Studies on the Genus *Topomyia*:

1. A New Species from Sabah, Malaysia

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ABSTRACT. A new species *Topomyia (Topomyia) sabahensis* is described from Sabah, Malaysia. The adult female, male, pupa and larva are described in detail and illustrations of the male genitalia, pupa and larva are provided. *Topomyia sabahensis* is a rain forest species, so far known to breed only in the leaf axils of *Allocasia* species.

INTRODUCTION

Topomyia is an Oriental genus of the tribe Sabethini, with most of the species occurring in Southeast Asian countries. Species of this genus generally show a high degree of endemism. A recent revival of interest in this genus has resulted in a new species being described from Japan (Miyagi, 1976), two new species from Kampuchea (Klein, 1977) and a new species from the Philippines (Miyagi, Toma and Rivera, 1983). In Malaysia, a number of new species were recognized by the senior author from material obtained as a result of extensive collections made during the years 1966-1973. So far, one new species has been described (Ramalingam, 1975) and another redescirbed (1983). Six collections of a new species of *Topomyia* were made from Semporna, on the eastern coast of Sabah, all from the leaf axils of *Allocasia*, in secondary rain forest. The collections include a series of adult males and females, larvae and associated skins.

The terminology used for the adult and the male genitalia follows Harbach and Knight (1980), and for the chaetotaxy of the larva and pupa, that of Belkin (1962). The following system is used to enumerate seta branching: if only one numeral is given in parenthesis following the seta number, it represents the only numer of branches encountered in the sample; if two sets of figures are given, the first represents the modal number of branches and the second, the range encountered in the sample.

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Topomyia (Topomyia) sabahensis New Species
(Figs. 1 and 2)

FEMALE. Wing, 2.58 mm. Proboscis, 1.58 mm. Forefemur, 1.74 mm. Abdomen about 1.9 mm. long. Small dark brown with silver markings on head and thorax. Head. Vertex, occiput and side of head covered with broad, flat, dark brown decumbent scales with blue luster. A large triangular patch of flat silvery scales present on vertex just above the eyes, similar patch on side of head below eye. Erect scales absent. Eyes touching above antenna. Interocular and ocular setae present. Clypeus elongate; dark brown integument, bare of scales. Maxillary palpus entirely covered with brown scales; about 0.11 of proboscis. Proboscis elongate, narrow at base and slightly enlarged towards distal end; covered with dark scales except the labella which is light in color. Pedicel of antenna dark with few narrow scales on inner side. Flagellum pillose approximately 1.4 mm. long. Thorax. Integument of scutum, scutellum, pleurae and mesopostnotum brown. Scutum covered with small, narrow, curved, brown scales, with a median line composed of two rows of flat, round, silvery scales; silver line extending all the way to the scutellum and getting slightly broader in the posterior third. Dorsocentral, humeral, scutal, supra-alar and prescutellar setae present. Central lobe of the scutellum covered with a patch of silver scales, side lobe brown scaled. Mesopostnotum bare. Antepronotal lobes with a patch of silver as well as brown scales dorsally; row of setae on anterior side. postpronotum covered with large brown scales on upper 2/3 and with silvery scales on lower half; single large setae present on posterior border. Three to four prespiracular setae present. Postspiracular setae absent. Paratergite bare. A large patch of rounded silvery scales covering the post- and subspiracular areas, the propleuron, most of the sternopleuron and the mesepimeron. Mesepisternum bare. Setae present in patches on propleuron, prealar and upper mesepimeron. Leg. Coxae of all three legs with patches of silver scales. Foreleg covered entirely with brown scales. Mid- and hindlegs brown with white line of scales on venter of femur and tibia. Claws of all legs simple and equal. Wing. Brown scaled. Squame scales densely covering wing veins; plume scales narrow. Cell R2 about 2.8 times the length of its stem. Anal vein ending beyond fork of Cu. Alula with several hair-like scales. Upper calypter bare. Haltere. Pedicel with light brown scales, capitellum scales darker. Abdomen. The terga of segments I-VIII are densely covered with dark brown scales, with the lateral aspect of each terga having a strip of yellow-gold scales. Sternites II-VIII entirely covered with flat, pale golden scales.

MALE. Wing, 2.43 mm. Proboscis, 1.46 mm. Palpi, 0.15 mm. Forefemur, 1.64 mm. Resembles the female in most respects except: The ventral side of the proboscis has a pale line of scales on basal 1/3 and at the apical end. A pale line of scales is present on the ventral side of the femur in the foreleg; this line extending all the way down the femur to tarsi V in mid- and hindlegs. Head: Maxillary palps and antenna about the same length as in the female; antenna pillose.

MALE GENITALIA (Fig. 1). As figured. Tergum of IX segment broad, with the two lobes close to each other; each lobe bearing a flat, broad and pointed spinulate seta. Sternite of IX segment broadly conical and covered with scales and scattered setae; apical area with very fine setae. Gonocoxite narrow at base and broadest at distal end; length approximately twice (1.8-2.2) its breadth at distal end; ventral aspect covered with scales and setae; dorsal aspect with a dense row of long curved setae on distal side; a curved row of fine setae present on the distal third and some fine setae present on the inner side of the gonocoxite. The dorsal lobe of the claspette is composed of a long curved stem, bearing a narrow, elongate and pointed filament. The ventral lobe bears a patch of setiforms, with one or two being more prominent than the others. Gonostylus broader at base, slightly curved and bearing a short, sharp gonostylar claw. A patch of small setae present on outer aspect of the basal part of the gonostylus. Paraproct elongate with pointed apex. Phallosome long and slender.

PUPA (Fig. 1). - Abdomen 2.8 mm. Trumpet, 0.31 mm. Paddle, 0.45 mm. Integument of cephalothorax and abdomen pale yellow, with darker bands at anterior areas of abdominal tergites II-VII. Chaetotaxy as figured; smaller setae pale, the more conspicuous setae dark brown and marked with an asterisk (*). Cephalothorax: Trumpet: slightly darker than rest of cephalothorax; narrow in basal third, the sides then being parallel to each other. Index 2.7-3.0; pinna 0.17-0.33 of trumpet length. Seta 1 long, conspicuous and 2 branched from base; 2(3,1-4), 3(2,2-4), 4(3,2-4), 5(3,1-4), 6(2,1-3), 7(2,1-3), 8(1,1-2), 9(2,1-2), 10(2,1-5), 11(1), 12(2,2-3). Abdomen: Fine microtrichia present on abdominal segments II-VIII. Segment I: Seta 1 with four to eight main branches, branching further in a dicotomous manner to end in fine setae. Seta 2(1), 3*(1), 4(1,1-2), 5(4,3-5), 6(1,1-2), 7(1,1-2), 9(2,1-3). Segment II: 1(5,4-6), 2(1,1-2), 3*(1), 4(3,2-4), 5(2,1-3), 6*(1,1-2), 7(1,1-3), 9(1), 11(3,2-4). Segment III: 1(3,1-3), 2(1), 3*(1), 4(3,2-4), 5(3,2-4), 6(2,1-4), 7(3,1-4), 8(3,2-4), 9(1), 10(2,1-2), 11(3,1-4). Segment IV: 1(2,2-5), 2(1), 3(3,2-4), 4(3,2-4), 5*(1), 6(1,1-3), 7(4,2-5), 8(3,2-5), 9(1), 10(2,1-3), 11(3,1-4). Segment V: 1(1-3), 2(1), 3(2,1-3), 4(4,2-6), 5*(1), 6(1,1-4), 7(4,3-6), 8(3,2-6), 9(1), 10(1,1-3), 11(2,1-4). Segment VI: 1(2,1-3), 2(1), 3(2,1-3), 4(3,2-5), 5*(1), 6(1,1-2), 7(1,1-3), 8(3,2-6), 9(1), 10(3,1-4), 11(4,1-4). Segment VII: 1(1,1-2), 2(1,1-2), 3(1), 4(1,1-2), 5(1), 6(2,2-4), 7(1,1-3), 8(4,3-6), 9*(18,15-20) barbed, 10(2,2-5), 11(4,1-6). Segment VIII: 4(1,1-2), 9*(16,16-19) barbed. Paddle: uniformly and lightly pigmented, with a distinct midrib; length abouth 1.6 times breadth; margin with long and distinct fringe. Seta 1 indistinct from fringe. Male genital lobe as illustrated and extending to 0.96 or almost the length of paddle; female genital lobe to 0.38 of paddle.

LARVA (Fig. 2). Head, 0.69 mm. Siphon, 0.59 mm. Chaetotaxy as figured, setae lightly to moderately pigmented. Stellate setae present, spicules absent. Integument smooth. Prominent setae marked with an asterisk (*), stellate setae wth capital S, after the number of branches. Head: Width about 1.21 of length. Ocular buldge and collar inconspicuous. Pale yellow coloration. Integument smooth. Mental plate with a strong, blunt median tooth, with about 10 smaller teeth on either side. Maxilla without well developed horn. Mouth brush very dense, with inner setae serrated. Seta 1(single, stout, pointed and slightly

pigmented), 4(1), 5(1), 6(1), 7(1,1-2), 8(2,1-3), 9(3,2-4), 10(2,1-2), 11(5,4-6), 12(3,2-4), 13(1,1-2), 14(3,2-4), 15(2,2-3). Antenna: Length about 0.35 of head. Shaft about the same width throughout. Integument pale and smooth. All setae single. Setae 1 extending over tip of antenna, its base about 0.85 from base of antenna. Thorax: Long pleural setae with barbs. Prothorax: Seta 0(12,9-18, Stellate), 1(12,9-19,S), 2(1), 3(6,5-10,S), 4(15,9-18,S), 5*(12,10-16), 6*(1), 7*(9,5-10), 8(10,5-14,S), 9*(2,2-3), 10*(1), 11(1), 12*(1), 14(6,4-6,S). Mesothorax: Seta 1(10,5-12,S), 2(2,1-2), 3(1), 4(2), 5*(1), 6*(1), 7*(1), 8(3,3-5), 9*(2), 10*(1), 11(1,1-2), 12*(1), 13(7,4-9,S), 14(6,5-10,S). Metathorax: Seta (1(8,4-10,S), 2(2,1-2), 3(4,2-6), 4(7,4-9,S), 5(10,8-14,S), 6*(2,1-2), 7*(10,6-10), 8(3,2-4), 9*(5,2-8), 10(1), 12*(1), 13(12,10-17,S). Abdomen: Segment I: Seta (1(12,8-14,S), 2(10,4-12,S), 3(2,2-3), 4(7,3-8,S), 5(5,4-8,S), 6*(5,2-7), 7*(2,2-4), 9(4,3-5,S), 10(2,2-3), 11(8,7-12,S), 13(12,7-12,S), Segment II: Seta 1(10,5-13,S), 2(7,4-8,S), 3(5,3-6), 4(2,1-2), 5(6,4-8,S), 6*(6,3-7), 7*(2,2-3), 8(1), 9(4,3-7,S), 10(2,1-2), 11(2), 12(3,2-5,S), 13(7,5-11,S). Segment III: Seta 1(13,10-15,S), 2(3,2-5), 3(2,1-2), 4(2,1-2), 5(5,3-7,S), 6*(2), 7(6,4-8,S), 8(2,2-4), 9*(6,4-9), 10(2,2-3), 11(2), 12(1), 13(7,4-8,S). Segment IV: Seta 1(20,12-22,S), 2(3,2-5), 3(1,1-2), 4(2), 5(4,3-7,S), 6*(2), 7(5,4-8,S), 8(2,2-3), 9(7,5-10,S), 10(3,2-4), 11(3,3-4), 12(1), 13(7,4-8,S). Segment V: Seta 1(18,14-28,S), 2(3,2-5), 3(1), 4(2,1-3), 5(4,3-6), 6*(2), 7(3,2-4), 8(3,2-4), 9(8,6-12,S), 10(3,2-5), 11(2), 12(1), 13(5,3-8,S). Segment VI: Seta 1(14,12-28,S), 2(3,2-5), 3(2,1-2), 4(2,2-3), 5(3,2-5), 6*(1), 7(2,1-2), 8(4,3-6), 9(8,5-12,S), 10(3,3-4), 11(3,2-4), 12(2,2-4), 13(4,3-6,S). Segment VII: Seta 1(16,14-30,S), 2(4,1-4), 3*(1), 4(1), 5(3,2-4), 6(4,3-6), 7(1,1-2), 8(5,4-6), 9(5,4-8), 10(4,3-5), 11(4,3-6), 12(1,1-2), 13(4,3-5,S). Segment VIII: Seta 1(10,6-16,S), 2(1), 3(1,1-3), 4(1), 5* (2,2-3),. Comb scales 33(17-43), in 3 to 5 irregular rows; individual scales large, pointed and with a fringe at base. Siphon: Index 4.2 (3.7-4.6), narrow with parallel sides in basal 2/3 and tapering in apical third; lightly pigmented; pecten teeth 3-7, frequently with 2 or more teeth together at base, other teeth widely apart, distal most tooth usually beyond middle of siphon; 4 to 5 pairs of ventral tufts, basal pair 3-4 branched, others 2 branched, the last tuft frequently single. Anal Segment: Saddle: Incomplete, only dorsal plate present, lightly pigmented, a few small spines present on distal margin; length 0.31(0.29-0.33) mm. Gills: Long with rounded ending, length 0.66 (0.47-0.78) mm., averaging 2.1 times the length of the saddle. Seta 1*(2,2-3) arising on saddle, 2*(3,2-5), 3*(1), 4a(3,2-4) ventral tuft consisting of single pair of setae.

TYPE DATA. Holotype male (S 979.12), with slides of associated larval and pupal skins and genitalia, Double Hill Forest Reserve, Semporna, Sabah, Malaysia, elevation 30 m, from *Allocasia* leaf axils, in secondary rain forest, 22 May 1970; Collectors: Sulaiman bin Omar, Chia, Y. W. and Thomas (USNM). Allotype female (S 979.11), with slides of associated larval and pupal skins, same data as holotype (USNM). Paratypes: 1 male, 3 female, one slide associated pupal skin, 1 slide male genitalia and 6 slides whole larvae from the same collection as the holotype and 5 males, 5 females, 3 slides male genitalia and 4 slides whole

larvae from collection S 981, which was made from the same locality, the same larval habitat, on the same day and by the same collectors as the holotype collections. Three male (S 981) with one slide male genitalia, 4 female (2 from collection S 979 and 2 from S 981) and 4 slides of whole larvae (2 from each collection) (USNM). Two male (one from each collection) with 2 slides of male genitalia, 3 female (one with associated pupal skin, S 979.100), and 3 slides of whole larvae (from collection S 979 and 1 from S 981) (BM). One male (S 981) with slide of male genitalia, one female (S 981) and 3 slides of whole larvae (2 from collection S 979 and one from S 981) (Ramalingam).

SPECIMENS EXAMINED. Total specimens 112: 32 male, 46 female, 4 associated skins, 23 whole larvae on slides and 7 male genitalia slide preparations.

TAXONOMIC DISCUSSION. *Topomyia sabahensis* belongs to the subgenus *Topomyia* of Thurman (1959) as the claspette of the male genitalia is provided with a rod-like dorsal lobe in addition to the setaceous ventral lobe; and the IX tergite is fairly broad, with the two lobes close together.

The presence of a median line of silver scales extending all the way back to the end of the scutum together with a patch of silver scales on the middle lobe of the scutellum relates *sabahensis* to the following species: *barbus. dubitans, gracilis, hernandoi, nigra, pseudobarbus, trifida* and *vijayae.* The male genitalia of *sabahensis* is however distinctive: 1. The gonocoxite is broad at the distal end, the border of which bears long and curved setae and on the distal third a curved row of fine setae. 2. The shape of the gonostylus and the IX tergite.

The larval and pupal stages in the genus *Topomyia* offer good diagnostic characters. However these stages are very poorly known and have been adequately described and illustrated in a very few species. For this reason, it is not possible at this time to highlight the diagnostic characters of the immature stages of *Topomyia sabahensis.*

BIOLOGY. Six collections were made of *Topomyia sabahensis,* all from coastal secondary rain forest at an elevation of 30 m and from the leaf axils of *Allocasia* species, containing slightly colored water. Other species of mosquitoes that were found breeding with *sabahensis* were: *Armigeres jugraensis* (3 collections), *Aedes albopictus* (3), *Aedes poicilius* (2), *Culex brevipalpis* (2), and *Malaya genurostris* (1). Nothing is known of the biology of the adults, but as with other *Topomyia* they also probably do not take a blood meal.

DISTRIBUTION. So far known only from the type locality, Double Hill Forest Reservce, Semporna, Sabah State, (Borneo Island) Malaysia.

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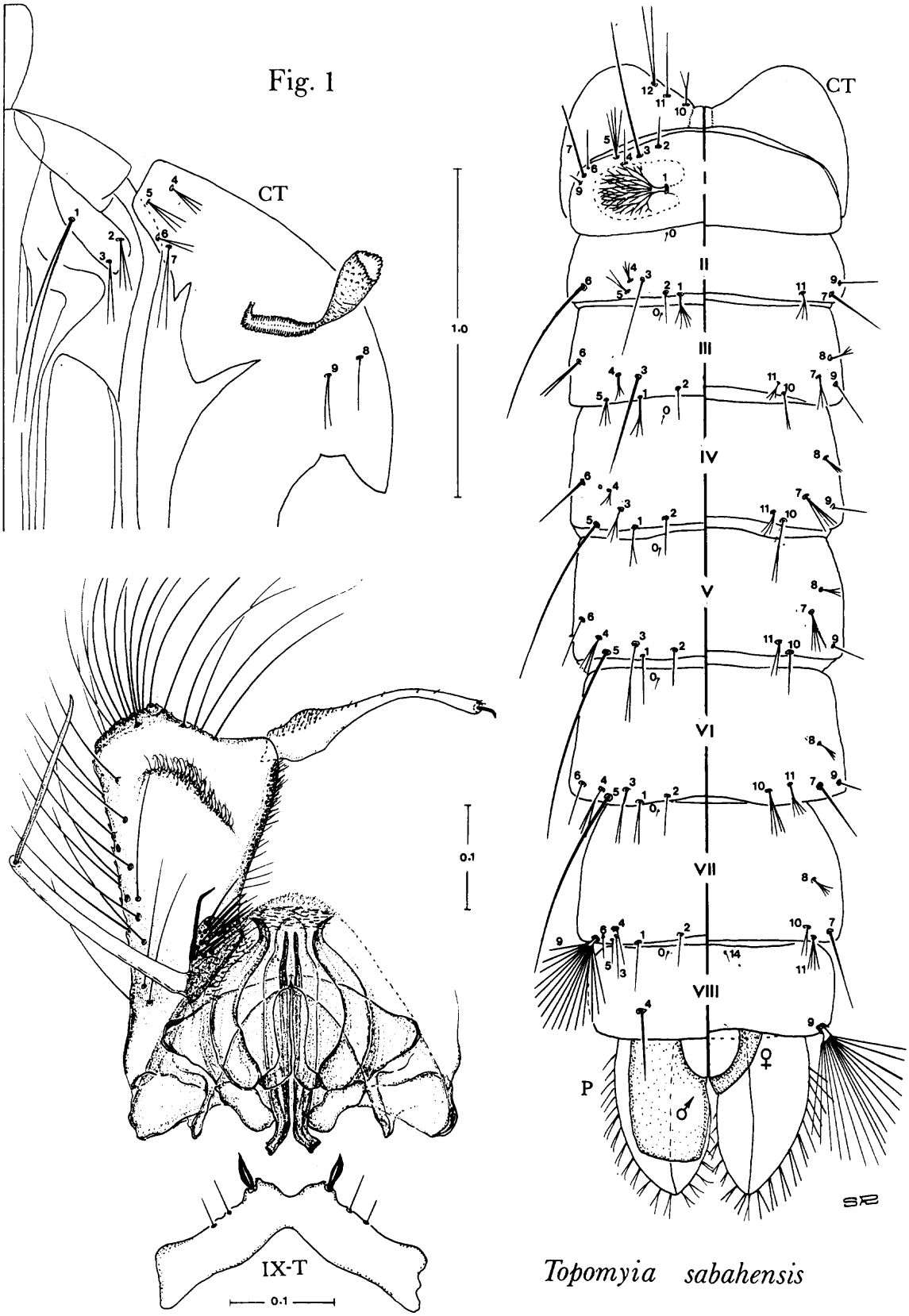
Fig. 1



Topomyia sabahensis

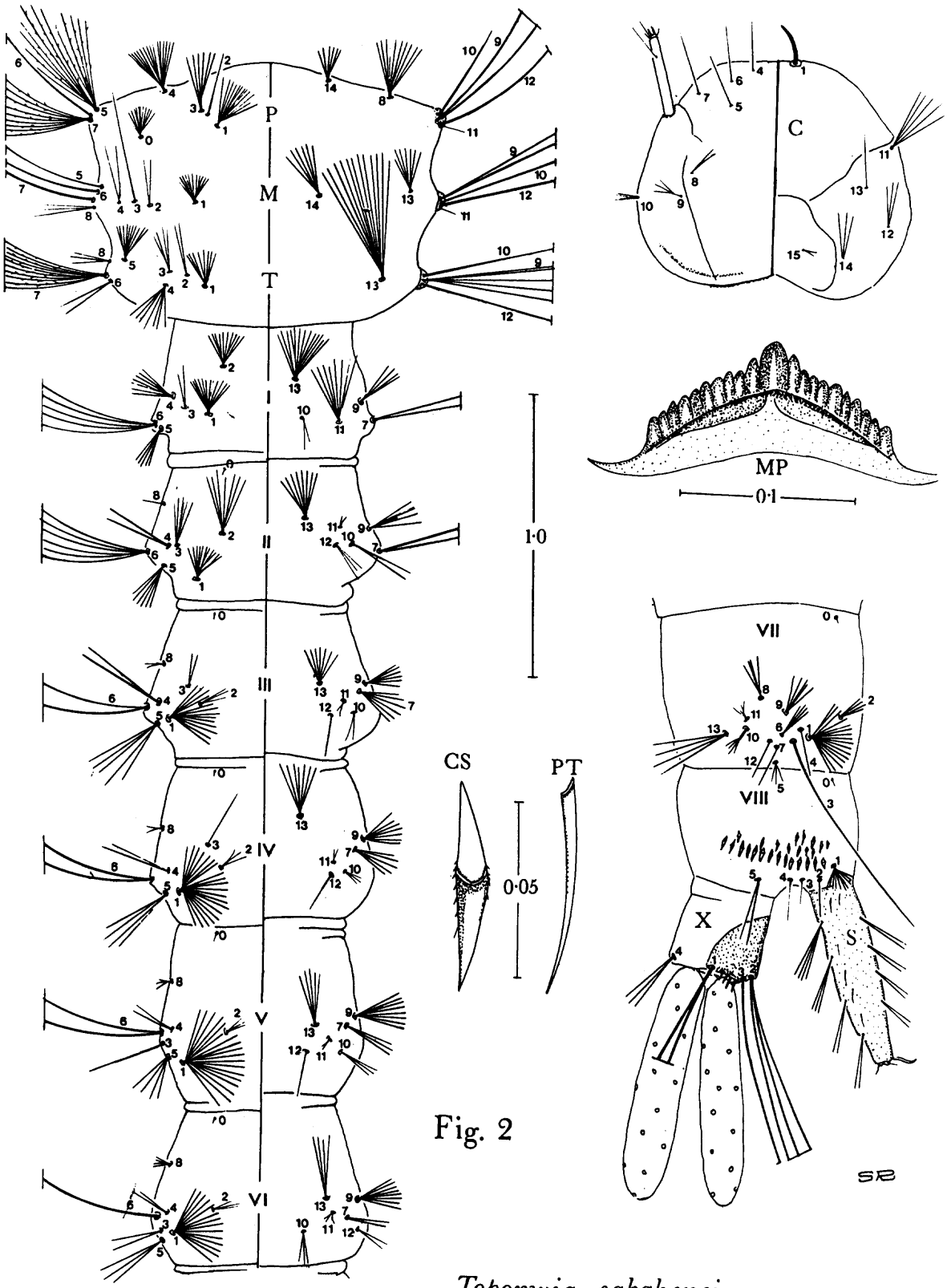


Fig. 2

Topomyia sabahensis