

Description of a New Species, *Tripteroides* (*Tripteroides*)  
*riverai* from the Philippines (Diptera: Culicidae)<sup>1</sup>

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ABSTRACT. The female, male, pupa and larva of *Tripteroides* (*Tripteroides*) *riverai* n. sp., from Palawan Island, the Philippines, are described, illustrated and compared with a related species, *Tripteroides mabinii*. The adults were bred from larvae collected from bored bamboo internodes.

As ornamented species, *Tripteroides mabinii*, has been transferred from the subgenus *Rachisoura* to the subgenus *Tripteroides* and placed in the Mabinii Group which consists of only one species (Mattingly 1981). Since 1946 when larvae of this species were collected from cut bamboo on Mindanao Island, no further collections of this conspicuous species or of any additional member of this group have been made.

In a recent study of the Culicidae for a project initiated in 1981 "The phylogenetic studies on mosquito fauna of Southeast Asia," the authors found an interesting species belonging to the *Tripteroides* (*Tripteroides*) Mabinii Group. As a result of morphological studies, the authors concluded that one of the mosquitoes collected from Palawan Island is an additional new species of the Mabinii Group, and it is described here as *Tripteroides* (*Tripteroides*) *riverai*. The authors are pleased to name this species in honor of Dr. Delfin G. Rivera, Director of the Malaria Eradication Service, Ministry of Health, Republic of the Philippines, who has contributed much toward the control of malaria in the Philippines. The method of presentation, terminology and abbreviation used in the description follow Belkin (1962a, b), Mattingly (1981) and Harbach and Knight (1980). Chaetotaxy tables for the 4th instar larva and pupa follow Tanaka, Mizusawa and Saugstad (1979).

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*Tripteroides (Tripteroides) riverai* n. sp.

FEMALE (Fig. 1). Wing length about 2.5 mm. Head. Proboscis relatively long and slender about 1.7 length of forefemur, 1.1 of abdomen. Palpus 0.17 of proboscis. Pale scales at inner lateral side of palpus and dorso-basal side of proboscis. Palpus and proboscis otherwise entirely dark. Clypeus bare. Torus darkened toward base. Torus with minute setae on inner surface. Antenna about 0.5 length of proboscis. Eye margin of occiput with border of bright peacock blue iridescent scales, remainder of occiput with black scales showing blue iridescence under illumination. Small patches of silvery scales below at sides. Nape with numerous, relatively conspicuous, narrow black erect scales in a single row. An ocular seta present well out on each side. Thorax. Scutum thickly covered with very narrow scales, apical part of scale pale and the remainder dark brown. Scutal integument light brown. A pair of prescutellar setae present, no acrostichals or dorsocentrals. Scutellum with broad, flat, dark brown scales. Postnotum dark brown. Anterior pronotum with broad, flat, dark brown scales and with 5-8 dark setae. Posterior pronotum sparsely covered with narrow curved dark scales on upper 1/3 and with a single dark seta on posterior margin at middle. Two to 4 spiraculars present. Propleuron with broad, flat, dark brown scales and with a conspicuous dark seta. Subspiracular area with flat silver scales. Flat scales with brilliant silver reflection present on about the upper 3/4 of the sternopleuron and 3/4 of the mesepimeron. Upper mesepimeron with 7-12 setae. Paratergite bare. Four to 6 lower sternopleural setae and 2-4 prealars present. Legs. Forefemur with 2 conspicuous silver spots on lower anterior surface at about 0.84 and 0.64 of the distance from base and a streak of silvery white scales in basal half on anterior surface. Midfemur with 2 conspicuous silver spots on anterior surface at about 0.86 and 0.59 of the distance from base and a streak of silvery white scales in basal half of anterior surface. Hindfemur with subapical silver spot on anterior surface at about 0.89 of the distance from base and a streak of silvery white scales in basal 3/5. First hindtarsal segment longer than hindtibia. Apical part of midtibia and basal part of first hindtarsus without flexible bristles. Claws paired and simple on all legs. Foreclaws slightly longer than midclaws. The latter slightly longer than the hindclaws. Wing. Veins dark scaled, 1A ending at level between m-cu and cubital fork. Cell  $R_2$  about 1.5 length of vein  $R_{2+3}$ . Upper calypter with 2-5 hairlike scales. Alula with 3-5 narrow scales. Halter. Head dark except for a patch of dull silvery scales on upper surface. Abdomen (Fig. 1). Tergum I dark scaled, laterotergite with small silvery scales. II-VII usually dark dorsally, with latero subapical silvery patches, sometimes V-VII with subapical median silvery scales or silver band, VIII dark. Sternites silvery, except for VIII which is black. Terminalia (Fig. 1). Post genital plate (PGP) somewhat attenuated towards apex and with relatively shallow apical emargination. IXth tergite (IX-T) with 4 setae on each side. Insula (INS) with about 10 peripheral setae on each side, without posterolateral setae.

MALE (Figs. 1, 2). Ornamentation of male is very similar to female. Wing about 2.3 mm. Head. Palpus about 0.14 of proboscis. All the first 4 flagellar segments of antenna with 3 or 4 verticillary stout setae. Legs. Claws paired

and simple on all legs. One of the foreclaws very large, curved, the other smaller and curved. Midclaws subequal, slightly curved and longer than hindclaws. Hindclaws relatively straight, subequal. Wing. Cell  $R_2$  about 1.3 length of vein  $R_{2+3}$ . Terminalia (Fig. 2). Dististyle (DIST) moderately long, swollen on the distal 1/3. Basal lobe (BL) of basistyle with 4 setae markedly stouter than the remainder. Paraproct (PR) with 4 teeth. Phallosome (PH) as figured. IXth tergite (IX-T) with the lobes closely approximated, each with 8-9 apical setae.

PUPA (Fig. 2). Chaetotaxy as figured in Fig. 2 and recorded in Table 1. Trumpet 3.5-5.0 as long as wide at the middle, dark, appearing cylindrical. Paddle 1.2-1.4 as long as their greatest breadth.

LARVA (Figs. 3, 4). Chaetotaxy as figured in Figs. 3, 4 and recorded in Table 2. Head. About 0.87-0.97 as long as broad. Maxilla (Mx) as figured in Fig. 4A, long and fang-like, but not developed beyond base of antenna, with 5-8 teeth in basal 3/4 of inner anterior part, 3 or 4 teeth in apical 1/4 of inner basal part and a conspicuous tooth on outer surface. Maxillary suture conspicuous but incomplete, not reaching posterior tentorial pit. Mandible (Mn) with 5 teeth as figured (Fig. 4C). Mentum (MP, Fig. 4B) triangular with 8-10 teeth on each side of the central tooth. Thorax. Setae 3-M and 4-M about same length, 6-M single, not spine-like and 7-M with 5-8 branches. Abdomen. Setae 2-I-VII multibranching, each on separate sclerotized plate. Comb with 4-10 large and moderately large teeth in a row on narrow, triangular, sclerotized comb plate and with 1 or 2 small teeth on ventrad of or sometimes out of the plate and very often absent. Comb scales (CS) with or without small fringe at base as figured (Fig. 3F). Seta 1-VIII with 12-19 branches usually on upper edge of sclerotized comb plate, sometimes apart from the plate laterally and with distinct basal tubercle. Edge of saddle with 5 or 6 large and 2-5 moderately large slender spines. Seta 1-X with 2-5 branches, 2-X with 5-8, 3-X with 2 or 3, 4-X with 4-9. Anal papillae cylindrical form, somewhat slender apex, 1.0-1.8 length of the saddle. Dorsal and ventral papillae about same length. Siphon. 3.6-4.2 length of saddle. Pecten with 4-6 and distributed over most of the length of the siphon. Pecten teeth (PT) as figured (Fig. 3E). Seta 1-S with 4-8 branches, 1a-S 10-12 in number with 2-4 branches, 2a-S 4-6 in number with 2-4 branches. Three small lateral setae of siphon each with 3-5 branches situated on apical part.

#### HOLOTYPE

Female (820120-a), with larval and pupal skins on slide, found as 4th stage larva in a bamboo internode at Iwahig, Palawan Is., Philippines, January 20, 1982 by I. Miyagi and M. Tsukamoto. Holotype will be deposited in the National Sciences Museum, Tokyo, Japan.

#### ALLOTYPE

Male (820120-b), with larval and pupal skins and genitalia on slides. Allotype will be deposited in the National Sciences Museum, Tokyo, Japan.

## PARATYPES

Ten males and 13 females with associated larval and pupal skins on slides and 4 males, 4 females and 10 larvae. Collections were made in bamboo internodes at the same locality as holotype and allotype in October 25, November 6 and 9, 1981, and January 20, August 8, 1982, by I. Miyagi, M. Tsukamoto, M. Mogi, M. Horio and T. Toma. Paratypes, 1 female and male with associated larval and pupal skins on slides, will be deposited in the National Science Museum, Tokyo and the U. S. National Museum, Washington, D. C. The remaining paratypes will be deposited in the laboratory of Medical Zoology, University of the Ryukyus, Okinawa, Japan.

## DISTRIBUTION

Iwahig Prison and Penal Farm, Palawan Island, the Philippines.

## BIOLOGY

The immature stages of *Tripteroides riverai* have been collected in water accumulating in erect bamboo internodes bored by certain beetles and also found in newly cut bamboo stumps. They are rarely associated with *Topomyia rausai* Miyagi and *Toxorhynchites* sp. The bionomics of the adults are unknown.

## TAXONOMIC DISCUSSION

The subgeneric classification of the genus *Tripteroides* is currently somewhat chaotic. In the current World Catalog (Knight and Stone 1977), the genus *Tripteroides* is divided into 3 subgenera, *Rachionotomyia* Theobald (syn. *Tricholeptomyia* Dyar and Shannon, *Polylepidomyia* Theobald), *Rachisoura* Theobald and *Tripteroides* Giles. The ornamented subgenus *Tripteroides* is large and complex. It is in a chaotic state and must await further comprehensive studies. On the other hand, a comprehensive study of the unornamented subgenera of *Tripteroides* has been made by Mattingly (1980, 1981). *Tripteroides mabinii*, which was placed in *Rachisoura* by Baisas and Ubaldo-Pagayon (1952), has been transferred from the subgenus *Rachisoura* to *Tripteroides* s. str. by Mattingly (1981). *Tripteroides mabinii* from the Philippines is distinctly different from the other members of the subgenus *Tripteroides* by its long larval maxillary spine. Mattingly divided the subgenus into two groups, the Nitidoventer Group and the Mabinii Group; the latter consisted of only one species.

The adult of *Tripteroides riverai* n. sp. somewhat resembles *Tripteroides mabinii* in having a border of bright peacock blue iridescent scales on the eye margins and flat scales with brilliant silver reflection present on the sternopleuron and the mesepimeron. Pupal seta 1-C is very long, stout and conspicuous. The larval maxilla has changed into a long conspicuous fang or horn. Maxillary suture is conspicuous but incomplete, not reaching the posterior tentorial pit. The new species is readily distinguished from *Tripteroides mabinii* by the following diagnostic characters: Adult. One of the male foreclaws is very

large, not toothed and the other is small. Male terminalia. IXth tergite has 8-9 apical setae and basal lobe of basistyle has 4 setae markedly stout. Pupa. Trumpet is not broad but cylindrical. Abdominal seta 5-VI is short about as long as 5-VII. Larva. Tubercles of pleural setae are not sharply pointed, mesothoracic seta 6-M is not spine-like but slender, abdominal seta 0-VI-VII is not vestigial but well developed, mentum is triangular in shape and maxilla fang-like with a conspicuous outer protrusion and many inner teeth, not beyond the base of antenna.

Thus, *Tripteroides riverai* is quite different from the known member of the Mabinii Group. At present, however, it should be treated as an additional new member of this group.

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Table 1. Chaetotaxy of the pupa of *Tripterooides (Tripterooides) riverai*

SETA NO.	CEPHALO-		ABDOMEN							
	THORAX	I	II	III	IV	V	VI	VII	VIII	
0	-	-	1	1	1	1	1	1	1	1
1	2-3	14-32	5-9	6-9	5-9	4-7	3-6	1-2	-	-
2	2-4	1-2	1-2	1-2	1-2	1-3	1-4	1-2	-	-
3	2-5	1-2	1-2	1	1-2	1-3	1	1	-	-
4	1-4	1-2	2-5	1-4	1-4	2-5	1-4	1-2	1	1
5	2-5	3-5	1-3	1-4	1	1	1	1	-	-
6	1	1-3	1-3	1-2	1-3	1-2	1-2	3-4	-	-
7	1-2	1-2	1-3	1-3	1-3	1-4	1-3	1	-	-
8	2-4	1	1-2	1-3	1-3	1-4	3-6	3-6	-	-
9	1-3	-	1	1	1	1	1	10-15	16-21	-
10	2-5	-	1-2	1-2	1-3	1-3	1	1	-	-
11	1-3	-	1-3	1-3	1-4	1-4	2-4	2-4	-	-
12	2-6	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	1	1

Chaetotaxy based on 20 pupal skins which have associated adult specimens.

Table 2. Chaetotaxy of the 4th instar larva of *Tripterooides (Tripterooides) riverai*

SETA NO.	HEAD	THORAX			ABDOMEN							
		PRO-	MESO-	META-	I	II	III	IV	V	VI	VII	VIII
0	1	8-17	-	-	-	-	1-6	2-7	4-7	4-8	7-11	-
1	1	7-13	5-10	6-9	4-6	4-6	4-6	5-8	5-8	6-11	12-17	12-19
2	1	1	1-3	2-5	4-5	4-5	5-6	5-7	4-7	5-8	8-12	1
3	1	5-8	1	1	1	1	1	1	1	1	1	3-7
4	1	8-14	1	3-4	2-4	1-4	1	1	2-4	1-3	1-2	1-2
5	1-2	1	1	4-11	4-6	2-5	2-6	2-7	3-7	4-7	7-12	3-6
6	1	1	1	1	1	1-2	1	1	1	1-2	5-6	
7	2-4	6-10	5-8	1-2	1-2	1-2	1	1	1	1	1	
8	1	14-23	6-10	6-11	-	1	1	1	2-5	5-12	11-13	
9	2-4	1	6-11	5-10	1-2	1-3	1-5	3-6	5-8	5-7	6-10	1-S 4-8
10	1	3-6	1	1	1	1	1-6	1-4	2-5	1	5-6	1-X 2-5
11	2-3	1-3	1-3	1-2	4-8	5-8	5-7	5-7	5-9	9-12	11-15	2-X 5-10
12	1-2	1	1	1	-	1-2	1	1	1	1-2	1	3-X 2-3
13	1	9-13	8-17	6-8	5-8	5-8	6-8	6-9	6-10	7-11	10-12	4-X 4-9
14	1	7-12	6-14	-	-	-	-	-	-	-	-	ANTENNA 1-A
15	3-5	-	-	-	-	-	-	-	-	-	-	1

Chaetotaxy based on 10 whole larvae and 15 larval skins which have associated adult specimens.



## EXPLANATION OF FIGURES

Fig. 1. Adult of *Tripteroides riverai* (A-F)

- A. Lateral aspect of female abdomen
- B. Foreclaws, midclaws and hindclaws
- C. Female cercus (CERC) and postgenital plate (PGP)
- D. Female IXth tergite (IX-T)
- E. Female insula (INS)
- F. Spermathecae

Fig. 2. Pupa of *Tripteroides riverai* (A-B) and male terminalia (C)

- A. Cephalothorax (C)
- B. Abdomen
- C. Dististyle (DIST), IX-tergum (IX-T), phallosome (PH), basal lobe of basistyle (BL) and paraproct (PR)

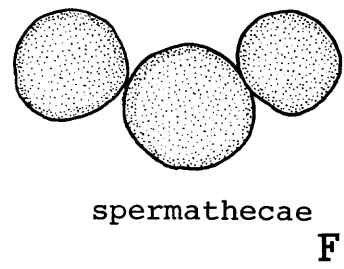
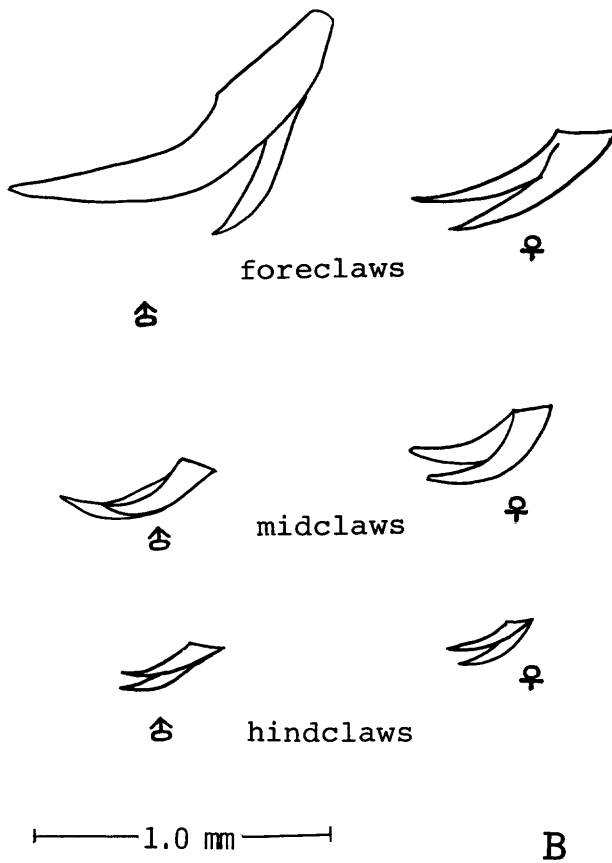
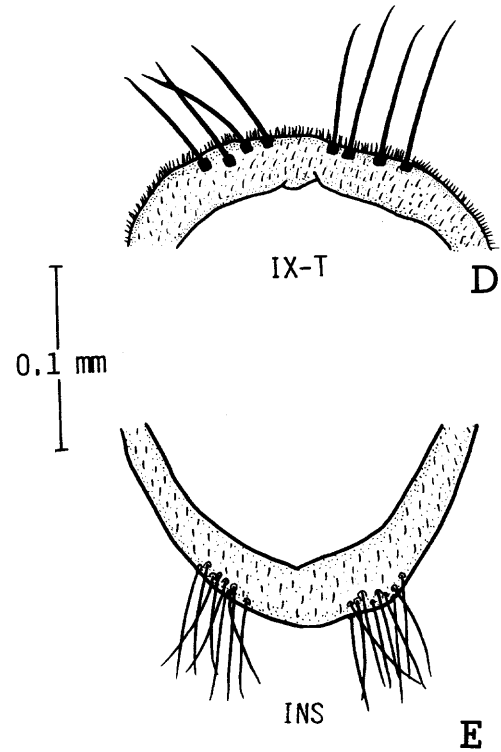
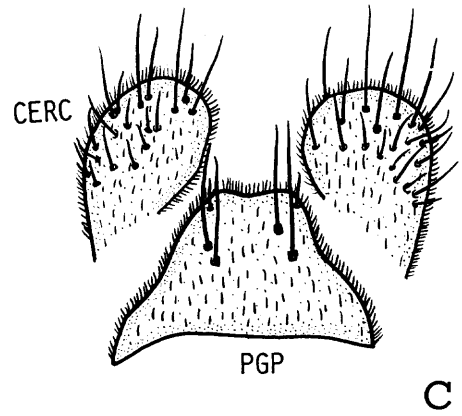
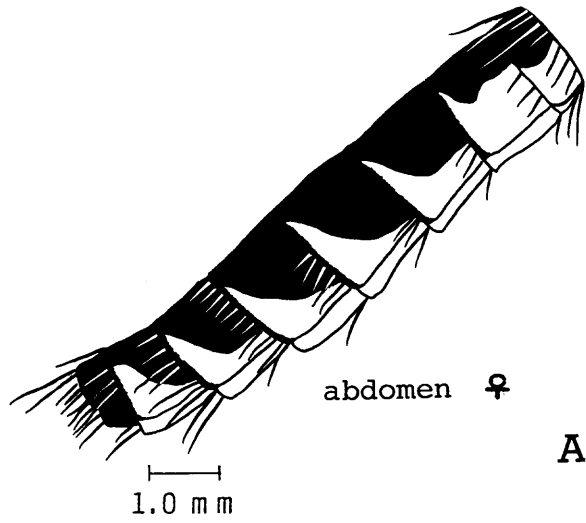
Fig. 3. Larva of *Tripteroides riverai* (A-E)

- A. Thorax and abdomen
- B. Antenna
- C. Head
- D. Terminal segments
- E. Comb scales (CS) and pecten teeth (PT)

Fig. 4. Larva of *Tripteroides riverai* (A-C)

- A. Maxilla (Mx), dorsal and ventral aspects
- B. Mental plate (MP)
- C. Mandible (Mn)

Fig. 1



TAKAKO

Fig. 2

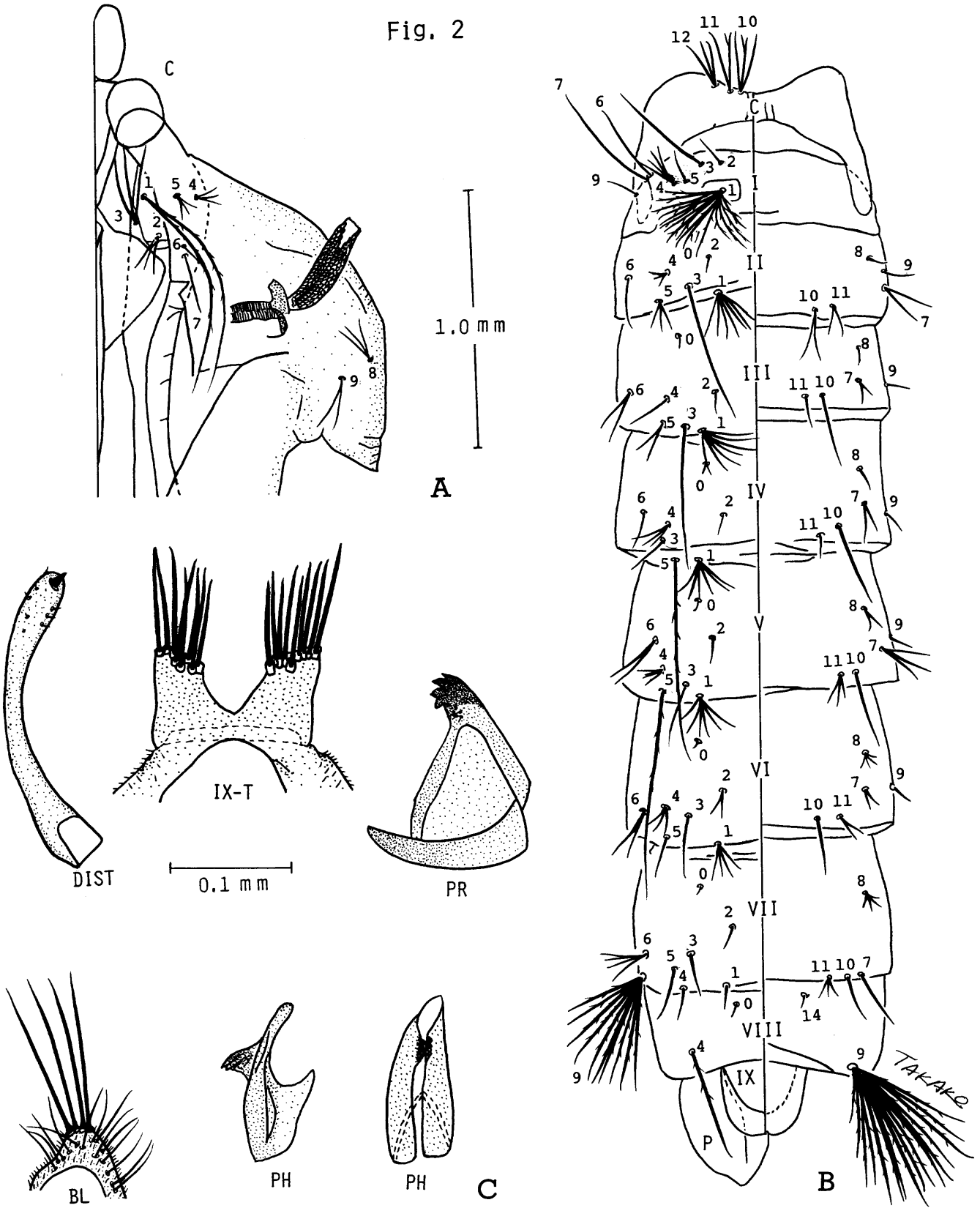


Fig. 3

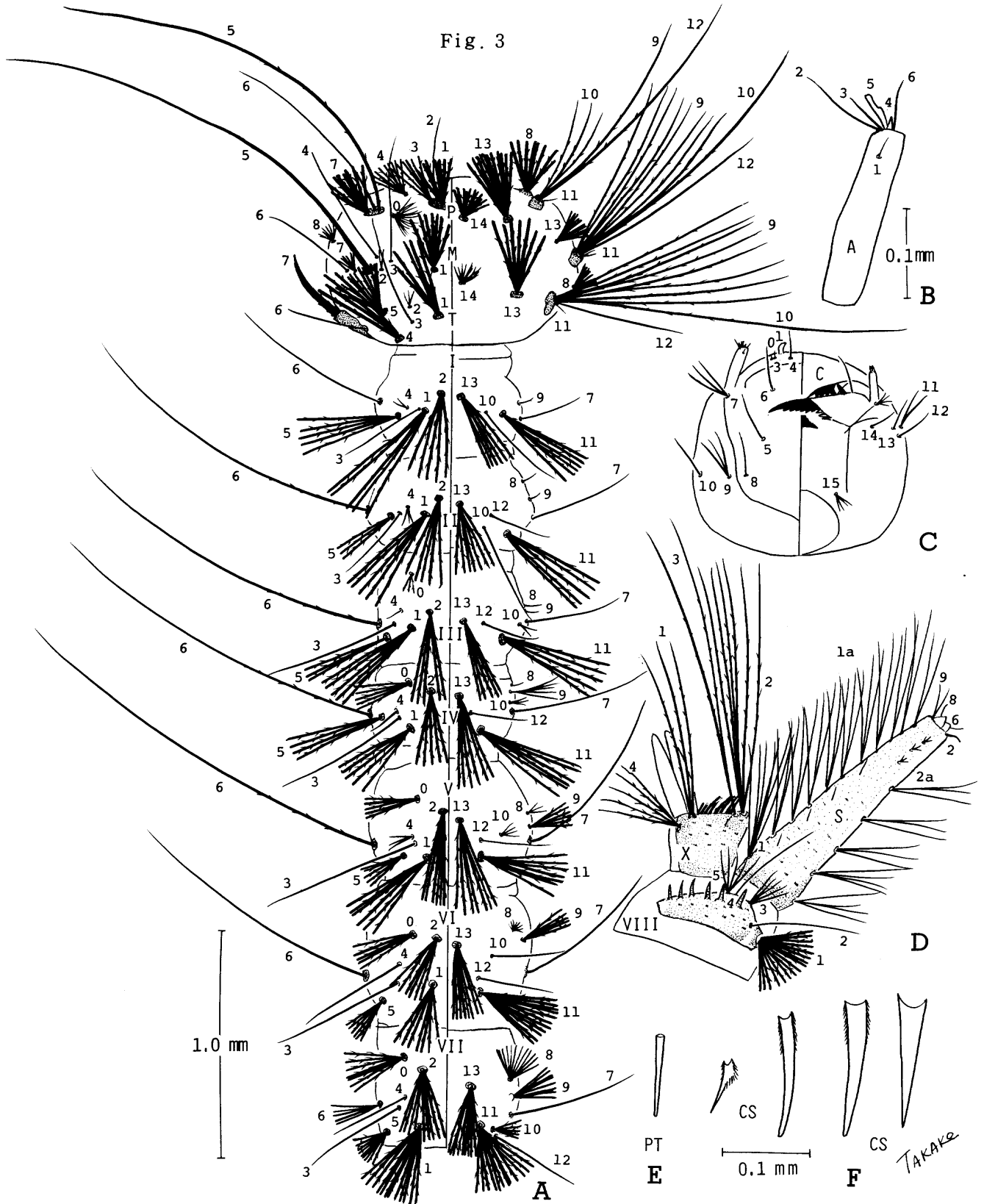


Fig. 4

