

Notes on African *Aedes*, subgenus *Mucidus*
(Diptera: Culicidae)¹

by

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Introduced by Botha de Meillon

During a study of the Southeast Asian members of the subgenus *Mucidus*,³ Ethiopian material was examined to confirm relationships with the Oriental species as well as to solidify the taxonomy of the group as a whole. The Ethiopian species are perhaps the least known taxonomically of the three faunistic groups (Ethiopian, Oriental, and Australasian), although much has been published on their occurrence and biology. Six species of *Mucidus* have been recorded from Africa and Mauritius.

This paper deals with the nomenclature of the Ethiopian *Aedes* (*Mucidus*) *sudanensis* (Theobald), and the immature forms and terminalia, hitherto undescribed, of *A. (M.) tonkingi* Gebert.

Aedes (Mucidus) sudanensis (Theobald), fig. 2

Mucidus sudanensis Theobald 1908, Rep. Wellcome trop. Res. Lab. 3:252 (♀*).

Mucidus scatophagoides Theobald, Edwards 1911, *Bull. ent. Res.* 2:246.

Aedes (Mucidus) scatophagoides (Theobald), Edwards 1932, in Wytzman, *Genera Insect.* fasc. 194: 133, and 1941, Mosq. Ethiopian Region, 3: 110 (♂*, ♀); Harris 1942, *Bull. ent. Res.* 33(3): 182; Knight 1947, *J. Wash. Acad. Sci.* 37: 319 (in part); Gebert 1948, *Entomologist* 81: 96; Hopkins 1952, Mosq. Ethiopian Region, 1: 121 (L*); van Someren et al. 1955, *Bull. ent. Res.* 46(3): 471; Mattingly 1961, *Culic. Mosq. Indomalayan Area*, V: 18 (in part); Hamon et al. 1966, *Ann. Soc. ent. France* 2(2): 373.

FEMALE. Differs from *scatophagoides* as follows: proboscis without white scales, entirely yellow with scales of basal 0.5 partially to mostly brown-tipped; palpus with first segment mostly brown-scaled, second all brown-scaled or with a few scattered white scales, third mostly brown-scaled, fourth all white; postgenital plate (fig. 2) slightly rounded to a truncate apex, not noticeably emarginate; cerci with short stout hairs on the basal half, becoming longer and thinner apically.

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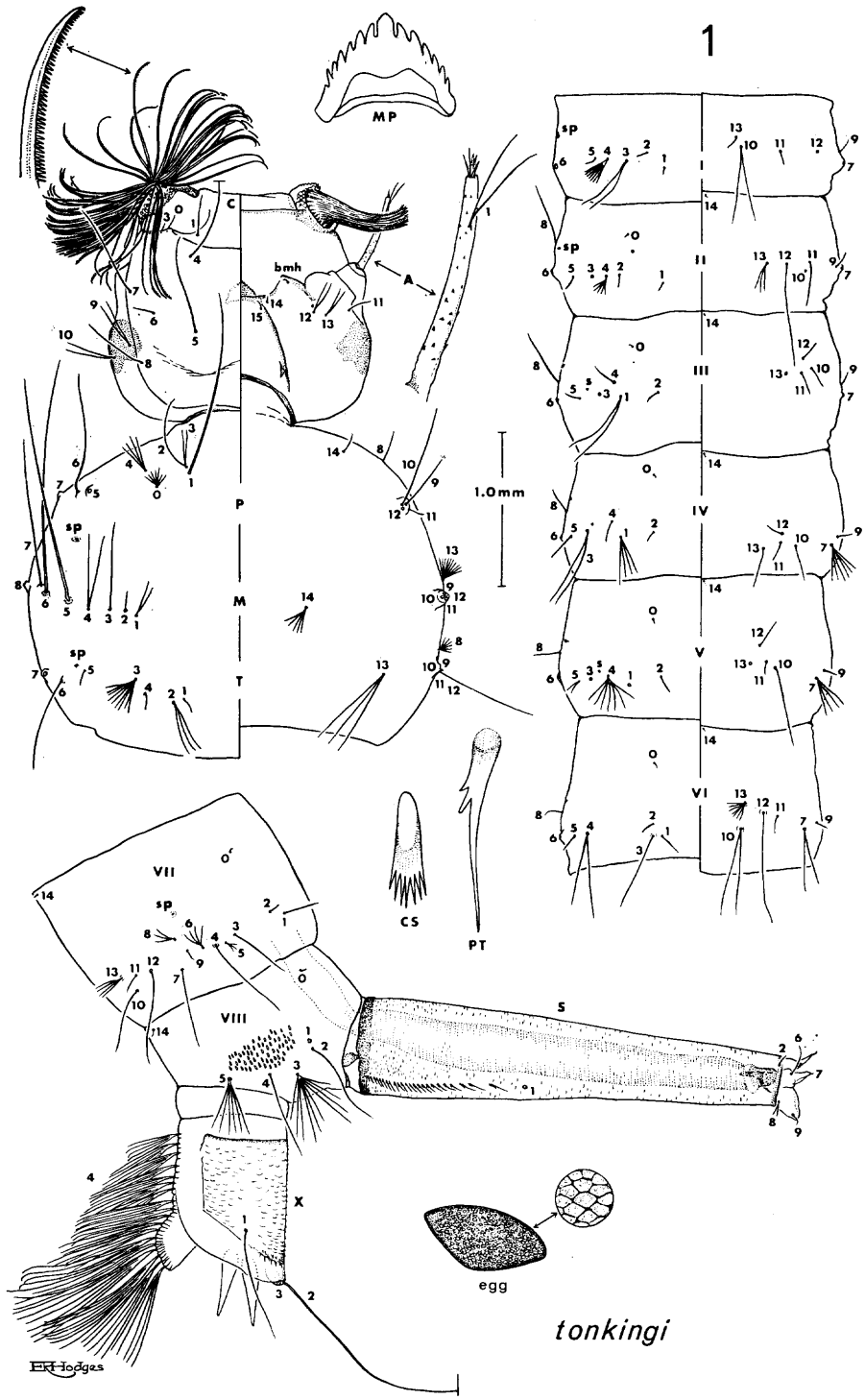


Fig. 1. *Aedes (Mucidus) tonkingi*, larva and egg.

MALE. Similar in general habitus to female; proboscis all yellow-scaled; palpus as in *scatophagoides*.

PUPA. One associated pupal skin was examined and appears to be identical with the Oriental *scatophagoides*. Edwards (1941:384) noticed a difference between the African and Oriental pupae (then still considered to be the same species). The character used was the number of branches in abdominal hair I-II, single in African specimens, double in Oriental specimens. However, the number of branches of this hair has been found to be so variable in the Oriental *scatophagoides* that the character is of no use.

LARVA. Two cast skins were examined and appear to be identical to *scatophagoides* larvae except for the number and size of the comb scales, which are fewer and larger in *sudanensis*. Hopkins (1952:121) cited 30-40 comb scales as the average for *sudanensis*. The mature *scatophagoides* larvae I have examined have 48-55 scales. When sufficient immature material becomes available these differences may be of some value in separating the two forms.

DISTRIBUTION (fig. 4). Material on hand plus specimens recorded in the literature include the following countries: DEMOCRATIC REPUBLIC OF THE CONGO, GHANA, KENYA, MALAWI, MALI, MAURITANIA, MOZAMBIQUE, NIGERIA, SOUTH AFRICA, RHODESIA, SENEGAL, SOMALIA, SUDAN, TANZANIA, UPPER VOLTA, and ZAMBIA. These records give an indication of two separate population groups (see fig. 4), but a possible lack of concentrated collecting in the central region of Africa, between the two groups, may account for their separation. The closely related *scatophagoides* ranges from WEST PAKISTAN east to south-eastern CHINA.

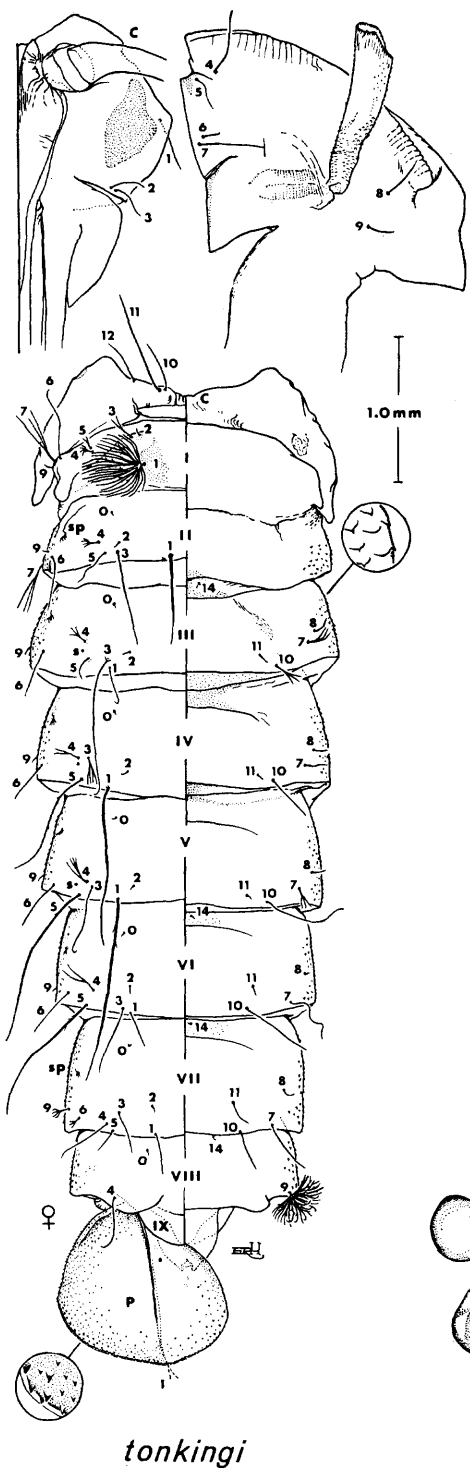
TAXONOMIC DISCUSSION. Although synonymized by Edwards in 1911, this species is quite distinct. It differs from its Oriental counterpart, *scatophagoides*, in the lack of white scales or a median white band on the proboscis. Also, the scaling of the basal palpal segments is usually much darker in the African species. Knight (1947:319) cited the possible difference in the distribution of the setae on the inner tergal surface of the male basimere. The small number of male specimens available (2) has not allowed an adequate study of the terminalia. Slide preparations have shown a small difference in the shape of the apex of the female postgenital plate as well as a slight difference in the length and thickness of the hairs on the cerci. Female *scatophagoides* (fig. 2) have the postgenital plate slightly emarginate at its apex. Also the hairs of the cerci are longer and thinner than those of *sudanensis*.

TYPE DATA. Lectotype female, SUDAN, Upper White Nile, 1909 (H. King). Selected 29.x.1969 by P. F. Mattingly. Type in the British Museum.

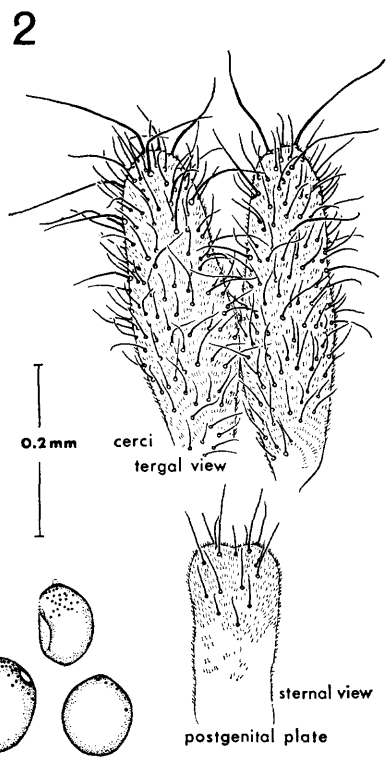
BIOLOGY. Hamon *et al.* (1966:373) record adults biting man at sundown. Hopkins (1952:121) lists mudpools and marshy ground for breeding sites. van Someren *et al.* (1955:471) record drains, swamps, pools, and occasionally streams and wells for breeding sites. Hopkins (*loc. cit.*) records *Aedes* (*Ochlerotatus* and *Neomelanicion*) as prey.

Aedes (*Mucidus*) *tonkingi* Gebert, figs. 1, 2, 3

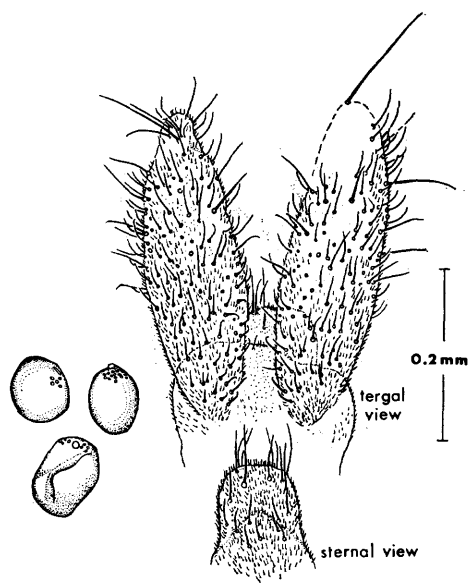
Aedes (**Mucidus**) **tonkingi** Gebert 1948, *Entomologist* **81**:96 (♂, ♀); Muspratt 1959, *J. ent. Soc. Sth. Afr.* **22**(1): 64.



tonkingi



scatophagoides



sudanensis

Fig. 2. *Aedes (Mucidus) tonkingi*, pupa; *A. (M.) sudanensis*, postgenital plate (♀); *A. (M.) scatophagoides*, postgenital plate (♀).

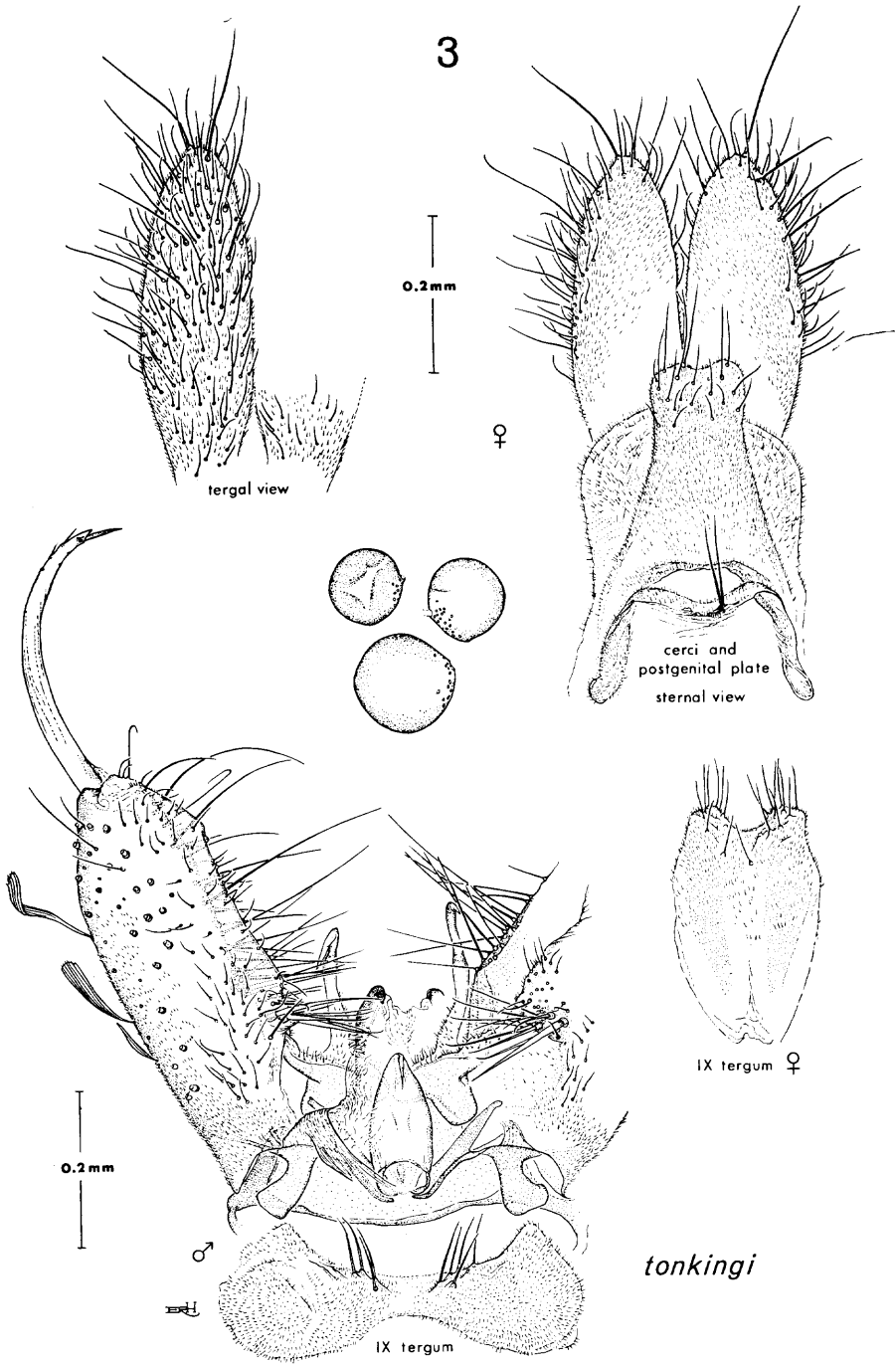


Fig. 3. *Aedes (Mucidus) tonkingi*, terminalia.

Aedes tonkingi is the most restricted in distribution of all the *Mucidus*, being found only on the Island of Mauritius. The adult habitus and male terminalia show some similarities to *scatophagoides*, but examination of its immatures shows morphological similarities to other African species as well. Since its description in 1948, little or no information has been recorded on its biology or immature forms. It is apparently rare on Mauritius (Gebert 1948:96).

FEMALE TERMINALIA (fig. 3). Typical for the subgenus; postgenital plate slightly expanded at apex with the apical sides rounded and emarginate at the middle; spermathecae 3, 1 larger than the others; cerci with the mesal ventral surface without large hairs; dorsal surface densely hairy.

MALE TERMINALIA (fig. 3). Typical for the subgenus; basal lobe of basistyle with 3-5 stout setae and numerous thin hairs; stem of claspette with a slight constriction at or beyond the middle, filament generally narrow with outer region expanded; phallosome parallel sided basally, becoming slightly acute at apex, apex with a raised ridge on the dorsal, medial line; ninth tergum with 4-6 hairs on each side of the middle.



Fig. 4. African distribution of *Aedes (Mucidus) sudanensis*.

PUPA (fig. 2). Trumpets typical for members of this group (Group A *Mucidus* of Edwards 1932), gradually expanded with an index of approximately 4 (length to greatest width). Cephalothorax with hairs 4-7, 10-12 single. Abdominal hair 1-I multiple, somewhat stellate with 3-4 main basal branches, 2-I single, 3-I bifid or trifid, 4, 5-I multiple at tip, 6-I and 7-I single or multiple at tip; 1-II single or bifid at half; hairs 1, 5-IV, V long and single; hair 9-VIII of more than 12 branches and with noticeable secondary branching; paddle densely spiculate, wider at apical 0.3 than long, hair 1-P double.

LARVA (fig. 1). Antenna spiculate, tuft at apical 0.25 single or double; mandibles and mental plate typical for the group; hairs 1, 3-7-C single, 8-10-C single or double, 12, 13-C double, 14, 15-C single; comb scales of segment VIII 60 to 65 in number and fringed apically; siphon elongate, 4 times as long as basal width; siphonal tuft not seen; pecten teeth 20-24 and moderate to elongate in length with up to 3 lateral teeth, usually 2; ventral brush with 31-34 tufts each with 5-8 branches; anal papillae short, 0.5-0.75 the length of the saddle.

EGG (fig. 1). The eggs of this species are vaguely triangular in shape, being slightly less than 1.0 mm in length and approximately 0.5 as wide as long, the widest area being at the middle. The pattern of the chorion can best be described as a mosaic of various sized penta-, hexa- and heptagons. The eggs from which this description was made were laid 21 days after a female took a meal of bird blood.

TYPE DATA. Holotype male, allotype female and paratypes in the Central Laboratory, Redent, Mauritius. Type locality: Black River District, MAURITIUS.

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REFERENCES

- EDWARDS, F. W. 1911. The African species of *Culex* and allied genera. *Bull. ent. Res.* **2**: 241-268.
 ———— 1932. *Genera Insectorum*. Diptera. Fam. Culicidae. Fasc. 194. 258 pp. Belgium.
 ———— 1941. Mosquitoes of the Ethiopian Region. III. Culicine adults and pupae. British Museum (Nat. Hist.), London. 499 pp.
 GEBERT, S. 1948. Notes on a new species of *Aedes*, sub-genus *Mucidus* (Diptera: Culicidae) found in Mauritius. *Entomologist* **81**: 96-99.
 HAMON, J., M. MAFFI, P. GRENIER, C. S. OUEDRAOGO & D. DJIME. 1966. Notes sur les Moustiques de la République Islamique de Mauritanie (Diptera: Culicidae). *Ann. Soc. ent. France* (n.s.) **2**(2): 371-383.
 HARRIS, V. W. 1942. Notes on Culicine mosquitoes in Tanganyika Territory. *Bull. ent. Res.* **33**(3): 181-193.

- HOPKINS, G. H. E. 1952. Mosquitoes of the Ethiopian Region. I. Larval bionomics of mosquitoes and taxonomy of culicine larvae. 2nd. ed. with notes and addenda by P. F. Mattingly. London. 355 pp.
- KNIGHT, K. L. 1947. The *Aedes* (*Mucidus*) mosquitoes of the Pacific. (Diptera: Culicidae). *J. Wash. Acad. Sci.* **37**: 315-325.
- MATTINGLY, P. F. 1961. The culicine mosquitoes of the Indomalayan area. Part V. Genus *Aedes* Meigen, subgenus *Mucidus* Theobald, *Ochlerotatus* Lynch Arribalzaga and *Neomelanicionion* Newstead. British Museum (Nat. Hist.), London. 62 pp.
- MUSPRATT, J. 1959. Research on South African Culicini (Diptera: Culicidae). V. A new species of and notes on the subgenus *Mucidus*, with other observations and records. *J. ent. Soc. Sth. Afr.* **22** (1): 64-77.
- THEOBALD, F. V. 1908. New mosquitoes from the Sudan and lists and synoptic tables of all the known Sudanese species. *Rep. Wellcome trop. Res. Lab.* **3**: 249-267.
- VAN SOMEREN, E. C. C., C. TEESDALE & M. FURLONG. 1955. The mosquitoes of the Kenya coast; records of occurrence, behaviour and habitat. *Bull. ent. Res.* **46** (3): 463-493.

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