

A New Species of *Toxorhynchites* from Bangladesh
(Diptera: Culicidae)¹

Ronald Rosenberg² and Neal L. Evenhuis^{3, 4}

ABSTRACT. The adult male, pupa and larva of *Toxorhynchites* (*Toxorhynchites*) *bengalensis* n. sp. are described and illustrated. The unique holotype male was collected in Sylhet District, Bangladesh.

INTRODUCTION

We describe here a new species of *Toxorhynchites*, to be included in the forthcoming revision of the *Toxorhynchites magnificus* group (Evenhuis and Steffan, in prep.). The format of the description is based on Steffan and Evenhuis (1982). Terminology follows Harbach and Knight (1980), except for the orientation and relationship of certain structures, when that of McAlpine et al. (1981) is used. The form for the chaetotaxy tables is slightly modified from Tanaka et al. (1979). The type is deposited in the U. S. National Museum of Natural History, Washington, D. C.

Toxorhynchites (*Toxorhynchites*) *bengalensis* Rosenberg and Evenhuis, n. sp.

MALE. *Wing*: Length 7.30 mm (1 specimen). *Head*: Vertex, viewed dorsally, with metallic aeneous spatulate scales appearing blue to blue-green from the front; ocular line yellowish to golden scaled; forked scales dark; ocular setae (4 vertical pairs plus 1 lateral pair) dark brown, all subequal in length. Proboscis basally and maxillary palpus (MP1p) purple scaled with magenta highlights, proboscis brown scaled apically; length of MP1p₂₊₃ 2.17 mm, MP1p₄ 1.27 mm, MP1p₅ 2.13 mm. *Antenna*: Pedicel (Pe) pubescent; flagellomere 1 (Flm₁) 0.20 mm with scales absent, numerous short brown setae dorsally and medially; Flm₂ 0.10 mm; flagellar whorls (FW₅₋₁₂) dense with 20+ setae. Clypeus silvery pollinose.

¹Contribution from the project "Biosystematics of *Toxorhynchites*" supported by the National Institutes of Health Grant AI-12168-07 to W. A. Steffan.

²Department of Entomology, U. S. Army Medical Component, AFRIMS, 315/6 Rajvithi Rd, Bangkok, Thailand.

³Department of Entomology, Bishop Museum, P. O. Box 19000-A, Honolulu, HI 96817.

⁴From whom reprints are available.

Thorax: Scutum with brownish fusiform scales appearing aeneous when viewed from above; anterior promontory (AnP) with blue fusiform scales in 3 patches, one medial and one each side near AnP; supraalar area with blue-green spatulate scales extending forward to above paratergite. Scutellum (Stm) with aeneous spatulate scales, scutellar setae dark brown. Paratergite bare. Anteprenotum (Ap) with blue-green to blue spatulate scales, scales along ventral edge whitish. Postpronotum (Ppn) with greenish to blue-green spatulate scales. Proepisternum (Ps), mesokatepisternum (Mks), and mesanepimeron (Mam) with dense silvery white spatulate scales; anteroventral portion of Mks and mesomeron (Msm) with aculeae only; posteroventral angle of Mam bare. Pleural setae white; 4 lateral Mam setae; scales absent on Mts below base of halter.

Legs: Coxae and trochanters with dense silvery white spatulate scales and numerous fine white hairs; coxa I with 3 stout dark brown lateral setae and numerous fine yellowish setae; coxa II with 4-6 stout yellow lateral setae; coxa III with 1 stout brown lateral seta, numerous longer yellow medial setae. Femora with metallic purple scales dorsally, with yellow scales ventrally, these scales becoming progressively broader on mid and hind femora. Tibiae with purple scales; TiII with yellowish scales on basal 3/4; TiIII with patch of white scales on medial 1/4. Tarsomeres (Ta) with purple scales except for white banding on basal 1/2 of TaII₁, TaII₂ and TaIII₂, and basal 1/3 of TaIII₁.

Wing: Costa and vein R₁ with aeneous scales basally, other wing veins brown-scaled; radiomedial (rm) crossvein with longitudinal portion 2.5x as long as transverse portion; M₃₊₄ oblique, joining M₁₊₂ slightly distal of rm.
Halter: Pale; pedicel yellow; capitellum with dark brown scales.

Abdomen: Laterotergite with silvery white spatulate scales; Tergum I with blue-green and aeneous scales dorsally, blue-green and pale yellow scales laterally, fine white setae anteriorly, dorsolaterally and laterally, posterior margin with single row of amber setae. Terga II-VII with dark spatulate scales appearing purplish from above. Terga II-VII with lateral patch of white and blue-green scales; usually single row of lateral white setae with denser white setal patch at each posterolateral corner, becoming progressively larger on each posterior tergum. Lateral setae on VI-VII-Te modified into a definite caudal tuft. VI-Te with long white and dark brown tufts of setae, VII-VIII-Te tufts all dark brown; II-III, V-VI-S with silvery white scales, basal 1/6 with purple scales; IV, VII-S all purple-scaled; VIII-S blue-scaled dark brown seta along posterior margins of II-VII-S.

Genitalia (Fig. 1). Length: Gonocoxite (Gc) 0.67 mm; gonostylus (Gs) 0.64 mm, gonostylar claw (GC) 0.07 mm. IX-Te with tergal lobe (IX-TL) squared, with 9 simple setae on dorsolateral and lateral margins. Basal medial lobe (BML) with 2 stout spical setae, length of longest 0.34 mm, remainder of medial surface of BML with numerous short simple seta 0.30 length of longest apical seta. Gs with 2 subapical acute gonostylar claws; medial margin of Gs with sparse microsetae restricted to apical 1/3. Proctiger with paired paraproct, each sclerotized apically, forming a simple spur, with 6 subapical cercal setae. Aedeagus with narrow dorsal aedeagal bridge; basal piece and paramere as illustrated.

PUPA (Fig. 2, Table 1), (1 specimen). *Pigmentation*: Generally light brown overall; trumpet dark brown, light brown at tip; abdomen generally uniformly light brown. Paddle pale yellow, darker around edges, with dark subbasal line of mottling, midrib brown basally, evanescent apically. *Measurements*: Trumpet length 1.12 mm, width 0.32 mm; trumpet index 3.50; pinna 0.18 of trumpet length. Length of abdomen 7.87 mm. Paddle length 2.05 mm, width 1.39; paddle index 1.47; margin of paddle at apex of midrib slightly bulging, medial section of paddle slightly longer than lateral section, lateral section with small apical lobe; paddle margin spicules sparse, minute, densest on apical lobe. Length of setae: 6-IV 0.36 mm, 6-VI 1.78 mm, 6-VII 0.24 mm, 5-VII 0.36 mm. *Chaetotaxy*: As illustrated (Fig. 2), range of variation shown in Table 1. Seta 13-CT absent; seta 1-I fan shaped, without barbs; seta 5-I multi-branched; seta 8-VII 8-branched; seta 1-IX absent; setae 6-I-IV, VII very short, length never exceeding 0.50 mm; setae 6-V-VI short, but generally 3x length of seta 6 on other segments. Paddle subrhomboid in shape, medial section slightly longer than lateral section, rounded apically, lateral section with small rounded apical lobe directed posterolaterally; Sp sparse, minute, restricted for the most part to posterior margin and apical lobe, longest on latter.

LARVA (Table 2), (1 specimen). *Pigmentation*: Head, siphon and saddle uniformly light brown; spiracular apodeme tapering sharply toward darker brown apex. *Measurements*: Head length 1.22 mm; dorsal apodeme length 0.94 mm, width 0.99 mm; antenna length 0.40 mm; siphon length 1.06 mm, width 0.59 mm; spiracular apodeme length 0.33 mm; saddle length 0.63 mm; saddle-siphon index 1.68. *Chaetotaxy*: Range of variation shown in Table 2. Seta 2-VII, 2-branched.

TYPE DATA. Holotype male (165-34-L) with associated pupal and larval skins on separate slide, BANGLADESH, Sylhet District, Chunaraghat, Chaklapunji Tea Estate, (91°25'N 24°0'E), 14.II.1975, collected from either bamboo stumps or tree holes 1-2 m above ground, heavy shade, 100 m elev, R. Rosenberg and N. P. Maheswary. A detailed description of the site is in Rosenberg and Maheswary (1982).

DISTRIBUTION. Known only from the type locality in Bangladesh.

TAXONOMIC DISCUSSION. *Tx. (Tox.) bengalensis*, n. sp. belongs to the *magnificus* species group (Steffan and Evenhuis, in press). The adult can be separated from *Tx. (Tox.) funestus* (Leicester) by the absence of stout dark brown lateral setae on the midcoxa and the basal spines on MxPlp₄ being shorter than those on MxPlp₂₋₃; from *magnificus*, this species differs predominantly in the absence of white scales at the apex of MxPlp₂₋₃. The pupa is most similar to *funestus*, but differs primarily in seta 5-I 10 or more branched, seta 1-IX absent, seta 3-II long and weakly barbed and seta 8-VII 8-branched. The larva differs from *funestus* in having the siphon light brown; from *magnificus* it differs by the head capsule having the X-shaped medial labral apodeme short (this apodeme longer in *magnificus*).

BIONOMICS. The 4th instar larva of *bengalensis* was isolated from a pooled collection made from bamboo stumps and tree holes 1-2 m above ground in patches of secondary forest situated in and around hills cultivated in tea. At least 70% of the water collected came from bamboo stumps, which are known to be the primary immature habitat of *Tx. magnificus* and *funestus*. Otherwise, the biology of *bengalensis* is unknown.

ACKNOWLEDGMENTS

We would like to thank Mr. Arthur Kodani for executing the illustrations, Ms. Jane Taylor for typing the manuscript, and N. P. Maheswary for field support.

LITERATURE CITED

- Harbach, R. E. and K. L. Knight. 1980. Taxonomists' glossary of mosquito anatomy. Plexus Publ., Marlton, New Jersey. xi + 415 pp.
- McAlpine, J. F. 1981. Morphology and terminology - adults, pp. 9-63. *In*: McAlpine, J. F. et al., Manual of Nearctic Diptera. Volume 1 Biosystematics Research Institute, Ottawa. vi + 674 pp.
- Rosenberg, R. and N. P. Maheswary. 1982. Forest malaria in Bangladesh. I. Parasitology. *Am. J. Trop. Med. Hyg.* 31:175-182.
- Steffan, W. A. and N. L. Evenhuis. 1982. A new species of *Toxorhynchites* from Papua New Guinea (Diptera: Culicidae). *Mosq. Syst.* 14:1-13.
- Tanaka, K., K. Mizusawa and E. S. Saugstad. 1979. A revision of the adult and larval mosquitoes of Japan (including the Ryukyu Archipelago and the Ogasawara Islands) and Korea (Diptera: Culicidae). *Contr. Am. Entomol. Inst.* 16:i-vii + 987 pp.

TABLE 1. Chaetotaxy of the Pupa of *Toxorhynchites (Toxorhynchites) bengalensis*, n. sp.

SETA NO.	ABDOMEN										
	CEPHALO-THORAX	I	II	III	IV	V	VI	VII	VIII	IX	X
0	-	-	1	1	1	0-1	0-1	1	1	-	-
1	1(L,b)	m(f)	m	1(L,b)	1(L,b)	1	1	3-4	-	-	5-7
2	-	1	1	1	1	1	1	1	-	-	-
3	-	1(L)	1(L,b)	1(L)	4-8	1	1	1-2	-	-	-
4	1	5	7	4	5	7	1	1	1	-	-
5	3	m	1(L)	1(L,b)	1(L,b)	1(L,b)	1(L,b)	1	-	-	-
6	3	1	3	1	1	1(L,b)	1(L,b)	6	-	-	-
7	3	3-4	3	4-6	6	5	2-4	2	-	-	-
8	1	-	1	1	1	1	5	8	-	-	-
9	1	1	1	1	1	1	1	1	1(b)	-	-
10	1-2	-	1	2-5	2	1	1	1	-	-	-
11	2	-	-	1	1	1	1	1	-	-	-
12	2-3	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	1	-	-	-

B = barbed; b = weakly barbed; d = dendritic; L = long; m = multiple (more than 10 branches); sf = stiff; f = fanlike. Specimens examined: 1

TABLE 2. Chaetotaxy of the 4th Instar Larva of *Toxorhynchites (Toxorhynchites) bengalensis*, n. sp.

SETA NO.	HEAD			THORAX						ABDOMEN									
	ANTENNA	PRO-	MESO-	META-	I	II	III	IV	V	VI	VII	VIII							
0	1	-	m	-	-	1	1	1	1	1	1	1							
1	1	x	1	1(L)	1(sf,B)	1(sf,B)	1(b)	1(B)	1(B)	4	x	x							
2	-	x	1-2	3	2-4	1-2	1-2	1	2	1	2	x							
3	1	x	5-6	m	2(L,b)	2(L,b)	2(L,b)	2(L,b)	1(L,b)	1(sf,B)	1(B)	5							
4	1	x	2	m	2(b)	2(L,b)	1(L,b)	x	2(b)	x	x	1(sf,B)							
5	m	1	1(sf,B)	m	3	2	3	2	3	x	x	1(sf,B)							
6	1	1	3-4	1(sf,B)	2(L,b)	2(L,b)	2(L,b)	2(L,b)	2(L,b)	1(L,b)	x	1-S							
7	1-2	-	1(sf,B)	2(sf,B)	2(L,b)	2(L,b)	2-3(L,b)	2(L,b)	2(L,b)	1(L,b)	1(L,b)	10(sf,B)							
8	1	-	m	m	-	3	1	1	1	x	x	1-X							
9	4	-	1(sf,B)	1(sf,B)	1	1	1	1	1	x	1	1(sf,B)							
10	m(d)	-	1(L,b)	1(L,b)	1	2(L,b)	2(L,b)	1(B)	1(B)	1	x	2-X							
11	7	-	1	1	2(L,b)	2(L,b)	2(L,b)	x	3(b)	1(L)	x	x							
12	m	-	1(L)	1(L)	m	2-3	4	3	4	1	x	3-X							
13	x	-	2-3	m	-	-	-	-	-	-	-	x							
14	1	-	-	-	-	-	-	-	-	-	-	4-X							
15	1	-	-	-	-	-	-	-	-	-	-	x							
6-Mx	1	-	-	-	-	-	-	-	-	-	-	-							

B = barbed; b = weakly barbed; d = dendritic; L = long; m = multiple (more than 10 branches); sf = stiff; x = missing. Specimens examined: 1

bengalensis

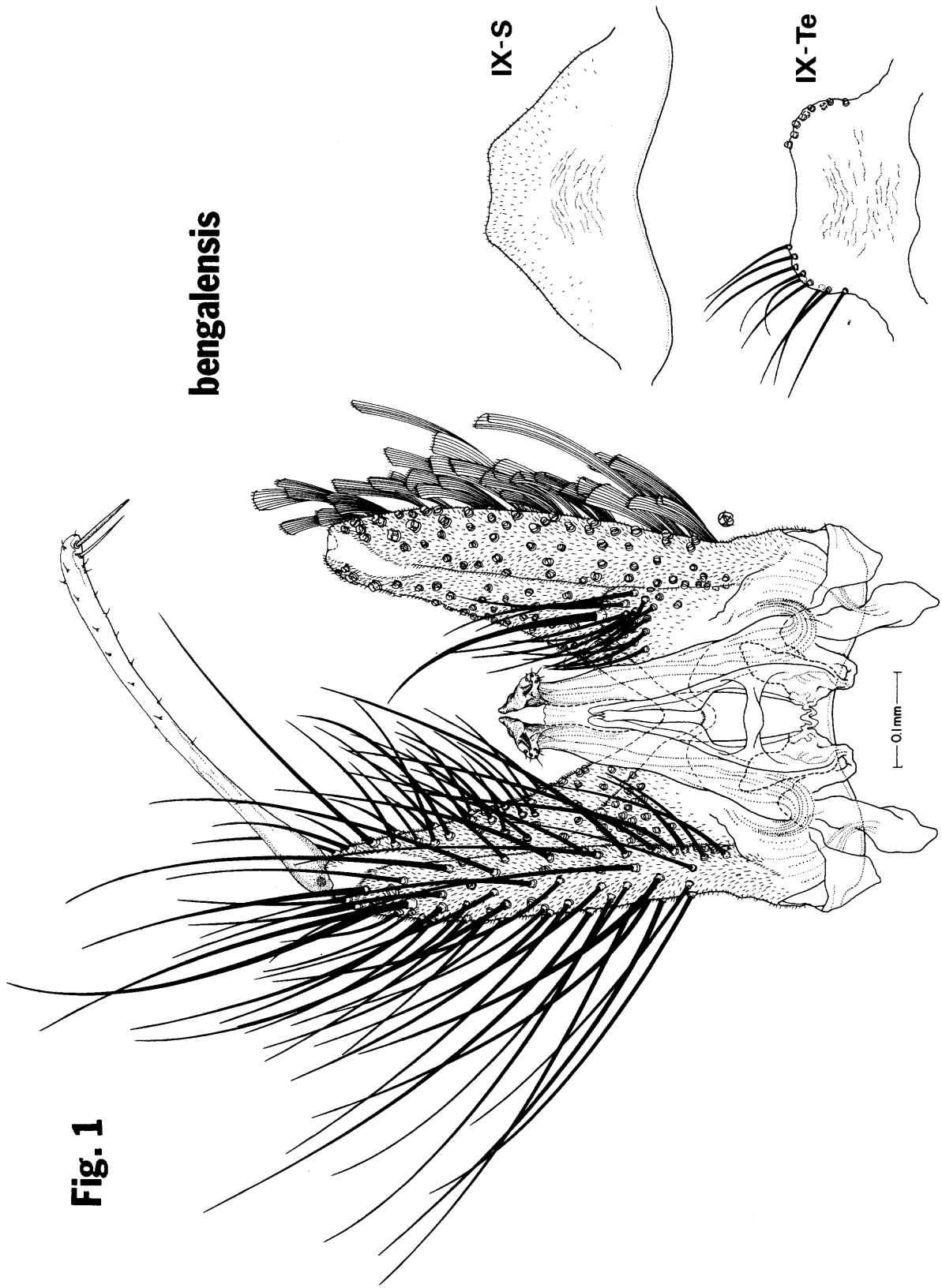


Fig. 1

Fig. 2

