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A redescription of *Topomyia decorabilis* Leicester, 1908 (Diptera, Culicidae) from Malaysia and Indonesia

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Abstract: Detailed redescriptions and illustrations of the adults including male genitalia, pupa and larva of *Topomyia* (*Suaymyia*) *decorabilis* Leicester, 1908 are presented based on specimens collected in Malaysia and Indonesia. The pupa and larva of the species are described for the first time. The larva of the species is predacious, having enlarged maxillae.

Key words: mosquito, Culicidae, *Topomyia decorabilis*, Malaysia, Indonesia, redescription

In 1908, Leicester described *Topomyia decorabilis* on the basis of males and females from Selangor, Malaysia. Edwards (1922) illustrated the male genitalia of the species based on the specimens of Leicester's collection in the British Museum. Thurman (1959) proposed the subgenus *Suaymyia* (Orthotype: *Topomyia cristata* Thurman, 1959) and placed *To. decorabilis* in the subgenus.

Several collections of larval mosquitoes were made from the secondary rain forest of the central mountain range of Gombak, Peninsular Malaysia and Kuching, East Malaysia and Sumatra, Indonesia. The collections included adults, larvae, pupae, and larval and pupal exuviae of *To. decorabilis*. As the original descriptions of the species (Leicester, 1908) are scanty, and the immature stages unknown, an adult male and female, larva and pupa are redescribed and illustrated in this paper.

The terminology used for the adults and immature stages mainly follows Harbach and Knight (1980, 1981), Harbach and Peyton (1993) and partly Belkin (1962). Some of the specimens examined will be deposited in the Sarawak Museum and other Institutes after our taxonomic work on the genus *Topomyia* is completed.

Topomyia (*Suaymyia*) *decorabilis* Leicester

(Figs. 1, 2 and 3; Table 1, 2)

Topomyia decorabilis Leicester, 1908, Stud. Inst. Med. Res. F. M. S., 3: 239. Type specimens: male and female; type locality: The Gap (Selangor), Malaya. Edwards, 1922, Indian J. Med. Res. 10: 440 (illustration of male genitalia).

Topomyia (*Suaymyia*) *decorabilis* of Thurman, 1959, Univ. Maryland Arg. Expt. Sta. Bull. A-100, 45.

Male (Fig. 1A–G, K, N–P).

Head. Black with somewhat purple reflections in dorsal aspect; vertex closely covered with broad flat dark-brown scales; apical part of vertex with silver scale patch; erect scales and narrow decumbent scales absent on occiput; a pair of brownish interocular and several black ocular setae present; postgena covered with flat silver scale patch. Clypeus small, dark brown, with pale fine powders marginally. Maxillary palpus short, about 0.06 of proboscis, covered with dark scales. Proboscis slender, 2.50 mm, longer than antenna, slightly swollen at the distal end, covered by dark scales, and without ventral line of white scales. Pedicel light brown, with fine grayish powders.

Thorax. Scutum covered densely with dark brown scales and with a median silvery line from anterior promontory to prescutellar area; the line consisting of double rows of overlapping flat silvery scales, many well developed supraalars. Thoracic pleura covered densely with silvery reflected spatulate scales on upper and lower postpronotal, antepronotal, upper proepisternal, postspiracular, sub-spiracular, prealar, upper and lower mesokatepisternal, upper mesepimeral and metepisternal areas. Conspicuous black setae absent on the pleuron, except about 15 antepronotals, 1–3 postpronotals, 5–7 prespiraculars, 4 upper prealars, and 6 pale upper mesepimerals. Scutellum with flat silvery scales and 4 well developed setae on median lobe, and 3 or 4 setae with black spatulated scales on each lateral lobe.

Wing. Length 3.95 mm: Cell R_2 about 2.8 of stem R_{2+3}; alula with 6–7 fine piliform scales distally on margin; upper calypter without setae. Haltere; scabellum pale, pedicel and capitellum with dark scales.

Legs. Coxae yellow, with silvery-white scales, trochanters with some dark scales dorsoapically; femora, tibiae and tarsi with dark scales dorsally, and yellow scales ventrally. Forefemur 3.22 mm. Forefemora and tibia a little longer than mid- and hindfemara and tibiae; first tarsal segment of all legs ($Ta\text{-}I_1$–$Ta\text{-}III_1$) shorter than each tibia (Ti-I –Ti-III). Fore unguis (Fig. 1N, O, P) a little larger than others, unequal in size, the larger one with a lateral tooth. Ungues of mid- and hindlegs small, paired without lateral tooth.

Abdomen. Length 2.70 mm. Terga dark-scaled, with golden-yellow spatulate scales laterally, a line of demarcation between dark and golden scaling more or less sinuate on terga II to VII in lateral view (Fig. 1K); tergum I with lateral tuft of about 20 setae. All sterna with yellow spatulate scales.

Genitalia (Fig. 1A–G). Lobes of tergum IX (Fig. 1G) widely separated by narrow bridge, each lobe attenuated apically, terminating in single stout blade-like seta and 2–4 setae closely spaced on inner basal margin of each lobe. Gonocoxite (Fig. 1A) length about 2.2 times breadth at middle, with ventrosubapical lobes with 2 long stout flattend spines, rounded apically and 1 long inner seta, with several fine setae. Claspette lacking. Gonostylus (Fig. 1E, F) simple and short, with many setae dorsoapically and with a gonostylar claw rounded apically. Paramere (Fig. 1C) or paraproct very long, slender and pointed apically. Aedeagus (Fig. 1D) large, with a pair of sharp hooks.

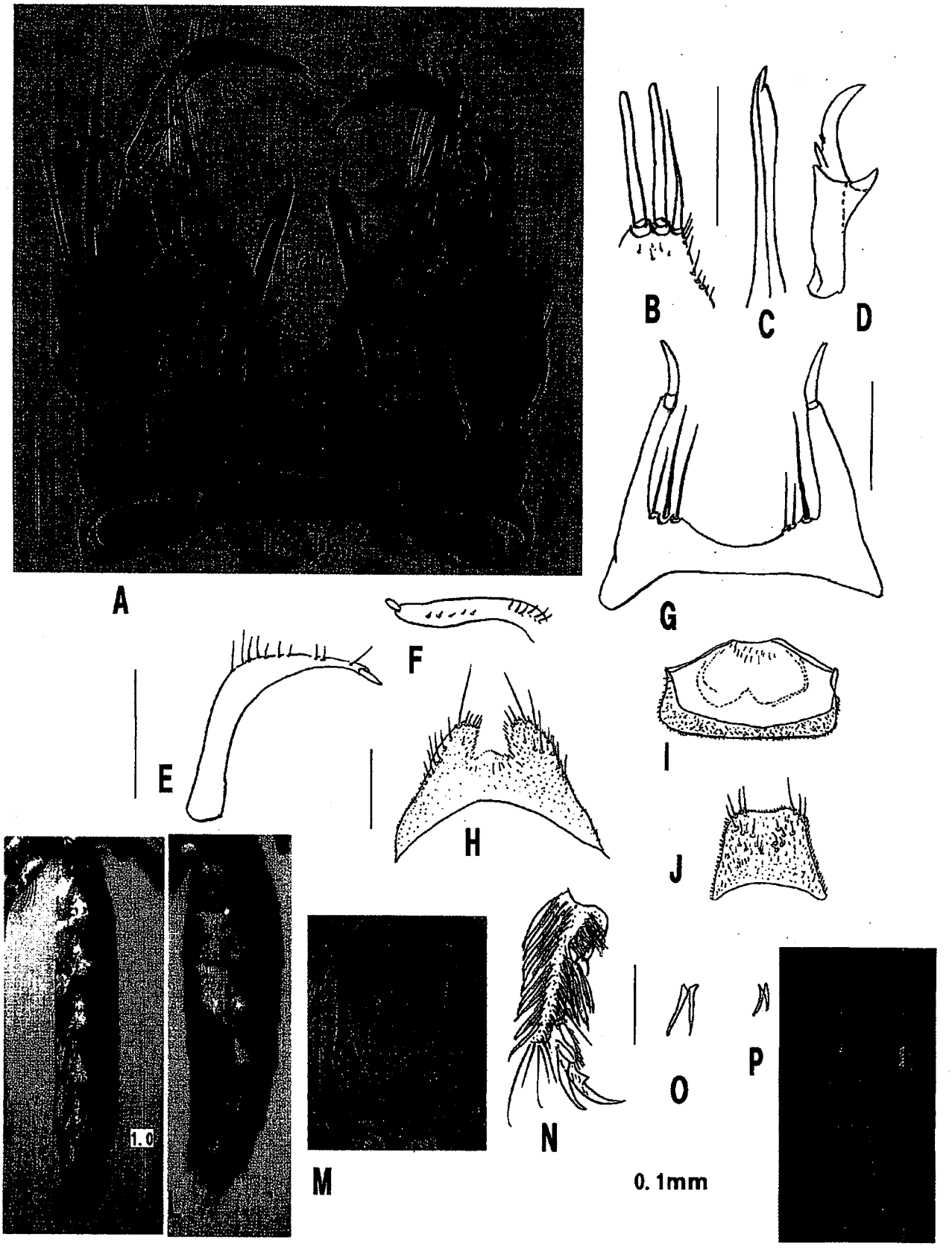
Female (Fig. 1H–J, L).

Wing about 4.20 mm. Proboscis 2.10 mm. Forefemur 3.00 mm. Abdomen (Fig. 1L) 2.6 mm. Resembles to male, except fore and mid ungues a little larger than the hind and equal in size, without lateral tooth. *Genitalia.* Cercus (Fig. 1H) with several marginal setae and with many fine setae, without scales; postgenital lobe (Fig. 1J) with concave slightly at apical margin and with several setae on distal half; upper virginal lip short bridge, with many fine setae (Fig. 1I).

Pupa (Fig. 1M, Fig. 2A–C, Table 1).

Abdomen (from segments I to VIII) about 4.05 mm length. Trumpet 0.22 mm, index 1.89–2.00. Paddle 0.42–0.50 mm, index 1.00–1.20.

Fig. 1. Male (A–G, K, N–P) and female (H–J, L), pupa (M) and larva (Q) of *Topomyia* (*Suaymyia*) *decorabilis* Leicester. A, genitalia (Gc), dorsal view; B, dorsomesal lobe (DML); C, paramere (Par); D, aedegus (Ae); E, gonostylus(GS); F, apical part of GS, different view; G, tergum IX lobe (IX-TL); H, circus, ventral view; I, upper virginal lip, ventral view; J, postgenital lobe, ventral view; K, abdomen, lateral view; L, abdomen, lateral view; M, pupal trumpet, lateral view; N, foreunguis, lateral view; O, midunguis, ventral view; P, hindunguis, lateral view; Q, forth-instar larva. (Scales represent 0.1 mm unless otherwise stated.)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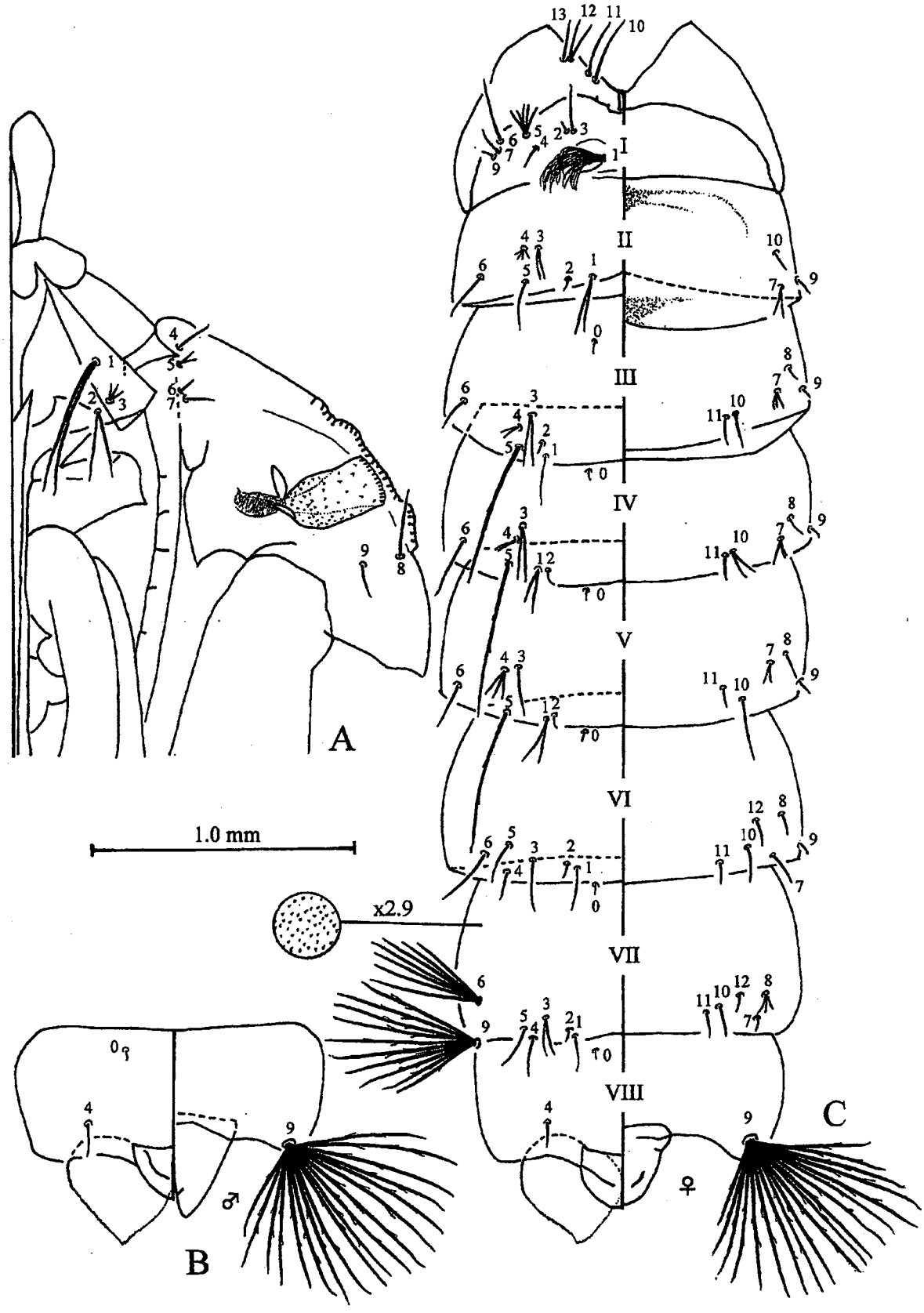

Fig. 2. Pupa of *Topomyia* (*Suaymyia*) *decorabilis* Leicester. A, cephalothorax of female; B, terminal part of male and female; C, metanotum and abdomen of female.

Table 1. Chaetotaxy of the pupa of *Topomyia* (*Suaymyia*) *decorabilis*.

Seta no.	Cephalo-thorax	Abdominal segments							
		I	II	III	IV	V	VI	VII	VIII
0	—	—	—	1	1	1	1	1	1
1	2, 3*	M*	1-4	1-3	2-5	1-3	1-3	1-3	—
2	1, 2	1	1	1	1	1	1	1	—
3	1-4	1 (1, 2)	1-3	2, 3	2-5	1	1 (1, 2)	1-3	—
4	1-3	1 (1, 2)	4-8	1-3	1-3	2-10	1-4	1-5	1
5	1, 2	4-9	1	1 (1, 2)*	1*	1 (1, 2)*	1, 2	1	—
6	1-4	1-3	1 (1, 2)	1, 2	1, 2	1	1	7-16*	—
7	1 (1, 2)	1-4	1-5	1-5	1-4	2-7	1, 2	1	—
8	1 (1, 2)	—	—	1-5	1-3	1-3	1-4	3-6	—
9	1 (1, 2)	1	1	1	1	1	1 (1, 2)	9-22*	18-33*
10	1	—	1	1	1 (1, 2)	1 (1, 2)	1	1 (1, 2)	—
11	1 (1, 2)	—	—	1	1	1 (1, 2)	1	1	—
12	1-5	—	—	—	—	—	1-3	1**	—
13	1	—	—	—	—	—	—	—	—

Specimens examined: 4 pupal exuviae from Gombak, Malaysia.
M, multiple branched; *prominent seta; **present or absent.
First number indicates modal number of branches. Numbers in parentheses indicate the range.

Cephalothorax (Fig. 2A): Trumpet (Fig. 1M) yellow-brown, with fine sculpturing, broadened towards open pinna. Seta 1-CT long, conspicuous, with 2 or 3 branches. Abdominal setae 5-III–V long, usually single; 6-VII long, 7–16 branched; 9-VII long, barbed 9–22 branched; 9-VIII long, barbed 18–33 branched. Paddle uniformly and lightly pigmented, short, broad, ending in a tapered blunt point, without a distinct midrib and with minute spicles along apical margin. Male genital lobe extending to about 0.8 of paddle, median caudal lobe extending to about 0.6 of paddle.

Fourth-instar Larva (Figs. 1Q, 3A–I, Table 2).

Head. Length about 1.12 mm, width about 1.1 of length. Siphon 0.68–1.33 mm. Abdominal setae pigmented. Stellate setae absent. Integument smooth, spicules absent. Head (Fig. 3E). Pigmentation of head yellow, integument smooth. Dorsomentum (Fig. 3F) with median tooth and 6–7 smaller on either side. Mouth parts modified for predation. Labral area strongly produced, hair of mouth brushes stout pectinate. Mandible black, with a large apical tooth and with 2 or 3 ventral teeth. Maxilla large, variable in length, about 0.62 mm. Maxillary body bears a collection of setae basally (LR: laciniarastrum) and 3 mult-branched long setae apically (MxB: maxillary brush). Maxillary bundle (MxBn) large, a little shorter than length of maxillary body (MxBo), index (MxBn/MxBo) 0.8–0.9 (X=0.82); apical tooth (AT) prominent, tooth-like; seta 1 of MxBo minute, situated at basal 0.54 maxillary body, set 2 single short, situated at basal 0.64; seta 3 single, large, situated at basal 0.92, close to MxB. Antenna (Fig. 3C) length about 0.22 of head. Seta 1-A weak, single, arising 0.8 from base, extending over tip of antenna. Seta 1-C (Fig. 3D) stout, with brush tip; setae 4–8 and 10 usually single; 9, 11 short, usually single, sometimes 2–4 branched; 13 stout, frayed at tip (Fig. 3 G). Abdominal setae 6-II, VI large, usually single, sometimes double. Comb scales 7–22, in 1 or 2 irregular rows; individual scales (Fig. 3I) usually pointed and with fine fringes towards base.

Siphon (Fig. 3H, S). Usually long, variable length, broad at base, tapering, lightly pigmented with fine spicules evenly, index 3.7–7.6. Pecten teeth absent. 1-S of 16–26 dorsal setae of siphon in a zigzag row, larger than siphonal diameter, individual setae long, 3–11 branched; ventral setae 24–33 in a zigzag row, individual seta long, single or 2–10 branched. Saddle incomplete. Lateral seta1-X 2–4 branched with aciculate, 2-X 20–28 branched, 3-X 9–17 branched; 4-X 20–34 branched, setae of one side of 4-X apparently longer than those of other side (Fig. 3H, 4-X). Gills elongate, tapering.

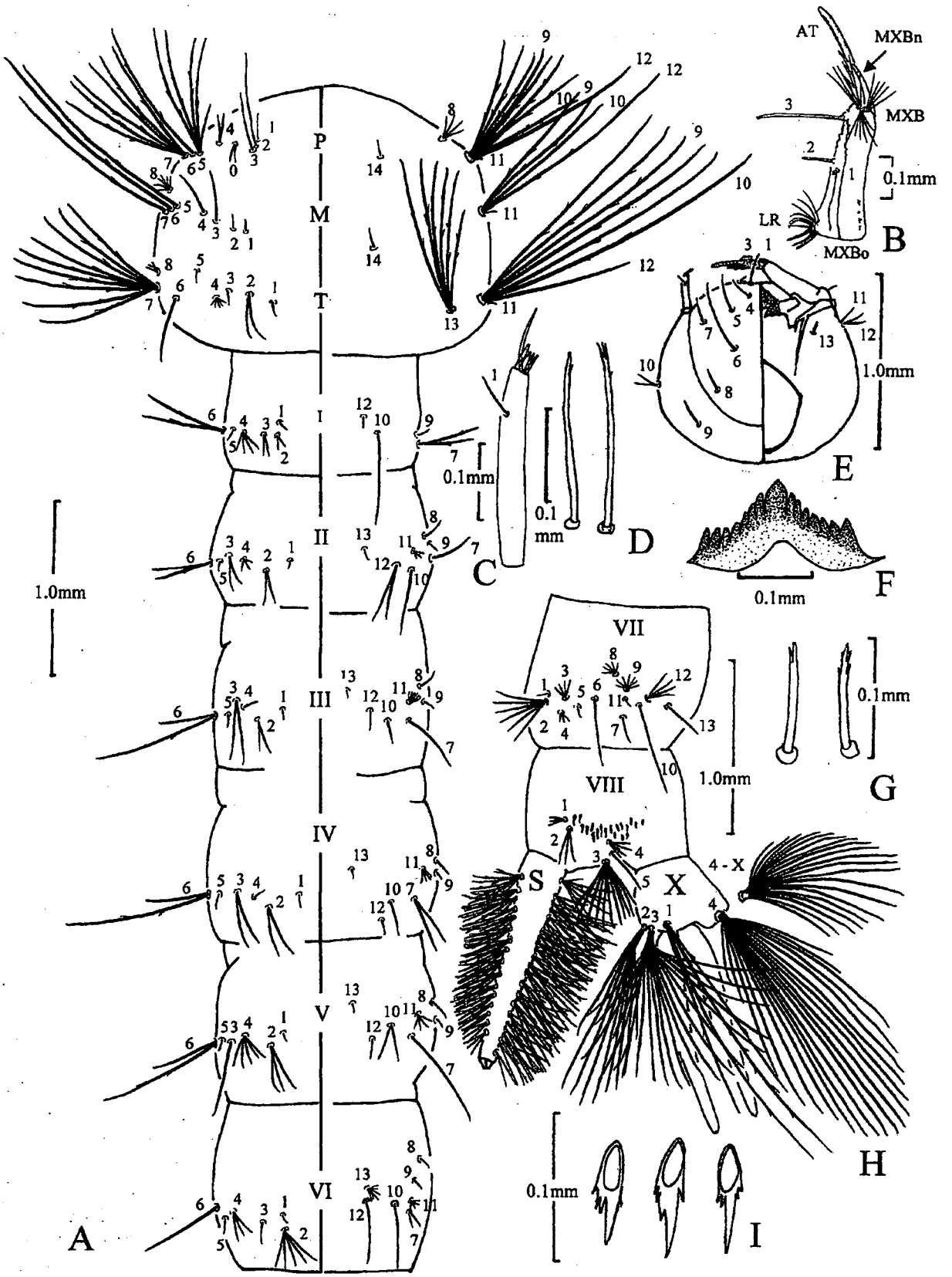

Fig. 3. Larva of *Topomyia* (*Suaymyia*) *decorabilis* Leicester. A, thorax and abdominal segments of I–VI; B, maxillar; C, antenna; D, seta 1-C; E, head; F, dorsomentum; G, seta 13-C; H, abdominal segments VII and X; I, comb scales.

Table 2. Chaetotaxy of the larva of *Topomyia* (*Suaymyia*) *decorabilis*.

Seta no.	Head	Thorax			Abdominal segments							
		P	M	T	I	II	III	IV	V	VI	VII	VIII
0	—	1-5	—	—	—	—	—	—	—	—	—	—
1	1	1	1	1	1	1	1	1	1	1	1	1-6
2	—	1	1	1-3	1, 2	1, 2	2, 3	1-5	3-7	5-7	6-9	3, 4
3	1	1, 2	1	1	1-4	1, 2	2, 3	1-4	1	1-3	4-10	11-17
4	1	1-4	1, 2	3-9	3-10	2-6	1	1-4	5-7	1-6	3-5	4-9
5	1	5-11*	1*	1, 2	1	1	1	1, 2	1	1	1	1
6	1	1-3*	1*	1, 2	1-4*	1(1, 2)*	1, 2*	1-3*	1, 2*	1(1, 2)*	1	—
7	1	5-14*	1*	8-14*	1, 2	1-4	1-3	1, 2	1-3	1-4	1	1-X=2-4*
8	1, 2	3-7	4-10	2-5	—	1	1	1	1	1, 2	5-8	
9	1-4	5-12*	1, 2*	5-8*	1	1	1	1	1	1	7-13	2-X=20-28*
10	1-3	1-3*	1*	1*	1	1	1	1-3	2, 3	1, 2	1	
11	1, 2	1	1	1	—	3-5	3-11	3-9	4-6	1-5	1-3	3-X=9-17*
12	1-4	1, 2*	1*	1*	1	2, 3	1	1	1, 2	1	4-6	
13	—	—	—	5-8*	—	1	1	1	1	6-10	1	4-X=20-34*
14	—	1**	1**	—	—	—	—	—	—	—	—	—

Specimens examined: 6 larvae from Gombak and Sarawak, Malaysia.
*Prominent seta; **present or absent.
First number indicates modal number of branches. Numbers in parentheses indicate the range.

Specimens examined. The following specimens were collected as larval and pupal stages from living bamboo internodes, Ulu Gombak, about 30 km from Kuala Lumpur, Peninsular Malaysia by I. Miyagi and T. Toma in 2003 and 2004.

3♂♂ (no. 040925-1) on pin with G63 (genitalia), L (larval) and P (pupal) exuviae mounted on slide (286); with G66, L, P (289); with L and P (256). 1♂ (040923-1) with G64, L, P (282). 2♀♀ (031014-3) with L, P (139,140). 1♂ (031014-3) with L, P (138). 1♂ (040315-56)with L, P (753). 1♀ (040909-1) with L, P (277). 1♂ (040927-1) with L, P (200). 1♀ (031006-5) with L, P (116), 1♂ (040926-12) with L, P (199), 1♀ (031014-5) with L, P (141). 1♂ (050929-1) with L, P (114). 1♀ (040318-9) L, P (618) without adult specimen, 1♀ (040318-10) L, P (780) without adult. 2 Larvae (040919-10, 040925-1).

Larval stage collected from living bamboo internodes, Kuching, Sarawak, East Malaysia by I. Miyagi and T. Toma on September, 2005, 1♂ (050917-7) with G 55, L, P (107). 1♀ (050917-7) with L, P (115). 6 Larvae (050929-2).

Larvae collected from living bamboo internodes, Lembah Anai, Sumatra, Indonesia by I. Miyagi and T. Toma on August 1997. 3♂♂ (970823-13) with L, P (21, 158, 238). 2♂♂ and 3♀♀ (970827-1) with L, P (208, 228 and 92, 112, 220). 1♂ and 2♀♀ (970829-1) with L, P (204 and 117, 221).

Larvae collected from living bamboo internodes, Siberut Is., Indonesia by T. Okazawa on April 2005. 1♀ (050401)with L, P (29), 1♂ (050402) with G, L, P (22), 1♀ (050402) with L, P (7), 1♀ (050402) with L, P (11), 1♀ (050403) with L, P (27).

Taxonomic Discussion. Topomyia decorabilis appears to be closely related to *Topomyia imitatus* from Mindanao, Philippines (Baisas, 1946), *Topomyia suchariti* from Thailand (Miyagi and Toma, 1989), *Topomyia nemorosa* from Yunnan, China (Gong, 1996) which may be a junior synonym of *To. suchariti* and *Topomyia miyagii* from Flores, Indonesia (Toma and Mogi, 2003). These species are grouped as the *decorabilis* species-group by the following characters: In adult males, the lobes of tergum IX are widely separated by a narrow bridge, each lobe attenuated apically, terminating in a single stout

blade-like seta that is shorter than the attenuated lobe and 3–5 well developed setae closely spaced on the inner basal margin of each lobe; gonocoxite with dorsomesal lobes and 2–4 long stout flattend spines apically rounded. In pupae, trumpet short, index less than 3; abdominal setae 6, 9-VII and 9-VIII long many branched and aciculated; paddle short, a little longer than the width without midrib (except *To. imitatus*) and with fine marginal spicules. In larvae, maxilla with articulated large maxillary horn (Maxillary bundle); siphon long, with many long branched dorsal and ventral tufts in a zigzag row; pectin teeth obsolete. However, the following structures in the male genitalia of *To. decorabilis* are very distinctive and differ from those of other species of the group: 1) Gonostylus simple and short with a well developed gonostylar claw rounded apically without well developed marginal setae; 2) Gonocoxite with dorsomesal lobe and 2 long stout flattend spines that are rounded apically and lack a tuft of many long recurved setae; 3) paramere very long and slender pointed apically and aedeagus large with a pair of sharp hooks.

Topomyia spinophallus Zhou, Zhu and Lu were described from Yunnan, China (Zhou et al., 1999). The illustrations of the genital organs in this species may be identical to those of *Topomyia decorabilis*.

Bionomics. The immatures of *To. decorabilis* are usually found in water accumulated in a small sized (3–5 cm diameter) living bamboo internode with a small hole (about 2 mm diameter) bored by insects such as ants and Chrysomelid beetles and newly cut bamboos. The larvae of *Tripteroides aranoides* (Theobald), *Topomyia apsarae* Klein, *Topomyia spathulirostris* Edwards, *Topomyia roslihashimi*, *Toxorhynchites* spp., *Armigeres dolicocephalus* (Leicester), *Armigeres digitatus* (Edwards) and *Armigeres omissus* (Edwards) were found in living bamboo internodes of the same bamboo forest in Ulu Gombak, but these species were never found with *To. decorabilis* in the same bamboo internodes and cut bamboos (Miyagi and Toma, 2005).

Distribution. Known from Peninsular Malaysia (Ulu Gombak), East Malaysia (Kuching area, Sarawak) and Indonesia (Siberut Is., Sumatra).

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