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DESCRIPTIONS OF *ZAVORTINKIUS*, A NEW SUBGENUS
OF *AEDE*S, AND THE ELEVEN INCLUDED SPECIES FROM
THE AFROTROPICAL REGION (DIPTERA: CULICIDAE)

by

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Abstract. A new subgenus, *Zavortinkius*, in genus *Aedes* is described and includes 11 species of which four are new (*Ae. brunhesi*, *Ae. geoffroyi*, *Ae. huangae* and *Ae. interruptus*) and seven are transferred from subgenus *Finlaya* (*Ae. brygooi*, *Ae. fulgens*, *Ae. longipalpis*, *Ae. monetus*, *Ae. mzooi*, *Ae. phillipi* and *Ae. pollinator*). *Aedes pollinator* is resurrected from synonymy with *Ae. longipalpis* and a lectotype is designated. *Aedes longipalpis sensu lato* is defined as a complex of four species (i.e., *Ae. geoffroyi*, *Ae. huangae*, *Ae. longipalpis* and *Ae. pollinator*). The new subgenus is divided into three species groups (Brygooi, Longipalpis and Monetus) based on features of the adults, female and male genitalia, pupae and fourth-instar larvae. Keys to adults, pupae and fourth-instar larvae are provided. Chaetotaxy data are given in tables for pupae and fourth-instar larvae of the species. Descriptions are provided for the subgenus and each species and pertinent stages/structures are illustrated. Synonymy, taxonomic literature references, type data, distribution, bionomics, medical importance and a comparative discussion are included for the subgenus and the included species. A lectotype is selected for *Ae. monetus*. New terminology is provided for some structures.

TABLE OF CONTENTS

ABSTRACT	3
INTRODUCTION	4
MATERIALS AND METHODS	5
STRUCTURE AND TERMINOLOGY	6
TAXONOMIC TREATMENT	7
GENUS <i>AEDES</i> , SUBGENUS <i>ZAVORTINKIUS</i> REINERT, NEW SUBGENUS	7
SPECIES GROUPS OF SUBGENUS <i>ZAVORTINKIUS</i>	13
LONGIPALPIS GROUP	13
BRYGOOI GROUP	14
MONETUS GROUP	14
KEYS TO SPECIES OF <i>AEDES</i> (<i>ZAVORTINKIUS</i>)	15
ADULTS (both sexes)	15
PUPAE	17
FOURTH-INSTAR LARVAE	18

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LONGIPALPIS GROUP	19
<i>Aedes (Zavortinkius) longipalpis</i> (Grunberg)	19
<i>Aedes (Zavortinkius) fulgens</i> Edwards	26
<i>Aedes (Zavortinkius) geoffroyi</i> Reinert, new species	31
<i>Aedes (Zavortinkius) huangae</i> Reinert, new species	34
<i>Aedes (Zavortinkius) mzooi</i> van Someren	38
<i>Aedes (Zavortinkius) pollinator</i> (Graham)	40
BRYGOOI GROUP	43
<i>Aedes (Zavortinkius) brygooi</i> Brunhes	43
<i>Aedes (Zavortinkius) interruptus</i> Reinert, new species	47
<i>Aedes (Zavortinkius) phillipi</i> van Someren	49
MONETUS GROUP	51
<i>Aedes (Zavortinkius) monetus</i> Edwards	51
<i>Aedes (Zavortinkius) brunhesi</i> Reinert, new species	55
ACKNOWLEDGMENTS	56
LITERATURE CITED	57
LIST OF FIGURES	64
LIST OF FIGURE ABBREVIATIONS	65
FIGURES	67
TABLES	85
PUPAE	85
FOURTH-INSTAR LARVAE	93
APPENDICES	101
A. Current status of life stages/structures of species in the subgenus <i>Zavortinkius</i>	101
B. Conspectus of taxonomic change	102
C. English translation from German of original description of <i>Stegomyia longipalpis</i> ...	103
SYSTEMATIC INDEX	104

INTRODUCTION

Zavortinkius, a new subgenus in genus *Aedes* Meigen, is proposed for four new species (i.e., *Ae. brunhesi* Reinert, *Ae. geoffroyi* Reinert, *Ae. huangae* Reinert and *Ae. interruptus* Reinert) and the following seven species previously placed in subgenus *Finlaya* Theobald, *Ae. brygooi* Brunhes, *Ae. fulgens* Edwards, *Ae. longipalpis* (Grunberg), *Ae. monetus* Edwards, *Ae. mzooi* van Someren, *Ae. phillipi* van Someren and *Ae. pollinator* (Graham). All species included in the new subgenus occur in the Afrotropical Region.

Edwards (1925) previously had divided the four then known African species of *Finlaya* into two groups and included in Group I the species *Ae. fulgens* and *Ae. longipalpis*. In 1932, Edwards treated, for the first time, the entire subgenus *Finlaya* of genus *Aedes* and included *Ae. fulgens* and *Ae. longipalpis* along with five other species (the five other species are excluded from the present study) in his Group C (*longipalpis*-group) based only on the tarsal scale patterns of the adults. In 1952, Knight and Marks revised the internal classification of subgenus *Finlaya*, but retained Edwards' Group C (as LONGIPALPIS-group). Their revision was based primarily on adult ornamentation, but also included two features of the male genitalia and the arrangement of larval setae 4-7-C. They included the following species in the group: *Ae. fulgens*, *Ae. longipalpis*, *Ae.*

monetus, *Ae. phillipi* and seven other species. The latter seven species are not included in the new subgenus *Zavortinkius*. Lee et al. (1982) followed the Group C (as *longipalpis*-group) classification of Edwards (1932).

Grunberg (1905) described *Stegomyia longipalpis*, the oldest species of those now included in subgenus *Zavortinkius*. This species is herein selected as the type species for this new subgenus. Edwards (1911) proposed the synonymy of *Stegomyia pollinator* Graham with *Ae. longipalpis* and all subsequent authors have followed this. *Aedes pollinator* (males only) is herein resurrected from synonymy and a lectotype is designated; Graham's (1910a) two female syntypes are specimens of *Ae. longipalpis*. *Aedes longipalpis sensu lato* is herein defined as a complex of four species (i.e., *Ae. geoffroyi*, *Ae. huangae*, *Ae. longipalpis* and *Ae. pollinator*). Eleven species are included in the subgenus, four of which are new and seven are transferred from subgenus *Finlaya*. *Zavortinkius* is very distinct (see listing of primary features in the discussion section of subgenus *Zavortinkius*) and shows little similarity in all stages to the type species, *Ae. kochi* (Doenitz), of subgenus *Finlaya*. The proposed subgeneric abbreviation for *Zavortinkius* is *Zav.*

MATERIALS AND METHODS

The new subgenus is defined and each of the included species has all known stages described. Three species groups (Longipalpis Group with six species; Brygooi Group with three species; and Monetus Group with two species) are defined based on features of the adults (both sexes), female and male genitalia, pupae and fourth-instar larvae. The nominotypical species for each of the three groups is described in some detail, however, features identical to *Ae. longipalpis* or the subgenus description are not included. Species within a group are compared to the nominotypical species of that group and pertinent stages and structures are illustrated. Limited numbers of specimens were available for some species, therefore, variability of characters from a wide geographical range could not be determined for those species. Since *Ae. longipalpis* is the type species for the subgenus it is completely described in all stages.

The following taxonomic presentation includes a detailed description of the subgenus *Zavortinkius* (primary distinguishing features of each stage/structure are given in the discussion section) and is followed by an outline of the species groups, keys to adults (both females and males included), pupae and fourth-instar larvae, and descriptions and illustrations of the 11 species. Sixteen tables list the observed branching of setae for pupae and fourth-instar larvae. Setae listed in the tables show ranges followed by their modal condition in parentheses. Synonymy, taxonomic literature references, descriptions of life stages, type data, geographical distribution (from both specimens examined and published literature), bionomics, medical importance and a discussion are provided for each included species. Appendix A lists the current status of life stages/structures described and/or illustrated for the species assigned to the subgenus. Appendix B provides a conspectus of taxonomic changes. An English translation from German for the original description of *Stegomyia longipalpis* is provided in Appendix C.

In the synonymy and taxonomic literature references, the following abbreviations and symbols are used, K = key, ♀ = female, ♂ = male, A = adult, P = pupa, L = fourth-instar larva and E = egg; an asterisk following the abbreviations/symbols indicates that at least some portion of that sex or stage is illustrated. In the distribution section and appendices, the abbreviations used are the same as above but with the following three additions: g = genitalia, p = pupal exuviae and l = fourth-instar larval exuviae. Distribution records are indicated with countries in capital letters while provinces/counties and place names have the first letter capitalized. Numbers of specimens that I examined for each collection follow the place name. Current country names are as listed in

Merriam-Webster's Geographical Dictionary (1997, 3rd Ed., Merriam-Webster, Inc., Springfield, MA). Distributional and bionomic information are taken from the collection data sheets and specimen labels of the specimens that I examined and from the published literature. Based on the current interpretation of the species included in *Zavortinkius* many previous records of species distribution and bionomics should be reevaluated.

Measurements of slide mounted and pinned specimens were made with an ocular micrometer having a linear scale of 100 divisions that had been calibrated using a stage micrometer. The scale (when shown) used for the illustrations is in millimeters. Footnotes are included at the end of the section in which they are used. Male genitalia are described in the prerotation position.

STRUCTURE AND TERMINOLOGY

Chaetotaxy and nomenclature follow Harbach and Knight (1980, 1982) except for terminology used by Reinert (1990), and the following which are new or have their use restricted.

Aedeagal guide (AeG) = in male genitalia of *Aedes* a narrow sclerotized strip, usually spiculate, extending laterally and connecting the basomesal areas of the pair of claspettes (or basal mesal lobes) and located ventral to the aedeagus (adapted from Wood 1991:266).

Antedorsocentral area = in adults restricted to the anterior area of the scutum at the cephalic end of the dorsocentral area, lateral to the anterior promontory, and anteromesally to the scutal fossal area; often bearing setae.

Anterior promontory = in adults restricted to the median anterior area of the scutum at the cephalic end of the acrostichal area and mesal to the antedorsocentral area; often bearing setae.

Claspette (CI) = in genitalia of male *Aedes* mosquitoes I consider the claspette and the basal mesal lobe to be homologous structures but specially developed (see Harbach and Knight 1980). Species of *Zavortinkius* have the claspette developed as an elongate, narrow, columnar stem (CSt) with a terminal long blade-like claspette filament (CF); stems are mostly covered (especially the basal portion) with spicules, and bases of the pair are connected by a narrow spiculate aedeagal guide.

Claspette filament length (CF length) = absolute length measured from base to apex.

Claspette filament/Claspette stem index (CF/CSt index) = in male genitalia the ratio determined by dividing the claspette filament length by the claspette stem length.

Claspette stem length (CSt length) = length measured along a straight line from the most basal portion of the lateral lobe to the apex of the stem, minus the claspette filament (= basal mesal lobe length of Reinert 1990:3).

Claspette stem/Gonocoxite index (CSt/Gc index) = in male genitalia the ratio determined by dividing the claspette stem length by the gonocoxite length.

Genital lobe index (GL index) = in pupae the ratio resulting from the median ventral length measured from the base to the apex of the lobe (male or female) divided by the ventral width measured at the widest point (adapted from Reinert et al. 1997:7).

Genital lobe/paddle index (GL/Pa index) = in pupae the ratio resulting from the median ventral length of the genital lobe (male or female) divided by the maximum paddle length measured along a straight line from the basal articulation to the most distal point.

Scutal fossal setae arrangement = follows Harbach and Knight's (1980) Fig. 16a (not Figs. 11a and 12a).

TAXONOMIC TREATMENT

GENUS *Aedes* MEIGENSUBGENUS *ZAVORTINKIUS* REINERT, NEW SUBGENUS

Type species: *Stegomyia longipalpis* Grunberg, 1905

Stegomyia in part of Grunberg 1905; Wesche 1910; Graham 1910a, 1910b; Edwards 1911.

Kingia in part of Theobald 1910.

Ochlerotatus in part of Edwards 1912a, 1912b; Aders 1917.

Aedes (*Ochlerotatus*) Group *Finlaya* of Edwards 1917.

Aedes (*Finlaya*) in part of Macfie and Ingram 1923; Edwards 1925, 1932, 1935, 1941; de Meillon et al. 1945; van Someren 1949, 1962; Haddow et al. 1951; Hopkins 1936, 1941, 1952; Knight and Marks 1952; Muspratt 1955; van Someren et al. 1955; Peters 1956; Stone et al. 1959; Stone 1963; Brunhes 1971, 1978; Hochman and Reinert 1974; Ribeiro and Ramos 1973; Knight and Stone 1977; Ravaonjanahary 1978; White 1980; Townsend 1990; Jupp 1996; Reinert 1999.

Chaetotaxy and other features are summarized for the subgenus as follows.

Females. *Head:* Antennal pedicel with few short dark setae mesally, scales absent, 0.67-0.90 length of proboscis; maxillary palpus 0.19-0.75 length of proboscis (long to very long in species of Longipalpis Group), dark-scaled; proboscis 0.92-1.10 length of femur I, dark-scaled; ocular line with overlapping broad silvery spatulate scales (some species also with 3-5 of median scales dark); vertex with decumbent scales broad, few semierect forked scales; occiput with several to moderate number of erect forked scales. *Thorax:* Scutum with scales narrow or moderately broad and with patches of overlapping broad silvery scales; anterior promontory and usually antedorsocentral areas each with several broad scales and few setae; acrostichal area with stripe of snowy-white or silvery scales extending from anterior margin to at least posterior medial scutal area; only overlapping broad scales on prescutellar area, 2-6 (usually 2-5) lateral setae; supraalar area with large patch of overlapping broad silvery scales; acrostichal setae absent; dorsocentral setae absent; antealar area with 1-4 setae (usually 1,2); antepronotum with broad silvery scales, 5-13 setae; postpronotum covered with overlapping broad silvery scales, 1-6 posterior setae (usually 2,3); proepisternum with upper area covered with overlapping broad silvery scales, 1-4 (usually 1,2) setae; postspiracular area with 1-4 setae; mesokatepisternum with 1 or 2 patches of overlapping broad silvery scales, 0-3 upper (usually 1,2), 1,2 median posterior and 1-6 lower setae; paratergite with patch of overlapping broad silvery scales; prealar area with patch of overlapping broad silvery scales on lower and extending onto upper area, 2-9 setae; mesepimeron with 1 or 2 patches of overlapping broad silvery scales, 3-14 upper setae; overlapping broad silvery scales of thorax and abdomen very broad, *spatulate*, and with apices broadly rounded (presenting rounded appearance). *Legs:* Femora I-III without apical, pale-scaled patches or bands; tarsus III with or without pale-scaled areas; posttarsi I-III each with 2 ungues equal in size, both with one tooth. *Wing:* Dorsal and ventral veins dark-scaled; remigium with setae present dorsoapically or absent. *Abdomen:* Terga I-VII with basolateral, silvery-scaled patches, some species also with other silvery-scaled patches dorsally.

Female genitalia. *Segment VIII:* Laterally compressed; apical intersegmental membrane between segments VII and VIII nonpigmented, moderately long, covered with minute spicules. *Tergum VIII:* Basal 0.2-0.4 retracted into segment VII; covered with minute spicules; moderately

to heavily pigmented; base wide, straight or gently convex; basolateral corners broadly rounded; apex narrower but broadly rounded; numerous broad, spatulate scales on apical 0.78-0.98; several short and few moderately long setae on apical 0.49-0.74; apical margin with few moderately long, stout setae; basolateral seta present; Te-VIII index 0.65-0.89; Te-VIII/Te-IX index 1.43-2.76; length 0.29-0.40 mm; width 0.37-0.57 mm. *Sternum VIII*: Covered with minute spicules; moderately to heavily pigmented; base straight or slightly convex mesally; apex with small (0.04-0.08 of dorsal length, Longipalpis and Monetis Groups) to moderately deep (0.10-0.16 of dorsal length, Brygooi Group) median indentation separating broadly rounded lobes (Longipalpis and Brygooi Groups) or gently sloping from apicolateral corners to midline (Monetis Group); lateral margins usually nearly straight but becoming slightly narrower basally; patch of broad scales on laterobasal area; numerous short setae covering most of apical 0.82-0.93 except basolateral areas; apical margin with row of stout setae, moderately long laterally and gradually decreasing in length to short setae mesally, margin also with row of numerous short lanceolate setae intermixed with stout setae; setae 1-6-S irregularly spaced from basomedian to apicolateral areas; basolateral seta absent (present in *Ae. geoffroyi* and *Ae. pollinator*); S-VIII index 0.93-1.17; length 0.44-0.57 mm; width 0.44-0.55 mm. *Tergum IX*: Covered with minute spicules; composed of 2 heavily pigmented, long, narrow, lateral plates connected by moderately pigmented, basomesal strip; 1-5 short setae apically on each side of midline, 2-9 total setae; Te-IX index 1.65-2.72; length 0.17-0.25 mm; width 0.08-0.12 mm. *Insula*: Covered with short spicules; moderately pigmented; liplike, lateral margins up-raised, presenting V-shaped appearance; 1-5 long setae on each side of midline lateroapically, 4-10 total setae. *Lower vaginal lip*: Covered with short spicules; lightly pigmented; narrow, broader at hinge; lower vaginal sclerite absent; ventral tuft present. *Upper vaginal lip*: Covered with short spicules; heavily pigmented; moderately broad; caudal margin nearly straight but slightly bowed; upper vaginal sclerite moderately developed, heavily pigmented, consisting of narrow strip along mesal margin of lip and with enlarged lobe arising from basomesal area of lip. *Spermathecal eminence*: Membranous; nonpigmented; more or less dome-shaped caudally; basal area with minute, simple spicules. *Postgenital lobe*: Covered with short spicules, those along lateral margins longer and stouter; long and relatively narrow with base bilobed; apex broadly rounded, flat or with minute to moderately deep (0.02-0.12 of dorsal length) median indentation; basal mesal apotome well developed, heavily pigmented, usually long, narrow; 3-13 setae on each side of midline, 7-25 total setae; ventral PGL/cercus index 0.76-0.92; dorsal PGL index 1.11-1.95; ventral PGL index 2.34-4.18; ventral length 0.17-0.28 mm. *Proctiger*: With short tubercles bearing minute spicules scattered over entire area; membranous. *Cercus*: Covered with minute to short spicules, longer ones on lateral and apical margins; heavily pigmented; long, moderately wide and with more or less uniform width throughout length; apex bluntly rounded; mesal margin straight; dorsal surface without scales, 7-10 (usually 8,9) long and moderately long, stout, straight setae on apical area, several short setae on apical 0.50-0.74; several short, curved, lanceolate setae on apical, apicolateral and apicomesal margins; ventral surface with few short setae lateroapically; cercus index 2.29-3.75; cercus/dorsal PGL index 2.18-3.17; length 0.21-0.31 mm; width 0.07-0.11 mm. *Spermathecal capsules*: One large and 2 medium-sized ones; heavily pigmented; spherical; large and one medium-sized capsules with moderate number of spermathecal capsule pores near orifice, other medium-sized capsule with only few pores near orifice. *Accessory gland duct*: Base long; heavily pigmented.

Males. Generally similar to females. *Head*: Antenna plumose, setae directed primarily dorsally and ventrally, 0.47-0.88 length of proboscis; maxillary palpus 0.53-1.03 length of proboscis, palpomeres 4,5 and apex of 3 with few setae, palpomere 5 slightly downturned (Longipalpis Group) or palpomeres 4,5 straight or slightly upturned (Brygooi and Monetis Groups); proboscis 1.01-1.29 length of femur I. *Legs*: Posttarsi I-III with 2 unguis, each with one tooth, I,II with 1 large and 1 smaller unguis, III with unguis equal in size.

Male genitalia. *Tergum IX*: Moderately to heavily pigmented; separated into 2 lateral sclerites; covered with minute spicules; posterior margin of each lateral sclerite bearing in single row 1-12 setae that are moderately long, thin or stout, curved and caudally projected, 2-23 total setae; tergum connected laterally with sternum IX by heavily pigmented narrow band. *Gonocoxite*: Heavily pigmented; covered with minute spicules; long and relatively narrow; tergal surface with setae more or less evenly dispersed over entire area, basal dorsomesal lobe short, projected caudosternally, with poorly defined wrinkled area along basal portion distinguishing it from remainder of gonocoxite, bearing 1 to many long stout setae; lateral surface with long stout setae and long broad scales from base to apex; sternal surface covered with long scales and few long stout setae apically, 2 rows of moderately long stout setae on mesal margin except basal 2-6 setae shorter and thinner. *Gonostylus*: Moderately pigmented; moderately long to long; gonostylus/gonocoxite (Gs/Cc) index 0.30-0.44 (Longipalpis and Brygooi Groups), 0.63-0.66 (Monetus Group); Gs length 0.13-0.27 mm; relatively narrow (except broad in *Ae. brygooi*); 1,2 tiny setae subapically (setae absent in *Ae. huangae* and *Ae. longipalpis*); gonostylar claw (GC) long, uniformly narrow, curved distally, apex blunt with 1,2 minute grooves; GC/Gs index 0.13-0.46; GC length 0.03-0.08 mm. *Claspette*: Stem moderately pigmented, with short spicules, moderately long, length 0.09-0.17 mm, with 2-5 short setae; filament long, flattened; CF/CSt index 0.53-1.12; CF length 0.09-0.16 mm; aedeagal guide narrow, covered with short spicules. *Proctiger*: Paraproct heavily pigmented; moderately long; apex beak-shaped with 1 subapical tooth; base curved; cercus membranous with moderately pigmented, elongate cercal sclerite; 2-8 minute cercal setae on each side, 4-16 total setae. *Tergum X*: Heavily pigmented; narrow but developed into tongue-shaped, median, cephalad-directed lobe separating 2 halves of tergum IX (fused with tergum IX lobes in Monetus Group). *Phallosome*: Aedeagus troughlike, long, relatively narrow, length 0.12-0.17 mm; paramere heavily pigmented, middle broader and with short lobe, length 0.08-0.12 mm; paramere/aedeagus (Par/Ae) index 0.61-0.79; basal piece (BP) heavily pigmented, moderately wide to relatively wide, length 0.05-0.08 mm; BP/Ae index 0.33-0.57. *Sternum IX*: Moderately to heavily pigmented; moderately large; covered with minute spicules; median caudal area formed into small dorsally projected fold; 2-10 long and moderately long long stout setae on posterior area.

Pupae. *Cephalothorax*: Dorsal apotome consists of 2 long longitudinal sclerites connected by a membrane mesally; setae 1,3-CT moderately long, branched (3-CT rarely single in *Ae. phillipi*); 2-CT shorter, with 2-5 branches; 4,5-CT moderately long, branched (5-CT rarely single), approximately equal in length; 6-CT short, thin, with 2-9 branches (rarely single); 7-CT long, with 2-6 stout branches; 8-CT long, with 2-9 branches; 9-CT long, slightly shorter than 8-CT, single to 3-branched; 11-CT long to very long, stout, single (2-branched on 1 side of 1 specimen of *Ae. geoffroyi*). *Trumpet*: Narrow (Longipalpis Group), moderately wide (Brygooi Group) or wide (Monetus Group), dark; widest on middle third. *Abdomen*: Sterna IV-VII with strong, transverse ridge posterior to seta 14; seta 2-II laterad of 1-II and mesad of 3-II; 2-III-VII mesad (Brygooi and Longipalpis Groups) or lateral (Monetus Group) to 1-III-VII; 3-I long, single to 7-branched (very rarely single); 3-II,III long, longer than succeeding terga, stout, usually single (occasionally 2,3-branched); 5-IV-VI very long, noticeably longer than succeeding terga, stout; 6-I long, stout, single (*Ae. huangae* with 2 branches, rarely 3-branched); 7-I,II long; 6-I,II longer than 7-I,II; 7-VI (and usually 6-VI) moderately long, moderately stout, often single; 6-III-V anterior to 9-III-V; 6-VI at level with or slightly posterior to 9-VI; 6-VII short, with 2-12 thin branches, medial and posterior to 9-VII (slightly anterior in *Ae. fulgens*); 9-VII moderately long, stout, usually very lightly aciculate, with 2-7 branches (very rarely single in *Ae. fulgens*); 9-VIII moderately long, stout, strongly aciculate distally, with 4-15 branches, displaced anteriorly from posterior margin of segment (except in *Ae. geoffroyi*); male GL/Pa index 0.53-0.77; male GL index 1.05-1.45. *Paddle*: Wide; midrib narrow and well developed to apex or near apex, very minute to tiny serrations on basal 0.50-0.78

of lateral margin; numerous minute spicules on lateral 0.25-0.50 (0.12 in *Ae. brygooi*); index 1.18-1.56; seta 1-Pa single (rarely 2-forked in *Ae. fulgens*, *Ae. huangae* and *Ae. longipalpis*).

Fourth-instar larvae. *Head:* Seta 1-C stout, curved, apex acute or blunt, single; 3-C single, short; 4-7-C posterior to antennal base; 4-6-C alveoli form small triangle (except forming diagonal line in *Ae. pollinator*); 4-C medial and slightly posterior (slightly anterior in *Ae. geoffroyi*) to 6-C, short to moderately long, with 2-23 fine or thin branches (usually with 7 or more branches); 6-C long to very long, single to 7-branched; 5-C posterior and slightly medial to 6-C, posterior and lateral to 4-C, long to very long, single to 7-branched; 7-C lateral to 5,6-C and slightly anterior or slightly posterior to 6-C, moderately long to long, single to 32-branched; 8-10-C branched (10-C rarely single in *Ae. geoffroyi*); 13-C lateral to 12-C, with 2-6 branches (single in *Ae. monetus*); 14-C far anterior and near anteroventral margin of lateralia and lateral to basolateral area of dorsomentum, long, stout, single to 5-branched; 15-C shorter than 14-C (15-C longer than 14-C in *Ae. monetus*), small, with 2-9 branches; 18-C short, single; 19-C absent; 6-Mx usually stout, single to 10-branched; lateral palatal brush filaments simple or comb-tipped; labiogula moderately long. *Antenna:* Length 0.31-0.49 mm; long, narrow, with few to moderate number of small spicules; seta 1-A extends beyond apex of antenna (except shorter than apex in *Ae. huangae*, *Ae. longipalpis* (usually) and *Ae. pollinator*), single to 4-forked or branched, attached 0.43-0.69 from antennal base; 4-A approximately 0.75-0.85 length of 2-A. *Thorax:* Seta 1-P long, longer than 2-P, single to 5-branched; 2-P long, single; 3-P shorter than 2-P, with 2-9 branches; 5-P shorter than 6-P; 2-T with 3-10 branches (single or 2-branched in *Ae. monetus*); 6-T with 2-6 branches (Longipalpis Group; single on 1 side and 2-branched on other side of 2 specimens of *Ae. geoffroyi*) or single (Brygooi Group), 2-forked on 1 side and single on other side of 1 specimen of *Ae. monetus*. *Abdomen:* Seta 2-II-VII slightly anterior to 1-II-VII, usually single or 2-branched (single to 5-branched); 3-I-V (and usually VI) branched, usually with 3 or more branches (3-I-VI single or 2-branched in *Ae. monetus*); 4-I with 5-21 branches; 5-I-VI posterior to 6-I-VI; 6-I,II moderately long to long, 6-I with 2-6 (usually 3-5) branches, 6-II with 2-5 branches (rarely single in *Ae. brygooi*); 7-I equal to or slightly shorter than 6-I (7-I slightly longer than 6-I in *Ae. longipalpis*), with 2,3 branches (rarely single); 7-II short, usually with 5-12 (2-13) branches; 12-I single to 6-branched (usually with 2-4 branches); 8-II with 2-7 (usually 3-5) branches; 9-II-VI single, short (except always 2-branched and up to 5-branched in *Ae. monetus*); 9-II 2-branched on 1 side of 2 specimens of *Ae. pollinator*); 10-III-V branched (usually with 2-4 branches, rarely single; 10-III-V always single in *Ae. monetus*); 10-VII usually 2,3-branched (single to 6-branched); 1-VII long to very long, stout, single to 4-branched; 3-VII with 2-11 branches; 1-VIII shorter than 2-VIII, with 3-10 thin branches, not aciculate; 2-VIII closer to 1-VIII than to 3-VIII, with 2-6 branches; 4-VIII longer than 3-VIII, closer to 3-VIII than to 5-VIII, single; segment VIII with comb in patch of 21-97 scales; saddle heavily pigmented, acus absent, incomplete ventrally, caudal process well developed and heavily pigmented, stout spicules posteriorly or absent; saddle/siphon index 2.66-4.09; 1-X with 2-8 fine branches, shorter than saddle length; 4-X with 10-12 setae, posterior 8 setae always on grid, each fanlike with short stem and terminating in 4-14 (usually 7-10) long simple branches, grid well developed, anterior 2-4 setae shorter, branched. *Siphon:* Heavily pigmented, collar darker; acus absent (Longipalpis Group) or present (Brygooi and Monetis Groups); pecten with 13-28 moderately long to long, moderately stout, evenly spaced spines, each with 1 or more stout denticles basoventrally, spines increase in length distally; seta 1-S distal to pecten, usually with 3-6 (range 2-10) branches; 6-S long, single; 8-S short, with 2-9 branches (8-S long, approximately equal to 6-S length, with 2,3 branches in *Ae. monetus*); spiracular apodeme long, narrow, with lightly pigmented apical knob, with or without knob on basoventrally area.

Discussion. The following principal features are most distinctive for *Zavortinkius* and they can be used in separating this subgenus from other subgenera of genus *Aedes*: **adults** by the combi-

nation of (1) supraalar area has a large patch of overlapping, broad, silvery, spatulate scales; (2) thorax has all scales on the pleura overlapping, broad, silvery and spatulate; (3) acrostichal and dorsocentral setae are absent; (4) decumbent scales of vertex and scutellum are all broad; (5) antennal pedicel has scales absent; (6) postpronotum is covered with scales that are overlapping, very broad, silvery and spatulate; and (7) ocular line has overlapping, broad, silvery, spatulate scales; **female genitalia** by the combination of (1) postgenital lobe is long, relatively narrow, base bilobed, and basomesal apoteme is well developed; (2) cercus is long, moderately wide and with a more or less uniform width throughout the length, apex is bluntly rounded, and scales are absent; (3) tergum IX is composed of two heavily pigmented, long, narrow, lateral plates that are connected by a moderately pigmented basomesal strip and have 1-5 short setae apically on each side of the midline; (4) lower vaginal lip is lightly pigmented, upper vaginal lip is heavily pigmented and has a moderately developed sclerite; and (5) insula is liplike, moderately pigmented, and bearing 1-5 (rarely only 1) long setae on each side of midline apicolaterally; **male genitalia** by the combination of (1) tergum X is heavily pigmented, narrow but developed with a tonguelike, median, cephalad directed lobe separating the two halves of tergum IX; (2) tergum IX is separated into two lateral sclerites, each having the posterior margin bearing 1-12 moderately long, stout, curved setae in a single row; (3) claspette has a moderately long, narrow stem terminating in a long flattened filament; (4) aedeagus is simple and troughlike; (5) gonostylar claw is long, uniformly narrow, curved distally and has the apex blunt; and (6) gonocoxite is long with the dorsal surface having a basal dorsomesal lobe bearing at least one stout seta, and ventral surface bearing a double row of moderately long, stout setae on the mesal margin; **pupae** by the combination of (1) seta 7-CT is long and has 2-6 stout branches; (2) seta 8-CT is long and has 2-9 branches; (3) seta 6-I,II is long and seta 6-II is longer than seta 7-II; (4) seta 2-II is laterad of seta 1-II and mesad of seta 3-II; (5) setae 3-II,III, 5-IV-VI are stout and longer than succeeding terga, 5-IV-VI is very long; (6) seta 6-VII is short, fine, branched and 0.3-0.6 of seta 9-VII length; (7) seta 9-VII,VIII is stout and branched (9-VII is very rarely single in *Ae. fulgens*); and (8) seta 1-Pa is single (very rarely 2-forked); and **fourth-instar larvae** by the combination of (1) setae 4-6-C alveoli forming a small triangle posterior to the level of the antennal base (except setae are in a diagonal line in *Ae. pollinator*); seta 4-C is mesad of setae 5,6-C (except in *Ae. pollinator*) and anterior to seta 5-C, seta 4-C is short to moderately long and has 2-23 fine or thin branches; setae 5,6-C are long to very long (or at least have one branch long to very long when they are multiple-branched); seta 7-C is laterad and slightly anterior or slightly posterior to seta 6-C, and posterior to antennal base; (2) setae 8-10-C are branched (10-C is rarely single in *Ae. geoffroyi*); (3) seta 18-C is present and seta 19-C is absent; (4) seta 1-P>seta 2-P>seta 3-P length, 2-P is single; (5) seta 1-VII is long to very long; (6) antenna is long, narrow and seta 1-A usually is single and attached 0.43-0.69 from antennal base; (7) seta 2-VIII has 2-6 branches and is longer than seta 1-VIII; (8) segment VIII has comb in a patch of 21-97 scales; and (9) ventral brush (seta 4-X) consisting of 10-12 setae, posterior 8 setae always on a well developed grid, each seta is fanlike with a short stem and terminating in 4-14 (usually 7-10) long simple branches, and anterior 2-4 setae are shorter and branched.

The similarity of the overlapping, broad, silvery-scaled acrostichal stripe of the species of the Longipalpis and Monetus Groups with the Australian *Ae. (Molpemyia) pecuniosus* Edwards is discussed by Reinert (1993). Within subgenus *Molpemyia* Theobald, a similar condition occurs as is found in *Zavortinkius* where areas of the scutum are pale-scaled; these pale scales are narrow in some species and broad in others of these subgenera. The maxillary palpi of *Zavortinkius* males are of two types, one with palpomere 5 downturned, and the other with palpomeres 4,5 slightly thinner, longer and upturned. During this study these features (broad or narrow acrostichal scales; type of male maxillary palpus) proved to be of group-level importance within subgenus *Zavortinkius*. The

importance of overlapping, broad, silvery, spatulate scales on the supraalar and pleural areas of the thorax was shown to be of subgeneric value.

Adults of *Zavortinkius* have a superficial resemblance to some species in subgenus *Stegomyia*, especially the Africanus Group (see Huang 1990 for a description of the latter) in the broad, silvery, spatulate scales of the scutum and postpronotum, however, they are easily separated by: antennal pedicel is without scales; maxillary palpus is dark-scaled; several semierect forked scales are on the vertex; male genitalia have the aedeagus trough-like and the claspette has a moderately long stem and one long flattened filament; and female genitalia have a setose liplike insula. Edwards (1941:130) cited hybridization studies of Connal in which the attempted crossing of *Ae. (Stg.) aegypti* (Linnaeus) with *Ae. (Stg.) luteocephalus* (Newstead) and *Ae. longipalpis* (probably *Ae. geoffroyi*) produced negative results.

Females of the Longipalpis Group have long to very long maxillary palpi (0.26-0.75 length of proboscis) while the maxillary palpi of the Brygooi and Monetis Groups are relatively short (0.19-0.22 length of proboscis). A similar situation occurs in subgenus *Mucidus* Theobald of *Aedes* in which the maxillary palpi are long to very long in the Mucidus Group (Group A) and relatively short in the Pardomyia Group (Group B).

Other features of the adults, in addition to those given above, that are useful in separating *Zavortinkius* from other subgenera of *Aedes* are: upper proepisternum has only 1-4 (usually 1,2) setae; mesokatepisternum has only 1,2 median posterior setae; prescutellar area usually has 2-5 (range 2-6) lateral setae; paratergite is broad and has a patch of overlapping broad silvery spatulate scales; acrostichal area has a stripe of pale scales; and maxillary palpus, proboscis and wing are completely dark-scaled.

Adults of four species (*Ae. fulgens*, *Ae. huangae*, *Ae. monetis* and *Ae. mzooi*) have broad silvery spatulate scales on the mesopostnotum and two species (*Ae. brygooi* and *Ae. interruptus*) have similar scales covering the metamer. The presence of scales or setae on the mesopostnotum is common in the tribe Sabethini but is very unusual for genus *Aedes*. Edwards (1920) noted "a tuft of pale yellowish narrow curved scales apically" on the mesopostnotum of *Ae. lepidontus* Edwards. Reinert (1974), while studying species of *Verrallina* Theobald noted one large and one short setae on the median caudal area of the mesopostnotum in *Ae. virilis* (Leicester). Harrison and Bickley (1990) also reported one seta on this structure in *Ae. virilis* while Lee et al. (1987) reported a patch of setae on the mesopostnotum of *Ae. (Ver.)* species No. 171 (of Marks). Within subgenus *Zavortinkius* the presence of scales on the mesopostnotum appears to be of specific importance.

The male genitalia of members of the subgenus display similar development of terga IX and X, sternum IX, proctiger and gonocoxite. Development of the aedeagus, gonostylus and claspette show features of group level and distinctive features for some species. The basal dorsomesal lobe of the gonocoxite possesses features unique for most species. The development of tergum X as a heavily pigmented, narrow basal band with a tonguelike median, cephalad directed lobe, is unique for the subgenus.

Female genitalia of species within the subgenus have the cercus, postgenital lobe, upper and lower vaginal lips, and tergum VIII similarly developed. Group level features are primarily the shape of the apical margin of sternum VIII and the cercus index. Various combinations of characters can be used to separate most species.

Other pupal features that help distinguish the subgenus are the very large and long male genital lobes and both setae 8,9-CT are long, moderately stout and branched (9-CT is rarely single).

Other features of the fourth-instar larvae, in addition to those listed above, that are useful in separating them from those of other subgenera of *Aedes* are: seta 14-C is relatively long; seta 3-I-V (and usually VI) is branched (usually with 3 or more branches except single to 2-branched in *Ae.*

monetus); seta 2-VIII has 2-6 branches and is closer to seta 1-VIII than to seta 3-VIII; and seta 4-VIII is single, longer than seta 3-VIII, and is closer to seta 3-VIII than to seta 5-VIII.

It is a pleasure to name the new subgenus *Zavortinkius* in honor of Dr. Thomas J. Zavortink, Department of Biology, University of San Francisco, San Francisco, California, in recognition of his important contributions to the systematics of the Culicidae.

Distribution. All species of subgenus *Zavortinkius* occur in the Afrotropical Region. Species have been collected from the following countries: Angola, Botswana, Cameroon, Central African Republic, Comores Islands, Democratic Republic of the Congo (= Zaire), Equatorial Guinea, Ghana, Ivory Coast, Kenya, Liberia, Madagascar, Malawi, Mali, Nigeria, Republic of the Congo, Senegal, Sierra Leone, South Africa, Tanzania, Togo, Uganda, Zambia and Zimbabwe.

Bionomics. Immatures of species included in the subgenus are typically found in treeholes, sometimes in other plant containers (e.g., bamboo stumps, sections and pots, plant axils, banana fibre, and seed pods), and rarely in rockholes, snail shells, wells and artificial containers (e.g., tins, tires and gutters).

Females of some species have been taken feeding on humans and monkeys. Adults appear to prefer forested areas and are active during the day, especially in the canopy; however, some species have been collected in smaller numbers during the night. Other species have been taken in plantations, in the bush and in buildings.

Medical importance. *Aedes fulgens* was incriminated by Jupp et al. (1981), in laboratory experiments, as a potential vector of chikungunya virus. Uganda S virus was probably isolated from either *Ae. longipalpis* or *Ae. ingrami* Edwards (Haddow 1961).

SPECIES GROUPS OF SUBGENUS ZAVORTINKIUS

LONGIPALPIS GROUP

Included species. *Ae. fulgens*, *Ae. geoffroyi*, *Ae. huangae*, *Ae. longipalpis*, *Ae. mzooi* and *Ae. pollinator*.

Distribution. Angola, Botswana, Cameroon, Central African Republic, Democratic Republic of the Congo, Equatorial Guinea, Ghana, Ivory Coast, Kenya, Liberia, Malawi, Mali, Nigeria, Republic of the Congo, Senegal, Sierra Leone, South Africa, Tanzania, Togo, Uganda, Zambia and Zimbabwe.

Adults (both sexes). Tarsi II,III with pale-scaled areas; subspiracular area bare; mesokatepisternum with separate upper and lower patches of scales, with 1-3 upper setae; mesepimeron with single scale patch; scutal fossal area dark-scaled; acrostichal area with pale stripe of broad scales.

Males. Posttarsi I,II with ungues unequal in size, each with 1,2 teeth, III with ungues equal in size, both with 1 tooth.

Female genitalia. Sternum VIII with apex having small median indentation separating broadly rounded lobes, base straight; cercus index 2.29-3.28.

Male genitalia. Aedeagus long, narrow, approximately uniform width throughout length, apex more or less blunt; claspette filament long, narrow, approximately uniform width throughout length but apical portion narrowest.

Pupae. Seta 2-VII noticeably mesad of 1-VII; trumpet narrow, pinna 0.10-0.34 length of trumpet; seta 3-VI with 2-6 branches (very rarely single).

Fourth-instar larvae. Seta 5-C single¹; 13-C branched; 1-3-P without common setal support plate; 3-M with 2-7 branches; 6-T branched²; 9-III-VI single; 6-III,IV shorter than 6-I,II; comb with 46-97 scales; saddle usually with stout spines posteriorly; siphon without acus; 8-S short.

BRYGOOI GROUP

Included species. *Aedes brygooi*, *Ae. interruptus* and *Ae. phillipi*.

Distribution. Madagascar.

Adults (both sexes). Tarsi II,III dark scaled; subspiracular area with elongate patch of silvery-scales; mesokatepisternum with separate upper and lower patches of scales, with 1,2 upper setae; mesepimeron with 2 scale patches; scutal fossal area dark-scaled; acrostichal area with pale stripe of narrow scales.

Males. Posttarsi I,II each with 1 large and 1 small unguis both with 1 tooth, III with unguis equal in size, both with 1 tooth.

Female genitalia. Sternum VIII with apex having moderately deep median indentation separating broadly rounded lobes, base convex mesally; cercus index 2.81-3.75.

Male genitalia. Aedeagus long, basal 0.5 moderately broad and tapering to narrow pointed apex; claspette filament long, narrow, approximately uniform width throughout length but apical portion narrowest.

Pupae. Seta 2-VII noticeably mesad of 1-VII; trumpet moderately wide, pinna 0.35-0.41 length of trumpet; seta 3-VI single.

Fourth-instar larvae. Seta 5-C with 2-7 branches; 13-C branched; 1-3-P with pigmented common setal support plate; 3-M single; 6-T single; 9-III-VI single; 6-III,IV longer than 6-I,II; comb with 24-36 scales; saddle with stout spines posteriorly; siphon with acus; 8-S short.

MONETUS GROUP

Included species. *Aedes brunhesi* and *Ae. monetus*.

Distribution. Madagascar and Comores Islands.

Adults (both sexes). Tarsi II,III dark-scaled; subspiracular area with elongate patch of silvery-scales; mesokatepisternum with single large-scaled patch continuous over upper and lower areas, without upper setae; mesepimeron with single scale patch; scutal fossal area with patch of broad silvery scales; acrostichal area with pale stripe of broad scales.

Males. Posttarsi I,II each with 1 large unguis having 1 tooth and 1 small simple unguis, III with unguis equal in size, both simple.

Female genitalia. Sternum VIII with apex gently sloping from apicolateral corners to midline, base straight; cercus index 2.36.

Male genitalia. Aedeagus long, narrow, approximately uniform width throughout length, apex blunt; claspette filament long, broad, greatly expanded on basal portion, apex blunt.

Pupae. Seta 2-VII lateral to 1-VII; trumpet wide, pinna 0.51 length of trumpet; seta 3-VI single.

Fourth-instar larvae. Seta 5-C with 3,4 branches; 13-C single; 1-3-P with pigmented common setal support plate; 3-M single; 6-T single³; 9-III-VI branched; 6-III,IV longer than 6-I,II; comb with 21-27 scales; saddle without stout spines; siphon with acus; 8-S long, approximately equal to 6-S length.

¹Seta 5-C 2-branched in 1 specimen of *Ae. pollinctor*.

²Seta 6-T single on 1 side, 2-branched on other side in 2 specimens of *Ae. geoffroyi*.

³Seta 6-T 2-forked on 1 side, single on other side of 1 specimen of *Ae. monetus*.

KEYS TO SPECIES OF *AEDES* (*ZAVORTINKIUS*)

ADULTS (both sexes)

1. Tarsi II,III dark-scaled; subspiracular area with elongate patch of pale scales2
 Tarsi II,III with pale-scaled areas; subspiracular area bare6
- 2 (1). Scutum with patch of broad pale scales on scutal fossal area; acrostichal area with pale stripe of broad scales; mesokatepisternum with single large scale patch3
 Scutum with only narrow dark scales on scutal fossal area; acrostichal area with pale stripe of narrow scales; mesokatepisternum with separate upper and lower patches of scales4
- 3 (2). Posterior medial scutal and prescutellar areas with broad silvery scales; mesopostnotum with broad scales anteriorly under scutellum; postspiracular area with patch of broad silvery scales posterior to setae*monetus*
 Posterior medial scutal and prescutellar areas with broad dark brown scales; mesopostnotum without scales; postspiracular area without scales*brunhesi*
- 4 (2). Scutum with dorsocentral pale-scaled stripe extending to anterior margin; tergum IV with basomedian pale-scaled patches dorsally; occiput with pale golden erect forked scales*brygooi*
 Scutum with dorsocentral pale-scaled stripe not reaching anterior margin; tergum IV with basomedian area dark-scaled dorsally; occiput with brown erect forked scales5

- 5 (4). Metameron without scales*phillipi*
 Metameron covered with overlapping broad silvery scales*interruptus*
- 6 (1). Tarsus II with tarsomere I having posterior surface mostly pale-scaled; scutellum with large patch of silvery scales covering midlobe7
 Tarsus II with tarsomere I dark-scaled with only narrow pale-scaled band basally; scutellum with midlobe having patch of black scales medially separating silvery-scaled patches8
- 7 (6). Tibiae I-III dark-scaled; tergum V with pair of small silvery-scaled patches dorsally; prescutellar area nearly covered with broad silvery scales, only narrow median bare area*fulgens*
 Tibiae II,III with pale-scaled band basally, I usually with pale-scaled band basally, also I and basal portion of II with narrow median pale-scaled stripe longitudinally on posterior surface; tergum V dark-scaled dorsally; prescutellar area with broader bare median area separating lateral broad silvery-scaled areas*mzooi*
- 8 (6). Scutum with acrostichal pale-scaled stripe not reaching silvery-scaled areas of prescutellar area but interrupted by broad black scales on posterior medial scutal area9
 Scutum with acrostichal pale-scaled stripe extending from anterior margin onto prescutellar area where it forks and extends along lateral areas to scutellum10
- 9 (8). Mesopostnotum bare; female maxillary palpus 0.30-0.36 length of proboscis*geoffroyi*
 Mesopostnotum with several broad silvery spatulate scales below scutellum; female maxillary palpus 0.38-0.44 length of proboscis*huangae*
- 10 (8). Large patch of broad black scales on posterior dorsocentral area (caudal to juncture of prescutal suture and lateral to silvery-scaled stripe of acrostichal area) and extending over area lateral to prescutellar setae to near scutellum, also usually a few similar scales mesad of setae and lateral to prescutellar silvery scales); anteprenotum of female with 5-8 (usually 5-7) thinner setae*pollinctor*
 Posterior dorsocentral area and area lateral to prescutellar setae covered with narrow black scales or at most only 6-8 broad black scales lateral to acrostichal silvery-scaled stripe; anteprenotum of female with 9-13 (usually 9-11) stout setae*longipalpis*

PUPAE¹

1. Seta 2-VII noticeably mesad of 1-VII; trumpet narrow to moderately wide; pinna 0.10-0.41 length of trumpet2
- Seta 2-VII lateral to 1-VII; trumpet wide; pinna 0.51 length of trumpet*monetus*
- 2 (1). Trumpet narrow, pinna 0.10-0.34 of length; seta 3-VI with 2-6 branches²3
- Trumpet moderately wide, pinna 0.35-0.41 of length; seta 3-VI single7
- 3 (2). Seta 12-CT very long, longer than seta 11-CT; seta 1-Pa long*fulgens*
- Seta 12-CT moderately long to long, shorter than seta 11-CT; seta 1-Pa short4
- 4 (3). Seta 10-CT single³, longer than seta 12-CT; seta 6-I with 2 branches⁴, shorter than or equal to 7-I length*huangae*
- Seta 10-CT with 2-7 branches, shorter than seta 12-CT; seta 6-I single, noticeably longer than 7-I length5
- 5 (4). Seta 6-IV with 3,4 branches; seta 5-VII with 6-9 (usually 7,8) branches; male GL/Pa index 0.53-0.59*longipalpis*
- Seta 6-IV single or 2-branched; seta 5-VII single to 5-branched (usually 2,3-branched); male GL/Pa index 0.71-0.776
- 6 (5). Seta 10-CT moderately long, 2-branched; pinna 0.10-0.13 length of trumpet; seta 1-II with 2-7 (usually 2-4) branches*geoffroyi*
- Seta 10-CT short, with 3-7 (usually 4,5) branches; pinna 0.21-0.34 length of trumpet; seta 1-II with 8-20 (usually 8-10) branches⁵*pollinator*
- 7 (2). Seta 3-IV with 3,4 branches; seta 6-VII with 6-9 branches*brygooi*
- Seta 3-IV with 5-7 branches; seta 6-VII with 2-5 branches*phillipi*

¹Pupae of *Ae. brunhesi*, *Ae. interruptus* and *Ae. mzooi* are unknown.²Seta 3-VI single on only 1 side of 1 specimen of *Ae. geoffroyi*.³Seta 10-CT 2-branched on only 1 side of 1 specimen of *Ae. huangae*.⁴Seta 6-I single on only 1 side of 1 specimen of *Ae. huangae*.⁵Seta 1-II 5-branched on only 1 side of 1 specimen of *Ae. pollinator*.

FOURTH-INSTAR LARVAE¹

1. Seta 8-P with 10-12 branches; seta 13-C single; seta 9-III-VI branched*monetus*
 Seta 8-P single to 5-branched; seta 13-C with 2-9 branches; seta 9-III-VI single2
- 2 (1). Comb with 46-97 scales; seta 6-III,IV shorter than seta 6-I,II3
 Comb with 24-36 scales; seta 6-III,IV longer than seta 6-I,II7
- 3 (2). Seta 6-C noticeably longer than seta 5-C and slightly longer than or equal to seta 7-C length; seta 1-S near distal end of pecten, long, length approximately 0.90-0.95 width of siphon at point of attachment*geoffroyi*
 Seta 6-C shorter than seta 5-C length and noticeably longer than seta 7-C; seta 1-S widely separated distally from pecten, shorter, length approximately 0.35-0.68 width of siphon at point of attachment4
- 4 (3). Seta 4-C situated between and in diagonal line with seta 5,6-C; seta 1-A 2-branched at base of setae²*pollinator*
 Seta 4-C offset mesad of seta 5,6-C, not in diagonal line; seta 1-A single²5
- 5 (4). Setae 5,7-P single; seta 9-T single*huangae*
 Setae 5,7-P with 2,3 branches; seta 9-T with 3 or more branches6
- 6 (5). Seta 1-C with apex acute; most comb scales with apex acute; seta 6-Mx with 3-6 branches*fulgens*
 Seta 1-C with apex blunt; all comb scales with apex broad; seta 6-Mx single*longipalpis*
- 7 (2). Seta 7-C with 6-10 branches; seta 6-V,VI with 2 branches; seta 4-C with 6-12 branches*phillipi*
 Seta 7-C with 22-32 branches; seta 6-V,VI single; seta 4-C with 13-23 branches*brygooi*

¹Fourth-instar larvae of *Ae. brunhesi*, *Ae. interruptus* and *Ae. mzooi* are unknown.

²Seta 1-A single in 1 specimen of *Ae. pollinator*; 2-forked on 1 side of 1 specimen of *Ae. longipalpis*; seta 1-A 2-forked near apex on 1 side of approximately 30% of specimens and on both sides of 1 specimen of *Ae. fulgens*.

LONGIPALPIS GROUP

Aedes (Zavortinkius) longipalpis (Grunberg)

(Figs. 1, 3-6, 8, 9, 11-14)

Stegomyia longipalpis Grunberg, 1905:383 (♀*).*Ochlerotatus longipalpis* of Edwards 1912a:17-19 (♀*; ♀ and ♂ in part).*Aedes (Finlaya) longipalpis* of Edwards 1925:269 (♀ in part), 1932:151, 1941:120, 121 (♀*; K, ♀ and ♂ in part); Haddow et al. 1951:218 (A); Knight and Marks 1952:525, 526 (A, L); Gillett 1955:249 (E); Stone et al. 1959:166; van Someren 1962:19, 20 (A, ♂*?); Stone 1963:126; Hochman and Reinert 1974:6 (L); Knight and Stone 1977:98; White 1980:128; Reinert 1999 (P, L).

Female (Figs. 1, 3, 4). *Head*: Antenna dark brown, flagellomere 1 with basal area covered with small broad dark scales, pedicel dark blackish brown, with few short setae medially, 0.80-0.81 length of proboscis; maxillary palpus with scales black, broad, moderately long and many semierect presenting shaggy appearance, 0.35-0.39 length of proboscis; clypeus dark, bare; proboscis narrow, dark-scaled, 0.92-0.99 length of femur I; vertex covered with broad decumbent scales, large median black patch surrounded on lateral margins with silvery patches, few erect and semierect black forked scales mesally; postgena with broad decumbent scales, black patch anterior to antepnotum and silvery patch below; occiput with moderate number of long black erect forked scales; ocular line broad, with overlapping broad silvery scales, several dark setae; 2 long dark interocular setae; eyes contiguous above antennae. *Thorax*: Integument black; scutum with narrow black scales except for overlapping broad spatulate silvery scales on following: acrostichal area with moderately broad stripe extending from anterior margin (posterior of anterior promontory setae) to prescutellar area where it forks to form moderately broad stripe to scutellum mesad of prescutellar setae (moderately wide median area of prescutellar area bare), and large patch covering combined antealar and supraalar areas dorsal to paratergite, broad black scales posterior to this patch covering remainder of supraalar area, occasionally small patch of 6-8 broad black scales on posterior dorsocentral area lateral to acrostichal silvery-scaled stripe and anterior to prescutellar area; occasionally few broad black scales mesad of prescutellar setae; dark setae as follows: 3-5 anterior promontory, 4-8 antedorsocentral, 1 short and 1,2 long antealar, patch of short dark supraalar anterior to wing base and several long ones medially and posteriorly, 2-5 (usually 4,5) lateral prescutellar, and 1 moderately long to long parascutellar; scutellum with overlapping broad spatulate scales, midlobe with lateral silvery patches separated by median black patch, lateral lobes with small black patch, 2 long to 2 long and 0-4 short setae on midlobe, 2-4 long and 1-3 short setae on lateral lobes; mesopostnotum bare; all pleural scale patches with overlapping broad silvery spatulate scales; antepnotum with large patch of scales covering most of posterior area, 7-13 (usually 9-11) dark setae; postpnotum covered with scales, 1-3 dark setae; paratergite broad, with patch of scales; proepisternum with patch of scales covering upper area and extending onto most of lower area, 1,2 (usually 1) long dark setae (1 long and when 2 present second 1 short); subspiracular, mesomerall and metamerall areas bare; postspiracular area usually with 2 (rarely 1 or 3) dark setae; mesokatepisternum with large upper patch and smaller lower patch of scales, 1 long to 1 long and 2 short dark setae on upper area, 1,2 long dark setae on median posterior area and 4-6 short dark setae on lower area; prealar area with large patch of scales on lower area and extending dorsally to cover lower part of knob, 3-5 dark setae; mesepimeron with large patch of scales covering entire surface except narrow strip on ventral and posterior margins, 6-9 dark upper setae. *Legs*: Trochanters I-III with broad silvery scales, few setae; coxa I with very small upper and small lower

patch of broad silvery scales separated by large median patch of broad black scales, II,III with large patch of broad silvery scales dorsally and few broad black scales ventrally; femora I with anterior and posterior surfaces with broad dark scales, ventral surface with few silvery scales on basal 0.3-0.4, II,III with anterior surface dark-scaled with medium-sized elongate silvery-scaled patch at about middle, patch narrower proximally, posterior surface dark-scaled; tibiae I-III dark-scaled except I,II with very small silvery-scaled patch basoventrally, III with large white-scaled patch on basoventral approximately 0.25 and extending dorsally to form narrow basal band; tarsi I-III dark-scaled except for I with tarsomeres 1,2 with small white-scaled spot dorsobasally, II with tarsomere 1 with small white-scaled basal band, tarsomere 2 with approximately basal 0.7 white-scaled (bands narrower on ventral surface), III with tarsomere 1 with narrow white-scaled band basally, tarsomere 2 with approximately basal 0.9 white-scaled; posttarsi I-III each with 2 ungues, equal in size, both with 1 tooth. *Wing*: Dorsal and ventral veins black-scaled; remigial setae absent; alula with narrow dark scales on posterior margin; upper calypter with row of dark setae on margin. *Halter*: Pedicel dark; capitellum with few black scales basally and silvery scales apically. *Abdomen*: Terga with overlapping broad black spatulate scales, I also with large lateral patch of silvery scales, II-VI also with large silvery-scaled patch anterolaterally, similar but smaller patch on VII, also VI,VII with pair of large, more or less, rectangular patches of silvery scales dorsally, patches not reaching anterior or posterior margins of terga, VIII also with large silvery-scaled patch anterodorsally; sterna III-VII black-scaled and with silvery scales forming moderately broad band anteriorly and expanding on lateral areas to near posterior margin.

Female genitalia (Figs. 5, 6). *Tergum VIII*: Heavily pigmented; base nearly straight; scales on apical 0.84-0.87; setae on apical 0.51-0.63; Te-VIII index 0.73-0.82; Te-VIII/Te-IX index 1.58-1.77; length 0.32-0.40 mm; width 0.42-0.52 mm. *Sternum VIII*: Heavily pigmented; apical margin with small (0.05-0.07 of dorsal length) median indentation separating broadly rounded lobe on each side, row of short, broad lanceolate setae, longer ones laterally; triangular patch of broad scales laterobasally on apical 0.73-0.84; setae on apical 0.83-0.87; S-VIII index 0.96-1.17; length 0.46-0.56 mm; width 0.46-0.52 mm. *Tergum IX*: Lateral plates connected on basomesal approximately 0.6; 1-4 setae apically on each side of midline, 4,5 total setae; Te-IX index 1.73-2.25; length 0.18-0.25 mm; width 0.09-0.12 mm; dorsal spheres absent. *Insula*: Lateral margins upraised presenting V-shaped appearance; 2-5 setae on each side of midline, 4-10 total setae. *Postgenital lobe*: Basomesal apotome long and narrow; apex of lobe flat or with small (0.03-0.12 of dorsal length) median indentation; 4-9 setae on each side of midline, 9-17 total setae; ventral PGL/cercus index 0.79-0.92; dorsal PGL index 1.11-1.49; ventral PGL index 2.34-3.52; ventral length 0.18-0.23 mm. *Cercus*: Heavily pigmented; mesal margin straight; dorsal surface with setae on apical 0.56-0.63; 7,8 (usually 8) long and moderately long stout setae on apical area; cercus index 2.96-3.16; cercus/dorsal PGL index 2.38-2.97; length 0.22-0.28 mm; width 0.07-0.09 mm.

Male. Similar to female except for the following. *Head*: Antenna, 0.75-0.88 length of proboscis; maxillary palpus 0.95-1.02 length of femur I, approximate proportion of each palpomere-- 5 = 0.13, 4 = 0.10, 3 = 0.40, 2 = 0.26, 1 = 0.11, palpomere 5 slightly downturned, with few long setae ventrally and about 2 long and 2 short ones at apex, palpomere 4 with few long setae directed lateroventrally, palpomere 3 long, apex slightly swollen and with few long setae directed ventrally; proboscis 1.06-1.08 length of femur I. *Thorax*: Antealar area with 1 short and 1 long setae; antepnotum with 7-10 (usually 7,8) setae. *Legs*: Posttarsi I-III each with 2 ungues, I,II with ungues unequal, each with 1 tooth, III with ungues equal, each with 1 tooth.

Male genitalia (Figs. 8, 9). *Tergum IX*: Moderately to heavily pigmented; posterior margin on each side of midline bearing 3-5 setae, 7,8 total setae. *Gonocoxite*: Tergal surface with setae moderately long, moderately stout and more or less dispersed evenly over entire area, basal dorsomesal lobe thumb-shaped, projected caudosternally, bearing 4-6 (usually 5) setae that are long,

stout, curved, simple and arranged in line from apex to base; lateral surface with long stout setae and long broad dark scales from base to apex; scales on apical area of gonocoxite noticeably longer than others; sternal surface covered with long dark scales and few long stout setae apically; Gc length 0.38-0.41 mm. *Gonostylus*: Moderately long, Gs length 0.13-0.15 mm; narrow but distal 0.5 gently tapered to narrower apex; occasionally few minute spicules on basal 0.5; without setae; Gs/Gc index 0.34-0.38; GC long, length 0.04-0.06 mm; GC/Gs index 0.33-0.42. *Claspette*: Stem moderately long, covered with short spicules except distal 0.1, length 0.13-0.14 mm, 3,4 thin setae, 1 moderately long on apical 0.33, 2,3 short on middle 0.33; filament blade-shaped, slightly curved, heavily pigmented, apex acute and slightly recurved, length 0.10-0.12 mm; CF/CSt index 0.79-0.87; CSt/Gc index 0.32-0.33. *Proctiger*: With 3-5 minute cercal setae on each side, 7-10 total setae. *Tergum X*: Narrow but developed into tongue-shaped, median, cephalad-directed lobe separating 2 halves of tergum IX. *Phallosome*: Aedeagus long, relatively narrow, approximately uniform width throughout length, apex gently narrowed and with small median indentation, basotergal notch small, length 0.15-0.16 mm; paramere relatively narrow, length 0.10-0.12 mm; Par/Ae index 0.63-0.77; basal piece moderately wide, length 0.07 mm; BP/Ae index 0.41-0.47. *Sternum IX*: With 2-4 long and 3,4 moderately long stout setae on posterior area, 5-7 total setae.

Pupa (Figs. 11-13). Setal branching as in Table 1. *Cephalothorax*: Uniformly pale tan; lateralia with cuticular ocular facets of compound eye weakly developed; median keel with long row of strongly developed transverse striations; postscutal area completely split to metanotum along dorsal ecdysial line during eclosion of imago; seta 7-CT with 4-6 branches; 8-CT long, with 5-8 branches, 9-CT single to 3-branched; 10-CT short, with 4-7 branches; 11-CT long, single, longer than 12-CT; 12-CT moderately long, with 4-6 branches, longer than 10-CT. *Trumpet*: Narrow; index 4.18-4.85; pinna 0.15-0.18 length of trumpet. *Abdomen*: Terga with small spicules; seta 1-II short, with 12-17 (usually 14-17) thin branches; 1-III with 7-13 (usually 9-13) branches; 1-IV with 5-8 (usually 6,7) branches; 1-VI with 3-6 (usually 5,6) branches; 2-VII noticeably mesal to 1-VII; 3-VI, 4-VII with 3-6 branches; 5-VII with 6-9 (usually 6,7) branches; 6-I long, noticeably longer than 7-I length, single; 6-IV with 3,4 branches; 6-V with 2,3 branches; 6-VII with 7-12 (usually 10,11) branches; 9-VIII with 10-15 (usually 11-13) branches, displaced anteriorly from posterior margin; stout pimple like spicule situated slightly cephalad of 9-VIII; female GL index 0.93-0.95; female GL/Pa index 0.34-0.36; male GL index 1.24-1.31; male GL/Pa index 0.53-0.59. *Paddle*: Index 1.18-1.26; with tiny serrations on basal 0.73-0.78 of lateral margin; seta 1-Pa short.

Fourth-instar larva (Fig. 14). Setal branching as in Table 9. *Head*: Seta 1-C with apex blunt; 4-C mesal and slightly posterior to 6-C, short, with 6-11 fine branches; 5,6-C very long and long respectively, single (5-C 2-branched on 1 side of 1 specimen); 5-C posterior and very slightly lateral to 4-C; 7-C lateral and slightly anterior to 6-C, long, single (2-branched on 1 side of 2 specimens); 13-C with 2-5 branches; maxillary body long; 6-Mx single; dorsomentum with 30-33 teeth; lateral palatal brush filaments simple. *Antenna*: Length 0.42-0.48 mm; few (about 6,7) small spicules on proximal 0.3; seta 1-A usually not reaching apex of antennal shaft, borne 0.53-0.61 from antennal base, single (2-forked on 1 side of 1 specimen). *Thorax*: Setae 1-3-P not borne on common setal support plate; 5-7-P, 5-M moderately long, approximately equal in length (6-P slightly longer than 5-P), moderately stout, 5-P,M with 2,3 branches; 6-T with 4,5 thin branches; 12-T single. *Abdomen*: Some setae pectinate (e.g., 3-II-IV,VI, 4-II,V); seta 2-VIII with 4-6 thin branches; 3-II with 6,7 fine branches; 3-V with 5-8 fine branches; 3-VI with 3-5 fine branches; 3-VII with 6-10 fine branches; 3-VIII with 5-7 branches; 4-VI with 6-10 fine branches; 6-III-V moderately long, thin, lightly pigmented, shorter than 6-I,II; 7-II with 7-10 thin branches; 10-III with 4-6 thin branches; 10-IV with 4-7 thin branches; 10-V with 3-5 thin branches; segment VIII with comb of 66-79 (usually 66-77) scales in patch, scales with apex broadly rounded, moderately long thin spicules on apical and lateral margins; saddle heavily pigmented, about 3-6 short stout spines on posterior

margin dorsally; saddle/siphon index 2.79-3.32; 2-X approximately 0.5 length of 3-X, with 4-7 branches; 4-X with 10-12 (usually 12) setae, posterior 8 setae on grid, each with 7-13 branches, anterior 2-4 setae shorter and with fewer branches; 4 anal papillae, moderately broad, pointed, dorsal pair long, ventral pair approximately 0.65 length of dorsal pair. *Siphon*: Acus absent; index 2.63-2.99 (dorsal length to basal width) or 3.01-3.67 (dorsal length to width at 0.5 length); pecten located subbasal, on basal 0.38-0.43, composed of 13-21 spines, proximal 2-4 spines small, spines at mid length of pecten with 3,4 stout and 0-2 tiny spicules basoventrally; seta 1-S borne on proximal 0.58-0.61 of siphon far distal to pecten, with 5-8 branches; 8-S short, with 7-9 branches; spiracular apodeme with narrow knob on basoventral area.

Egg. Gillett (1955:249) reported the following for eight batches of fixed eggs from the Zika Forest near Entebbe, Uganda "...eggs of *A. (F.) longipalpis* resemble those of the various species of *Stegomyia* used, in their long sausage-shape."

Type data. The holotype female is deposited in the Berlin Zoological Museum (Zoologisches Museum für Naturkunde der Humboldt-Universität zu Berlin), Berlin, Germany, and contains the following information on four labels attached to the adult pin: Kamerun, Duala-Hafen, Dr. Zupitza [Zupitza is followed by two letters that appear to be "S" and "g"], 17.-18.VII.01. (blue paper rectangular label); Zool. Mus. Berlin (off white paper rectangular label); *Stegomyia Longipalpis* Grunberg (white paper rectangular label); and Type (pale red paper small rectangular label). The holotype is in fair condition but tarsus III is missing on one leg and tarsomeres 4,5 of tarsus III are missing on the other leg. Another pinned female in the Berlin Zoological Museum may be a paratype, but is not labeled as such, and contains three labels with the following information: Westajinka, (Kamerun), Ziemanni S; Zool. Mus. Berlin; and *Stegomyia Longipalpis* Grunberg.

Discussion. *Aedes longipalpis sensu lato* is a complex of four species (i.e., *Ae. geoffroyi*, *Ae. huangae*, *Ae. longipalpis* and *Ae. pollinator*) and here referred to as the Longipalpis Complex. Because the species of this complex are very similar previous workers had not recognized them and had lumped the species together as *Ae. longipalpis*, which probably resulted in the differences in published descriptions. Within the Longipalpis Complex, pupal and fourth-instar larval characters provide the most clear separation between the species. Some adults are difficult to identify to species using habitus features, especially if the scutum is rubbed. The keys, individual species descriptions and illustrations provide features for separating the species of the complex. It was not always possible to determine from the published literature which species of the complex previous investigators had studied, therefore most of the records need to be confirmed. Considerable additional collections of individually reared adults with their associated fourth-instar larval and pupal exuviae are needed from central and western Africa to provide an accurate distribution of the species.

Species within the Longipalpis Group, which includes the four species of the Longipalpis Complex plus *Ae. fulgens* and *Ae. mzooi*, have very long maxillary palpi in the females that somewhat resemble those of species of *Aedes (Mucidus)*; however, these latter mentioned mosquitoes are distinctively different in all life stages from *Zavortinkius*. Within the Longipalpis Group, female maxillary palpal length, compared to proboscis length, for the specimens examined was primarily different (but with some overlap in range) for most species (i.e., *Ae. pollinator* 0.26-0.31; *Ae. geoffroyi* 0.30-0.36; *Ae. longipalpis* 0.35-0.39; *Ae. huangae* 0.38-0.44; *Ae. mzooi* 0.47-0.51; and *Ae. fulgens* 0.66-0.75); however, these ranges may increase with the examination of additional material. Females of the group are moderately large-sized except those of *Ae. pollinator*, which are moderate in size. See the key to adults for primary features separating the species of the group.

The male genitalia of members of the Longipalpis Group are similar especially in the following: aedeagus is long, narrow and has approximately an uniform width throughout the length,

and is more or less emarginate; claspette filament is long, narrow, and the distal portion is tapering to a point; gonocoxite has scales on the apical portion very long and noticeably longer than the others; gonostylus is moderately long and narrow; sternum VIII has the apical margin gently concave or flat; and tergum IX has few (usually 4 or less) setae on each side of the midline. Most species of the group can be separated from each other by the development of the basal dorsomesal lobe of the gonocoxite, number and thickness of setae on tergum IX and presence/absence of short subapical setae on the gonostylus.

Pupae of the Longipalpis Group have the male genital lobes with the apices approximated. The group is distinguished from the other two groups in having the trumpet narrow and with the pinna 0.10-0.34 of the trumpet length. Species in the Longipalpis Group are easily separated by the development and branching of setae 10-12-CT, i.e., *Ae. fulgens* has seta 12-CT>seta 11-CT>seta 10-CT, *Ae. geoffroyi* has seta 11-CT>seta 12-CT>seta 10-CT, *Ae. huangae* has seta 11-CT>seta 10-CT>seta 12-CT, *Ae. longipalpis* has seta 11-CT>seta 12-CT>seta 10-CT and *Ae. pollinator* has seta 11-CT>seta 12-CT>seta 10-CT. Additionally, *Ae. pollinator* has seta 10-CT short and with 3-7 (usually 4,5) branches, seta 11-CT is long and seta 12-CT is moderately long and with 3-6 (usually 3,4) branches; *Ae. fulgens* has seta 10-CT short and with 4-11 branches, seta 11-CT is long and seta 12-CT is very long and single or 2-branched; *Ae. geoffroyi* has seta 10-CT moderately long and 2-branched, seta 11-CT is very long and seta 12-CT is long and single to 3-branched (usually 2,3); *Ae. huangae* has seta 10-CT long and single (2-branched on 1 side of 1 specimen), seta 11-CT is very long and seta 12-CT is long and with 3-6 (usually 3,4) branches; and *Ae. longipalpis* has seta 10-CT short and with 4-7 branches, seta 11-CT is long and seta 12-CT is moderately long and with 4-6 (usually 5,6) branches.

Fourth-instar larvae of species in the Longipalpis Group are similar to each other but can be separated as follows: *Ae. longipalpis*--seta 1-C has the apex blunt; seta 5-C>seta 6-C>seta 7-C length; seta 6-Mx is single; seta 5-P,M has 2,3 branches; seta 6-III,IV is moderately long (usually about 0.5 or less length of seta 6-I,II) and thin; comb consisting of 66-79 scales and each is rounded apically; saddle bearing a few (about 3-6) short stout spines on the posterior margin dorsally; anal papillae are moderately broad, apices are pointed, dorsal pair are long and ventral pair are moderately long; and seta 1-S is separated distally from the pecten; *Ae. pollinator*--seta 1-C has the apex blunt; seta 5-C>seta 6-C>seta 7-C length; seta 6-Mx and seta 5-M are single; seta 5-P has 2,3 branches; seta 6-III,IV is moderately long (usually less than 0.5 length of 6-I,II), thin; comb consisting of 76-97 scales with each scale rounded apically; saddle bearing a few long stout spines on the posterior margin dorsally; anal papillae are moderately long, narrow, and are approximately equal in length; and seta 1-S is widely separated distally from pecten; *Ae. fulgens*--seta 1-C has the apex acute; seta 5-C>seta 6-C>seta 7-C length; seta 6-Mx has 3-6 branches; seta 5-P has 2 (rarely 3) branches; seta 5-M is single; seta 6-III,IV is longer (approximately 0.75-0.80 length of seta 6-I,II) and stouter; comb consisting of 46-68 scales and most scales have a pointed median apical spine; saddle bearing a patch (about 5-7) of long stout spines on the posterior margin dorsally; anal papillae are broad, apices are broadly pointed, dorsal pair are moderately long and ventral pair are short; and seta 1-S is separated distally from the pecten; *Ae. geoffroyi*--seta 1-C has the apex acute; seta 6-C>seta 7-C>seta 5-C length; setae 6-Mx, 5-P,M are single; seta 6-III,IV is slightly shorter than seta 6-I,II and stouter; comb consisting of 54-64 scales and each scale is rounded apically; saddle bearing a patch of long stout spines on the posterior margin dorsally; anal papillae are moderately broad, apices are pointed, and dorsal and ventral pairs are moderately long; and seta 1-S is close to distal end of the pecten; and *Ae. huangae*--seta 1-C has the apex acute; seta 5-C>seta 6-C>seta 7-C length; seta 6-Mx is single or 2-branched; seta 5-P is single; seta 5-M has 3,4 branches; seta 6-III,IV is moderately long (usually 0.65-0.80 length of seta 6-I,II) and stouter; comb consisting of 65-88 scales and each scale is rounded apically; saddle bearing 4-6 (usually 4) moderately long stout spines

on the posterior margin dorsally; anal papillae are moderately broad, apices are pointed, dorsal pair are long and ventral pair are moderately long; and seta 1-S is separated distally from the pecten.

Fourth-instar larvae of the Longipalpis Group are distinguished from those of the other two groups by: seta 5-C is single (except 2-branched in one specimen of *Ae. pollinator*); setae 1-3-P are without a common setal support plate; seta 3-M has 2-7 branches; seta 6-III,IV is shorter than seta 6-I,II; comb is composed of 46-97 scales in a patch; and siphon is without an acus.

Graham's two syntype females of *Stegomyia pollinator* are conspecific with *Ae. longipalpis*. Labels on one female contain the following information: Yaba, 26-7-09, C [caught] on window, 1 pin, WMG; Yaba, Lagos, W. Africa, 26.VII.1909, Dr. W. M. Graham, 1910-80; Syn-type; and *Aedes (Zavortinkius) longipalpis*, Det: John F. Reinert (rectangular, white, paper label). The other female contains the same label data except: 22-9-09, C [caught] in bedroom (first label); and Type, *Stegomyia pollinator* Graham (small, circular, white, paper label with a red border). Both females are in fair condition and are deposited in The Natural History Museum (BMNH), London, United Kingdom.

Edward's (1941:120, 121) description of the female and male appear to be those of *Ae. longipalpis* but the description and illustration (pages 386, 387) of the pupa is *Ae. pollinator* and the description (page 429) of the larva is *Ae. geoffroyi*. Additionally, Edward's distributions (page 121) given for Nigeria, Lagos (Graham's types of *Ae. pollinator*) are *Ae. longipalpis* and *Ae. pollinator*, (Wigglesworth's specimens) are *Ae. geoffroyi*, *Ae. longipalpis* and *Ae. pollinator*, (Cannal's specimens) are *Ae. geoffroyi*, while those listed for Ghana (Gold Coast), Ofako (Ingram's larval and pupal specimens) are *Ae. geoffroyi*, Cameroons, Misselele (Zumpt's specimens) are *Ae. longipalpis*, and Uganda, Katoba (Gibbins' specimens) are *Ae. pollinator* (see specimens examined under my distribution sections). Robinson's (1950:81, 82) descriptions of the pupa and larva of *Ae. longipalpis* appear to be those of *Ae. fulgens*. The description and the male genitalia illustration of van Someren (1962) appear to be of *Ae. longipalpis* except for the gonostylus which shows two short setae subapically (these setae are absent in the specimens of *Ae. longipalpis* that I have examined).

See the discussion sections of *Ae. geoffroyi* and *Ae. pollinator* concerning records of *Ae. longipalpis* by Kumm (1931) and Hopkins (1936, 1952). The record of *Ae. longipalpis* by Phillip (1931) from Lagos, Nigeria, should be attributed to *Ae. geoffroyi* and *Ae. pollinator* (see specimens examined and recorded under distribution sections of the latter two species). The records of *Ae. longipalpis* by Robinson (1948, 1950) from Balovale, Zambia, should be for *Ae. fulgens* (see record under distribution section of the latter species). Specimens collected and reported as *Ae. longipalpis* from Kapain, Liberia, by Peters (1956) are *Ae. huangae* (see discussion section of the latter species). I have examined two fourth-instar larvae that are deposited in the BMNH, London, United Kingdom. These two larvae are mounted on a single slide and possess the following label data: *Aedes longipalpis* Grunb., Kenya, P. C. C. Garnham, B.M. 1947-222. These specimens are most likely from the collections reported by Garnham et al. (1946). Even though both larvae are in very poor condition the following features can be seen: seta 1-A is single, one of pair is lightly forked on the distal 0.2; seta 4-C is short, branched, and mesad of seta 5-C; setae 5-7-C are long, simple, and approximately equal in length; seta 1-S is well separated from the distal pecten spine; and saddle bearing a few stout spines posterodorsally. This combination of features does not fit *Ae. fulgens*, *Ae. geoffroyi*, *Ae. huangae*, *Ae. longipalpis* or *Ae. pollinator*; therefore, the larvae may belong to *Ae. mzooi*, of which the immatures are unknown, or an undescribed species.

Because *Ae. longipalpis* is now known to be a complex of four species and since no voucher specimens were available for examination the following reports on bionomics and distribution need to be reevaluated and confirmed: Bauer (1928); Boorman and Service (1960); Collado (1936); Cornet et al. (1979); Doucet and Cachan (1962); Doucet et al. (1960); Dunn (1926, 1927, 1928); Edwards (1912a, 1941); Evans (1925, 1926); Forattini et al. 1970; Fox (1958); Garnham et al.

(1946); Gayral et al. (1975); Grjebine (1957); Lumsden (1951, 1952); Hamon et al. (1956a, 1956b, 1961); Machado et al. (1981); Maillot and Grjebine (1947); Medler (1980); Raymond et al. (1976); Rickenbach et al. (1972, 1974, 1976a, 1976b); Rozeboom and Burgess (1962); Salaun et al. (1969); and Service (1963, 1965).

Distribution. 91 specimens examined: 2♀pl+g, 5♀pl, 3♀p, 4♀+g, 11♀, 3♂pl+g, 5♂pl, 3♂+g, 2♂ and 8L.

CAMEROON, Duala-Hafen (= harbor), 17-18 Dec. 1901, Dr. Zupitza (1♀, holotype); Westajinka, Ziemanni (1♀, paratype ?); Misselele, 15-25 Nov. 1935, F. Zumpt (1♂+g); Yaounde, 29 Mar. 1950 (3L).

DEMOCRATIC REPUBLIC OF THE CONGO, Lambermont, 17 Apr. 1950, M. Lips (3L).

IVORY COAST, Dabakala Pref., Sokala-Sobara, O.R.S.T.O.M. Laboratory, 26 Jun. 1987, B. Jeoffroy and T. J. Zavortink (1♀pl+g, 2♀pl, 1♀, 3♂pl+g, 5♂pl and 2L); Center Department, Dezidougou, near M'Bahiakro, 29,30 May, 2 Jun. 1985, Y-M. Huang and J. E. Pecor (1♀pl+g, 3♀pl, 2♀p and 1♂).

NIGERIA, Yuba, Lagos, 26 Jul., 22 Sep. 1909, 1♀ caught in bedroom 1♀ caught on window, W. M. Graham (2♀, syntypes of *Ae. pollinator*); Zaria Province, Kaduna, 21 Aug. 1957, W. A. McDonald (1♀+g, 2♀, 1♂+g and 1♂).

SIERRA LEONE, Nerebaro, 3 Nov. 1955, D. J. Lewis (1♀+g); Southern Province, Tiwai Island, 9 May 1984, Y-M. Huang (1♀p).

UGANDA, Bwamba Province, Jun., treehole B3, van Someren (1♂+g); Bwamba, Semliki Forest, Apr.-May, Sep.-Oct. 1947, A. J. Haddow (1♀+g and 4♀); Entebbe area, c.1961, J. D. Gillett (1♀+g).

Distribution from the literature.

ANGOLA, Dundo (Machado et al. 1981).

CAMEROON (Salaun et al. 1969); Duala (Grunberg 1905); Misselele (Edwards 1941); Yaounde vicinity, Ototomo, Zoatoupsi (Rickenbach et al. 1972); Yaounde (Rickenbach et al. 1974, 1976a); Ndelle, Tibati, Yaounde (Rickenbach et al. 1976b).

CENTRAL AFRICAN REPUBLIC, Carnot, Guembe River, Sosso (Grjebine 1957).

DEMOCRATIC REPUBLIC OF THE CONGO, Eala, Leopoldville (Edwards 1941); Lambermont, Vinamont (Mattingly 1953; Lips 1953).

EQUATORIAL GUINEA, Kioko Island, Rebola (Collado 1936).

IVORY COAST (Doucet et al. 1960); Abidjan (Doucet and Cachan 1962).

LIBERIA, Charlesville (Fox 1958); Harbel (Rozeboom and Burgess 1962).

MALI, Bougouni, Sogola, Yanfolila (Hamon et al. 1961).

NIGERIA (Edwards 1912a; Hopkins 1936; Medler 1980); Lagos (Wesche 1910; Graham 1910b; Forattini et al. 1970); Ikoyi, Yuba (Dunn 1926); Lagos vicinity (Dunn 1927, 1928); Yuba in vicinity of Lagos (Bauer 1928); Ashiri (Hamon et al. 1956a); Niger Delta, Oloibiri District, Degema (Boorman and Service 1960); Enugu Ezike, Ibadan, Ikeja, Ikorodu, Kaduna, Katabu, Lagos, Oloibiri, Tiko, Ilorin, Itowolo, Malumfashi, Misselele (Service 1963); Anguwun, Anara Forest Reserve (Service 1965).

REPUBLIC OF THE CONGO, Brazzaville (Maillot and Grjebine 1947; Grjebine 1957).

SENEGAL (Cornet et al. 1979); Bignona, Velingara (Hamon et al. 1956b); Kedougou (Raymond et al. 1976).

SIERRA LEONE, Daru (Evans 1925); Freetown (Evans 1926; Edwards 1941).

TOGO (Edwards 1912a).

UGANDA, Bwamba County (Haddow 1945; Haddow et al. 1951; Dick and Haddow 1952); Bwamba County, Mamirimiri, Mongiro (Haddow et al. 1947); Bwamba County, Mongiro (Haddow

and Mahaffy 1949); Bwamba County, Mamirimiri (Haddow and Dick 1948); Bwamba County, Ntotoro, Tokwe (Lumsden 1951); Bwamba County, Mongiro (Lumsden 1952); Entebbe, Bwamba County, Semliki Forest (Haddow 1961); Zika Forest, near Entebbe (Gillett 1955; Haddow and Ssenkubuge 1965).

Bionomics. Immatures have been collected from rot-holes in trees (Evans 1926); banana fibre, tree root, treehole and stream (Edwards 1925); treeholes (Dunn 1926, 1927; Hopkins 1952; Dick and Haddow 1952; Grjebine 1957; Fox 1958; Boorman and Service 1960; Haddow 1961; Hamon et al. 1961; Raymond et al. 1976); preferred high treeholes (Haddow et al. 1947); very common in treeholes in forest (Haddow et al. 1951); hollow of mango tree (Hamon et al. 1956a); holes of flamboyants (Hamon et al. 1956b); and in treeholes in a village and a forest reserve (Service 1965).

Females have been taken biting humans (Bauer 1928; Edwards 1941; Lumsden 1952); adults were collected from "bottle hole" and "basin hole" of trees (Dunn 1928); adults are widely distributed, never very common, and largely confined to the forest, have a marked period of biting activity in the middle of the day (1000-1400 hrs) when the temperature, saturation deficiency and light are at their maximum (Haddow 1945); females are arboreal and were collected between 0600 and 1800 hours (peak activity 1000-1400 hrs) during the rainy and dry seasons (Haddow et al. 1947); biting monkeys (Haddow and Dick 1948); adults collected on platforms in trees located between 50 and 60 feet above ground during the evening and early night (Haddow and Mahaffy 1949); biting humans in the canopy (very common), forest (occasional), plantations (scarce), by night in canopy (occasional), also taken biting monkeys (Haddow et al. 1951); biting humans at forest floor and in canopy (Lumsden 1951); in human-baited traps (Fox 1958); adults in forest (Doucet et al. 1960; Doucet and Cochran 1962; Gayral et al. 1975); adults are markedly arboreal and essentially diurnal in the forest canopy, the biting cycle showed a steady and rapid increase from shortly after sunrise to a well-marked peak in mid-afternoon and a sharp fall thereafter, adults do not appear to swarm (Haddow 1961); biting humans during the day in a forest at 20 ft level and in a banana plantation (Haddow and Ssenkubuge 1965); showed a human-biting preference for the canopy with a peak at the beginning of the afternoon (Rickenbach et al. 1972); and precipitin tests showed females had fed on primates (Rickenbach et al. 1974).

Medical importance. Uganda S virus was believed to have been isolated from a pool of 47 *Ae. (Zav.) longipalpis*, 17 *Ae. (Fin.) ingrami* and one *Ae. (Aedimorphus) natronius* Edwards adults collected in Bwamba County, Uganda (Dick and Haddow 1952); however, Haddow (1961) stated that either *Ae. longipalpis* or *Ae. ingrami* was probably the species from which the original isolation of Uganda S virus was made.

***Aedes (Zavortinkius) fulgens* Edwards**
(Figs. 1, 3, 4, 6, 8, 10, 12, 13, 16)

Aedes (Ochlerotatus) fulgens (Group *Finlaya*) Edwards, 1917:313 (♀).

Ochlerotatus longipalpis of Aders 1917:396 (L).

Ochlerotatus fulgens of Aders 1917:396 (L).

Aedes fulgens of Haworth 1924:174.

Aedes (Finlaya) fulgens of Edwards 1925:269 (♀), 1932:129, 148, 150, 1941:120, 121 (K, ♀); Hopkins 1936:106 (L), 1941:175, 176, 177 (K, ♀, L), 1952:118, 129 (K, L); Robinson 1950:81, 82 (P, L); Muspratt 1955:162, 195 (K, A); de Meillon et al. 1945:99 (P); Knight and Marks 1952:526 (A, L); van Someren et al. 1955:472 (A); Stone et al. 1959:162; Gardner 1971:108, 142, 147 (L*); Ribeiro and Ramos 1973:117 (K, ♀, L); Knight and Stone 1977:95; White 1980:128; Townsend 1990:75; Jupp 1996:56, 59 (K, ♀*, ♂*).

Similar to *Ae. longipalpis* but differs as follows.

Female (Figs. 1, 3, 4). *Head*: Antenna 0.77-0.90 length of proboscis; maxillary palpus long, 0.66-0.75 length of proboscis; proboscis 0.93-0.99 length of femur I; vertex with few erect and semierect pale brown forked scales (3-5 of these black); occiput with pale brown erect forked scales. *Thorax*: Scutum with prescutellar area covered with overlapping broad silvery scales or with only very narrow median area bare; 2 anterior promontory setae; 5-8 antedorsocentral setae; 1 short and 1 long antealar setae; scutellum with midlobe covered with wide patch of broad silvery scales (few specimens also with 1-5 median posterior dark scales), 2,3 long and 0,1 short setae, lateral lobes with 2 long to 4 long and 0,2 short setae; mesopostnotum with few broad silvery scales anteriorly below scutellum (4 specimens without scales, apparently rubbed off?); 2-5 postpronotal setae; 1 long upper proepisternal seta; 1 (rarely 2) postspiracular seta; 2-8 prealar setae; 1,2 upper, 1,2 median posterior and 2-4 lower mesokatepisternal setae; 6-13 upper mesepimeral setae. *Legs*: Coxa I with upper and lower patch of silvery scales separated by moderate-sized median patch of black scales; femora I with anterior surface dark-scaled (few silvery scales ventrally in some specimens), posterior surface with silvery-scaled stripe ventrally on approximately basal 0.75; tibiae I-III dark-scaled, I,II also with small silvery-scaled patch (reduced to 2,3 scales in some specimens) basoventrally, III all dark-scaled; tarsi I-III dark-scaled, I also with tarsomere 1 with posterior surface white-scaled, II also with tarsomere 1 with dorsal, ventral and posterior surfaces white-scaled (in number of specimens pale scales extending onto dorsal and ventral areas of anterior surface leaving only distinct or indistinct median narrow dark-scaled line), tarsomere 2 white-scaled or with few dark scales apically, tarsomere 3 with or without small white-scaled patch basally on anterodorsal, dorsal and posterodorsal areas, III with tarsomere 1 dark-scaled, tarsomere 2 with approximately basal 0.75 white-scaled. *Wing*: Remigium with 2-4 dark setae. *Abdomen*: Tergum V also with pair of small silvery-scaled patches (sometimes patches reduced to only 2,3 scales or absent) dorsolaterally at about mid length.

Female genitalia (Fig. 6). *Tergum VIII*: Scales on apical 0.86-0.93; setae on apical 0.60-0.69; Te-VIII index 0.71-0.89; Te-VIII/Te-IX index 1.62-1.96; length 0.33-0.38 mm; width 0.40-0.46 mm. *Sternum VIII*: Apical margin with small (0.07-0.08 of dorsal length) median indentation, lanceolate setae somewhat narrower; laterobasal scale patch somewhat larger, on apical 0.79-0.93; setae on apical 0.84-0.90; S-VIII index 0.97-1.16; length 0.49-0.57 mm; width 0.46-0.51 mm. *Tergum IX*: With 1-3 setae apically on each side of midline, 2-5 total setae; Te-IX index 1.83-2.31; length 0.17-0.22 mm; width 0.08-0.10 mm. *Insula*: With 3-5 setae on each side of midline, 7-10 total setae. *Postgenital lobe*: Apex flat or with small (0.03-0.05 of dorsal length) median indentation; 6-10 setae on each side of midline, 14-18 total setae; basal mesal apotome shorter and broader; ventral PGL/cercus index 0.85-0.89; dorsal PGL index 1.16-1.81; ventral PGL index 2.84-3.67; ventral length 0.19-0.22 mm. *Cercus*: Dorsal surface with setae on apical 0.57-0.71; 8,9 long and moderately long stout setae on apical area; cercus index 2.55-3.00; cercus/dorsal PGL index 2.55-3.00; length 0.21-0.25 mm; width 0.08-0.10 mm.

Male. Similar to female except for the following. *Head*: Antenna 0.72-0.80 length of proboscis; maxillary palpus 0.96-1.00 length of proboscis; proboscis 1.01-1.10 length of femur I. *Leg*: Tarsus II with tarsomere 3 dark-scaled. *Abdomen*: Tergum V with few silvery scales or without silvery scales dorsally.

Male genitalia (Figs. 8, 10). *Tergum IX*: Posterior margin on each side with 1-3 setae, 4,5 total setae. *Gonocoxite*: Basal dorsomesal lobe poorly developed as small area of gonocoxite defined basally by wrinkles, bearing 2 setae that are moderately long, stout, curved and simple. *Gonostylus*: Gs length 0.16 mm; slightly thicker; spicules absent or only 3,4 on proximal 0.3; 1,2 (usually 1) subapical setae; GC usually somewhat thicker, length 0.04-0.05 mm; GC/Gs index 0.25-0.30. *Claspette*: Stem usually shorter, length 0.10-0.11 mm; CSu/Gc index 0.29-0.30. *Proctiger*:

With 4-7 cercal setae on each side of midline, 8-12 total setae. *Phallosome*: Aedeagus with basotergal notch very deep, length 0.14-0.15 mm; Par/Ae index 0.72-0.78. *Sternum IX*: With 2-4 long and 3-6 moderately long setae (1 specimen with 2 broad scales) on posterior area, 7-10 total setae.

Pupa (Figs. 12, 13). Setal branching as in Table 2. *Cephalothorax*: Pale tan with small darker areas on posterior portion of scutum; seta 7-CT with 2-5 branches; 10-CT short, with 4-11 branches; 11-CT long, shorter than 12-CT, single; 12-CT very long, single to 2-branched. *Trumpet*: Index 3.53-4.34; pinna 0.11-0.12 length of trumpet. *Abdomen*: Terga with tiny spicules; seta 1-II with 7-33 (usually 12-27) branches; 1-VI with 2-6 (usually 3-5) branches; 3-VI with 2,3 branches; 4-VII with 2-4 branches (rarely 2-branched); 5-VII with 2-4 (usually 3,4) branches; 6-I very long, noticeably longer than 7-I length; 6-IV with 2-6 (usually 2-5) branches; female GL index 0.90-1.06; female GL/Pa index 0.35-0.40; male GL lobe index 1.32-1.36; male GL/Pa index 0.58-0.62. *Paddle*: Index 1.23-1.34; with tiny serrations on basal 0.66-0.72 of lateral margin; seta 1-Pa long.

Fourth-instar larva (Fig. 16). Setal branching as in Table 10. *Head*: Seta 1-C with apex acute; 7-C lateral and slightly posterior to 6-C, with 2,3 branches; 6-Mx with 3-6 branches; dorsomentum with 25-33 teeth. *Antenna*: Length 0.39-0.47 mm; number of small spicules on basal 0.7, many on basal 0.4 stout; seta 1-A extends beyond apex of antennal shaft, single (usually) or 2-forked *near apex* (approximately 30% of specimens 2-forked on 1 side; 1 specimen 2-forked on both sides). *Thorax*: Seta 5-P with 2 branches (3-branched in 1 specimen); 5-M single; 6-T with 2-4 branches; 12-T usually with 2 branches (if single on 1 side, then 2-branched on other side, very rarely both single). *Abdomen*: Setae 3-VIII, 10-III, IV with 2-4 branches; 6-I-V long, stout, heavily pigmented, 6-I, II slightly longer than 6-III, IV; 6-VI single; 7-II with 3-6 branches; segment VIII with comb of 46-68 scales, almost all scales long and with stout pointed median spine apically, short fine spicules on lateral margins basal to spine; saddle with patch of (about 5-7) long stout spines and several short stout spicules on posterior margin dorsally; saddle/siphon index 2.98-3.48; 2-X with 4,5 branches; 4 anal papillae, broad, apices broadly pointed, dorsal pair moderately long, ventral pair short, about 0.25-0.30 length of dorsal pair. *Siphon*: Index 2.31-3.45 (dorsal length to basal width) or 2.85-3.68 (dorsal length to width at 0.5 length); pecten on proximal 0.42-0.49, composed of 19-25 spines, proximal 1-3 spines small, spines at mid length with 1,2 (usually 1) stout and 0-2 tiny spicules basoventrally; spiracular apodeme without knob on basoventral area.

Type Data. Edwards (1917) stated the type series included specimens from Zanzibar (Dr. W. M. Aders), some bred from larvae found in a hole in a mango tree, 15.v.1915 and one female from Karonga, Nyasaland, ii.1912 (Dr. A. G. Eldred). In 1990, Townsend indicated the holotype male and seven paratypes (four female and three male) were in the BMNH. The holotype male contains the following information on four labels attached to the adult pin: Pres. by Impl. Bureau Ent., 1915-258 (white rectangular paper label); *Ochlerotatus fulgens* Edw., Type (circular paper label with a red border); HOLO-TYPE (circular paper label with a red border); and Zanzibar: Wireless Station, 15.V.1915, Dr. W. M. Aders, Larvae in hole in mango tree (white paper square label). The holotype is pinned through both sides of the mesepimeron with a minuten pin secured to a yellow plastic rectangular stage that is secured to an insect pin; the genitalia are mounted in a drop of balsam on a yellow plastic rectangle attached to the insect pin. One paratype female has the same label data as the holotype except for Para-type; the genitalia are mounted in a drop of balsam on a small glass coverslip glued to a paper stage attached to the insect pin. One paratype female contains the following data: Zanzibar, Dr. W. M. Aders, 1916-145; and Para-type. One paratype female contains the following label information: Pres. by Ent. Res. Committee, 1913-394; Karonga, Nyasaland, II.1912, A. G. Eldred; and Para-type. I have examined the holotype and three female paratypes that are deposited in the BMNH, London, United Kingdom.

Discussion. Adults of *Ae. fulgens* are easily separated from those of the other species of the Longipalpis Group by: maxillary palpus is exceptionally long (0.66-0.75 length of proboscis); prescutellar space is completely covered with overlapping broad silvery spatulate scales or has only a very narrow median area bare; tarsi II and III have more extensive pale-scaled patterns; midlobe of scutellum has a wide patch of overlapping broad silvery spatulate scales (a few specimens with 1-5 median posterior dark scales); mesopostnotum has a few broad silvery spatulate scales below the scutellum; and tergum V has a distinctive pale-scaled pattern. *Aedes huangae* and *Ae. mzooi* also possess broad silvery scales on the mesopostnotum and the latter species has the midlobe of the scutellum covered with a wide patch of overlapping broad silvery spatulate scales. Both *Ae. fulgens* and *Ae. mzooi* possess setae on the remigium while the other species of the Longipalpis Group have these setae absent.

Two collections of *Ae. fulgens* from Kenya (KEN66, KEN68) and one from South Africa (SAF51) of individually reared adults, with their associated pupal and fourth-instar larval exuviae, have scales present or absent on the mesopostnotum (i.e., nearly all specimens from these collections had scales present but they were absent in three from Kenya and one from South Africa). In the specimens without scales from these collections it could not be determined if they had been rubbed off. However, all adults from other collections had scales present on the mesopostnotum. Therefore, it was not possible at this time to determine if this character is variable or not. Several progeny broods containing long series of adults, individually reared with their associated pupal and fourth-instar larval exuviae, will be required to solve this question.

Male genitalia of *Ae. fulgens* differ from other members of the group by the gonocoxite having a poorly developed basal dorsomesal lobe that bears two setae.

Pupae of *Ae. fulgens* are distinctive in having seta 12-CT very long, seta 11-CT long and seta 10-CT short.

See the discussion section of *Ae. longipalpis* for additional information and a comparison of this species with the other species of the Longipalpis Group.

Edwards (1917) clearly indicated that his new species *fulgens* was in the genus *Aedes* (p. 202) and in the subgenus *Ochlerotatus* Group *Finlaya* (p. 211) even though on page 213 he listed the new name *Ochlerotatus (F.) fulgens*, sp. nov. with the description, therefore Edwards' name should not be included in parenthesis when given after the species name.

Aders (1917) description of *Ae. longipalpis* larvae from Zanzibar appears to be that of *Ae. fulgens* as he stated that the median plume seta (5-C) was slightly longer than the others (6,7-C), comb composed of 30-40 scales and pecten having 26 teeth. Zanzibar is outside the known range of *Ae. longipalpis* and all adult specimens collected by Aders from Zanzibar (see below) that I have examined are *Ae. fulgens*. Additionally, Hopkins (1936) stated that the description of the larva of *Ae. longipalpis* by Aders (1917) belonged to *Ae. fulgens*.

Hopkins' (1941) description of *Ae. fulgens* larvae from Mombasa, Kenya, indicated that seta 1-A was nearly always 2-branched (occasionally 3-branched) at least on one side and seta d (7-C) was rather variable in position but always within the line joining the bases of seta B (6-C) and seta C (5-C), often almost level with the line joining the bases of seta 6-C on the two sides, but sometimes much further back. In all specimens of *Ae. fulgens* from Kenya and South Africa that I have examined seta 1-A was never 2-branched at the base of the seta; however, seta 1-A was lightly 2-forked near the apex on one side in approximately 30% of the specimens and 2-forked on both sides of one specimen. Additionally, all specimens that I examined had seta 4-C situated posteromesad of seta 6-C and never in a diagonal line between setae 5-C and 6-C.

Robinson's (1950:81, 82) descriptions of the pupa and larva of *Ae. longipalpis* appear to be those of *Ae. fulgens*.

The adult illustrations by Jupp (1996, Plate 4, Fig. 8, and Fig. 32c) show a large silvery-scaled patch on the anterolateral portion of the thorax. This scale patch actually is on the postpronotum and not on the scutal fossal area.

Distribution. 148 specimens examined: 2♀pl+g, 18♀pl, 3♀p, 7♀+g, 23♀, 5♂pl, 1♂p+g, 2♂+g, 10♂, 4pl, 1 l and 5L.

KENYA, Coast Province, Kombeni River, 2.8 km NE of Rabai, 14 Nov. 1986, T. J. Zavortink, S. S. Shanks and E. Mkuzi (6♀pl, 2♀pl+g, 2♀, 2♂pl, 1♂+g, 6♂, 1pl, 1 l and 4L).

MALAWI, Karonga, Feb. 1912, A. G. Eldred (1♀, paratype).

SOUTH AFRICA, Kwazulu-Natal Province, Bobomene (1♀pl and 2♂pl); Masanje, Windmill (4♀pl); Pafuri (1pl); Skukuza (1♀pl); Transvaal, Thabazimbi, Warmbaths, Phalaborwa, J. Muspratt (3♀ and 1♂); Transvaal, 11.5 km NE of Hazyview, 17 Mar. 1988, T. J. Zavortink and S. Shanks (6♀pl, 3♀p, 1♀+g, 19♀ and 1♂p+g); Transvaal, Potgietersrust, B. de Meillon (1pl).

TANZANIA, Zanzibar, 15 May 1915, W. M. Aders (1♂+g, holotype; 1♀+g and 1♀, paratypes); Zanzibar, 1916, W. M. Aders (2♀+g, 1♀ and 3♂).

ZAMBIA, Livingstone, 6 Jan. 1943, J. Muspratt (1♂pl and 1pl); Balovale, 1945, B.M. 1947-185, G. G. Robinson (1 l).

Distribution from the literature.

ANGOLA, Cuangar, Jangada do Cuangar, Pereira (Ribeiro and Ramos 1973).

BOTSWANA (de Meillon 1947; Leeson 1958; Jupp 1996).

KENYA, Mombasa (Edwards 1941; Hopkins 1941); along coast (except Msambweni and Vanga), Kwale (highlands) (van Someren et al. 1955); Gede, Taveta (Lumsden 1955); Ganda (van Someren et al. 1958); Mombaa Island, Kwa Shekh (Teesdale 1959); coast (Gardner 1971); Rabai, Kombeni River, Buni Forest, Kwale District, Shimba Hills National Park, Makadara (Lounibos 1981).

MALAWI (Leeson 1958); Karonga (Edwards 1917); Fort Johnson, Karonga (Edwards 1941).

SOUTH AFRICA, Transvaal, Potgietersrust (de Meillon et al. 1945); Tongaland (Muspratt 1956); Transvaal, Bushbuckridge District, Chipise District, Baltimore, Damants' Drift near Thabazimbi, Wylie Poort, Malelane District, Messina District, Warmbaths District (Muspratt 1955); Tongaland, Lake Simbu (de Meillon et al. 1957); Transvaal (Leeson 1958); Transvaal (north eastern), Phalaborwa, Hope farm (Jupp et al. 1981); Natal, Ndumu, Transvaal, Mica, Skukuza, Tzaneen (Kemp and Jupp 1991); Natal, Transvaal (Jupp 1996).

TANZANIA, Zanzibar (Aders 1917; Edwards 1917); Dar-es-Salaam, Lindi, Tanga (Haworth 1924); Dar-es-Salaam, Korogwe, Mombo, Moshi, Tanga (Harris 1942); Zanzibar, Dar-es-Salaam (Edwards 1941).

ZAMBIA (Leeson 1958); Lunda, Congo border (Edwards 1941); Livingstone (de Meillon 1945; Muspratt 1945); Balovale, Livingstone (Robinson 1948)

ZIMBABWE (Jupp 1996); Bindura, Ndanga (Leeson 1958); Chipinda Pools on Lundi River (McIntosh et al. 1964).

Bionomics. Immatures were collected in Kenya from treeholes 1.3 to 1.6 meters above ground, in water the color of dark coffee, and in association with immatures of *Ae. (Stegomyia) heischi* van Someren and *Ae. (Stegomyia) soleatus* Edwards; and in South Africa from a large open treehole 2.1 meters above ground, in brown water, and in associated with immatures of *Ae. (Albuginosus) marshalli* (Theobald), *Ae. (Stegomyia) ledgeri* Huang, *Ae. (Stegomyia) metallicus* (Edwards) and *Culex (Eumelanomyia) horridus* Edwards (T. J. Zavortink, personal communication). Also, larvae were collected in South Africa from treeholes in fig, baobab and *Ficus* trees.

Immatures have been collected from a hole in a mango tree (Edwards 1917; Aders 1917); leaf axils in palms (Haworth 1924); well-shaded rock pools with decaying leaves (Hopkins 1936); treeholes (Harris 1942; Hopkins 1952; Gardner 1971; Ribeiro and Ramos 1973); bamboo pots (Muspratt 1956; Kemp and Jupp 1991); treeholes (very common), bamboo pots (scarce), plant axils, seed pods, gutters, rockholes and steps cut in coconut palms (rare), snail shells, tins and wells (exceptional) (van Someren et al. 1955); treeholes and tins, and found parasitized with nematodes (Muspratt 1945); treeholes, bamboos and rockholes with leaves (Leeson 1958); and treeholes and bamboos (Lounibos 1981). Eggs exhibited delayed hatching behavior (Lounibos 1981).

Females have been taken feeding on humans (de Meillon 1947; Lumsden 1955); biting humans rarely in bush and adults rarely collected inside buildings (van Someren et al. 1955); biting human in bush, and adults collected in outgoing window trap in house (van Someren et al. 1958); biting humans outside in bush (Leeson 1958); and adults collected with nets in bush (Teesdale 1959).

Medical importance. Jupp et al. (1981), in laboratory experiments, demonstrated that *Ae. fulgens* had a high infection rate and transmitted chikungunya virus between *Myristomys albicaudatus* rodents.

***Aedes (Zavortinkius) geoffroyi* Reinert, new species**

(Figs. 2-4, 6, 8, 10, 12, 13, 15)

Aedes longipalpis of Kumm 1931:67, 69 (L*; K and L in part).

Aedes (Finlaya) longipalpis of Hopkins 1936:97, 104, 105 (K and L in part), 1952:118, 127-129 (K and L in part); Edwards 1941:120, 121, 386, 387, 429 (K, ♀, ♂, P and L in part).

Similar to *Ae. longipalpis* but differs as follows.

Female (Figs. 2-4). *Head*: Antenna 0.76-0.87 length of proboscis; maxillary palpus 0.30-0.36 length of proboscis; proboscis 0.96-0.98 length of femur I; 3 interocular setae. *Thorax*: Acrostichal silvery-scaled stripe incomplete, extending posteriorly to about posterior medial scutal area which is covered with broad black scales (some specimens with this area with mixture of black and silvery broad scales); prescutellar area with line of broad black scales on both sides of row of setae, narrow line of broad silvery scales mesal to inner line of dark scales, 2-5 (usually 4,5) setae; supraalar area with large patch of broad black scales posterior to silvery-scaled patch; 3,4 anterior promontory setae; 6-9 antedorsocentral setae; 1 long or 1 short and 1 long antealar setae; 8-13 (usually 9-12) long stout anteprenotal setae; 2 (rarely 1) postprenotal setae; 1,2 (usually 2) upper proepisternal setae; 1,2 (usually 2) postspiracular setae; 1,2 upper, 1,2 median posterior and 3,4 lower mesokatepisternal setae; 4-6 prealar setae; 5-7 upper mesepimeral setae. *Legs*: Femur I with ventral surface with few silvery scales on basal 0.5; tarsus I with pale scales only basoventrally on tarsomere 1, II,III with white-scaled area slightly reduced on tarsomere 2. *Abdomen*: Terga VI,VII with dorsal, more or less, rectangular silvery-scaled patches smaller.

Female genitalia (Fig. 6). *Tergum VIII*: Scales on apical 0.80-0.85; setae on apical 0.50-0.66; Te-VIII index 0.86; Te-VIII/Te-IX index 1.49; length 0.31 mm; width 0.37 mm. *Sternum VIII*: Apical margin with small (0.04-0.07 of dorsal length) median indentation; laterobasal scale patch on apical 0.72-0.81; setae on apical 0.85-0.89; S-VIII index 1.02-1.09; length 0.48-0.57 mm; width 0.44-0.54 mm. *Tergum IX*: With 2,3 setae apically on each side of midline, 4-6 total setae; Te-IX index 1.95-2.43; length 0.21-0.23 mm; width 0.09-0.12 mm. *Insula*: With 3-5 setae on each side of midline, 6-9 total setae. *Postgenital lobe*: Apex flat or with tiny (0.03-0.06 of dorsal length) median indentation; 7-13 setae on each side of midline, 14-25 total setae; ventral PGL/cercus index 0.81-0.90; dorsal PGL index 1.21-1.50; ventral PGL index 2.83-3.23; ventral length 0.21-0.28 mm.

Cercus: Dorsal surface with setae on apical 0.60-0.68; 7,8 (usually 7) long and moderately long stout setae on apical area; cercus index 2.53-2.71; cercus/dorsal PGL index 2.38-2.89; length 0.24-0.28 mm; width 0.09-0.11 mm.

Male. Similar to female except for the following. *Head*: Antenna 0.76 length of proboscis; maxillary palpus 0.91-0.95 length of proboscis; proboscis 1.17 length of femur I. *Thorax*: Acrostichal silvery-scaled stripe complete to prescutellar area in 1 specimen (incomplete in others), however, broad black scales present along prescutellar setae; antepronotum with 6-9 (usually 7,8) setae.

Male genitalia (Figs. 8, 10). *Tergum IX*: Posterior margin on each side with 1-5 (usually 2,3) thin setae, 2-7 total setae. *Gonocoxite*: Basal dorsomesal lobe with apex truncate and broader, bearing 2-4 (usually 2,3) setae that are long, stout, slightly curved and simple; Gc length 0.43-0.48 mm. *Gonostylus*: With 2 short subapical setae; 3 specimens with 2 gonostylar claws on 1 side; Gs/Gc index 0.37-0.41; Gs length 0.15-0.20 mm; GC length 0.04-0.05 mm; GC/Gs index 0.22-0.26. *Claspette*: Stem with seta absent on apical 0.33, 3,4 short setae on basal 0.66, length 0.12-0.14 mm; CF/CSt index 0.76-0.89; CSt/Gc index 0.28-0.32. *Proctiger*: With 3-7 (usually 4,5) cercal setae on each side of midline, 6-12 (usually 9-12) total setae. *Phallosome*: Aedeagus length 0.14-0.15 mm; paramere length 0.09-0.11 mm; Par/Ae index 0.62-0.79; BP/Ae index 0.38-0.51. *Sternum IX*: With 2-4 long and 3,4 slightly shorter stout setae on posterior area, 4-8 total setae.

Pupa (Figs. 12, 13). Setal branching as in Table 3. *Cephalothorax*: Pale tan with small darker areas on posterior portions of scutum and mesothoracic wing; seta 7-CT with 2-5 branches; 8-CT with 2-4 branches; 10-CT moderately long, 2-branched; 11-CT very long, single, longer than 12-CT; 12-CT long, single to 3-branched (single on 1 side of 1 specimen). *Trumpet*: Index 3.33-4.00; pinna 0.10-0.13 length of trumpet. *Abdomen*: Terga with minute spicules; seta I-II long, moderately stout, with 2-7 (usually 2-4) branches; 1-III with 2-4 (usually 2,3) branches; 1-IV,VI single to 3-branched (usually 2); 3-VI usually with 2,3 branches, very rarely single; 4-VII with 3,4 branches; 5-VII with 2,3 branches; 6-IV single to 2-branched (usually 2); 6-VII with 4-6 (usually 5,6) branches; 9-VIII with 4-7 branches, inserted on posterior margin; female GL index 1.09-1.11; female GL/Pa index 0.41-0.59; male GL index 1.27-1.29; male GL/Pa index 0.74. *Paddle*: Index 1.20-1.29; very few minute serrations on basal 0.61-0.66 of lateral margin.

Fourth-instar larva (Fig. 15). Setal branching as in Table 11. *Head*: Seta 1-C with apex acute; 4-C medial and at same level as or slightly anterior to 6-C; 6-C slightly longer than or equal to 5,7-C; 7-C lateral and slightly posterior to 6-C, longer than 5-C; 6-Mx single; dorsomentum with 27-29 teeth. *Antenna*: Length 0.31-0.35 mm; several small spicules on basal 0.75; seta 1-A borne 0.63-0.69 from antennal base. *Thorax*: Seta 7-P longer than 5,6-P, 5-M; 5-P,M single; 6-T usually 2-branched (rarely single). *Abdomen*: Setae 2-VIII, 8-VI, 10-IV with 2,3 branches; 3-II with 3,4 branches; 3-V, 7-II with 2-4 branches; 3-VI, 10-III,V single or 2-branched; 3-VII with 3-5 branches; 3-VIII with 4,5 branches; 4-VI with 3 branches; 6-I-V long, stout, darkly pigmented; segment VIII with comb of 54-64 scales; saddle with 3-6 long stout heavily pigmented spines on posterior margin dorsally; saddle/siphon index 2.74-2.86; 2-X approximately 0.6 length of 3-X, with 3-5 branches; 4-X with 10 (11 in 1 specimen) setae, posterior 6-8 on grid, each with 5-8 (rarely 5) branches; 4 anal papillae, moderately broad, dorsal pair moderately long, ventral pair about 0.90-0.97 length of dorsal pair. *Siphon*: Index 2.72-3.18 (dorsal length to basal width) or 2.87-3.11 (dorsal length to width at 0.5 length); pecten on basal 0.45-0.49, first pecten spine at base (or very near base) of siphon, composed of 15-20 spines, these stouter than *Ae. longipalpis*; seta 1-S long, borne on proximal 0.51-0.55 of siphon distal but close to pecten, with 2-4 branches; spiracular apodeme without large knob on basoventral area.

Type data. The holotype female contains the following information on three labels attached to the adult pin: IVR23-19, Adiopodoume, Inst. Past. Forest, Abidjan Dept., Ivory Coast; 13 June

1987, B. Geoffroy & T. Zavortink, collectors; and HOLOTYPE, *Aedes (Zavortinkius) geoffroyi*, Det: John F. Reinert. The holotype's associated pupal and fourth-instar larval exuviae are mounted on a microscope slide. The allotype male (IVR23-17, T92.14 Term.), one female paratype (IVR23-20) and two male paratypes (IVR23-15, 18), each with associated pupal and fourth-instar larval exuviae (mounted on microscope slides), possess the same collection data on their labels as the holotype except the collection numbers and type designations. Additional information on the type series is included in the bionomics section. All specimens of the type series are deposited in the National Museum of Natural History (NMNH), Smithsonian Institution, Washington, DC.

Discussion. See the discussion section of *Ae. longipalpis* for a comparison of this species with the other species of the Longipalpis Group.

The primary distinguishing features of the adults of *Ae. geoffroyi* from those of other species of the Longipalpis Group are: acrostichal silvery-scaled stripe is incomplete posteriorly (also in *Ae. huangae*); posterior medial scutal area has broad black scales; and prescutellar setae have a row of broad black scales on both sides.

The male genitalia of *Ae. geoffroyi* differ from those of *Ae. longipalpis* in the development of the basal dorsomesal lobe of the gonocoxite, longer gonocoxite, longer gonostylus, gonostylus has two short subapical setae and GC/Gs index is 0.22-0.26. Also, *Aedes geoffroyi* has the moderately long seta absent on the distal 0.33 of the claspette stem which differs from the other species of the Longipalpis Group.

Pupae of *Ae. geoffroyi* are similar to those of *Ae. longipalpis* but differ, in addition to characters in the pupal key, as follow, *Ae. geoffroyi*--seta 5-CT is single or 2-branched; seta 8-CT has 2-4 branches; seta 1-II is long and has 2-5 (usually 3) moderately stout branches; seta 4-I has 4-6 branches; seta 1-II has 2-7 branches; seta 5-II has 3-5 branches; seta 5-III has 3-6 branches; seta 1-IV and seta 5-VIII are single to 3-branched; seta 3-VII has 2,3 branches; seta 9-VIII has 4-7 branches; trumpet index is 3.33-4.00; and male GL/Pa index is 0.74; in comparison *Ae. longipalpis*--seta 5-CT has 4,5 branches; seta 8-CT has 5-8 branches; seta 3-I has 3-7 branches; seta 4-I has 14-23 branches; seta 1-II has 13-17 branches; seta 5-II has 9-13 branches; seta 5-III has 7-14 branches; seta 1-IV has 5-8 branches; seta 3-VII has 4-7 branches; seta 5-VIII has 5-9 branches; seta 9-VIII has 10-15 branches; trumpet index is 4.18-4.85; and male GL/Pa index is 0.53-0.59.

Fourth-instar larvae of *Ae. geoffroyi* have shorter antennae (0.31-0.35 mm), pecten extending to the base (or very near base) of the siphon, seta 1-S is long (length approximately 0.90-0.95 width of the siphon at the point of attachment) and seta 1-S is near the distal end of the pecten, which distinguish them from those of the other species of the Longipalpis Group which have the antennae longer (0.39-0.48 mm; except *Ae. pollinator* 0.31-0.35 mm), seta 1-S is shorter (length approximately 0.35-0.68 width of the siphon at the point of attachment) and seta 1-S is widely separated distally from the pecten.

Kumm's (1931) illustrations of the larval pecten spines and development of the posterodorsal long spines of the saddle are those of *Ae. geoffroyi* and not *Ae. longipalpis*. I have examined adult and immature specimens collected by Kumm that are deposited in the BMNH, London, United Kingdom, and they contain specimens of both *Ae. geoffroyi* and *Ae. pollinator*. These specimens were previously identified as *Ae. longipalpis* and are listed herein under the distribution sections of the latter two species. For the specimens listed below the labels affixed to the pinned adults for Nigerian collection numbers 3,4 and 5 indicate the collector was A. Kumm but labels on the slide-mounted larval exuviae from the same collection numbers indicate the collector was H. W. Kumm. I believe these are the specimens reported in Kumm (1931) as *Ae. longipalpis*.

Edwards (1941:429), while describing *Ae. longipalpis*, stated that he examined larval specimens from Lagos and Ibadan, Nigeria and that head seta A (7-C) was simple, about as long as seta B (6-C), seta C (5-C) was rather shorter and more slender than seta B (6-C) and seta d (4-C) was

placed inside and almost in a transverse line with seta B (6-C); however, these features fit *Ae. geoffroyi*. The above mentioned specimens appear to be those examined by Edwards as they are *Ae. geoffroyi* (except for the three slides of *Ae. pollinctor* recorded in the following discussion section of this species).

Hopkins (1936, 1952) description of the larva of *Ae. longipalpis* appears to have included specimens of *Ae. geoffroyi* as he stated for seta 1-S "the few specimens which I have seen from Nigeria have 1-3 branches." I have examined five slides in the BMNH, London, United Kingdom, that were previously identified as *Ae. longipalpis* but are *Ae. geoffroyi* (i.e., two slides with three fourth-instar larvae have label data--Nigeria, Lagos, Mrs. S. L. M. Connal, and three slides with three fourth-instar larval exuviae have label data--Nigeria, Ibadan, H. W. Kumm, 4-4, 5-13 and 5-19).

This species is named in honor of Dr. Bernard Geoffroy in recognition of his work on mosquitoes of the Afrotropical Region.

Distribution. 111 specimens examined: 2♀pl+g, 1♀pl, 2♀p, 1♀l+g, 4♀+g, 28♀, 2♂pl+g, 1♂pl, 3♂l, 7♂+g, 16♂, 5 l and 5L.

CAMEROON, Yaounde, Sep. 1948 (1L).

GHANA, Ofako, 24 May 1922, treehole, Dr. A. Ingram (1♀+g and 1♀).

IVORY COAST, Abidjan Department, Adiopodoume, Pasteur Institute Forest, 13 Jun. 1987, B. Geoffroy and T. J. Zavortink (1♀pl, holotype; 1♂pl+g, allotype; and 1♀pl+g, 1♂pl+g and 1♂pl, paratypes).

LIBERIA, Marshall Territory, near Liberian Institute, Farwein Village, 11 Sep. 1955 (1♀+g).

NIGERIA, C. B. Phillip (2♀); Yaba, Lagos, Mar. 1928, rot-hole, V. Wigglesworth (1♀+g, 10♀, 1♂+g and 3♂); same data except Apr. 1928 (1♀, 1♂+g and 1♂); 1928, Coll. Nos. 3, 4, 5 and 18, A. Kumm (2♀p, 1♀l+g, 9♀, 3♂l, 2♂+g, 9♂ and 5 l); Ibadan, 25 Jul. 1928, A. Kumm (4♀); Ibadan, Jul. 1928, Coll. Nos. 3 and 4, H. W. Kumm (1♂+g and 2♂); Lagos, 3 Sep. 1928, Mrs. S. L. M. Connal (1♀+g, 3♀, 2♂+g, 1♂ and 4L).

SIERRA LEONE, Nerebero, 3 Nov. 1955, D. J. Lewis (1♀pl+g).

Distribution from literature.

NIGERIA, Oyo Province, Ibadan (Kumm 1931); Lagos, Ibadan (Edwards 1941) (all as *Ae. longipalpis*).

Bionomics. The type series (IVR23) specimens were collected as immatures from a small treehole 1.5 meters above ground in *Ficus*, the habitat water was colorless, and the immatures were associated with immatures of *Culex (Eumelanomyia) albiventris* Edwards and *Eretmapodites* species (T. J. Zavortink, personal communication). Larvae of *Ae. geoffroyi* and *Ae. huangae* were collected on the same day from water in the same treehole in the Ivory Coast.

Immatures were collected from treeholes (including flamboyant) and bamboo stumps (Kumm 1931, as *Ae. longipalpis*).

Aedes (Zavortinkius) huangae Reinert, new species

(Figs. 2, 3, 6, 8, 9, 12, 13, 15)

Aedes (Finlaya) longipalpis of Peters 1956:539 (L).

Similar to *Ae. longipalpis* but differs as follows.

Female (Figs. 2, 3). *Head*: Antenna 0.87-0.89 length of proboscis; maxillary palpus 0.38-0.44 length of proboscis; proboscis 0.95-0.98 length of femur I. *Thorax*: Acrostichal stripe of

silvery-scales incomplete, extending posteriorly to about posterior medial scutal area which is covered with broad black scales; 2-4 anterior promontory setae; 3-5 antedorsocentral setae; 1 long or 1 long and 1 short antealar setae; 3-5 posterior medial scutal setae; 2-4 (usually 2,3) lateral prescutellar setae; scutellum with 2 long to 2 long and 2 short setae on midlobe, 3,4 long to 3 long and 2 short setae on lateral lobe; mesopostnotum with 6-14 broad silvery spatulate scales below scutellum; 5-9 (usually 5-7) anteprenotal setae; 2,3 (usually 2) postprenotal setae; 1 upper proepisternal seta; 1,2 (usually 1) postspiracular setae; 3,4 prealar setae; 1,2 upper, 1-3 median posterior and 2-5 lower mesokatepisternal setae; 3-5 upper mesepimeral setae. *Legs*: Tarsus II with white-scaled patch on tarsomere 2 covering only basal 0.5; tibiae III with basal white-scaled patch smaller.

Female genitalia (Fig. 6). *Tergum VIII*: Scales on apical 0.82-0.89; setae on apical 0.55-0.59; Te-VIII index 0.72-0.83; Te-VIII/Te-IX index 1.51-1.77; length 0.32-0.35 mm; width 0.39-0.49 mm. *Sternum VIII*: Apical margin with small (0.06-0.07 of dorsal length) median indentation; laterobasal scale patch on apical 0.79-0.80; setae on apical 0.87-0.90; S-VIII index 1.02-1.13; length 0.48-0.51 mm; width 0.46-0.48 mm. *Tergum IX*: With 2,3 setae apically on each side of midline, 5,6 total setae; Te-IX index 1.65-2.12; length 0.18-0.23 mm; width 0.10-0.11 mm. *Insula*: With 3,4 setae on each side of midline, 6-8 total setae. *Postgenital lobe*: Apex broadly rounded, 5-7 setae on each side of midline, 11-13 total setae; ventral PGL/cercus index 0.86-0.88; dorsal PGL index 1.35-1.52; ventral PGL index 2.88-3.39; ventral length 0.20-0.22 mm. *Cercus*: Dorsal surface with setae on apical 0.66-0.73; cercus index 2.62-2.88; cercus/dorsal PGL index 2.43-2.58; length 0.22-0.25 mm; width 0.09 mm.

Male. Similar to female except for the following. *Head*: Antenna 0.73-0.78 length of proboscis; maxillary palpus 0.93-1.03 length of proboscis; proboscis 1.08-1.12 length of femur I. *Thorax*: Anteprenotum with 4-6 (usually 5,6) setae.

Male genitalia (Figs. 8, 9). *Tergum IX*: Posterior margin on each side developed as relatively narrow short lobe, bearing 2-4 stouter curved setae, 5-8 total setae. *Gonocoxite*: Basal dorsomesal lobe thumb-shaped, bearing 2,3 setae in row from *subapical* area to base; Gc length 0.42-0.43 mm. *Gonostylus*: Gs length 0.15-0.16 mm; without setae; Gs/Gc index 0.35-0.37; GC length 0.05 mm; GC/Gs index 0.30-0.37. *Claspette*: Stem length 0.14-0.16 mm, with 3 short thin setae, 1 on apical 0.33, 2 on middle 0.33; filament blade-shaped, moderately curved, length 0.10-0.11 mm; CF/CSt index 0.53-0.71; CSt/Gc index 0.34-0.39. *Proctiger*: With 4,5 minute cercal setae on each side, 9,10 total setae. *Phallosome*: Aedeagus moderately long, length 0.13-0.14 mm; paramere length 0.09-0.10 mm; Par/Ae index 0.67-0.75; basal piece length 0.05-0.07 mm; BP/Ae index 0.43-0.53. *Sternum IX*: With 2-4 long and 2,3 moderately long setae on posterior area, 5-7 total setae.

Pupa (Figs. 12, 13). Setal branching as in Table 4. *Cephalothorax*: Dorsal portion dark tan with areas of pale tan, mesothoracic wing mostly pale tan but with few darker tan areas, metathoracic wing mostly dark tan; seta 6-CT short, 2-branched (rarely 3-branched); 7-CT with 3-5 (usually 3,4) branches; 8-CT with 3-5 branches; 10-CT long, single (2-branched on 1 side of 1 specimen); 11-CT very long, single, 11-CT longer than 10-CT; 12-CT long, with 3-6 (usually 3,4) branches, 12-CT shorter than 10,11-CT. *Trumpet*: Index 4.63-5.18; pinna 0.16-0.20 length of trumpet. *Abdomen*: Segments I-IV (and often much of V,VI) dark tan, remainder of abdomen pale tan; seta I-II moderately long, with 4-7 (usually 5-7) thin branches; I-III with 5-8 (usually 5,6) branches; 1-IV with 3-6 (usually 4,5) branches; 1-VI with 2-4 (usually 2,3) branches; 5-VII with 2-4 (usually 3,4) branches; 6-I with 2 branches (single on 1 side of 1 specimen), shorter than or approximately equal to 7-I length; 6-IV with 2,3 (usually 2) branches; 6-VII with 6-10 (usually 8-10) branches; tergum VIII usually with small blunt spicule slightly anteromesally of 9-VIII (present

at least on 1 side); female GL index 1.02-1.21; female GL/Pa index 0.36-0.39; male genital lobe similarly shaped as *Ae. fulgens*, GL index 1.30-1.45; male GL/Pa index 0.61-0.65. *Paddle*: Index 1.19-1.29; with very few minute serrations on basal 0.50-0.63 of lateral margin; seta 1-Pa single (2-forked on 1 side of 2 specimens).

Fourth-instar larva (Fig. 15). Chaetotaxy as in Table 12. *Head*: Seta 1-C with apex acute; 4-C with 2-4 fine branches; 5-C very long; 6-C long, shorter than 6-C, single (2-branched on 1 side of 1 specimen); 7-C short, with 2-6 thin branches; 13-C with 2,3 branches; 6-Mx single or 2-branched; dorsomentum with 28-31 teeth. *Antenna*: Length 0.41-0.49 mm; seta 1-A borne 0.54-0.58 from antennal base, noticeably shorter than apex of antenna. *Thorax*: Setae 5-7-P single; 6-T with 2,3 branches. *Abdomen*: Seta 2-VIII with 2-4 branches; 3-II with 3-6 (usually 3,4) branches; 3-V with 3-5 (usually 3,4) branches; 3-VII with 4-6 (usually 4) branches; 3-VIII with 3-6 branches; 4-VI with 3,4 branches; 6-II slightly longer than 6-I; 7-II with 2-4 branches; 10-III with 2,3 branches; 10-IV with 3,4 (usually 3) branches; 10-V single to 3-branched (usually 2-branched); segment VIII with comb of 65-88 (usually 76-88) scales in patch; saddle with 4-6 (usually 4) moderately long stout spicules on posterior margin dorsally; saddle/siphon index 3.19-3.55; 2-X with 6,7 (usually 7) branches; 4-X with 12 setae, posterior 8 setae on grid and with 8-14 branches; because segments VI and VII were badly twisted in all exuviae the accuracy of some setae in not certain. *Siphon*: Basal margin with small notch at level of pecten; index 2.97-3.21 (dorsal length to basal width) or 3.06-4.06 (dorsal length to width at 0.5 length); pecten on basal 0.38-0.42, composed of 15-20 (usually 16-18) spines, spines at mid length with 2-4 (usually 2,3) small stout spicules basoventrally; seta 1-S borne on proximal 0.48-0.53 of siphon distal to pecten, with 4-8 (usually 6,7) thin branches; 8-S with 3,4 branches; spiracular apodeme without knob on basoventral area.

Type data. The holotype female contains the following information on three labels attached to the adult pin: IVORY COAST, 1985, IV287-105, HUANG & PECOR; SAMP ACC. 1138; and HOLOTYPE, *Aedes (Zavortinkius) huangae*, Det: John F. Reinert. The holotype's associated pupal exuviae is mounted in Canada balsam on a microscope slide. The following additional information is from the collection data sheet: Center Department, Dezidougou (7°44'N 4°16'W), near M'Bahiakro, VI-2-1985, collectors Yiau-Min Huang and James E. Pecor, and collected as immatures from water in a large-sized treehole, three meters above ground, and in partial shade. The pinned allotype male, with associated pupal and fourth-instar larval exuviae mounted in Canada balsam on a microscope slide, possesses the same data as the holotype except the collection number (IV190-10), genitalia preparation number (T98.7 Term.) and the collection date (V-26-1985). Paratypes have the same collection data as the holotype except: 1♀pl (IV287-10), 1♀pl (IV287-11), 1♀pl (IV287-13, T98.8 Term.), 1♀pl (IV287-14, T98.6 Term.), 1♀p (IV287-106), 1♀p (IV287-107); V-30-1985, small-sized treehole, 1♀pl (IV261-13), 1♀p (IV261-102); and V-29-1985, medium-sized treehole, 1♂pl (IV232-13), 1♂pl (IV232-14, T98.5 Term.). The holotype and all paratypes are deposited in the NMNH, Washington, DC.

Discussion. Females of *Ae. huangae* have the scaling of the head, thorax and abdomen similar to *Ae. geoffroyi* except for the presence of scales on the mesopostnotum. *Aedes huangae* also is similar in scaling to *Ae. longipalpis* except for the dark scales on the posterior medial scutal area which interrupts the silvery-scaled line on the acrostichal area and the silvery-scaled areas of the prescutellar area, presence of silvery scales on the mesopostnotum, and minor scale differences on tarsus II and tibia III. The maxillary palpus to proboscis length (0.38-0.44) differs from most of the other species of the Longipalpis Group.

Male genitalia are similar to those of *Ae. longipalpis* but differ by the following: tergum IX has the posterior margin developed into relatively narrow short lobes and with the setae stouter;

basal dorsomesal thumb-shaped lobe of gonocoxite bearing 2,3 setae from *subapical* area to the base; aedeagus is shorter; and CF/CSt index is 0.53-0.71.

Pupae of *Ae. huangae* are easily distinguished from other members of the Longipalpis Group by: setae 10-12-CT have different lengths and development (see above); seta 6-I has 2 branches; tergum VIII usually has a small blunt spicule cephalomesally to seta 9-VIII (also in *Ae. longipalpis*); female genital lobe is longer; and a combination of other features mentioned above.

Fourth-instar larvae of *Ae. huangae* have the following features that distinguish them from those of the other species of the Longipalpis Group: seta 1-A is noticeably shorter than the apex of the antenna; seta 4-C has 2-4 branches; seta 5-C is very long, seta 6-C is long and seta 7-C is short and has 2-6 branches; setae 5,7-P, 9-T, 6-IV,V are single; seta 7-T has 3,4 branches; comb consisting of 65-88 (usually 76-88) scales; and siphon has a small notch on the basal margin at the level of the pecten.

Several adults collected and identified as *Ae. longipalpis* by Peters (1956) from Kpaine (spelling as on specimen labels), Liberia, are *Ae. huangae* (see below).

This species is named in honor of Dr. Yiau-Min Huang in recognition of her studies on the subgenus *Stegomyia* of the Oriental and Afrotropical Regions and who was one of the collectors of specimens of this new species.

Distribution. 55 specimens examined: 2♀pl+g, 4♀pl, 4♀p, 1♀+g, 6♀, 2♂pl, 2♂+g, 2♂, 6 l and 1L.

CAMEROON, Yaounde, 10 Feb. 1950, J. Rageau (2♀, 1♂+g and 1♂).

IVORY COAST, Center Department, Dezidougou, near M'Bahiakro (7°44'N 4°16'W), 2 June, 26,29,30 July 1985, Y-M. Huang and J. E. Pecor (1♀pl, holotype; 1♂pl+g, allotype and 2♀pl+g, 3♀pl, 3♀p, 1♂pl+g, 1♂pl, paratypes); Abidjan Department, Adiopodoume, Pasteur Institute Forest, 13 June 1987, B. Geoffroy and T. J. Zavortink (1♀pl).

LIBERIA, Kpaine (7°10'N 9°7'W), 26 Oct. 1953, 1400 ft., W. Peters (1♀+g, 1♀, 1♂+g and 1♂).

SIERRA LEONE, Balia, 3 Nov. 1955, D. J. Lewis (6 l and 1L); Western Area, Fourah Bay College Botanic Reserve, near Freetown (8°29'N 13°13'W), 25 May 1984, Y-M. Huang and J. E. Pecor (1♂pl).

UGANDA, Bwamba, Oct. 1942, A. J. Haddow (1♀); same data except, July 1943 (1♀); same data except, Semliki Forest, 1946, caught in canopy 40-64 ft. above ground (1♀).

Distribution from the literature.

LIBERIA, Kpaine, Ganta (Peters 1956).

Bionomics. Immatures have been collected from water in small-, medium- and large-sized treeholes. Larvae were collected from clear water in a small treehole 1.5 meters above ground in *Ficus* and associated with immatures of *Ae. geoffroyi*, *Cx. (Eum.) albiventris* and *Eretmapodites* species in the Ivory Coast (T. J. Zavortink, personal communication). Immatures of both *Ae. huangae* and *Ae. longipalpis* were taken on the same day from water in one treehole in the Ivory Coast.

Immatures have been found in well shaded treeholes in high forest (Peters 1956, as *Ae. longipalpis*).

Aedes (Zavortinkius) mzooi van Someren

(Figs. 1, 3, 4, 6, 8, 10)

Aedes (Finlaya) mzooi van Someren, 1962:19 (♀, ♂*).*Aedes (Finlaya) mzooi* of Stone 1963:126; Knight and Stone 1977:100; White 1980:128; Townsend 1990:107.Similar to *Ae. longipalpis* but differs as follows.

Female (Figs. 1, 3, 4). *Head*: Antenna 0.82-0.86 length of proboscis; maxillary palpus 0.47-0.51 length of proboscis; proboscis 0.92-0.96 length of femur I; occiput and vertex with erect forked scales pale brown; postgena with black-scaled patch smaller; ocular line with 3-5 broad dark brown scales mesally separating overlapping broad silvery-scaled areas. *Thorax*: Prescutellar area with broad patch of overlapping broad silvery spatulate scales along anterior and lateral margins, without broad black scales around prescutellar setae; supraalar area with only few broad black scales posterior to silvery-scaled patch, posterior area with narrow black scales; 2-4 anterior promontory setae; 3-5 antedorsocentral setae; 3,4 lateral prescutellar setae; scutellum with midlobe covered with wide patch of broad silvery spatulate scales, 2,3 long setae, lateral lobe with 2,3 long and 0-2 short setae; mesopostnotum with broad silvery scales anteriorly under scutellum and extending posteriorly as short median line; 5-7 anteprenotal setae; 2,3 postprenotal setae; 1,2 upper proepisternal setae; 1-3 postspiracular setae; 1-3 upper, 2 median posterior and 3-5 lower mesokatepisternal setae; 3-6 prealar setae; 7-13 upper mesepimeral setae. *Legs*: Femur II with anterior surface with silvery-scaled patch nearly reaching base; femur III with anterior surface with approximately basal 0.85 silvery-scaled; tibia I with posterior surface with narrow longitudinal stripe of white scales from base to near apex; tibia II with narrow white-scaled band basally and extending on posterior surface for short distance as narrow stripe; tarsus I with tarsomere 1 having posterior surface with narrow white-scaled line on approximately basal 0.8; tarsus II with tarsomere 1 with posterior surface white-scaled except for small dark-scaled ventroapical patch, tarsomere 2 with approximately basal 0.8-0.9 white-scaled; tarsus III with tarsomere 1 dark-scaled, tarsomere 2 with approximately basal 0.66 white-scaled. *Wing*: Remigium with 1,2 setae.

Female genitalia (Fig. 6). *Tergum VIII*: Scales on apical 0.98; setae on apical 0.71; Te-VIII index 0.73; Te-VIII/Te-IX index 1.62; length 0.35 mm; width 0.47 mm. *Sternum VIII*: Apical margin with small (0.06 of dorsal length) median indentation; laterobasal scale patch on apical 0.85; setae on apical 0.88; S-VIII index 1.05; length 0.55 mm; width 0.52 mm. *Tergum IX*: With 2 setae apically on each side of midline, 4 total setae; Te-IX index 2.28; length 0.21 mm; width 0.09 mm. *Insula*: With 5 setae on each side of midline, 10 total setae. *Postgenital lobe*: Apex flat; 6 setae on each side of midline, 12 total setae; ventral PGL/cercus index 0.85; dorsal PGL index 1.31; ventral PGL index 3.12; ventral length 0.21 mm. *Cercus*: Dorsal surface with setae on apical 0.67; cercus index 3.06; cercus/dorsal PGL index 2.79; length 0.25 mm; width 0.08 mm.

Male. Similar to female except for the following. *Head*: Antenna 0.7 length of proboscis; maxillary palpus 0.91-0.95 length of proboscis; proboscis 1.09 length of femur I. *Legs*: White-scaled areas smaller, especially on tarsomere 1 of tarsus II.

Male genitalia (Figs. 8, 10). *Tergum IX*: Posterior margin on each side with 2 setae, 4 total setae. *Gonocoxite*: Basal dorsomesal lobe broader, with 4,5 setae that are long, stout, curved and simple, of which 1 is apical; Gc length 0.44 mm. *Gonostylus*: Slightly longer, Gs length 0.17 mm; 1 short subapical seta; Gs/Gc index 0.39-0.40; GC length 0.05 mm; GC/Gs index 0.30-0.31. *Claspette*: Stem with distal seta longer and stouter; length 0.12-0.13 mm; CF/CS index 0.80-0.89; CS/Gc index 0.27-0.29. *Proctiger*: With 8 cercal setae on each side of midline, 16 total setae. *Sternum IX*: With 3 long and 3 moderately long stout setae on posterior area, 6 total setae.

Pupa and fourth-instar larva. Unknown, but see discussion section of *Ae. longipalpis*.

Type data. Van Someren (1962) stated that the type series consisted of the holotype female, allotype male, and six female and three male paratypes, bred from larvae collected by Mr. E. C. Hancock from treeholes found in the rain forests of the Usambara Mountains of Tanganyika at Amani and Sigi (at the junction of the East African Highlands and East African Lowland Districts). The holotype and allotype were taken from the Sigi River bridge near Amani. She indicated that the type and some paratypes would be deposited in the British Museum (Natural History) (now The Natural History Museum) and the remainder of the material in the collection of the Division of Insect-borne Diseases, Nairobi, Kenya. Townsend (1990) indicated that the holotype female and six paratypes (three female and three male) were in the BMNH, London, United Kingdom. The holotype female contains the following information on three labels attached to the adult pin: Sigi, Tanganyika, treehole, Sept. 1956, E. C. Hancock (white paper rectangular label); *Aedes (Finlaya) mzooi* van Someren, Holotype ♀ (pale red paper rectangular label); and HOLO-TYPE (circular paper label with a red border). The holotype is pinned through the venter of the thorax with a minuten pin attached to a long narrow stage of white cardboard that is secured to a short, thick, flat-headed, straight pin. The allotype male contains the same label data as the holotype except: ALLO-TYPE and T95.13 Term. (genitalia preparation number). The genitalia are mounted in Canada balsam on a microscope slide. One female and one male paratypes have the same label information as the holotype except: PARA-TYPE and caught in forest (instead of treehole); the genitalia of the male are mounted in a drop of balsam on a small plastic strip attached to the straight pin. One female paratype has the same label data as the holotype except for PARA-TYPE and T92.25 Term. One female paratype has the same label data as the holotype except: Amani (instead of Sigi), 11 (small white paper label), and PARA-TYPE. All the above paratypes and allotype are mounted on minuten pins secured to either white cardboard or clear plastic rectangle stages and secured to straight pins similar to the holotype. I have examined the holotype, allotype and three female and one male paratypes that are deposited in the BMNH, London, United Kingdom.

Discussion. Adults are most similar to those of *Ae. fulgens* but can be separated by the length of the female maxillary palpus, prescutellar area with the median bare area wider, mesopostnotum with the silvery-scaled area larger and extending posteriorly as a short median stripe, and pale-scaled areas of the legs (tarsi I,II, femora II,III and tibiae I-III). *Aedes mzooi* is easily separated from the other members of the Longipalpis Group by the extensive white-scaled area of femur III.

Male genitalia of *Ae. mzooi* differ from those of other species of the Longipalpis Group in development of the basal dorsomesal lobe of the gonocoxite being broader and bearing four or five setae, proctiger has 16 cercal setae, gonostylus length is longer (0.17 mm) and claspette stem has the distal seta longer and stouter.

See the discussion sections of *Ae. fulgens* and *Ae. longipalpis* for additional information.

Distribution. 8 specimens examined: 1♀+g, 3♀, 1♂+g and 1♂.

TANZANIA, Usambara Mountains, Sigi River bridge, near Amani, Sep. 1956, treehole, E. C. Hancock (1♀, holotype; 1♂+g, allotype; and 1♀+g, 2♀ and 1♂, paratypes).

Distribution from the literature.

TANZANIA, Amani, Sigi, Usambara Mountains (van Someren 1962).

Bionomics. Larvae have been collected from treeholes in rain forests (van Someren 1962).

***Aedes (Zavortinkius) pollinator* (Graham)**

(Figs. 1, 3, 6, 8, 9, 12, 13, 15)

Stegomyia pollinator Graham, 1910a:272 (♂); lectotype here designated.*Stegomyia pollinator* of Wesche 1910:29 (L*); Graham 1910b:54; Townsend 1990:122.*Kingia pollinator* of Theobald 1910:628.*Stegomyia longipalpis* of Edwards 1911:268 (synonymized *Stegomyia pollinator*).*Ochlerotatus longipalpis* of Edwards 1912a:17-19 (♀ and ♂ in part) (*pollinator* as synonym), 1912b:376 (L) (*pollinator* as synonym).*Aedes (Finlaya) longipalpis* of Macfie and Ingram 1923:429-432 (P*, L*); Hopkins 1936:97, 104, 105 (L*; K and L in part), 1941:176, 177 (K and L in part); 1952:118, 127-129 (L*; K and L in part); Edwards 1925:268 (♀ in part), 1932:151 (*pollinator* as synonym), 1941:120, 121, 386, 387, 429 (P*; K, ♀, ♂, P and L in part); Stone et al. 1959:166 (*pollinator* as synonym); Knight and Stone 1977:99 (*pollinator* as synonym); White 1980:128 (*pollinator* as synonym).*Aedes longipalpis* of Kumm 1931:67, 69 (K and L in part).Similar to *Ae. longipalpis* but differs as follows.**Female** (Figs. 1, 3). **Head:** Antenna 0.85-0.89 length of proboscis; maxillary palpus 0.26-0.31 length of proboscis; proboscis 0.99-1.15 length of proboscis; occiput with moderately long brown erect forked scales. **Thorax:** Large patch of broad black scales on posterior dorsocentral area (caudal to juncture of prescutal suture and lateral to silvery-scaled stripe on acrostichal area) and extending over area lateral to prescutellar setae to near scutellum (also usually few similar scales mesad of setae and lateral to prescutellar silvery scales); 2,3 anterior promontory setae; 3-5 antedorsocentral setae; usually 1 long and 1 short (rarely 1 long) antealar setae; 6 long dark posterior medial scutal setae (often rubbed off); 2-4 (usually 2,3) lateral prescutellar setae; 1 short parascutellar seta; 5-8 (usually 5-7) moderately long anteprenotal setae; 1 long dark upper proepisternal seta; 1 upper, 1,2 median posterior and 3-5 lower mesokatepisternal setae; 2-4 prealar setae; 4-7 upper mesepimeral setae.**Female genitalia** (Fig. 6). **Tergum VIII:** Scales on apical 0.83-0.89; setae on apical 0.49-0.61; Te-VIII index 0.65-0.78; Te-VIII/Te-IX index 1.49-1.71; length 0.29-0.32 mm; width 0.38-0.47 mm. **Sternum VIII:** Apical margin with small (0.05-0.06 of dorsal length) median indentation; laterobasal scale patch on apical 0.75-0.79; setae on apical 0.82-0.89; S-VIII index 0.97-1.03; length 0.44-0.47 mm; width 0.44-0.46 mm. **Tergum IX:** With 1-3 setae apically on each side of midline, 4,5 total setae; Te-IX index 1.94-2.31; length 0.17-0.19 mm; width 0.08-0.10 mm. **Insula:** With 3-5 setae on each side of midline, 6-9 total setae. **Postgenital lobe:** Apex flat or with small (0.03-0.05 of dorsal length) median indentation; 6,7 setae on each side of midline, 12-14 total setae; ventral PGL/cercus index 0.79-0.92; dorsal PGL index 1.17-1.50; ventral PGL index 2.67-2.98; ventral length 0.17-0.21 mm. **Cercus:** Dorsal surface with setae on apical 0.64-0.74; 7,8 (usually 7) long and moderately long stout setae on apical area; cercus index 2.89-3.28; cercus/dorsal PGL index 2.42-3.17; length 0.21-0.25 mm; width 0.07-0.08 mm.**Male.** Similar to female except for the following. **Head:** Antenna 0.69-0.80 length of proboscis; maxillary palpus 1.01-1.03 length of proboscis; proboscis 1.08-1.20 length of femur I. **Thorax:** Anteprenotum with 4-6 (usually 4,5) setae.**Male genitalia** (Figs. 8, 9). **Tergum IX:** Posterior margin on each side bearing 1-5 moderately stout setae, 3-7 total setae. **Gonocoxite:** Basal dorsomesal lobe with apex truncate and broader, bearing 3,4 (usually 3) setae in row from apex to base; Gc length 0.38-0.44 mm. **Gonostylus:**

Gs length 0.14-0.17 mm; with 2 short setae subapically; Gs/Gc index 0.34-0.44; GC length 0.04-0.05 mm; GC/Gs index 0.31-0.39. *Claspette*: Stem length 0.11-0.12 mm, with 2-4 short thin setae; filament blade-shaped, moderately curved, length 0.09-0.10 mm; CF/CSt index 0.77-0.88; CSt/Gc index 0.28-0.30. *Proctiger*: With 3-5 minute cercal setae on each side, 6-9 total setae. *Phallosome*: Aedeagus long, length 0.12-0.14 mm; paramere length 0.09-0.11 mm; Par/Ae index 0.63-0.75; basal piece length 0.05-0.07 mm; BP/Ae index 0.39-0.52. *Sternum LX*: With 2,3 long and 2-4 moderately long setae on posterior area, 4-6 total setae.

Pupa (Figs. 12, 13). Setal branching as in Table 5. *Cephalothorax*: Pale tan except for darker areas on postscutal area and mesothoracic wing, metanotal wing dark tan; seta 7-CT with 3-5 (usually 3,4) branches; 8-CT with 4-7 branches; 10-CT short, with 3-7 (usually 3,4) branches; 11-CT long, single, 11-CT longer than 10,12-CT; 12-CT moderately long, with 3-6 (usually 4,5) branches, 12-CT shorter than 11-CT, longer than 10-CT. *Trumpet*: Index 3.35-4.53; pinna 0.21-0.34 (usually 0.25-0.33) length of trumpet. *Abdomen*: Segments I-IV darker tan, remainder of abdomen pale tan; seta 1-II moderately long, with 5-20 (usually 8-14) thin branches; 1-III with 3-9 (usually 6,7) thin branches; 1-IV with 2-4 (usually 3,4) thin branches; 1-VI with 2,3 (usually 2) branches (single on 1 side of 1 specimen); 4-VII with 3-5 (usually 3,4) branches; 5-VII with 2-5 (usually 2,3) branches; 6-IV,V single (6-IV 2-branched on 1 side of 1 specimen); 6-VII with 2-8 (usually 2,3) branches; female GL index 0.91-0.99; female GL/Pa index 0.44-0.55; male GL index 1.20-1.25; male GL/Pa index 0.71-0.77. *Paddle*: Index 1.30-1.39; with very few tiny serrations on basal 0.58-0.63 of outer margin.

Fourth-instar larva (Fig. 15). Setal branching as in Table 13. *Head*: Seta 4-C in diagonal line between 5,6-C, slightly closer to 6-C than to 5-C; 5-C single (2-branched in 1 specimen); 7-C moderately long, shorter than 5,6-C, with 2-5 (usually 3,4) branches; dorsomentum with 29-33 (usually 29) teeth. *Antenna*: Length 0.31-0.35 mm; seta 1-A not reaching apex of antennal shaft, borne 0.52-0.64 from antennal base, 2-branched at base of seta (single in 1 specimen). *Thorax*: Seta 5-P with 2,3 (usually 2) branches; 5-M single; 6-T with 4-6 branches; 12-T single or 2-branched. *Abdomen*: Seta 2-VIII with 5,6 branches; 3-II with 5-7 (usually 6,7) branches; 3-VIII with 5-8 (usually 6,7) branches; 7-II with 3-6 branches; 10-III single to 5-branched (usually 2-4); segment VIII with comb of 76-97 (usually 80-88) scales; saddle with 2,3 moderately long and 2-4 short stout spicules on posterior margin dorsally; saddle/siphon index 3.08-3.37; 2-X with 3-5 (usually 4,5) thin branches; 4-X with 10 setae, posterior 8 on grid; 4 anal papillae, moderately long, narrow, approximately equal in length. *Siphon*: Index 3.03-4.19 (dorsal length to basal width) or 2.71-3.59 (dorsal length to width at 0.5 length); pecten on basal 0.33-0.42, composed of 16-20 (usually 17-19) spines; seta 1-S borne on proximal 0.54-0.60 of siphon far distal to pecten, with 6-9 (usually 6-8) fine branches; 8-S with 4,5 short branches; spiracular apodeme without basoventral knob.

Type data. Four syntypes (two female and two male) of *Stegomyia pollinator* are deposited in the BMNH, London, United Kingdom. A lectotype male is hereby selected and contains the following information on six labels attached to the adult pin: Yaba, 25-10-09, fr [from] larvae in hollow tree, WMG (on underside of white paper circular stage that adult is pinned to with a minuten pin); Type (small white paper circular label with red border); Yaba, Lagos, W. Africa, 25.X.1909, Dr. W. M. Graham, 1910-80 (white paper rectangular label); Syn-type (small white paper circular label with a blue border); Terminalia on slide (small white paper rectangular label); and LECTOTYPE, *Stegomyia pollinator* Graham, By: John F. Reinert (white paper rectangular label with a red border). The genitalia are mounted on a microscope slide with the following three labels: *Stegomyia pollinator* Graham, (= *longipalpis* Grunb.), NIGERIA, Yaba, 25:X:1909, W. M. Graham, Rest on pin; Syn-type; and LECTOTYPE, *Stegomyia pollinator*, By: John F. Reinert. The lectotype

is in fair condition but with the scutum partially rubbed, right leg III and left leg II missing, and abdominal segments IV-VI and 0.5 of VII glued to the circular paper stage. The second male syntype is selected as a paralectotype and contains the same label data except, without the red-bordered circular label with Type, but with PARALECTOTYPE, *Stegomyia pollinator* Graham, By: John F. Reinert (white paper rectangular label with a blue border). The specimen is in fair condition and the genitalia are mounted in a drop of balsam on a small, yellow, rectangular plastic stage attached to the adult pin. Graham's two female syntypes are conspecific with *Ae. longipalpis*.

Discussion. The adult habitus of *Ae. pollinator* is very similar to that of *Ae. longipalpis* but differs in the presence of a large patch of broad black scales on the posterior dorsocentral area that extends to near the anterior margin of the scutellum, shorter female maxillary palpus and shorter parascutellar seta. Females differ from both *Ae. geoffroyi* and *Ae. huangae* in having the acrostichal silvery-scaled stripe complete and merging with the silvery scales of the prescutellar area and from the latter species in having the mesopostnotum bare. The anteprepronotum has 5-8 (usually 5-7) setae which differs from most specimens of the other species of the Longipalpis Complex except *Ae. huangae*.

Male genitalia of *Ae. pollinator* are similar to those of *Ae. longipalpis* but differ by the following: basal dorsomesal thumb-shaped lobe of the gonocoxite has the apex truncate, broader and bearing three or four setae; gonostylus has two short subapical setae; claspette stem is shorter (0.11-0.12 mm); and aedeagus is shorter (0.12-0.14 mm).

Pupae of *Ae. pollinator* can be separated from the other species of the Longipalpis Group by: paddle is shorter with an index of 1.30-1.39; pinna opening is wider (0.21-0.34 of trumpet length); seta 11-CT > seta 12-CT > seta 10-CT length, seta 10-CT is short and usually 4,5-branched (range 3-7), seta 11-CT is long, seta 12-CT is moderately long and usually has 3,4 branches (range 3-6); seta 1-II usually has 8-14 branches (range 5-20); seta 1-IV usually has 3,4 branches (range 2-4); seta 6-IV,V is single (6-IV 2-branched on one side of one specimen); male GL/Pa index is 0.71-0.77; male GL index is 1.20-1.25; and female GL/Pa index is 0.44-0.55.

Fourth-instar larvae of *Ae. pollinator* are easily separated from the other species of the Longipalpis Group (and subgenus) by seta 1-A being 2-branched (*Ae. monetus* also 2-branched), seta 4-C is situated in a diagonal line between setae 5-C and 6-C, and by the larger number of comb scales (76-97). Seta 1-C has a blunt apex that is similar to *Ae. longipalpis*. Larvae of *Ae. pollinator* appear to have a lateral "pouch" ventrally on the lateralia that may accommodate the elongated maxilla when it is positioned most laterad; a somewhat smaller "pouch" was seen in larvae of *Ae. longipalpis*. Both *Ae. pollinator* and *Ae. geoffroyi* possess a shorter antennal shaft (0.31-0.35 mm) than the other species of the group.

Wesche (1910) described the larva of *Stegomyia pollinator* Graham from a single specimen that was collected at Lagos, Nigeria. This larva was provided by W. M. Graham as indicated by the statement on page 30 "[Larvae found in a hollow tree in August; they were small and did not become imagines till October.-W.M.G.]" Unfortunately, the features included in the description could fit several of the species currently included in the Longipalpis Complex (e.g., *Ae. longipalpis*, *Ae. huangae* and *Ae. pollinator*). Additionally, since I have examined larvae from Nigeria of three species (*Ae. longipalpis*, *Ae. geoffroyi* and *Ae. pollinator*) I know that more than one species occurs in this country. However, since both the lectotype and paralectotype males of *Ae. pollinator* have the same collection data on the underside of the paper stage to which the adult is pinned (i.e., Yaba, 25-10-09, fr larvae in hollow tree, WMG) I surmise that the larva described by Wesche came from the same collection. Also, the few larval characters mentioned by Wesche (1910:29-30) in his description appear to fit *Ae. pollinator*. Therefore I am considering Wesche's specimen to be *Ae. pollinator*.

The larval illustrations and descriptions of *Ae. longipalpis* by Macfie and Ingram (1923) and Hopkins (1936, 1941, 1952) are of *Ae. pollinctor*. Pupal illustrations of *Ae. longipalpis* by Macfie and Ingram (1923) and Edwards (1941) also are *Ae. pollinctor*.

For the specimens listed below the labels affixed to the pinned adults for Nigerian collection numbers 18 and 27 indicate the collector was A. Kumm but labels on the slide-mounted larval exuviae from the same collection numbers indicate the collector was H. W. Kumm. I believe these are the specimens reported in Kumm (1931) as *Ae. longipalpis*.

Distribution. 93 specimens examined: 2♀pl+g, 3♀pl, 1♀l+g, 2♀p, 1♀+g, 12♀, 1♂pl+g, 1♂pl, 1♂l+g, 1♂p+g, 12♂+g, 14♂, 1pl and 2L.

GHANA, Accra region, 1920-23, J. W. S. Macife (1♂); Ofako, 24 May 1922, 1922-282, treehole, Dr. A. Ingram (1♂); Ofako, 5 Jun. 1922, treehole (1pl and 1L).

IVORY COAST, Adzope Province, Tanoekro, 26 km WSW of Abengourou, 16 Jun. 1987, B. Geoffroy and T. J. Zavortink (1♀pl and 1L); Center Department, Dezidougou, near M'Bahiakro, 26,27,30 May, 2 Jun. 1985, Y-M. Huang and J. E. Pecor (1♀pl+g, 1♀pl, 2♂pl+g, 1♂pl and 1♂p+g).

NIGERIA, C. B. Phillip (1♀, 1♂+g and 2♂); Yaba, Lagos, 25 Oct. 1909, from larvae in hollow tree, W. M. Graham (1♂+g, lectotype; 1♂+g, paralectotype); 1928, Coll. Nos. 3, 18, 27 and 30, A. Kumm (1♀l+g, 1♀+g, 7♀, 1♂l+g, 7♂+g and 5♂); Ibadan, 25 Jul. 1928, A. Kumm (4♂); Yaba, Lagos, Mar. 1928, B.M. 1928-486, V. Wigglesworth (1♀, 1♂+g and 1♂); same data except, Apr. 1928 (1♀).

SIERRA LEONE, Southern Province, Tiwai Island, Potoru, 15 May 1984, Y-M. Huang (1♀pl+g, 1♀pl and 1♀p); Southern Province, Moyamba District, Kasawe Forest Reserve (8°19'N 12°13'W), 29 May 1984, Y-M. Huang and J. E. Pecor (1♀p).

UGANDA, Katoba, 10 Apr. 1936, E. G. Gibbins (2♀ and 1♂+g).

Distribution from literature.

GHANA, Ofako near Accra (Macfie and Ingram 1923; Edwards 1941; Hopkins 1941) (all as *Ae. longipalpis*).

NIGERIA (Hopkins 1941); Oyo Province, Ibadan (Kumm 1931); Lagos (Edwards 1941) (all as *Ae. longipalpis*).

UGANDA, Katoba (Edwards 1941; Hopkins 1941) (all as *Ae. longipalpis*).

Bionomics. A larva was collected in the Ivory Coast from a treehole 1.5 meters above ground in water the color of weak tea (T. J. Zavortink, personal communication). Immatures were collected from water in small-sized holes in coffee trees, 1-2 meters above ground, in partial shade and located in a coffee plantation in the Ivory Coast and from small- and medium-sized treeholes, in partial or heavy shade and located in a rainforest in Sierra Leone. Immatures in Ghana were taken from a treehole.

Immatures have been collected from a hollow tree (Wesche 1910, as *Ae. longipalpis*); rot-holes in trees in dense "bush" (Macfie and Ingram 1923, as *Ae. longipalpis*) and in treeholes (including flamboyant) and bamboo stumps (Kumm 1931, as *Ae. longipalpis*).

BRYGOOI GROUP

Aedes (Zavortinkius) brygooi Brunhes

(Figs. 2, 3, 7-9, 12, 13, 17)

Aedes (Finlaya) brygooi Brunhes, 1971:335 (K, ♀, ♂*, P*, L*).

Aedes (Finlaya) brygooi of Knight and Stone 1977:92; Ravaonjanahary 1979:23, 39 (K, A*, ♂*, L*); White 1980:128.

Female (Figs. 2, 3). Setae on head, scutum and pleural areas pale brown. *Head*: Antenna 0.75-0.82 length of proboscis; maxillary palpus 0.20-0.22 length of proboscis; proboscis 0.95-1.02 length of femur I, curved upward in dried specimens; vertex dark brown-scaled and with few broad decumbent dusty-white scales posteriorly, semierect forked scales pale golden; occiput with narrow curved decumbent scales white, erect forked scales pale golden; ocular line of silvery scales separated mesally by 3-5 broad brown scales and 2 long interocular setae; postgena with patch of broad silvery scales on upper area. *Thorax*: Scutum covered with narrow reddish-black scales except for following: overlapping broad silvery spatulate scales forming very small patches on anterior promontory (anterior to setae) and on antedorsocentral area (anterior to setae) (1 specimen with broad, pale brown scales on antedorsocentral area), large patch on supraalar area and extending anteriorly onto posterior portion of antealar area (few narrow silvery scales posterior to patch and followed by narrow dark scales), and thin stripe along lateral margins of prescutellar area medial to setae, narrow curved snowy-white scales forming narrow stripe on acrostichal area and extending from broad scales on anterior promontory to prescutellar area, similar but somewhat broader stripe on dorsocentral area extending from antedorsocentral broad scales to near posterior margin of scutum (1 specimen with very few narrow brown scales behind broad scales before silvery-scaled stripe), stripe widening laterally at median scutal fossal area, broad dark scales absent; 2-4 anterior promontory setae; 3-5 antedorsocentral setae; 1-3 anterior scutal fossal setae; 3-6 lateral prescutellar setae; 3 long (1 specimen also with 1 short) golden antealar setae; patch of golden-brown short supraalar setae anterior to wing base; scutellum with midlobe having several broad silvery scales at base and lateral margins of moderate-sized dark-scaled median patch, lateral lobes with patch of broad dark scales (lateral lobes of 1 specimen with 1,2 broad silvery scales on posterior medial area of patch), midlobe with 4,5 long and 1-4 short setae, lateral lobes with 3,4 long and 1-5 short setae; mesopostnotum bare; overlapping broad silvery spatulate scales on following areas: anteprenotum with patch separating setae into 2 groups, postpronotum covered, paratergite with patch, subspiracular area with elongate patch, upper proepisternum covered, mesokatepisternum with moderate-sized upper and lower patches, prealar area with patch on lower area extending onto knob, mesepimeron with large anterior lower and small posterior upper patches, and metameron covered; pleural setae as follow: 8-10 anteprenotal, 2-5 (usually 2,3) postpronotal, 2 (rarely 1) postspiracular, 1,2 long upper, 1 long median posterior and 2-5 short lower mesokatepisternal, 4-7 prealar, and 5-14 upper posterior mesepimeral. *Legs*: Coxae I-III each with large anterior patch of overlapping broad silvery scales; femora I-III black-scaled but with white-scaled areas as follow: I with anterior surface having narrow line ventrally on approximately basal 0.25, posterior surface with stripe ventrally or near ventrally from base to near apex, II with anterior surface having scattered scales on extreme ventral area and few on median distal 0.5, posterior surface with narrow indistinct stripe ventrally on approximately basal 0.5 and on distal 0.25, III with anterior surface having large patch covering approximately basal 0.45 and then narrowing as median stripe to approximately distal 0.77, posterior surface with large patch covering approximately basal 0.5, dorsal surface dark-scaled over most of basal white-scaled area; tibiae I-III and tarsi I-III dark-scaled; posttarsi I-III each with 2 ungues, equal in size, all with 1 tooth. *Wing*: Remigium with 0-2 dark seta. *Abdomen*: Terga, in addition to silvery-scaled patches anterolaterally, also with small dorsal silvery-scaled patches anteromesally on I (usually) and III-VII, patches on IV-VI larger, VIII with most of basal area silvery-scaled; sterna II-VIII dark-scaled with silvery scales forming narrow anterior band and large lateral triangular patches nearly reaching posterior margin.

Female genitalia (Fig. 7). Similar to *Ae. longipalpis* but differs as follows. *Tergum VIII*: Base gently convex; scales on apical 0.78; setae on apical 0.6; Te-VIII index 0.68; Te-VIII/Te-IX index 1.6; length 0.33 mm; width 0.48 mm. *Sternum VIII*: Apical margin with moderately deep (0.1 of dorsal length) median indentation, setae on margin narrower; base slightly convex mesally;

laterobasal scale patch on apical 0.88; setae on apical 0.87; S-VIII index 1.05; length 0.55 mm; width 0.53 mm. *Tergum IX*: With 2,3 setae on each side of midline, 5 total setae; Te-IX index 2.23; length 0.2 mm, width 0.09 mm. *Insula*: With 3 setae on each side of midline, 6 total setae. *Postgenital lobe*: Apex with minute (0.02 of dorsal length) median indentation; 8,9 setae on each side of midline, 17 total setae; ventral PGL/cercus index 0.88; dorsal PGL index 1.83; ventral PGL index 3.54; ventral length 0.22 mm. *Cercus*: Dorsal surface with setae on apical 0.62; 7,8 long and moderately long stout setae on apical area; cercus index 2.81; cercus/dorsal PGL index 2.2; length 0.25 mm; width 0.09 mm.

Male. Similar to female except for the following. *Head*: Antenna 0.56-0.60 length of proboscis; maxillary palpus 0.76-0.85 length of proboscis, more or less straight but with palpomeres 4,5 thin and slightly down turned, scales recumbent, few short setae, palpomeres 4,5 slightly thinner and combined length longer than palpomere 3; proboscis 1.08-1.12 length of femur I; postgena silvery-scaled, occasionally with few dusty-white scales anteriorly. *Thorax*: Scutum with ante-dorsocentral area with fewer broad silvery scales; scutellum with midlobe having silvery-scaled area larger; proepisternum usually with 2 (rarely 1) upper setae (holotype with 4,5); mesepimeron with 3-6 upper setae. *Legs*: Femur III with anterior surface with white-scaled median stripe extending almost to apex; posttarsi I-III each with 2 unguis, I,II each with 1 large and 1 small unguis, both with 1 tooth, III with unguis equal in size, both with 1 tooth. *Abdomen*: Tergum III with dorsal silvery-scaled patch absent, IV with patch reduced in size.

Male genitalia (Figs. 8, 9). *Tergum IX*: Each posterior lobe with 6-9 setae, 14-18 total seta. *Gonocoxite*: Tergal surface with short setae more numerous, especially on laterobasal area, basal dorsomesal lobe produced into short, narrow, bent lobe terminating in 1 long seta that is flattened, filament-like, with distal portion expanded and apex rounded, proximal portion shorter, narrow, distally bent, 2 long and 3-6 shorter lanceolate setae, mesal margin of ventral surface with fewer moderately long stout setae but with more long broad scales, scales on apical portion of gonocoxite approximately equal in length to others. *Gonostylus*: Moderately long, proximal area relatively narrow and distal portion greatly expanded, wrinkled and covered with moderately long spicules; 1 tiny subapical seta; Gs length 0.18-0.22 mm; GC length 0.06-0.07 mm; Gs/Gc index 0.36-0.40; GC/Gs index 0.29-0.39. *Claspette*: Stem with 2,3 short thin setae, 0,1 on apical 0.33, 2 on middle 0.33, length 0.14 mm; filament long, narrow and twisted, length 0.12 mm; CF/CSt index 0.87-0.91; CSt/Gc index 0.25. *Proctiger*: With 2,3 minute cercal setae on each side, 5,6 total setae. *Phallosome*: Aedeagus with basal 0.5 moderately wide and tapered distally to narrow pointed apex, length 0.16 mm; Par/Ae index 0.69-0.70; paramere length 0.11 mm; basal piece broader, length 0.08-0.09 mm; BP/Ae index 0.41-0.57. *Sternum IX*: With 2 long and 6 short stout setae on posterior area (holotype with 2 long and 1 short stout setae and 1 broad scale).

Pupa (Figs. 12, 13). Setal branching as recorded in Table 6. *Cephalothorax*: Tan with much of dorsal and posterior areas of scutum and mesothoracic wing darker; lateralialia with cuticular ocular facets of compound eye moderately well developed; median keel with short row of very poorly developed transverse striations; seta 7-CT with 2,3 branches; 8-CT with 2-4 branches; 9-CT single; 10,12-CT moderately long, 10-CT with 4,5 branches, 12-CT single to 3-branched; 11-CT longer than 10,12-CT. *Trumpet*: Moderately wide; index 2.79-3.19; pinna 0.35-0.41 length of trumpet. *Abdomen*: Terga generally all dark, with minute spicules; seta I-II long, with 12-20 branches; 2-VII slightly mesal to 1-VII; 3-IV with 3,4 branches; 6-VII with 6-9 branches; 8-V with 4-7 branches; 8-VI with 5-9 branches; 9-VIII displaced anteriorly from posterior margin; female GL index 1.09-1.11; female GL/Pa index 0.41-0.59; male GL index 1.19-1.24; male GL/Pa index 0.75-0.76. *Paddle*: Index 1.23-1.32; tiny serrations on basal 0.65-0.73 of lateral margin; seta 1-Pa moderately long.

Fourth-instar larva (Fig. 17). Setal branching as in Table 14. *Head*: Seta 1-C with apex acute; 4-C medial and slightly posterior to 6-C, short, with 13-23 fine branches; 5-C longer than 6-C, 2-branched; 5,6-C long, stout, lightly aciculate, each with 1 branch longer and stouter than others; 6-C longer than 7-C, single to 3-branched; 7-C lateral and slightly posterior to 6-C, moderately long, with 22-32 fine branches; maxillary body moderately long; 6-Mx with 3-10 thin branches; dorsomentum with 27,28 teeth; lateral palatal brush filaments simple, fine. *Antenna*: Length 0.45-0.48 mm; several small spicules on proximal 0.67-0.92; seta 1-A borne 0.43-0.48 from antennal base, stout, lightly aciculate, single (2-forked on 1 side of 1 specimen). *Thorax*: Setae 1-3-P borne on pigmented common setal support plate; 5-P aciculate, with 2-5 branches; 7-P aciculate, with 3,4 branches; 3-M long, single; 14-M with 10-21 fine branches; 2-T long, with 3,4 branches; 3-T with 9-13 thin branches; 6-T long, single. *Abdomen*: Seta 1-VII very long, stout, single; 2-I,II single or 2-branched; 2-III-VI, 9-II-VI, 10-VI single; 2-VIII with 2,3 thin branches; 3-II, 12-I with 3-6 branches; 3-IV with 3-5 thin branches; 3-VI long, single or 2-branched; 6-I-V long, stout, 6-III,IV longer than 6-I,II; 6-III,V,VI single; 7-I long, stout, aciculate, 2-branched; 7-III with 6-8 thin branches; 10-III long, with 2-4 branches; 13-II with 6-16 thin branches; segment VIII with comb of 24-36 scales, each with apex rounded, moderately long thin spicules on apical and lateral margins; saddle with several (about 8-10) long and few (3-6) short stout spines on posterior margin, dorsally; saddle/siphon index 3.47-4.09; 4-X with 12 setae on grid, posterior 8 each with 6-10 branches, anterior 4 setae shorter and with fewer branches; posterior part of lateral grid bar larger; 4 anal papillae, broad, pointed apically, dorsal pair moderately long, ventral pair approximately 0.6 length of dorsal pair. *Siphon*: Acus present; index 3.70-4.79 (dorsal length to basal width) or 2.47-3.91 (dorsal length to width at 0.5 length); pecten on proximal 0.33-0.41, composed of 21-27 spines, proximal 2,3 spines small, spines at mid length with 2 stout spicules basoventrally and 1,2 (usually 1) tiny spicules basal to these; seta 1-S borne on proximal 0.47-0.54 of siphon distal to pecten, long, with 2-4 thin branches; 8-S short, with 3-5 branches; spiracular apodeme with moderate-sized knob on basoventral area.

Type data. The pinned holotype male, with the genitalia mounted on a microscope slide, is deposited in the Institut de Recherche pour le Developpement (IRD), Centre de Montpellier, Montpellier, France, and contains the following information on three labels attached to the adult pin: *Aedes (Finlaya) brygooi*, Holotype male, No. E244e/T498JB, entre Antanimore et Ambovombe, Tulear, Madagascar, 1-2-68, J. BRUNHES Rec. & Det.; E299e; and T498JB. Brunhes (1971) indicated that the type series consisted of: male holotype, female allotype, four female and two male paratypes, 17 larvae and nine pupae pedotypes, and 15 female and 27 male metatypes.

Discussion. Adults of *Ae. brygooi* are similar to those of *Ae. interruptus* and *Ae. phillipi* but are distinguished from these species by: occiput has pale golden erect forked scales; dorsocentral white-scaled stripe is complete to the anterior margin of the scutum; and terga I,III-V have the dorsal silvery-scaled patches on anteromedian area. Both *Ae. brygooi* and *Ae. interruptus* have the metameron with broad silvery scales but these are absent in *Ae. phillipi*.

Female genitalia of the Brygooi Group are distinguished by sternum VIII having the apex with a moderately deep median indentation that separates broadly rounded lobes and with the base convex mesally.

The male genitalia of members of the Brygooi Group differ in the following: aedeagus is long and the basal 0.5 is moderately broad and tapering to a narrow, pointed apex; claspette filament is long, narrow, and is approximately uniform in width throughout the length but with the apical third tapering to a point; gonocoxite has scales on the apical portion approximately the same length as the others; gonostylus is moderately long and narrow (except *Ae. brygooi* which has the distal portion greatly expanded, wrinkled and covered with moderately long spicules); and sternum VIII has the apical margin gently concave (except *Ae. brygooi* has a large median lobe).

Pupae of the Brygooi Group are distinguished from the other two groups by the male genital lobes have apices separated, trumpet is moderately wide, and pinna is 0.35-0.41 of the trumpet length.

Fourth-instar larvae of species in the Brygooi Group are similar but can be separated as follows: *Ae. brygooi*--seta 1-C has the apex acute; seta 4-C is short and has 13-23 fine branches; seta 5-C>seta 6-C>seta 7-C length; seta 5-C is long and 2-branched with one branch longer and stouter; seta 6-C is long, stout, single to 3-branched, and one branch is longer and stouter; and seta 7-C is moderately long and with 22-32 fine branches; seta 6-V, VI is single; and *Ae. phillipi*--seta 1-C has the apex blunt; seta 4-C is moderately long and has 6-12 thin branches; seta 5-C>seta 6-C>seta 7-C length; seta 5-C is long and has 3-7 branches and one branch is longer and stouter; seta 6-C is long and has 3-6 branches and one branch is longer and stouter; seta 7-C is long and has 6-10 stout branches; and seta 6-V, VI has 2 branches.

Distribution. 23 specimens examined: 1 ♀pl, 1 ♀+g, 3 ♀, 2 ♂+g, 4 ♂, 2p and 5L.

MADAGASCAR, Tulear Province, Ambovombe, Antanimoro, 1 Feb. 1968, J. Brunhes (1 ♂+g, holotype; 1 ♀pl, paratype); Majunga Province, Aerodrome, 10 Feb. 1967, J. Brunhes (1 ♀ and 1p); Majunga Province, Maevatanana, 16 Feb. 1967, J. Brunhes (2 ♂); Majunga Province, 16 Feb. 1969, Nov. 1970, J. Brunhes (2 ♂ and 3L); Majunga Province, Ankarafanksika, Nov. 1970, J. Brunhes (1 ♀); Majunga Province, Tsaramandroso, S/P Ambato-Boeni, Jan. 1971, J. Brunhes (1L); Diego-Suarez Province, Anamakia, 8 Sep. 1975, C. Ravaonjanahary (1 ♀+g, 1 ♀, 1 ♂+g, 1p and 1L).

Distribution from the literature.

MADAGASCAR, Majunga Province, Antsifabositra, Maevatanana, Mampikong, Tulear Province, Ambovombe (Brunhes 1971); Ampijoroa (Fontenille 1988).

Bionomics. Larvae have been collected from treeholes (baobabs and mangos) and seed husks (Brunhes 1971).

Aedes (Zavortinkius) interruptus Reinert, new species

(Figs. 2-4, 7, 8, 10)

Similar to *Ae. brygooi* but differs as follows.

Female (Figs. 2-4). *Head:* Antenna 0.66-0.73 length of proboscis; maxillary palpus 0.20-0.21 length of proboscis; proboscis 1.01-1.02 length of femur I; vertex with few semirecumbent narrow dark brown forked scales; occiput with numerous dark brown erect forked scales. *Thorax:* Scutum with narrow stripe of narrow curved silvery scales on acrostichal area extending from posterior of anterior promontory area into anterior portion of prescutellar area, similar stripe on dorsocentral area from about level of scutal angle extending to posterior of scutum but with short break (covered with dark scales) posterior to prescutal suture, narrow curved dark scales on lateral margins of prescutellar area medial to prescutellar setae; scutal setal differences follow: 4 anterior promontory, 2-4 antedorsocentral, 2-4 anterior scutal fossal, 3,4 lateral prescutellar, and patch of dark short supraalar anterior to wing base; scutellum with midlobe covered with overlapping broad silvery scales on basal and lateral areas, large patch of broad dark scales on median posterior area; pleural setal differences follow: 8-12 anteprenotal, 4-6 postprenotal, 2-4 upper proepisternal, 1-4 postspiracular, 1,2 upper, 1,2 median posterior and 1,2 lower mesokatepisternal, 6-9 prealar, and 4-7 upper mesepimeral. *Legs:* Femora I-III dark brown-scaled but with white-scaled areas as follow: I with posterior surface having narrow median longitudinal stripe from base to near apex, II with anterior surface having moderately broad indistinct stripe from about middle to near apex, posterior surface with narrow longitudinal stripe from base to apex ventrally, stripe narrower and may be indistinct distally, III with anterior surface having broad stripe on basal approximately 0.6 and

continuing as narrow median stripe to near apex, posterior surface with broad stripe on basal approximately 0.4-0.5 except dorsal surface dark-scaled. *Abdomen*: Terga I-VII with large anterolateral silvery-scaled patches, I,II with patches extending to posterior margin, III,IV with few dark scales on posterior or posteroventral margin of patch, V-VII with small anteromesal patch of silvery scales (occasionally absent on V), VIII with narrow anterodorsal silvery-scaled band not reaching lateral margin.

Female genitalia (Fig. 7). *Tergum VIII*: Scales on apical 0.8; setae on apical 0.54; Te-VIII index 0.75; Te-VIII/Te-IX index 1.69; length 0.37 mm; width 0.5 mm. *Sternum VIII*: Apical margin with moderately deep (0.16 of dorsal length) median indentation, apical margin with lanceolate setae narrower; laterobasal scale patch on apical 0.86; setae on apical 0.88; S-VIII index 1.01; length 0.55 mm; width 0.55 mm. *Tergum IX*: With 4,5 setae on each side of midline, 9 total setae; Te-IX index 1.87; length 0.22 mm; width 0.12 mm. *Insula*: With 4,5 setae on each side of midline, 9 total setae. *Postgenital lobe*: Apex flat; 7,8 setae on each side of midline, 15 total setae; ventral PGL/cercus index 0.77; dorsal PGL index 1.95; ventral PGL index 4.18; ventral length 0.24 mm. *Cercus*: Dorsal surface with setae on apical 0.5; 7 long and moderately long stout setae on apical area; cercus index 3.75; cercus/dorsal PGL index 2.79; length 0.31 mm; width 0.08 mm.

Male. Similar to female except for the following. *Head*: Antenna 0.61-0.64 length of proboscis; maxillary palpus 0.87-0.93 length of proboscis; proboscis 1.05-1.14 length of femur I. *Thorax*: Scutum with dorsocentral pale-scaled stripe without distinct break posterior to prescutal suture; pleural areas usually with slightly fewer setae, especially upper mesepimeron with 3,4 setae.

Male genitalia (Figs. 8, 10). *Tergum IX*: Each posterior lobe with 6-8 setae, 14 total setae. *Gonocoxite*: Tergal surface with setae slightly longer, basal dorsomesal lobe shaped similarly to *Ae. phillipi* but with 2 apical long flattened setae, basal portion of lobe bearing approximately 20,21 setae that are moderately long, stout, slightly curved and simple; scales on apical portion of gonocoxite approximately equal to others. *Gonostylus*: With few spicules scattered along entire length, Gs length 0.18 mm; 1,2 subapical tiny setae; Gs/Gc index 0.42-0.43; GC length 0.08 mm; GC/Gs index 0.45. *Claspette*: Stem relatively short, completely covered with short spicules, with 3 short thin setae, 2 on apical 0.33 and 1 on basal 0.33, length 0.09 mm; filament darkly pigmented, similar to *Ae. phillipi* but broader, length 0.09-0.10 mm; CF/CSt index 1.06; CSt/Gc index 0.21. *Proctiger*: With 3 minute setae on each side, 6 total setae. *Phallosome*: Aedeagus shape similar to *Ae. brygooi*, length 0.16 mm; Par/Ae index 0.74-0.75; paramere length 0.12 mm; basal piece length 0.07 mm; BP/Ae index 0.34-0.36. *Sternum IX*: With 2 long and 3 short stout setae on posterior area, 5 total setae.

Pupa and fourth-instar larva. Unknown.

Type data. The holotype male contains the following information on five labels attached to the adult pin: *Aedes (Finlaya) phillipi*, male No. E216g, Province Tamatave, Madagascar, 20-12-67, J. BRUNHES Rec. & Det.; E216g, Prov. Tamatave, Madagascar, Brunhes, 20-12-1967; *Aedes (F.) phillipi*, Brunhes Det.; T95.15 Term. (genitalia preparation number); and HOLOTYPE, *Aedes (Zavortinkius) interruptus*, Det: John F. Reinert. The male genitalia are mounted in Canada balsam on a microscope slide. The allotype female has the following label data: No. 250b, Madagascar, Province Tamatave, Am-mange [Ambodimanga], Moramanga, February 1968, J. Brunhes Rec. & Det.; ALLOTYPE, *Aedes (Zavortinkius) interruptus*, Det: John F. Reinert; and T95.14 Term. (genitalia mounted on a microscope slide). One female and one male paratypes, all previously identified as *Ae. (Fin.) phillipi*, are as follow: No. E215e, Madagascar, Province de Tamatove, 20-12-67, J. Brunhes Rec. & Det.; PARATYPE, *Aedes (Zavortinkius) interruptus*, Det: John F. Reinert. The holotype, allotype and two paratypes are deposited in the IRD, Montpellier, France.

Discussion. Adults of *Ae. interruptus* are most similar to those of *Ae. phillipi* but differ primarily in having: overlapping broad silvery scales covering the metamerion; dorsocentral white-

scaled stripe is interrupted by a dark-scaled area; slightly different pale-scaled areas of the terga; and slightly longer male maxillary palpus. See the discussion section of *Ae. brygooi* for more information on comparisons of the species within the Brygooi Group.

Distribution. 6 specimens examined: 1♀+g, 1♀, 1♂+g and 1♂.

MADAGASCAR, Tamatave Province, 20 Dec. 1967, J. Brunhes (1♂+g, holotype; 1♀ and 1♂, paratypes); Tamatave Province, Ambodimanga, Moramanga, Feb. 1968, J. Brunhes (1♀+g, allotype).

Bionomics. Larvae were collected in treeholes from a primary forest at an elevation of 1,000 meters and in association with larvae of an *Orthopodomyia* species at Ambodimanga, Moramanga Prefecture, Tamatave Province (J. Brunhes, personal communication).

***Aedes (Zavortinkius) phillipi* van Someren**
(Figs. 2, 3, 7-9, 12, 13, 16)

Aedes (Finlaya) phillipi van Someren, 1949:7 (♂).

Aedes (Finlaya) phillipi of Knight and Marks 1952:526 (A); Stone et al. 1959:169; Brunhes 1971:340 (K, ♀, ♂*, P*, L*); Knight and Stone 1977:102; Ravaonjanahary 1978:23, 41 (K, A*, ♂*, L*); White 1980:128; Townsend 1990:120.

Similar to *Ae. brygooi* but differs as follows.

Female (Fig. 3). *Head*: Antenna 0.7 length of proboscis; maxillary palpus 0.21 length of proboscis; proboscis 1.02 length of femur I; vertex with few dark brown semirecumbent forked scales anteriorly behind ocular line; occiput with few dark brown erect forked scales; postgena with broad brown scales but with small patch of broad silvery scales on anterodorsal area connected to ocular line and larger similar scaled patch below; ocular line with 2,3 broad brown scales medially separating silvery scaled areas. *Thorax*: Scutum with narrow curved silvery scales forming very narrow stripe on acrostichal area, similar but wider stripe on dorsocentral area extending from about level of scutal angle to posterior of scutum, narrow curved dark scales on anterior and lateral margins of prescutellar area medial to setae; pleural silvery-scaled patches similar except metameron bare; scutal setal differences as follow: 3 anterior promontory, 3,4 antedorsocentral, 3,4 anterior scutal fossal, 4,5 lateral prescutellar, and patch of short, dark supraalar anterior to wing base; scutellum with midlobe covered with overlapping broad scales that are silvery on basal and lateral areas, large patch of dark scales on median posterior area, midlobe with 4,5 long setae, lateral lobes with 4,5 long setae; pleural setal differences follow: 8,9 anteprenotal, 4 postprenotal, 2,3 upper proepisternal, 1,2 postspiracular, 1,2 upper, 1 median posterior and 2 lower mesokatepisternal, 5 prealar, and 6-9 upper mesepimeral. *Legs*: Femora I-III dark brown-scaled but with following white-scaled areas: I with posterior surface having narrow stripe medially from base to near apex, II with anterior surface having narrow median stripe from midlength to slightly wider area near apex, posterior surface with narrow indistinct stripe ventrally on approximately basal 0.4 and on subapical area, III with anterior surface having broad stripe on basal approximately 0.5 and continued as narrow median stripe to near apex, posterior surface with broad patch covering approximately basal 0.4 but with narrow brown-scaled strip above. *Abdomen*: Terga I-V without anterior median silvery scales.

Female genitalia (Fig. 7). *Tergum VIII*: Base gently convex, scales on apical 0.84; setae on apical 0.74; Te-VIII index 0.72; Te-VIII/Te-IX index 2.76; length 0.3 mm; width 0.42 mm. *Sternum VIII*: Apical margin with moderately deep (0.15 of dorsal length) median indentation, setae on margin narrower; base slightly convex mesally; laterobasal scale patch on apical 0.93; setae on

apical 0.93; S-VIII index 0.93; length 0.47 mm; width 0.51 mm. *Tergum IX*: With 3,4 short setae on each side of midline, 7 total setae; Te-IX index 1.98; length 0.22 mm; width 0.11 mm. *Insula*: With 1-3 setae on each side of midline, 4 total setae. *Postgenital lobe*: Apex with minute (0.03 of dorsal length) median indentation; 5,6 setae on each side of midline, 11 total setae; ventral PGL/cercus index 0.91; dorsal PGL index 1.74; ventral PGL index 3.43; ventral length 0.21 mm. *Cercus*: Dorsal surface with setae on apical 0.55; 6 long and moderately long stout setae on apical area; cercus index 2.81; cercus/dorsal PGL index 2.18; length 0.23 mm; width 0.08 mm.

Male (Fig. 2). Similar to female except for the following. *Head*: Antenna 0.66-0.67 length of proboscis; maxillary palpus 0.85-0.86 length of proboscis, palpomeres 4,5 slightly thinner, longer, upturned and with fewer setae; proboscis 1.05-1.16 length of femur I; vertex with few to several broad dusty-white scales on posterior area; occiput with several dark brown and 2,3 golden-brown erect forked scales. *Thorax*: Scutum with only 3,4 broad silvery scales on antedorsocentral and anterior promontory areas; prescutellar area with few broad silvery scales along lateral margin mesad of setae (present in 2 paratypes, but this area partially rubbed in all paratypes seen); pleural areas usually with slightly fewer setae. *Legs*: Femur I with posterior surface having white-scaled stripe ventrally, stripe indistinct on distal portion; femur II with anterior surface with white scales ventrally forming indistinct stripe on basal approximately 0.5 and indistinct median stripe on distal approximately 0.4, posterior surface with narrow white-scaled stripe ventrally on basal approximately 0.6. *Abdomen*: Terga dark-scaled except for basolateral silvery-scaled patches.

Male genitalia (Figs. 8, 9). *Tergum IX*: Each posterior lobe with 4-6 setae, 9-14 total setae. *Gonocoxite*: Basal dorsomesal lobe shaped similarly to *Ae. brygooi* but with apical portion bearing 1-3 setae that are long, curved and somewhat flattened, and basal portion bearing 8-13 setae that are moderately long, stout, curved and simple; scales on apical portion of gonocoxite approximately equal to others. *Gonostylus*: Spicules absent or only 3; 2 short subapical setae; Gs length 0.14-0.17 mm; Gs/Gc index 0.34-0.43; GC length 0.06-0.07 mm; GC/Gs index 0.40-0.46. *Claspette*: Stem with 3 short thin setae, 2 on apical 0.33 and 1 on middle 0.33; length 0.10-0.11 mm; filament similarly shaped but narrower, length 0.1 mm; CF/CSt index 0.90-0.93; CSt/Gc index 0.26-0.29. *Proctiger*: With 2,3 minute cercal setae on each side of midline, 5,6 total setae. *Phallosome*: Aedeagus shape similar to *Ae. brygooi*; length 0.13-0.14 mm; paramere length 0.08-0.09 mm; Par/Ae index 0.61-0.70; basal piece length 0.05-0.06 mm; BP/Ae index 0.33-0.48. *Sternum IX*: With 1 long and 1 short to 2 long and 5 short stout setae on posterior area, 2-7 total setae.

Pupa (Figs. 12, 13). Setal branching as recorded in Table 7. *Cephalothorax*: Seta 9-CT longer than 8-CT, single or 2-branched; 11-CT slightly longer than 10,12-CT; 10,12-CT with 2-4 branches. *Trumpet*: Index 2.74-3.79; pinna 0.4 length of trumpet. *Abdomen*: Terga I-IV darker, remainder medium tan; seta 1-II very long, with 8-18 thin branches; 3-IV with 5-7 branches; 6-VII with 2-5 branches; 8-V single to 3-branched; 8-VI with 3,4 branches; female GL index 0.74; female GL/Pa index 0.32; male GL index 1.05; male GL/Pa index 0.66. *Paddle*: Index 1.27-1.42; tiny serrations on basal 0.54-0.60 of lateral margin; seta 1-Pa long.

Fourth-instar larva (Fig. 16). Setal branching as in Table 15. *Head*: Seta 1-C with apex blunt; 4-C moderately long, with 6-12 thin branches; 5-C longer than 6-C, with 3-7 branches; 6-C longer than 7-C, with 3-6 branches; 7-C long, stout, strongly acuminate, with 6-10 branches; 6-Mx with 2-8 stout branches; dorsomentum with 25-28 teeth; lateral palatal brush filaments comb-tipped or simple and fine. *Antenna*: Several small spicules on proximal 0.59-0.78; seta 1-A borne 0.43-0.50 from antennal base, single. *Thorax*: Seta 5-P with 2-6 branches; 7-P with 4-6 branches; 14-M with 12-24 branches; 3-T with 4-19 branches. *Abdomen*: Seta 1-VII long to very long; 1-5-VIII each on separate pigmented setal support plate; 2-I single to 3-branched; 2-II,III,V,VI single; 2-IV single or 2-branched; 2-VIII with 2 branches; 6-III,V,VI with 2 branches; 7-III with

7-14 branches; 10-III with 2,3 branches; 13-II with 10-23 branches; segment VIII with comb of 27-35 scales; saddle with several (8-12) long and several (4-8) short stout spines on posterior margin, dorsally; saddle/siphon index 2.66-3.27; 4-X with 12 setae on grid, posterior 8 setae each with 5-7 branches; 4 anal papillae, long, narrow, ventral pair approximately 0.75 length of dorsal pair. *Siphon*: Index 2.19-3.29 (dorsal length to basal width) or 1.91-2.44 (dorsal length to width at 0.5 length); pecten on proximal 0.4-0.5 of siphon, composed of 21-28 spines, proximal 1-3 spines small, spines at mid length with 1,2 (usually 1) stout spicules basoventrally and 1,2 (usually 1) tiny spicules basal to stout one; seta 1-S borne on proximal 0.47-0.57 of siphon distal to pecten, with 3,4 branches.

Type data. Van Someren (1949) indicated the holotype male and 14 male paratypes were from Sakaramy near Diego Suarez, Madagascar. I have examined five male paratypes (two with genitalia preparations, T86.82 Term. and T92.26 Term.) that are deposited in the BMNH, London, United Kingdom. Labels affixed to the adult pins of the paratypes contain the following information: *Aedes (Finlaya) phillipi* van Someren, paratype; Medical Dept. Kenya, Madagascar, Sakaramy, Treehole; E. C. C. van Someren, B.M. 1947-281; and Para-type. Knight and Stone (1977) and Townsend (1990) state that the holotype and eight paratypes are in the BMNH, London, United Kingdom.

Discussion. *Aedes phillipi* is most similar to *Ae. interruptus* and is discussed under the latter species. The adult is also similar to *Ae. brygooi* in the scutal scaling but differs in the shorter dorsocentral white-scaled stripe, scaling of the midlobe of the scutellum, bare metameron, and pale scaling on the femora. See the discussion section of *Ae. brygooi* for a comparison of the species within the Brygooi Group.

Distribution. 15 specimens examined: 2♂+g, 5♂, 1♀pl+g and 1♂pl+g.

MADAGASCAR, Sakaramy, near Diego-Suarez, treehole, E. C. C. van Someren (2♂+g, and 3♂, paratypes); Diego-Suarez Province, Antalaha, Reserve II, Jul. 1966, J. Brunhes (1♀pl+g); Tulear Province, Fort-Dauphin, St-Luce, 27 Jan. 1968, J. Brunhes (1♂pl+g).

Distribution from the literature.

MADAGASCAR, Diego Suarez, Sakaramy (van Someren 1949; Doucet 1950); Diego-Suarez Province, Fianarantsoa Province, Manakara, Tananarive Province, Moramanga, Tulear, Fort-Fauphin, St-Luce (Brunhes 1971); Andapa, Sakaramy (Ravaonjanahary 1978); Perinet, Sud-Est (Fontenille and Coulanges 1988); Ampijoroa, Kianjavato, Manombo, Ranomafana, Perinet, Sud-Est (Fontenille 1988).

Bionomics. Larvae have been collected from treeholes, *Ravenala* sections, and rarely from *Pandanus* leaf axils (Brunhes 1971).

Females were collected on human bait (Fontenille 1988).

MONETUS GROUP

Aedes (Zavortinkius) monetus Edwards

(Figs. 2, 3, 7, 10, 12, 13, 18)

Aedes (Finlaya) monetus Edwards, 1935:132 (♀).

Aedes (Finlaya) monetus of Edwards 1941:120, 122 (K, ♀); Knight and Marks 1952:526 (A); Stone et al. 1959:167; Brunhes 1971:344 (K, ♂*, P*, L*), 1978:209, 238, 244 (K, A, L); Gardner 1971:109; Knight and Stone 1977:100; Ravaonjanahary 1978:23, 40 (K, A*, ♂*, L*); White 1980:128; Townsend 1990:106.

Female (Figs. 2, 3). *Head*: Antenna 0.67-0.73 length of proboscis; maxillary palpus 0.19-0.22 length of proboscis; proboscis 1.07-1.10 length of femur I; vertex covered with overlapping broad decumbent dark brown scales except for small diamond-shaped patch of overlapping broad silvery scales anteromesally and connected with overlapping broad silvery scales of ocular line, patch extending forward over upper interocular area, large patch of similar scales on lateral area anteriorly (1 specimen with patch extending to posterior margin of head) and connected to ocular line, few dark brown semierect narrow forked scales mainly posterior to ocular line; postgena with broad dark brown scales dorsally and in middle but separated by large patch of broad silvery scales, and silvery scales covering ventral surface of head; occiput with several short dark or medium brown erect forked scales. *Thorax*: Scutum densely covered with moderately broad linear dark brown scales except for overlapping broad silvery scales as follows: anterior promontory covered and continued over entire acrostichal area as moderately broad stripe to prescutellar area which is completely covered except for very narrow bare median line, large patch covering combined median and posterior scutal fossal areas and extending to lateral margin of scutum, large patch covering most of supraalar area anterior to wing base; antedorsocentral area with small patch of broad pale brown or silvery scales (anterior to setae); supraalar area with patch of broad dark brown scales posterior to silvery-scaled patch, similar scales lateral to prescutellar setae; scutal setae as follow: 2,3 anterior promontory, 3-6 antedorsocentral, 1,2 anterior scutal fossal; 2,3 lateral prescutellar, scutellum with midlobe covered with broad silvery scales, 4 long and 1-3 short setae, lateral lobes with patch of broad dark brown scales, 3,4 long and 1-3 short setae; mesopostnotum with patch of overlapping broad silvery spatulate scales anteriorly under scutellum; pleural area with patches of overlapping broad silvery scales as follow: anteprepronotum with large patch extending anteriorly and separating setae into 2 groups, postpronotum entirely covered, subspiracular area covered with large elongate patch, postspiracular area with small patch posterior to setae, proepisternum with large patch covering upper area and extending ventrally onto lower area, mesokatepisternum with large continuous patch covering upper and lower areas and extending dorsally over lower and upper prealar areas, mesepimeron with large continuous patch covering entire area except narrow posterior strip; metameron bare; pleural setae as follow: 8-10 dark anteprepronotal, 3-5 dark postpronotal, 1,2 (usually 2) pale upper proepisternal, 1-4 pale postspiracular, 1 pale median posterior and 1-3 pale lower mesokatepisternal, 3-5 pale prealar, and 5-8 pale fine upper posterior mesepimeral (syntype also with 1 pale seta anterodorsal to scale patch). *Legs*: Coxae I-III each with large anterior patch of overlapping broad silvery scales; femora I-III dark brown-scaled but with white-scaled areas as follow: I,II with anterior surface having narrow stripe ventrally on approximately basal 0.25, posterior surface with stripe ventrally from base to near apex, III with anterior surface having large patch covering approximately basal 0.65, posterior surface having large patch covering approximately basal 0.5, distal portion of pale-scaled areas narrower; tibiae I-III and tarsi I-III dark brown-scaled; posttarsi I-III each with 2 unguis, equal in size, I,II with each unguis having 1 tooth, III simple. *Abdomen*: Terga dark brown-scaled with patches of overlapping broad silvery scales as follow: I-V with large laterobasal patch, I,II with patches reaching posterior margin, III-V with small dark-scaled area posterior to silvery-scaled patches, V also with patch extending posteriorly onto dorsal surface, VI with large bilobed patch dorsobasally reaching lateral margins, patch somewhat incomplete mesally, VII,VIII with large patches dorsobasally and not reaching lateral margins, patch on VII somewhat bilobed; sterna similarly scaled as *Ae. longipalpis*. *Wing*: Remigium with setae absent.

Female genitalia (Fig. 7). *Tergum VIII*: Scales on apical 0.79; setae on apical 0.65; Te-VIII index 0.73; Te-VIII/Te-IX index 1.43; length 0.34 mm; width 0.47 mm. *Sternum VIII*: Apical margin with small (0.08 of dorsal length) median indentation; laterobasal scale patch restricted to few scales; setae on apical 0.83; S-VIII index 0.93; length 0.47 mm; width 0.5 mm.

Tergum IX: With 4,5 setae on each side of midline, 9 total setae; Te-IX index 2.72; length 0.24 mm; width 0.09 mm. *Insula*: With 4,5 setae on each side of midline, 9 total setae. *Postgenital lobe*: Apex with moderately deep (0.08 of dorsal length) median indentation, 3,4 setae on each side of midline, 7 total setae; ventral PGL/cercus index 0.76; dorsal PGL index 1.36; ventral PGL index 3.14; ventral length 0.18 mm. *Cercus*: Somewhat broader; dorsal surface with setae on apical 0.71; 10 long and moderately long stout setae on apical area; cercus index 2.36; cercus/dorsal PGL index 3.03; length 0.24 mm; width 0.1 mm.

Male. Similar to female except for the following. *Head*: Antenna 0.47-0.54 length of proboscis; maxillary palpus 0.53-0.59 length of proboscis, more or less straight, thin, scales recumbent, few short setae, palpomeres 4,5 thinner and combined length shorter than palpomere 3; proboscis 1.17-1.29 length of femur I. *Legs*: Posttarsi I-III each with 2 unguis, I,II each with 1 large unguis having 1 tooth and 1 small simple unguis, III with unguis equal in size, both simple.

Male genitalia (Figs. 7, 10). *Tergum IX*: Posterior lobes larger, each with 9-12 setae, 18-23 total setae. *Gonocoxite*: Basal dorsomesal lobe well developed into oblong projection bearing 25,26 setae that are moderately long, stout, slightly curved and lanceolate; lateral margin with 8,9 very long stout setae; scales on apical portion of gonocoxite approximately equal in length to others; Gc length 0.37-0.40 mm. *Gonostylus*: Long, narrow, moderately curved, spicules and subapical seta absent; Gs length 0.24-0.27 mm; Gs/Gc index 0.65-0.66; GC length 0.05-0.06 mm; GC/Gs index 0.21-0.23. *Claspette*: Stem with strong bend approximately 0.72 from base, with 4,5 short thin setae, 1,2 on apical 0.33, 2,3 on middle 0.33, 0,1 on basal 0.33, covered with short spicules except approximately distal 0.20-0.25, length 0.15-0.17 mm, base of stem with narrow, heavily pigmented band extended laterally and connected to ventroapical area of basal dorsomesal lobe of gonocoxite, this oblong area with 25-27 long, lanceolate setae; filament broad, caudal margin produced into flattened, somewhat pointed, wing-shaped area, apex bluntly rounded, length 0.15-0.16 mm; CF/CS index 0.98-1.00; CS/Gc index 0.41-0.43. *Proctiger*: With 2,3 cercal setae on each side of midline, 4,5 total setae. *Tergum X*: Heavily pigmented but lateral margins of tongue-like, median, cephalad-produced, lobe strongly fused with mesal margins of tergum IX lobes, margins distinguished by incomplete sutures. *Phallosome*: Aedeagus long, narrow, approximately uniform width throughout length, apex blunt, length 0.16-0.17 mm; paramere broader, length 0.11-0.12 mm; Par/Ae index 0.64-0.74; basal piece relatively wide, length 0.08 mm; BP/Ae index 0.45-0.48. *Sternum IX*: With 2,3 long and 3,4 short stout setae on posterior area, 5-7 total setae.

Pupa (Figs. 12, 13). Setal branching as in Table 8. *Cephalothorax*: Tan with much of dorsal and posterior portions of scutum and mesothoracic wing slightly darker; lateralia with ocular facets of compound eye weakly developed; median keel with short row of poorly developed transverse striations; seta 7,8-CT with 2,3 branches; 9-CT single; 10,12-CT moderately long, with 3,4 branches; 11-CT long, longer than 10,12-CT. *Trumpet*: Wide; index 2.69; pinna 0.51 length of trumpet. *Abdomen*: Terga tan, I-V with basal portions darker, with minute spicules; seta 1-II long, with 7,8 thin branches; 2-VII lateral to 1-VII; 9-VIII on posterior margin; male GL index 1.09; male GL/Pa index 0.59. *Paddle*: Index 1.56; minute serrations on basal 0.57 of lateral margin; seta 1-Pa moderately long.

Fourth-instar larva (Fig. 18). Setal branching as in Table 16. *Head*: Seta 1-C with apex blunt; 4-C medial and slightly posterior to 6-C, moderately long, with 10-17 thin branches; 5-C longer than 6-C, with 3,4 branches; 5,6-C long, stout, not aciculate, each with 1 branch longer and stouter than others; 6-C longer than 7-C, with 4-7 branches; 7-C lateral and slightly posterior to 6-C, long, not aciculate, with 12-15 thin branches; 13-C longer than, lateral and very slightly posterior to 12-C, single; 14-C shorter than 15-C; 6-Mx with 3-5 stout branches; dorsomentum with 22,23 teeth; lateral palatal brush filaments comb-tipped or simple. *Antenna*: Length 0.31-0.42 mm; several small spicules on proximal 0.28-0.66; seta 1-A borne 0.52-0.56 from antennal base, with 2-4

branches; 2,3-A attached subapically. *Thorax*: Setae 1-3-P borne on pigmented common setal support plate; 1-P very long, stout, acuminate, with 3-5 branches; 1-M long, with 5-7 branches; 3-M long, single; 2,6-T single or 2-branched; most setae in pro-, meso- and metathorax lateral groups dark, stout, acuminate. *Abdomen*: Seta 1-I-VI long, branched; 1-VII long, with 3,4 branches; 2-I-VII long, 2,3 branched on I-V, single or 2-branched on VI, VII; 2-VIII with 2 thin branches; 3-II-VI long, single or 2-branched on II-IV, single on V,VI; 3-VII with 2-5 branches; 4-III,IV single; 6-I-VI long, stout, not acuminate or occasionally with very few spicules; 6-III,IV longer than 6-I,II; 9-I-VI stout, branched; 10-I-VI long, single; 13-I-V long, branched; 13-VI medial and anterior to 10-VI; 1-5-VIII each on pigmented setal support plate; segment VIII with comb of 21-27 scales, each scale with apex rounded, moderately long thin spicules on apical and lateral margins; saddle without stout spines, saddle/siphon index 3.07-3.25; 4-X with 12 setae, posterior 10 on grid, each with 4-11 branches, anterior 2 setae shorter and usually with fewer branches; 4 anal papillae, short, moderately broad, pointed, ventral pair approximately equal in length to dorsal pair. *Siphon*: Acus present, index 2.38-3.25 (dorsal length to basal width) or 2.26-3.64 (dorsal length to width at 0.5 length); pecten on proximal 0.47-0.48, composed of 20-27 spines, usually with proximal spine small, spines at mid length with 1 stout spicule basoventrally, 1-3 moderately stout and 3-6 tiny spicules basal to stout spicule; seta 1-S borne on proximal 0.51-0.54 of siphon distal to pecten, long, with 4,5 thin branches; 8-S long, approximately equal to 6-S length, with 2,3 branches; spiracular apodeme with moderate-sized knob on basoventral area.

Type data. A lectotype is here selected for one of Edwards' (1935) two female syntypes deposited in the BMNH, London, United Kingdom, and contains the following information on five labels attached to the adult pin: MADAGASCAR, Maevatanane, 21.XII.1933, Dr. W. A. Lamborn, In house; Pres. by Imp. Inst. Ent., Brit. Mus. 1934-169; *Aedes (Finlaya) monetus* Edwards; Syn-Type; and LECTOTYPE, *Aedes (Zavortinkius) monetus*, selected by John F. Reinert. The other syntype female becomes a paralectotype.

Discussion. Adults of the *Monetus* Group are easily separated from the other two groups by: possessing a patch of overlapping broad silvery spatulate scales on the combined median and posterior scutal fossal areas; mesokatepisternum having a single large continuous patch of broad silvery spatulate scales covering much of upper and lower areas and extending dorsally over the lower and upper prealar areas; mesokatepisternum having upper setae absent; and mesepimeron having a large continuous patch of overlapping broad silvery spatulate scales covering the entire area except for a narrow posterior strip. See discussion section of *Ae. brunhesi* for characters separating this similar species from *Ae. monetus*.

Female genitalia of *Ae. monetus* possess the following: sternum VIII is long and has the apex gently sloping from the apicolateral corners to the midline and with a very small scale patch laterobasally; tergum IX is longer and narrower and has an index of 2.72; cercus has the mesal margin straight; and segment VIII is laterally compressed.

The male genitalia of the *Monetus* Group possess the following: aedeagus is developed similarly to those of the Longipalpis Group but with the apex definitely blunt; claspette filament is long, broad, greatly expanded on the basal 0.5, and the apex is blunt; gonocoxite has the scales on the apical portion approximately the same length as the others; gonostylus is long, length 0.25-0.27 mm, narrow, and gently curved; Gs/Gc index is 0.63-0.66; sternum VIII has the apical margin with a small median lobe; tergum X has a median, cephalad directed lobe fused with the mesal margins of tergum IX lobes; and phallosome has the paramere broad.

Pupae of the *Monetus* Group are distinguished from the other two groups by the male genital lobes having apices separated, trumpet is wide, and pinna is 0.51 of the trumpet length.

Fourth-instar larval features of *Ae. monetus* that are unique for members of the subgenus are seta 13-C is single, seta 8-P has 10-12 branches, seta 2-I,II has 4,5 branches, seta 3-I,II is single or

2-branched, seta 4-III,IV is single, seta 9-II-VI has 2 or more branches, seta 13-VI has 4-7 branches and seta 8-S is long, approximately equal to seta 6-S length and has 2,3 branches. Other important features of the larvae are seta 2-III-V has 2 or more branches, seta 3-III is single or 2-branched, seta 10-I,III is single, and seta 13-II has 4-7 branches. *Aedes monetus* larvae have seta 6-C with one branch longer and stouter than the other branches which is similar to species of the Brygooi Group.

Distribution. 12 specimens examined: 1♀+g, 3♀, 1♂pl, 1♂+g and 2L.

MADAGASCAR, Maevatanana, 21 Dec. 1933, in house, M6, Dr. W. A. Lamborn (1♀+g, lectotype; 1♀, paralectotype); Majunga Province, S/P de Maevatanana, Mar. 1969, J. Brunhes (1L); same data except, 16 Feb. 1969 (1♀); Tulear Province, Antanimoro, Ambovombe, 1 Feb. 1968, J. Brunhes (1♂pl); Majunga Province, Ankatafantsika, Nov. 1970, J. Brunhes (1♀ and 1♂+g); Majunga Province, Tsaramandroso, S/P Ambato-Boeni, Jan. 1971, J. Brunhes (1L).

Distribution from the literature.

COMORES ISLANDS, Mayotte Island, Ironi-Be, Moheli, Aerodrome (Brunhes 1977, 1978).

MADAGASCAR, Maevatanana (Edwards 1935, 1941); Ouest, Maevatanana (Doucet 1950); Majunga Province, Antsifaboatra, Maevatanana, Manpikony, Marovoay, Tsaramandroso, Tulear Province, Ambovombe, Antanimoro (Brunhes 1971); Ankara Fandak (Gardner 1971); Diego-Suarez Province, Antsahampano, Anamakia, Sakaray (Ravaonjanahary 1978); Ampijoroa, Maevatanana (Fontenille and Coulanges 1988); Ampijoroa, Kianjavato, Maevatanana, Perinet, Sud-Est (Fontenille 1988).

Bionomics. Larvae have been collected from treeholes (baobabs, mango, etc.), seed husks and once from a tire containing clear water (Brunhes 1971) and from bamboo sections, treeholes and old tires (Brunhes 1978).

Females have been collected in a house (Edwards 1935) and from human bait (Fontenille 1988). Females are reported to aggressively bite humans during the day in the forest (Brunhes 1978).

Aedes (Zavortinkius) brunhesi Reinert, new species

(Figs. 3, 7, 10)

Similar to *Ae. monetus* but differs as follows.

Female, pupa and fourth-instar larva. Unknown.

Male (Fig. 3). *Head*: Antenna 0.61 length of proboscis; maxillary palpus broken, only palpomeres 1 and 2 remain; proboscis 1.21 length of femur I. *Thorax*: Scutum with overlapping broad silvery-scaled stripe on acrostichal area extending only to anterior of posterior medial scutal area; 2 broad silvery scales on antedorsocentral area (right side only); posterior medial scutal area and anterior and lateral margins of prescutellar area with broad dark brown scales, no silvery scales; combined median and posterior scutal fossal, and supraalar areas each with silvery-scaled patches smaller; scutellum with overlapping broad silvery-scaled patch wider; mesopostnotum bare; scutal setae as follow--2 anterior promontory, 4 antedorsocentral, 1 anterior scutal fossal; 3 lateral prescutellar, pleural setae as follow--5 antepronotal, 3 postpronotal, 1 upper proepisternal, 1,2 postspiracular, 3,4 prealar, and 3 upper posterior mesepimeral. *Legs*: Femora I,II with posterior surface having pale-scaled area restricted to basal approximately 0.4 of I and approximately 0.5 of II. *Abdomen*: Tergum VI without silvery-scaled anterior band, VII with silvery-scaled band incomplete.

Male Genitalia (Figs. 7, 10): *Tergum LX*: Each posterior lobe with 6 setae, 12 total setae. *Gonocoxite*: With 27-31 long, curved, lanceolate setae on oblong ventroapical area of basal dorsomesal lobe, basal 6,7 setae long; length 0.38-0.39 mm. *Gonostylus*: Gs length 0.24-0.25 mm;

Gs/Gc index 0.63-0.64; GC length 0.03 mm; GC/Gs index 0.13-0.14. *Claspette*: Stem with strong bend on apical third, with 3,4 short thin setae, 1 on apical 0.33, 2,3 on middle 0.33, 0 on basal 0.33; length 0.14 mm; filament broad, caudal margin produced into flattened, somewhat truncated, wing-shaped area, apex bluntly rounded, length 0.15 mm; CF/CSt index 1.05-1.12; CSt/Gc index 0.37. *Proctiger*: With 2,3 cercal setae on each side of midline, 5 total setae. *Phallosome*: Length 0.15 mm; Par/Ae index 0.78; BP/Ae index 0.5. *Sternum IX*: Appears to have 3 setae on posterior area.

Type data. The holotype male, mounted on a minuten pin, contains the following information on five labels attached to the adult pin: E387 (collection number); Correfour Demberi, Sada Mayotte Comores, Brunhes: rec.; *Aedes (Finlaya) monetus*, male No. E387, Correfour Demberi, Sada Mayotte Comores, 16-02-69, J. B. BRUNHES Rec. & Det.; HOLOTYPE, *Aedes (Zavortinkius) brunhesi* Reinert; and T95.11 Term. (genitalia preparation number). The holotype and genitalia (mounted in Canada balsam on a microscope slide) are deposited in the IRD, Montpellier, France.

Discussion. The male is similar to that of *Ae. monetus* but is easily distinguished from it by the presence of broad dark brown scales on the posterior medial scutal area and the anterior and lateral margins of the prescutellar area, absence of scales on the mesopostnotum and the postspiracular area, antenna is shorter, proboscis is 1.21 length of femur I, and femora I and II have reduced pale-scaled areas on the posterior surfaces. *Aedes brunhesi* is easily separated from the other species of *Zavortinkius* (except *Ae. monetus*) by the presence of a patch of overlapping broad silvery spatulate scales on the combined median and posterior scutal fossal areas. See the discussion section of *Ae. monetus* for additional information.

The male genitalia of *Ae. brunhesi* differ from those of *Ae. monetus* by the claspette filament having the caudal margin produced into a somewhat truncated wing-shaped area and the length of the claspette stem.

This species is named in honor of Professor Jacques Brunhes in recognition of his work on mosquitoes of the Afrotropical Region.

Distribution. 2 specimens examined: 1♂+g holotype, see type data.

Bionomics. Immatures were collected from bamboo sections (J. Brunhes, personal communication).

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LIST OF FIGURES

- Figure 1. Dorsal view of adult scutum and scutellum: *Ae. longipalpis* ♀, *Ae. pollinator* ♀, *Ae. fulgens* ♀ and *Ae. mzooi* ♀. Dorsal view of adult mesopostnotum: *Ae. fulgens* ♀ and *Ae. mzooi* ♀. None drawn to scale.
- Figure 2. Dorsal view of adult scutum and scutellum: *Ae. huangae* ♀, *Ae. geoffroyi* ♀, *Ae. monetus* ♀, *Ae. brygooi* ♀, *Ae. phillipi* ♂ and *Ae. interruptus* ♀. Dorsal view of adult mesopostnotum: *Ae. huangae* ♀ and *Ae. monetus* ♀. None drawn to scale.
- Figure 3. Dorsal view of adult abdomen: *Ae. longipalpis* ♀, *Ae. pollinator* ♀, *Ae. geoffroyi* ♀, *Ae. huangae* ♀, *Ae. fulgens* ♀, *Ae. mzooi* ♀, *Ae. interruptus* ♀, *Ae. phillipi* ♀, *Ae. brygooi* ♀, *Ae. monetus* ♀ and *Ae. brunhesi* ♂. None drawn to scale.
- Figure 4. Anterior view of female tarsi I-III: *Ae. interruptus*, *Ae. mzooi*, *Ae. fulgens*, *Ae. geoffroyi* and *Ae. longipalpis*.
- Figure 5. Female genitalia of *Ae. longipalpis*.
- Figure 6. Female genitalia (cercus, sternum VIII and Terga VIII and IX): *Ae. fulgens*, *Ae. longipalpis*, *Ae. mzooi*, *Ae. geoffroyi*, *Ae. huangae* and *Ae. pollinator*.
- Figure 7. Female genitalia (cercus, sternum VIII and terga VIII and IX): *Ae. monetus*, *Ae. interruptus*, *Ae. brygooi* and *Ae. phillipi*. Male sternum VIII and tergum VIII: *Ae. monetus* and *Ae. brunhesi*.
- Figure 8. Male sternum VIII and tergum VIII: *Ae. longipalpis*, *Ae. geoffroyi*, *Ae. fulgens*, *Ae. mzooi*, *Ae. pollinator*, *Ae. huangae*, *Ae. interruptus*, *Ae. brygooi* and *Ae. phillipi*.
- Figure 9. Male genitalia (claspette, gonostylus and phallosome): *Ae. huangae*, *Ae. pollinator*, *Ae. longipalpis* (also includes proctiger, sternum IX and terga IX and X), *Ae. brygooi* and *Ae. phillipi*.
- Figure 10. Male genitalia (claspette, gonostylus and phallosome): *Ae. mzooi*, *Ae. fulgens*, *Ae. geoffroyi*, *Ae. monetus*, *Ae. interruptus* and *Ae. brunhesi*.
- Figure 11. Pupa of *Ae. longipalpis*.
- Figure 12. Pupal metanotum: *Ae. fulgens*, *Ae. longipalpis*, *Ae. pollinator*, *Ae. geoffroyi* and *Ae. huangae*. Pupal dorsal apotome: *Ae. fulgens*, *Ae. pollinator*, *Ae. longipalpis*, *Ae. geoffroyi* and *Ae. huangae*. Pupal trumpet: *Ae. longipalpis*, *Ae. huangae*, *Ae. pollinator*, *Ae. geoffroyi*, *Ae. fulgens*, *Ae. brygooi*, *Ae. phillipi* and *Ae. monetus*.
- Figure 13. Pupa (male genital lobe and paddle): *Ae. huangae*, *Ae. pollinator*, *Ae. geoffroyi*, *Ae. longipalpis*, *Ae. fulgens*, *Ae. brygooi*, *Ae. phillipi* and *Ae. monetus*.
- Figure 14. Fourth-instar larva of *Ae. longipalpis*.

Figure 15. Fourth-instar larva (cranium and siphon): *Ae. geoffroyi*, *Ae. pollinctor* and *Ae. huangae*.

Figure 16. Fourth-instar larva (cranium and siphon): *Ae. fulgens* and *Ae. phillipi*.

Figure 17. Fourth-instar larva (cranium, abdominal segments VIII and X and siphon) of *Ae. brygooi*.

Figure 18. Fourth-instar larva (cranium, abdominal segments VIII and X and siphon) of *Ae. monetus*.

LIST OF FIGURE ABBREVIATIONS

Adult

I	= Tarsus I	Mpn	= Mesopostnotum
II	= Tarsus II	Scu	= Scutum
III	= Tarsus III	Stm	= Scutellum

Female Genitalia

AGDB	= Accessory gland duct base	SCa	= Spermathecal capsule
BMA	= Basal median apodeme	SCaP	= Spermathecal capsule pore
BLS	= Basal lateral seta	SE	= Spermathecal eminence
Ce	= Cercus	SES	= Spermathecal eminence spicule
DPGL	= Line of attachment of proctiger to dorsal surface of PGL	S-VIII	= Sternum VIII
H	= Hinge	Te-VIII	= Tergum VIII
I	= Insula	Te-IX	= Tergum IX
LVL	= Lower vaginal lip	UVL	= Upper vaginal lip
PGL	= Postgenital lobe	UVS	= Upper vaginal sclerite
Pr	= Proctiger	VT	= Ventral tuft
		1-6-S	= Setae 1-6-S of S-VIII

Male Genitalia

Ae	= Aedeagus	PH	= Phallosome
BP	= Basal piece	Ppr	= Paraproct
CF	= Claspette filament	Pr	= Proctiger
Cl	= Claspette	S-IX	= Sternum IX
CSe	= Cercal seta	S-VIII	= Sternum VIII
CSt	= Claspette stem	Te-IX	= Tergum IX
GC	= Gonostylar claw	Te-VIII	= Tergum VIII
Gs	= Gonostylus	Te-X	= Tergum X
Par	= Paramere		

Pupa

CT = Cephalothorax
DAp = Dorsal apotome
GL = Genital lobe
I-VIII = Abdominal segments
I-VIII

Mtn = Metanotum
Pa = Paddle
T = Trumpet

Fourth-instar larva

A = Antenna
C = Cranium
CS = Comb scale
Dm = Dorsomentum
I-VIII,X = Abdominal segments
I-VIII,X
M = Mesothorax

Mx = Maxilla
P = Prothorax
PS = Pecten spine
S = Siphon
Sa = Saddle
SAd = Spiracular apodeme
T = Metathorax

Fig. 1

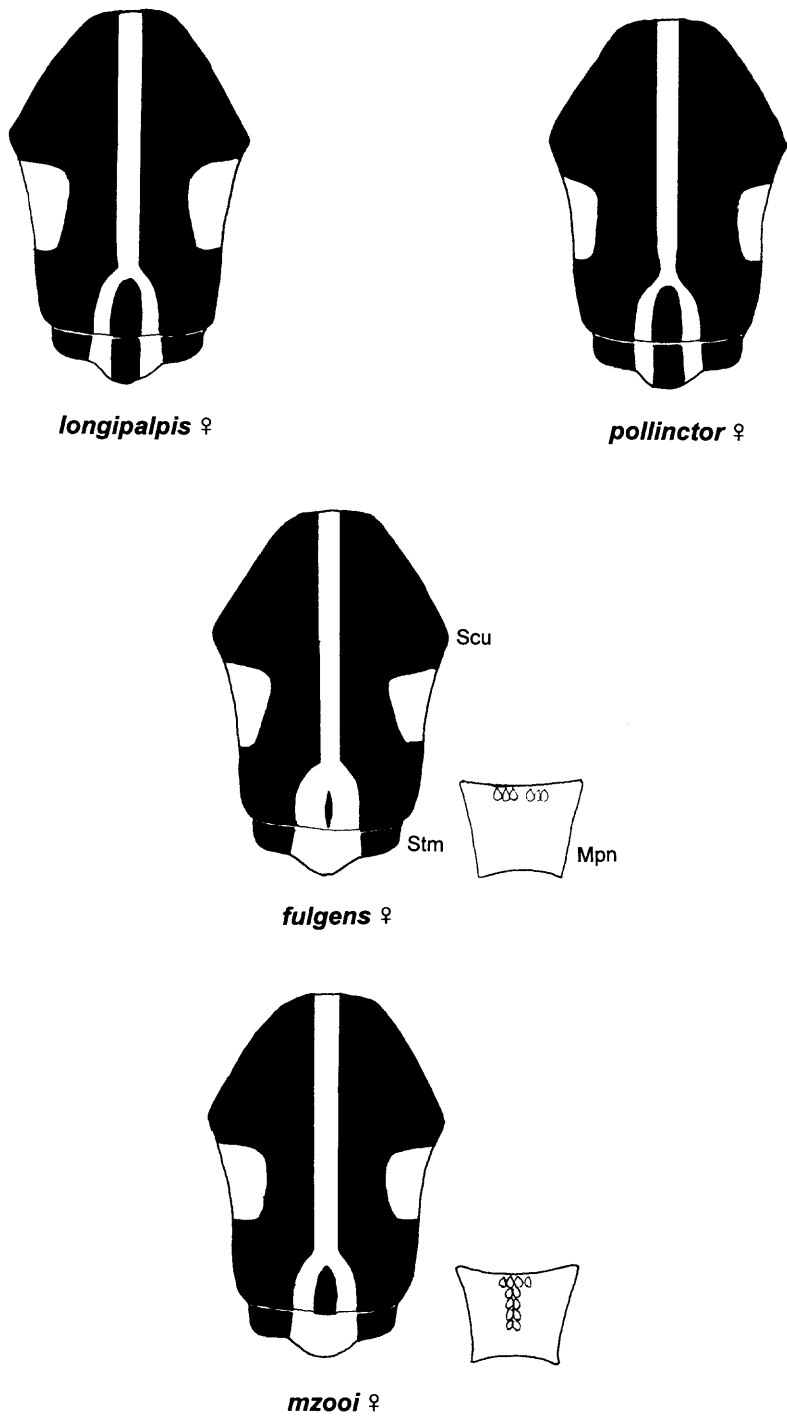


Fig. 2

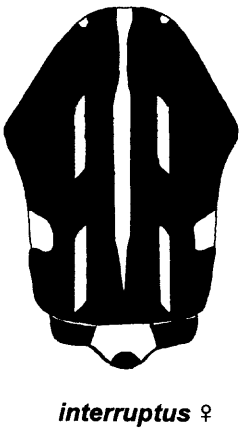
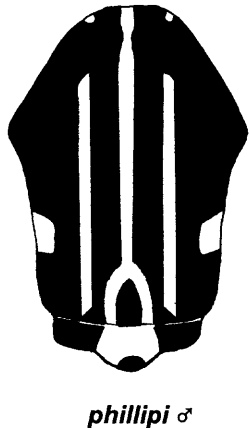
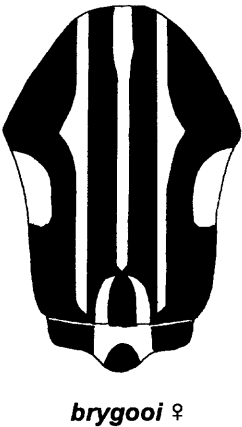
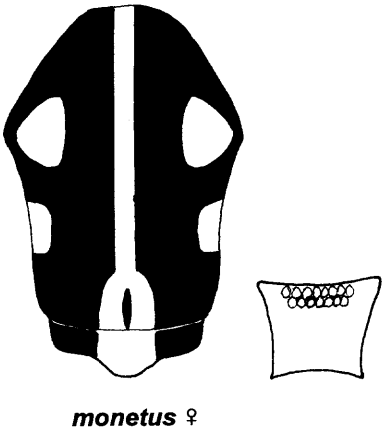
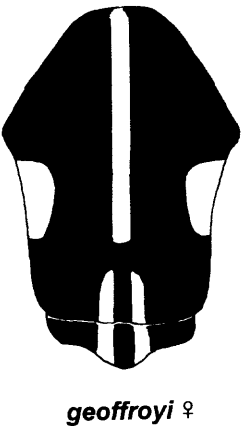
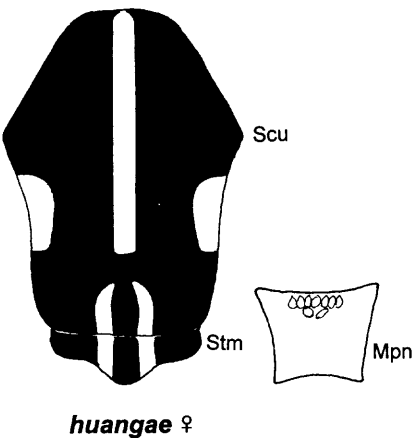


Fig. 3



longipalpis ♀



pollinctor ♀



geoffroyi ♀



huangae ♀



fulgens ♀



mzooi ♀



interruptus ♀



phillipi ♀



brygooi ♀



monetus ♀



brunhesi ♂

Fig. 4

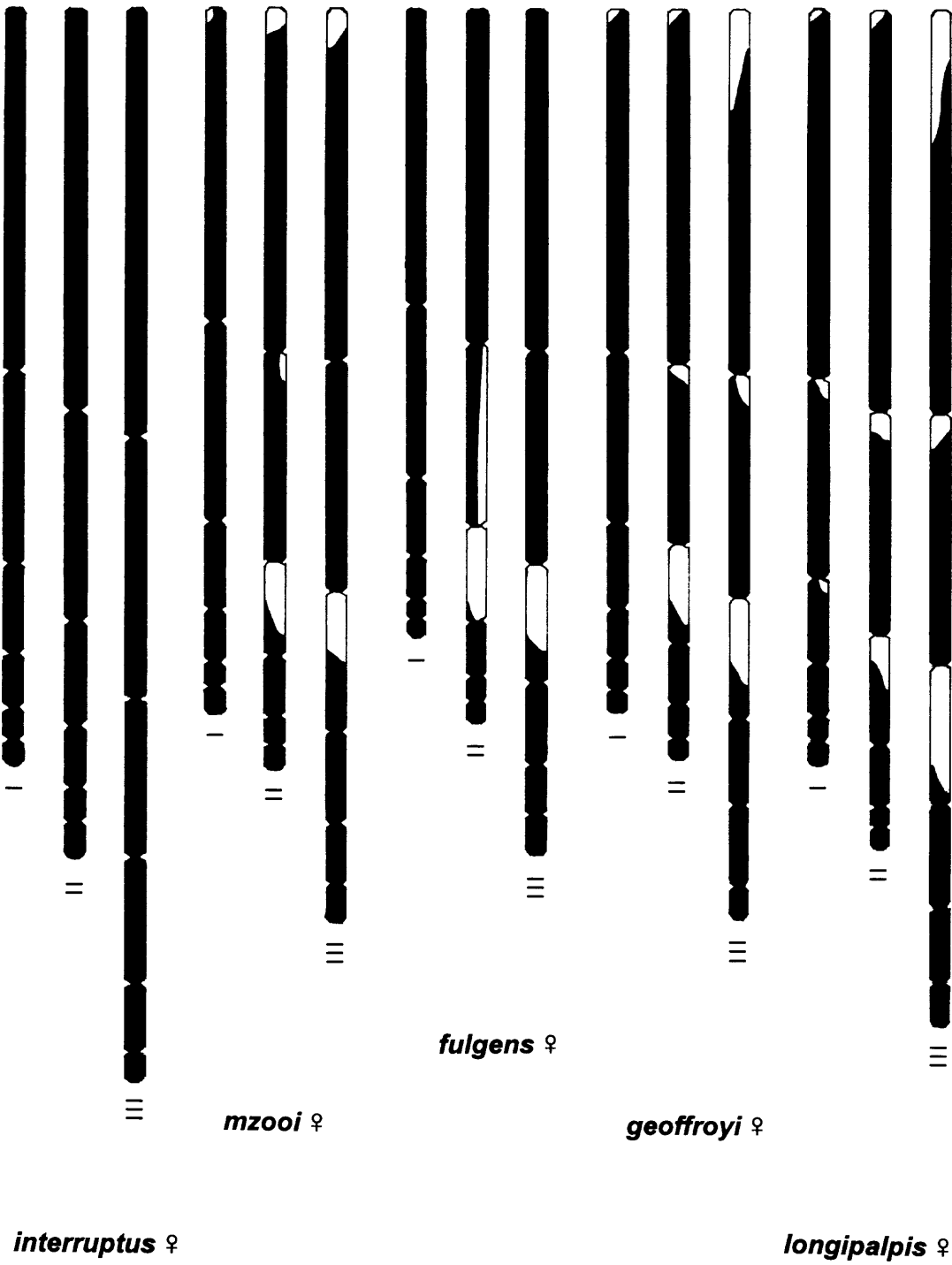
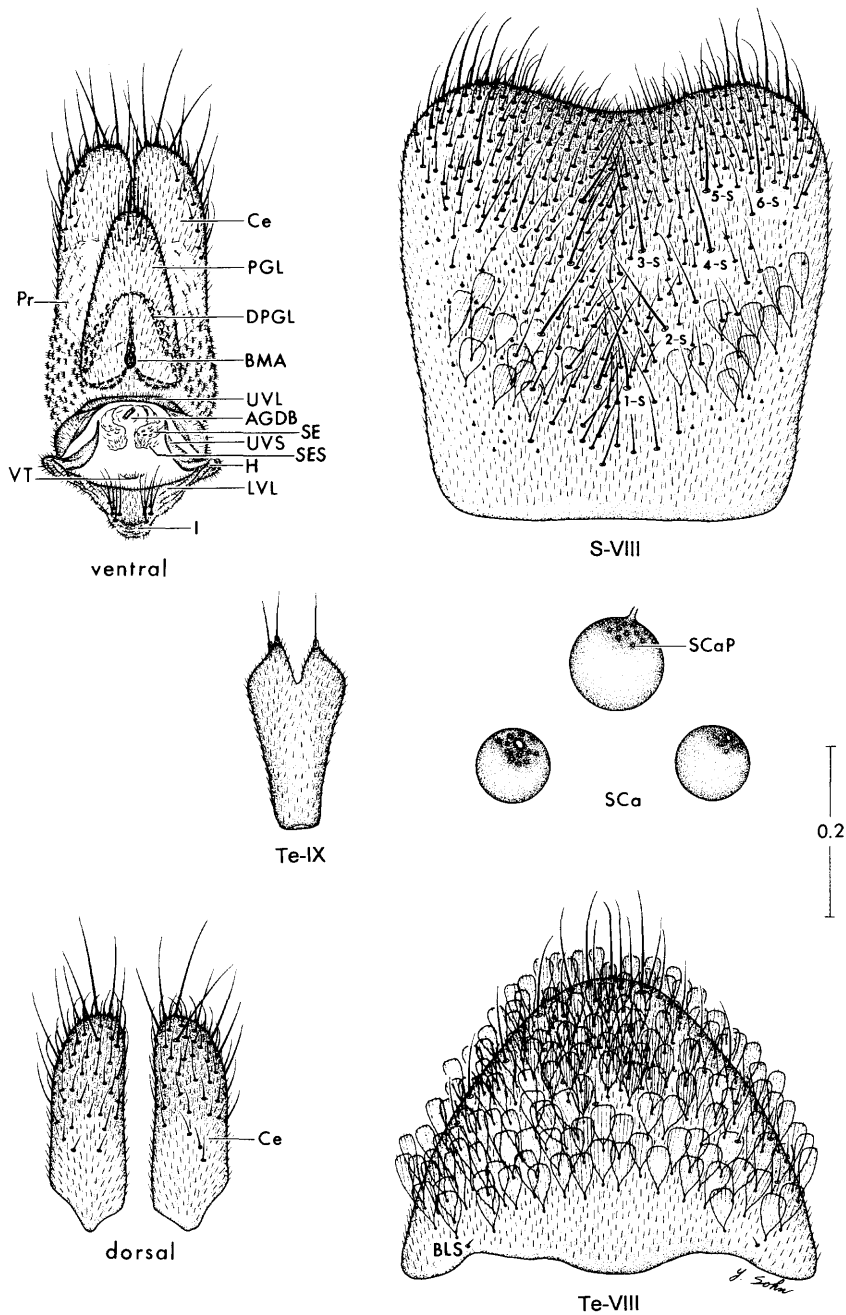


Fig. 5



longipalpis ♀

Fig. 6

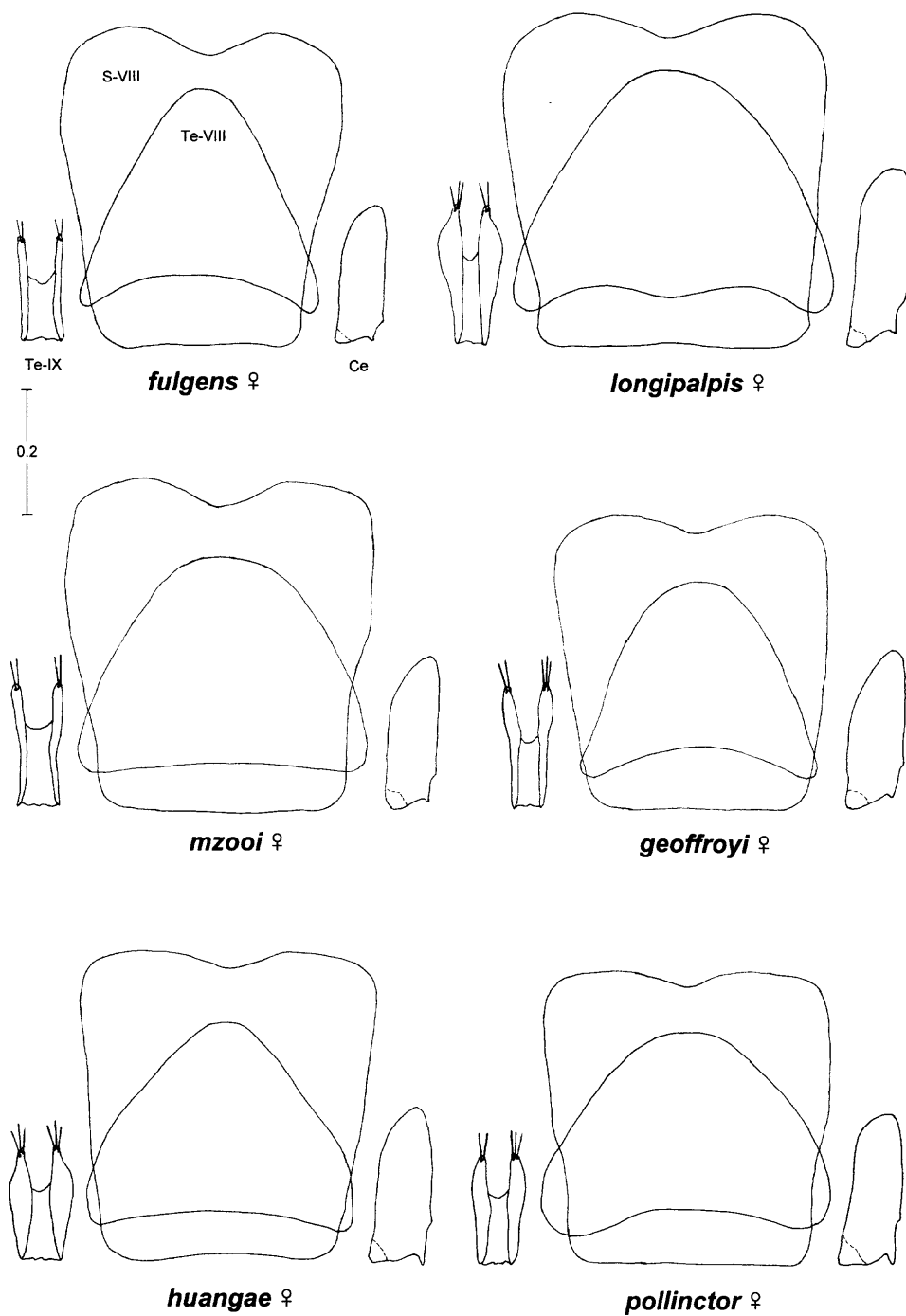


Fig. 7

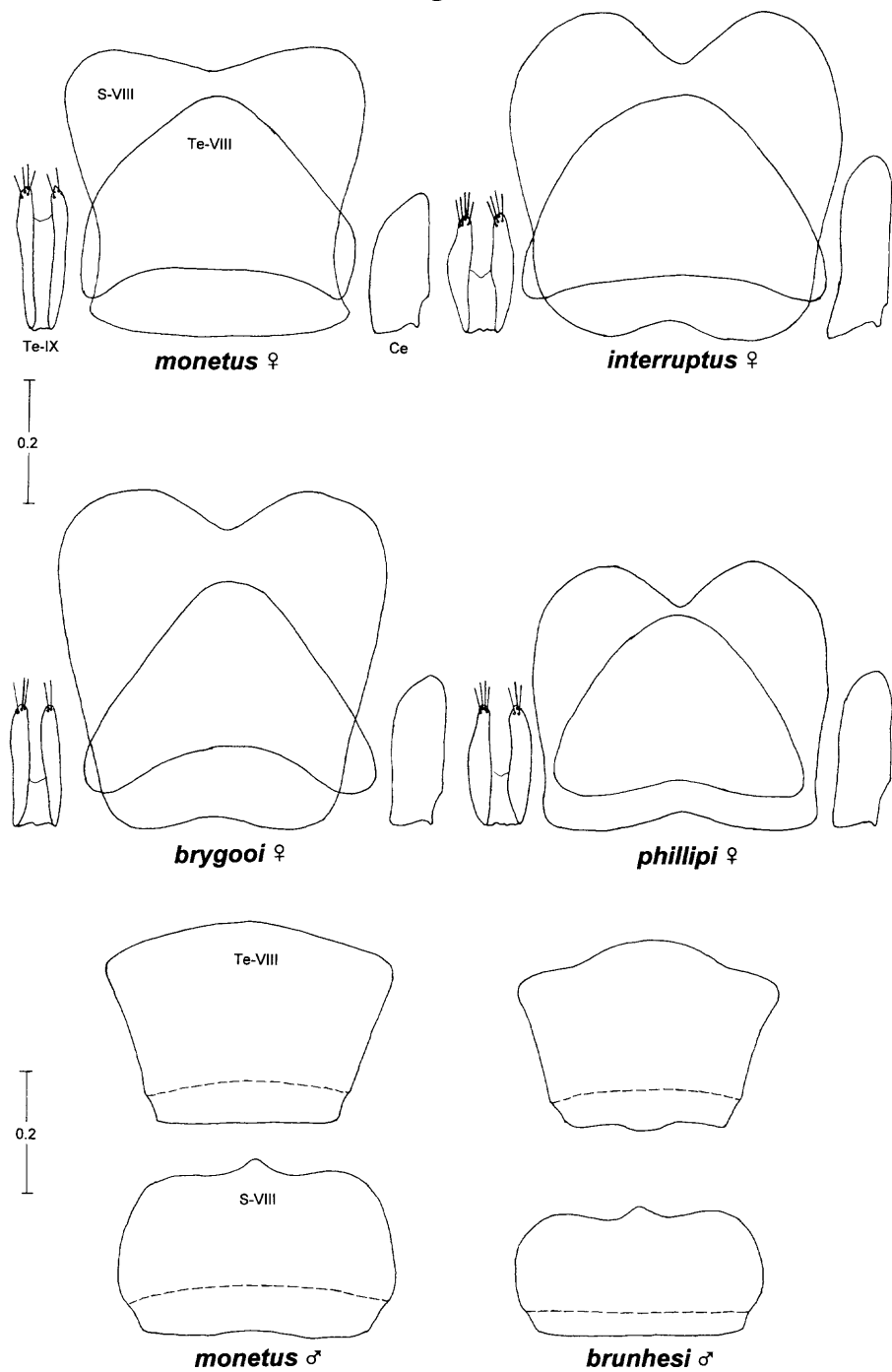


Fig. 8

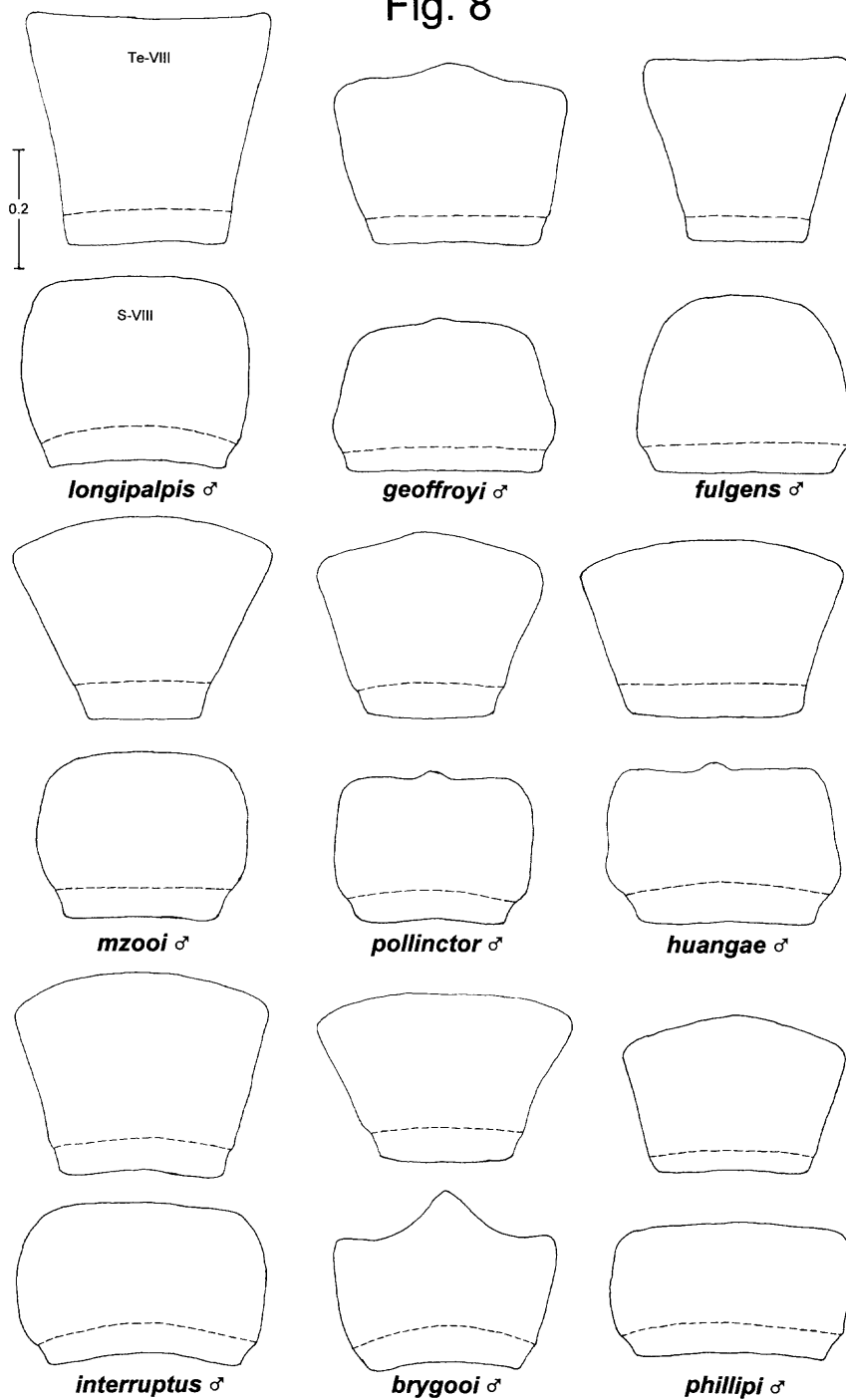


Fig. 9

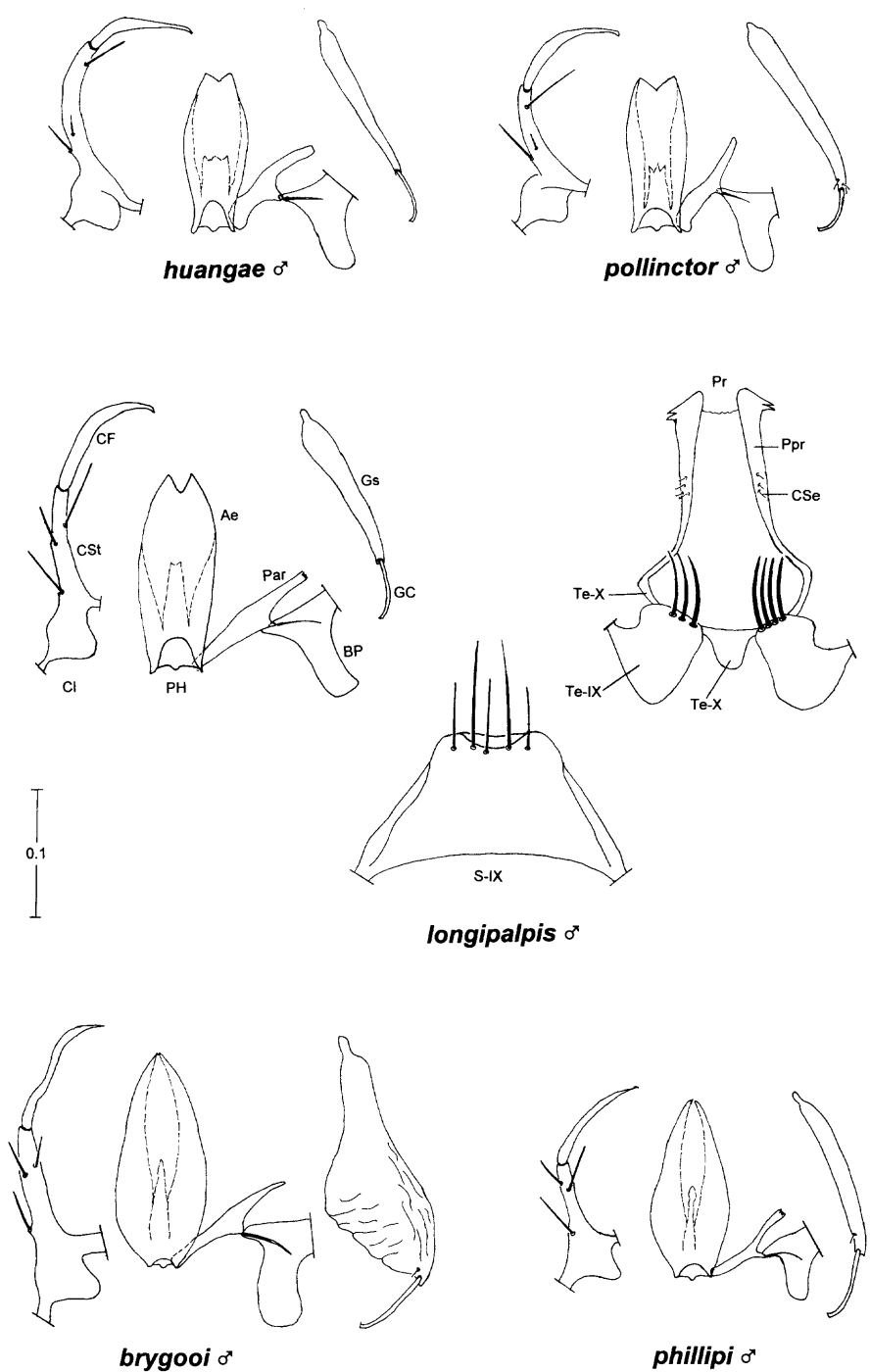


Fig. 10

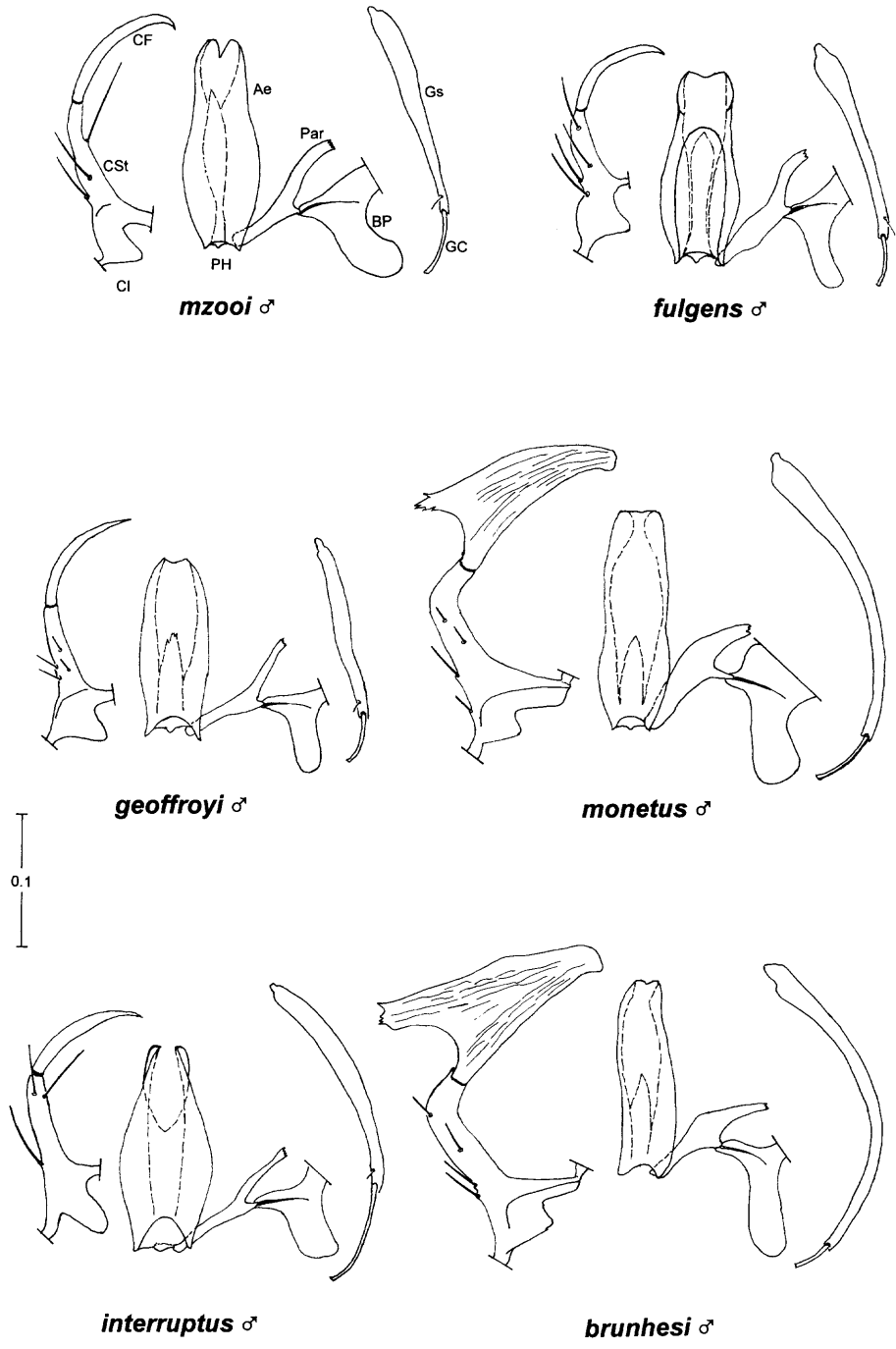
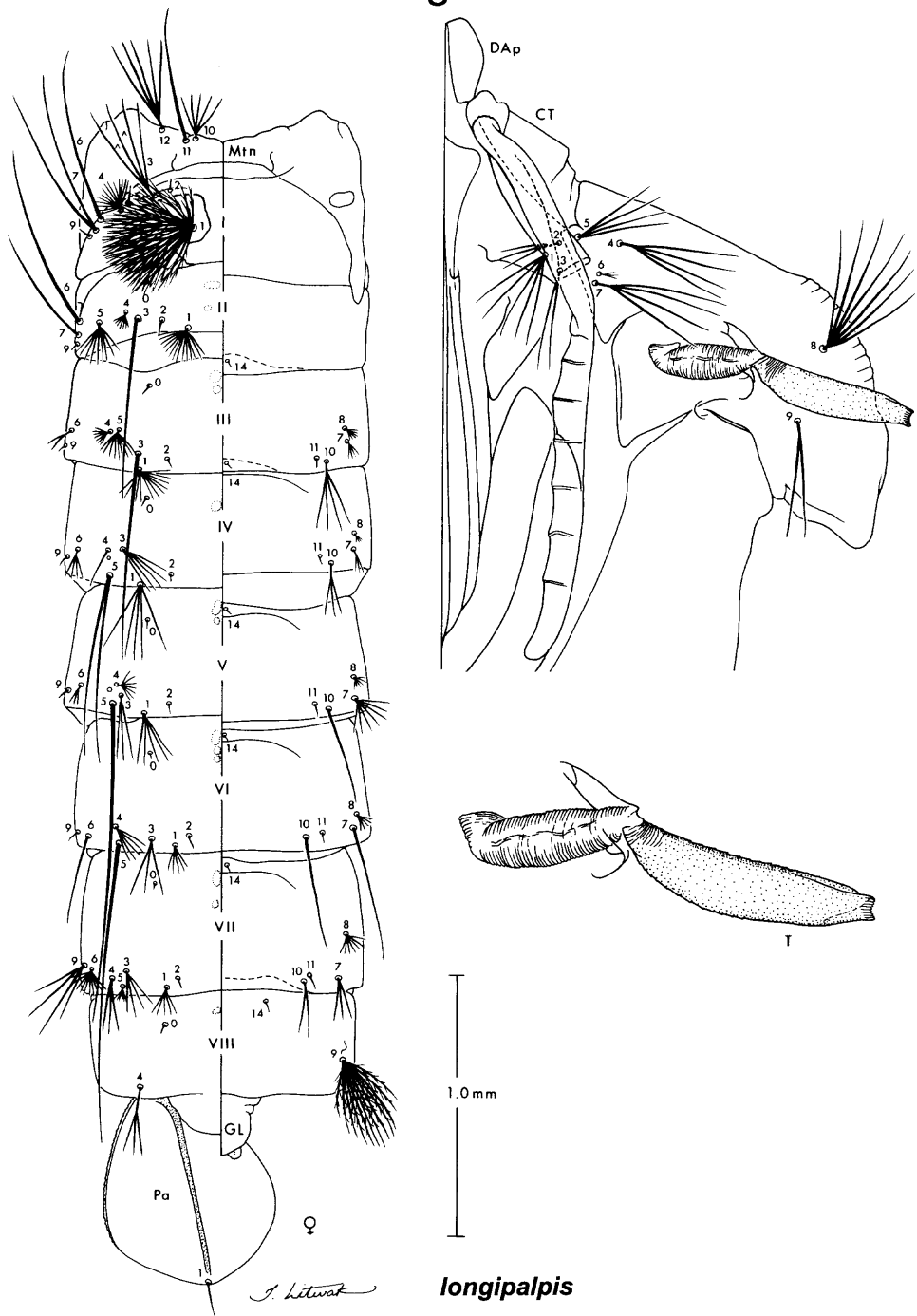


Fig. 11



longipalpis

Fig. 12

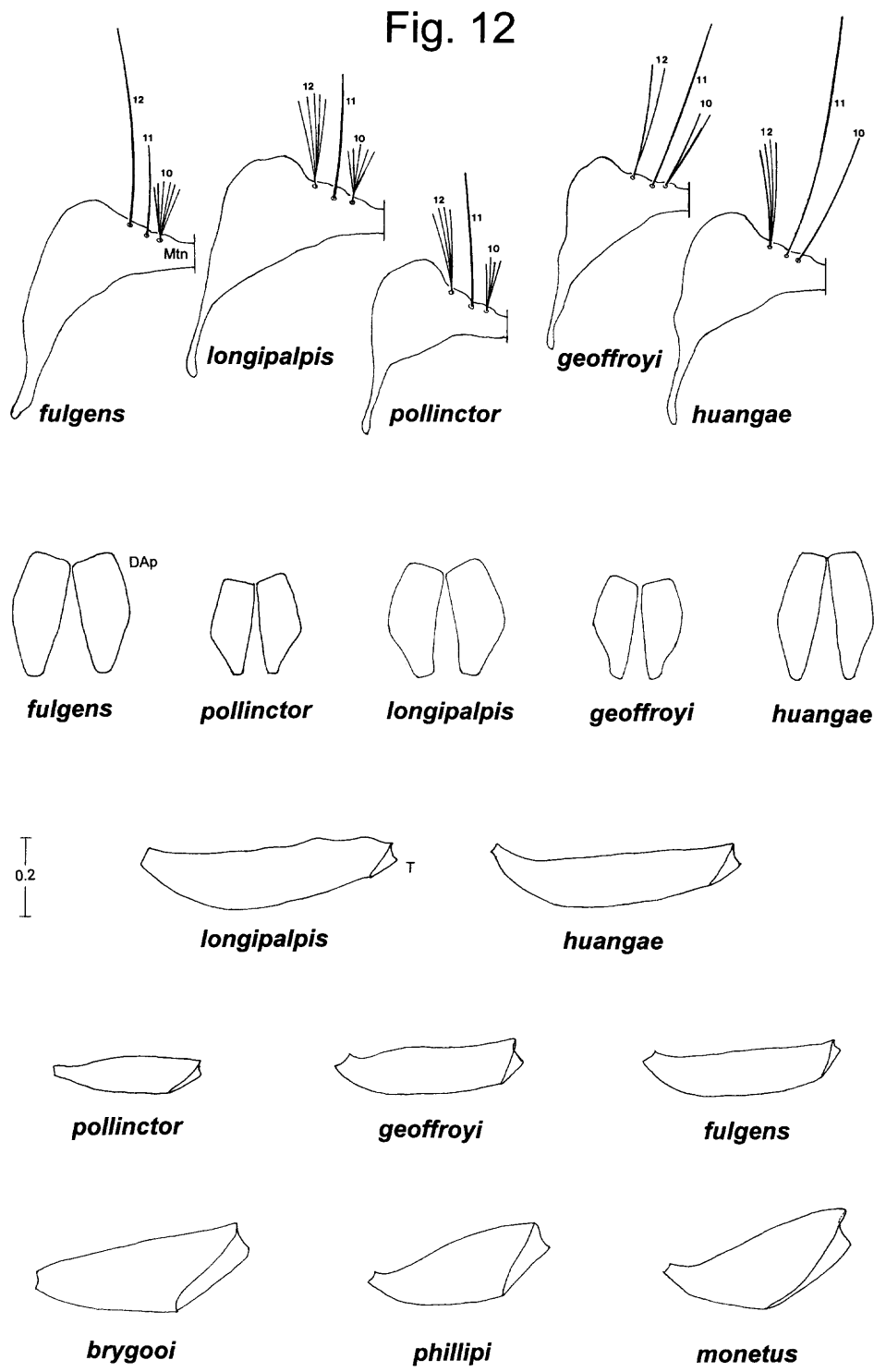


Fig. 13

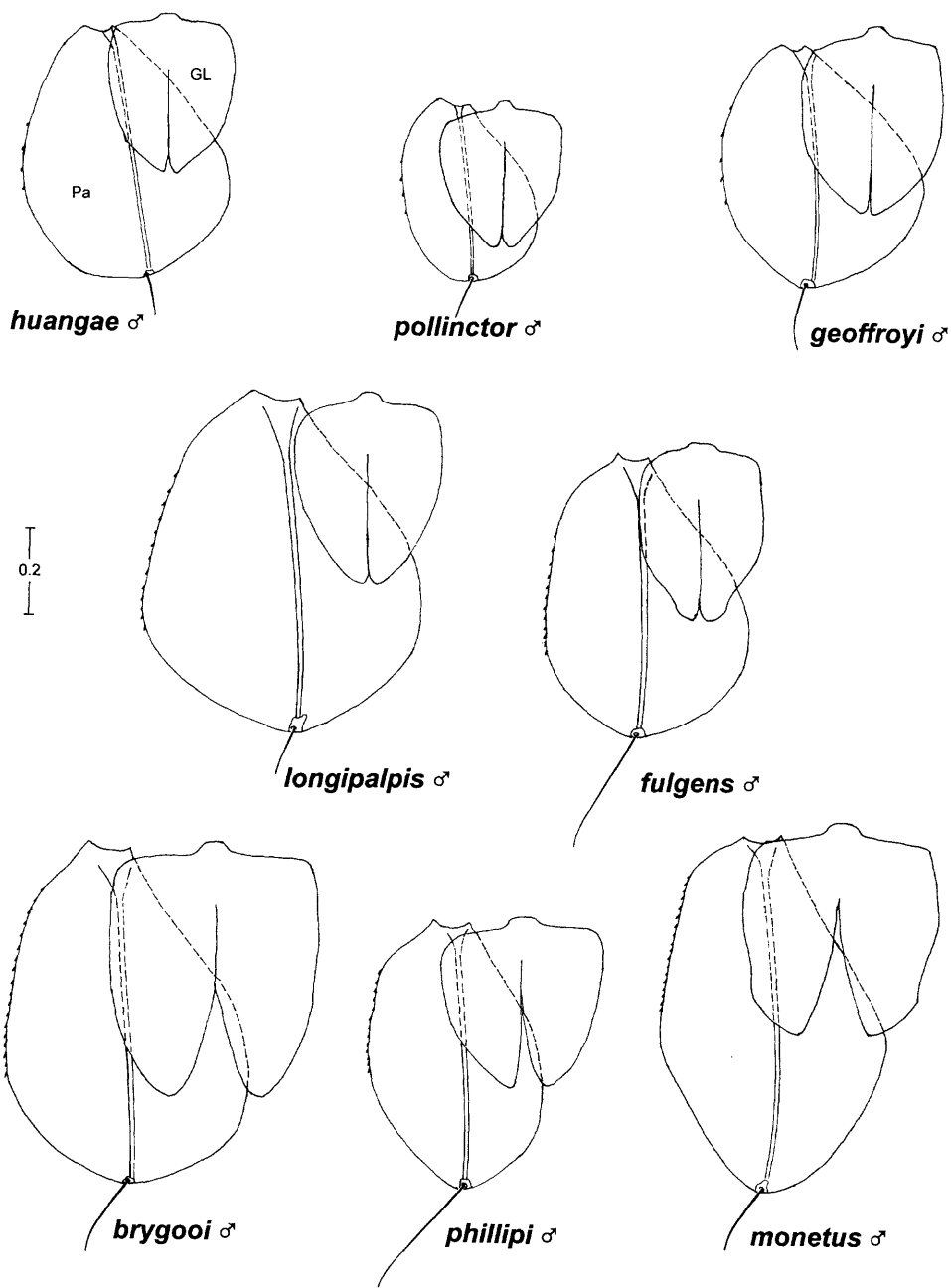


Fig. 14

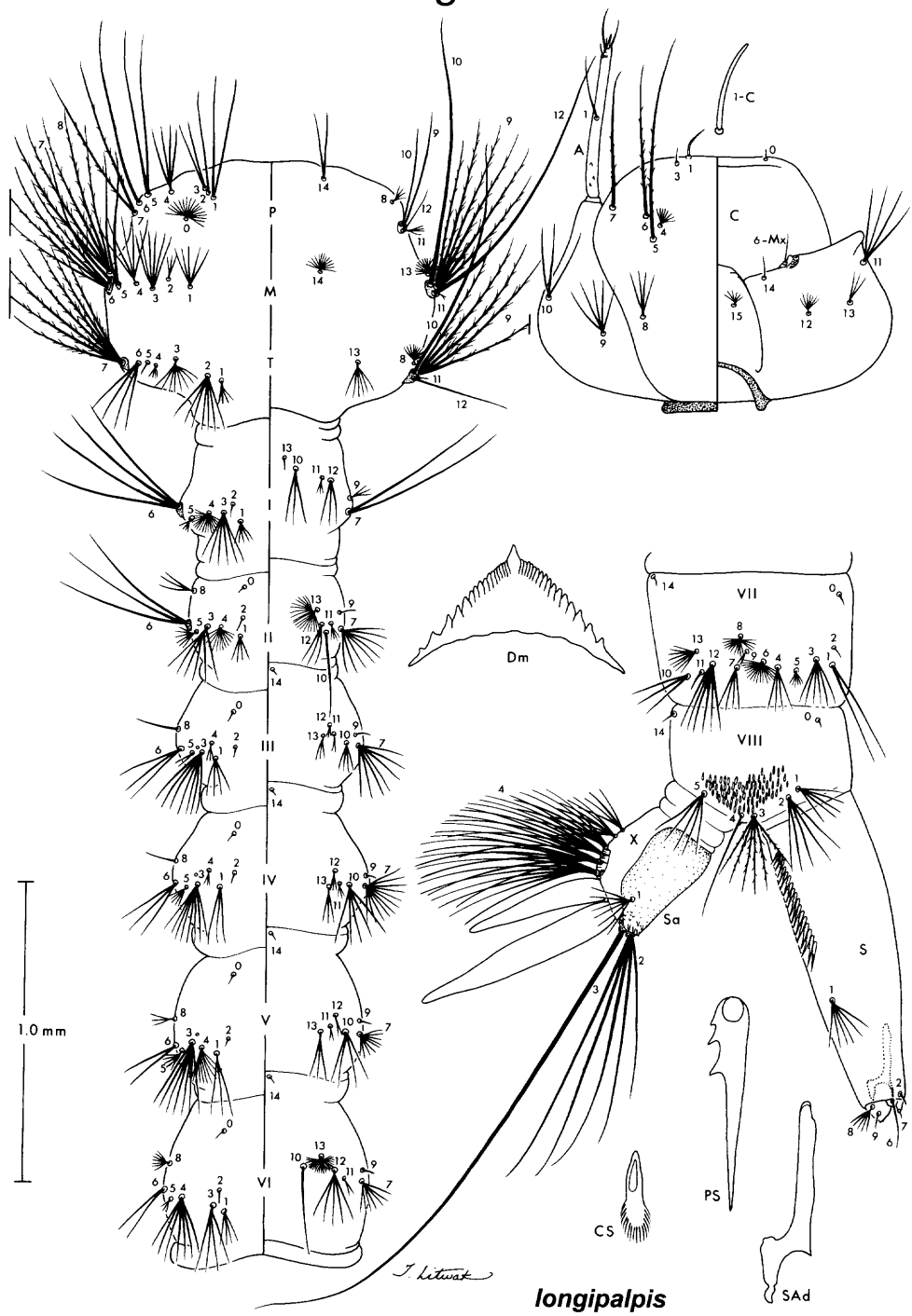


Fig. 15

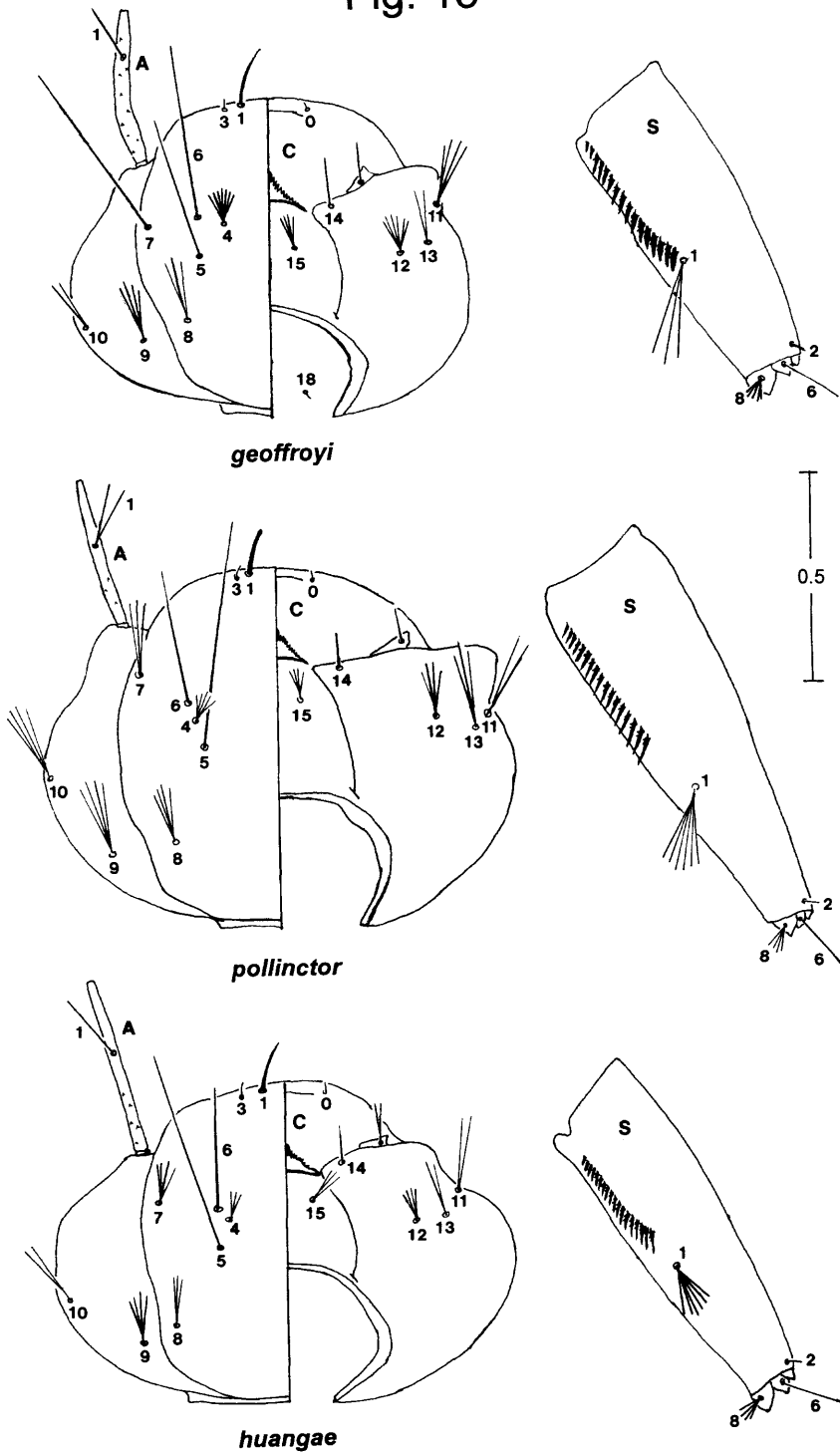


Fig. 16

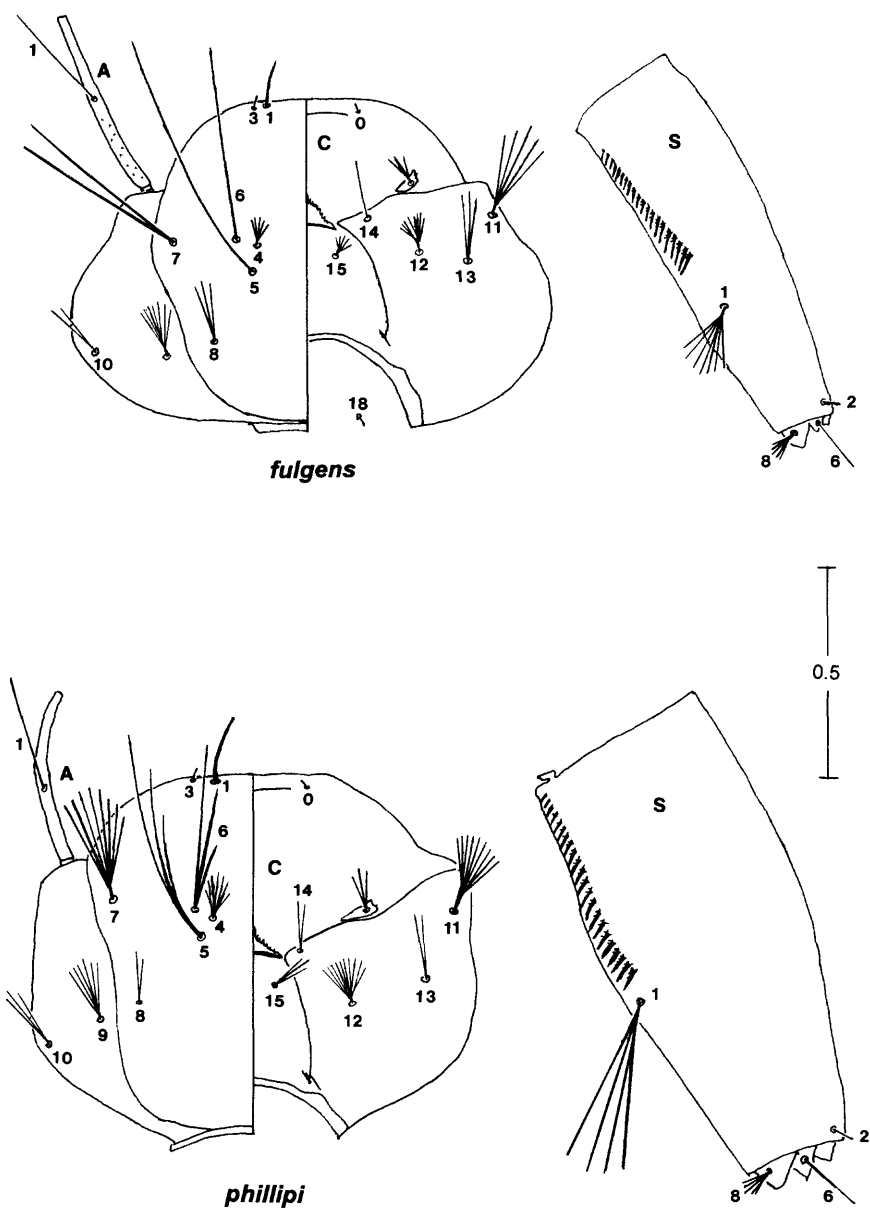


Fig. 17

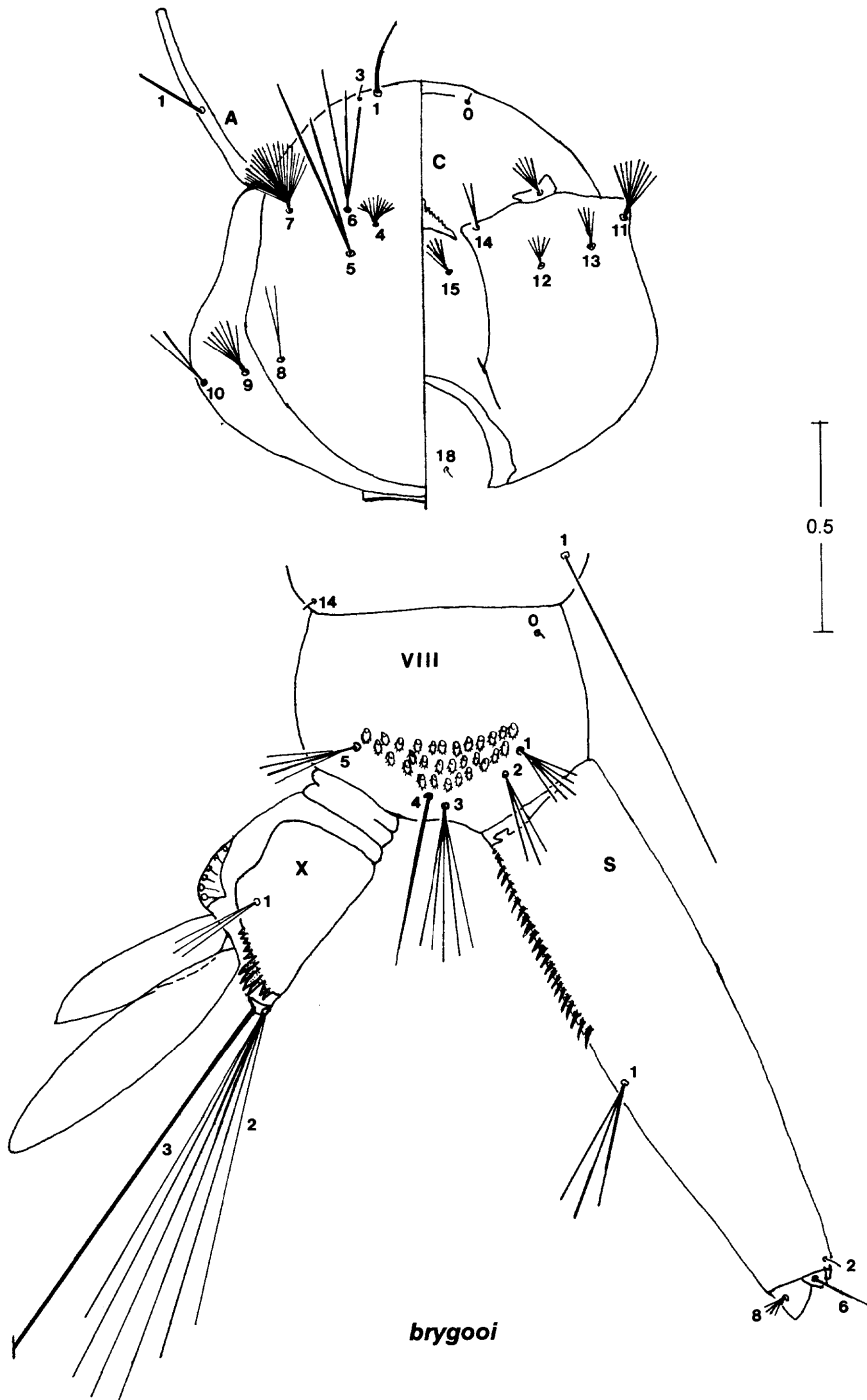


Fig. 18

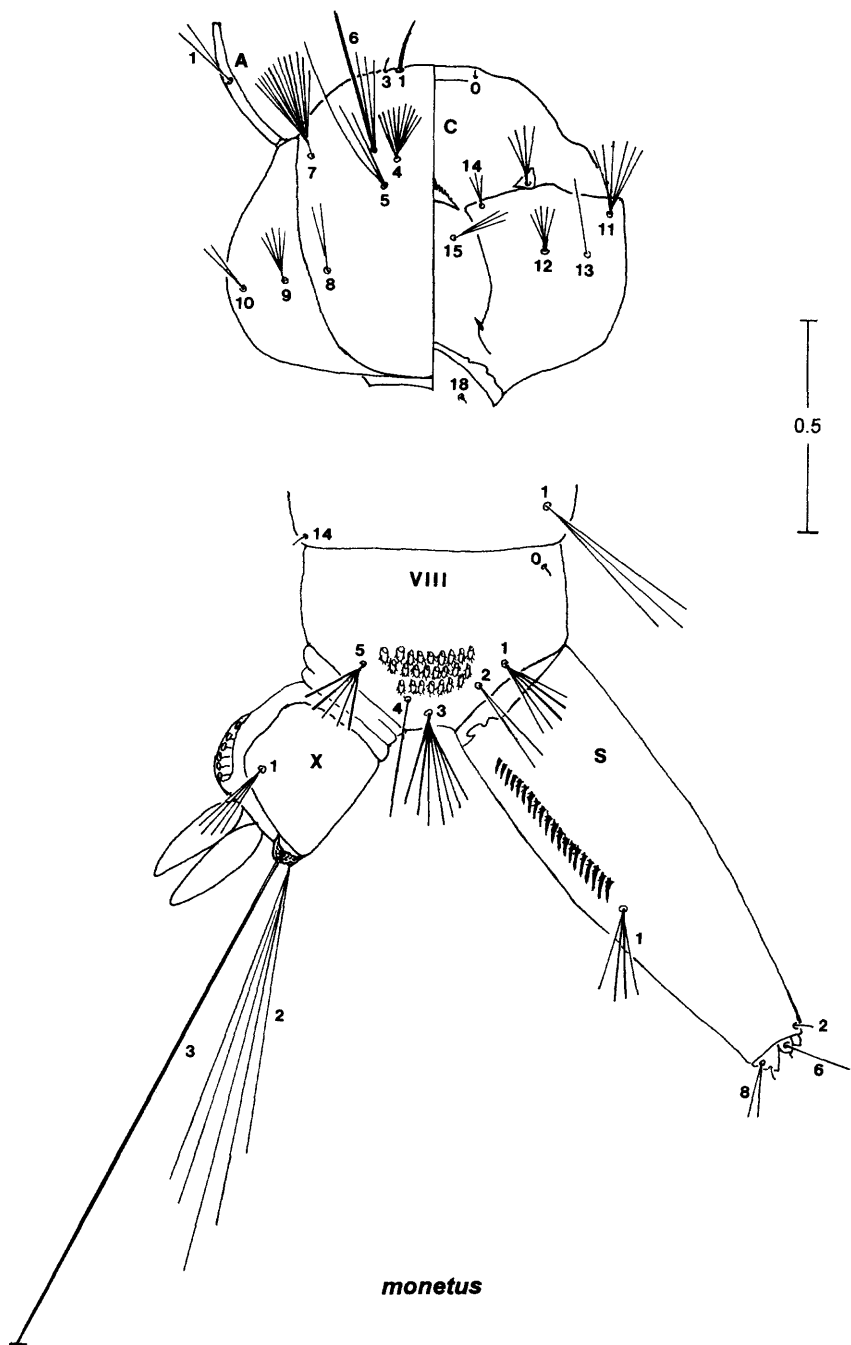


Table 1. Observed branching of setae on pupae of *Ae. (Zav.) longipalpis* (5 specimens).

Seta No.	Cephalothorax		Abdominal Segments		
	CT	I	II	III	IV
0			1	1	1
1	4,5(4)	29-76	12-17(17)	7-13(11)	5-8(6)
2	3,4(3)	1	1,2(1)	1	1
3	2,3(3)	3-7(4)	1	1	4-8(6)
4	4-6(5)	14-23(16)	6-11(8)	7-11(9)	1,2(1)
5	4,5(4)	1-7(3)	9-13(11)	7-14(11)	1,2(2)
6	3-6(5)	1	1	2-5(3)	3,4(4)
7	4-6(4)	2,3(2)	1,2(1)	4-8	1-5(3)
8	5-8(6)			4-8(7)	3-8(7)
9	1-3(2)	1	1	1	1
10	4-7(5)	0-2(0)		3-5(4)	3-6(4)
11	1	0-2(0)	0-2(0)	1	1
12	4-6(5)				
14				1	1

Seta No.	Abdominal Segments				Paddle Pa
	V	VI	VII	VIII	
0	1	1	1	1	
1	3-6(5)	3-6(5)	4-6(6)		1,2(1)
2	1	1	1		
3	2-4(3)	3-6(4)	4-7(5)		
4	7-11(8)	4-9(5)	3-6(4)	3-6(3)	
5	1,2(1)	1	6-9(7)		
6	2,3(3)	1-3(1)	7-12(11)		
7	7-12(10)	1	1-4(3)		
8	4-8(6)	4-9(7)	7-11(8)		
9	1	1	3,4(3)	10-15(12)	
10	1	1	1-4(2)		
11	1,2(1)	1	1,2(1)		
12					
14	1	1	1	1	

Table 2. Observed branching of setae on pupae of *Ae. (Zav.) fulgens* (7 specimens).

Seta No.	Cephalothorax		Abdominal Segments		
	CT	I	II	III	IV
0			1	1	1
1	3-6(3)	19-55	7-33	5-13(10)	4-9(7)
2	2-4(3)	1	1,2(1)	1	1
3	3,4(3)	2-5(3)	1-3(2)	1-3(2)	2-6(2)
4	2-5(3)	4-11(6)	6-11(8)	4-7(5)	1
5	2,3(2)	3-6(5)	5-13	8-23(8)	2,3(2)
6	4-9(6)	1	1	2-6(5)	2-6(3)
7	2-5(4)	1-3(2)	1-3(2)	2-8(3)	1,2(2)
8	4-9(5)			2-7	2-5(3)
9	2,3(2)	1	1	1	1
10	4-11(6)	0,1(0)		3-5(3)	3,4(4)
11	1		0-2(0)	1	1
12	1,2(1)				
14				1	1

Seta No.	Abdominal Segments				Paddle Pa
	V	VI	VII	VIII	
0	1	1	1	1	
1	2-5(5)	2-6(4)	3-5(4)		1,2(1)
2	1	1	1		
3	1-3(2)	2,3(2)	2-5(3)		
4	5-10(7)	4-7(5)	2-4(3)	2	
5	1,2(2)	1,2(1)	2-4(3)		
6	1-3(1)	1,2(1)	5-12(9)		
7	5-9(7)	1-3(1)	2,3(2)		
8	2-5(4)	3-7(5)	3-7(6)		
9	1	1	1-4(2)	5-11(8)	
10	1,2(1)	1	1,2(2)		
11	1	1	1,2(2)		
12					
14	1	1	1	1	

Table 3. Observed branching of setae on pupae of *Ae. (Zav.) geoffroyi* (5 specimens).

Seta No.	Cephalothorax		Abdominal Segments		
	CT	I	II	III	IV
0			1	1	1
1	2,3(3)	10-15	2-7(3)	2-4(2)	1-3(2)
2	2-4(2)	1	1	1	1
3	2-4(3)	1-3(2)	1	1	2-5(3)
4	2-4(3)	4-6(5)	4-9	3-7(4)	2,3(2)
5	1,2(2)	1-3(2)	3-5(4)	3-6(4)	1
6	2-4(2)	1	1	1,2(1)	1,2(2)
7	2-5(2)	2,3(2)	2-4(3)	2-6	2-4(2)
8	2-4(2)			3,4(4)	2-4(2)
9	2,3(2)	1	1	1	1
10	2	1		3-5(3)	2-4(3)
11	1		0-2(0)	1	1
12	1-3				
14				1	1

Seta No.	Abdominal Segments				Paddle Pa
	V	VI	VII	VIII	
0	1	1	1	1	
1	1-3(2)	1-3(2)	1-5		1
2	1	1	1		
3	1,2(2)	1-3(2)	2,3(3)		
4	4-8(5)	2-4(3)	3,4(3)	2,3(2)	
5	1	1	2-4(3)		
6	1-3(1)	2,3(2)	4-6(5)		
7	4-7(5)	1-4(2)	2,3(2)		
8	2-5(2)	2-5(3)	2-6(4)		
9	1	1	2	4-7(6)	
10	1,2(2)	1,2(1)	1-3(2)		
11	1,2(1)	1	1,2(1)		
12					
14	1	1	1	1	

Table 4. Observed branching of setae on pupae of *Ae. (Zav.) huangae* (6 specimens).

Seta No.	Cephalothorax		Abdominal Segments		
	CT	I	II	III	IV
0			1	1	1
1	4-6(5)	31-42(31)	4-7(5)	5-8(6)	3-6(5)
2	3-5(4)	1	1	1	1
3	2-4(3)	3-5(5)	1	1	4,5(4)
4	3-6(5)	7-13(8)	5-9(5)	3-6(3)	1,2(2)
5	3,4(4)	1-4(3)	4-7(6)	5-10(7)	1
6	2,3(2)	1,2(2)	1,2(1)	2,3(2)	2,3(2)
7	3-5(4)	2,3(2)	1-4(3)	2-4(3)	1,2(2)
8	3-5(4)			2-4(4)	2
9	2,3(2)	1,2(2)	1	1	1
10	1			2-5(3)	2-4(3)
11	1			1	1
12	3-6(4)				
14				1	1

Seta No.	Abdominal Segments				Paddle Pa
	V	VI	VII	VIII	
0	1	1	1	1	
1	3-5(3)	2-4(3)	2-5(4)		1,2(1)
2	1	1	1		
3	2-4(3)	2-4(4)	3-5(4)		
4	5-9(6)	4-7(5)	2-5(3)	2-4(3)	
5	1	1	2-4(4)		
6	1-3(2)	1-3(3)	6-10(8)		
7	7-10(10)	1-5(2)	1,2(2)		
8	2,3(2)	2-4(2)	4-8(5)		
9	1	1	2-4(4)	9-14(10)	
10	1-3(2)	1	1-3(2)		
11	1	1	1		
12					
14	1	1	1	1	

Table 5. Observed branching of setae on pupae of *Ae. (Zav.) pollinator* (6 specimens).

Seta No.	Cephalothorax	Abdominal Segments			
	CT	I	II	III	IV
0			1	1	1
1	3-5(4)	16-29(20)	5-20(8)	3-9(7)	2-4(4)
2	2,3(3)	1	1	1	1
3	2-4(2)	3-5(3)	1	1	4-6(5)
4	2-5(5)	5-7(6)	4-8(6)	4-6(4)	1,2(2)
5	2-5(3)	2-4(4)	5-9(7)	5-9(5)	1,2(1)
6	2-5(2)	1	1	1,2(1)	1,2(1)
7	3-5(3)	2,3(3)	2-4(2)	2-5(3)	1-3(2)
8	4-7(4)			3,4(4)	2-5(3)
9	2-4(3)	1,2(1)	1	1	1
10	3-7(4)			3-5(4)	3-5(3)
11	1			1	1
12	3-6(4)				
14				1	1

Seta No.	Abdominal Segments				Paddle
	V	VI	VII	VIII	Pa
0	1	1	1,2(1)	1	
1	2-4(2)	1-3(2)	2-5(2)		1
2	1	1	1		
3	2-4(3)	2-4(2)	2-5(3)		
4	4-6(6)	4-7(6)	3-5(3)	2-4(2)	
5	1	1	2-5(3)		
6	1	1-3(2)	2-8(3)		
7	2-5(4)	1,2(1)	1,2(2)		
8	2-5(4)	2-4(4)	3-7(5)		
9	1	1	2-4(2)	10	
10	2	1	2		
11	1	1	1,2(1)		
12					
14	1	1	1	1	

Table 6. Observed branching of setae on pupae of *Ae. (Zav.) brygooi* (3 specimens).

Seta No.	Cephalothorax		Abdominal Segments		
	CT	I	II	III	IV
0			1	1	1
1	2-5	33-36	12-20(12)	6-12(6)	3-11(7)
2	3,4(3)	1	1	1	1
3	2-4(3)	2,3(2)	1	1	3,4(3)
4	3,4	3-9	4-8	3,4(4)	1,2(1)
5	2	2	5-9(9)	9-14(9)	1-3(2)
6	4-6(5)	1	1	1,2(1)	1,2
7	2,3(2)	2,3(2)	1,2(2)	4-7	2-4(2)
8	2-4			4-6(6)	2-5
9	1	1	1	1	1
10	4,5(5)			2	2,3(2)
11	1		1	1	1-3(1)
12	1-3(1)				
14				1	1

Seta No.	Abdominal Segments				Paddle Pa
	V	VI	VII	VIII	
0	1	1	1	1	
1	1-3(2)	2,3(2)	1,2(1)		1
2	1	1	1		
3	1	1	1-3(2)		
4	6-9	3-7	1,2(1)	1	
5	1	1	2-8		
6	1-3	1,2(1)	6-9		
7	4-11(6)	1	1,2(1)		
8	4-7	5-9	4-8(6)		
9	1	1	5	8	
10	1	1	1		
11	1,2(1)	1,2(1)	1		
12					
14	1	1	1	1	

Table 7. Observed branching of setae on pupae of *Ae. (Zav.) phillipi* (2 specimens).

Seta No.	Cephalothorax		Abdominal Segments		
	CT	I	II	III	IV
0			1	1	1,2(1)
1	2-4	25-31	8-18	5-16	3-5(5)
2	2,3	1	1	1	1
3	1,2(2)	2,3	1	1	5-7(6)
4	3-5(3)	4-8	4-10(8)	2-5(4)	1-3
5	2	1	5-7(5)	6-12	1
6	1-4	1	1	2,3(2)	1-3(2)
7	3	2,3(3)	2,3	3-5(3)	1,2(1)
8	4			3-8	2,3(3)
9	1,2(2)	1	1	1	1
10	2-4(3)			2,3	1-4
11	1		1	1	1
12	2-4				
14				1	1

Seta No.	Abdominal Segments				Paddle Pa
	V	VI	VII	VIII	
0	1	1	1	1	
1	2,3(2)	2,3(3)	1,2		1
2	1	1	1		
3	1,2(2)	1	2		
4	4-8(8)	1-3(2)	1,2(1)	1,2(1)	
5	1	1	2-5(2)		
6	1,2(2)	1,2	2-5(2)		
7	4-7(4)	1,2(1)	1		
8	1-3(1)	3,4(4)	5,6		
9	1	1	4-7(7)	7-10	
10	1	1	1,2(1)		
11	1	1	1		
12					
14	1	1	1	1	

Table 8. Observed branching of setae on pupa of *Ae. (Zav.) monetus* (1 specimen).

Seta No.	Cephalothorax	Abdominal Segments			
	CT	I	II	III	IV
0			1	1	1
1	2	29,30	7,8	5	5
2	2	1	1	1	1
3	2	1	1	1	5
4	4	5,6	6	2,4	1
5	1	3	5	5,6	1
6	1,2	1	1	1	1
7	2,3	1	2	3,4	1
8	2,3			4,7	5,6
9	1	1	1	1	1
10	3,4	1		2,3	2
11	1	3		1	1
12	3,4				
14				1	1

Seta No.	Abdominal Segments				Paddle Pa
	V	VI	VII	VIII	
0	1	1	1	1	
1	3,4	4	1		1
2	1	1	1		
3	1	1	1		
4	5	3	1	1	
5	1	1	1		
6	1	1	2		
7	1,5	1	1		
8	4,5	5	2		
9	1	1	2,3	4,6	
10	1	1	1		
11	1	1	1		
12					
14	1	1	1	1	

Table 9. Observed branching of setae on larvae of *Ae. (Zav.) longipalpis* (5 specimens).

Seta No.	Cranium		Thorax		Abdominal Segments		
	C	P	M	T	I	II	III
0	1	16-22(19)				1	1
1	1	1-3(2)	3-7(5)	3-5(4)	3-7(5)	3,4(4)	3-5(4)
2		1	2,3(3)	7-9(8)	1	1	1
3	1	2,3(2)	4-7(7)	8,9(9)	3-8(6)	6,7(6)	5-9(6)
4	6-11(10)	3,4(4)	5-9(5)	3-5(4)	11-21	8-13(13)	2-4(3)
5	1	2,3(2)	2,3(2)	1	3-6(4)	4-7(5)	2-6(4)
6	1	1	4,5(5)	4,5(4)	3-5(4)	3,4(3)	2-4(3)
7	1,2(1)	2	1	6-8(7)	2,3(2)	7-10(8)	5-12(9)
8	2-5(4)	2-5(4)	5-7(5)	6-15(11)		3,4(3)	1
9	3-7(5)	1-3(2)	5-7(6)	3-5(4)	1-4(3)	1	1
10	3-5(3)	1	1	1	3,4(3)	1	4-6(4)
11	4,5(4)	2-4(3)	2,3(2)	1-3(2)	2-4(3)	2-5(3)	2-4(3)
12	5-10(7)	1	1	1	1-4(3)	2-4(3)	3-5(4)
13	2-5(3)		13-23(16)	5-13(6)	1	12-19(12)	2-4(3)
14	1	2,3(2)	10-16(14)			1	1
15	4-7(6)						

Seta No.	Abdominal Segments					Siphon S
	IV	V	VI	VII	VIII	
0	1	1	1	1	1	
1	3,4(3)	2-4(3)	3-5(4)	2,3(2)	4,5(5)	5-8(6)
2	1	1	1	1	4-6(5)	4-7(5)
3	6-11(8)	5-8(6)	3-5(4)	6-10(8)	5-7(6)	1
4	2-4(3)	7-11(8)	6-10(10)	4-7(5)	1	
5	4-6(4)	3-5(5)	3-5(3)	6-10(8)	4-6(5)	
6	2-4(3)	2,3(2)	2,3(2)	21-28		1
7	8-14(11)	6-13(9)	7-9(7)	4-8(5)		1
8	1	2-4(3)	5-8(7)	13-24		7-9(8)
9	1	1	1	2-4(2)		1
10	4-7(5)	3-5(4)	1	2-6(4)		
11	2-4(3)	1-3(2)	1-4(3)	1,2(1)		
12	2-4(3)	2,3(2)	4-7(5)	5-8(8)		
13	3,4(3)	3-5(4)	27-39	7-11(8)		
14	1,2(1)	1	1	1	1	

Table 10. Observed branching of setae on larvae of *Ae. (Zav.) fulgens* (6 specimens).

Seta No.	Cranium		Thorax	T	Abdominal Segments		
	C	P	M		I	II	III
0	1	13-24				1	1
1	1	2,3(2)	5-10(9)	4-7(5)	6-9(7)	4-8(6)	5-7(5)
2		1	2,3(2)	5-8(6)	1,2(1)	1	1
3	1	3-5(3)	4,5(4)	7-14(11)	4-7(5)	4-8(6)	3-6(6)
4	5-10(5)	2-4(3)	4-6(5)	3-5(4)	9-16(11)	8-14(11)	4-6(6)
5	1	2,3	1	1	3-6(4)	5-8(5)	5-8(5)
6	1	1	3,4(3)	2-4(3)	2-4(3)	2,3(2)	1,2(2)
7	2,3(2)	2,3(2)	1	5-8(7)	2	3-6(5)	5-8(7)
8	2-4(3)	2-4(3)	4-7(4)	7-13(8)		2-5(3)	2,3(2)
9	6-9(7)	2,3(3)	4,5(5)	3-6(5)	2-4(3)	1	1
10	2-4(2)	1,2(1)	1	1	2-4(2)	1-3(2)	2-4(3)
11	4-8(5)	3-5(3)	2,3(3)	2,3(3)	1-3(3)	2-5(3)	2-4(3)
12	6-10(9)	1	1	2	2-4(3)	2-4(3)	2-4(3)
13	3-6(3)		9-20	6-11(6)	1-5(2)	14-24	5-8(7)
14	1-3(1)	2,3(2)	10-19			1	1
15	4-7(5)						

Seta No.	Abdominal Segments						Siphon S
	IV	V	VI	VII	VIII	X	
0	1	1	1	1	1		
1	4-7(5)	3-5(4)	3-5(3)	2-4(4)	4-8(5)	4-7(7)	5-10(7)
2	1,2(1)	1	1	1	3-5(4)	4,5(5)	1
3	4-9(6)	4-6(5)	3,4(3)	6-11(6)	2-4(3)	1	
4	4	5-11(7)	6-9(7)	4-7(5)	1		
5	5-9(6)	4-8(6)	4-7(5)	3-7(5)	3-5(4)		
6	1,2(2)	1-3(1)	1	16-25(17)			1
7	6-10(7)	5-12	5-7(5)	3-5(4)			1
8	1-3(2)	2-4(2)	3-8(6)	8-14(13)			4-7(5)
9	1	1	1	2,3(3)			1
10	2-4(4)	2-4(3)	1	3-5(3)			
11	2-4(2)	2,3(3)	2,3(3)	1-3(3)			
12	2-4(3)	2,3(3)	3-5(4)	3-7(6)			
13	4-8(5)	5-7(5)	19-30	7-12			
14	1	1	1	1	1,2(2)		

Table 11. Observed branching of setae on larvae of *Ae. (Zav.) geoffroyi* (5 specimens).

Seta No.	Cranium		Thorax		Abdominal Segments		
	C	P	M	T	I	II	III
0	1	10-14(12)				1	1
1	1	1	3-5(4)	5,6(5)	5-7(5)	4-6(4)	2-4(3)
2		1	1,2(2)	3-5(5)	1,2(1)	1,2(1)	1
3	1	2,3(2)	2-4(3)	4-7(5)	4-6(4)	3,4(4)	3-5(4)
4	6-12(11)	2,3(3)	3-5(4)	2-4(3)	7-10(8)	7-10(7)	2-4(3)
5	1	1	1	1	4-6	5-9(6)	4-7(5)
6	1	1	2,3(2)	1,2(2)	2-6(3)	2,3(2)	1,2(1)
7	1	1,2(1)	1	5-7(5)	1,2(1)	2-4(3)	4-6(6)
8	2,3(2)	1-3(2)	3-5(4)	8-12(10)		3-5(4)	1
9	4-6(4)	1,2(2)	3,4(3)	3	2,3(2)	1	1
10	1-3(2)	1	1	1	2,3(2)	1	1,2(2)
11	4-6(5)	1-3(2)	2,3(2)	2,3(2)	2-5(3)	1-3(2)	1-4(2)
12	5-8(6)	1	1	1	1-4(2)	2,3(2)	2,3(2)
13	2		8-15	3-5(5)	1,2(1)	10-16(12)	2,3(2)
14	1,2(1)	2	7-13(13)			1	1
15	3,4(3)						

Seta No.	Abdominal Segments						Siphon S
	IV	V	VI	VII	VIII	X	
0	1	1	1	1	1		
1	2,3(2)	2	2,3(2)	1,2(2)	4-6(5)	3-5(3)	2-4(3)
2	1	1	1	1	2,3(2)	3-5(4)	1
3	2-4(4)	2-4(3)	1,2(1)	3-5(5)	4,5(5)	1	
4	2,3(2)	4,5(5)	3	3,4(3)	1		
5	4-6(5)	4-6(5)	4,5	4-7(5)	4,5(5)		
6	1,2(1)	1,2(1)	1,2(1)	8-12(12)			1
7	4-7(5)	5-7(5)	3-5(5)	3,4(4)			1
8	1	1	2,3(3)	7-10(8)			5,6(5)
9	1	1	1	3,4(4)			1
10	2,3(2)	1,2(2)	1,2(1)	1,2(2)			
11	1-3(2)	2,3(2)	1,2(1)	1			
12	2	1	1,2	2,3(3)			
13	1-3(2)	2,3(2)	14-23	3-6			
14	1	1	1	1	1		

Table 12. Observed branching of setae on larvae of *Ae. (Zav.) huangae* (6 specimens).

Seta No.	Cranium		Thorax		Abdominal Segments		
	C	P	M	T	I	II	III
0	1	7-12(9)				1	1
1	1	1	2-6(4)	2-4(2)	2-5(4)	2-4(4)	2-4(3)
2		1	2,3(3)	4-6(4)	1	1	1-3(1)
3	1	2	2,3(3)	4-7(5)	3-5(5)	3-6(3)	4-6(5)
4	2-4(3)	2,3(2)	2-4(4)	3-6(4)	5-14(10)	3-8(6)	2,3(3)
5	1	1	3,4(3)	1,2(1)	4-7(4)	2-6(3)	2-6(3)
6	1,2(1)	1	3-5(4)	2,3(2)	3,4(4)	2	1
7	2-6(4)	1	1	3,4(3)	2	2-4(3)	3-7(5)
8	2-4(3)	1-3(1)	5-7(5)	3-7(7)		2,3(3)	1
9	3-5(3)	1	5,6(6)	1	1,2(1)	1	1
10	2-4(2)	1	1	1	2	1-3(1)	2,3(3)
11	2-4(2)	1-3(1)	1-3(2)	1,2(1)	1-3(2)	1,2(2)	2,3(2)
12	4-6(4)	1	1	1	2,3(2)	1,2(2)	2,3(2)
13	2,3(2)		5-10(9)	6-9(7)	1	8-15(9)	2,3(3)
14	1,2(1)	1,2(2)	5-12(6)			1	1
15	3-5(4)						

Seta No.	Abdominal Segments						Siphon S
	IV	V	VI	VII	VIII	X	
0	1	1	1	1	1		
1	3,4(3)	3-6(3)	3,4(3)	1,2(1)	3-8(4)	4-6(4)	4-8(6)
2	1	1	1	1	2-4(3)	6,7(7)	1
3	5-7(6)	3-5(4)	3	4-6(4)	3-6(5)	1	
4	2,3(2)	2-4(4)	3,4(3)	4,5(4)	1		
5	2,3(3)	2-4(3)	4	4-7	3-5(4)		
6	1	1	1	9-16(13)			1
7	4,5(5)	5-7(6)	3-5	3-5(3)			1
8	1	1	3-5	6-9(8)			3,4(4)
9	1	1	1	1-3(1)			1,2(1)
10	3,4(3)	1-3(2)	3,4(3)	2			
11	2,3(2)	1,2(1)	1,2(2)	1,2(1)			
12	1,2(2)	1,2(2)	1-3(1)	4,5(5)			
13	1-3(2)	2,3(3)	14-21	3-5(3)			
14	1	1	1	1	1		

Table 13. Observed branching of setae on larvae of *Ae. (Zav.) pollinctor* (6 specimens).

Seta No.	Cranium		Thorax		Abdominal Segments		
	C	P	M	T	I	II	III
0	1	14-20(19)				1	1
1	1	2	4,5(5)	2-5(3)	4-6(5)	3,4(4)	3-5(3)
2		1	2-4(2)	8-10(10)	1	1	1
3	1	2-4(3)	5,6(5)	4-9(7)	5-7(6)	5-7(7)	6-9(6)
4	5-10(5)	2-4(4)	4-6(6)	3-6(4)	8-16(12)	7-10(7)	3
5	1,2(1)	2,3(2)	1	1	3-5(5)	3,4(4)	3-5(5)
6	1	1	3-6(5)	4-6(4)	3-5(5)	2-4(3)	1,2(1)
7	2-4(3)	2	1	6-8(7)	2	3-6(5)	3-6(4)
8	4-6(4)	2-4(3)	3-7(5)	7-11(9)		2-5(5)	1,2(2)
9	3-5(4)	2,3(2)	5-7(6)	4-6(5)	2-4(2)	1,2(1)	1
10	3-5(4)	1	1	1	3	1,2(1)	1-5(3)
11	4-6(4)	2,3(2)	2-4(3)	2,3(2)	2	2,3(2)	1-3(3)
12	5-8(5)	1,2(1)	1	1,2(2)	2-4(2)	2-4(2)	2,3(3)
13	2-5(4)		17-27(21)	7-12(7)	1-4(2)	7-20(12)	2-4(4)
14	1,2(1)	2,3(2)	14-24(15)			1	1
15	4,5(4)						

Seta No.	Abdominal Segments					Siphon S	
	IV	V	VI	VII	VIII		X
0	1	1	1	1	1		
1	3-5(4)	3	3,4(3)	2,3(3)	3-6(4)	5-8(5)	6-9(6)
2	1	1	1	1	5,6(6)	3-5(4)	1
3	5-7(6)	5-7(5)	3-5(3)	6-9(6)	5-8(6)	1	
4	2,3(2)	4-6(6)	5-9(7)	5-7(5)	1		
5	4-6(5)	4,5(5)	5,6(5)	5-9(6)	3-6(5)		
6	1,2(1)	1,2(2)	1	18-35(22)			1
7	3-5(4)	4-6(6)	3-5(5)	4-6(6)			1
8	1,2(1)	2,3(2)	1-5(2)	13-22(21)			4,5(4)
9	1	1	1	2,3(3)			1
10	3-5(4)	2-4(3)	1-3(3)	4,5(4)			
11	2-4(3)	2,3(3)	2,3(2)	1-3(2)			
12	3,4(3)	2	2-5(5)	5-7(5)			
13	3,4(3)	3,4(3)	27-45	5-7(6)			
14	1	1	1	1	1		

Table 14. Observed branching of setae on larvae of *Ae. (Zav.) brygooi* (6 specimens).

Seta No.	Cranium		Thorax		Abdominal Segments		
	C	P	M	T	I	II	III
0	1	17-22(20)				1	1
1	1	2,3(2)	2-4(3)	3-6(3)	5-10(5)	2-5(3)	2-4(3)
2		1	2-4(2)	3,4(4)	1,2(1)	1,2(1)	1
3	1	3	1	9-13(11)	4-6(5)	3-6(5)	2-5(4)
4	13-23	2,3(3)	3-5(4)	2-6(4)	10-17(13)	9-11(10)	2-5(4)
5	2	2-5(4)	1	1	6-9(7)	7-9(7)	5-10(8)
6	1-3(3)	1	3,4(4)	1	2-4(3)	1-3(2)	1
7	22-32	3,4(3)	1	5-10	2	5,6(6)	6-8(7)
8	2	3,4(3)	4-7(5)	9-19		3-5(5)	2,3(2)
9	5-11(7)	2-4(3)	4,5(5)	3-6(4)	2-4	1	1
10	2-4(2)	1	1	1	1,2(2)	1,2(1)	2-4(3)
11	7-13(8)	3-6(3)	3,4(4)	2-5(4)	3-7(3)	1-4(2)	2-4(2)
12	4-9(6)	1	1	1	3-6(4)	2-4(2)	2,3(2)
13	2-5		6-15	4,5	2-9	6-16	2-4(3)
14	2-4(2)	2,3(2)	10-21			1	1
15	4-9(5)						

Seta No.	Abdominal Segments						Siphon S
	IV	V	VI	VII	VIII	X	
0	1	1	1	1	1		
1	2,3(3)	1,2(2)	2,3(2)	1	4-6(5)	2,3(3)	2-4(2)
2	1	1	1	1	2,3(3)	5-7(6)	1
3	3-5(4)	2-4(2)	1,2(1)	5-7(5)	3-6(5)	1	
4	2-5(4)	5-9	4-6(6)	2,3(3)	1		
5	5,6(6)	3-7(4)	3-7(5)	6-9(6)	4-6(4)		
6	1,2	1	1	12-15(13)			1
7	5-7(6)	5-10(7)	4-7(7)	4-8			1
8	1-6(2)	1,2(2)	4-9(6)	10-17(13)			3-5(4)
9	1	1	1	3-6(3)			1
10	2-4	2,3(3)	1	1,2(2)			
11	2,3(2)	2	1-3	1			
12	2,3(2)	2	1-3(2)	3,4(4)			
13	2,3(2)	2,3	16-28	2,3(2)			
14	1	1	1	1	1,2(1)		

Table 15. Observed branching of setae on larvae of *Ae. (Zav.) philipi* (2 specimens).

Seta No.	Cranium		Thorax		Abdominal Segments		
	C	P	M	T	I	II	III
0	1	13-29(21)				1	1
1	1	3-5(3)	3,4(3)	1-4(3)	4-6(4)	2,3(2)	2-4(2)
2		1	1,2(2)	3,4(3)	1-3(1)	1	1
3	1	3-8(4)	1	4-19(4)	3-6	3,4	3,4(3)
4	6-12(7)	2-4(2)	2-4(3)	3-7(6)	10-20	6-14	2-4(2)
5	3-7	2-6(5)	1	1	5-7(6)	6-11	9-16
6	3-6(4)	1	2-6(4)	1	4-6(4)	2,3(3)	2
7	6-10(8)	4-6(4)	1	7-12	2	5-13(9)	7-14(7)
8	2,3(2)	2-4(4)	4-10(6)	15-32(18)		2-7	1-3(2)
9	5-10	2-6	5-10	4-8(7)	3,4(3)	1	1
10	2,3(3)	1	1	1	1,2(2)	1	2,3(2)
11	7-10(9)	2-4(2)	3	2,3(3)	3-6(3)	2,3(2)	1,2(2)
12	6-11(10)	1	1	1	3,4	1-3(1)	2,3(2)
13	2		12-31	4,5(5)	2-5(3)	10-23	3-5(4)
14	2-5(2)	1-3(2)	12-24			1	1
15	3-6(3)						

Seta No.	Abdominal Segments					Siphon S
	IV	V	VI	VII	VIII	
0	1	1	1	?	1	
1	2,3(3)	2,3(2)	1-3(2)	1-3(1)	6-10	3,4(4)
2	1,2(1)	1	1	1	2	1
3	3,4(4)	2,3(3)	1-5(2)	6,7(6)	4-7	
4	2-4	3-10(4)	2-4(4)	2,3(2)	1	
5	3-5(4)	2-5(4)	3-6(3)	7,8(7)	6-9(8)	
6	2	2	2	6-10		1
7	6-13(6)	5-10	5-7(5)	4,5(5)		1
8	1,2(2)	2,3(2)	4-8(5)	8,9(9)		4-9(5)
9	1	1	1	3		1
10	2,3(3)	1,2(2)	1-3(1)	1,2(2)		
11	2-5(3)	2-4(2)	1-4(3)	1		
12	1-4(2)	1,2(1)	2,3(2)	2,3(3)		
13	4,5(4)	3,4(3)	12-21	3,4(3)		
14	1	1	1	1	1,2	

Table 16. Observed branching of setae on larvae of *Ae. (Zav.) monetus* (3 specimens).

Seta No.	Cranium		Thorax		Abdominal Segments		
	C	P	M	T	I	II	III
0	?	7-13				I	I
1	1	3-5(4)	5-7	2-5	2-5	4-6(6)	3-5
2		1	1,2(2)	1,2(1)	4,5	4,5	2-4(4)
3	1	5-9(6)	1	5-10(10)	1,2(1)	1,2(1)	1,2(1)
4	10-17(17)	2,3(2)	2,3(2)	3-6(4)	7-12(12)	6-12(7)	1
5	3,4(3)	2,3	1	1-3(3)	5,6	5-7(6)	5-7(7)
6	4-7(4)	1	2,3(2)	1,2(1)	2-4(3)	2,3(2)	2
7	12-15	2	1	5-8(7)	1	3-6(4)	4,5(5)
8	2	10-12(10)	4,5(4)	6-8(7)		2-4	2,3(2)
9	4-7	2,3(2)	5,6(5)	3-6	2-4(2)	2-4(3)	2,3(3)
10	2,3(2)	1	1	1	1	1	1
11	4-7(6)	3-5(5)	2,3(3)	1-5	6	1	1,2(1)
12	4,5(5)	1	1	1	1	1	1,2(1)
13	1		5-9	6-8(8)	4-6	4-7(5)	4,5
14	3	2-6(5)	6-13			1	1
15	2-4(2)						

Seta No.	Abdominal Segments						Siphon S
	IV	V	VI	VII	VIII	X	
0	1	1	1	1	1		
1	2-4	3	1-3	3,4(3)	4-8(5)	3-5(4)	4,5
2	2,3(2)	2,3	1,2(2)	1,2(1)	2	3-5(5)	1
3	1,2(1)	1	1	2-5(2)	6-8	1	
4	1	5-7(5)	3,4(3)	2	1		
5	4-6(5)	4,5	4,5	3-5(4)	5,6(6)		
6	2	2	2	4-6(4)			1
7	4,5(5)	4-6(4)	4,5(5)	3-5			1
8	2	2,3(2)	2-6(2)	4-7(4)			2,3(2)
9	2-5(3)	2,3(2)	2	3-5			1
10	1	1	1	2			
11	1,2(1)	2	1,2(1)	1,2(2)			
12	1,2(1)	1	1	2,3(2)			
13	4,5(4)	3,4(4)	4-7(4)	3-5			
14	?	1,2	1,2	1,2(1)	2,3(2)		

APPENDIX A. Current status of life stages/structures of species in the subgenus *Zavortinkius*.

Species	♀	♀g	♂	♂g	P	L
<i>Ae. brunhesi</i>			X*	X*		
<i>Ae. brygooi</i>	X*	X*	X	X*	X*	X*
<i>Ae. fulgens</i>	X*	X*	X	X*	X*	X*
<i>Ae. geoffroyi</i>	X*	X*	X	X*	X*	X*
<i>Ae. huangae</i>	X*	X*	X	X*	X*	X*
<i>Ae. interruptus</i>	X*	X*	X	X*		
<i>Ae. longipalpis</i>	X*	X*	X	X*	X*	X*
<i>Ae. monetus</i>	X*	X*	X	X*	X*	X*
<i>Ae. mzooi</i>	X*	X*	X	X*		
<i>Ae. phillipi</i>	X*	X*	X*	X*	X*	X*
<i>Ae. pollinator</i>	X*	X*	X	X*	X*	X*

X = Indicates that the stage/structure has been described.

* = Indicates that the stage/structure has been illustrated.

♀ = female, ♂ = male, g = genitalia, L = fourth-instar larva, P = pupa.

APPENDIX B. Conspectus of taxonomic changes.**New Taxa**

Ae. brunhesi Reinert, new species of subgenus *Zavortinkius*

Ae. geoffroyi Reinert, new species of subgenus *Zavortinkius*

Ae. huangae Reinert, new species of subgenus *Zavortinkius*

Ae. interruptus Reinert, new species of subgenus *Zavortinkius*

Zavortinkius Reinert, new subgenus of genus *Aedes* Meigen

Changes in Taxonomic Status

Ae. brygooi Brunhes, from subgenus *Finlaya* to subgenus *Zavortinkius*

Ae. fulgens Edwards, from subgenus *Finlaya* to subgenus *Zavortinkius*

Ae. longipalpis (Grunberg), from subgenus *Finlaya* to subgenus *Zavortinkius*

Ae. monetus Edwards, from subgenus *Finlaya* to subgenus *Zavortinkius*

Ae. mzooi van Someren, from subgenus *Finlaya* to subgenus *Zavortinkius*

Ae. phillipi van Someren, from subgenus *Finlaya* to subgenus *Zavortinkius*

Ae. pollinator (Graham), resurrected from synonymy with *Ae. longipalpis*,
from subgenus *Finlaya* to subgenus *Zavortinkius*

Lectotype Designation

Ae. monetus Edwards

Ae. pollinator (Graham)

APPENDIX C. English translation from German of original description of *Stegomyia longipalpis* (K. Grünberg, 1905. Zur Kenntnis der Culicidenfauna von Kamerun und Togo. Zool. Anzeiger 29:377-390).

Stegomyia longipalpis n. sp.

Base color black. Legs black-brown, 2nd tarsal segment of middle and hind leg with broad white band basally. Palpi large, one third of proboscis. Scales, especially of abdomen and legs with purple sheen.

♀. Line in head with dark scales; around eyes a ring of silver-white scales. Antennal segments black-brown with whitish hairs and brownish whorl hairs. Proboscis and palpi black-brown with dark scales. Palpi very large, more than one third of proboscis (Fig. 6).

Markings of thorax damaged in all specimens, thus the following description may have to be revised. Base color of thorax shining black, dark scales with silver-white spots. Thorax dorsally with broad silver-white longitudinal line. Also white scales anterior to scutellum. Anterior part of thorax and at base of wings have large silver-white patches. Silver-white patches also on lateral surface of thorax (similar to *S. fasciata*).

Scutellum dark in the middle. White scales on the sides.

Abdomen black, dorsally with densely dark, violet shining scales; 6th and 7th segments apically with large silver-white patches, 8th segment with broad white band basally. Ventral side covered thickly with black scales, no sheen. All segments except the last with large, triangular silver-white lateral patches. Broad side of patches is at anterior margin, tapering to a point at the distal margin. From dorsal view these patches cannot be seen.

Wings, especially apical margin and 1st and 2nd longitudinal veins thickly covered with blackish-brown scales. The common cross vein (v) (= cross vein between longitudinal veins 3 and 4 in Fig. 7) is the immediate continuation of the basal portion of the 3rd longitudinal vein and is tilted only slightly towards the basal portion. The posterior cross vein (h) (= cross vein between longitudinal veins 4 and 5) is separated from the common cross vein by a distance that is approximately equal to the length of the common cross vein.

Legs with dark violet shining scales and some tarsal segments with white bands. Coxae basally with white patch. Inner side of femur of middle and hind legs with a longitudinal white line. Tibiae whitish at base, especially of hind legs. Tarsi of front leg dark. Metatarsus of middle leg with a narrow tarsal segment with broad white band. Metatarsus of hind legs with small white patch on outside. 2nd tarsal segment (except tip) is shining white.

Body length (excluding proboscis) 5,5-6,5 mm.

Proboscis 2,5 mm.

Palpi 1 mm.

♂ unknown.

Kamerun, Duala (harbor), July.

The species is easily recognized by its large size, lively violet shine and white band on hind tarsi.

Figure captions:

Fig. 6. *Stegomyia longipalpis* n. sp. ♀, head.

Fig. 7. *Stegomyia longipalpis* n. sp. cross vein orientation.

SYSTEMATIC INDEX

Valid taxa are in Roman type, synonyms are italicized. Boldface page numbers are those which began the primary treatment of the taxon. Figure numbers are in parentheses.

<i>Aedes</i>	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 22, 23, 24, 25, 26, 27, 29, 30, 31, 32, 33, 34, 36, 37, 38, 39, 40, 42, 43, 44, 46, 47, 48, 49, 50, 51, 54, 55, 56, 64, 65, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102
<i>Aedimorphus</i>	26
Africanus Group	12
<i>albicaudatus</i>	31
<i>albiventris</i>	34, 37
<i>Albuginosus</i>	30
<i>brunhesi</i>	3, 4, 14, 15, 17, 18, 54, 55 , 56, 64, (3, 7, 10), 101, 102
<i>brygooi</i>	3, 4, 9, 10, 12, 14, 15, 17, 18, 43 , 46, 47, 49, 50, 51, 64, 65, (2, 3, 7, 8, 9, 12, 13, 17), 90, 98, 101, 102
Brygooi Group	3, 4, 5, 8, 9, 10, 12, 14 , 43, 46, 47, 49, 51
<i>Culex</i>	30, 34, 37
<i>Eretmapodites</i>	30, 34, 37
<i>Eumelanomyia</i>	34, 37
<i>fasciata</i>	103
<i>Ficus</i>	30, 37
<i>Finlaya</i>	3, 4, 5, 7, 19, 22, 26, 29, 31, 34, 38, 39, 40, 43, 46, 48, 49, 51, 54, 56
<i>fulgens</i>	3, 4, 9, 10, 11, 12, 13, 16, 17, 18, 22, 23, 24, 26 , 28, 29, 31, 36, 39, 64, 65, (1, 3, 4, 6, 8, 10, 12, 13, 16), 86, 94, 101, 102
<i>geoffroyi</i>	3, 4, 5, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 22, 23, 24, 31 , 33, 34, 36, 37, 42, 64, 65, (2, 3, 4, 6, 8, 10, 12, 13, 15), 87, 95, 101, 102
<i>huangae</i>	3, 4, 5, 9, 10, 12, 13, 16, 17, 18, 22, 23, 24, 29, 34 , 36, 37, 42, 64, 65, (2, 3, 6, 8, 9, 12, 13, 15), 88, 96, 101, 102
<i>heischi</i>	30
<i>horridus</i>	30
<i>ingrami</i>	13, 26
<i>interruptus</i>	3, 4, 12, 14, 16, 17, 18, 46, 47 , 48, 51, 64, (2, 3, 4, 7, 8, 10), 101, 102
<i>Kingia</i>	7, 40
<i>kochi</i>	5
<i>ledgeri</i>	30
<i>lepidontus</i>	12
<i>longipalpis</i>	3, 4, 5, 7, 9, 10, 12, 13, 16, 17, 18, 19 , 22, 23, 24, 26, 27, 29, 31, 32, 33, 34, 36, 37, 38, 39, 40, 41, 42, 43, 44, 56, 64, (1, 3, 4, 5, 6, 8, 9, 11, 12, 13, 14), 85, 93, 101, 102, 103
Longipalpis Complex	22, 42
Longipalpis Group	3, 4, 5, 8, 9, 10, 11, 12, 13 , 19, 22, 23, 24, 29, 33, 37, 39, 42, 54
<i>luteocephalus</i>	12
<i>marshalli</i>	30
<i>metallicus</i>	30
<i>Molpemyia</i>	11

monetus	3, 4, 5, 10, 12, 13, 14, 15, 17, 18, 42, 51 , 54, 55, 56, 64, 65, (2, 3, 7, 10, 12, 13, 18), 92, 100, 101, 102
Monetus Group	3, 4, 5, 8, 9, 10, 11, 12, 14 , 51, 54
Mucidus	12, 22, 59
Mucidus Group	12
Mystromys	31
mzooi	3, 4, 12, 13, 16, 17, 18, 22, 29, 38 , 39, 64, (1, 3, 4, 6, 8, 10), 101, 102
natronius	26
Ochlerotatus	7, 19, 26, 28, 29, 40
Orthopodomyia	49
Pandanus	51
Pardomyia Group	12
pecuniosus	11
phillipi	3, 4, 5, 9, 14, 16, 17, 18, 46, 47, 48, 49 , 51, 64, 65, (2, 3, 7, 8, 9, 12, 13, 16), 91, 99, 101, 102
pollinator	3, 4, 5, 8, 10, 11, 13, 15, 16, 17, 18, 22, 23, 24, 25, 33, 34, 40 , 41, 42, 43, 64, 65, (1, 3, 6, 8, 9, 12, 13, 15), 89, 97, 101, 102
Ravenala	51
Sabethini	12
soleatus	30
Stegomyia	4, 5, 7, 12, 19, 22, 24, 30, 37, 40, 41, 42, 56, 103
Verrallina	12
virilis	12
Zavortinkius	1, 3, 4, 5, 6, 7, 10, 11, 12, 13, 15, 19, 22, 24, 26, 31, 33, 34, 36, 38, 40, 43, 47, 48, 49, 51, 54, 55, 56, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102

