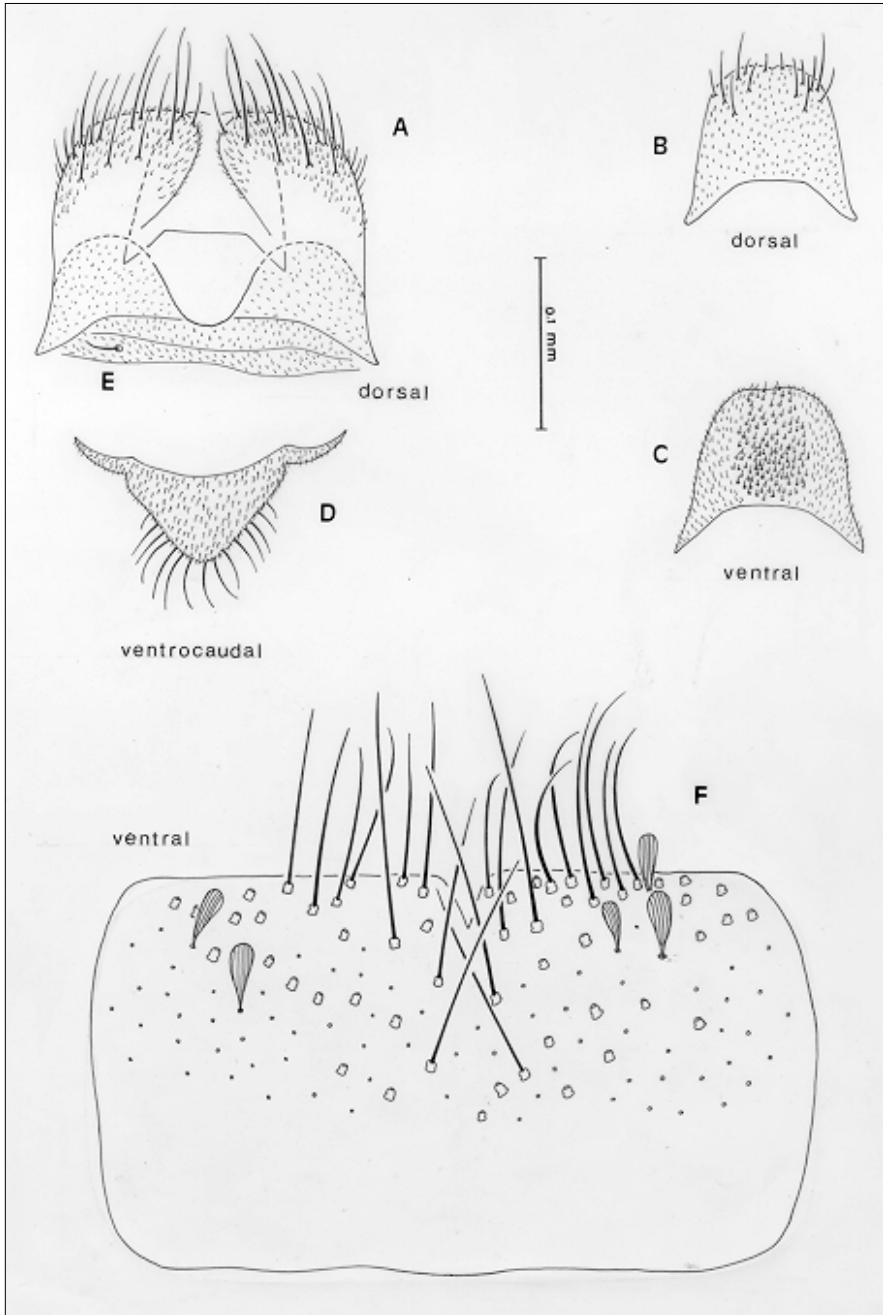


Fig. 10: *Wyeomyia testeii*, female genitalia. A: cerci, postgenital lobe; B, C: postgenital lobe; D: insula; E: tergum IX; F: sternum VIII

AT which is nearly half length of maxilla body; dorsomesal surface usually with 8 sclerotized teeth, progressively longer apically, apicolateral surface with numerous long setae; maxillary brush com-

prised of long setae. Setae 2,3,6-Mx simple, 1-Mx spiniform, strong, short, bifurcate at apex. Maxillary palpus not fused to maxilla. Mandible (Fig. 14-C,D): mandibular sweeper divided into 2

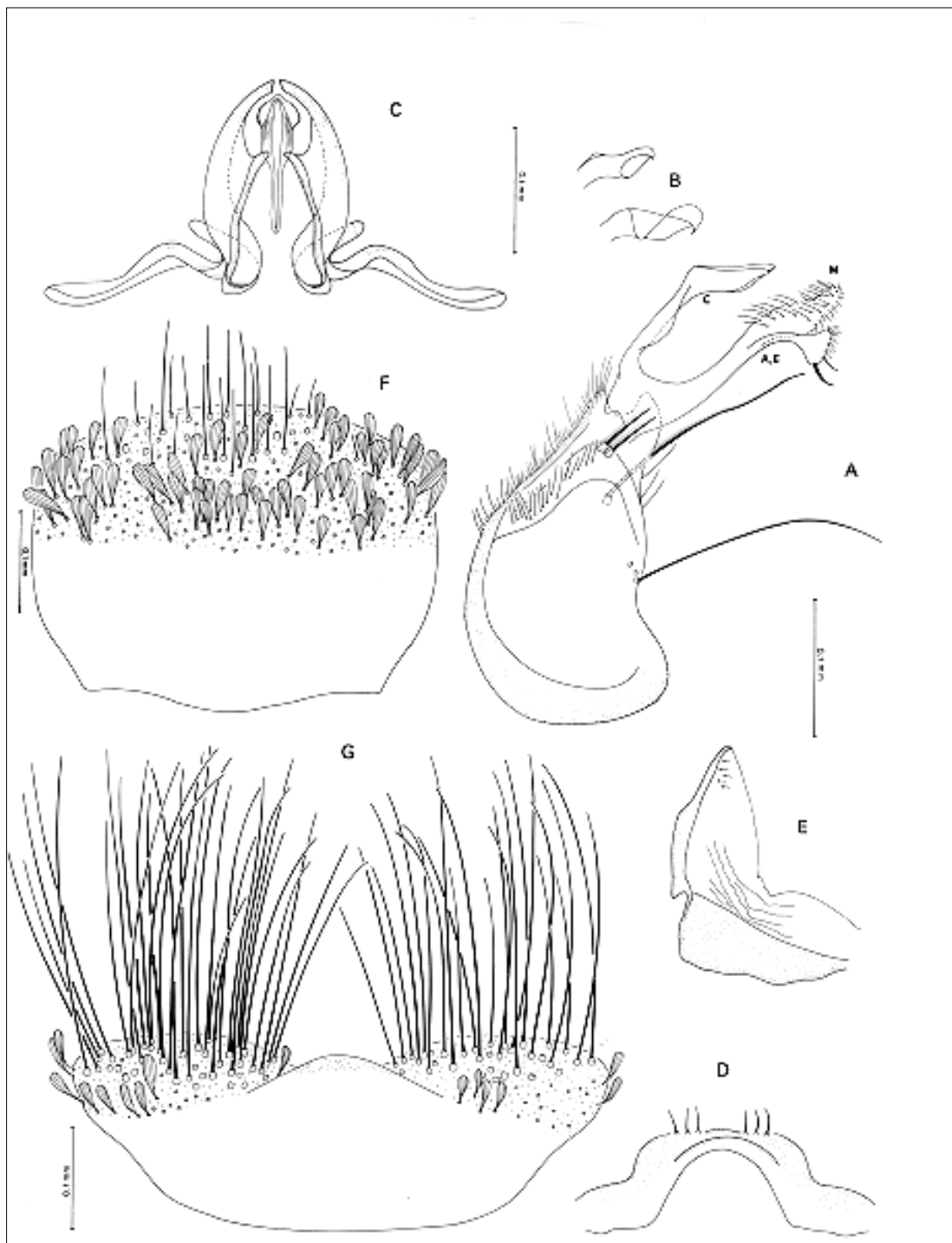


Fig. 11: *Wyeomyia testei*, male genitalia. A: gonocoxite, gonostylus (lobes C, M, A,E); B: aspects of lobe C of gonostylus; C: aedeagus; D: tergum IX; E: proctiger; F: sternum VIII; G: tergum VIII

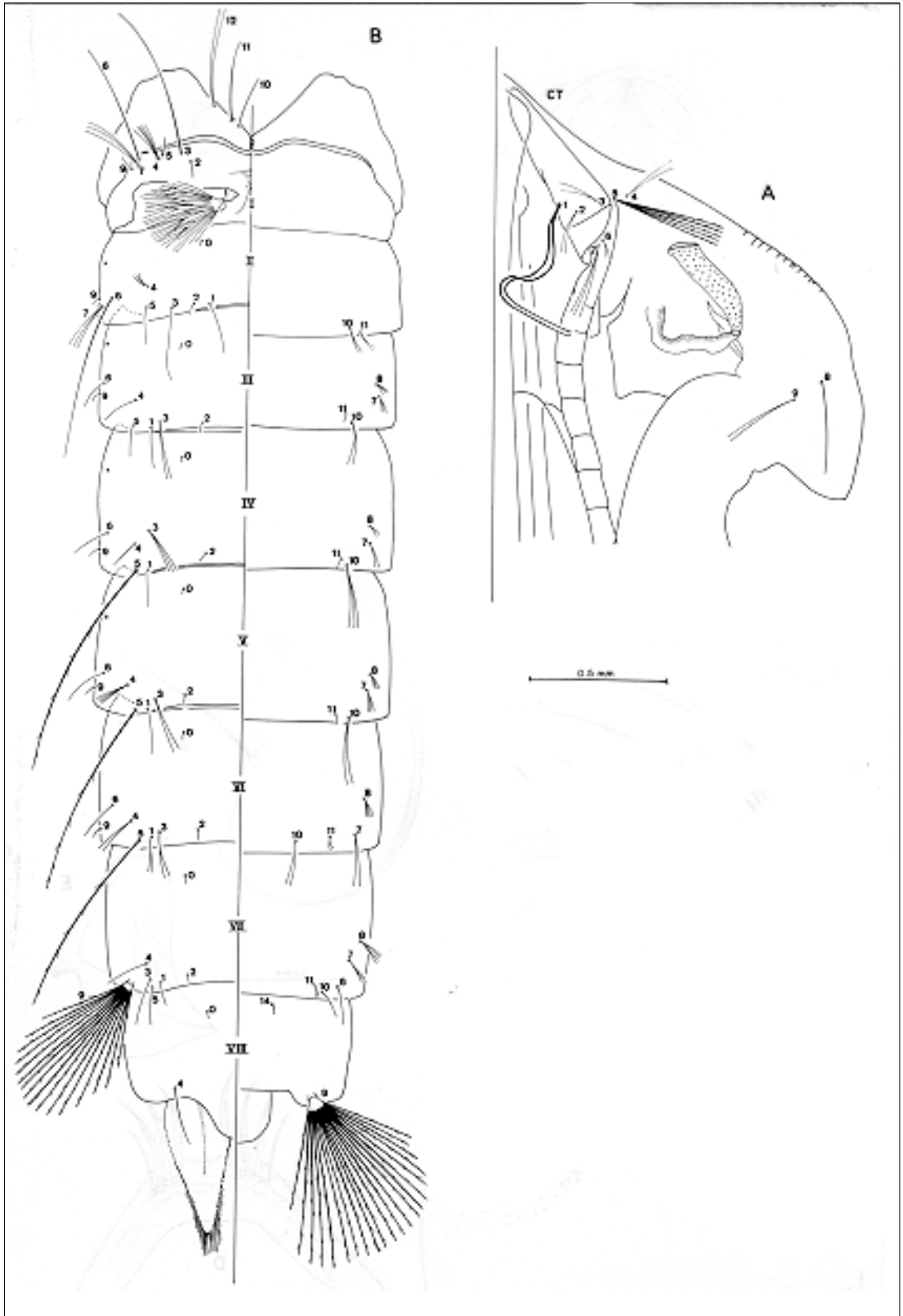


Fig. 12: *Wyeomyia testei*, pupa. A: cephalothorax (CT); B: metanoto, abdomen (I-VIII abdominal segments)

TABLE V

Range of numbers of branches for pupal setae of *Wyeomyia (Dendromyia) testei* (mode in parentheses)

Setae no.	Cephalo- thorax	Abdominal segments							
		I	II	III	IV	V	VI	VII	VIII
0	-	-	1,2 (1)	1	1	1	1	1	1
1	2	D	1	1-3(1)	1-3(1)	1,2(1)	1,2	1,2(1)	-
2	2,3(2)	1,2(1)	1	1	1	1	1	1	-
3	2,3(2)	1	1	1-4(2)	2-5(3)	2-4(2)	1-3(2)	1,2(1)	-
4	1-3(2)	4-7(5)	3-5(3)	1,2(1)	1,2(1)	3-6(4)	1-4(2)	1	1,2(1)
5	3-7,9(5)	1	1	1-3(1)	1	1	1	1,2(1)	-
6	1-4(2)	1	1,2(1)	1-3(1)	1,2(1)	1,2(1)	1,2(1)	1,2(1)	-
7	2-5	2-6(3)	2-5(3)	1-4(2,3)	1-3(2,3)	2-4(3)	1-3(1,2)	2,3,5(3)	-
8	1	-	-	3-5(3,4)	1-4(2)	2-4(3)	3-5(3,4)	3-7(5)	-
9	1,2	1	1	1	1	1	1	11,13-18	17-26
10	1	-	1-3(2)	2,3(2)	1-3(3)	2,3(2)	1-3(2)	1-3(1)	-
11	1	-	2,3	1,2(1)	1,2(1)	1,2(1)	1-3(2)	1-3(2)	-
12	2-4	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	1

groups: one anterior with 4 setae and the other posterior with 2 setae, all setae long and strong. Dorsomentum (Fig. 14-E) usually with 9 teeth on each side of more prominent median tooth. Hypostomal suture complete; occipital foramen with dorsolateral slit-like extension on either side, margins heavily pigmented laterally. Setae 1-C strong, curved; seta 7, 11-C aciculate; 14-C posterior to 15-C. *Antenna*: short, cylindrical, setae single; seta 1-A inserted near apex. *Thorax*: integument nude. Setae 4-P, 5,6-M, 7,13-T on individual pigmented basal plates; pleural groups 9-12-P,M,T on common basal plates; 11-P,M,T spiniform. Seta 1-P normally single, inserted near setae 2,3-P; 4-P multiple (14-21 branches), moderately short, aciculate; 5-P with 7-10 (9) branches; 6-P with 11-18, usually 13 or 14 branches; seta 1-T short nearly diaphanous; seta 13-T developed; 5-7,9,10,12-P, 5,6,8,9,10,12-M and 7,9,10,12,13-T aciculate. *Abdomen*: integument smooth. Seta 1-I,II short, 1-III-VII long, slightly aciculate; 2-I-VII short, single, mesad to seta 1-I-VII; 3-IV,V slightly aciculate; 5-I-VI usually with 3-6 branches; 6,7-I,II inserted on slightly pigmented basal plates; 6-I-VI long, aciculate, 6-III-VI usually double; 7-I,II long, branched, aciculate; 9-I-VI short, single; 10-III slightly aciculate, 11-I long, with 9-17 aciculate branches; 12-II,VI aciculate; 13-I well developed, aciculate, with numerous branches (11-14, 17-22); 13-IV-VII slightly aciculate; 13-VII long, with usually 5 aciculate branches. *Segment VIII*: setae 2,4,5-VIII long, aciculate; comb with 13 (10-16) spiniform scales with minute spicules at margins, scales in uneven single row. *Siphon*: elongate, index about 5.0 - 6.5 (mean 5.8), widest at base,

spiculate. Pecten with 7 (6-10) spines in ventral median row. Seta 1-S usually with 3 (2,3) aciculate branches; 3 (2,3) ventral accessory setae (1a-S), hair-like, double; 4 dorsal accessory setae (2a-S) inserted in a straight row; most basal 2a-S (not always present) very small, single, other 2a-S long, spiculate at apex and strongly pigmented, arranged in a row; 2-S simple. *Segment X*: saddle incomplete, same color as siphon. Seta 1-4-X aciculate, 4-X moderately long, half length of 1-X.

Material examined: 1 female Pe; 1 male Pe, 6 male Le Pe G, 2 male Le Pe, 3 female Le Pe G, 6 female Le Pe. BRAZIL: State of Rondônia, Cujubim, May 1988, M.G. Castro coll., M. A. Motta, M.G. Castro and R. Lourenço-de-Oliveira det., larvae from pineapple (*Ananas sativus*), 1 female Pe; 1 male Pe; Candeias do Jamari, Colina, 651 Road, Sep 1994, D. C. Lima coll., M. A. Motta det., larvae from pineapple, 1 male Le Pe G, 2 male Le Pe, 2 female Le Pe G, 4 female Le Pe; same dates as above except: May 1995, 4 male Le Pe G; State of Pará, Belém, Nov 1994, M. A. Motta and O. V. Silva coll., M.A. Motta det., from eggs laid at the laboratory by wild-caught females on human bait, 1 male Le Pe G, 1 female Le Pe G, 2 female Le Pe (IOC).

Bionomics: females of *Wy. testei* have been collected on human bait in forest during the daytime. Immature stages were found only in the axils of bromeliads (*Ananas sativus*). The larvae have aggressive behavior, killing but not eating prey. Numerous immature stages were collected by us breeding together with *Wy. aphobema* Dyar and *Wy. melanocephala* Dyar & Knab.

Distribution: French Guyana, Guyana and Brazil.

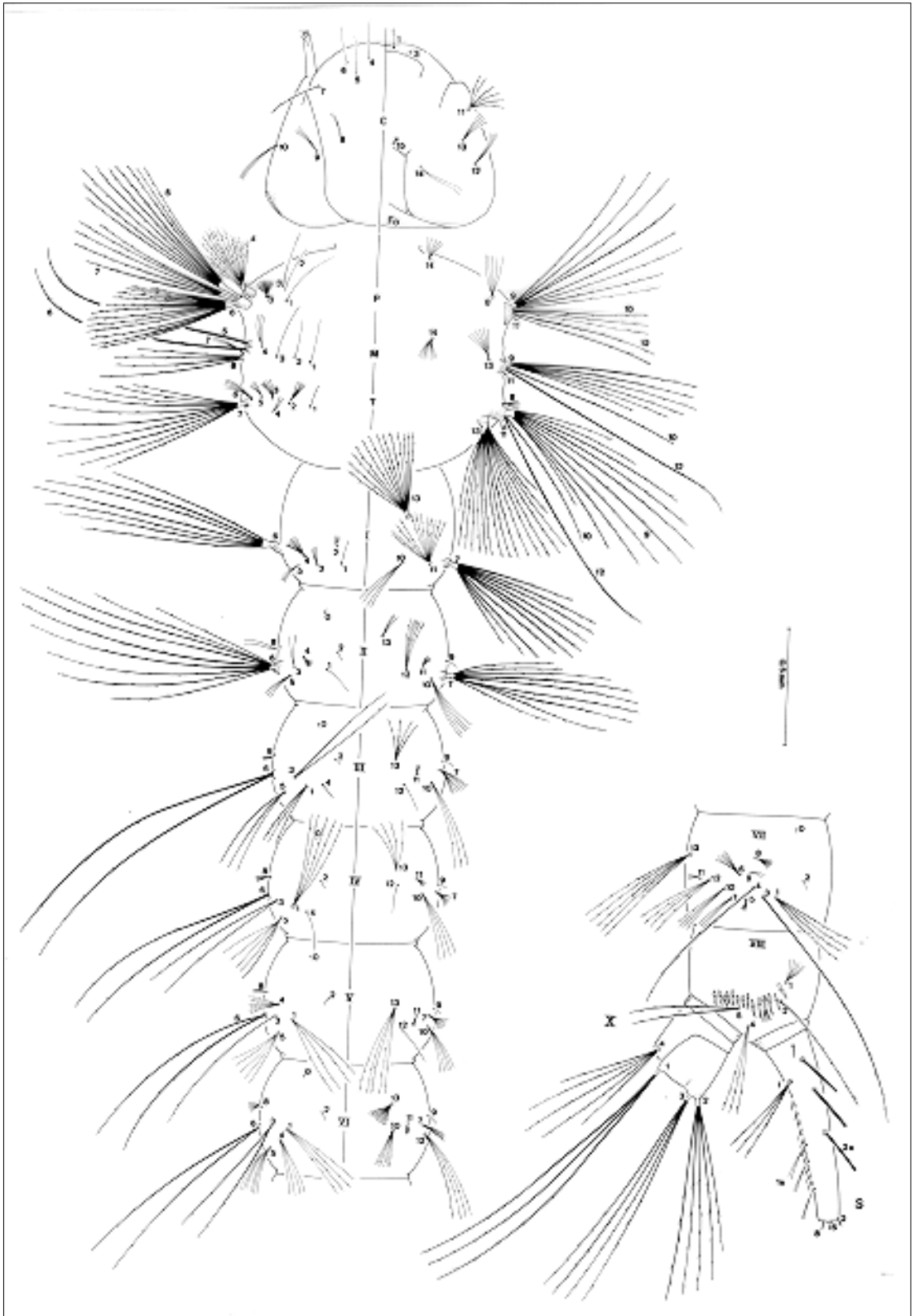


Fig. 13: *Wyeomyia testei*, larva. C: cranium; P: prothorax; M: mesothorax; T: metathorax; I-X abdominal segments; S: siphon

TABLE VI
Range of numbers of branches for setae of 4th larval instar of *Wyeomyia (Dendromyia) testei* (mode in parentheses)

Setae no.	Head		Antenna		Thorax		Abdominal segments									
	C		P	M	T	I	II	III	IV	V	VI	VII	VIII	X		
0	-		6-10(9)	-	-	-	I	I	I	I	I	I	-	-		
1	1	1,2(1)	1	1,2(1)	1,2(1)	1,2(1)	1,2(1)	2-4(3)	4-6(5)	3-6(4)	3-6(4)	3-5(4)	5-8(6,7)	2-4(3)		
2	-	3-5(4)	1	3-5(4)	2-4(3)	2-4(3)	1,2(1)	1	1	1	1	1	1	4-8(5,6)		
3	1	4-6(5)	1	4-6(5)	3-5(3)	3-5(3)	2-4(2)	1,2(2)	2,3(2)	1	1-3(2)	1	4-7(5)	3,4		
4	1	14-21(16)	1	2-4(3)	1-3(2)	6-8(7)	5-8(7)	1	1	6-8(6,7)	3-5(4)	1	3-5(3)	5-8(5)		
5	1	7-10(9)	1	2-5(3)	2,3(3)	2,3(3)	3-5(3)	2-5(3,4)	4,5(5)	4-6(5)	5-7(6)	3-5(4)	2,3(2)	-		
6	1	11-18	1	3-5(4)	6-10(7)	6-10(7)	7-10(7,9)	2	2	2	2	6-8(6)	-	-		
7	1,2(1)	3-5(4,5)	3,4(3)	3,4(3)	7-11(10)	9-13(10)	6-12(9)	7-11(8,10)	6-9(6,7)	5-11(7-9)	4-7(5)	2-4(3)	-	-		
8	2,3(2)	5-8(5)	3-6(4,5)	3-6(4,5)	4-8(4,5)	-	1,2(2)	3-6(3,4)	3-5(5)	3-5(4)	5-8(6)	6-11(10)	-	-		
9	3-5(3)	7-12(8)	5,6,8(6)	10-14(13)	1	1	1	1	1	1	1	2-4(2)	-	-		
10	1-3(3)	3-5(3,4)	1,2(1)	1,2(1)	3-6(4)	3-6(4)	3-6(5)	2-4(3)	3-5(4)	3-7(5)	5-8(7)	3-5(4)	-	-		
11	5-8(6)	1,2(1)	1	1,2(1)	9-17(16)	9-17(16)	4-7(5)	2-6(3,4)	2-5(4)	3-5(4)	3-6(4)	3-5(3,4)	-	-		
12	3-5(4)	2	1	1,2(1)	1	-	4-8(5)	1-3(1,2)	1-3(1)	1,2(1)	4-8(4)	3-5(4)	-	-		
13	3-5(4)	6-10(6)	17-26	6-10(6)	17-26	11-14,17-22	2,3	3-7(4)	4-7(4)	4-7(5)	8-14(12)	3-7(5)	-	-		
14	2,3(2)	8-11(8)	-	8-11(8)	-	-	-	-	-	-	-	-	-	-		
15	3-6(4,5)	-	-	-	-	-	-	-	-	-	-	-	-	-		

Systematics: *Wy. testei* seems to be closely related to *Wy. trifurcata*, based mainly on morphological characters of the male genitalia (the shape of the gonostylus, and tergum IX with short, slender setae). Also, the immature stages of both species inhabit bromeliads (genus *Ananas*), while the other species of *Dendromyia* have been collected in plants of order Zingiberales, such as *Heliconia*, *Calathea*, and *Aracea*. In the female, *Wy. testei* differs from *Wy. jocosa* and *Wy. complosa* in the absence of scales on the clypeus; from *Wy. luteoventralis* and *Wy. trifurcata* in having the midtarsomeres with white scales; from *Wy. ypsipola* in having midtarsomeres I, II and occasionally the base of III covered with white scales; IV and V dark. In the male genitalia, *Wy. testei* differs from *Wy. ypsipola* in having the gonocoxite without an apical tuft of setae; from *Wy. trifurcata* and *Wy. complosa* in having tergum VIII without apicolateral tufts of long setae; from *Wy. luteoventralis* and *Wy. jocosa* in having tergum IX with small hair-like setae. In the pupa, *Wy. testei* differs from *Wy. luteoventralis* and *Wy. ypsipola* in having the paddle gradually narrowed to the apex; from *Wy. trifurcata* in having seta 1-I branched at different levels; from *Wy. complosa* in having seta 6-III anterior to seta 4-III and seta 5-CT usually with 3 (4, 5) branches; *Wy. testei* differs from *Wy. jocosa* in having seta 3-II nearly as long as half of the length of the next abdominal tergum. In the larva, *Wy. testei* differs from *Wy. trifurcata* in having seta 15-C short, about 1/7 the length of 14-C; from *Wy. complosa* in having the siphon with accessory seta 2a-S strong and heavily pigmented; from *Wy. jocosa*, *Wy. luteoventralis* and *Wy. ypsipola* in having seta 6-P with 11-18 branches and seta 5-P usually with 9 (7-10) branches.

Wyeomyia (Dendromyia) complosa (Dyar, 1928) *Dendromyia (Melanolepis) complosa* Dyar, 1928: 74 (male*, female, L*). San Juan de Pequini, Panama (USNM).

Wyeomyia (Dendromyia) complosa of Del Ponte & Cerqueira 1938: 234 (male*, female); Lane & Cerqueira 1942: 615 (male*, female); Lane 1953: 995 (male*, female, L); Harbach & Peyton 1993: 14; Motta & Lourenço-de-Oliveira 1995: 384.

Wyeomyia (Prosopolepis) complosa of Heinemann & Belkin 1977: 454; 1978a: 189; 1978b: 395, 440, 458; 1979: 109.

Female - Head: vertex with broad dark scales with blue-greenish reflections; occiput with scales with whitish reflections in median area but without forming a distinct spot; area behind eyes and postgena with broad white scales; ocular line narrow, with few whitish scales, setae long, darkish;

3 interocular long, darkish setae. Proboscis covered with broad brown scales, expanded distally, length 2.2 mm, about 0.8 length of forefemur; basal labial setae long, bronzy. Maxillary palpus darkish like proboscis, 0.17 length of proboscis; clypeus darkish, ovate, densely covered with small, moderately broad bronzy scales. *Antenna*: pedicel darkish, pruinose, with some narrow bronzy scales; flagellum slightly verticillate, as long as proboscis.

Thorax: integument brown. Anteprenotum completely covered with darkish scales with bluish reflections; setae long, strong, darkish. Postpronotum covered with darkish scales dorsally and whitish scales ventrally. Scutum with darkish brown integument, covered with moderately broad darkish scales with blue-greenish reflections, except for a small group of white scales on middle of anterior promontory; setae of anterior promontorial and

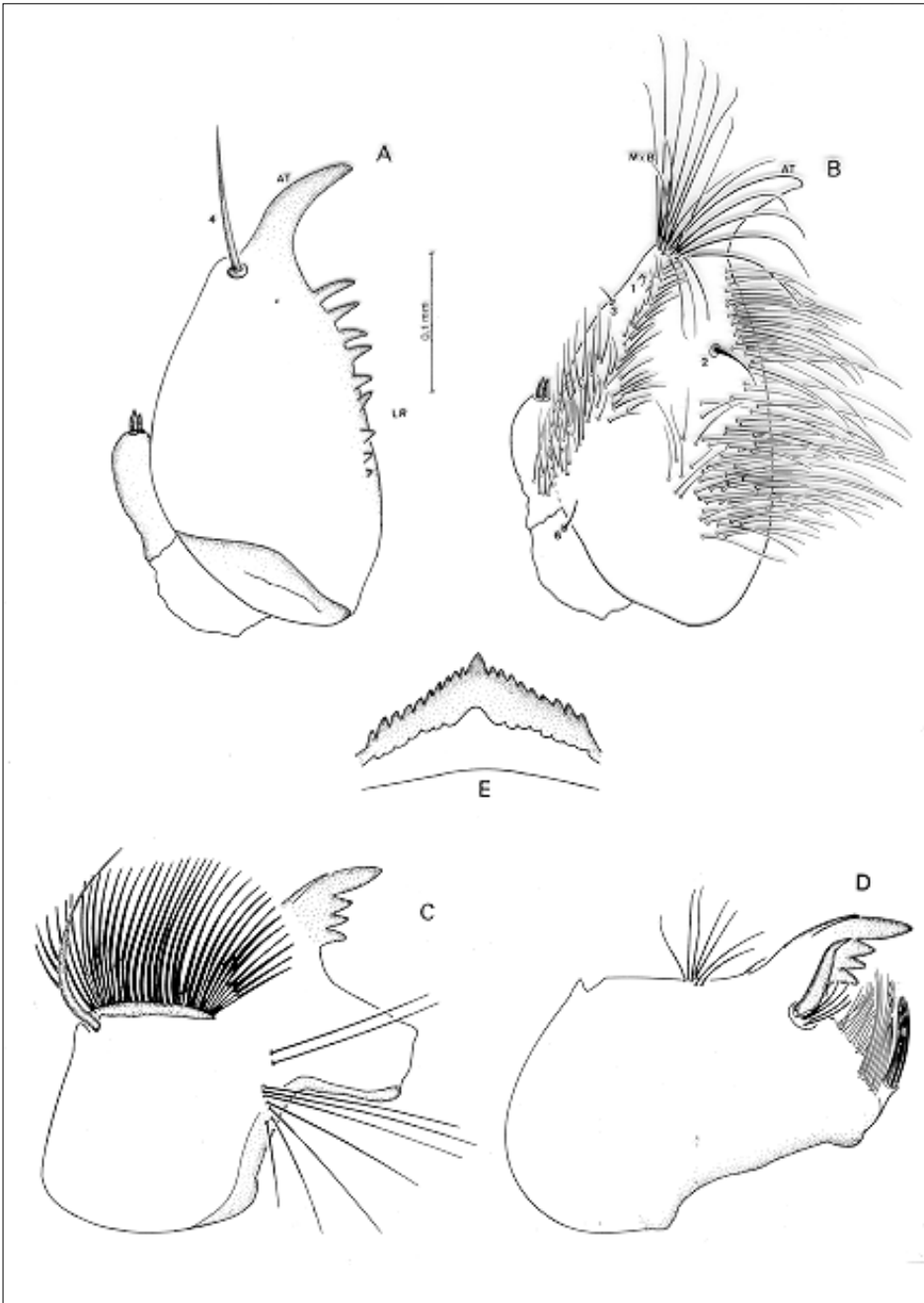


Fig. 14: *Wyeomyia testei*, larval mouthparts. A, B: maxillae; C, D: mandible (A, C: ventral; B, D: dorsal views); E: dorsomentum

median scutal fossal area darkish, supraalar setae numerous, strong, darkish. Scutellum with scales same color as scutal scales; setae dark, 3-5 long and short setae on each lobe. Mesopostnotum brown, pruinose, with a tuft of about 10-12 darkish setae of different sizes, sometimes light scales may be in tuft. Pleural sclerites yellowish, covered with whitish scales, setae yellowish and bronzy; upper proepisternal area with whitish scales; 2 or 3 bronzy prespiracular setae; 4 or 5 yellowish lower mesokatepisternal setae inserted below and above upper margin of mesomeron; about 6 bronzy prealar setae; 14 or 15 elongate, yellowish upper mesepimeral setae. *Wing*: length 3.9 - 4.1 mm (mean 4.0 mm). Upper calypter without setae. Veins covered with moderately broad brown scales. Veins R_s , R_{2+3} , R_2 , R_3 , M_{1+2} , M , M_1 , M_2 and 1A with lateral anterior and appressed scales moderately broad, spatulate. Cu and base of M_{3+4} with lateral anterior scales narrow. *Halter*: scabellum yellowish, pedicel yellowish, dark-scaled on one side; capitellum with dark scales. *Legs*: integument of coxae and trochanters yellowish, with whitish scales, setae long, bronzy and yellowish. Femora dark with a line of white scales ventrally; tibiae dark with a ventral weak line of white scales basally. Fore- and hindtarsomeres dark; mid-tarsomeres II-V with white scales on one side; V white-scaled nearly all around. Ungues simple. *Abdomen*: terga densely covered with broad dark scales with blue-greenish reflections; lateral margins whitish; sterna with whitish scales; line of demarcation between dark and whitish scaling nearly straight. Tergum I with numerous long, yellowish setae; segment VIII with bronzy setae. *Genitalia* (Fig. 15): tergum VIII (not figured) with posterior margin straight and posterolateral corners rounded, covered with spatulate scales, moderately long setae distally. Sternum VIII (Fig. 15-F) almost straight on posterior margin with a V-shaped notch at middle, long setae distally. Tergum IX (Fig. 15-E) spiculose, narrow, with 1 or 2 long setae on either side. Cerci (Fig. 15-A) elongate, digitiform, spiculose with long setae distally. Postgenital lobe (Fig. 15-B,C) spiculose, almost same length as cerci, elongate, bilobate at apex, dorsal surface with long setae apicolaterally, ventral surface with central area with minute setae, arising from conspicuous alveoli. Upper and lower vaginal lips normal. Insula (Fig. 15-D) covered with conspicuous setae, with a central protuberance with a marginal row of 4 setae on each side, these setae with tip toward to inside; middle area bare. Three spermathecal capsules with different sizes. *Male*: similar to female except for the following sexual differences. *Head*: antenna with pedicel brown, pruinose with narrow bronzy scales. Pro-

boscis: length 2-2.3 mm (mean 2.1 mm) about 0.9 length of forefemur, maxillary palpus 0.12 length of proboscis. *Wing*: length 3.3-4.1 mm (mean 3.6 mm). *Legs*: femora and base of tibiae pale ventrally; fore- and hindtarsomeres dark; mid-tarsomeres III and IV with white scales on one side, V dark, sometimes with some white scales on base. *Abdomen*: tergum VIII with an apicolateral tuft of long, strong, bronzy setae. *Genitalia* (Fig. 16): setae of tergum VIII (Fig. 16-G) numerous, long, some as long as twice length of gonocoxite; scales broad. Sternum VIII (Fig. 16-F) with broad scales and short setae. Tergum IX (Fig. 16-D) with moderately narrow interlobar space, each lobe bearing about 4-6 long foliform setae with sharp apices, inner setae stronger than the outer. Proctiger (Fig. 16-E) normal; paraproct with 2 teeth and 3 minute setae. Gonocoxite (Fig. 16-A) short, inner surface with minute setae; outer surface with strong setae apically; tergomesal surface with 3 moderately long setae. Basal mesal lobe slightly sclerotized, with about 10 long setae. Gonostylus (Fig. 16-A,B) short, without a stem, basally divided into 3 principal lobes: lobe C narrow, long, bearing a membranous process distally; lobe A,E narrow, bifurcated into 2 branches: one branch digitiform, with a row of 5 setae at tip, the other longer and bearing 1 seta. Lobe M cylindrical, expanded distally, with numerous long and short setae mainly on middledistal area. Aedeagus (Fig. 16-C) round, apical tergal arms joined; submedian tergal arms not joined; median sternal plate simple, membranous, rugose, wrinkled.

Pupa (Fig. 17): number of branches of setae in Table VII. *Cephalothorax*: pale; seta 5-CT nearly as long as seta 1-CT, aciculate, usually with 2 branches. *Trumpet*: integument darker than cephalothorax, short, index 4.1 - 5.7 (mean 4.6). *Abdomen*: pale, anterior margin of sterna II - VII darker; seta 1-I strongly dendritic, branched near base; 1-II aciculate at apex; 2-II-VII near posterior margin of segment, 2-II close and nearly on level with setae 1 and 3; 2-III mesad to seta 1 that is more mesad than seta 3; 2-III-VII well mesad of seta 1. Seta 3-IV anterior to seta 1; 3-V-VII, slightly anterior to seta 1; 5-IV-VI single, aciculate, longer than next tergum; 6-II usually long, single; 6-III-VII short, 6-VII ventral; 7-II long usually with 3, 4 branches; 9-VII, VIII strong, aciculate; 9-VIII nearly as long as paddle; seta 11-II usually absent. Genital lobe in male nearly as long as abdominal segment VIII, rugose; median caudal lobe well developed, expanded apicolaterally, rugose. *Paddle*: pale, long, gradually narrowed from base to apex; inner and outer margins lined with small spicules that become longer and denser at tip.

Larva (Fig. 18): number of branches of setae in

Table VIII. *Head*: pale, wider than long. Maxilla (Fig. 19-A,B) elongate, with a prominent AT that is about 1/3 length of maxilla, LR usually with 9 (9-11) teeth progressively stronger apically; dorsal surface with numerous long setae on mesal and apicolateral margins; maxillary brush composed of a group of long setae; setae 2-4,6-Mx simple; seta

1-Mx spiniform, strong, short, bifurcated at apex; maxillary palpus small not fused to maxilla. Mandible (Fig. 19-C,D): mandibular sweeper divided into 2 groups: one with 2 seta and the other with 6, all setae long, strong. Dorsomentum (Fig. 19-E) with 9 teeth on each side of a prominent median tooth. Hypostomal sutures complete; occipital fo-

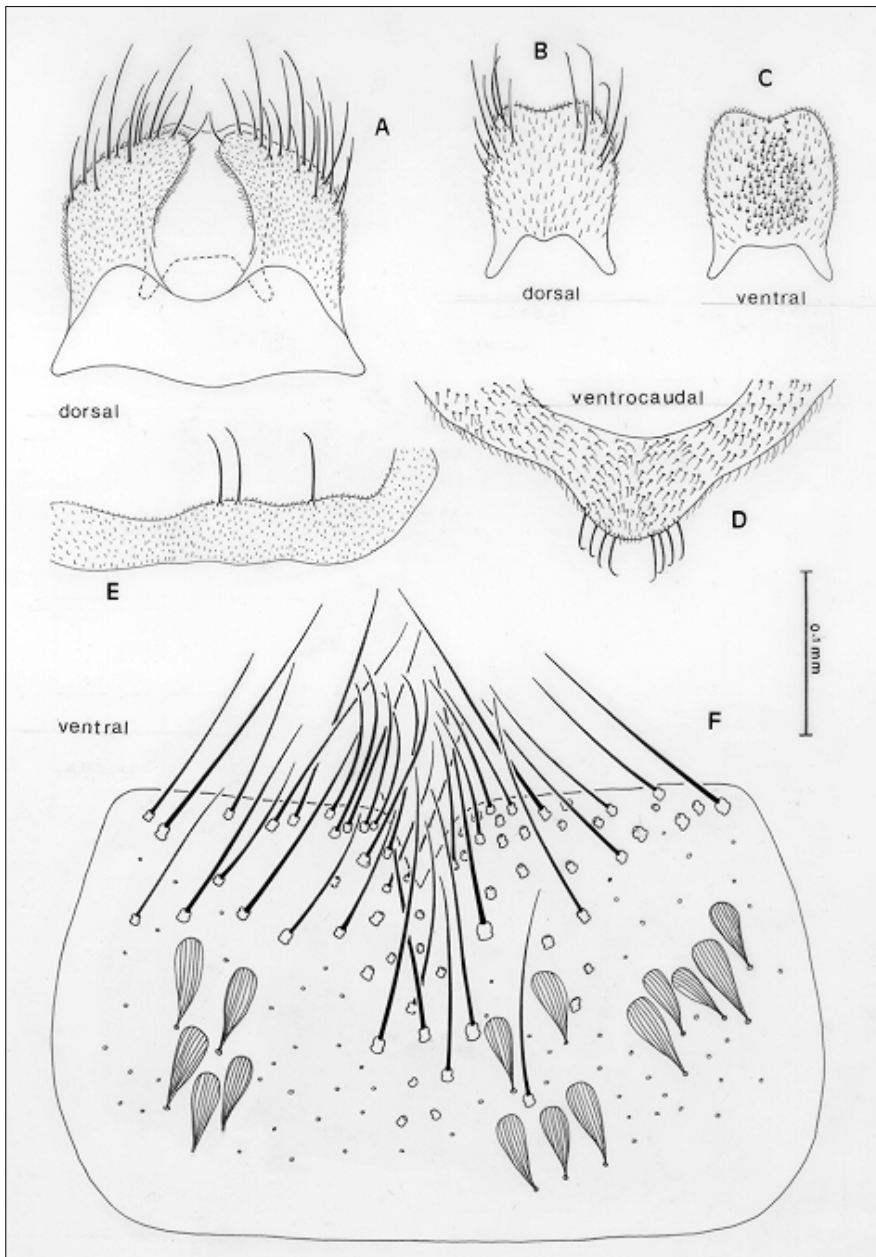


Fig. 15: *Wyeomyia complosa*, female genitalia. A: cerci, postgenital lobe; B, C: postgenital lobe; D: insula; E: tergum IX; F: sternum VIII

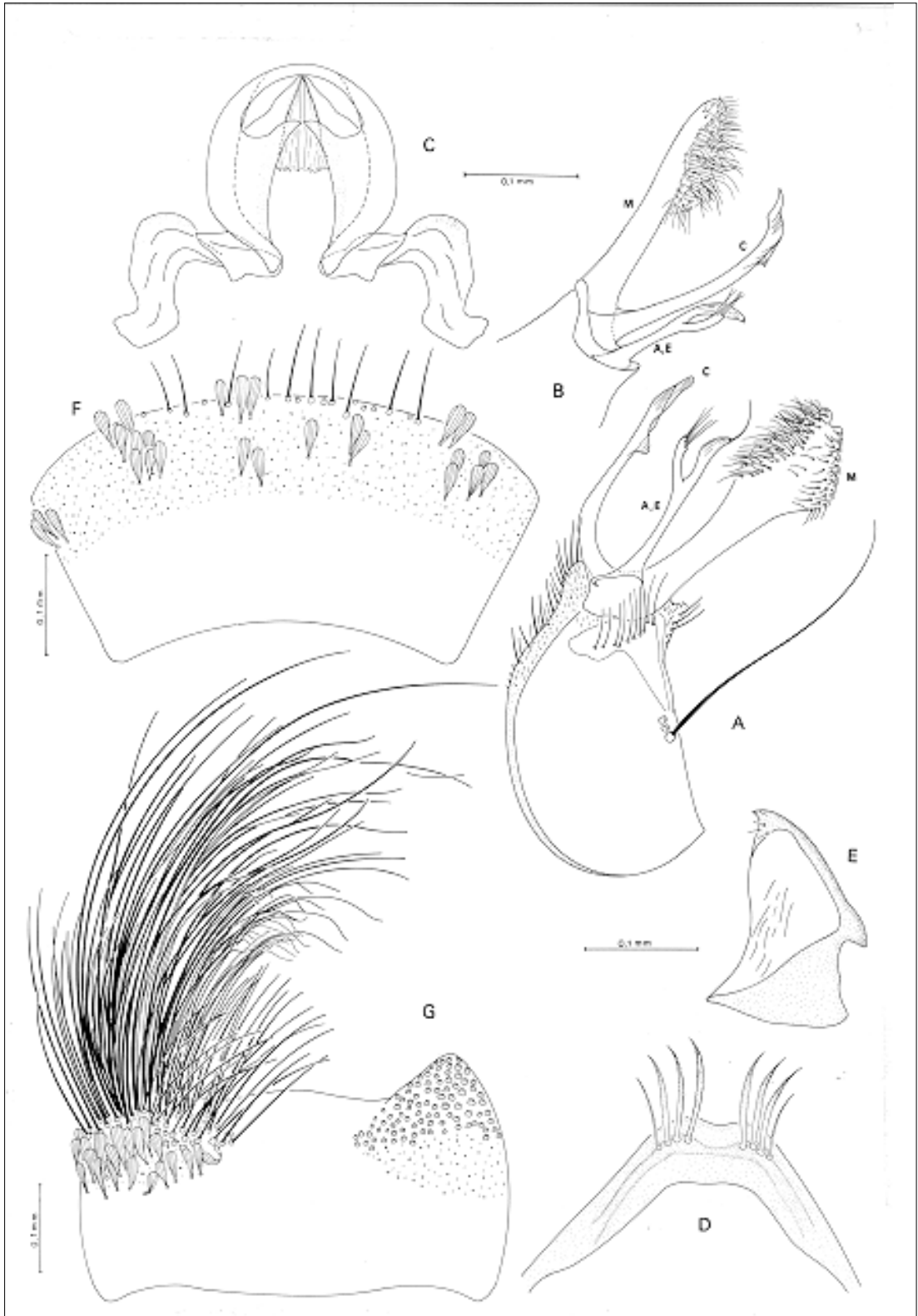


Fig. 16: *Wyeomyia complosa*, male genitalia. A: gonocoxite, gonostylus (lobes C, A,E, M); B: gonostylus; C: aedeagus; D: tergum IX; E: proctiger; F: sternum VIII; G: tergum VIII

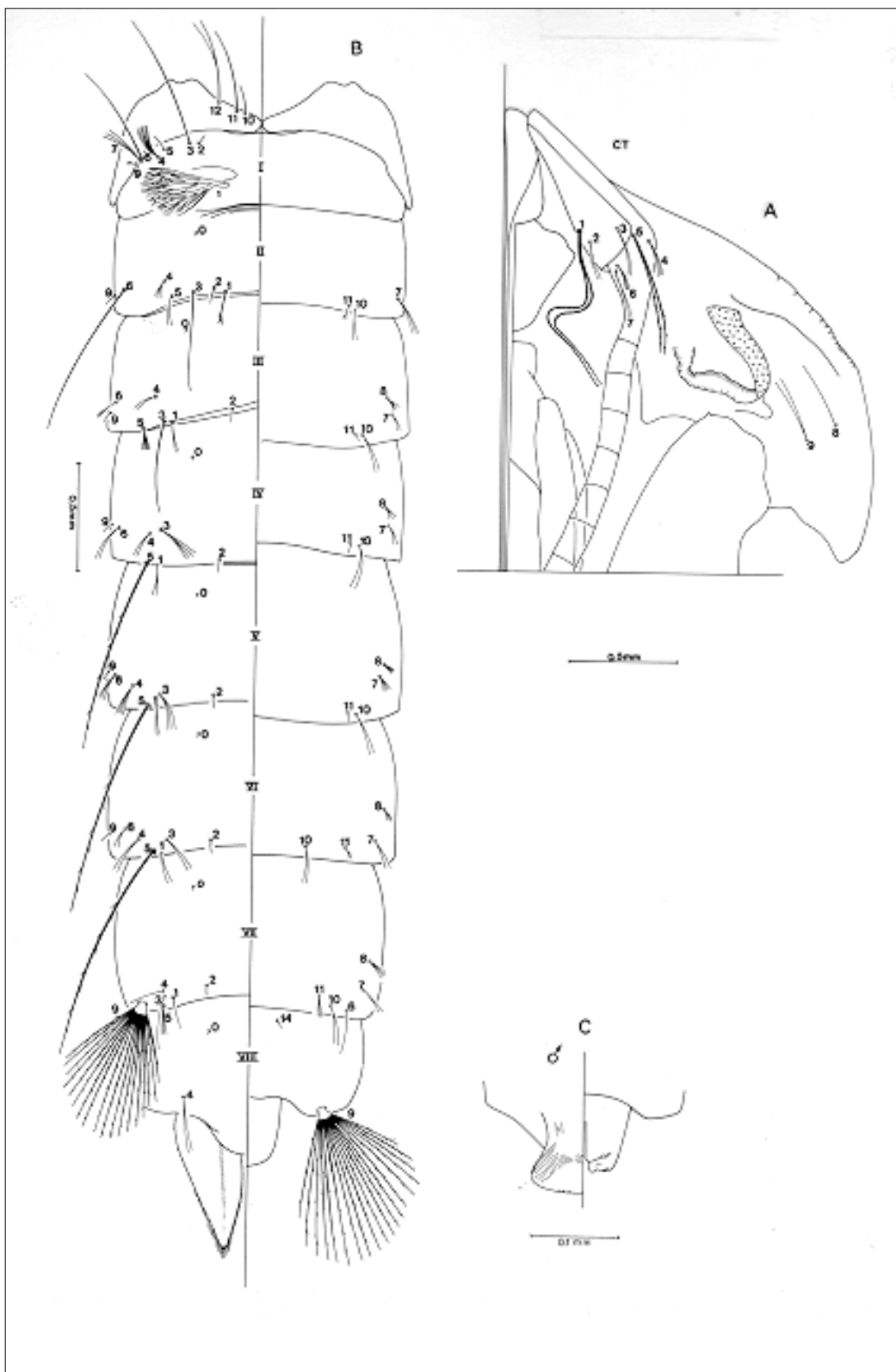


Fig. 17: *Wyeomyia complexa*, pupa. A: cephalothorax (CT); B: metanoto and abdomen (I-VIII abdominal segments); C: male, genital lobe

TABLE VII

Range of numbers of branches for pupal setae of *Wyeomyia (Dendromyia) complosa* (mode in parentheses)

Setae no.	Cephalo- thorax	Abdominal segments							
		I	II	III	IV	V	VI	VII	VIII
0	-	-	1	1	1	1	1	1	1
1	2	D	1	2-4(2,3)	1,2(2)	1-3(2)	2,3(2)	1,2(1)	-
2	2-4(2,3)	1,2(1)	1	1	1	1	1	1	-
3	1-3(2)	1	1	1	2-5(4)	1-3(3)	2,3(2)	1,2(1)	-
4	2-4(3)	3-6(6)	2-5(3)	2,3(2)	2,3(2)	3-6(5)	2,3(2)	1,2(1)	1,2(2)
5	2,3(2)	1,2(1)	1-4(2)	2-5(5)	1	1	1	1-4(3)	-
6	2-6(3)	1	1,2(1)	1-3(2)	1-3(2)	1-3(2,3)	1-3(2)	1,2(1)	-
7	2-5(2)	2-4(3,4)	2-5(3,4)	1-4(2,3)	2-4(2)	2-6(4)	1,2(2)	1-4(2)	-
8	1,2(1)	-	-	2-5(3,4)	2-4(3,4)	2-5(4)	2-6(3)	3-8(5,6)	-
9	1-3(2)	1,2(2)	1	1	1	1	1	9-18	18-23
10	1,2(1)	-	1-3(2)	1-3(2)	2,3(2)	2	1-3(2)	1,2	-
11	1	-	1,2(2)	1-3(1)	1-3(1)	1-3(1)	2-5(2)	2-5(3)	-
12	2	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	1

ramen with dorsolateral slit-like extension on either side, margins heavily pigmented laterally. Seta 1-C stout, curved; setae 4,6-C simple; 5,7-C slightly aciculate; 11,14-C long, aciculate, 15-C inserted nearly on level with 14-C. Antenna short, cylindrical, setae single; 1-A near to apex. *Thorax*: integument bare. Setae 4-P, 5,6-M and 7,13-T on individual pigmented basal plates; pleural groups 9-12-P,M,T on common basal plates; 11-P,M,T spiniform; 1-P simple, near and slightly laterad of 2,3-P; 4-P short, multiple, strongly aciculate; 5,6-P usually double, long, aciculate. Seta 1-T very thin, nearly diaphanous; 5-7,9,10,12-P; 5,6,8,9,10,12-M; 7,9,10,12,13-T aciculate. *Abdomen*: integument smooth. Seta 1-I, II very small, usually with 2 or 3 branches; 1-III long more branched (5,6); 1-IV-VII longer with fewer branches, slightly aciculate; 2-I short, normally with 4,5 branches, 2-II-VII usually short, single; 3-I short with 3-6 branches, 3-II long, double or triple, 3-III,IV,VI long, usually double; 3-V,VII single, aciculate, very long; 5-I, VII short, branched, 5-III-VI long, usually triple, slightly aciculate; 6-IV-VI inserted on slightly pigmented tubercle; 6-I,II with numerous aciculate branches, 6-I-VI long, aciculate; 7-I,II aciculate, inserted on pigmented basal plate, 7-III-VI short, multi-branched; 13-I well cephalad, long, usually with 6 (5-8) aciculate branches, 13-II short, single; 13-III,IV long, usually triple; 13-V,VII long, multi-branched, aciculate, 13-VI short with 7,9 branches. *Segment VIII*: setae 2,4,5-VIII long, aciculate, comb usually with 16 (13-17) spiniform scales, scales with minute spicules laterally, in uneven single row. *Siphon*: elongate, index 6.2-7.8 (mean 7), pale, heavily spiculose, widest at base. Pecten

usually with 9 (8-12) spines arranged in ventral median row, extending from near base of seta 1-S to near apex; 1-S inserted near base, usually with 5 (4-6) aciculate branches. One pair of seta 1a-S with aciculate branches (3,4); 2 or 3 long dorsal accessory setae (2a-S) that are single or double, sometimes aciculate; an additional short seta 2a-S, not always present, inserted near base of siphon. *Segment X*: saddle incomplete, same color as siphon; seta 1-4-X aciculate, 4-X short, less than half length of 1-X.

Material examined: 1 female Pe G, 1 female Le Pe, 1 male Le Pe G, 4 Le Pe female, 1 male Le Pe, 3 Le Pe G male, 1 Pe male. BRAZIL: State of Pará, Belém, Mosqueiro Road, Nov 1992, M. A. Motta & O. V. Silva coll., M. A. Motta det., larvae from *Sororoca (Phenakospermum guyannense)*, 1 female Pe G, 1 female Le Pe (IOC); same data as above except: Oct 1995, 1 male Le Pe G (IOC); PANAMA: Tocumen, Cerro Azul, 7 Feb 1963, A. Quinonez coll., larva from Aracea (*Dieffenbachia*), 1 Le Pe; Tocumen, 14 Feb 1963, A. Quinonez coll., em *Dieffenbachia*; 2 Le Pe G, 2 Le Pe, same data as above except: larva from *Heliconia* 1 Le Pe G male; 2 Le Pe; Mata de Cacao, Chiriqui Grande, Bocas del Toro, 27 Apr 1963, A. Quinonez coll., larva from *Dieffenbachia*, 1 Le Pe; Quebrada Nigua, Bocas del Toro, 27 Apr 1963, A. Quinonez coll., larva from *Dieffenbachia* 1 Pe, (USNM).

Distribution: known from Panama, Nicaragua, Costa Rica, Venezuela, French Guiana, Guiana, Surinam, Brazil and Ecuador.

Bionomics: the immature stages were collected by us in *Sororoca (Phenakospermum guyannense)*, Strelitzaceae, bird-of-paradise family in forest in Belém, State of Pará, Brazil. Heineman and Belkin

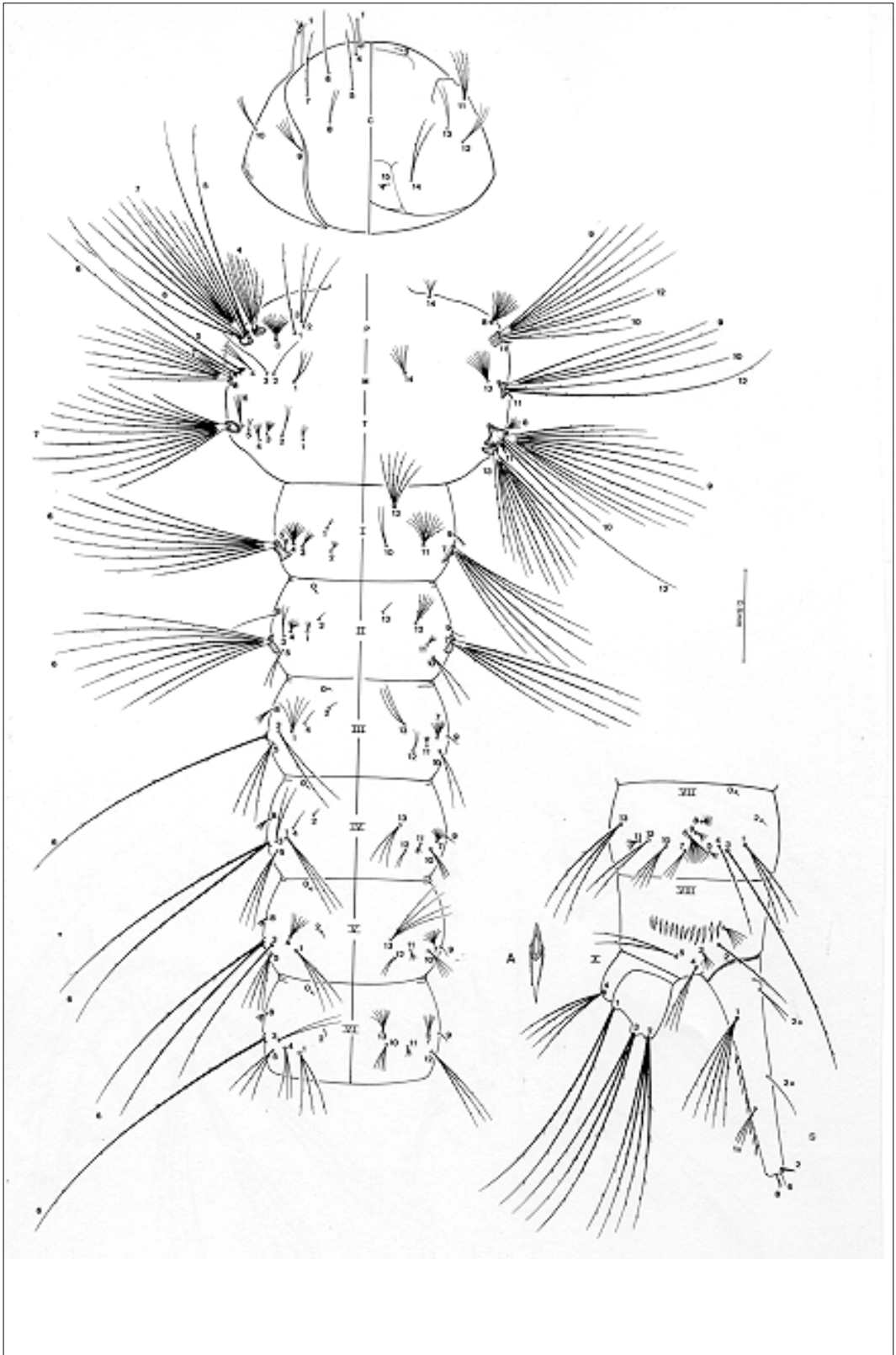


Fig. 18: *Wyeomyia complosa*, larva. C: cranium; P: prothorax; M: mesothorax; T: metathorax; I-X abdominal segments; S: siphon; A: comb scale of segment VIII

TABLE VIII
Range of numbers of branches for setae of 4th larval instar of *Wyeomyia* (*Dendromyia*) *complosa* (mode in parentheses)

Setae no.	Head C	Antenna			Thorax		Abdominal segments										
		P	M	T	I	II	III	IV	V	VI	VII	VIII	X				
0	-	12-25	-	-	-	I	I	I	I	I	I	I	I	I	I	I	-
1	1	1	3,4	3-6(3)	1-3(2)	3-5(3,4)	3-7(5,6)	3,4(3)	3,4(3)	3,4(3)	3,4(3)	3,4(3)	3,4(3)	3,4(3)	2-4(3)	2-4(3)	2,3(2)
2	-	1	1	2-4(2)	3-6(4,5)	1	1	1,2(1)	1,2(1)	1,2(1)	1,2(1)	1,2(1)	1,2(1)	1,2(1)	1	1	4,5(4)
3	1	2,3(2)	1	5-8(6)	3-6(4)	2,3	1,2	2,3(2)	2,3(2)	2,3(2)	2,3(2)	2,3(2)	2,3(2)	2,3(2)	1	1	3,4(4)
4	1	8-13(10)	3,4	3,4(4)	10-13(10)	6-8(7,8)	1,2(1)	1,2(1)	1,2(1)	1,2(1)	1,2(1)	1,2(1)	1,2(1)	1,2(1)	1	1	2-5(2,3)
5	1	1,2(2)	1	2,3(2)	3-5(3,4)	2-4(2)	2-5(3)	3,4(3)	3,4	2-4(3)	2-4(3)	2-4(3)	2-4(3)	2-4(3)	1	1	4-6(4)
6	1	2,3(2)	1	3-6(4,5)	7-10(9)	7-10(8,9)	1	2-4(2,3)	2,3	1	11,12,15	11,12,15	11,12,15	11,12,15	1	1	1,2(2)
7	1	9-14(9)	3-6(3)	10-13(11,12)	5-9(6,7)	4-7(5)	6-13,15	8-11(8,9)	7-10(9)	4-6(5)	3,4(3)	3,4(3)	3,4(3)	3,4(3)	1	1	-
8	2,3	11-20	4-7(5,7)	6-10	1,2(1)	1,2(1)	3-6(4,5)	3-6(4)	4,5(4)	5,7,9	9-11	9-11	9-11	9-11	1	1	-
9	4-6	4-6,8(6)	3-6(4,5)	10-13(11,12)	1-3(2)	1	1,2(1)	1	1	1,2(1)	1,2(1)	1,2(1)	1,2(1)	1,2(1)	1	1	-
10	2-5(3)	2,3(2)	1	1	2,3(2)	2,3(2)	2-4(2)	2-4(3)	4-6(4,5)	4,5	4,5	4,5	4,5	4,5	1	1	-
11	3,4	1	1	1	8-11(10)	4-7(5)	3-7(5,6)	3-5(4,5)	3-5(4)	3-5(4)	3-5(4)	3-5(4)	3-5(4)	3-5(4)	1	1	-
12	2-4(3)	1,2(2)	1	1	-	5-7(5,6)	2,3(2)	1,2(2)	1-3(2,3)	2-4(3)	2-4(3)	2-4(3)	2-4(3)	2-4(3)	1	1	-
13	2,3(2)	-	7-15	11-15(13)	5-8(6)	1,2	2-4(3,4)	3,4(3)	3,4(3)	7,9	2-4(3)	2-4(3)	2-4(3)	2-4(3)	1	1	-
14	2	3-5(4)	4-7(5,6)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	3-7(4,6)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(1977,1978a,b) collected larvae of *Wy. complosa* in Heliconia and Aracea (*Dieffenbachia* sp.).

Systematics: *Wy. complosa* seems to be a less typical species of *Dendromyia*, due to some morphological characters in the larva, such as the less developed AT of the maxilla, the position of seta 15-C on level with seta 14-C and the siphon with 2, or 3 hair-like dorsal accessory setae (2a-S) that are single or double. However, taking into account all the morphological characters of all life stages *Wy. complosa* is more closely related to species of subgenus *Dendromyia* than any other species of *Wyeomyia*. In the female, *Wy. complosa* differs from *Wy. luteoventralis*, *Wy. ypsipola*, *Wy. testei* and *Wy. trifurcata* in having scales on the clypeus; from *Wy. jocosa* in having midtarsomeres II-V covered with white scales. In the male genitalia, *Wy. complosa* differs from *Wy. ypsipola*, *Wy. testei*, *Wy. luteoventralis* and *Wy. jocosa* in having tergum VIII with apico-lateral tufts of long and numerous setae; from *Wy. trifurcata* in having tergum IX with long, broad, foliform setae. In the pupa, *Wy. complosa* differs from *Wy. luteoventralis* and *Wy. ypsipola* in having the paddle gradually narrowed from the base to the apex; from *Wy. trifurcata* in having seta 1-I multibranching at different levels and the paddle as long as or a little shorter than seta 9-VIII; *Wy. complosa* differs from *Wy. jocosa* and *Wy. testei* in having seta 6-III on level with seta 4-III and seta 5-CT usually with 2 (2, 3) branches.

DISCUSSION

The significance of the immature stages in the systematics and phylogeny of mosquitoes has been recognized since Dyar and Knab (1906): *The test of any system of classification is the degree of its agreement with the phylogeny of the group. The past history is indicated by all stages, often more clearly in the larvae than in the adults.* Belkin (1962) noted that sabethines were difficult to characterize in the adult stage, but clearly distinct in the larval stage. Studies conducted by some authors (Zavortink 1979, Harbach & Peyton 1990, 1992, 1993, Harbach 1991, Motta & Lourenço-de-Oliveira 1995, Harbach & Kitching 1998) indicate the value of larval characters in the recognition of monophyletic groups, particularly in sabethines that are more difficult to characterize than others.

In this paper, emphasis was given to morphological characters of the larval and pupal stages to better characterize subgenus *Dendromyia*, which includes only six species. Among *Dendromyia* species, the most closely related species seems to be *Wy. luteoventralis*, *Wy. ypsipola* and *Wy. jocosa*. The first two species are almost isomorphic in the immature stages, but easily distinguished in the

adult stage. Indeed, these two species showed high genetic identity in an allozyme study (Motta et al. 1998). Besides the morphological similarities, these three species breed in *Heliconia* and Marantacea (although *Wy. ypsipola* and *Wy. jocosa* also breed in Aracea). *Wy. testei* bears more similarities to *Wy. trifurcata* than to other *Dendromyia*, mainly in characters of the male genitalia. Even though *Wy. complosa* is less typical of *Dendromyia* because of differences in the maxilla and siphon of the larva, it still shares the same group characters of *Dendromyia*.

In the cladogram of Judd (1996), *Wy. ypsipola* forms a monophyletic group with *Wy. occulta* Bonne-Wepster and Bonne. *Wy. occulta* bears some differences from *Dendromyia*, including: larva with maxilla without AT; setae 4-P, 8-M, and 7-T multi-branched in the apical third; comb of segment VIII composed of several rows of scales; siphon without strong accessory setae (2a-S); adult with a patch of scales on mesopostnotum. *Wy. occulta* seems to be indistinguishable from *Wy. negrensis* Gordon and Evans. Specimens from the type localities of both species were compared by us and no differences

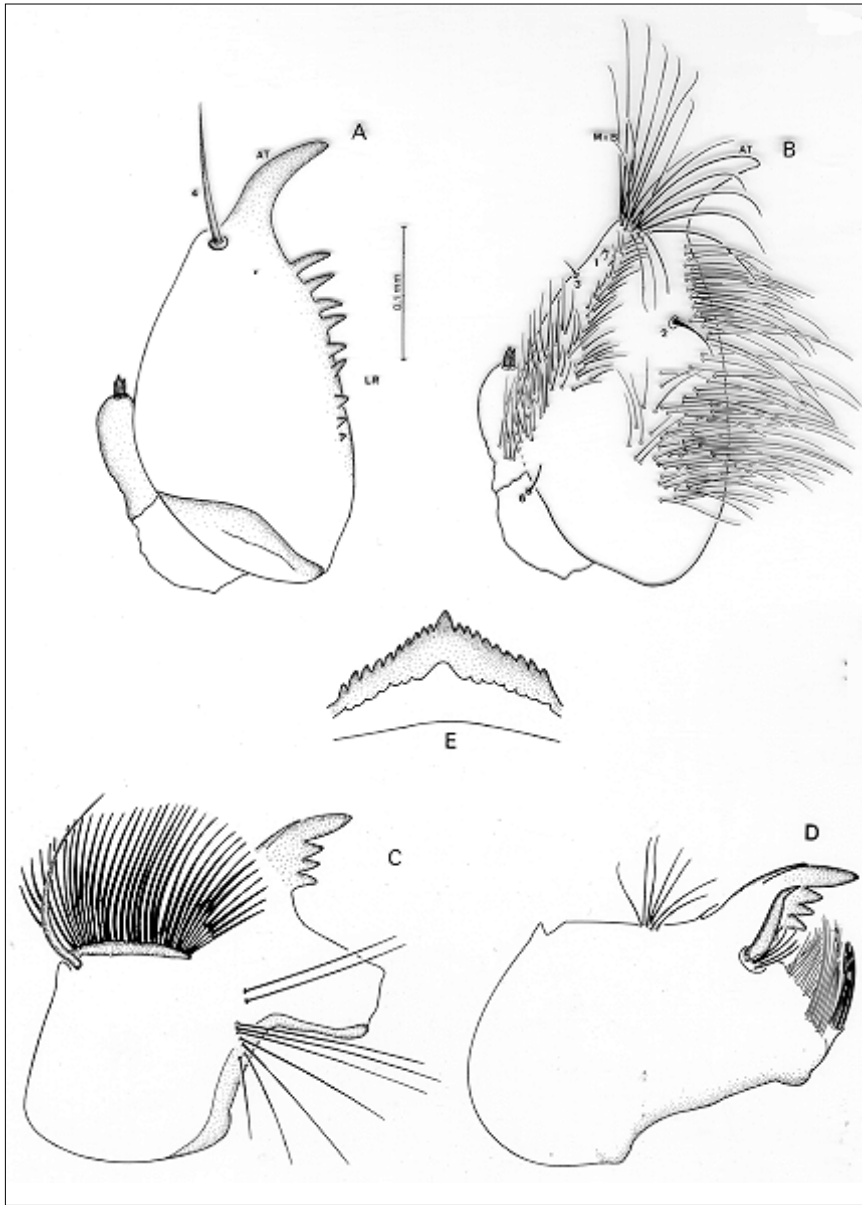


Fig. 19: *Wyeomyia complosa*, larval mouthparts. A, B: maxillae; C, D: mandible (A, C: ventral; B, D: dorsal views); E: dorsomentum

were observed. The type specimens of *Wy. negrensis* does not correspond to the original description, including the characters that differentiate it from *Wy. occulta*. Therefore, we are convinced that *Wy. occulta* and *Wy. negrensis* are the same species. However, to be recognized as a synonym, a study of type specimens of both species must be done. The specimens we identified as *Wy. negrensis* in an allozyme study (Motta et al. 1995) were probably *Wy. occulta*. *Wy. occulta* showed low genetic identity when compared with *Dendromyia* species, values considered enough by Thorpe and Solé-Cava (1994) to suggest that they belong to distinct genera.

In the group or series *Prosopolepis* of Lane and Cerqueira (1942), only *Wy. flui* Bonne-Wepster and Bonne (as *Wy. kerri* Del Ponte and Cerqueira) remains since *Wy. confusa* was recently redescribed and recognized as the monotype of subgenus *Prosopolepis* (Lourenço-de-Oliveira et al. 1999). The larva of *Wy. flui* are very distinct from those of *Dendromyia* as well as *Prosopolepis* in that it has a small maxilla without AT; seta 14-C is anterior to 15-C; the comb of segment VIII has scales not forming a row; the siphon is short with some simple accessory setae; seta 1-S is branched, very long and similar to the length of the siphon.

Comparing the morphological characters of *Dendromyia* with those listed by Harbach and Peyton (1990) for the immature stages of subgenera *Caenomyiella*, *Decamyia*, *Wyeomyia* and *Zinzala*, we conclude that *Dendromyia* is more closely related to *Caenomyiella* than the others. Some characters of this subgenus are common to *Dendromyia*, including: pupa with seta 1-I with 3 or 4 principal branches and numerous apical ones; seta 2-III - VII near the posterior margin of the tergum; 6-II simple, at least twice the length of 7-II; 6-VII ventral; larva with seta 11-P,M,T simple, spiniform; seta 2-III-VII on level or slightly anterior to setae 1 and 4; 9-I-VI short and simple; maxilla with distinct, but weakly developed AT.

Among the species previously placed in subgenus *Dendromyia* (Lane & Cerqueira 1942), which are now without subgeneric affiliation, exists one group consisting of *Wy. mystes*, *Wy. bourrouli* Lutz, *Wy. forcipenis* Lourenço-de-Oliveira & Silva, *Wy. finlayi* Lane & Cerqueira, *Wy. airosai* Lane & Cerqueira, *Wy. howardi* Lane & Cerqueira and the species that Lane and Cerqueira erroneously described as *Wy. luteoventralis* (which is a distinct new species that it will be redescribed elsewhere), all sharing some morphological characters, such as: adults essentially with the same scale pattern; male genitalia with the gonocoxite elongate, gonostylus with a well developed stem, lobes roughly similar in gen-

eral features; larva with maxilla without developed AT, maxillary palpus small or atrophied; scales of comb of segment VIII on a plate, siphon with numerous accessory seta; pupa usually pigmented, generally with a darkish pattern; paddle almost ovate, setae 9-VIII usually little longer than 9-VII.

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