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**THE SUBGENUS *STEGOMYIA* OF *AEDES* IN THE
AFROTROPICAL REGION
I. THE *AFRICANUS* GROUP OF SPECIES
(DIPTERA: CULICIDAE)**

By

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THE SUBGENUS *STEGOMYIA* OF *AEDES* IN THE
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I. THE *AFRICANUS* GROUP OF SPECIES
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Abstract

The *africanus* group of the subgenus *Stegomyia* Theobald, genus *Aedes* Meigen, is characterized and diagnosed. Keys to the identification of species are provided. Information on the present status of the *africanus* group of species is summarized. *Aedes (Stegomyia) maxgermaini*, a new species, from Cameroon, is recognized. *Aedes (Stegomyia) pseudoafricanus* Chwatt is reported from the Ivory Coast and Sierra Leone for the first time. Lectotypes are designated for *Aedes (Stegomyia) africanus* (Theobald) and *Aedes (Stegomyia) luteocephalus* (Newstead).

Introduction

African species of *Stegomyia* have not been revised for nearly four decades, and previous work is now out of date and of limited use. Adults and pupae were last treated comprehensively by Edwards (1941); Hopkins (1936, 1952) published on the larvae. In the early 1950s, Mattingly (1952, 1953) published two preliminary studies on African *Stegomyia*, and since then, the subgenus has not been studied as a group. Revisionary work on the Afrotropical fauna of this subgenus is now badly needed, as additional species and subspecies have been discovered and described, usually as isolated descriptions, but also because earlier descriptions are inadequate, and accurate identifications are essentially impossible. Because of this, much confusion and misidentification of African *Stegomyia* has resulted, as Huang (1979, 1981, 1986a, 1986b, 1988a, 1988b) has already noted. To clarify this situation, a series of revisions, usually treating

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species groups, is being undertaken in which previously described species and new taxa are treated comprehensively, including figures of important characters. This paper is the first of the revisionary papers.

Stegomyia is one of the most important subgenera of mosquitoes from the standpoint of the transmission of pathogens on a world-wide basis. *Aedes aegypti* (Linnaeus) is the classical vector of urban yellow fever in African and American tropics. The significance of members of the subgenus *Stegomyia* in transmitting arboviruses in Africa cannot be overemphasized. African species of *Stegomyia* have been implicated as natural hosts, vectors, and/or reservoirs of 8 viruses, 6 of which cause human illness: Chikungunya, dengue 1 and 2, Dugbe, Rift Valley Fever, yellow fever and Zika. Chikungunya, dengue and yellow fever are the most important arboviruses associated with *Stegomyia*. Despite their medical importance, published records on African *Stegomyia* are superficial and inadequate, and it is extremely difficult to accurately identify specimens of vector species for mosquito survey, virus isolation studies and epidemiological studies.

This paper is part of a revision of the subgenus *Stegomyia* Theobald (genus *Aedes* Meigen) from the Afrotropical Region. *Aedes (Stegomyia) africanus* (Theobald) has been recognized as one of the most important virus vectors in the Afrotropical Region [as Ethiopian Region] (Haddow, 1961). The *africanus* group contains several species that are important vectors of arboviruses to humans in Africa. A thorough study to determine the diversity of species that occur in the area and to develop adequate and reliable methods for recognizing them became evident and has led to this taxonomic revision.

Due to the complexity and highly variable nature of the group, this study has been hindered by the lack of individually reared, associated specimens from East and Central Africa.

The present paper deals with the *africanus* group. Eight species of *Stegomyia*, of which 1 species is new, are recognized in the *africanus* group. The known stages of the 8 species of the *africanus* group are described or redescribed and illustrated. Keys to the identification of species are provided. Information on the present status of the *africanus* group and its distribution are summarized in appendices I and II. Information on type data, distribution, bionomics, medical importance and a taxonomic discussion of each species are presented.

The term "Afrotropical Region" as used here is a recommended term in zoogeography for the old name "Ethiopian Region" (Crosskey and White, 1977). This area falls approximately within 35° south to 20° north latitude and 18° west to 52° east longitude (Map 1).

Materials and Methods

This study is based on specimens accumulated by the Medical Entomology Project (MEP) and the Systematics of *Aedes* Mosquitoes Project (SAMP), Department of Entomology, National Museum of Natural History, Smithsonian Institution, and upon specimens that were borrowed from individuals and institutions mentioned in the acknowledgments section. All primary types that are pertinent to taxa in this paper have been studied.

Distributional records are listed in the following order and format: current country names are in capital letters, administrative divisions, where known, are in

italics, and place names have the first letter capitalized. Place names that could not be located in the gazetteers available are spelled according to the labels on the specimens.

The terminology follows that of Harbach and Knight (1980, 1982), with the exception of "tarsal claws," which is retained for "ungues." The venation terms follow those of Belkin (1962).

An asterisk (*) following the abbreviations used (M = male, F = female, P = pupa, L = larva and E = egg), indicates that all or some portion of that sex or stage is illustrated. The abbreviations used in the literature cited section conform to the "Serial Sources for the BIOSIS Data Base," BioSciences Information Service (1982).

Characterization of the *Aedes (Stegomyia) africanus* Group

DIAGNOSIS. The *africanus* group can be distinguished from other congeners of *Stegomyia* by the following combination of characters: (1) maxillary palpi with white scales; (2) scutum with dorsocentral setae; (3) scutum with a distinct patch of broad white scales on fossal area; (4) subspiracular area with broad white scales; (5) postspiracular area without scales; (6) paratergite with broad white scales; (7) white knee-spot absent on all femora; (8) midfemur with 3 large, white patches on anterior surface (on basal, median and apical areas); (9) hindtarsus with a basal white band at least on tarsomeres 1-3, tarsomere 4 with or without basal white band; and (10) hindtarsomere 5 all dark.

DESCRIPTION. The *africanus* group is characterized by the following combination of characters.

FEMALE. Head. Proboscis dark-scaled, without pale scales on ventral surface, shorter to longer than forefemur; maxillary palpus 0.19-0.32 length of proboscis, dark, with white scales on entire dorsal surface of palpomere 4; pedicel covered with white scales except on dorsal surface; antenna with a few, or some dark scales on flagellomere 1; clypeus bare; occiput with few, or some erect forked scales; a row of broad white scales around eye margins; vertex with a median stripe or patch of broad white scales, or vertex with broad dark scales and some long yellow forked scales on anterior area, and large median patch of broad yellow scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. **Thorax.** Scutum with narrow dark scales, and a distinct median stripe of broad white scales on anterior promontory, a large patch of broad white scales on fossal area, a patch of broad white scales on lateral margin just in front of wing root, followed mesally by a patch of narrow yellow scales, or without a patch of narrow yellow scales mesad of it; without or with a short median stripe of narrow yellow or white scales in front of prescutellar area; sometimes the median stripe reaching forward to the anterior median white stripe; or scutum with narrow dark scales, and a distinct median stripe of broad white scales on anterior promontory, followed by a distinct median longitudinal stripe of narrow yellow scales, reaching to the prescutellar area; posterior dorsocentral yellow or white line of narrow scales not developed, or present, reaching to posterior 0.17-0.33 of scutum; or posterior dorsocentral yellow line of narrow scales well developed, reaching forward to the posterior end of fossal white patch; prescutellar line of narrow yellow scales not de-

veloped, or present, with all narrow yellow scales; or prescutellar line present and well developed, with narrow yellow scales and a few broad, flat, metallic silvery white scales posteriorly; acrostichal setae absent; dorsocentral setae present; scutellum with broad white scales on all lobes and with a few broad dark scales at apex of midlobe, or with a large patch of broad dark scales at apex of midlobe; or scutellum with broad white scales on midlobe and with a few broad dark scales at apex of midlobe, with broad dark scales on lateral lobe, sometimes lateral lobe with broad dark scales at base and covered with a few broad white scales; antepnotum with broad white scales; postpronotum with a large patch of broad white scales; or postpronotum with a large patch of broad white scales interrupted by median bare stripe without scales; paratergite with broad white scales; postspiracular area without scales; hypostigmal area without scales; patches of broad white scales on propleuron, subspiracular area, upper and lower portions of mesokatepisternum, and on mesepimeron; upper mesokatepisternal scale patch not reaching to anterior corner of mesokatepisternum; upper mesepimeral scale patch connecting with lower mesepimeral scale patch; lower mesepimeron without setae; metameron and mesopostnotum bare. *Wing*. With dark scales on all veins except for a minute basal spot of white scales on costa; cell R_2 2.1-3.6 length of R_{2+3} . *Halter*. With dark scales; or with dark and white scales. *Legs*. Coxae with patches of white scales; white knee-spot absent on all femora; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in apical 0.22-0.61; midfemur with 3 large, white patches on anterior surface (on basal, median and apical areas); hindfemur with 3 large, white patches on anterior surface (on basal, median and apical areas); or hindfemur with at most 2 large, white patches on anterior surface (on median and apical areas); or hindfemur anteriorly with a large pale band at base and with 2 large, white patches on median and apical areas; fore- and midtibiae anteriorly dark; sometimes with a short, white stripe on ventral surface in basal area; hindtibia anteriorly dark, with or without a white longitudinal stripe on ventral surface in basal area; fore- and midtarsomeres 1,2 or 1-3 with abasal white band; hindtarsus with a basal white band at least on tarsomeres 1-3; tarsomere 4 with a basal white band, or all dark; tarsomere 5 all dark; fore- and midlegs with tarsal claws equal, all toothed; hindleg with tarsal claws equal, both toothed, or both simple. *Abdomen*. Tergum I with white scales on laterotergite, with or without a median pale spot; terga II-VIII with basolateral white spots which are not visible in dorsal aspect except on terga VII, VIII; or terga II-VII with a basal pale band and basolateral white spots which do not connect with the basal pale band; or tergum II with or without a basal pale band, complete, or incomplete at middle; terga III-VI with a basal pale band, complete or incomplete at middle and basolateral white spots which do not connect with the basal complete or incomplete pale band; sterna II-VII, or III-VII with a basal white band; segment VIII largely retracted. *Genitalia*. Apical margin of sternum VIII with a median notch and with conspicuous rounded lateral lobes; insula longer than wide, with minute setae and with 2-6 larger setae on apical 0.50; tergum IX broader than long, or as long as broad, apical margin of tergum IX with well developed lateral lobes, each with 1-8 setae; apical margin of postgenital plate with a deep, or a shallow median notch; or sometimes without a median notch; cercus short and broad; 3 spermathecae, one larger than the other 2.

MALE. Essentially as in the female, differing in the following sexual characters: *Head*. Maxillary palpus slightly shorter to longer than proboscis, predominantly dark, with white band at base of palpomeres 2-5, or 3-5, those on palpomeres 4,5 dorsally incomplete, or that on palpomere 5 dorsally incomplete; sometimes palpomere 5 with white scales on entire ventral surface; palpomeres 4,5 subequal, slender, dorsally curved and with only a few short setae; antenna plumose, shorter than proboscis. *Wing*. Cell R_2 about 1.7-2.9 length of vein R_{2+3} . *Legs*. Fore- and midtarsi with or without a basal white band on tarsomere 2; fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple; or fore- and midlegs with tarsal claws unequal, all simple. *Abdomen*. Sternum VIII with basolateral white spots. *Genitalia*. Gonocoxite 1.6-2.2 as long as wide (width measured 0.5 from base), scales restricted to dorsolateral, lateral and ventral surfaces, with setae on dorsomesal surface, mesal surface membranous; claspette large, lobed, distal expanded portion oval, or subtriangular, or square in dorsal aspect, with numerous simple setae on the expanded distal portion, and without, or with 1-3 stronger, spine-like setae on apicomesal corner; gonostylus simple, elongate, about 0.56-0.76 length of gonocoxite, with a long slender claw, or a short and stout claw process at apex and with few setae in apical 0.25; aedeagus with short teeth only; paraproct with sternal arm; cercal setae absent; apical margin of tergum IX slightly concave to concave medially with 3-12 setae on lateral lobe; sternum IX without setae.

PUPA. *Cephalothorax*. Trumpet about 3.0-4.0 as long as wide (width measured 0.5 from base); setae 1,3-CT single, longer than 2-CT; 2-CT single; 6-CT single, stout, slightly longer to longer than 7-CT; 9-CT single, longer than 8-CT; 10-CT with 1-3 branches, caudomesad of 11-CT; 11-CT single, stout. *Abdomen*. Seta 1-I well developed, with about 10 dendritic branches; 2-I single; 3-I usually single (1-2), long; 2-I and 3-I widely separated, distance between their bases about 1.5 of distance between those of 4-I and 5-I; seta 1-II with 1-8 branches; 2-IV,V anteromesad of 1-IV,V respectively. *Paddle*. Oval, 1.3-1.4 as long as wide; margins with fringe of long hair-like spicules; apex rounded, or slightly notched; seta 1-P single, or branched.

LARVA. *Head*. Antenna short, less than 0.5 length of head, without spicules; seta 1-A inserted on apical 0.5 of shaft, single; inner mouthbrushes apically pectinate; seta 4-C well developed, with 4-9 branches, cephalomesad of 6-C; 5-C usually single (1-2), long; 6-C usually single (1-2); 7-C with 2-8 branches; 8-10,13-C single; 11-C with 2-4 branches, barbed; 12,15-C with 2-4 branches; 14-C with 2-7 branches; mentum with 9-14 teeth on each side of central tooth. *Thorax*. Setae 1,5,7-P with 2-4 branches, barbed; 2-P single; 3-P with 2-4 branches; 4-P with 3-7 branches; 6-P single, barbed; 9-P with 1-3 branches; 11-P single or double; 14-P with 2-7 branches; 5,7-M single, barbed; 6-M with 2-4 branches, barbed; 8-M with 4-7 branches, barbed; 9-M with 3 branches, barbed; 10,12-M single, long, stout and barbed; 11-M single, small; 7-T with 3-8 branches, barbed; 9-T with 2-3 branches, barbed; 10,11-T similar to those on mesothorax; 12-T much reduced, single and simple; basal spine of meso- and metapleural setae long, apically pointed. *Abdomen*. Seta 6-I with 2-4 branches, barbed; 7-I usually double (1-2), barbed; 6-II-VI usually double (1-2), barbed; 7-II with 2-3 branches, barbed; 1-VII with 2-3 branches; 2-VII with 1-5 branches; 2-VIII distant from 1-VIII; 1,5-VIII with 2-5 branches, barbed; 3-VIII with 3-7 branches, barbed; 2,4-VIII single; comb with 6-15 scales in a row, each scale spatulate, or less spatulate,

with apex rounded, or each scale with free portion widened at base and sharp pointed at apex, with short fringe all around the scale; segment X with saddle incomplete, marginal spicules very small and inconspicuous; seta 1-X with 2-7 branches, barbed; 2-X with 2-5 branches; 3-X single, or branched; 4-X with 4 pairs of setae on grid, 4a,b-X single or double, 4c,d-X with 2-3 branches; no pre-cratral tufts; anal papillae subequal, 1.5-2.8 length of saddle, or unequal, dorsal pair slightly longer than ventral pair, 2.0-2.4 length of saddle, sausage-like; or anal papillae equal, about the length of saddle and pointed. *Siphon*. 1.2-2.5 as long as wide 0.5 from base, acus absent; pecten with 7-19 spines, evenly spaced, with or without the last spine widely spaced; seta 1-S with 1-3 branches, barbed, inserted beyond apical pecten spine and in line with pecten spines.

DISTRIBUTION. The *africanus* group is known only from the Afrotropical Region. Species of this group are found in West (Senegal, Guinea, Sierra Leone, Liberia, Mali, Ivory Coast, Burkina Faso, Ghana, Nigeria, Cameroon, Gabon), Southwest (Angola), Central (Central African Republic, Zaire), Southcentral (Zambia, Zimbabwe), Northeast (Sudan) and East (Uganda, Ethiopia, Kenya, Tanzania) Africa. It is absent from Madagascar.

TAXONOMIC DISCUSSION. The *africanus* group contains 8 species: *africanus* (Theobald) 1901 from Sierra Leone, *luteocephalus* (Newstead) 1907 from Zaire, *pseudoafricanus* Chwatt 1949 from Nigeria, *ruwenzori* Haddow and Van Someren 1950 from Uganda, *opok* Corbet and Van Someren 1962 from Uganda, *neoafricanus* Cornet, Valade and Dieng 1978 from Senegal, *corneti* Huang 1986 from Sierra Leone, and a new species, *maxgermaini*, from Cameroon treated below.

Edwards (1932) divided the subgenus *Stegomyia* into 4 groups which he designated A, B, C and D. Mattingly (1965) subdivided Group A into 3 subgroups known as Subgroup A₁ (*Ae. aegypti* subgroup), Subgroup A₂ (*Ae. africanus* subgroup) and Subgroup A₃ (*Ae. chemulpoensis* subgroup). *Aedes africanus*, *luteocephalus*, *opok*, *pseudoafricanus* and *ruwenzori* were assigned by Mattingly (1965: 22) to his Subgroup A₂.

Based on the present collection data, all members of the *africanus* group, except *opok* and *ruwenzori* from eastern Africa, occur in western Africa, while *africanus* and *luteocephalus* also occur in eastern Africa.

The *africanus* group show the strongest affinities with the *poweri* group but can be distinguished from the latter by the absence of a white knee-spot on all femora and by the presence of 3 large white patches on the anterior surface of the midfemur (on basal, median and apical areas).

The *africanus* group is well marked in the adult and pupal stages. The adult shares many characteristics of the *poweri* group in scutal and pleural markings. The pupa shares the characteristic of the *scutellaris* group in having paddle margins with a fringe of long hair-like spicules. The larva resembles the *poweri* and *simpsoni* groups in having comb scales in a single row, marginal spicules of the anal segment very small and inconspicuous, and the ventral brush (4-X) with 4 pairs of setae.

BIONOMICS. The immature stages of the *africanus* group have been found in tree holes, rot holes, bamboo pots, stump holes, cut bamboos, bamboo stump, tree fork and artificial containers. Females of 7 species, *africanus*, *luteocephalus*, *maxgermaini*, *neoafricanus*, *opok*, *pseudoafricanus* and *ruwenzori*, are known to bite man.

MEDICAL IMPORTANCE. The *africanus* group contains some of the most important virus vectors in the Afrotropical Region. These are discussed in detail under medical importance of the various species. Members of the *africanus* group are involved in the enzootic-epizootic cycles of yellow fever in primates in West and Central Africa (Germain, Sureau et al., 1976; Cornet *in* WHO, 1978 and Cornet et al., 1979) and in Uganda (McCrae and Kirya, 1982).

Keys to the Species of the *africanus* Group

Males and Females

(male of *maxgermaini* unknown)

1. Hindfemur anteriorly with a large pale band at base and with 2 large, white patches on median and apical areas (Figs. 8A, B) *luteocephalus* (p. 25)
- Hindfemur anteriorly without such a pale band at base, or hindfemur anteriorly with 3 large, white patches on basal, median and apical areas (Figs. 2A, B, C; 4A, B, C; 5C; 6A, B, C; 7B, D; 8C) 2
- 2(1). Posterior dorsocentral yellow line of narrow scales well developed, reaching forward to the posterior end of the fossal white patch; lateral lobe of scutellum with broad dark scales (Fig. 7C)..... *ruwenzori* (p. 42)
- Posterior dorsocentral yellow line of narrow scales not developed, or if present, not reaching to the posterior end of the fossal white patch; lateral lobe of scutellum with broad white scales (Figs. 1A; 3A, D; 5A, D; 7A)..... 3
- 3(2). Posterior dorsocentral yellow or white line of narrow scales present (Figs. 5A, D; 7A) 4
- Posterior dorsocentral yellow or white line of narrow scales not developed (Figs. 1A; 3A, D)..... 6
- 4(3). Fossal white patch rather broad at base along scutal margin; pre-scutellar line well developed, with narrow yellow scales and with some broad, flat, metallic silvery white scales posteriorly (Fig. 7A)..... *opok* (p. 36)
- Fossal white patch rather narrow at base along scutal margin; pre-scutellar line not developed, or if present, with only narrow yellow scales (Figs. 5A, D)..... 5
- 5(4). Anterior median white stripe rather long, 2.5-3.0 times as long as wide; hindleg with tarsal claws equal and simple (Figs. 5D, E)..... *pseudoafricanus* (p. 39)
- Anterior median white stripe short and broad, about 2 times as long as wide; hindleg with tarsal claws equal and toothed (Figs. 5A, B) *maxgermaini* (p. 31)

- 6(3). Hindtibia with a white stripe on ventral surface in basal 0.20 or more; male fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple; hindleg with tarsal claws equal and toothed (Figs. 2A, B, C; 4A; 3B, C) 7
- Hindtibia without, or with a very short white stripe on ventral surface in basal 0.08 or less; male fore- and midlegs with tarsal claws unequal, all simple; hindleg with tarsal claws equal and simple (Figs. 4B, C; 3E, F)*neoafricanus* (p. 33)
- 7(6). Hindfemur with 3 large, white patches on the anterior surface (on basal, median and apical areas) (Figs. 2C; 4A).....*africanus* (p. 14)
- Hindfemur with at most 2 large, white patches on the anterior surface (on median and apical areas) (Figs. 2A, B).....*corneti* (p. 22)

Male Genitalia

1. Claspette with numerous simple setae on the expanded distal portion and bearing no stronger, spine-like seta on the apicomeral corner (Figs. 10C; 16C)..... 2
- Claspette with numerous simple setae on the expanded distal portion and bearing 1-3 stronger, spine-like setae on the apicomeral corner (Figs. 13C; 20A, B; 23 A, B)..... 3
- 2(1). Claspette with distal expanded portion oval in dorsal aspect, with numerous simple setae on the apicolateral portion, and with some rather short setae on the apicomeral portion (dissected) (Fig. 16C).....*luteocephalus* (p. 25)
- Claspette with distal expanded portion subtriangular in dorsal aspect (narrows towards the apicolateral angle, becomes broader apicomerally, with apicomeral corner rounded), with numerous simple setae on the expanded distal portion (dissected) (Fig. 10C).....*africanus* (p. 14)
- 3(1). Claspette with distal expanded portion subtriangular or oval in dorsal aspect (Figs. 13C; 20A, B)..... 4
- Claspette with distal expanded portion square in dorsal aspect (Figs. 23A, B) 6

- 4(3). Claspette with distal expanded portion subtriangular in dorsal aspect (narrows towards the apicomasal angle, becomes broader apico laterally, with apicolateral corner rounded), with 1 stronger, spine-like seta on the apicomasal angle (Fig. 13C).....*corneti* (p. 22)
- Claspette with distal expanded portion oval in dorsal aspect (Figs. 20A, B) 5
- 5(4). Claspette with 2 stronger, spine-like setae on the apicomasal corner; gonostylar claw rather short and stout, about 5.3 times as long as wide (Fig. 20A)*neoafricanus* (p. 33)
- Claspette with 3 stronger, spine-like setae on the apicomasal corner; gonostylar claw long and slender, about 8.5 times as long as wide (Fig. 20B)*ruwenzori* (p. 42)
- 6(3). Apicomasal angle of claspette with a narrow thumb-like projection and bearing 2 stronger, spine-like setae (Fig. 23B)*pseudoafricanus* (p. 39)
- Apicomasal angle of claspette without such a projection, with 1 strong, spine-like seta on the apicomasal angle and with 1 smaller spine-like seta laterad of it (Fig. 23A).....*opok* (p. 36)

Pupae

(pupae of *maxgermaini*, *neoafricanus* and *opok* unknown)

1. Paddle apex with a notch.....*ruwenzori* (p. 42)
- Paddle apex without a notch (Figs. 10B, 13B, 16B) 2
- 2(1). Seta 9-III-VI strongly developed, thickened, much longer than 9-II (Fig. 16B).....*luteocephalus* (p. 25)
- Seta 9-III-VI not strongly developed, slender, about same magnitude as 9-II (Figs. 10B, 13B) 3
- 3(2). Seta 9-VII usually with 3 branches (2-4) and barbed (Fig. 10B)*africanus* (p. 14)
pseudoafricanus (p. 39)
- Seta 9-VII usually with 2 branches (1-2) and simple (Fig. 13B)*corneti* (p. 22)

Fourth Stage Larvae
(larvae of *maxgermaini* and *opok* unknown)

1. Seta 3-X branched.....*ruwenzori* (p. 42)
- Seta 3-X single (Figs. 11C, 14C, 17C, 21C)..... 2
- 2(1). Comb scale spatulate (with free portion parallel sided
and apex rounded, and with fringe around scale), or comb
scale less spatulate (slightly narrower toward apex, with
apex rounded and with short fringe around the scale)
(Figs. 11, 14, 17)..... 3
- Comb scale with free portion widened at base and sharp pointed at apex,
with short fringe around the scale
(Fig. 21).....*neoafricanus* (p. 33)
- 3(2). Comb scale spatulate; pecten spine usually with a single well
developed ventral denticle, sometimes with 1-2 small basal
ventral or dorsal denticles (Figs. 11, 14) 4
- Comb scale less spatulate; pecten spine usually with 2 ventral denticles,
and with 1-2 small dorsal denticles
(Fig. 17).....*luteocephalus* (p. 25)
- 4(3). Pecten spine rather long, about 7.8 times as long as wide
(Fig. 11).....*africanus* (p. 14)
pseudoafricanus (p. 39)
- Pecten spine short and broad, about 5.2 times as long as wide
(Fig. 14).....*corneti* (p. 22)

Descriptions of the Species

Aedes (Stegomyia) africanus (Theobald)
(Figs. 2C; 3A, B, C; 4A; 9; 10; 11)

Stegomyia africanus Theobald 1901a: 304 (M*, F*); Theobald 1901b: 3 (F);
Edwards 1912: 10 (F).

Stegomyia dubia Theobald 1910: 170 (F).

Aedes (Stegomyia) africanus (Theobald), Edwards 1941: 150 (M*, F*), 391 (P*);
Hopkins 1952: 156 (L*); Mattingly 1952: 241 (taxonomy), 245 (key to
adults), 251, 252 and 1953: 52 (distribution); Mattingly and Bruce-Chwatt
1954: 187 (M*, F*); Rickenbach, Ferrara, Germain, Eouzan and Button
1971: 286 (bionomics); Ribeiro and Ramos 1973: 119 (distribution and
bionomic); Service 1976: 260 (distribution); Cornet, Valade and Dieng
1978: 228 (F*, taxonomy), 229 (key to adults); Bang, Bown and Arata
1980: 411 (bionomics); Huang and Ward 1982: 147 (M*, F*, key to
adults); Bang, Knudsen, Onwubiko and Bown 1983: 128, 130 (bionomics).

FEMALE. *Head.* Proboscis slightly shorter than forefemur; maxillary palpus 0.24-0.26 length of proboscis; antenna with a few dark scales on flagellomere 1; occiput with few erect forked scales; vertex with a median patch of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax* (Fig. 3A). Scutum with narrow dark scales, and a distinct median stripe of broad white scales on anterior promontory, a large patch of broad white scales on fossal area, a patch of broad white scales on lateral margin just in front of wing root, followed mesally by a patch of narrow yellow scales; a short median stripe of narrow yellow scales in front of the prescutellar area; sometimes the median stripe reaching forward to the anterior median white stripe; posterior dorsocentral yellow or white line of narrow scales not developed; prescutellar line of narrow yellow scales absent; or sometimes with a few narrow yellow scales; scutellum with broad white scales on all lobes and with a few broad dark scales at apex of mid-lobe; postpronotum with a large patch of broad white scales, sometimes interrupted by median bare stripe without scales. *Wing.* Cell R_2 2.3-2.9 length of R_{2+3} . *Halter.* With dark and white scales. *Legs* (Figs. 3B, 4A). Forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in apical 0.40-0.61; hindfemur with 3 large, white patches on anterior surface (on basal, median and apical areas); fore- and midtibiae anteriorly dark; hindtibia anteriorly dark, with a white longitudinal stripe on ventral surface in basal 0.25 (0.20-0.31); fore- and midtarsi with a basal white band on tarsomeres 1,2; hindtarsomeres 1-4 with a basal white band, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.22-0.28, 0.19-0.23, 0.75-0.90 and 0.20-0.33; tarsal claws equal in length on all legs, all toothed. *Abdomen.* Terga II-VIII with basolateral white spots which are not visible in dorsal aspect except on terga VII-VIII; sometimes terga IV-VI, or V,VI with a basal pale band, incomplete at middle; sterna III-VII with a basal white band. *Genitalia* (Fig. 9). Insula longer than wide, with minute setae and with 2-4 larger setae on apical 0.33; tergum IX broader than long, apical margin of tergum IX with well developed lateral lobes, each with 2-4

setae; apical margin of postgenital plate usually with a deep median notch, or sometimes with a shallow median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head.* Maxillary palpus longer than proboscis, predominantly dark, with a white band at base of palpomeres 2-5, those on palpomeres 4,5 dorsally incomplete; sometimes palpomere 5 with white scales on entire ventral surface. *Wing.* Cell R_2 1.8-2.3 length of vein R_{2+3} . *Legs* (Figs. 2C, 3C). Basal white band on hindtarsomeres 1-4; the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.20-0.31, 0.14-0.27, 0.80-0.86 and 0.20-0.32; fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple. *Genitalia* (Fig.10C). Gonocoxite 2.0-2.2 as long as wide; claspette large, lobed, distal expanded portion subtriangular in dorsal aspect (narrows towards apico-lateral angle, broadened apicomeresally, with apicomeresal corner rounded), with numerous simple setae on the expanded distal lobe; gonostylus simple, elongate, about 0.56 length of gonocoxite, with a long slender claw process at apex and with a few setae in apical 0.25; apical margin of tergum IX concave medially with 4-7 setae on lateral lobe.

PUPA (Figs. 10A, B). *Cephalothorax.* Trumpet about 3.0 as long as wide; 2-CT single, small; 4-CT usually double (1-2); 5-CT double; 6-CT single, stout, longer than 7-CT; 7,8-CT usually double (1-2); 10-CT usually with 3 branches (1-3), caudomesad of 11-CT; 12-CT single. *Abdomen.* Seta 1-I well developed, fewer than 10 dendritic branches; 3-I single, long; seta 1-II usually double (1-3); 3-II,III single; 1-III usually double (1-2); 1-IV usually double (1-2); 5-IV-VI usually single (1-2), short, not reaching beyond posterior margin of following segment; seta 9-I-VI small, single, simple; 9-VII usually with 3 branches (3-4), barbed; 9-VII,VIII much longer and stouter than 9-I-VI; 9-VIII usually with 5 branches (3-7) and barbed. *Paddle.* Oval, about 1.35 as long as wide; apex rounded; seta 1-P single.

LARVA (Fig. 11). *Head.* Seta 4-C well developed, usually with 7 branches (6-9), cephalomesad of 6-C; 5-C single, long; 6-C single; 7-C usually double (2-3); 11-C usually with 3 branches (3-4), barbed; 12-C usually double (2-3); 14-C usually with 4 branches (3-5); 15-C usually with 4 branches (3-4); mentum usually with 10 (10-11) teeth on each side of central tooth. *Thorax.* Seta 1,7-P usually with 3 branches (3-4), barbed; 3-P usually with 3 branches (3-4); 4-P usually with 6 branches (4-6); 5-P usually with 4 branches (3-4), barbed; 9-P usually with 3 branches (2-3); 11-P single; 14-P usually with 7 branches (6-7); 6-M with 3 branches, barbed; 8-M usually with 6 branches (5-7), barbed; 7-T usually with 5 branches (4-5), barbed; 9-T with 3 branches, barbed. *Abdomen.* Seta 6-I usually with 3 branches (2-3), barbed; 7-I double, barbed; 6-II-VI double, barbed; 7-II usually double (2-3), barbed; 1-VII double; 2-VII single; 1-VIII usually with 3 branches (3-5), barbed; 3-VIII usually with 5 branches (4-6), barbed; 5-VIII usually with 4 branches (3-4), barbed; comb with 10-12 scales in a row, each scale spatulate, with free portion parallel sided and apex rounded, and with fringe around the scale; seta 1-X double, barbed; 2-X with 3 branches; 3-X single; 4a,b-X double, 4c,d-X double; anal papillae subequal, about 2.2 length of saddle, sausage-like. *Siphon.* 2.3-2.5 as long as wide 0.5 from base; pecten usually with 15(12-18) spines, evenly spaced, each spine usually with a single well developed ventral denticle, sometimes with 1-2 small basal ventral or dorsal denticles; seta 1-S double, barbed, inserted beyond apical pecten spine and in line with pecten

spines.

TYPE DATA. *Stegomyia africanus* Theobald, type male (MEP Acc. 945), with genitalia on a plastic plate, in British Museum (Natural History), London [BMNH]; type locality: Free Town (8° 30' N, 13° 10' W), *Western Area*, SIERRA LEONE, IX-99 (E. E. Austen). Type female (MEP Acc. 945), same data as type male, in the BMNH. I hereby designate the male as the lectotype. *Stegomyia dubia* Theobald, type female (Katamar, Bihe (12° 18' S, 17° 00' E), Angola, Feb., 1903), (in poor condition, head and thorax on pin, abdomen off and glued on a plastic plate with the hindleg), in the BMNH.

OTHER MATERIAL EXAMINED. BURKINA FASO. *Volta-Noire, Departement de la*: Nasso (11° 13' N, 4° 26' W), Cercle Bobo-Dioulasso, 5-VII-1960, J. Hamon, tree hole, 1 M, 1 M gen (MEP Acc. 724, 82/103) [ORSTOM]; Foret de Nasso, C. Bobo-Dioulasso (11° 12' N, 4° 18' W), 19-XII-1967, J. Hamon, 1 M, 1 M gen (MEP Acc. 724, 82/104) [ORSTOM]; same data except XII-1967-I-1968, G. Pichon, 10 M, 2 F, 7 M gen (MEP Acc. 724, 82/105-82/107, 84/326-84/329) [ORSTOM]; same data except 8-VI-1969, J. Hamon, 1 M, 1 M gen (MEP Acc. 724, 84/330) [ORSTOM]; Cercle de Bobo-Dioulasso, Foret de Dinderesso (11° 14' N, 4° 22' W), 1967, F. Rodhain, 1 M (#1225), 1 M gen (MEP Acc. 723, 82/95) [PIP]; Foret du Kou (11° 11' N, 4° 27' W), IX-1981, J.P. Hervy, 4 M, 1 F (MEP Acc. 926) [ORSTOM]. Upper Volta, 1981, J.P. Hervy, 5 M, 1 F, 5 M gen (SAMP Acc. 1083, 84/284-84/288) [ORSTOM].

CAMEROON. *East Cameroon: Nyong et Sanaga*: Yaounde (3° 52' N, 11° 31' E), J. Rageau, B.M. 1950-66, 1 M, 1 M gen (MEP Acc. 719, 82/84) [BMNH]; Nkolbisson (3° 53' N, 11° 27' E), 21-VI-1967, 1 M, 1 M gen (MEP Acc. 723, 82/93) [PIP]. *Bamileke*: Dschang (5° 27' N, 10° 04' E), 7-III-1975, Eouzan, 1 F (MEP Acc. 926) [ORSTOM]. *West Cameroon: Mamfe*: Fontem (5° 28' N, 9° 53' E), 7-III-1975, Eouzan, 2 F (MEP Acc. 926) [ORSTOM]. *Bamenda*: Edisihs Village (5° 56' N, 10° 10' E), 3-IV-1983, Huang, Adam & Berl, 1280 m, 1 M, 1 F, 1 M gen (MEP Acc. 1016, #137-2a, 6A, 83/343) [USNM]; Safari Lodge Bali (5° 50' N, 10° 01' E), 3-IV-1983, Huang, Adam & Berl, 1350 m, 1 F (MEP Acc. 1016, #138) [USNM]; same data, 1 M, 2 F, 1 M gen (MEP Acc. 1016, #139-1c, 1A, 1b, 89/243) [USNM]; Bamenda-Bali Road (5° 53' N, 10° 01' E), 3-IV-1983, Huang, Adam & Berl, 1250 m, 1 M, 1 F, 1 M gen, 1 F gen (MEP Acc. 1016, #140-2, 2A, 83/341, 83/342) [USNM]; same data except 1260 m, 1 F (MEP Acc. 1016, #141-3A) [USNM]; Nkwen Road (5° 58' N, 10° 10' E), 6-IV-1983, Huang, Adam & Berl, 1230 m, 14 F (MEP Acc. 1016, #147, taken biting between 0900-1000 h), 2 F gen (90/42, 90/43) [USNM].

CENTRAL AFRICAN REPUBLIC. Yomro-Kou-Kourou (7° 12' N, 20° 01' E), 29-VII-1975, J.P. Herve, 1 F (MEP Acc. 736) [ORSTOM]. Kaga-Bandoro (6° 59' N, 19° 11' E), 1-X-1975, J.P. Herve, 2 F (MEP Acc. 736) [ORSTOM]. *Ombella-Mpoko*: Bozo (5° 10' N, 18° 30' E), 20-XI-1978, J.P. Herve, 20 F (MEP Acc. 736) [ORSTOM]; same data except 22-X-1982, J.P. Cornet, 91 F (MEP Acc. 970) [ORSTOM].

ETHIOPIA. *Kefa*: Jima (7° 40' N, 36° 50' E) (Kaffa Prov., ex. *Acacia* tree hole by Atule stream, about 8 mi. S. of Jimma, 1770 m), 30-IV-1969, McCrae & Schmidt, 2 M, 1 F, 2 M gen (MEP Acc. 1036, 84/341, 84/342) [DVBD]; Agaro (7° 51' N, 36° 39' E) (Jima Prov., Agaro Area, Delecho, 2000 m., tree holes), V-1974, V.H. Lee, 4 M, 6 F, 2 M gen (MEP Acc. 647, 82/156, 82/157) [USNM].

GUINEA. *Mali*: Holo (12°01' N, 12°22' W), 3-5-XI-1981, M. Germain, 6 F (MEP Acc. 926) [ORSTOM].

IVORY COAST. *Est, Departement de l'*: Latourgo (9°37' N, 3°16' W), Cercle Bouna, 11-VIII-1959, Hamon, 1 F (MEP Acc. 724) [ORSTOM]; Foret 7 Km N. NE de Bouna (9°00' N, 3°30' W), 8-VI-1967, G. Pichon & Rodhain, 2 F (MEP Acc. 724) [ORSTOM]. *Sud, Departement du*: Niamoue (5°53' N, 4°49' W), Ss-Pref de Tiassale, 4-VIII-1963, Hamon & Brengues, 1 F (MEP Acc. 724) [ORSTOM]; Abidjan, Foret du Banco (5°25' N, 4°03' W), P. Cachan, (MEP Acc. 723), 5 M (#7072, #40266, #98036, #132065, #135042), 2 F (#7074, #34198), 5 M gen (82/96, 82/97, 84/298, 84/319, 84/320) [PIP]; same data, (MEP Acc. 724), 31 M (#2276, #2280, #33054, #33055, #34129, #34213, #34231, #38086, #40212, #40255, #65132, #80031, #85028, #85029, #85030, #85032, #88013, #89038, #89042, #89055, #89058, #94009, #95025, #97047, #98025, #99047, #103038, #104017, #139009, #143006, #144023), 1 F (#104010), 22 M gen (82/113-82/119, 82/124, 82/129, 82/130, 84/304, 84/306-84/308, 84/310-84/317) [ORSTOM]; Abidjan (5°19' N, 4°02' W), IRFA, 7-V-1985, Y.M. Huang, (SAMP Acc. 1138), tree hole, 2 M, 1 F, 3 individual rearings (3 l, 3 p), 1 M gen (IV 86-12, 85/179) [USNM]. *Centre, Departement du*: M'Bahiakro, Dezidougou (7°44' N, 4°16' W), 29-V-4-VI-1985, Huang & Pecor, (SAMP Acc. 1138), tree holes, 2 F (IV 243-12, IV 309-100), 2 individual rearings (1 l, 2 p) [USNM]; same data except 22-V-1985, B. Bouchite, (SAMP Acc. 1138), sweeping, 3 F (IV 167) [USNM]; same data except 13-15-VI-1985, B. Bouchite, (SAMP Acc. 1138), biting man, 1830-2000 h, 3 F (IV 379, IV 380, IV 388) [USNM]; Km 2, 14-VI-1985, B. Bouchite, (SAMP Acc. 1138), biting man, 1830-2000 h, 1 F (IV 385) [USNM]; Dezidougou, 22-V-1985, Petice, biting on man at ORSTOM study tower, 1 F (IV 170-2), progeny rearing at SAMP: 1 M, 3 F, 4 individual rearings (4 l, 4p), 1 M gen (SAMP Acc. 1138, IV 170(2)-10, 85/177) [USNM]; same data except 23-V-1985, B. Bouchite, biting on man at ORSTOM study tower, 1 F (IV 177-3), progeny rearing at SAMP: 18 M, 8 F, 26 individual rearings (25 l, 26 p), 5 L, 4 M gen (SAMP Acc. 1138, IV 177(3)-13, 85/169; IV 177(3)-14, 85/170; IV 177(3)-16, 85/171; IV 177(3)-18, 85/172) [USNM]; same data except 12-VI-1985, B. Bouchite, biting on man, 1830-2000 h, 1 F (IV 377-2), progeny rearing at SAMP: 17 M, 17 F, 34 individual rearings (26 l, 34 p), 5 M gen, 9 F gen (SAMP Acc. 1138, IV 377(2)-103, 85/173; IV 377(2)-10, 85/174; IV 377(2)-11, 85/175; IV 377(2)-12, 85/176; IV 377(2)-27, 90/37; IV 377(2)-21, 89/245; IV 377(2)-26, 89/246; IV 377(2)-28, 89/247; IV 377(2)-29, 89/248; IV 377(2)-32, 89/249; IV 377(2)-19, 90/33; IV 377(2)-23, 90/34; IV 377(2)-25, 90/35; IV 377(2)-31, 90/36) [USNM].

KENYA. *Western Region*: Kakamega (0°17' N, 34°45' E), 1936, 3 M, 1 M gen (MEP Acc. 1036, 84/335) [DVBD]; same data except XI-1948, 2 M, 1 F, 2 M gen (MEP Acc. 1036, 84/334, 84/336) [DVBD]. *Rift Valley Region*: Muguri River (0°12' N, 36°02' E), 21-I-1946, 1 M (No. 2, tree hole), 1 M gen (MEP Acc. 1036, 84/339) [DVBD]; Cheborgo (0°27' N, 35°39' E), 18-X-1951, 1 M (MEP Acc. 1036) [DVBD]. *Nyanza Region*: Maseno (0°01' S, 34°36' E), 1943, 1 F (MEP Acc. 848) [USNM]; Mosando (0°41' S, 34°44' E), 1948, Van Someren, 1 M (No. 54, tree hole), 1 M gen (MEP Acc. 848, 82/161) [USNM]; Sanda River (0°34' S, 34°44' E), 21-I-1946, 2 M (B1 No. 4, B2 No. 8, tree holes), 1 F (B1 No. 5, tree hole), 2 M gen (MEP Acc. 1036, 84/337, 84/338) [DVBD]; Muhoroni (0°10' S, 35°11' E), 18-IX-1951, 1 M (MEP Acc. 1036) [DVBD].

LIBERIA. *Montserrado County*: Kaka (6°11' N, 10°03' W), (Kakatown VIII-20-1930, Bequaert's Liberian Collections), 1 F (MEP Acc. 744) [MCZ].

NIGERIA. *Lagos*: Lagos (6°20' N, 3°20' E), 29-VII-1920, C.B. Philip, 1 M, 1 M gen (MEP Acc. 723, 82/94) [PIP]; same data except date unspecified, Mrs. S.L.M. Connal, 2 M, 1 M gen (MEP Acc. 726, 82/144) [LSHTM]; Yaba (6°24' N, 3°20' E), III-VI-1928, V. Wigglesworth, rot holes, 5 M, 3 M gen (MEP Acc. 726, 82/145, 82/146, 82/147) [LSHTM]. *Western*: Ibadan (7°23' N, 3°50' E), VIII-1929, H.W. Kumm, tree holes, 3 M (#38, #34, #34), 3 M gen (MEP Acc. 726, 82/12, 82/149, 82/150) [LSHTM]. *North-Central*: Zaria Prov., Kaduna (10°30' N, 7°28' E), 21-VIII-1957, W.A. McDonald, 1 M (36-101), 1 F (38-101) [USNM].

SENEGAL. *Senegal Oriental*: Plateau d'Eties (12°34' N, 12°26' W), XI-1982, J.P. Hervy, 20 M, 13 F, 10 M gen, 1 F gen (F No.12, SAMP Acc. 1083, 84/343-84/350, 90/49, 90/50, 90/48) [ORSTOM]; same data except 5-XII-1982, J.P. Hervy, 4 M, 1 F (F No. 15, SAMP Acc. 1038) [ORSTOM]. Marigot Yaya (12°29' N, 12°08' W), XI-1982, J.P. Hervy, 35 M, 21 F, 10 I, 6 L (F No. 11, SAMP Acc.1083) [ORSTOM]. *Diourbel*: Yaya (16°01' N, 15°55' W), 1-XII-1982, J.P. Hervy, 3 M, 7 F (F No. 13, SAMP Acc. 1083) [ORSTOM].

SIERRA LEONE. *Eastern Province*: Daru (7°59' N, 10°50' W), IV-VI-1911, Dr. J.C. Murphy, 1 M, 1 M gen (MEP Acc. 726, 82/143) [LSHTM]. *Southern Province*: Tiwai Is. (7°30' N, 11°20' W), 8-V-1984, Y.M. Huang, (SAMP Acc. 1093), tree hole, 2 M (#45-13,14), 1 F (#45-12) [USNM]; same data except 7-V-1984, Y.M. Huang, (SAMP Acc. 1093), plastic bottles placed on trees (#1-#10, #12, #13, #15-#22, #24-#34), 298 M, 288 F, 10 M gen (84/413-84/417, 84/419, 84/420, 85/180-85/182) [USNM]; same data except 8-15-V-1984, Y.M. Huang, (SAMP Acc. 1093), tree holes (#41, #43, #45, #58, #63-#66, #71, #77, #79, #82), 16 M, 28 F, 2 M gen (84/431, 84/432) [USNM]; same data except 8-V-1984, Y.M. Huang, (SAMP Acc. 1093), cut bamboo (#40), 1 M [USNM]; same data, large tree fork (#44), 1 M, 1 M gen (84/429) [USNM]; same data except 8-VI-1984, Y.M. Huang, (SAMP Acc. 1093), bamboo stump (#196), 2 F [USNM]; Kasewe Forest Reserve (8°19' N, 12°13' W), 29-V-1984, Huang & Pecor, (SAMP Acc. 1093), stump hole, 1 M (#156-11), 1 Mgen (84/422) [USNM]; same data, tree hole (#155), 1 F [USNM]; same data, stump hole (#160), 1 M, 1 F [USNM]. *Western Area*: Aberdeen (8°30' N, 13°18' W), VII-1928, V. Wigglesworth, rot-holes in cotton tree, 1 M, 1 M gen (MEP ACC. 726, 89/244) [LSHTM]; Fourah Bay College Botanic Reserve (8°29' N, 13°13' W), 24-V-1984, Huang & Pecor, (SAMP Acc. 1093), tin cans placed on trees (#122, #125), 3 F [USNM]; same data except 25-V-1984, Huang & Pecor, (SAMP Acc. 1093), tree hole (#140), 2 M, 1 F [USNM].

UGANDA. *Kingdom of Buganda*: Entebbe (0°04' N, 32°28' E), 1949, A.J. Haddow, 3 M, 2 F, 2 M gen (MEP Acc. 726, 82/13, 82/152) [LSHTM]; Entebbe, Zika, tree hole, VIII-1949, 2 M, 2 Mgen (MEP Acc. 1036, 84/332, 84/333) [DVBD]. *Bukedi District*: Lunyo (0°20' N, 33°55' E), II-1960, P.S. Corbet, 1 M (#C0723, light traps), 4 F (#C622), 1 M gen (MEP Acc. 1036, 84/331) [DVBD]. *Acholi District*: Awere (2°43' N, 32°50' E), (Ex. female col. Awere Acholi/ Uganda, Bred E.A. Virus Institute,) A. McCrae, 1 M, 1 M gen (MEP Acc. 1036, 84/340) [DVBD]. Uganda, bred 1963, London, Ex. eggs, 6 M, 3 M gen. (MEP Acc. 726, 82/153, 82/154, 82/155) [LSHTM].

ZAIRE. *Uele*: Congo, Bangoi ($3^{\circ}28' N$, $25^{\circ}28' E$), 1907, 1 M, 1 M gen (MEP Acc. 723, 82/92) [PIP]. *Haut-Congo*: Stanleyville ($0^{\circ}26' N$, $25^{\circ}14' E$), 1923, Dr. R. Mouchet, 1 M (MEP Acc. 725) [CMT]; same data except 1930, Dr. Richard, 3 M, 2 M gen (MEP Acc. 725, 82/138, 82/139) [CMT]. *Kongo-Central*: Leopoldville ($4^{\circ}20' S$, $15^{\circ}18' E$), 1933, Dr. C. Henrard, 1 M, 1 M gen (MEP Acc. 725, 82/131) [CMT]. *Cuvette-Centrale*: Coquilhatville ($0^{\circ}04' N$, $18^{\circ}20' E$), 1945, J. Wolfs, 3 M, 1 M gen (MEP Acc. 725, 82/135) [CMT]. *Kivu-Central*: Kivu: Bukavu ($2^{\circ}30' S$, $28^{\circ}52' E$), 12-VII-1947, J. Wolfs, 2 M, 2 F, 1 M gen (MEP Acc. 725, 82/136) [CMT]; same data except 16-IV-1948, J. Wolfs, 1 M, 1 M gen (MEP Acc. 725, 82/137) [CMT]; Costermansville ($2^{\circ}30' S$, $28^{\circ}51' E$), 6-VIII-1948, J. Wolfs, 1 M, 1 M gen (MEP Acc. 725, 82/132) [CMT]; same data except 1950, J. Wolfs, 4 M, 1 F, 1 M gen (MEP Acc. 725, 82/133) [CMT].

DISTRIBUTION (Map 2). This species is known from Angola, Burkina Faso, Cameroon, Central African Republic, Ethiopia, Guinea, Ivory Coast, Kenya, Liberia, Nigeria, Senegal, Sierra Leone, Uganda and Zaire. Ribeiro and Ramos (1973: 119) recorded *Ae. africanus* from Quibocolo do Zombo, Dundo and Maquela do Zombo, Angola, and Service (1976: 260) recorded it from Gabon, but I have not seen these specimens.

TAXONOMIC DISCUSSION. *Aedes africanus* differs from congeners of the *africanus* group by: (1) anterior median white stripe short and broad, about 2 times as long as wide; (2) posterior dorsocentral yellow or white line of narrow scales not developed; (3) prescutellar line of narrow yellow scales not present; (4) hindfemur with 3 large white patches on anterior surface (on basal, median and apical areas); (5) hindtibia with a white longitudinal stripe on ventral surface in basal 0.25 (0.20-0.31); (6) hindtarsomere 4 with basal 0.20-0.33 white; and (7) hindleg with tarsal claws equal and toothed.

The adult male and female of *Ae. africanus* are extremely similar to those of *Ae. cometi*, but they can be distinguished by the hindfemur, which has 3 large, white patches on the anterior surface (on basal, median and apical areas). In *cometi*, the hindfemur has at most 2 large white patches on the anterior surface (on median and apical areas).

The male genitalia of *Ae. africanus* are very similar to those of *Ae. luteocephalus* in having the claspette with numerous simple setae on the expanded distal portion and bearing no stronger, spine-like seta on the apicomesal corner, but can be distinguished from *luteocephalus* by the claspette, which has the distal expanded portion subtriangular in dorsal aspect (narrows towards the apicolateral angle, becomes broader apicomesally, with apicomesal corner rounded).

The larva of *Ae. africanus* is very similar to *cometi* in having the comb scale spatulate, with free portion parallel sided and apex rounded, and with fringe around the scale, and in having the pecten spine usually with a single well developed ventral denticle, sometimes with 1-2 small basal denticles. However, *Ae. africanus* can be distinguished from *cometi* by the elongated pecten spine, about 7.8 times as long as wide. In *cometi*, the pecten spine is short and broad, about 5.2 times as long as wide. The pupa of *Ae. africanus* also resembles *cometi*, but can be separated by seta 9-VII usually with 3 branches (3-4) and barbed. In *cometi*, seta 9-VII usually is 2-branched (1-2) and simple.

Aedes africanus is apparently a forest species that occurs in habitats at altitudes between <166 and 2,000 m (<500-6,000 ft) and yearly rainfall of 101.6-406.4 cm (40-160 in).

BIONOMICS. The immature stages of *Ae. africanus* have been collected from the following: tree holes, in Burkina Faso, Ethiopia, Ivory Coast, Kenya, Nigeria, Sierra Leone and Uganda; bamboo pots that were placed in forest (Foret du Banco), Abidjan, Ivory Coast; stump holes, in a forest, Sierra Leone; rot holes, in Nigeria, Sierra Leone; bamboo stump, cut bamboo, tree fork, in the forest, on Tiwai Island, in Sierra Leone and artificial containers (plastic bottles, tin cans) placed on trees, about 0.33-3.5 m above ground, in the forest, on Tiwai Island, and in Fourah Bay College Botanic Reserve, in Sierra Leone.

Mattingly (1952: 270) wrote that "*Aedes africanus*. Preferred. Tree-holes (Hopkins 1936, also mentions it as common in bamboo stumps). Occasional. Utensils (Hopkins 1936), rock-holes (Garnham et al. 1946), bamboo pots (Robinson 1950)." Hopkins (1952: 157) stated that *Ae. africanus* was "Common in tree-holes and bamboo-stumps; occasional in discarded tins, motor-tyres, etc. Mr. Gillett has twice obtained larvae from native water-pots in the Bwamba area of Toro district, Uganda, and Garnham, Harper and Highton (1946) also mention domestic containers." In Angola, Ribeiro and Ramos (1973: 120) found larvae in flower vases in a cemetery; artificial containers were occasionally recorded as larval habitats for this species. In Nigeria, Bang et al. (1983: 130) reported that in the town of Uyo, *Ae. africanus* has the unusual habit of breeding in clay pots during the dry months. However, neither *Ae. aegypti* nor *Ae. africanus* were present in clay pots during the rainy months from February to June.

In southeastern Nigeria, Bang et al. (1980: 411) stated that *Ae. africanus* oviposited as frequently in houses as outdoors, where it preferred shaded ovipositional sites and where oviposition was more frequent at ground level than at tree-canopy height. Thus, in this area of southeastern Nigeria intermediate between the forest and savanna zones, *Ae. africanus* may be regarded as a common sylvatic tree hole species that frequents human dwellings.

Preferred ovipositional sites for specimens collected in conjunction with this study were tree holes, stump holes, rot holes, bamboo pots and plastic bottles, while bamboo stump, cut bamboo, tree fork and tin cans were less commonly used. There is little doubt that *Ae. africanus* is the most adaptable species in the *africanus* group.

Females of this species have been taken biting man in Burkina Faso; in Dschang, Fontem, Bamenda, Bali, Cameroon; in Bozo, Central African Republic; in Mali, Guinea; in Dezidougou, Km 2, Ivory Coast; in Eties, Marigot Yaya, Yaya, Senegal and in Entebbe, Uganda.

Mattingly (1952: 276) stated that *Ae. africanus* seems to bite man readily in all parts of its range, and the same is true of *pseudoafricanus* and *luteocephalus*. Ribeiro and Ramos (1973: 120) reported that in Angola, females of this species readily bite man and monkeys. In Nigeria, Bang et al. (1983: 131) stated that *Ae. africanus* is strongly anthropophilic, constituting more than 90% of the mosquitoes coming to man. In southeastern Nigeria, females bite man not only in the forest at both ground and canopy levels but also in and near human habitations (Bang et al. 1980).

Rickenbach et al. (1971: 286) stated that in the forested area of southern Cameroon, *Ae. africanus* exhibits considerable crepuscular activity and its main

concentration is in the canopy. The biting-cycle shows a very striking peak of activity between 1700 and 1900 hours at ground level, and between 1800 and 1900 hours at upper levels. The vertical distribution is characterized by the occurrence of three-quarters of the biting population in the canopy for the entire diel period. But the analysis of mosquito distribution at different periods of the diel shows that the main activity is at lower levels during the day, while it is in the canopy in the hour after sunset and during the night.

Aedes africanus has been found in association with *Ae. cometi* from forest (Foret du Banco), Abidjan, Ivory Coast and from Tiwai Island, Sierra Leone; with *Ae. luteocephalus* from Foret de Nasso, Burkina Faso; from Mali, Guinea; from Dezidougou, Km 2, Ivory Coast and from Aberdeen, Sierra Leone; with *Ae. maxgermaini* from Dschang, Bamenda, Bali, Cameroon; with *Ae. opok* from Bozo, Central African Republic; with *Ae. pseudoafricanus* from Foret du Banco, Abidjan, Ivory Coast; from Lagos, Yaba, Nigeria and from Tiwai Island, Kasewe Forest Reserve, Sierra Leone.

In Nigeria, Bang et al. (1983: 128) stated that the numbers of *Ae. africanus* caught during crepuscular hours on human bait decreased toward the north, ranging from 95% in lowland rain forests to 5% in northern Guinea savanna forest. In the dry season the species is limited to the area south of the Benue River, where it continues to breed throughout the year in forest relicts south of 7°N latitude.

MEDICAL IMPORTANCE. *Aedes africanus* has been recognized as one of the most important virus vectors of the Afrotropical Region [as Ethiopian Region] (Haddow, 1961). In Uganda, *Ae. africanus* has been incriminated as the principal vector of yellow fever of the monkey to monkey cycle in Semliki Forest (Haddow, Smithburn et al., 1947; Haddow et al., 1948; Haddow and Mahaffy, 1949; Smithburn et al., 1949) and from monkey to man cycle in Bwamba County (Haddow, 1945; Haddow et al., 1947; Lumsden, 1951; Haddow, 1968). In eastern Africa, at least 4 arboviruses have been isolated from *Ae. africanus*: yellow fever (Smithburn and Haddow, 1946; Smithburn et al., 1949; Haddow, 1968; Kirya et al., 1977), Chikungunya (Weinbren et al., 1958; Haddow et al., 1961; McCrae et al., 1971), Rift Valley fever (Weinbren et al., 1957) and Zika (Dick et al., 1952; Weinbren and Williams, 1958; Haddow et al., 1964) in Uganda, and yellow fever in Ethiopia (Serie et al., 1968).

In Nigeria, *Ae. africanus* was shown to be an efficient vector of yellow fever under laboratory conditions (Philip 1929, 1930). It is recognized as a vector of yellow fever in West and Central Africa (Hamon et al., 1971, in West Africa; Rickenbach et al., 1971 and Germain et al., 1972, in Cameroon; Pajot, 1972 and Germain, Sureau et al., 1976, in Central African Republic; Bang et al., 1979 and Bang et al., 1983, in Nigeria). The yellow fever virus has also been isolated from *Ae. africanus* in the Ivory Coast (Chippaux et al., 1975) and in the Central African Republic (Germain, Sureau et al., 1976). In addition to the yellow fever virus, Chikungunya, Zika and Bouboui viruses have been isolated from *Ae. africanus* and *Ae. opok* in the Central African Republic (Germain et al., 1978), and Chikungunya virus has been isolated from *Ae. africanus* in Central African Republic (Saluzzo et al., 1980) and in Senegal (Jupp and McIntosh, 1988).

In Angola, Ribeiro and Ramos (1973: 120) stated that *Ae. africanus* is an important potential yellow fever vector, particularly liable to be involved in a sylvatic cycle of the disease in northern Angola.

Bang et al. (1983: 132) reported that in southeastern Nigeria, *Ae. africanus*, rather than monkeys, constitutes the main reservoir of virus in rain forest and forest relicts to the north. In the southern Sudan savanna of West Africa, *Ae. luteocephalus* was reported by Cordellier et al. (1977) as a reservoir of yellow fever virus.

Aedes (Stegomyia) corneti Huang
(Figs. 1A, B, C; 2A, B; 12; 13; 14)

Aedes (Stegomyia) corneti Huang 1986b: 765 (M*, F*, L*, P*).

FEMALE. *Head.* Proboscis longer than forefemur (1.26-1.31 length of forefemur); maxillary palpus about 0.19 length of proboscis; antenna with a few dark scales on flagellomere 1; clypeus bare; occiput with few erect forked scales; vertex with a median stripe or patch of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax* (Fig. 1A). Scutum with narrow dark scales, and a distinct median stripe of broad white scales on anterior promontory, a large patch of broad white scales on fossal area, a patch of broad white scales on lateral margin just in front of wing root; posterior dorsocentral yellow line of narrow scales not developed; prescutellar line of narrow yellow scales not present; scutellum with broad white scales on all lobes and with a few broad dark scales at apex of midlobe; postpronotum with a large patch of broad white scales interrupted by median bare stripe without scales. *Wing.* Cell R_2 about 2.6 length of R_{2+3} . *Halter.* With dark scales. *Legs* (Fig. 2A). Forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in apical 0.44-0.56; hindfemur with 2 large, white patches on anterior surface (on median and apical areas); fore- and midtibiae anteriorly dark; hindtibia anteriorly dark, with a white longitudinal stripe on ventral surface in basal 0.20-0.25; fore- and midtarsi with a basal white band on tarsomeres 1,2; hindtarsomeres 1-4 with a basal white band, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.22-0.25, 0.20-0.23, 0.82-0.88 and 0.33-0.50; tarsal claws equal in length on all legs, all toothed. *Abdomen* (Fig. 1B). Terga II-VIII with basolateral white spots which are not visible in dorsal aspect except on terga VII-VIII; sterna III-VII with a basal white band. *Genitalia* (Fig. 12). Insula longer than wide, with minute setae and with 3 larger setae on apical 0.25; tergum IX broader than long, apical margin of tergum IX with well developed lateral lobes, each with 2-6 setae; apical margin of postgenital plate with a shallow median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head.* Maxillary palpus slightly shorter than proboscis, predominantly dark, with a white band at base of palpomeres 2-5, those on palpomeres 4,5 dorsally incomplete. *Wing.* Cell R_2 about 2.1 length of vein R_{2+3} . *Legs* (Fig. 2B). Basal white band on hindtarsomeres 1-4; the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.25-0.30, 0.20-0.24, 0.81-0.87 and 0.30-0.44; fore- and midlegs with tarsal claws unequal, the smaller one toothed,

the larger one simple. *Abdomen* (Fig. 1C). Sternum VIII with basolateral white spots. *Genitalia* (Fig. 13C). Gonocoxite 2.0-2.2 as long as wide; claspette large, lobed, distal expanded portion subtriangular in dorsal aspect (narrows towards apicomeral angle, broadened apicolaterally, with apicolateral corner rounded), with numerous simple setae on the expanded distal portion and bearing 1 somewhat stronger, spine-like seta on apicomeral angle; gonostylus simple, elongate, about 0.6 length of gonocoxite, with a long slender claw process at apex and with a few setae in apical 0.25; apical margin of tergum IX concave medially with 3-12 setae on lateral lobe.

PUPA (Figs. 13A, B). *Cephalothorax*. Trumpet about 4.0 as long as wide; 2-CT single, small; 4-CT double; 5-CT usually with 3 branches (2-3); 6-CT single, stout, slightly longer than 7-CT; 7-CT usually double (1-2); 8,12-CT usually single (1-2); 10-CT usually double (1-3), caudomesad of 11-CT. *Abdomen*. Seta 1-I well developed, with more than 10 dendritic branches; 3-I usually single (1-2), long; seta 1-II usually with 3 branches (2-8); 3-II,III usually single (1-2); 1-III usually double (1-3); 1-IV usually double (1-2); 5-IV-VI usually single (1-2), short, not reaching beyond posterior margin of following segment; seta 9-I-VI small, single, simple; 9-VII usually with 2 branches (1-2); 9-VII,VIII much longer and stouter than 9-I-VI; 9-VIII usually with 4 branches (2-4) and barbed. *Paddle*. Oval, about 1.4 as long as wide; apex rounded; seta 1-P single.

LARVA (Fig. 14). *Head*. Seta 4-C well developed, usually with 5 branches (4-6), cephalomesad of 6-C; 5-C single, long; 6-C single; 7,12,15-C usually double (2-3); 11-C usually with 3 branches (2-3), barbed; 14-C usually with 4 branches (3-7); mentum usually with 13 (12-14) teeth on each side of central tooth. *Thorax*. Seta 1-P usually with 3 branches (2-3), barbed; 3-P double; 4-P usually with 4 branches (3-6); 5-P usually double (2-3), barbed; 7-P double, barbed; 9-P usually double (1-2); 11-P single; 14-P usually double (2-3); 6-M with 3 branches, barbed; 8-M usually with 6 branches (5-6), barbed; 7-T usually with 6 branches (5-6), barbed; 9-T usually with 3 branches (2-3), barbed. *Abdomen*. Seta 6-I usually with 3 branches (3-4), barbed; 7-I-II double, barbed; 6-II-VI double and barbed; 1-VII double; 2-VII single; 1-VIII usually double (2-3), barbed; 3-VIII usually with 5 branches (5-7), barbed; 5-VIII usually double (2-5), barbed; comb with 10-15 scales in a row, each scale spatulate, with apex rounded and with fringe around the scale; seta 1-X double, barbed; 2-X with 3 branches; 3-X single; 4a,b-X double, 4c,d-X with 2-3 branches; anal papillae subequal, about 2.8 length of saddle, sausage-like. *Siphon*. 2.0-2.5 as long as wide 0.5 from base; pecten usually with 15 (11-19) spines, evenly spaced, each spine usually with a single well developed ventral denticle, sometimes with 1-2 small basal ventral or dorsal denticles; seta 1-S double, inserted beyond apical pecten spine and in line with pecten spines.

TYPE DATA. *Aedes (Stegomyia) corneti* Huang, holotype male (SAMP Acc. 1093, SL 197-11), with associated larval and pupal skins on slide, with genitalia on slide (84/423), in U.S. National Museum, Washington, D.C. [USNM]; type locality: Tiwai Island (7°30' N, 11°20' W) (on the Moa River), Potoru, *Southern Province*, SIERRA LEONE, 8-VI-1984 (Y. M. Huang). Allotype female (SAMP Acc. 1093, SL 197-17), with associated larval and pupal skins on slide, same data as holotype [USNM]. Paratypes: 5 males, 1 female and 1, 4th instar larva as follows, (SAMP Acc. 1093): 5 males (SL 197-14-16, 18, 20) with associated larval and pupal skins on slides, with genitalia on slides (84/424-84/428)

and 1 female (SL 197-21) with associated larval and pupal skins on slides, with genitalia on slide (86/138), same data as holotype [USNM]; 1, 4th instar larva (SL 197), same data as holotype [USNM].

OTHER MATERIAL EXAMINED. CAMEROON. *East Cameroon*: Obala (4°10' N, 11°32' E), 14-VIII-1964, A. Rickenbach, 1 M, 1 M gen (MEP Acc. 724, 82/100) [ORSTOM].

IVORY COAST. *Sud, Departement du*: Abidjan, Foret du Banco (5°25' N, 4°03' W), P. Cachan, (MEP Acc. 723), 3 M (#86003, #86008, #86009), 3 F (#85014, #86007, #134014), 3 M gen (82/98, 82/99, 84/297) [PIP]; same data, (MEP Acc. 724), 15 M (#2272, #8038, #62079, #64091, #64093, #80036, #80042, #80045, #83013, #84028, #84029, #85013, #92026, #130019, #141007), 6 F (#62097, #80034, #80043, #82017, #83010, #84032), 15 M gen (82/120-82/123, 82/125-82/128, 82/141, 82/142, 84/301-84/303, 84/305, 84/309), 2 F gen (84/299, 84/300) [ORSTOM]; Cercle de Sassandra, Saoua (6°19' N, 5°10' W), 13-IV-1962, J. Hamon, 2 M (MEP Acc. 724, #620413C, #620413D), 2 M gen (84/321, 84/322) [ORSTOM]; same data except 24-IV-1962, tree hole, 1 F (MEP Acc. 724, #620413A) [ORSTOM].

SIERRA LEONE. *Southern Province*: Mabang (8°21' N, 11°51' W), 1926, R.M. Gordon, 1 M (MEP Acc. 719, #548), tree hole, 1 M gen (82/83) [BMNH].

DISTRIBUTION (Map 3). This species is known from Cameroon, the Ivory Coast and Sierra Leone.

TAXONOMIC DISCUSSION. *Aedes corneti* differs from congeners of the *africanus* group by: (1) scutum without a distinct median longitudinal yellow line of narrow scales; (2) posterior dorsocentral yellow or white line of narrow scales not developed; (3) prescutellar line of narrow yellow scales not present; (4) terga II-VIII (II-VII in male) each with basolateral white spots only; (5) hindfemur with at most 2 large white patches on anterior surface (on median and apical areas); (6) hindtibia with a white longitudinal stripe on ventral surface in basal 0.20-0.25; and (7) hindtarsomere 4 with basal 0.30-0.50 white.

The adult male and female of *Ae. corneti* are very similar to those of *Ae. africanus* with which it has been misidentified. In addition, *Ae. corneti* has been found in association with *africanus* in a forest in the Ivory Coast and in Sierra Leone. *Aedes corneti* can be distinguished from *africanus*, however, by the hindfemur, which has at most 2 large white patches on the anterior median and apical areas. In *africanus*, the hindfemur has 3 large white patches on the anterior basal, median and apical areas.

The adult of *Ae. corneti* is also very similar to that of *Ae. neoafricanus* in having the scutum without a distinct median longitudinal yellow line of narrow scales, the posterior dorsocentral yellow or white line of narrow scales not developed, and the prescutellar line of narrow yellow scales not present. However, *Ae. corneti* can be separated from *neoafricanus* by the diagnostic characters mentioned under the discussion of *neoafricanus*.

The male genitalia of *Ae. corneti* are differentiated from all other species of the *africanus* group by the claspette, which has the distal expanded portion subtriangular in dorsal aspect (narrows towards the apicomeral angle, becomes broader apicolaterally, with apicolateral corner rounded), with numerous simple setae on the expanded distal portion and bearing 1 somewhat stronger, spine-like seta on the apicomeral angle.

The larva of *Ae. corneti* is extremely similar to *africanus* with similar comb scales and pecten spines, but can be distinguished from *africanus* by the diagnostic character mentioned under the discussion of *africanus*. The pupa of *Ae. corneti* is also extremely similar to that of *africanus*, but differs from that of *africanus* by the diagnostic character mentioned under the discussion of *africanus*.

Aedes corneti is most closely related and similar to *Ae. africanus*, and I consider *Ae. corneti* to be a sister species of *Ae. africanus*. *Aedes corneti* is apparently a lowland forest species that occurs in habitats at altitudes of <166 m (<500 ft) and yearly rainfall of 101.6-330.2 cm (40-130 in).

BIONOMICS. Larvae of *Ae. corneti* were collected from a cut bamboo, about 0.33 m above the ground, partially shaded, in the forest, on Tiwai Island, and from tree holes, in Mabang, Sierra Leone. In the Ivory Coast, the immature stages of *Ae. corneti* were collected in bamboo pots that were placed in forest (Foret du Banco), Abidjan, and in tree holes in Saoua, Cercle de Sassandra. Preferred ovipositional sites for *Ae. corneti* were tree holes, bamboo pots and cut bamboo.

Aedes corneti has been collected with *Culex albiventris* Edwards and *Eretmapodites oedipodius* Graham from Tiwai Island, Sierra Leone; it has also been found with *Ae. africanus* from forest (Foret du Banco), Abidjan, Ivory Coast and in the forest, on Tiwai Island, Sierra Leone.

MEDICAL IMPORTANCE. Unknown.

Aedes (Stegomyia) luteocephalus (Newstead)
(Figs. 1D; 8A, B; 15; 16; 17)

Stegomyia luteocephala Newstead 1907. In Newstead, Dutton and Todd 1907: 15 (F*); Edwards 1912: 10 (F).

Kingia luteocephala Theobald 1910: 136 (F*).

Aedes (Stegomyia) luteocephalus (Newstead), Edwards 1941: 151 (M*, F*), 391 (P); Hopkins 1952: 157 (L*); Mattingly 1952: 241 (taxonomy), 245 (key to adults), 253, 254, 286 and 1953: 53 (distribution); Ribeiro and Ramos 1973: 122 (distribution and bionomics); Huang and Ward 1982: 147 (M*, F*, key to adults); Jupp and McIntosh 1988: 150 (bionomics).

FEMALE. *Head.* Proboscis shorter than forefemur; maxillary palpus 0.26-0.31 length of proboscis; antenna with some dark scales on flagellomere 1; occiput with some erect forked scales; vertex with broad dark scales and some long yellow forked scales on anterior area, and with a large median patch of broad yellow scales, with broad dark scales on each side interrupted by lateral stripe of broad yellow scales, followed ventrally by a patch of broad yellow scales. *Thorax* (Fig. 1D). Scutum with narrow dark scales, and a distinct median stripe of broad white scales on anterior promontory, followed by a distinct median longitudinal stripe of narrow yellow scales, reaching to the prescutellar area; a large broad patch of broad white scales on fossal area, a patch of broad white scales on lateral margin just in front of wing root, followed mesally by a patch of narrow yellow scales; posterior dorsocentral yellow line of narrow scales present, reaching to posterior 0.17 of scutum; prescutellar line well developed, with all narrow yellow scales; scutellum with broad white scales on all lobes and with a few broad

dark scales at apex of midlobe; postpronotum with a large patch of broad white scales. *Wing*. Cell R_2 2.1-2.8 length of R_{2+3} . *Halter*. With dark scales. *Legs* (Fig. 8B). Forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in apical 0.22-0.54; hindfemur anteriorly with a large pale band at base (in basal 0.16-0.23) and with 2 large, white patches on median and apical areas; fore- and midtibiae anteriorly dark; hindtibia anteriorly dark, with a white longitudinal stripe on ventral surface in basal 0.07-0.25; fore- and midtarsomeres 1,2 with a basal white band; hindtarsomeres 1-3 with a basal white band, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.22-0.29, 0.13-0.23 and 0.73-0.84; hindtarsomere 4 all dark; fore-, mid- and hindlegs with tarsal claws equal, all toothed. *Abdomen*. Tergum I with or without a median pale spot; terga II-VIII with basolateral white spots; terga II-VII with a basal pale band which does not connect with the basolateral white spots; sterna III-VII with a basal white band. *Genitalia* (Fig. 15). Insula longer than wide, with minute setae and with 2-6 larger setae on apical 0.50; tergum IX broader than long, apical margin of tergum IX with well developed lateral lobes, each with 2-8 setae; apical margin of postgenital plate usually with a shallow median notch, or sometimes without a median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head*. Maxillary palpus longer than proboscis, predominantly dark, with a white band at base of palpomeres 2-5, or 3-5, that on palpomere 5 dorsally incomplete. *Wing*. Cell R_2 1.7-2.5 length of vein R_{2+3} . *Legs* (Fig. 8A). Hindtarsomeres 1-3 with a basal white band, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.21-0.30, 0.16-0.23 and 0.46-0.64; fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple. *Genitalia* (Fig. 16C). Gonocoxite 1.8-2.2 as long as wide; claspette large, lobed, oval in dorsal aspect, with numerous simple setae on apicolateral portion, with some rather short, simple setae on apicomesal portion and bearing no stronger, spine-like seta on apicomesal corner of expanded distal lobe; gonostylus simple, elongate, about 0.6 length of gonocoxite, with a long slender claw process at apex and with a few setae in apical 0.25; apical margin of tergum IX concave medially with 6-8 setae on lateral lobe.

PUPA (Figs. 16A, B). *Cephalothorax*. Trumpet about 3.0 as long as wide; 2-CT single; 4,7-CT usually double (1-2); 5-CT usually with 3 branches (3-4); 6-CT single, stout, slightly longer than 7-CT; 8-CT usually double (2-4); 10-CT usually double (1-3), caudomesad of 11-CT; 12-CT usually single (1-2). *Abdomen*. Seta 1-I well developed, with more than 10 dendritic branches; 3-I single, long; seta 1-II usually double (2-3); 3-II,III single; 1-III usually double (1-2); 1-IV usually double (1-2); 5-IV-VI single, short, not reaching beyond posterior margin of following segment; seta 9-I-II small, single, simple; 9-III-VI well developed, longer than 9-II, single, simple; 9-VI usually single (1-2), much longer and stouter than 9-II; 9-VII usually with 3 branches (1-3), barbed; 9-VII,VIII much longer and stouter than 9-I-VI; 9-VIII usually with 6 branches (4-6), barbed. *Paddle*. Oval, about 1.3 as long as wide; apex rounded; seta 1-P single.

LARVA (Fig. 17). *Head*. Seta 4-C well developed, usually with 5 branches (4-6), cephalomesad of 6-C; 5-C single, long; 6-C single; 7-C usually double (2-3); 11-C usually with 3 branches (2-3), barbed; 12-C usually with 3 branches (2-3); 14-C usually with 4 branches (4-5); 15-C usually double (2-3); mentum usually with 10 (10-11) teeth on each side of central tooth. *Thorax*. Seta

1-P usually with 3 branches (3-4), barbed; 3-P usually double (2-3); 4-P usually with 6 branches (6-7); 5-P usually with 4 branches (3-4), barbed; 7-P with 3 branches, barbed; 9-P usually with 3 branches (2-3); 11-P single; 14-P usually with 7 branches (6-7); 6-M with 2 branches, barbed; 8-M usually with 5 branches (5-7), barbed; 7-T usually with 5 branches (3-6), barbed; 9-T with 3 branches, barbed. *Abdomen*. Seta 6-I usually with 4 branches (2-4), barbed; 7-I usually double (1-2), barbed; 6-II usually double (1-2), barbed; 6-III-VI double, barbed; sometimes 6-V single, barbed; 7-II usually double (2-3), barbed; 1-VII usually double (2-3); 2-VII usually with 3 branches (3-5); 1-VIII usually with 5 branches (4-5), barbed; 3-VIII usually with 3 branches (3-4), barbed; 5-VIII usually with 4 branches (4-5), barbed; comb usually with 10 (8-10) scales in a row, each scale less spatulate, slightly narrower towards apex, apex rounded and with a short fringe around the scale; seta 1-X usually with 3 branches (2-3), barbed; 2-X double; 3-X single; 4a,b-X single or double, 4c,d-X with 2-3 branches; anal papillae unequal, dorsal pair slightly longer than ventral pair, about 2.0-2.4 length of saddle, sausage-like. *Siphon*. 2.1 as long as wide 0.5 from base; pecten usually with 15 (13-19) spines, evenly spaced, each spine usually with 2 ventral denticles, and with 1-2 small dorsal denticles; seta 1-S single, barbed, inserted beyond apical pecten spine and in line with pecten spines.

TYPE DATA. *Stegomyia luteocephalus* Newstead, Syntype female (*Stegomyia luteocephalus* Newst., Congo, caught in house 9 Am, Kassango, Dec. 04.), (most of the scales on the scutum were rubbed off), in British Museum (Natural History), London [BMNH]; type locality: Kasongo (4°27' S, 26°39' E), *Maniema*, ZAIRE (Belgian Congo), XII-1904. I hereby designate this female as the lectotype. Syntype female *Kingia luteocephalus* Newst., Congo, caught in house, Kasongo, Dec. 19, 04., (the abdomen and legs are missing), in the BMNH.

OTHER MATERIAL EXAMINED. BURKINA FASO. *Hauts-Bassins, Departement des*: Tiera (11°46' N, 2°13' W), 24-VII-1953, 1 M, 1 M gen (MEP Acc. 724, 89/187) [ORSTOM]; Cassou (11°35' N, 2°03' W), 18-IX-1953, 1 M (MEP Acc. 724) [ORSTOM]. *Volta-Noire, Department de la*: Banfora (10°38' N, 4°46' W), 10-VII-1953, 1 M, 1 M gen (MEP Acc. 724, 89/188) [ORSTOM]; Cercle Bobo-Dioulasso, Samandeni (11°28' N, 4°28' W), J. Hamon, 4 M (#59070101, #59070102, #59070104, #59070105), 2 M gen (MEP Acc. 724, 89/189, 89/190) [ORSTOM]; Foret de Nasso (11°13' N, 4°26' W), Cercle Bobo-Dioulasso, 4-5-VII-1960, J. Hamon, tree holes, 2 M (MEP Acc. 724) [ORSTOM]; same data except 11-VII-1963, J. Hamon, 1 F (MEP Acc. 724) [ORSTOM]; same data except 26-X-1967, J. Hamon, 1 F (MEP Acc. 724) [ORSTOM]; same data except 18-22-XII-1967, G. Pichon, 5 M, 2 F (MEP Acc. 724) [ORSTOM]; same data except 16-I-1968, G. Pichon, 1 M (MEP Acc. 724) [ORSTOM]; same data except 29-XI-1969, bamboo, 1 M (MEP Acc. 724) [ORSTOM]; same data except date unspecified, bamboo, 1 M, 1 M gen (MEP Acc. 724, 89/194) [ORSTOM]; Bobo, Cercle Bobo-Dioulasso (11°12' N, 4°17' W), IX-1960, J. Hamon, 3 M (Lot B), 3 M (Lot C), 1 M (Lot D), 2 F (Lot D), 3 M gen (MEP Acc. 724, Lot B, 89/191, Lot C, 89/192, Lot D, 89/193) [ORSTOM]; Dinderesso (11°14' N, 4°22' W), IX-1981, J.P. Hervy, 1 M, 1 M gen (MEP Acc. 926, 89/195) [ORSTOM]; Foret du Kou (11°11' N, 4°27' W), IX-1981, J.P. Hervy, 1 M, 1 M gen (MEP Acc. 926, 89/196) [ORSTOM]; Soumoussou (11°01' N, 4°03' W), X-1981, J.P. Hervy, 1 M, 1 M gen (MEP Acc. 926, 89/197) [ORSTOM]. Upper Volta, 1981, J.P. Hervy, 1 M, 1 M gen (MEP Acc. 926, 89/198) [ORSTOM].

CENTRAL AFRICAN REPUBLIC. *Ndele*: Bangoran (8°05' N, 20°21' E), 24-IX-1975, J.P. Herve, 1 F (MEP Acc. 736) [ORSTOM]. *Ombella-Mpoko*: Bozo (5°10' N, 18°30' E), 1-20-XI-1975, J.P. Herve, 2 F (MEP Acc. 736) [ORSTOM].

ETHIOPIA. Ethiopia, (*Kefa*: Manera area: 7°40' N, 36°50' E), date unspecified, P. Neri, No. 21, 1 F (MEP Acc. 1036) [DVBD].

GHANA. Accra (5°33' N, 0°13' W), V-1919, Dr. J.W. Scott Macfie, tree hole, 2 M, 1 M gen (MEP Acc. 719, 89/204) [BMNH]. Saltpond (5°12' N, 1°05' W), VI-1919, Dr. M.N. Jrasset, 2 M, 1 F (MEP Acc. 719) [BMNH]. Aburi (5°51' N, 0°10' W), 6-VI-1920, Dr. A. Ingram, bamboo stems, 1 M, 1 M gen (MEP Acc. 719, 89/205) [BMNH].

GUINEA. *Mali*: Holo (12°01' N, 12°22' W), 2-5-XI-1981, M. Germain, 3 F (MEP Acc. 926) [ORSTOM].

IVORY COAST. *Est, Departement de l'*: Tehini, Bouna (9°00' N, 3°30' W), 17-VII-1957, 1 M, 1 M gen (MEP Acc. 724, 89/186) [ORSTOM]. *Centre, Departement du*: M'Bahiakro, Dezidougou (7°44' N, 4°16' W), 20-V-1985, B. Bouchite, (SAMP Acc. 1138), sweeping, 2 F (IV 166), biting/landing on man at ORSTOM study tower, 1 F (IV 166) [USNM]; Km 2, 23-V-1985, B. Bouchite, biting on man at ORSTOM study tower, 12 m above ground, 1830-2000 h, 1 F (IV179-2), progeny rearing at SAMP: 3 F, 3 individual rearings (1 l, 3 p) (SAMP Acc. 1138, IV 179(2)-10, 100, 101) [USNM]; Kofidougou (7°45' N, 4°19' W), 26-V-1985, Huang & Pecor, (SAMP Acc. 1138), plastic bottle placed on ORSTOM study tower, 9 m above ground, 8 M, 2 F, 10 individual rearings (6 l, 10 p), 3 L (IV 165-103, 104, 106, 107, 10-13, 17, 19) [USNM]; same data except 23-V-1985, B. Bouchite, (SAMP Acc. 1138), biting/landing on man, 8 F (IV 173) [USNM]; same data, biting on man at ORSTOM study tower, 20 m above ground, 1830-2000 h, 1 F (IV 178-4), progeny rearing at SAMP: 1 F, 1 individual rearing (1 l, 1 p) (SAMP Acc. 1138, IV 178(4)-10) [USNM]; same data except 28-V-1985, Petice, biting on man, 1730-1930 h, 2 F (IV 230-1, 2), progeny rearing at SAMP: 2 F, 2 individual rearings (2 l, 2 p) (SAMP Acc. 1138, IV 230(1)-10, 11), 1 M, 1 individual rearing (1 l, 1 p), 1 M gen (SAMP Acc. 1138, IV 230(2)-10, 89/185) [USNM]; same data except 13-14-VI-1985, B. Bouchite, (SAMP Acc. 1138), biting/landing on man, 2 F (IV 381, IV 386) [USNM]; Dabakala, Sokala-Sobara (8°27' N, 4°31' W), 24-V-1985, B. Bouchite, (SAMP Acc. 1138), biting/landing on man, 1830-2000 h, 2 F (IV 184) [USNM]; Km 9,24-V-1985, B. Bouchite, (SAMP Acc. 1138), biting/landing on man, 2 F (IV 185) [USNM]; same data, biting on man, 1830-2000 h, 1 F (IV 181-3), progeny rearing at SAMP: 2 M, 3 F, 5 individual rearings (3 l, 5 p) (SAMP Acc. 1138, IV 181(3)-100, 101, 10-12) [USNM]; Dabakala (8°27' N, 4°28' W), Km 35, 26-V-1985, B. Bouchite, biting on man, 1830-2000 h, 1 F (IV 218-1), progeny rearing at SAMP: 3 M, 2 F, 5 individual rearings (3 l, 5 p) (SAMP Acc. 1138, IV 218(1)-100, 101, 10-12) [USNM].

NIGERIA. *Lagos*: Lagos (6°20' N, 3°20' E), 8-IX-1928, Mrs. S.L.M. Connal, 1 M, 1 M gen (MEP Acc. 726, 89/217) [LSHTM]; Yaba (6°24' N, 3°20' E), III-1928, V. Wigglesworth, rot hole, 1 M, 1 M gen (MEP Acc. 719, 89/211) [BMNH]; same data except date unspecified, 5 M, 1 F, 2 M gen (MEP Acc. 719, 89/212, 89/220) [BMNH]; same data, rot holes, 9 M, 3 F, 3 M gen (MEP Acc. 726, 82/148, 89/215, 89/216) [LSHTM]. *North-Eastern*: Gadau (11°50' N, 10°12' E), 12-IX-1931, A.W. Taylor, tree hole, 1 M, 1 M gen (MEP Acc. 719, 89/210) [BMNH]. *Western*: Ibadan (7°23' N, 3°50' E), 24-25-VII-1929, tree holes, 1 M

(#8), 1 F (#11), 1 M gen (MEP Acc. 726, 89/214) [LSHTM]. Nigeria, 1929, A. Kumm, 3 M, 1 F, 1 M gen (MEP Acc. 726, 89/213) [LSHTM].

SENEGAL. *Senegal Oriental*: Kedougou (12°33' N, 12°11' W), 13-IV-1979, M. Germain, 1 M, 1 M gen (MEP Acc. 926, 89/199) [ORSTOM]; same data except XI-1980, T.H.G. Aitken, 14 M, 14 F, 1 M gen (MEP Acc. 844, 89/200) [USNM]; same data except 1981, M. Cornet, (MEP Acc. 890, from eggs), 53 M, 45 F, 19 I, 19 p, 18 M gen (#1-90, 82/14; #1-98, 82/42; #1-70, 82/45; #1-92, 82/46; #1-95, 82/47; #1-89, 89/153; #1-93, 89/154; #1-94, 89/155; #1-97, 89/156; #2-11, 82/43; #2-12, 82/44; #1A-41, 82/20; #1A-43, 82/21; #1A-44, 82/22; #1B-11, 82/23; #1B-13, 82/24; #1B-20, 82/25; #1B-26, 82/26) [USNM]; same data except 1982, M. Cornet, (MEP Acc. 969, from eggs), 66 M, 55 F (SG 4-SG 19) [USNM]; same data except 1982, J.P. Hervy, 13 M, 22 F (F No. 1, SAMP Acc. 1083) [ORSTOM]; same data, J.P. Hervy, 30 M, 19 F (F No. 5, SAMP Acc. 1083) [ORSTOM]; same data, J.P. Hervy, 18 M, 23 F, 1 M gen, 2 F gen (F No. 6, SAMP Acc. 1083, 89/161-89/163) [ORSTOM]; same data, J.P. Hervy, 15 M, 12 F, 2 M gen, 3 F gen (F No. 8, SAMP Acc. 1083, 89/164-89/168) [ORSTOM].

SIERRA LEONE. *Western Area*: Freetown (8°30' N, 13°10' W), IX-1914, A. Bacot, cotton tree, 1 M (MEP Acc. 719) [BMNH]; same data except 1915, A. Bacot, 2 M (MEP Acc. 719) [BMNH]; same data except V-1926, Major A.D. Fraser, 1 M, 1 F (MEP Acc. 719) [BMNH]; Aberdeen (8°30' N, 13°18' W), VII-1928, V. Wigglesworth, rot-holes in cotton tree, 5 M, 1 F, 1 M gen (MEP Acc. 726, 89/218) [LSHTM]. *Southern Province*: Njala University College (8°07' N, 12°05' W), 28-V-1984, Huang & Pecor, (SAMP Acc. 1093), rot hole, 1 M (#149-13) [USNM]; same data except 31-V-16-VI-1984, Huang & Pecor, (SAMP Acc. 1093), tree holes (#183, #184, #186, #187, #188, #206), 62 M, 56 F, 12 M gen (89/169-89/174, 89/177-89/179, 89/182-89/184), 4 F gen (89/175, 89/176, 89/180, 89/181) [USNM]; same data except 5-VI-1984, Huang & Pecor, (SAMP Acc. 1093), tree fork, 1 M (#190-31) [USNM]. Location and date unspecified, A.W. Bacot, 4 M (MEP Acc. 726) [LSHTM].

SUDAN. *Upper Nile Province*: Bor (6°12' N, 31°33' E), 12-VI-1909, (Bred from hole in tree, Bor/Recd from F.V. Theobald, 1910-396), 1 M, 1 M gen (MEP Acc. 719, 89/206) [BMNH]. *Equatoria Province*: Juba (4°51' N, 31°37' E), 9-X-1937, (Sudan Govt., San Inspector, Ref. 50/37/B.M. 1950-23), 1 M, 1 F, 1 M gen (MEP Acc. 719, 89/207) [BMNH]; same data except 5-30-IX-1940, (Sudan Govt., P.H. Inspector/B.M. 1950-23.), 2 M (MEP Acc. 719) [BMNH].

TANZANIA. *Mwanza Region*: Mwanza (2°32' S, 32°53' E), 11-III-1946, F.C. Hancock, tree hole, 1 M, 1 F, 1 M gen (MEP Acc. 848, 89/201) [USNM]; same data except 12-I-1946, F.C. Hancock, 1 M (MEP Acc. 1036) [DVBD]; same data except 11-III-1946, F.C. Hancock, 3 M, 1 F, 3 M gen (Mep Acc. 1036, 89/202, 89/203, 89/219) [DVBD]. *Morogoro Region*: Ifakara (8°08' S, 36°41' E), 1-IV-1963, 1 F (MEP Acc. 1036) [DVBD].

ZAMBIA. Balovale (13°34' S, 23°07' E), 1945, G.G. Robinson, (B.M. 1947-135), 1 M, 1 M gen (MEP Acc. 719, 89/208) [BMNH].

ZIMBABWE. Victoria Falls (17°52' S, 25°51' E), III-1949, C.V. Meeser, 1 M, 1 M gen (MEP Acc. 719, 89/209) [BMNH].

DISTRIBUTION (Map 4). This species is known from Burkina Faso, Central African Republic, Ethiopia, Ghana, Guinea, Ivory Coast, Nigeria, Senegal, Sierra Leone, Sudan, Tanzania, Zaire, Zambia and Zimbabwe. Ribeiro and Ramos (1973: 122) recorded *Ae. luteocephalus* from Mulondo (15°38' S, 15°12'

E), Angola, but I have not seen these specimens.

TAXONOMIC DISCUSSION. *Aedes luteocephalus* differs from congeners of the *africanus* group by: (1) scutum with a distinct median longitudinal yellow line of narrow scales; (2) scutellum with all broad white scales on lateral lobes; (3) terga II-VI each with a basal pale band and basolateral white spots; (4) hindfemur anteriorly with a large pale band at the base and with 2 large white patches on median and apical areas; (5) hindtibia with a white longitudinal stripe on the ventral surface in basal 0.07-0.25; (6) hindtarsomere 3 with basal 0.46-0.84 white; and (7) hindtarsomere 4 all dark.

The adult male and female of *Ae. luteocephalus* are easily confused with those of *Ae. africanus*. *Aedes luteocephalus* can be distinguished from *africanus* by the hindfemur, which has a large pale band at the base and with 2 large, white patches on the anterior median and apical areas, while *africanus* has 3 large, white patches on the anterior basal, median and apical areas of the hindfemur.

The adult of *Ae. luteocephalus* is also very similar to that of *Ae. ruwenzori*, but can be distinguished from *ruwenzori* by the scutellum with all broad white scales on the lateral lobes, and by the hindfemur with a large pale band at the base and with 2 large, white patches on the anterior median and apical areas. In *ruwenzori*, the scutellum has broad dark scales on the lateral lobes, and the hindfemur has 3 large, white patches on the anterior basal, median and apical areas.

The male genitalia of *Ae. luteocephalus* are similar to those of *Ae. neoafricanus* and *Ae. ruwenzori* in having the claspette with distal expanded portion oval in dorsal aspect, but can be separated from those of *neoafricanus* and *ruwenzori* by the claspette, which has numerous simple setae on apicolateral portion, with some rather short, simple setae on apicomesal portion and bearing no stronger, spine-like setae on the apicomesal corner.

The male genitalia of *Ae. luteocephalus* are also very similar to those of *Ae. africanus* in having the claspette with numerous simple setae on the expanded distal portion and bearing no stronger, spine-like seta on the apicomesal corner, but can be distinguished easily from those of *africanus* by the diagnostic characters given in the key.

The larva of *Ae. luteocephalus* is very similar to that of *africanus*, but can be distinguished from *africanus* by the comb scale, which is less spatulate, slightly narrower towards apex, with apex rounded and with a short fringe around the scale, and by the pecten spine, which usually has 2 ventral denticles, and with 1-2 small dorsal denticles. The pupa of *Ae. luteocephalus* can be distinguished from *africanus* by the well developed seta 9-III-VI, not as small as in *africanus*; seta 9-VI is much longer and stouter than 9-II.

Aedes luteocephalus is a savannah species that occurs in habitats at altitudes between <166 and 1,233 m (<500-3,700 ft) and yearly rainfall of 50.8-406.4 cm (20-160 in).

BIONOMICS. Immature stages of *Ae. luteocephalus* have been collected from the following: tree holes, in Burkina Faso, Ghana, Nigeria, Sierra Leone, Sudan and Tanzania; rot holes, in Nigeria, Sierra Leone; bamboos, in Burkina Faso; bamboo stem, in Ghana; tree fork, in Sierra Leone; plastic bottle placed on ORSTOM study tower, 9 m above ground, in Ivory Coast and artificial containers, in Senegal.

Mattingly (1952: 270) reported "*Aedes luteocephalus*. Preferred. Tree holes (Hopkins 1936, Lewis 1943). Occasional. Cut bamboos, utensils (Hopkins

1936), rock-holes (Hopkins 1936, Abbott 1948)."

Preferred ovipositional sites for *Ae. luteocephalus* studied here were tree holes and rot holes, while bamboos, bamboo stem, tree fork, plastic bottle and artificial containers were less commonly used.

Females of this species have been taken biting man in Dezidougou, Km 2, Kofidougou, Dabakala, Km 9, Km 35, Sokala-Sobara, Ivory Coast; in Kedougou, Senegal and in Nigeria.

Aedes luteocephalus has been found in association with *Ae. africanus* from Foret de Nasso, Burkina Faso; from Mali, Guinea; from Dezidougou, Km 2, Ivory Coast and from Aberdeen, Sierra Leone.

MEDICAL IMPORTANCE. *Aedes luteocephalus* from Yaba, Nigeria is an efficient vector of yellow fever under laboratory conditions, as shown by Bauer (1928). It is recognized as a vector of yellow fever in West and Central Africa. In West and Central Africa, yellow fever virus has been isolated from *Ae. luteocephalus* in Kedougou, Senegal, near Jos, Nigeria and in the Bobo Dioulasso area, in southwestern Burkina Faso [as Upper Volta] (Cornet et al., 1979; Germain et al., 1982). In addition to yellow fever virus, Chikungunya, Zika and dengue 2 viruses have also been isolated from *Ae. luteocephalus* in Senegal (Cornet et al., 1979), and Chikungunya virus has been isolated from *Ae. luteocephalus* in Senegal (Jupp and McIntosh, 1988).

Ribeiro and Ramos (1973: 122) reported that *Ae. luteocephalus* may play a role in the ecology of yellow fever in southern Angola.

Jupp and McIntosh (1988: 150) reported that in the savannah of eastern Senegal, *Ae. luteocephalus* is the predominate species in the mangrove galley forest, where humidity is high and temperature is fairly constant, and it is still abundant in the adjoining drier forest zone but is rare in more distant arid zones. This species has a major role in amplification of Chikungunya virus in the early part of the rainy season, but *Ae. furcifer* (Edwards) assumes this role later on in the season (Cornet et al., 1984).

Germain et al. (1980: 929) reported that in the yellow fever outbreak in Gambia in January 1979, two yellow fever virus strains were isolated from females of *Ae. aegypti* caught in a village of western Gambia, where active human cases were documented. It appears probable that initial transmission was by sylvatic vectors such as the *Ae. furcifer-taylori* group and possible others such as *Ae. luteocephalus*, *Ae. metallicus* (Edwards), and *Ae. vittatus* (Bigot). As the outbreak progressed, interhuman transmission by *Ae. aegypti* also occurred and this mixed epidemiological pattern later gave way to transmission by *Ae. aegypti* only when sylvatic vector populations declined in the dry season.

Aedes (Stegomyia) maxgermaini New Species
(Figs. 5A, B, C; 18)

FEMALE. *Head.* Proboscis shorter than forefemur; maxillary palpus 0.28-0.30 length of proboscis; antenna with some dark scales on flagellomere 1; occiput with few erect forked scales; vertex with a median patch of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax* (Fig. 5A). Scutum with narrow dark scales, and a distinct median stripe of broad white

scales on anterior promontory, a large (narrow and curved) patch of broad white scales on fossal area, a patch of broad white scales on lateral margin just in front of wing root, followed mesally by a patch of narrow yellow scales; a short median stripe of narrow yellow scales in front of prescutellar area; sometimes the median stripe reaching forward to the anterior median white stripe; posterior dorsocentral yellow line of narrow scales present, reaching to posterior 0.17 of scutum; prescutellar line not developed, with only a few narrow yellow scales; or sometimes prescutellar line present, with all narrow yellow scales; scutellum with broad white scales on all lobes and with a large patch of broad dark scales at apex of midlobe; postpronotum with a large patch of broad white scales interrupted by median bare stripe without scales. *Wing*. Cell R_2 2.4-2.9 length of R_{2+3} . *Halter*. With dark and white scales. *Legs* (Figs. 5B, 5C). Forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in apical 0.46-0.57; hindfemur with 3 large, white patches on anterior surface (on basal, median and apical areas); fore- and midtibiae anteriorly dark; hindtibia anteriorly dark, with a white longitudinal stripe on ventral surface in basal 0.24-0.33; fore- and midtarsomeres 1,2 or 1-3 with a basal white band; hindtarsomeres 1-4 with a basal white band, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.24-0.32, 0.17-0.29, 0.82-0.90 and 0.30-0.60; tarsal claws equal and toothed on all legs. *Abdomen*. Terga II-VIII with basolateral white spots; tergum II with or without a basal pale band, incomplete at middle; terga III-VI with a basal pale band, incomplete at middle which does not connect with the basolateral white spots; sterna III-VII with a basal white band. *Genitalia* (Fig. 18). Insula longer than wide, with minute setae and with 3-5 larger setae on apical 0.40; tergum IX broader than long, apical margin of tergum IX with well developed lateral lobes, each with 3-8 setae; apical margin of postgenital plate with a deep median notch.

MALE, PUPA and LARVA. Unknown.

TYPE DATA. Holotype female (MEP Acc. 1016/ Cameroon 1983, #150, Y.M. Huang), Foto ($5^{\circ}31' N$, $9^{\circ}55' E$), Mamfe, West Cameroon, CAMEROON, taken biting man between 1600 and 1700 h, about 1500 m, in *Raphia* palm forest-gallery, 6-IV-1983 (Huang, Adam & Berl). Deposited in the U. S. National Museum, Washington, D. C. [USNM]. Paratypes: 11 females (MEP Acc. 1016, #150), 2 females with genitalia on slides (MEP Acc. 1016, 89/40, 89/41), same data as holotype. Deposited in USNM.

OTHER MATERIAL EXAMINED. CAMEROON. *East Cameroon*: Bamileke: Dschang ($5^{\circ}27' N$, $10^{\circ}04' E$), 7-III-1975, Eouzan, 65 F, 5 F gen (MEP Acc. 926, 89/9-89/12, 90/47) [ORSTOM]; Bafou ($5^{\circ}28' N$, $10^{\circ}25' E$), 2-IV-1983, Huang, Adam & Berl, 1520 m, 1 F (MEP Acc. 1016, #136-2), 1 F gen (MEP Acc. 1016, #136-2, 83/344) [USNM]. *West Cameroon*: Bamenda: Safari Lodge Bali ($5^{\circ}50' N$, $10^{\circ}01' E$), 3-IV-1983, Huang, Adam & Berl, 1350 m, 1 F (MEP Acc. 1016, #139) [USNM]; Nkwen Road ($5^{\circ}58' N$, $10^{\circ}10' E$), 6-IV-1983, Huang, Adam & Berl, 1230 m, 16 F (MEP Acc. 1016, #147), 5 F gen (MEP Acc. 1016, #147, 89/42, 89/43, 90/44-90/46) [USNM]. Mamfe: Foto ($5^{\circ}31' N$, $9^{\circ}55' E$), 6-IV-1983, Huang, Adam & Berl, 1500 m, 13 F (MEP Acc. 1016, #149, #151), 4 F gen (MEP Acc. 1016, #149, 89/257, #151, 89/258-89/260) [USNM].

DISTRIBUTION (Map 5). This species is known only from Cameroon.

ETYMOLOGY. This species is named to honor Dr. Max Germain, Medical Entomologist, Services Scientifiques Centraux de l'O.R.S.T.O.M. (ORSTOM), and formerly Chief, Department of Medical Entomology,

ORSTOM, Bondy, France, in recognition and appreciation of his contributions to our knowledge of the mosquito fauna of Africa.

TAXONOMIC DISCUSSION. *Aedes maxgermaini* has the posterior dorsocentral yellow line of narrow scales present, fossal white patch rather narrow at base along the scutal margin, scutellum with broad white scales on all lobes and with a large patch of broad dark scales at apex of midlobe, and hindfemur with 3 large, white patches on the anterior surface (on basal, median and apical areas), and can thus be distinguished easily from all other species of the *africanus* group except *Ae. pseudoafricanus*. The adult female of *Ae. maxgermaini* is extremely similar to that of *pseudoafricanus*, but differs by: (1) anterior median white stripe rather short and broad, about 2 times as long as wide; (2) fossal white patch narrow and curved; and (3) hindleg with tarsal claws equal and toothed. In *pseudoafricanus*, the anterior median white stripe is rather long, 2.5-3.0 times as long as wide, the fossal white patch is narrow and wedge-shaped, and the hind-tarsal claws are equal and simple.

The adult female of *Ae. maxgermaini* is also extremely similar to that of *Ae. africanus* with which it has been misidentified. *Aedes maxgermaini* can be distinguished from *africanus*, however, by the posterior dorsocentral yellow line of narrow scales present, and by the terga III-VI each with a basal pale band, incomplete at middle. In *africanus*, the posterior dorsocentral yellow line of narrow scales is absent, and terga II-VI are all dark dorsally, or sometimes terga IV-VI, or V,VI each with a basal pale band, incomplete at middle.

BIONOMICS. Immature stages of *Ae. maxgermaini* have not been found in the field. Females of this species have been taken biting man in the *Raphia* palm forest galleries, at ground level: between 0900-1000 h, at 1,230 m, in Bamanda; between 1230-1300 h, at 1,350 m, in Bali; at about 1500 h, at 1,520 m, in Bafou and between 1500-1800 h, at 1,500 m, in Foto, Cameroon. *Aedes maxgermaini* has been found in association with *Ae. africanus* in the *Raphia* palm forest gallery in Dschang, Bamanda, Bali, Cameroon.

According to Dr. M. Germain, "the species from Cameroon can be caught in large number in the *Raphia* palm-tree galleries bordering the streams in the mountains surrounding Bamenda, in the southwest of Cameroon." I made similar observations during field studies in Cameroon in 1983.

MEDICAL IMPORTANCE. Unknown.

Aedes (Stegomyia) neoafricanus Cornet, Valade and Dieng
(Figs. 3D, E, F; 4B, C; 19; 20A; 21)

Aedes (Stegomyia) neoafricanus Cornet, Valade and Dieng 1978: 228 (M*, F*);
Huang and Ward 1982: 147 (M*, F*, key to adults).

FEMALE. Head. Proboscis slightly shorter than forefemur; maxillary palpus 0.26-0.31 length of proboscis; antenna with some dark scales on flagellomere 1; occiput with few erect forked scales; vertex with a median patch of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax* (Fig. 3D). Scutum with narrow dark scales, and a distinct median stripe of broad white scales on anterior promontory, a large patch of broad white scales on fossal

area, a patch of broad white scales on lateral margin just in front of wing root, followed mesally by a patch of narrow yellow scales; a short median stripe of narrow yellow scales in front of the prescutellar area; posterior dorsocentral yellow line of narrow scales not developed; prescutellar line of narrow yellow scales not present; scutellum with broad white scales on all lobes and with a few broad dark scales at apex of midlobe; postpronotum with a large patch of broad white scales. *Wing*. Cell R_2 2.4-2.7 length of R_{2+3} . *Halter*. With dark and white scales. *Legs* (Figs. 3E, 4B). Forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in apical 0.41-0.60; hindfemur with 3 large, white patches on anterior surface (on basal, median and apical areas), the basal white patch usually much reduced, or sometimes absent; fore- and midtibiae anteriorly dark; hindtibia anteriorly dark, without a white stripe on ventral surface in basal area, or with a very short white stripe on ventral surface in basal 0.08 or less; fore- and midtarsomeres 1,2 with a basal white band; hindtarsomeres 1-4 with a basal white band, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.23-0.29, 0.18-0.32, 0.80-0.96 and 0.17-0.47; fore- and midlegs with tarsal claws equal, all toothed; hindleg with tarsal claws equal, both simple. *Abdomen*. Tergum I with or without a median pale spot; terga II-VIII with basolateral white spots; tergum II with or without a basal pale band; terga III-VI with a basal pale band which does not connect with the basolateral white spots; sterna III-VII with a basal white band. *Genitalia* (Fig. 19). Insula longer than wide, with minute setae and with 3 (2-4) larger setae on apical 0.33; tergum IX broader than long, apical margin of tergum IX with well developed lateral lobes, each with 1-4 setae; apical margin of postgenital plate with a deep median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head*. Maxillary palpus longer than proboscis, predominantly dark, with a white band at base of palpomeres 2-5, those on palpomeres 4,5 dorsally incomplete. *Wing*. Cell R_2 2.2-2.5 length of vein R_{2+3} . *Legs* (Figs. 3F, 4C). Foretarsomere 2 usually without a basal white band; hindtarsomeres 1-4 with a basal white band, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.22-0.26, 0.16-0.27, 0.86-0.92 and 0.14-0.40; fore- and midlegs with tarsal claws unequal, all simple. *Abdomen*. Terga IV-VI with a basal pale band. *Genitalia* (Fig. 20A). Gonocoxite 1.6 as long as wide; claspette large, lobed, distal expanded portion oval in dorsal aspect (narrows towards apicomeral corner and apicolateral corner), with numerous simple setae on the expanded distal portion and bearing 2 somewhat stronger, spine-like setae on apicomeral corner; gonostylus simple, elongate, about 0.75 length of gonocoxite, with a short and stout claw process at apex and with a few setae in apical 0.25; apical margin of tergum IX concave medially with 3-5 setae on lateral lobe.

PUPA. Unknown.

LARVA (Fig. 21). *Head*. Seta 4-C well developed, usually with 9 branches (4-9), cephalomesad of 6-C; 5-C single, long; 6-C single; 7-C double; 11-C usually with 3 branches (2-3), barbed; 12,14-C usually with 3 branches (2-4); 15-C usually with 3 branches (3-4); mentum usually with 10 (9-10) teeth on each side of central tooth. *Thorax*. Seta 1-P usually with 3 branches (3-4), barbed; 3,9-P double; 4-P usually with 3 branches (3-4); 5-P usually with 3 branches (3-4), barbed; 7-P with 3 branches, barbed; 11-P usually double (1-2); 14-P usually with 3 branches (2-4); 6-M usually with 3 branches (3-4), barbed; 8-M usually with 6 branches (4-6), barbed; 7-T usually with 7 branches (5-8), barbed; 9-T with 3

branches, barbed. *Abdomen*. Seta 6-I with 3 branches, barbed; 7-I-II double, barbed; 6-II-VI double, barbed; 1-VII double; 2-VII usually single (1-2); 1-VIII usually with 4 branches (4-5), barbed; 3-VIII usually with 6 branches (4-7), barbed; 5-VIII usually with 3 branches (3-4), barbed; comb usually with 8 (6-8) scales in a row, each scale with free portion widened at base and sharp pointed at apex, and with a short fringe around the scale; seta 1-X usually double (2-3), barbed; 2-X with 3 branches; 3-X single; 4a,b-X double, 4c,d-X with 2-3 branches; anal papillae subequal, about 2.8 length of saddle, sausage-like. *Siphon*. 1.2-1.5 as long as wide 0.5 from base; pecten usually with 8 (7-11) spines, evenly spaced and with the last spine widely spaced, each spine usually with 1-4 ventral denticles, and with 1-3 small basal dorsal denticles; seta 1-S usually with 3 branches (2-3), barbed, inserted beyond apical pecten spine and in line with pecten spines.

TYPE DATA. *Aedes (Stegomyia) neoafricanus* Cornet, Valade and Dieng, holotype male (10 Km N. Kedougou, Galerie, ex F 15, Senegal, X-76, ORSTOM), with genitalia on slide (GA496), in the Services Scientifiques Centraux, Office de la Recherche Scientifique et Technique Outre-Mer, Bondy, France [ORSTOM]; type locality: 10 Km N. Kedougou, Senegal Oriental, SENEGAL, X-1976 (M. Cornet). Paratypes: 6 males (MEP Acc. 724), with genitalia on slides (MEP Acc. 724, GA526-GA530, 82/4), and 4 females (MEP Acc. 724), with genitalia on slides (MEP Acc. 724, 89/28-89/31), with same data as holotype, in the USNM.

OTHER MATERIAL EXAMINED. SENEGAL. *Senegal Oriental*: Kedougou (12°33' N, 12°11' W), Km 10, X-1981, M. Germain, 1 F (MEP Acc. 926) [ORSTOM]; same data except Km 5, XI-1982, J.P. Hervy, 7 M, 2 M gen (MEP Acc. 1083, 84/291, 84/292) [ORSTOM]; same data except Km 10, 11-X-1982, progeny rearing from eggs laid by female No. 35, J.P. Hervy, 7 M, 5 F, 13 I, 3 L, 2 M gen (MEP Acc. 1083, 84/293, 84/294), 2 F gen (MEP Acc. 1083, 84/295, 84/296) [ORSTOM].

DISTRIBUTION (Map 3). This species is known only from Senegal.

TAXONOMIC DISCUSSION. *Aedes neoafricanus* has the scutum without a distinct median longitudinal yellow line of narrow scales, posterior dorso-central yellow or white line of narrow scales not developed and prescutellar line of narrow yellow scales not present, and thus can be distinguished easily from all other species of the *africanus* group except *Ae. africanus* and *Ae. corneti*. However, *Ae. neoafricanus* differs from *africanus* and *corneti* by: (1) hindtibia without a white stripe on ventral surface in basal area, or with a very short white stripe on ventral surface in basal 0.08 or less; (2) male, fore- and midlegs with tarsal claws unequal, all simple; and (3) male and female, hindleg with tarsal claws equal and simple.

The adult male and female of *Ae. neoafricanus* are very similar to those of *Ae. africanus*. In *africanus*, the hindtibia has a white longitudinal stripe on the ventral surface in basal 0.25 (0.20-0.31), the male fore- and midtarsal claws are unequal, the smaller one toothed, the larger one simple, and on the male and female, the hindtarsal claws are equal and toothed.

The adult of *Ae. neoafricanus* is also very similar to *Ae. corneti*. In *corneti*, the hindtibia has a white longitudinal stripe on the ventral surface in basal 0.20-0.25, the male fore- and midtarsal claws are unequal, the smaller one toothed, the larger one simple, and on the male and female, the hindtarsal claws are equal and toothed.

The male genitalia of *Ae. neoafricanus* are extremely similar to those of

Ae. ruwenzori in having the claspette with distal expanded portion oval in dorsal aspect, with numerous simple setae on the expanded distal portion and bearing 2-3 stronger, spine-like setae on the apicomasal corner. However, *Ae. neoaffricanus* can be distinguished from those of *ruwenzori* by the claspette, which has 2 stronger, spine-like setae on the apicomasal corner, and by the gonostylar claw which is short and stout.

The male genitalia of *Ae. neoaffricanus* are also very similar to those of *Ae. luteocephalus* in having the claspette with distal expanded portion oval in dorsal aspect, but can be distinguished easily from those of *luteocephalus* by the claspette, which has numerous simple setae on the expanded distal portion and bears 2 stronger, spine-like setae on the apicomasal corner.

The larva of *Ae. neoaffricanus* is similar to *Ae. africanus* and *Ae. corneti*, but can be distinguished from *africanus* and *corneti* by the comb scale, which has the free portion widened at base and sharply pointed at apex, and with a short fringe around the scale, and by the pecten spine, which usually has 1-4 ventral denticles, and with 1-3 small basal dorsal denticles.

BIONOMICS. The immature stages of *Ae. neoaffricanus* have been collected from tree holes. Females of this species have been taken biting man in gallery forest in Kedougou, Senegal.

MEDICAL IMPORTANCE. Yellow fever virus has been isolated from *Ae. neoaffricanus* in Senegal. Cornet et al. (1978: 227) stated that *Ae. neoaffricanus* may have an accessory part in the transmission of yellow fever virus, as it was the origin of a recent isolation of one strain of this virus. In addition to yellow fever virus, Chikungunya virus has also been isolated from *Ae. neoaffricanus* in Senegal (Jupp and McIntosh, 1988).

Aedes (Stegomyia) opok Corbet and Van Someren
(Figs. 6C; 7A, B; 22; 23A)

Aedes (Stegomyia) opok Corbet and Van Someren 1962: 73 (M*, F); Germain, Cordellier, Herve, Geoffroy, Bouchite, Ravaonjanahary and Rickenbach 1975: 41 (F*; n. distribution); Herve, Germain and Geoffroy 1975: 235 (bionomics); Huang and Ward 1982: 147 (M*, F*, key to adults).

FEMALE. *Head.* Proboscis shorter than forefemur; maxillary palpus 0.28-0.31 length of proboscis; antenna with a few dark scales on flagellomere 1; occiput with few erect forked scales; vertex with a median patch of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax* (Fig. 7A). Scutum with narrow dark scales, and a distinct median stripe of broad white scales on anterior promontory, a large broad patch of broad white scales on fossal area, a patch of broad white scales on lateral margin just in front of wing root, followed mesally by a patch of narrow yellow scales; posterior dorsocentral yellow line of narrow scales present, reaching to posterior 0.33 of scutum; prescutellar line well developed, with narrow yellow scales and with a few broad, flat, metallic silvery white scales posteriorly; scutellum with broad white scales on all lobes and with a few broad dark scales at apex of midlobe; postpronotum with a large patch

of broad white scales. *Wing*. Cell R_2 2.4-3.6 length of R_{2+3} . *Halter*. With dark and white scales. *Legs* (Fig. 6C). Forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in apical 0.36-0.52; hindfemur with 3 large, white patches on anterior surface (on basal, median and apical areas); fore- and midtibiae anteriorly dark; hindtibia anteriorly dark, with a white longitudinal stripe on ventral surface in basal 0.17 (0.10-0.23); fore- and midtarsomeres 1,2 or 1-3 with a basal white band; hindtarsomeres 1-4 with a basal white band, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.22-0.30, 0.22-0.28, 0.71-0.87 and 0.17-0.35; fore-, mid- and hindlegs with tarsal claws equal and toothed. *Abdomen*. Tergum I sometimes with a median pale spot; terga II-VIII with basolateral white spots; tergum II with or without a basal pale band, incomplete at middle; terga III-VI with a basal pale band, incomplete at middle which does not connect with the basolateral white spots; sterna III-VII with a basal white band. *Genitalia* (Fig. 22). Insula longer than wide, with minute setae and with 4-5 larger setae on apical 0.40; tergum IX broader than long, apical margin of tergum IX with well developed lateral lobes, each with 2-4 setae; apical margin of postgenital plate with a median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head*. Maxillary palpus longer than proboscis, predominantly dark, with a white band at base of palpomeres 2-5, those on palpomeres 4,5 dorsally incomplete. *Wing*. Cell R_2 2.0-2.2 length of vein R_{2+3} . *Legs* (Fig. 7B). Hindtarsus with a basal white band on tarsomeres 1-4, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.22-0.31, 0.21-0.27, 0.71-0.86 and 0.13-0.24; fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple. *Genitalia* (Fig. 23A). Gonocoxite 2.0-2.2 as long as wide; claspette large, lobed, distal expanded portion square in dorsal aspect (mesal side shorter than lateral side, apical side as long as lateral side, with basolateral corner rounded), with numerous simple setae on the expanded distal portion and bearing 1 strong, basally widened spine-like seta on apicomesal angle, with 1 smaller spine-like seta laterad of it; gonostylus simple, elongate, about 0.58 length of gonocoxite, with a long slender claw process at apex and with a few setae in apical 0.25; apical margin of tergum IX concave medially with 3-5 setae on lateral lobe.

PUPA and LARVA. Unknown.

TYPE DATA. *Aedes (Stegomyia) opok* Corbet and Van Someren, holotype female, #C0561, in British Museum (Natural History), London [BMNH]; type locality: Awere, Acholi, UGANDA, VII-VIII-1959 (P. S. Corbet). Paratypes: 4 males (MEP Acc. 945, #C0475, #C0476, #C0547, #C0550), with genitalia on slides (82/162, 82/163, 84/269, 84/270) and 4 females (MEP Acc. 945, #C0548, #C0555, #C0570, #C0593), with genitalia on slide (88/522), same data as holotype, in the BMNH.

OTHER MATERIAL EXAMINED. **CENTRAL AFRICAN REPUBLIC.** *Ndele*: Bangoran (8°05' N, 20°21' E), 23-VI-1975, J.P. Herve, 1 F (MEP Acc. 736) [ORSTOM]; Djamasinda (8°31' N, 20°29' E), 18-VII-1975, J.P. Herve, 1 F (MEP Acc. 736) [ORSTOM]; Bamingui (7°33' N, 20°10' E), 28-VII-1975, J.P. Herve, 1 F (MEP Acc. 736) [ORSTOM]. *Ombella-Mpoko*: Bozo (5°10' N, 18°30' E), 20-XI-1978, J.P. Herve, 1 F (MEP Acc. 736) [ORSTOM]; same data except 22-X-1982, J.P. Cornet, 14 F, 4 F gen (MEP Acc. 970, 88/525, 88/526, 89/26, 89/27) [ORSTOM]; same data except IX-VII-1975-1979, B. Geoffroy, 29 F (SAMP Acc. 1330) [ORSTOM]; same data except IX-1980, B.

Geoffroy, 1 M, 33 F, 1 M gen (SAMP Acc. 1330, 88/524) [ORSTOM]; same data except VII-IX-1981, B. Geoffroy, 8 F (SAMP Acc. 1330) [ORSTOM]; Bouboui (4°37' N, 18°19' E), V-VII-1979, B. Geoffroy, 4 F (SAMP Acc. 1330) [ORSTOM].

UGANDA. *Acholi District*: Awere (2°43' N, 32°50' E), 23-IX-1970, A. McCrae, 1 F, 1 F gen (MEP Acc. 1036, 88/523) [DVBD].

DISTRIBUTION (Map 5). This species is known from Central African Republic and Uganda. Germain et al. (1975: 41) recorded *Ae. opok* from Burkina Faso [as Upper Volta], Ivory Coast and Mali, but I have not seen these specimens. Records of this species from West Africa (Upper Volta, Ivory Coast and Mali) by Germain et al. (1975) may refer to an undescribed species.

TAXONOMIC DISCUSSION. *Aedes opok* has the posterior dorsocentral yellow line of narrow scales present, scutellum with all broad white scales on the lateral lobes, and the hindfemur with 3 large white patches on anterior surface (on basal, median and apical areas), and can be distinguished easily from all other species of the *africanus* group except *Ae. maxgermaini* and *Ae. pseudoafricanus*. *Aedes opok* differs from *maxgermaini* and *pseudoafricanus* by: (1) fossal white patch rather broad at base along scutal margin; (2) prescutellar line well developed, with narrow yellow scales and with a few broad, flat, metallic silvery white scales posteriorly; and (3) hindtibia with a white longitudinal stripe on ventral surface in basal 0.17 (0.10-0.23). In *maxgermaini* and *pseudoafricanus*, the fossal white patch is rather narrow at the base along the scutal margin, the prescutellar line is not developed, or if present, has only narrow yellow scales, and the hindtibia has a white longitudinal stripe on the ventral surface in basal 0.24-0.33 (in *maxgermaini*) and in basal 0.22-0.34 (in *pseudoafricanus*).

The adult male and female of *Ae. opok* are easily confused with those of *Ae. africanus* and *Ae. opok* has been found in association with *africanus* in Bozo, Central African Republic. *Aedes opok* can be distinguished from *africanus* by: (1) fossal white patch rather broad at base along scutal margin; (2) posterior dorsocentral yellow line of narrow scales present; and (3) prescutellar line well developed, with narrow yellow scales and with a few broad, flat, metallic silvery white scales posteriorly. In *africanus*, the fossal white patch is rather narrow at the base along the scutal margin, the posterior dorsocentral yellow line of narrow scales is not present, and the prescutellar line is not developed, or only has narrow yellow scales.

The male genitalia of *Ae. opok* are very similar to those of *Ae. pseudoafricanus* in having the claspette with the distal expanded portion square in dorsal aspect, but can easily be distinguished from those of *pseudoafricanus* by the claspette, which lacks a narrow projection on the apicomesal angle. The claspette also has numerous simple setae on the expanded distal portion and has 1 strong, basally widened spine-like seta on the apicomesal angle, with 1 smaller spine-like seta laterad of it.

BIONOMICS. Corbet and Van Someren (1962: 76) reported that 2 specimens of *Ae. opok* were reared from scrapings taken from the walls of dry tree holes in the *Terminalia* woodland near Awere (altitude about 3,000 ft), Acholi District, Uganda.

In Uganda, females of *Ae. opok* have been taken biting man between 1700 and 1900 h. Corbet and Van Someren (1962: 76) reported that almost all the biting activity occurred in the crowns of trees, where 62 mosquitoes (6.9 per man-

hour) were caught, compared with 5 (1.0 per man-hour) at ground level and suggested that the preferred hosts of *Ae. opok* would be monkeys. Adults of both sexes rest in the ground-herb layer during the day, and females will leave woodland and bite over open ground at least 200 yards from woodland (Corbet and Van Someren, 1962).

In Central African Republic, females of *Ae. opok* have been taken biting man in a gallery forest, near the village of Bozo. Herve et al. (1975: 235) reported that the biting activity of *Ae. opok* was similar to that of *Ae. africanus*, but is more confined to the night (the proportion of females caught during night time consisted of over 80% compared to 65% in *Ae. africanus*).

Aedes opok has been found associated with *Ae. africanus* in a gallery forest near the village of Bozo, Central African Republic.

MEDICAL IMPORTANCE. Germain et al. (1976: 101) reported that yellow fever virus has been isolated from *Ae. opok* and considered it to be a potential sylvatic vector of yellow fever in Central African Republic. In addition to yellow fever virus, Chikungunya, Zika and Bouboui viruses have been isolated from *Ae. africanus* and *Ae. opok* in the Central African Republic (Germain et al., 1978).

Aedes (Stegomyia) pseudoafricanus Chwatt
(Figs. 5D, E; 6A, B; 23B; 24)

Aedes (Stegomyia) pseudoafricanus Chwatt 1949: 808 (M, F); Mattingly 1952: 242 (taxonomy), 245 (key to adults), 252 and 1953: 52 (distribution); Mattingly and Bruce-Chwatt 1954: 183 (M*, F*, P*, L*; biology).

FEMALE. Head. Proboscis shorter than forefemur; maxillary palpus 0.28-0.32 length of proboscis; antenna with a few dark scales on flagellomere 1; occiput with few erect forked scales; vertex with a median patch of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. **Thorax** (Fig. 5D). Scutum with narrow dark scales, and a distinct median stripe of broad white scales on anterior promontory, a large (narrow and wedge-shaped) patch of broad white scales on fossal area, a patch of broad white scales on lateral margin just in front of wing root, followed mesally by a patch of narrow white scales; a short median stripe of narrow white scales in front of prescutellar area; sometimes the median stripe reaching forward to the anterior median white stripe; posterior dorsocentral white line of narrow scales present, reaching to posterior 0.33 of scutum; prescutellar line of narrow yellow scales not present; or sometimes with a few narrow yellow scales; scutellum with broad white scales on all lobes and with a few broad dark scales at apex of midlobe; postpronotum with a large patch of broad white scales, sometimes interrupted by median bare stripe without scales. **Wing.** Cell R_2 2.4-2.7 length of R_{2+3} . **Halter.** With dark and white scales. **Legs** (Figs. 5E, 6B). Forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in apical 0.53-0.61; hindfemur with 3 large, white patches on anterior surface (on basal, median and apical areas); fore- and midtibiae anteriorly dark, sometimes with a short, white stripe on ventral surface in basal area; hindtibia anteriorly dark, with a white longitudinal stripe on ventral

surface in basal 0.22-0.34; fore- and midtarsomeres 1,2 or 1-3 with a basal white band; hindtarsomeres 1-4 with a basal white band, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.22-0.29, 0.18-0.24, 0.80-0.89 and 0.26-0.43; fore- and midlegs with tarsal claws equal and toothed; hindleg with tarsal claws equal, both simple. *Abdomen*. Terga II-VIII with basolateral white spots; terga II-VI with a basal pale yellowish band, incomplete at middle which does not connect with the basolateral white spots; sometimes terga II-VI all dark; sterna II-VII with a basal white band. *Genitalia* (Fig. 24). Insula longer than wide, with minute setae and with 2-5 larger setae on apical 0.33; tergum IX broader than long, apical margin of tergum IX with well developed lateral lobes, each with 4 (2-6) setae; apical margin of postgenital plate with a median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head*. Maxillary palpus longer than proboscis, predominantly dark, with a white band at base of palpomeres 2-5, those on palpomeres 4,5 dorsally incomplete; sometimes palpomere 5 with white scales on entire ventral surface. *Wing*. Cell R_2 2.1-2.3 length of vein R_{2+3} . *Legs* (Fig.6A). Hindtarsomeres 1-4 with a basal white band, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.21-0.34, 0.19-0.38, 0.83-0.91 and 0.22-0.42; fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple. *Genitalia* (Fig. 23B). Gonocoxite 1.7 as long as wide; claspette large, lobed, distal expanded portion square in dorsal aspect (apicomeral angle formed a narrow thumb-like projection, with basolateral corner drawn into a broad beak-like projection), with numerous simple setae on the expanded distal portion and bearing 2 stronger, spine-like setae on apicomeral angle; gonostylus simple, elongate, curved, about 0.76 length of gonocoxite, with a long slender claw process at apex and with a few setae in apical 0.25; apical margin of tergum IX slightly concave medially with 3-7 setae on lateral lobe.

PUPA and LARVA. Detailed descriptions will be given when adequate specimens are available.

TYPE DATA. *Aedes (Stegomyia) pseudoafricanus* Chwatt, holotype male (MEP Acc. 945), with genitalia on a plastic plate, in British Museum (Natural History), London [BMNH]; type locality: Gbohun near Yaba, NIGERIA, 1949 (L.J. Chwatt). Allotype female (MEP Acc. 945), Yaba, NIGERIA, IX-1949 (L.J. Chwatt), in the BMNH.

Mattingly and Bruce-Chwatt (1954: 189) stated that "The type male of *A. pseudoafricanus* is from Gbohun-Gbohun, in the Lagos area of Nigeria, and the allotype female is from Yaba, which lies nearby." Consequently, the statement of Townsend (1990: 123) that *Ae. pseudoafricanus* is represented by five syntypes is erroneous as a male holotype and female allotype were mentioned earlier by Mattingly and Bruce-Chwatt (1954: 189).

OTHER MATERIAL EXAMINED. **IVORY COAST**. *Sud, Departement du*: Abidjan, Foret du Banco (5°25' N, 4°03' W), P. Cachan, (MEP Acc. 724), 1 M (0-j-cl-I-125004), 1 F (2-icl-II-121052), 1 M gen (84/318) [ORSTOM]; Cercle de Sassandra, Sassandra Mangrove (4°57' N, 6°05' W), 25-IV-1962, J. Hamon, (MEP Acc. 724), 12 M (#620425 2a, 2c, D-G, J-L, T, V, Y), 2 F (#620425 C, D), 3 M gen, 1 F gen (82/109, 82/111, 82/112, 88/528) [ORSTOM].

NIGERIA. *Lagos*: Yaba (6°32' N, 3°23' E), 8-X-1909, Dr.W.M. Graham, 1 F, 1 F gen (MEP Acc. 719, 88/527) [BMNH]; Lagos Area (6°27' N,

3°23' E), 1926, L.J. Chwatt, 1 M, 1 M gen (MEP Acc. 722, 82/87) [MNHP].

SIERRA LEONE. *Southern Province*: Tiwai Island (7°30' N, 11°20' W), 8-V-1984, Y.M. Huang, (SAMP Acc. 1093), tree hole, 1 M, 1 individual rearing (1 l, 1 p), 1 M gen (#45-11, 84/430) [USNM]; Kasewe Forest Reserve (8°19' N, 12°13' W), 29-V-1984, Huang & Pecor, (SAMP Acc. 1093), stump hole, 1 M, 1 individual rearing (1 l, 1 p), 1 M gen (#156-10, 84/421) [USNM].

ZAIRE. *Kongo-Central*: Banana (5°59' S, 12°27' E), 1934, Dr. Wanson, 2 M (No. 2, No. 64), 1 F, 2 M gen, 1 F gen (MEP Acc. 719, 82/85, 82/86, 88/529) [BMNH]; same data, 4 M, 1 F, 4 M gen, 1 F gen (MEP Acc. 725, 82/2, 82/3, 82/88, 82/89, 82/90) [CMT].

DISTRIBUTION (Map 5). This species is known from the Ivory Coast, Nigeria, Sierra Leone, and Zaire.

TAXONOMIC DISCUSSION. *Aedes pseudoafricanus* differs from congeners of the *africanus* group by: (1) anterior median white stripe rather long, 2.5-3.0 times as long as wide; (2) posterior dorsocentral white line of narrow scales present; (3) fossal white patch rather narrow at base along scutal margin; (4) prescutellar line of narrow yellow scales not developed; (5) hindfemur with 3 large, white patches on anterior surface (on basal, median and apical areas); (6) hindtibia with a white longitudinal stripe on ventral surface in basal 0.22-0.34; (7) hindtarsomere 4 with basal 0.22-0.43 white; and (8) hindleg with tarsal claws equal and simple.

The adult male and female of *Ae. pseudoafricanus* are easily confused with those of *Ae. africanus*, and has been found in association with *africanus* in a forest in the Ivory Coast and in Sierra Leone. *Aedes pseudoafricanus* can be distinguished from *africanus* by: (1) anterior median white stripe rather long, 2.5-3.0 times as long as wide; (2) posterior dorsocentral white line of narrow scales present; and (3) hindleg with tarsal claws equal and simple. In *africanus*, the anterior median white stripe is short and broad, about 2 times as long as wide, the posterior dorsocentral white line of narrow scales is not present, and the hindtarsal claws are equal and toothed.

The adult of *Ae. pseudoafricanus* is also extremely similar to that of *Ae. maxgermaini*. However, *Ae. pseudoafricanus* can be distinguished from *maxgermaini* by the diagnostic characters mentioned under the discussion of *maxgermaini*.

The male genitalia of *Ae. pseudoafricanus* are very similar to those of *Ae. opok* in having the claspette with distal expanded portion square in the dorsal aspect, but can be distinguished from those of *opok* by the claspette, which has apicomeresal angle formed a narrow thumb-like projection. The basolateral corner is drawn into a broad beak-like projection, and has numerous simple setae on the expanded distal portion and bears 2 stronger, spine-like setae on the apicomeresal angle.

The larva and pupa of *Ae. pseudoafricanus* are inseparable from those of *africanus* (Mattingly and Bruce-Chwatt, 1954).

Aedes pseudoafricanus apparently is a common species in the mangrove forests along the west coast of Africa. It is reported here for the first time from the Ivory Coast and Sierra Leone. *Aedes pseudoafricanus* occurs in habitats at altitudes of <166 m (<500 ft) and yearly rainfall of 76.2-177.8 cm (30-70 in).

BIONOMICS. Immature stages of *Ae. pseudoafricanus* have been collected from the following: tree holes in the Ivory Coast, Nigeria and Sierra Leone;

bamboo pots in Ivory Coast and a stump hole in Sierra Leone. Mattingly (1952: 270) stated that *Ae. pseudoafricanus* preferred rot-holes in *Avicennia* mangrove.

Preferred ovipositional sites for *Ae. pseudoafricanus* studied here were tree holes and rot-holes while bamboo pots and stump hole were less commonly used.

Aedes pseudoafricanus has been collected in association with *Ae. africanus* from a tree hole, on Tiwai Island and from a stump hole, in a forest, Sierra Leone. It has also been found in association with *Ae. africanus* from a forest (Foret du Banco), Abidjan, Ivory Coast. In the Lagos area, Nigeria, Mattingly and Chwatt (1954: 189) reported that *Ae. pseudoafricanus* and *Ae. africanus* are sympatric. Chwatt (1949: 808) stated that *Ae. pseudoafricanus* is predominantly crepuscular and not as strictly arboreal as *Ae. africanus*.

MEDICAL IMPORTANCE. *Aedes pseudoafricanus* is a proven laboratory vector of yellow fever. Chwatt (1949: 808) reported that *Ae. pseudoafricanus* was infected with yellow fever virus after feeding on a *Macacus rhesus* inoculated with yellow fever virus (Strain Ojo 657).

Aedes (Stegomyia) ruwenzori Haddow and Van Someren
(Figs. 7C, D; 8C; 20B; 25)

Aedes (Stegomyia) ruwenzori Haddow and Van Someren 1950: 281 (F*); Gillett 1951: 195 (M, P, L*); Mattingly 1952: 245 (key to adults) and 1953: 15, 21 (taxonomy and distribution).

FEMALE. Head. Proboscis longer than forefemur; maxillary palpus 0.21-0.27 length of proboscis, antenna with a few dark scales on flagellomere 1; occiput with few erect forked scales; vertex with a median stripe or patch of broad white scales, with broad dark scales on each side interrupted by lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. **Thorax** (Fig. 7C). Scutum with narrow dark scales, and a distinct median stripe of broad white scales on anterior promontory, followed by a distinct median longitudinal stripe of narrow yellow scales, reaching to the prescutellar area; a large patch of broad white scales on fossal area, a patch of broad white scales on lateral margin just in front of wing root; posterior dorsocentral yellow line of narrow scales present, reaching forward to the posterior end of fossal white patch; prescutellar line of narrow yellow scales not present; or sometimes with a few narrow yellow scales; scutellum with broad white scales on midlobe and with a few broad dark scales at apex of midlobe, with broad dark scales on lateral lobe, sometimes lateral lobe with broad dark scales at base and covered with a few broad white scales; postpronotum with a large patch of broad white scales interrupted by median bare stripe without scales. **Wing.** Cell R_2 2.4-3.6 length of R_{2+3} . **Halter.** With dark and white scales. **Legs** (Fig. 8C). Forefemur anteriorly with anarrow, white longitudinal stripe on ventral surface in apical 0.34-0.56; hindfemur with 3 large, white patches on anterior surface (on basal, median and apical areas); fore- and midtibiae anteriorly dark; hindtibia anteriorly dark, with a white longitudinal stripe on ventral surface in basal 0.20-0.25; fore- and midtarsomeres 1,2 with a basal white band; hindtarsomeres 1-4 with a basal white band, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.18-0.25, 0.15-

0.23, 0.81-0.88 and 0.25-0.40; fore-, mid- and hindlegs with tarsal claws equal, all toothed. *Abdomen*. Terga II-VIII with basolateral white spots which are not visible in dorsal aspect except on terga VII-VIII; sterna III-VII with a basal white band. *Genitalia* (Fig. 25). Insula longer than wide, with minute setae and with 4-6 larger setae on apical 0.50; tergum IX as long as broad, apical margin of tergum IX with well developed lateral lobes, each with 2-4 setae; apical margin of postgenital plate with a shallow median notch.

MALE. Essentially as in the female, differing in the following sexual characters: *Head*. Maxillary palpus as long as proboscis, predominantly dark, with a white band at base of palpomeres 2-5, those on palpomeres 4,5 dorsally incomplete. *Wing*. Cell R_2 2.1-2.9 length of vein R_{2+3} . *Legs* (Fig. 7D). Fore- and mid-tarsomere 1 with a basal white band; hindtarsomeres 1-3 with a basal white band, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.24-0.30, 0.15-0.24 and 0.80-0.93; hindtarsomere 4 with or without a very small basal white patch; fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple. *Genitalia* (Fig. 20B). Gonocoxite 1.7 as long as wide; claspette large, lobed, distal expanded portion oval in dorsal aspect (with apicomesal corner and apicolateral corner rounded), with numerous simple setae on the expanded distal portion and bearing 3 somewhat stronger, spine-like setae on apicomesal corner; gonostylus simple, elongate, about 0.56 length of gonocoxite, with a long slender claw process at apex and with a few setae in apical 0.25; apical margin of tergum IX slightly concave medially with 5-7 setae on lateral lobe.

PUPA and LARVA. Detailed descriptions will be given when adequate specimens are available.

TYPE DATA. *Aedes (Stegomyia) ruwenzori* Haddow and Van Someren, holotype female, in British Museum (Natural History), London [BMNH]; type locality: Ruwenzori, 6,500 ft, UGANDA, VI-1948 (Van Someren). Paratype: 1 F, same data as holotype [CMT].

OTHER MATERIAL EXAMINED. UGANDA. Bunguha ($0^{\circ}43' N$, $30^{\circ}07' E$), XII-1951, J.D. Gillett, 6,000 ft, (MEP Acc. 719), 1 M (RB23), 1 M gen (82/7) [BMNH]; same data, 1 M, 1 M gen (MEP Acc.719, RB 3) [BMNH]; same data except V-1951, J.D. Gillett, 1 M, 1 M gen (MEP Acc. 808, RB 16, 88/530) [DVBD]. *Uganda*: Ruwenzori Range ($0^{\circ}23' N$, $29^{\circ}54' E$), V-1960, biting man, A.J. Haddow, 4 F, 2 F gen (MEP Acc. 1036, 89/32, 89/33) [DVBD].

DISTRIBUTION (Map 5). This species is known only from Uganda.

TAXONOMIC DISCUSSION. *Aedes ruwenzori* differs from congeners of the *africanus* group by: (1) scutum with a distinct median longitudinal yellow line of narrow scales; (2) posterior dorsocentral yellow line of narrow scales well developed, reaching forward to the posterior end of the fossal white patch; (3) scutellum with broad dark scales on lateral lobes; (4) terga II-VIII (II-VII in male) each with basolateral white spots only; (5) hindfemur with 3 large, white patches on anterior surface (on basal, median and apical areas); and (6) hindtibia with a white longitudinal stripe on ventral surface in basal 0.20-0.25.

The adult male and female of *Ae. ruwenzori* are similar to those of *Ae. africanus*, but can be distinguished by the posterior dorsocentral yellow line of narrow scales well developed, reaching forward to the posterior end of the fossal white patch, and by the scutellum with broad dark scales on lateral lobes. In *africanus*, the posterior dorsocentral yellow line of narrow scales is not present,

and the scutellum has all broad white scales on lateral lobes.

The adult of *Ae. ruwenzori* is also very similar to that of *Ae. luteocephalus* in having the scutum with a distinct median longitudinal yellow line of narrow scales. However, *Ae. ruwenzori* can be distinguished from *luteocephalus* by the diagnostic characters mentioned under the discussion of *luteocephalus*.

The male genitalia of *Ae. ruwenzori* are very similar to those of *Ae. luteocephalus* and *Ae. neoaffricanus* in having the claspette with distal expanded portion oval in dorsal aspect, but can be distinguished from those of *luteocephalus* by the claspette, which has numerous simple setae on the expanded distal portion and bearing 3 stronger, spine-like setae on the apicomesal corner. The male genitalia of *Ae. ruwenzori* can be distinguished from those of *neoaffricanus* by the claspette, which has 3 stronger, spine-like setae on the apicomesal corner, and by the gonostylar claw which is long and slender.

The larva and pupa of *Ae. ruwenzori* were described by Gillett (1951). The following diagnostic characters of *ruwenzori* are derived from Gillett (1951).

The larva of *Ae. ruwenzori* resembles that of *Ae. africanus*, but can be distinguished easily from that of *africanus* by the shape of the comb scale (sharp pointed spines) and the pecten spine (simple spines) (Gillett 1951: 195). The larva of *Ae. ruwenzori* is very similar to that of *Ae. neoaffricanus* in having the similar shape of the comb scale (sharp pointed spines). The larva of *Ae. ruwenzori* can be distinguished from those of *Ae. africanus*, *neoaffricanus*, *corneti*, *luteocephalus* and *pseudoaffricanus* by seta 3-X with 2-3 branches. In *africanus*, *corneti*, *luteocephalus*, *neoaffricanus* and *pseudoaffricanus*, seta 3-X is single.

The pupa of *Ae. ruwenzori* is very similar to that of *africanus* in having the paddle margins with a long dense fringe, but can be distinguished from that of *africanus* by the slightly notched paddle apex (Gillett 1951: 196, 197). The pupa of *Ae. ruwenzori* can also be distinguished from those of *Ae. corneti*, *luteocephalus* and *pseudoaffricanus* by the slightly notched paddle apex. In *africanus*, *corneti*, *luteocephalus* and *pseudoaffricanus*, the apex of the paddle is not notched.

BIONOMICS. In Uganda, the eggs of *Ae. ruwenzori* have been obtained from females taken biting from the mountain forest at Bunguha, Ruwenzori and larvae reared by J.D. Gillett in 1951. However, the immature stages of *ruwenzori* have not been found in the field. *Aedes ruwenzori* is apparently a mountain forest species which occurs in habitats at altitudes between 1,833 and 2,333 m (5,500-7,000 ft) and yearly rainfall of 152.4 cm (60 in).

Haddow and Van Someren (1950: 283) reported that *Ae. ruwenzori* is crepuscular as it bites mainly in the sunset period and is primarily arboreal. Further, it is the dominant mosquito of the Ruwenzori forest-canopy in the sunset period.

MEDICAL IMPORTANCE. Haddow and Van Someren (1950: 284) stated that *Ae. ruwenzori* does not seem to play a role in the transmission of yellow fever among monkeys.

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**Appendix I. Present Status of the Species of the
Aedes (Stegomyia) africanus Group**

SPECIES	STAGES				BIONOMICS
	A	P	L	E	
	M	F			
<i>africanus</i>	X*	X*	X*	X*	- Immature habitats known, female bites man
<i>corneti</i>	X*	X*	X*	X*	- Immature habitats known, female unknown
<i>luteocephalus</i>	X*	X*	X*	X*	- Immature habitats known, female bites man
<i>maxgermaini</i>	-	X*	-	-	- Immature habitats unknown, female bites man
<i>neoafricanus</i>	X*	X*	-	X*	- Immature habitats known, female bites man
<i>opok</i>	X*	X*	-	-	- Immature habitats known, female bites man
<i>pseudoafricanus</i>	X*	X*	X*	X*	- Immature habitats known, female bites man
<i>ruwenzori</i>	X*	X*	X	X*	- Immature habitats unknown female bites man

X* = Stage or sex described and illustrated.

- = Stage or sex unknown.

X = Stage or sex described.

**Appendix II. Distribution List of the Species of the
Aedes (Stegomyia) africanus Group**

AFROTROPICAL REGION							
SPECIES	ANG	BUR	CAM	CEN	ETH	GAB	GHA
<i>africanus</i>	X	X	X	X	X	*	
<i>corneti</i>			X				
<i>luteocephalus</i>	*	X		X	X		X
<i>maxgermaini</i>			X				
<i>neoafricanus</i>							
<i>opok</i>		*		X			
<i>pseudoafricanus</i>							
<i>ruwenzori</i>							

SPECIES	GUI	IVO	KEN	LIB	MAL	NIG	SEN
<i>africanus</i>	X	X	X	X		X	X
<i>corneti</i>		X					
<i>luteocephalus</i>	X	X				X	X
<i>maxgermaini</i>							
<i>neoafricanus</i>							X
<i>opok</i>		*			*		
<i>pseudoafricanus</i>		X				X	
<i>ruwenzori</i>							

SPECIES	SIE	SUD	TAN	UGA	ZAI	ZAM	ZIM
<i>africanus</i>	X			X	X		
<i>corneti</i>	X						
<i>luteocephalus</i>	X	X	X		X	X	X
<i>maxgermaini</i>							
<i>neoafricanus</i>							
<i>opok</i>				X			
<i>pseudoafricanus</i>	X				X		
<i>ruwenzori</i>				X			

X = Areas from which specimens were examined.

* = Record from literature.

List of Country Abbreviations

ANG	=	ANGOLA
BUR	=	BURKINA FASO (Upper Volta, Haute-Volta)
CAM	=	CAMEROON (Cameroun)
CEN	=	CENTRAL AFRICAN REPUBLIC
ETH	=	ETHIOPIA
GAB	=	GABON
GHA	=	GHANA (Gold Coast)
GUI	=	GUINEA
IVO	=	IVORY COAST (Cote d'Ivoire)
KEN	=	KENYA
LIB	=	LIBERIA
MAL	=	MALI
NIG	=	NIGERIA
SEN	=	SENEGAL
SIE	=	SIERRA LEONE
SUD	=	SUDAN
TAN	=	TANZANIA (Tanganyika)
UGA	=	UGANDA
ZAI	=	ZAIRE (Belgian Congo)
ZAM	=	ZAMBIA (N. Rhodesia)
ZIM	=	ZIMBABWE (S. Rhodesia)

List of Maps

1. The Afrotropical Region.
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3. Distribution of *Aedes (Stegomyia) corneti* and *Aedes (Stegomyia) neoafricanus*.
4. Distribution of *Aedes (Stegomyia) luteocephalus*.
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List of Figures

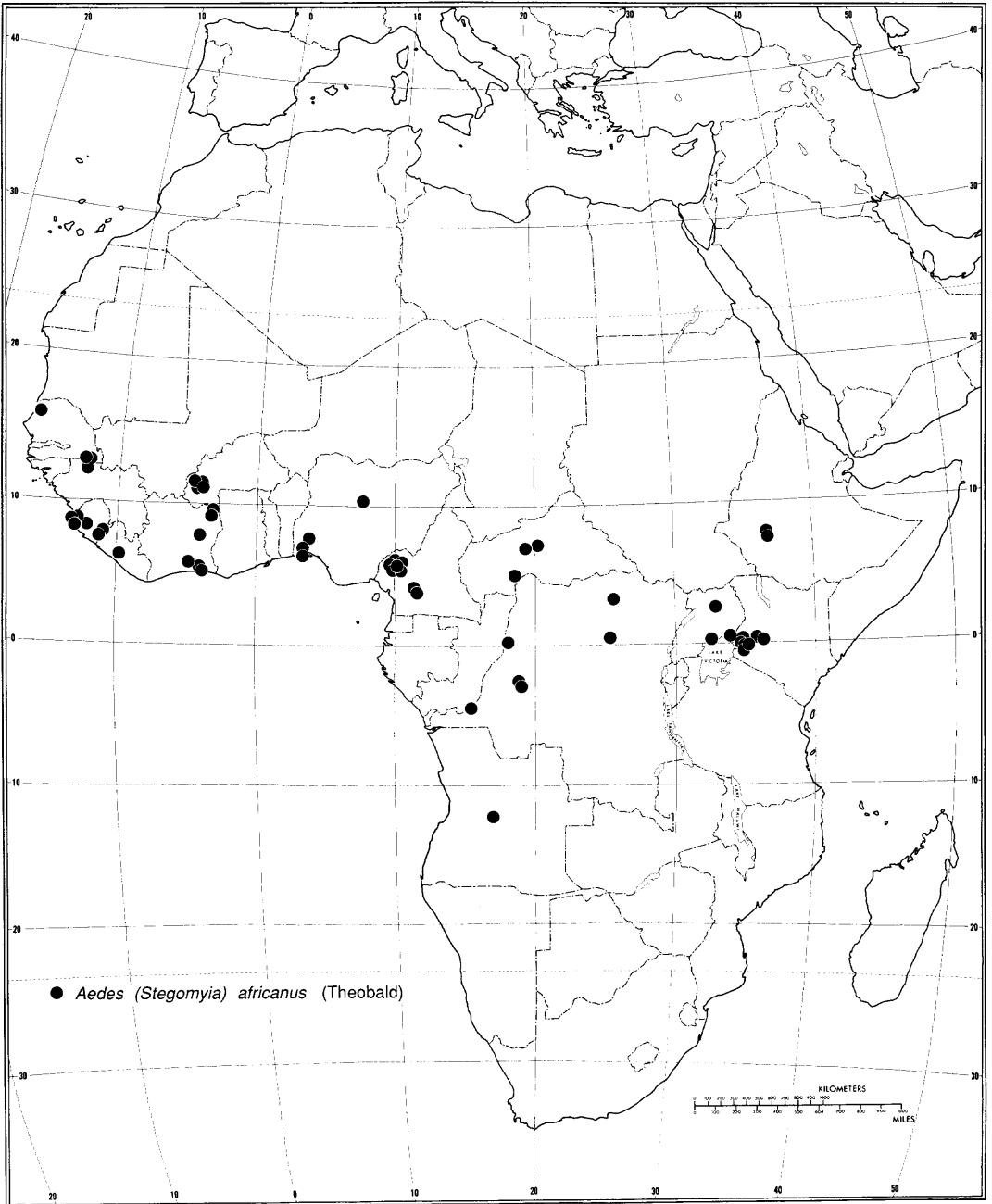
1. *Aedes (Stegomyia) corneti* - A, thorax (dorsal view); B, female abdomen (dorsal view); C, male abdomen (dorsal view);
Aedes (Stegomyia) luteocephalus - D, thorax (dorsal view).
2. *Aedes (Stegomyia) corneti* - A, female fore-, mid- and hindlegs (anterior view); B, male fore-, mid- and hindlegs (anterior view);
Aedes (Stegomyia) africanus - C, male fore-, mid- and hindlegs (anterior view).
3. *Aedes (Stegomyia) africanus* - A, thorax (dorsal view); B, female tarsal claws (fore- and hindlegs); C, male tarsal claws (fore- and hindlegs);
Aedes (Stegomyia) neoafricanus - D, thorax (dorsal view); E, female tarsal claws (fore- and hindlegs); F, male tarsal claws (fore- and hindlegs).
4. *Aedes (Stegomyia) africanus* - A, female fore-, mid- and hindlegs (anterior view);
Aedes (Stegomyia) neoafricanus - B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view).
5. *Aedes (Stegomyia) maxgermaini* - A, thorax (dorsal view); B, female tarsal claws (fore- and hindlegs); C, female (Holotype) fore-, mid- and hindlegs (anterior view);
Aedes (Stegomyia) pseudoafricanus - D, thorax (dorsal view); E, female tarsal claws (fore- and hindlegs).
6. *Aedes (Stegomyia) pseudoafricanus* - A, male fore-, mid- and hindlegs (anterior view); B, female fore-, mid- and hindlegs (anterior view);
Aedes (Stegomyia) opok - C, female fore-, mid- and hindlegs (anterior view).
7. *Aedes (Stegomyia) opok* - A, thorax (dorsal view); B, male fore-, mid- and hindlegs (anterior view);
Aedes (Stegomyia) ruwenzori - C, thorax (dorsal view); D, male fore-, mid- and hindlegs (anterior view).
8. *Aedes (Stegomyia) luteocephalus* - A, male fore-, mid- and hindlegs (anterior view); B, female fore-, mid- and hindlegs (anterior view);
Aedes (Stegomyia) ruwenzori - C, female fore-, mid- and hindlegs (anterior view).
9. *Aedes (Stegomyia) africanus* - A, B, C, D, female genitalia.
10. *Aedes (Stegomyia) africanus* - A, B, pupa; C, male genitalia.

11. *Aedes (Stegomyia) africanus* - A, B, C, larva.
12. *Aedes (Stegomyia) corneti* - A, B, C, D, female genitalia.
13. *Aedes (Stegomyia) corneti* - A, B, pupa; C, male genitalia.
14. *Aedes (Stegomyia) corneti* - A, B, C, larva.
15. *Aedes (Stegomyia) luteocephalus* - A, B, C, D, female genitalia.
16. *Aedes (Stegomyia) luteocephalus* - A, B, pupa; C, male genitalia.
17. *Aedes (Stegomyia) luteocephalus* - A, B, C, larva.
18. *Aedes (Stegomyia) maxgermaini* - A, B, C, D, female genitalia.
19. *Aedes (Stegomyia) neoaffricanus* - A, B, C, D, female genitalia.
20. *Aedes (Stegomyia) neoaffricanus* - A, male genitalia;
Aedes (Stegomyia) ruwenzori - B, male genitalia.
21. *Aedes (Stegomyia) neoaffricanus* - A, B, C, larva.
22. *Aedes (Stegomyia) opok* - A, B, C, D, female genitalia.
23. *Aedes (Stegomyia) opok* - A, male genitalia;
Aedes (Stegomyia) pseudoaffricanus - B, male genitalia.
24. *Aedes (Stegomyia) pseudoaffricanus* - A, B, C, D, female genitalia.
25. *Aedes (Stegomyia) ruwenzori* - A, B, C, D, female genitalia.

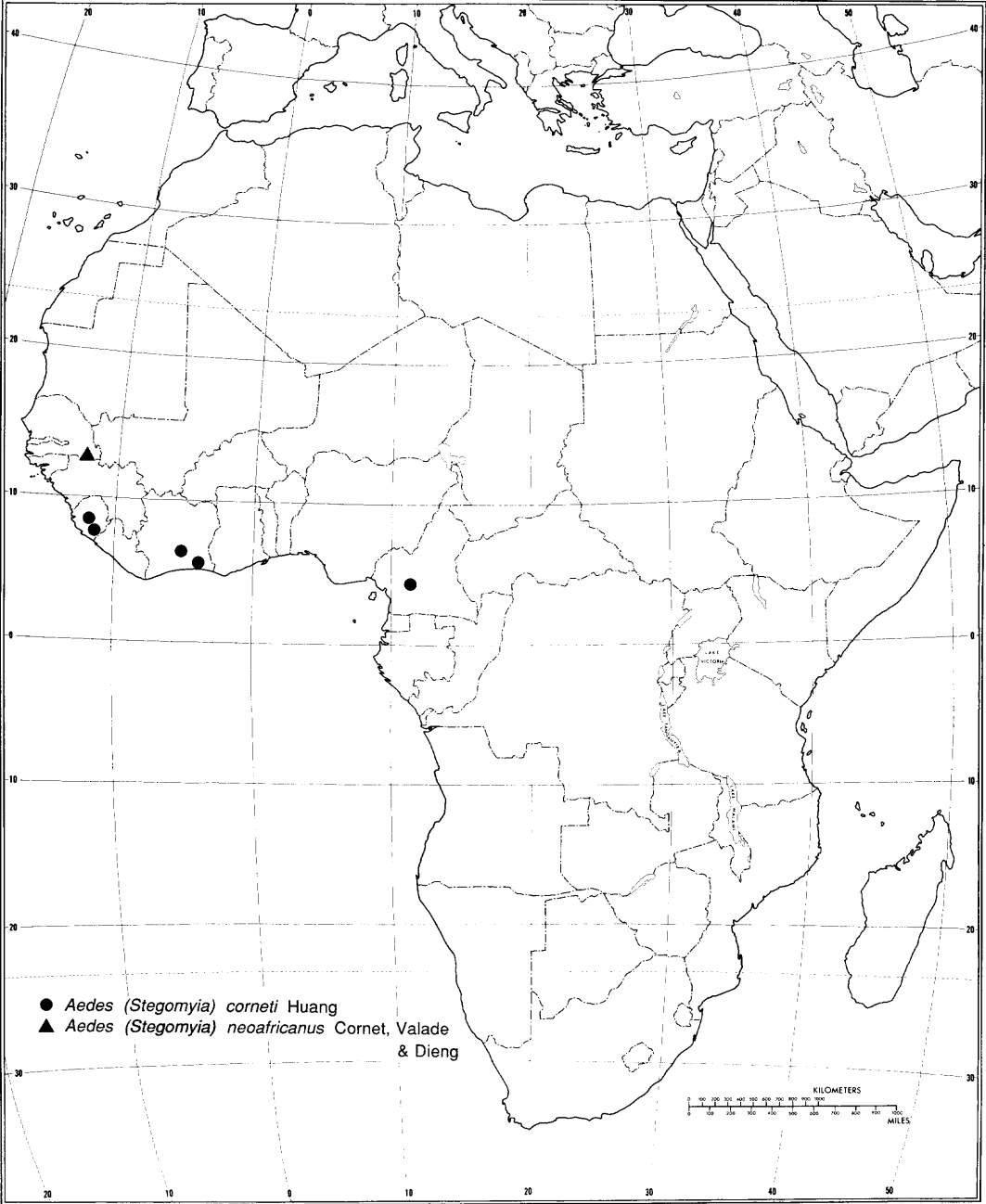
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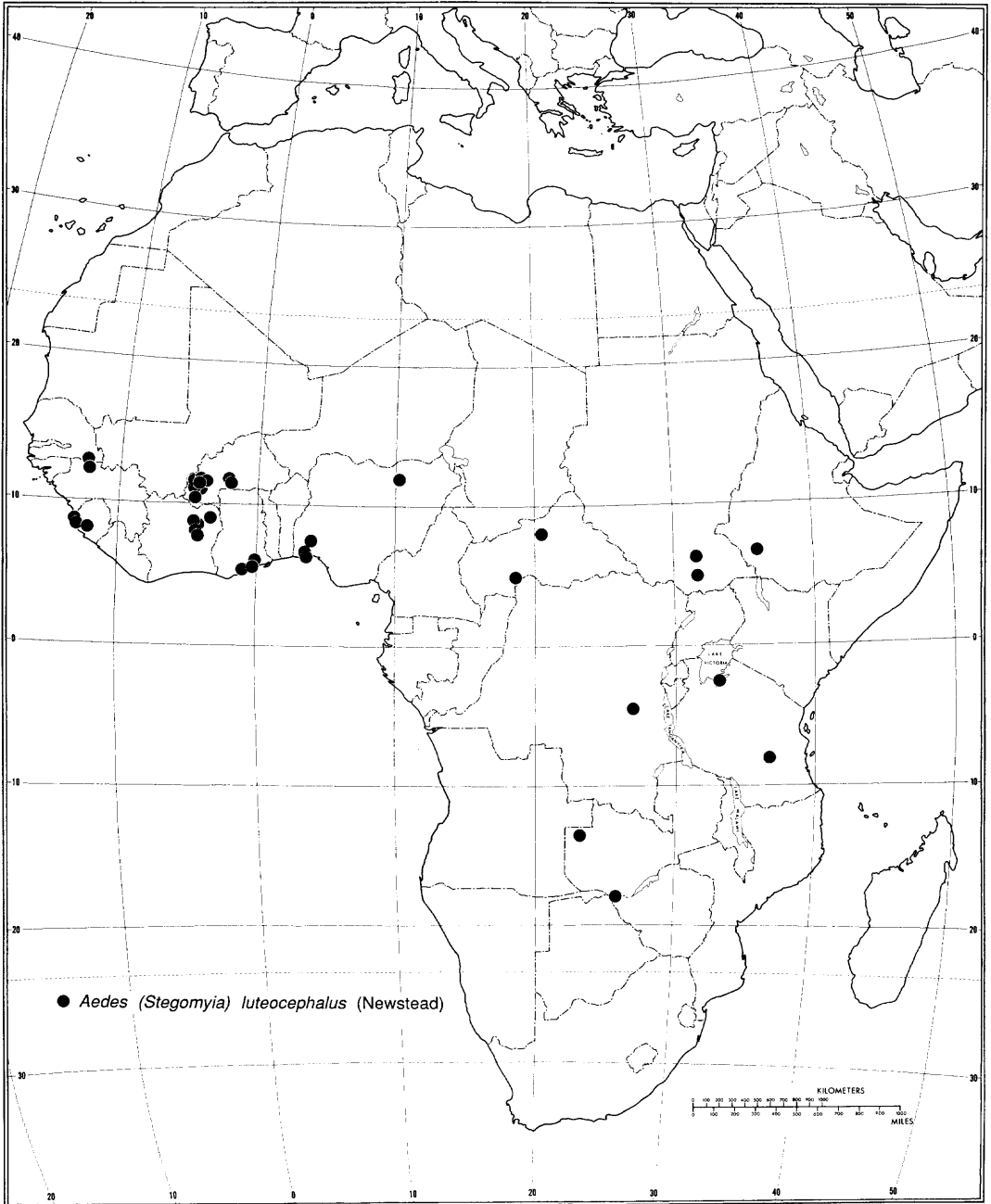
Map 2



Map 3



Map 4



Map 5

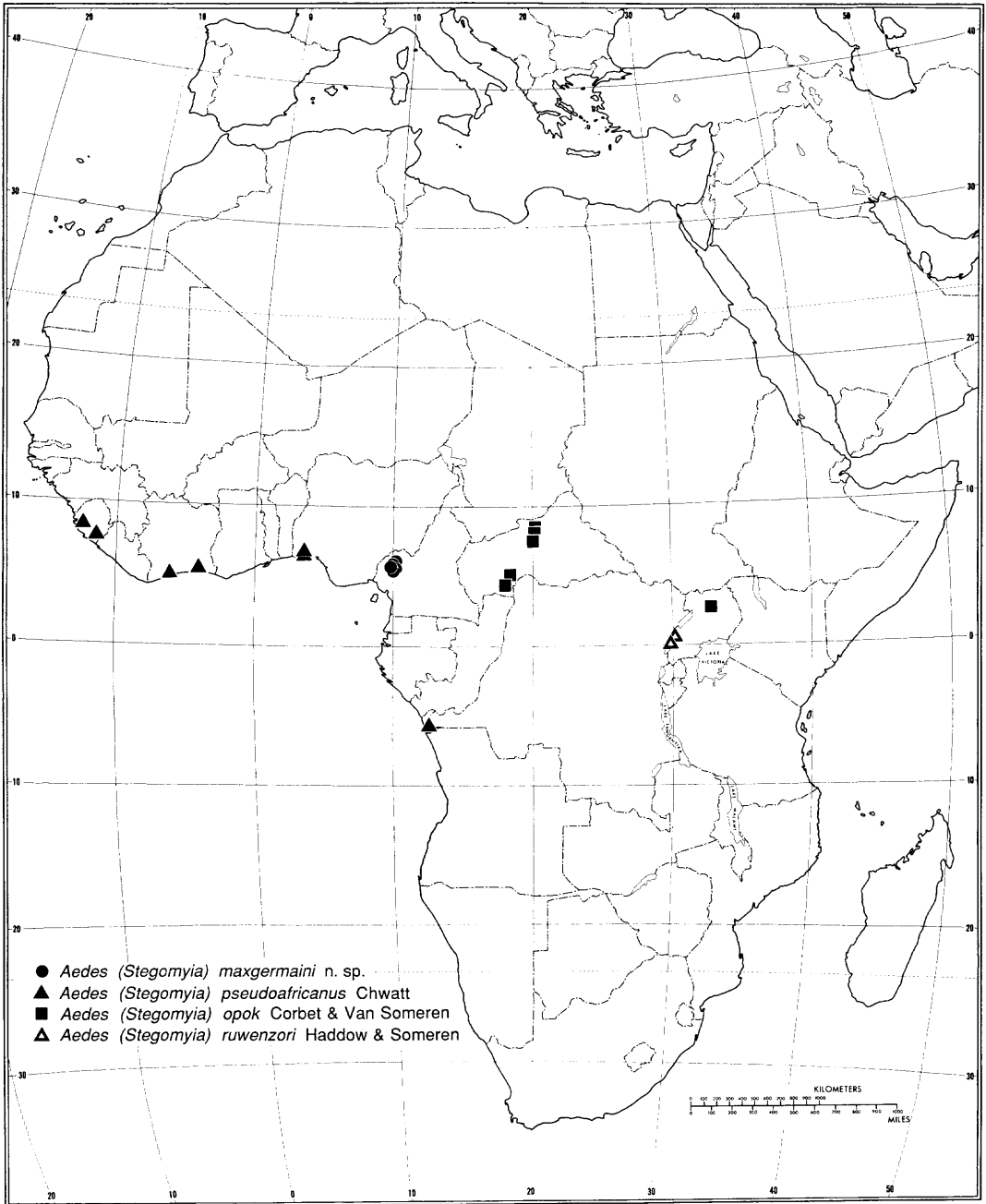


Fig. 1

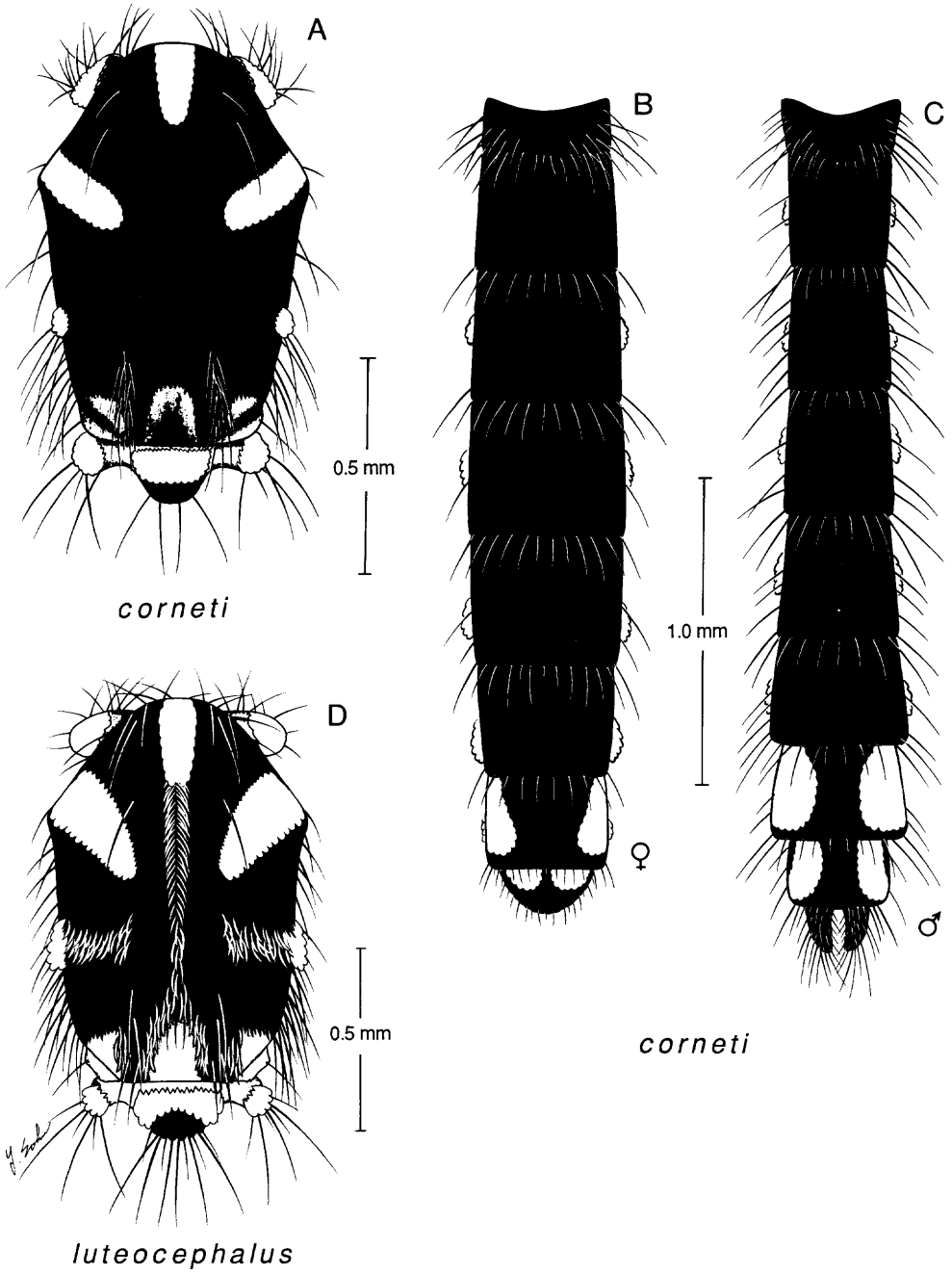


Fig. 2

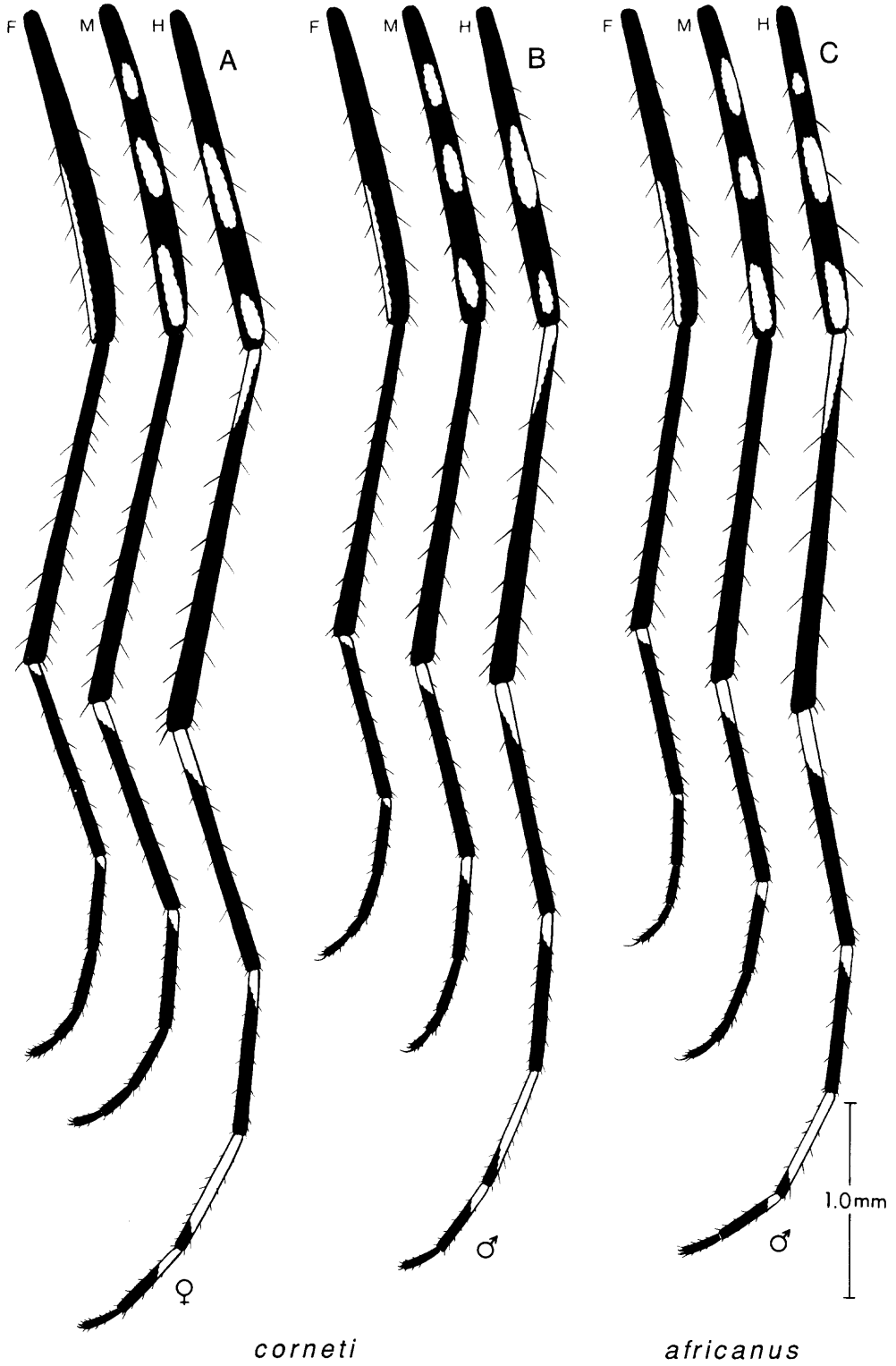


Fig. 3

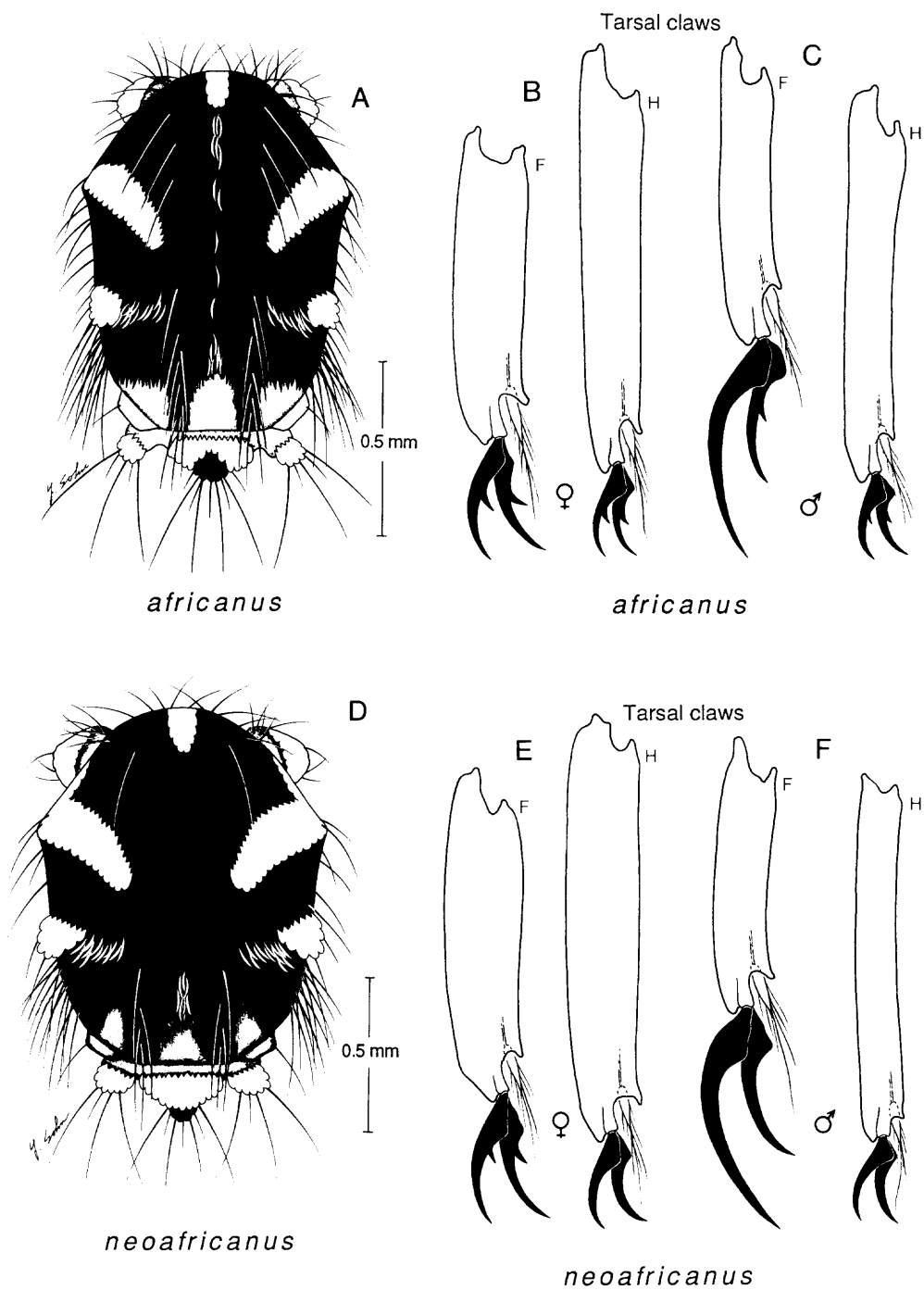


Fig. 4

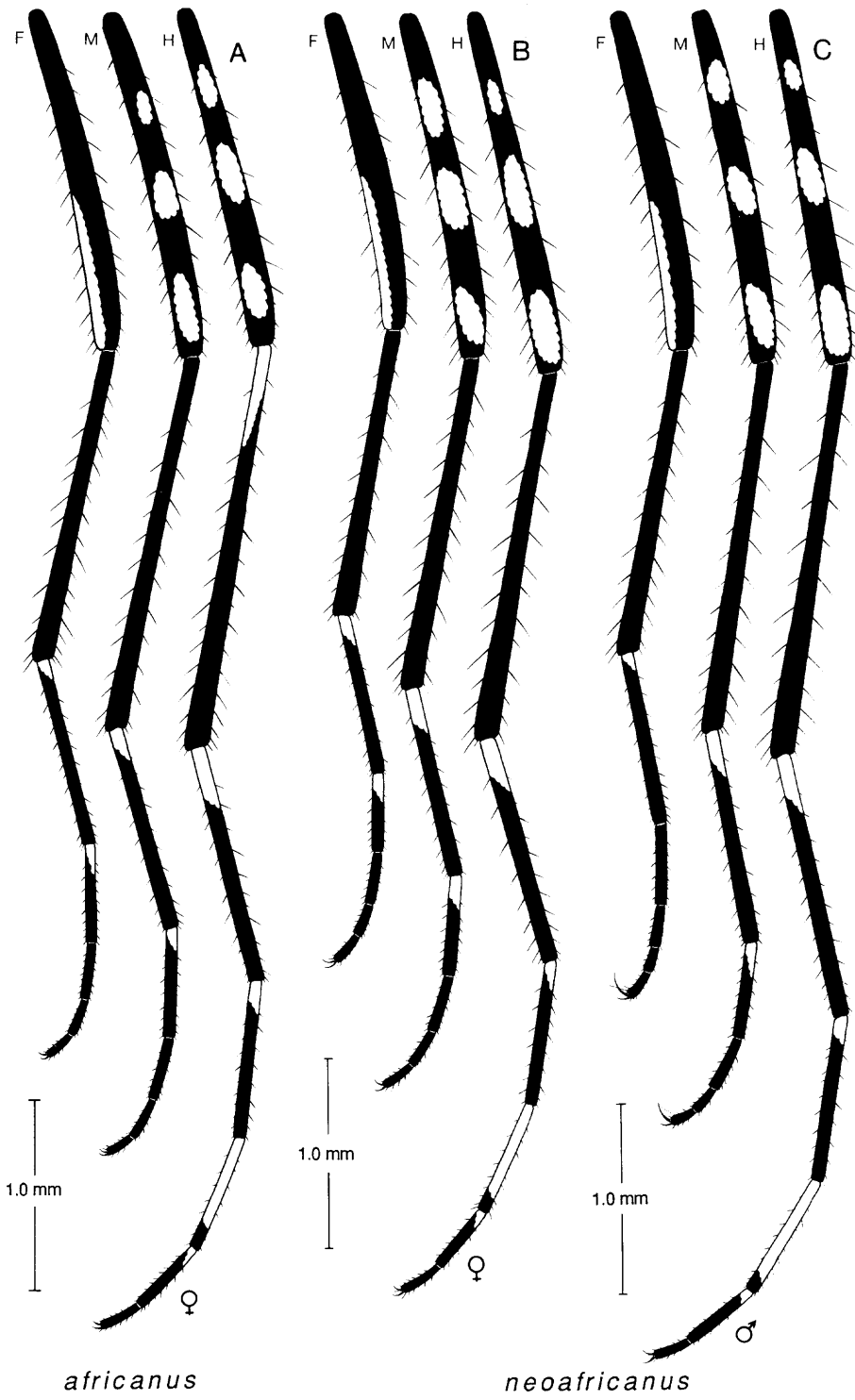
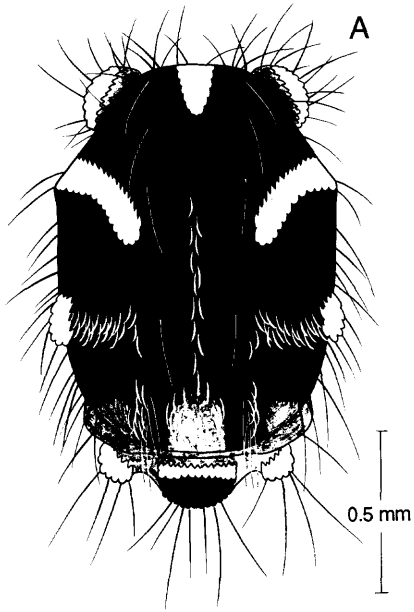
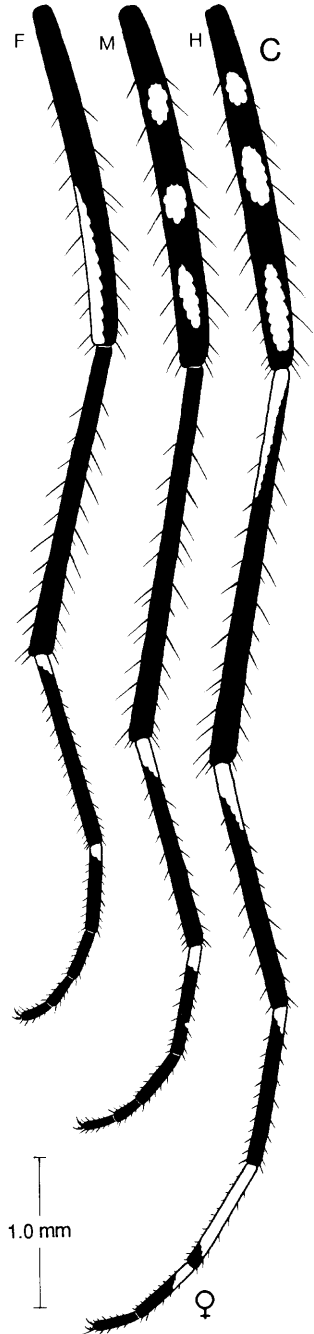
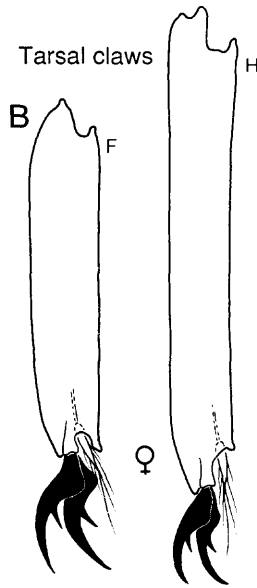


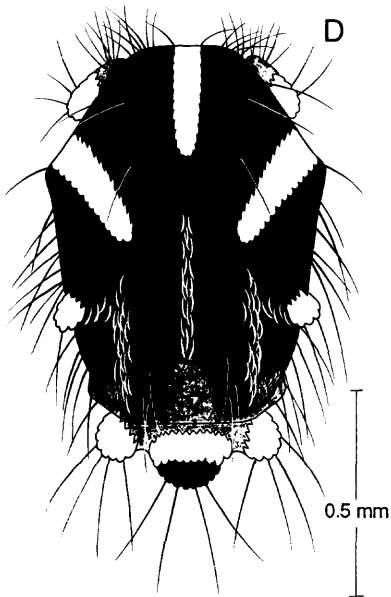
Fig. 5



maxgermaini



maxgermaini



pseudoafricanus

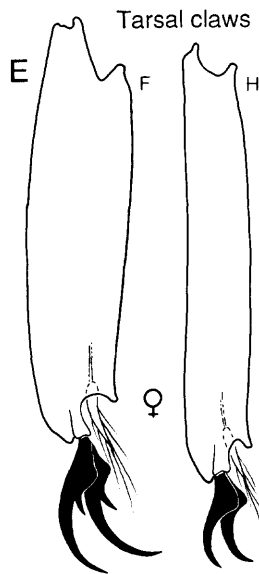


Fig. 6

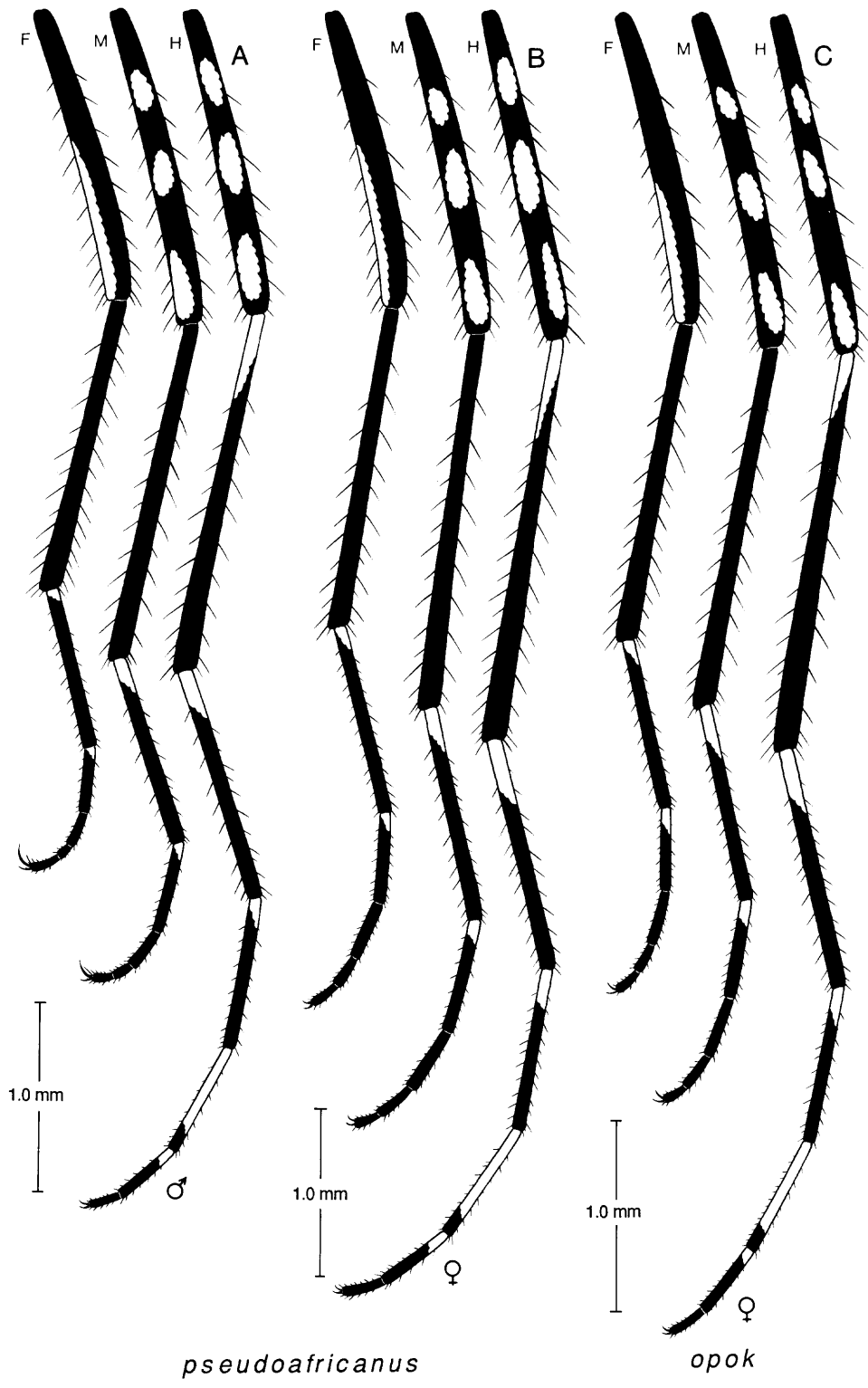
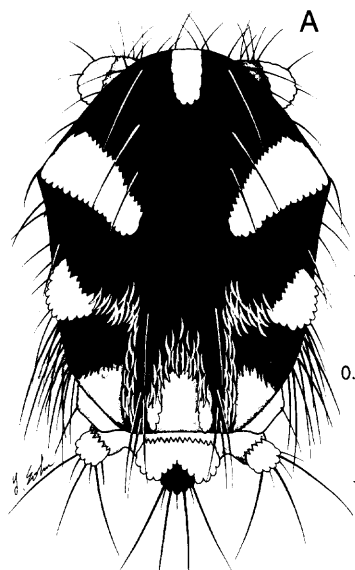
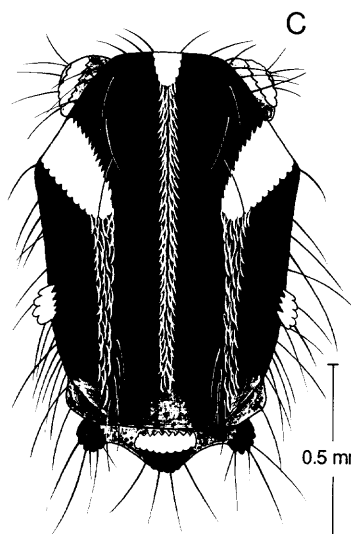


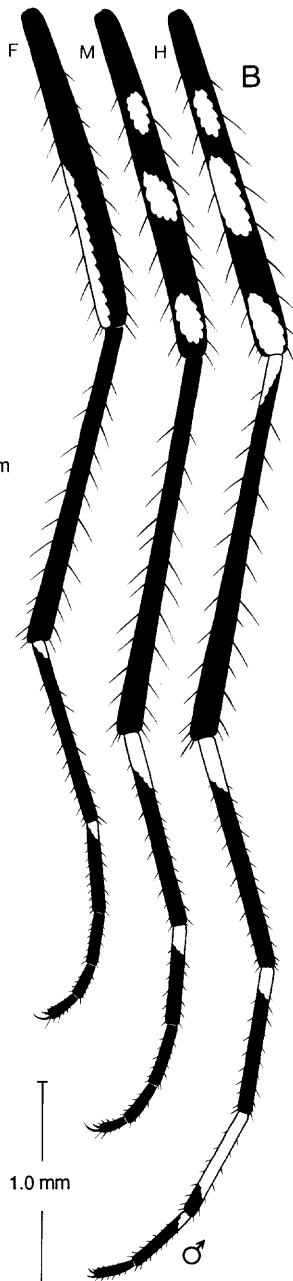
Fig. 7



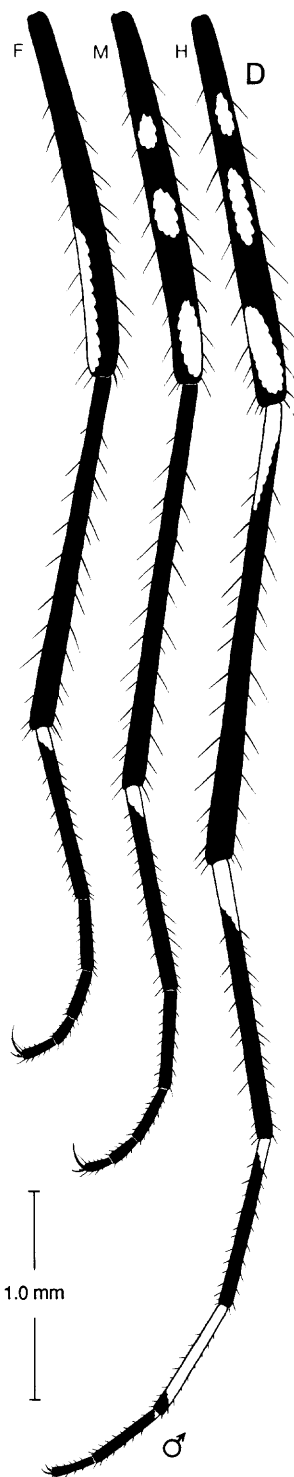
opok



ruwenzori

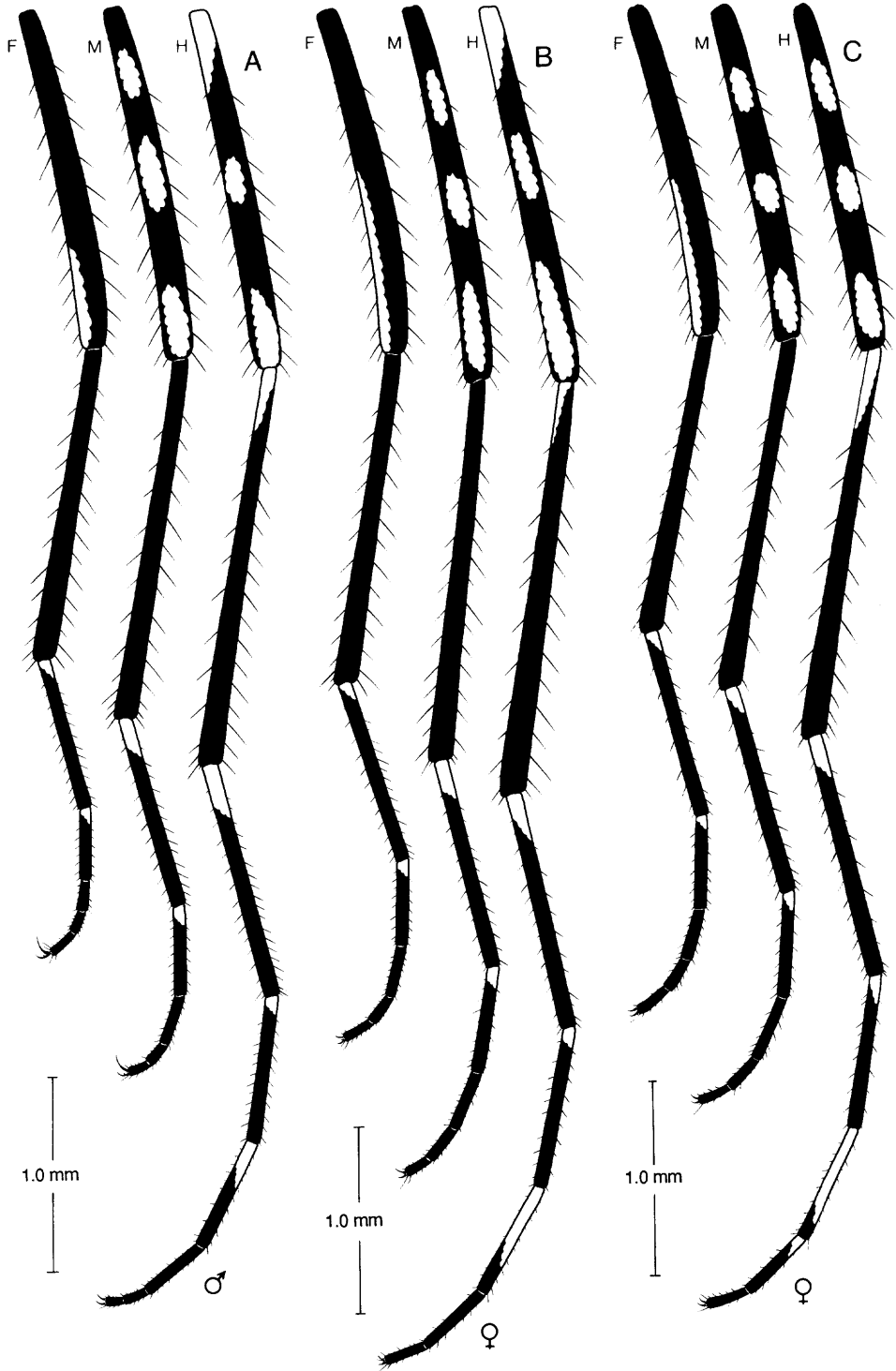


opok



ruwenzori

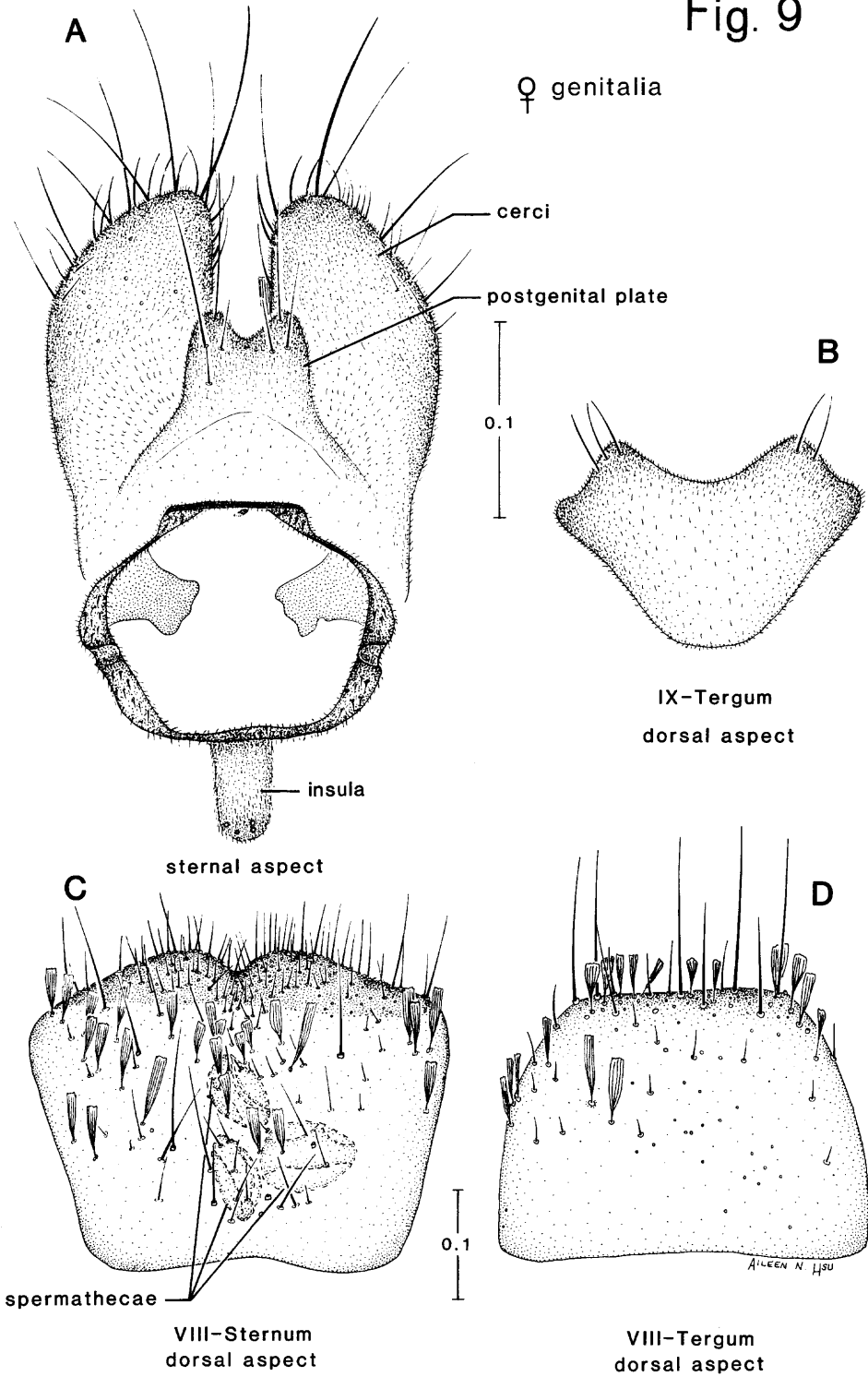
Fig. 8



luteocephalus

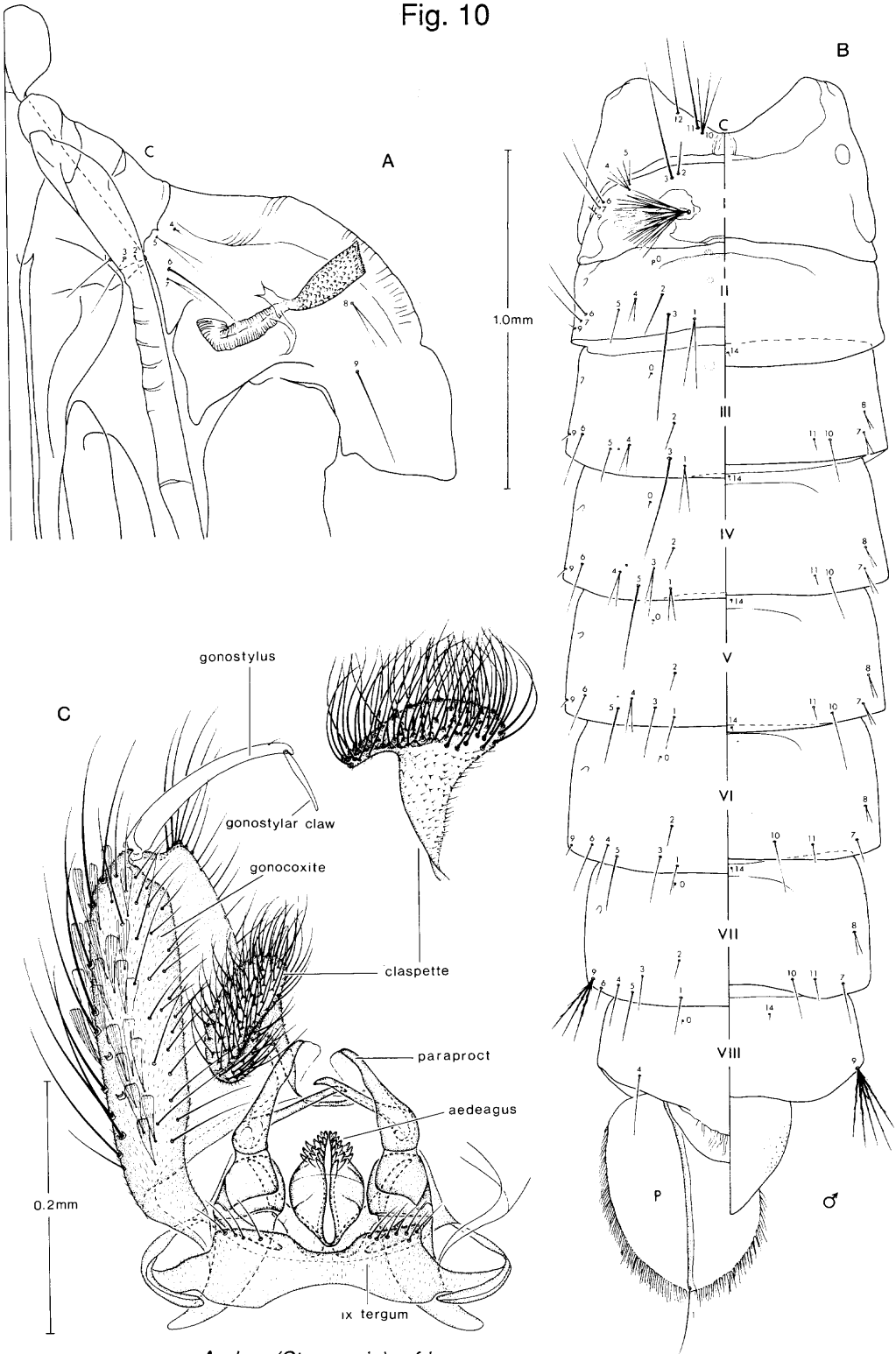
ruwenzori

Fig. 9



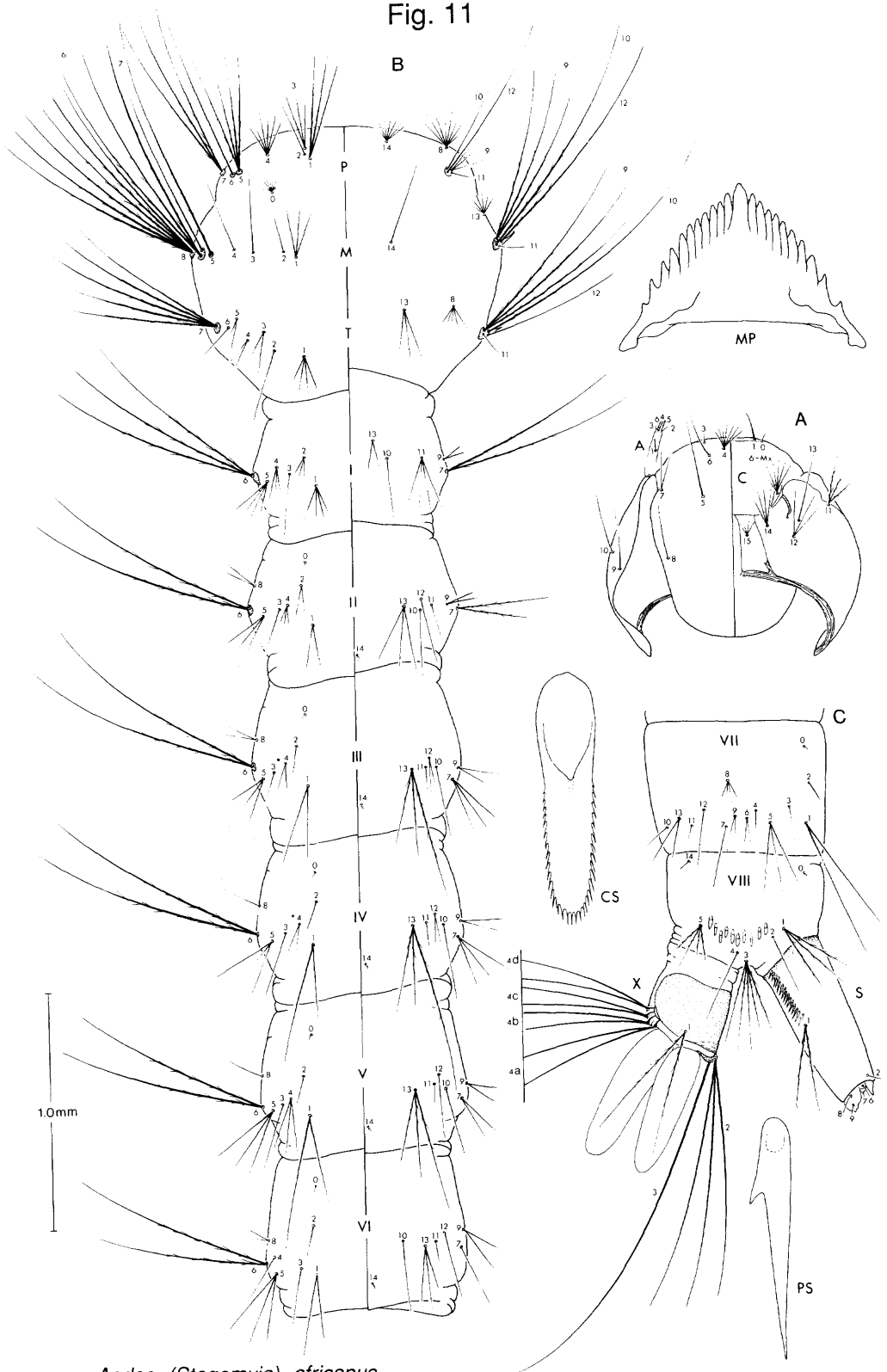
Aedes (Stegomyia) africanus

Fig. 10



Aedes (Stegomyia) africanus

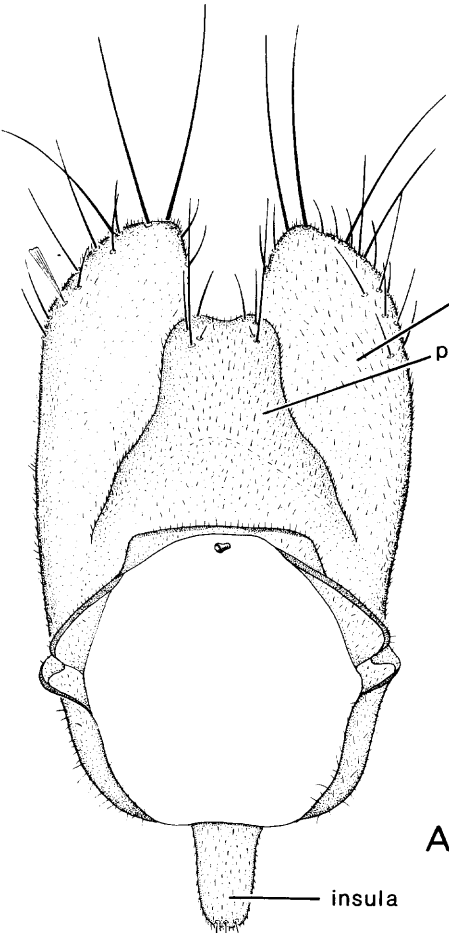
Fig. 11



Aedes (Stegomyia) africanus

Fig. 12

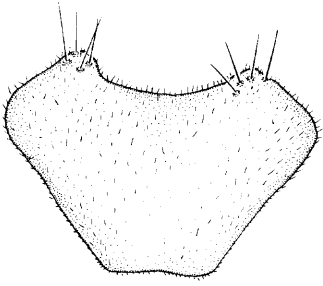
♀ genitalia



A

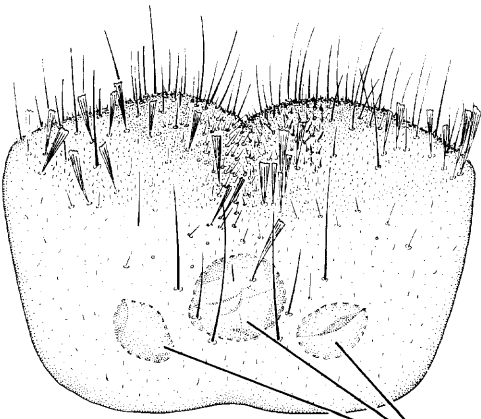
sternal aspect

0.1



IX-Tergum
dorsal aspect

B

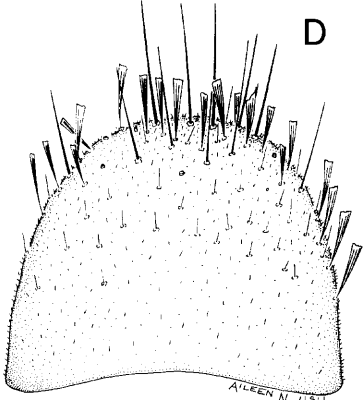


VIII-Sternum
dorsal aspect

spermathecae

C

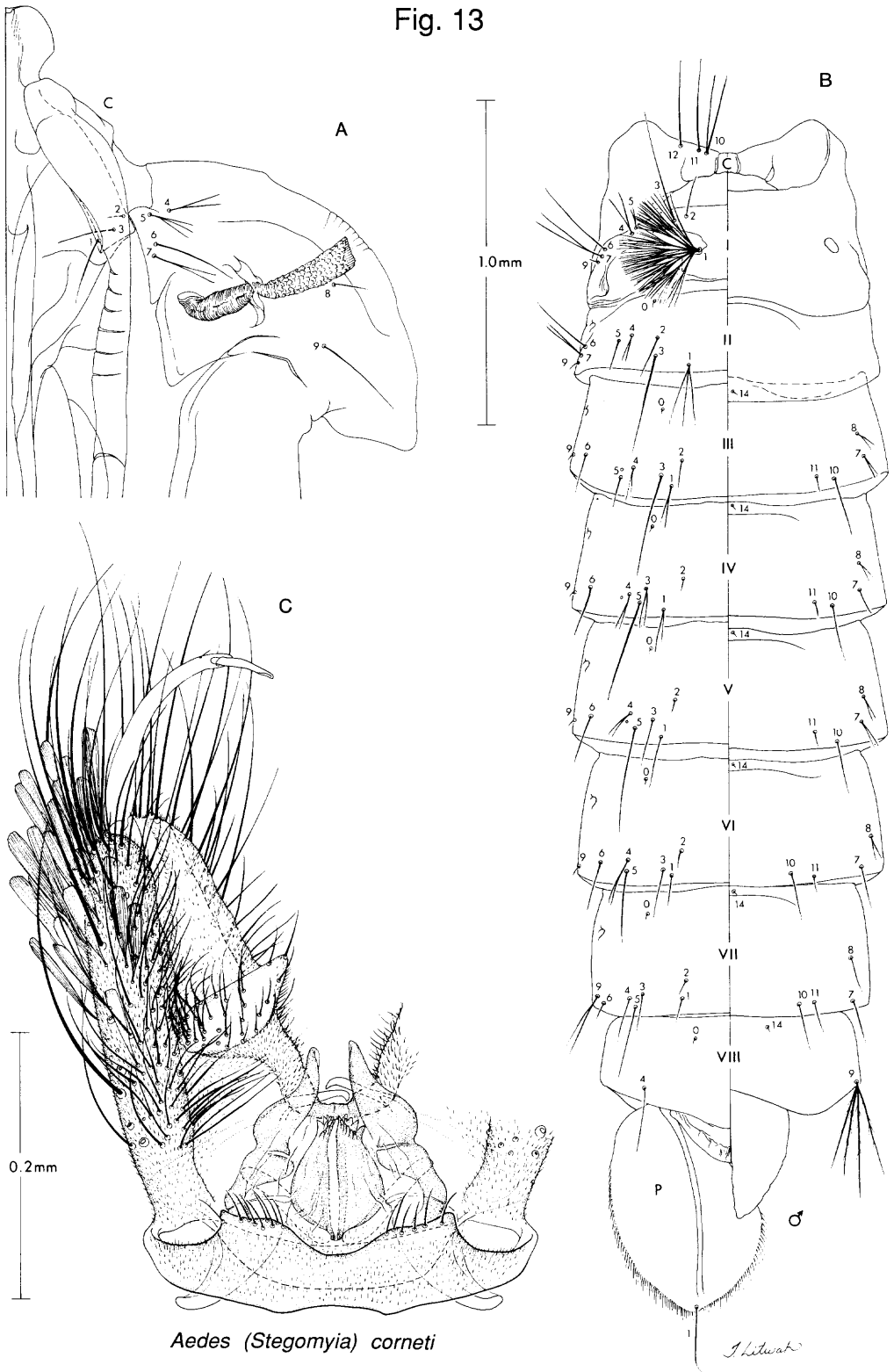
0.2



VIII-Tergum
dorsal aspect

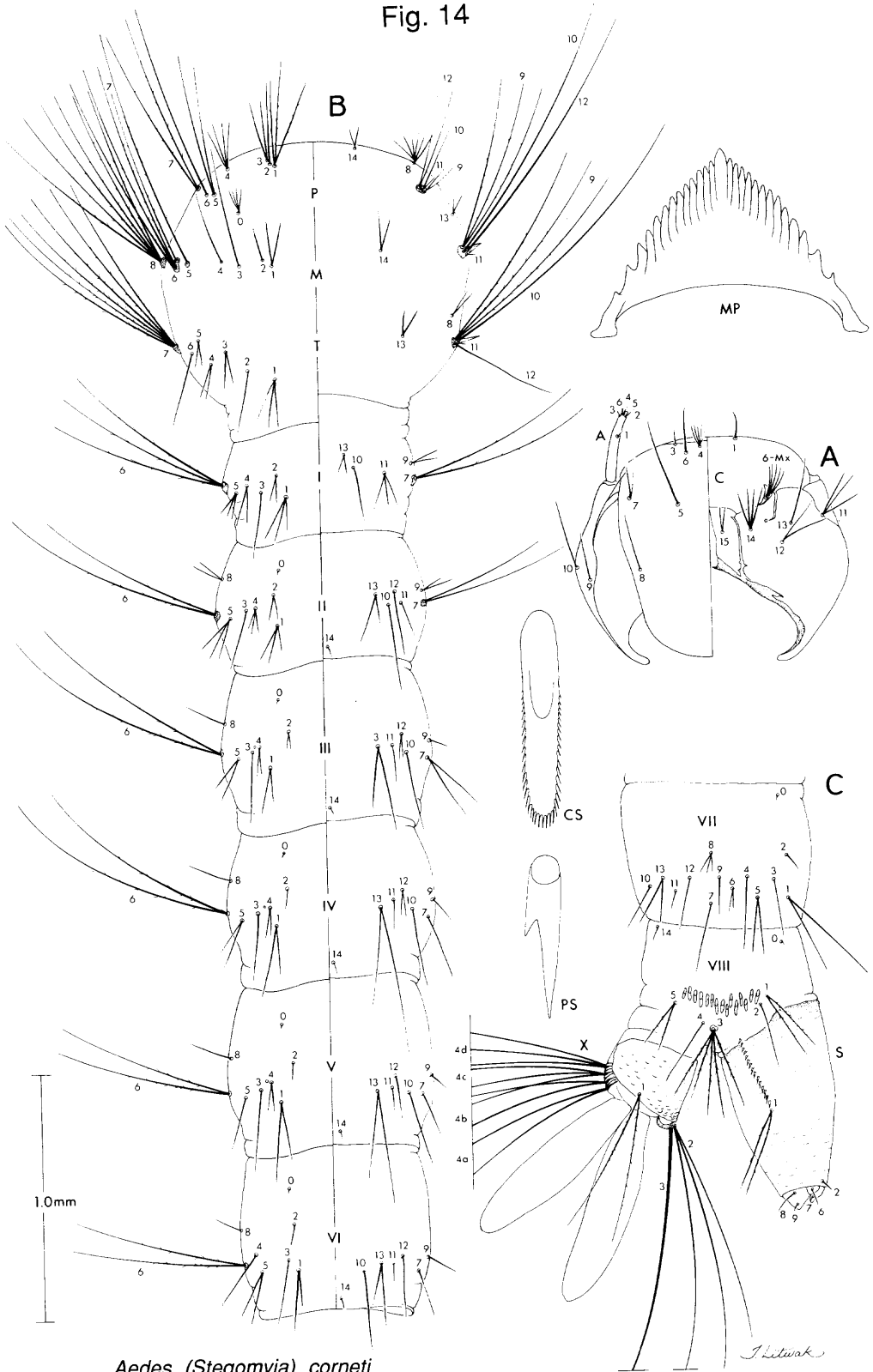
Aedes (Stegomyia) corneti

Fig. 13



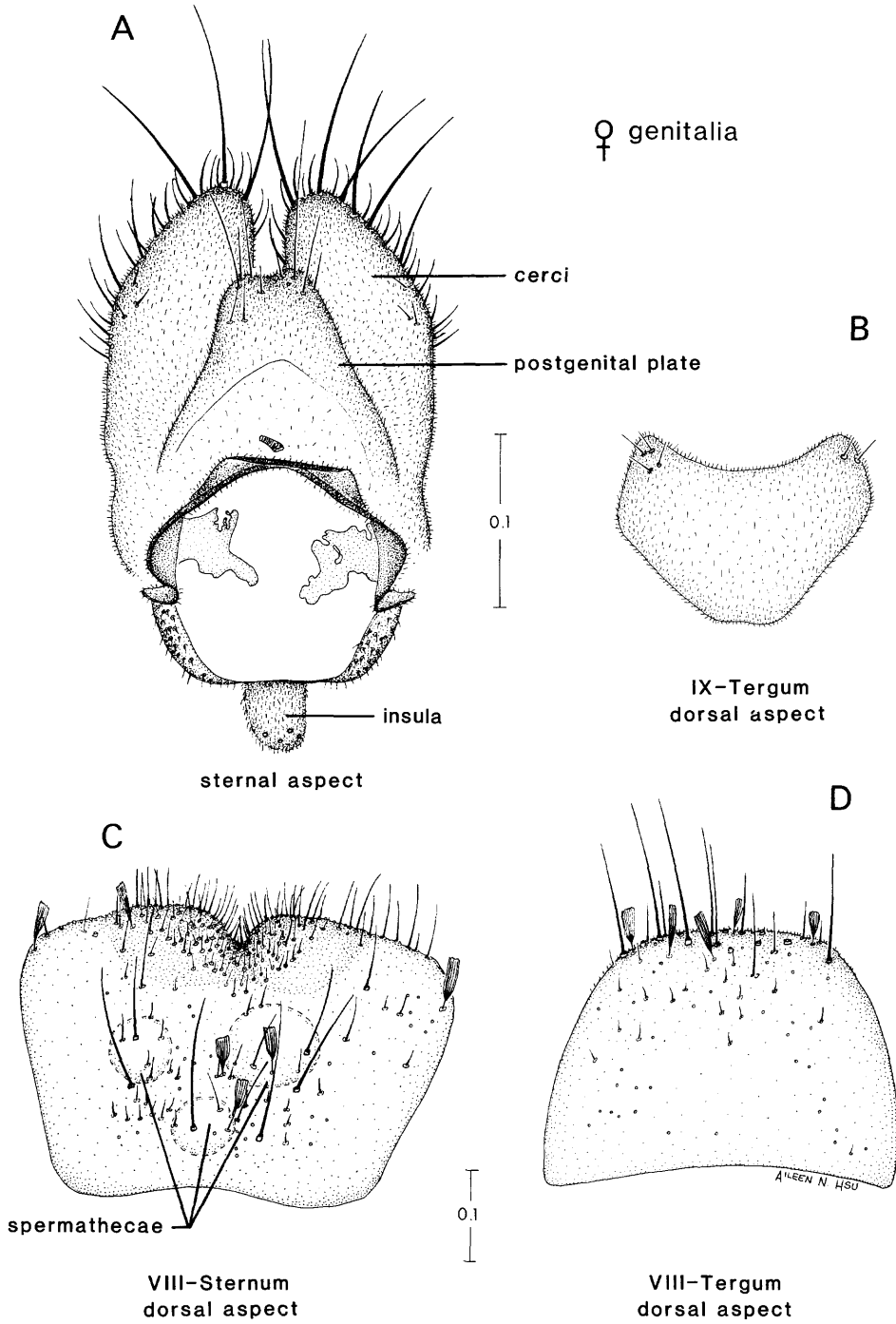
Aedes (Stegomyia) corneti

Fig. 14



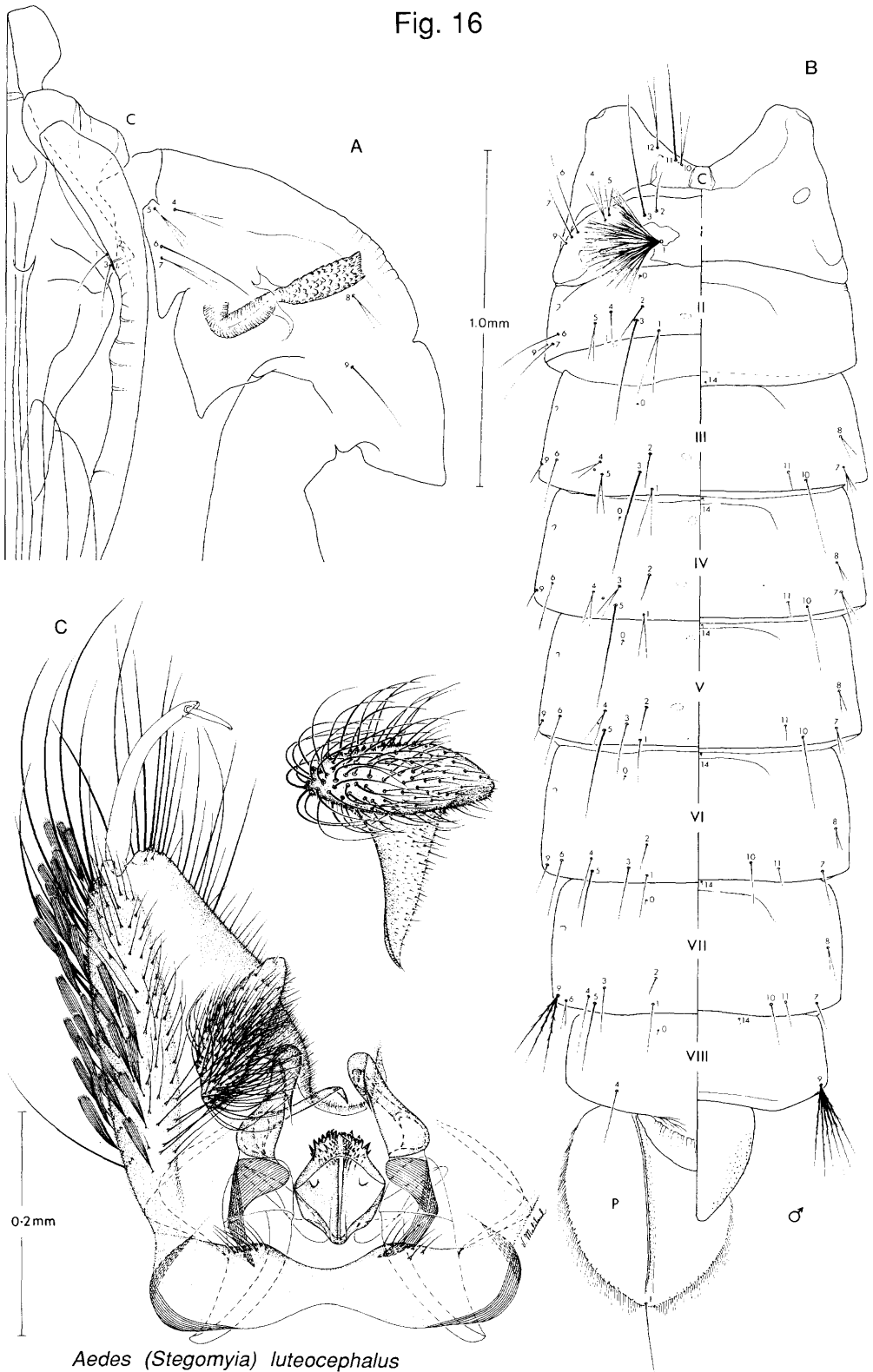
Aedes (Stegomyia) corneti

Fig. 15



Aedes (Stegomyia) luteocephalus

Fig. 16



Aedes (Stegomyia) luteocephalus

Fig. 17

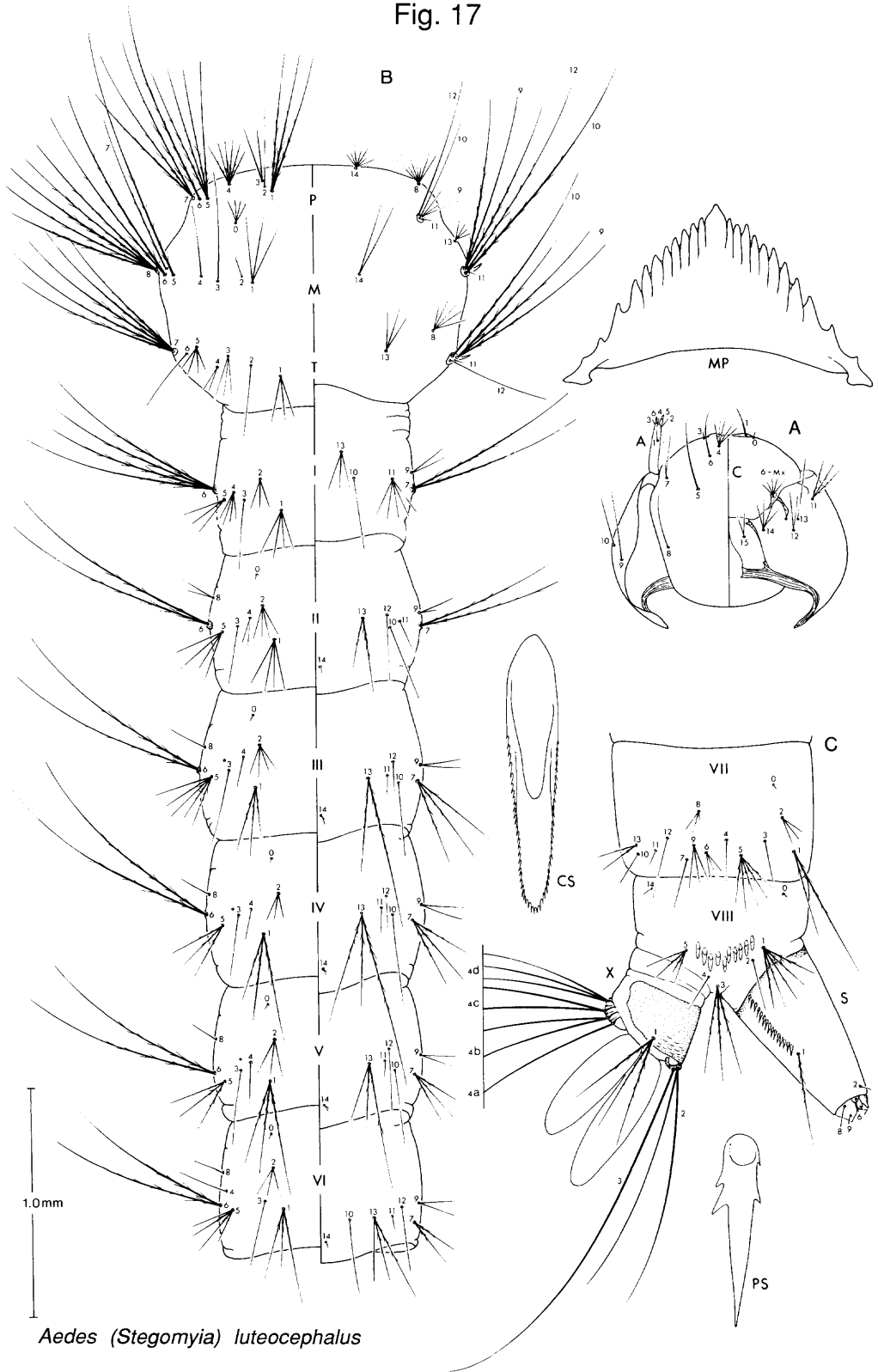
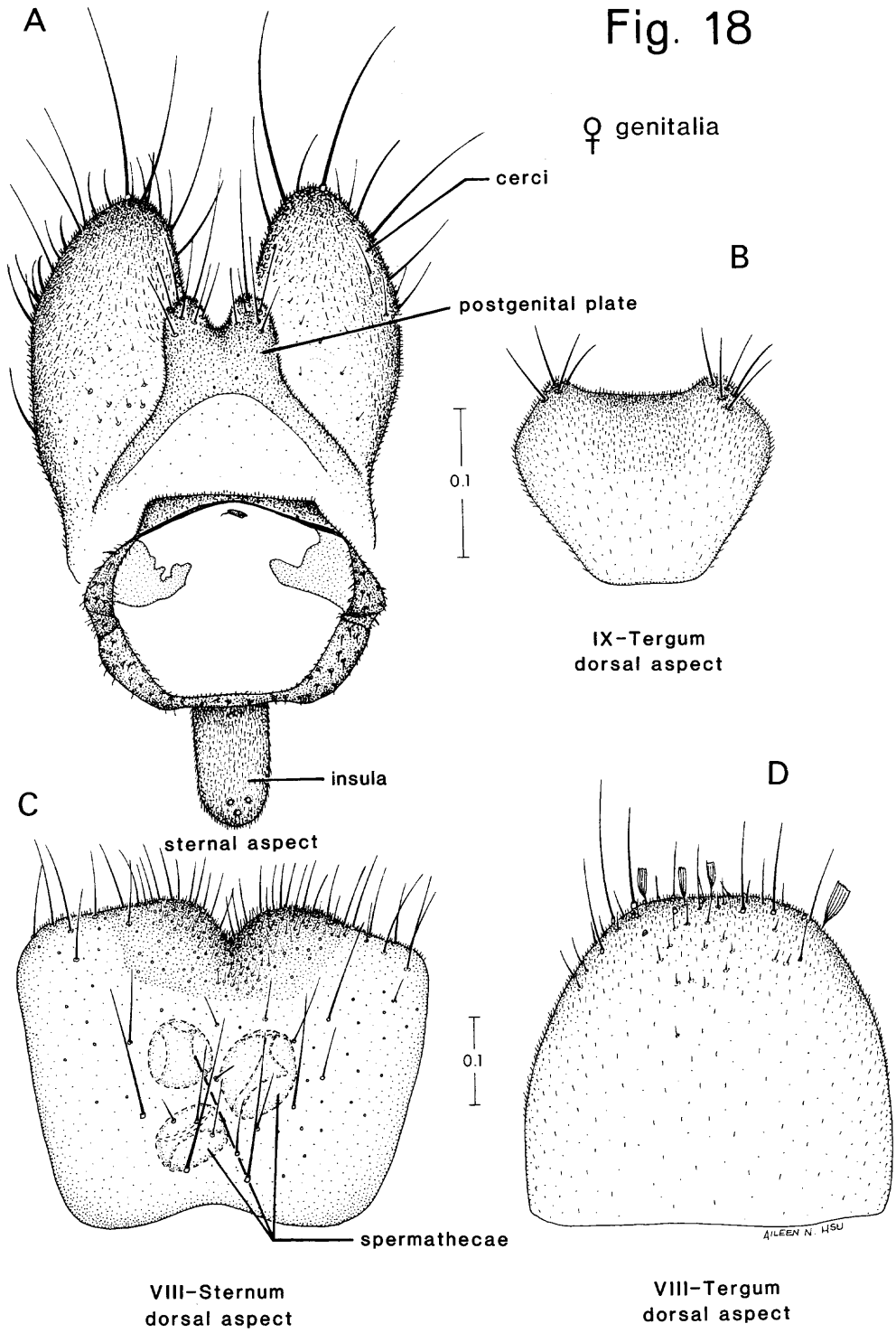


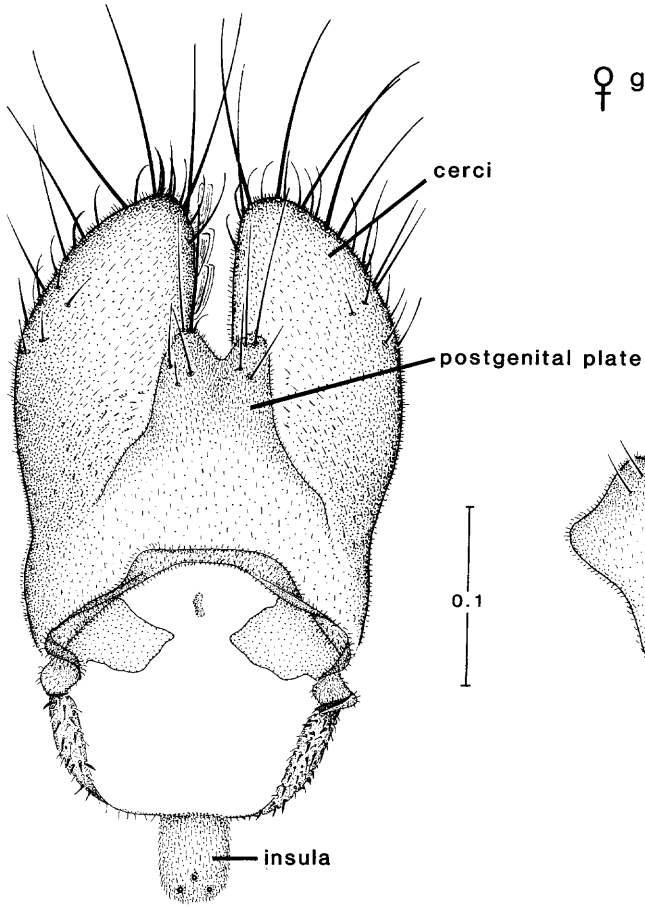
Fig. 18



Aedes (Stegomyia) maxgermaini

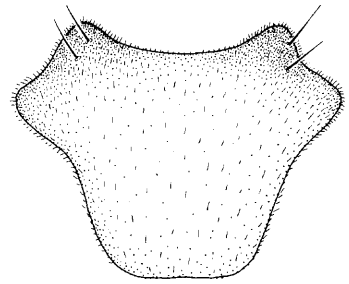
Fig. 19

♀ genitalia



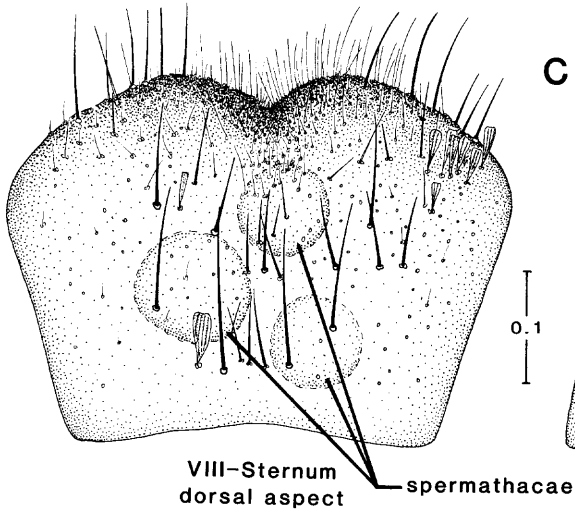
sternal aspect

A



IX-Tergum
dorsal aspect

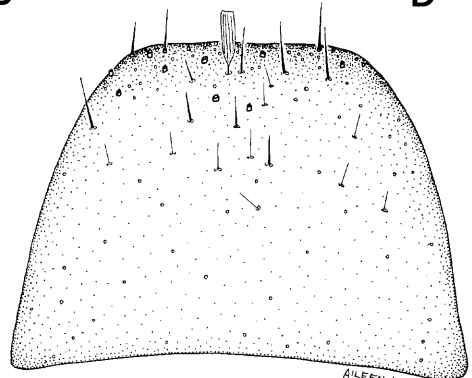
B



VIII-Sternum
dorsal aspect

spermathacae

C



VIII-Tergum
dorsal aspect

D

Aedes (Stegomyia) neoafricanus

Fig. 20

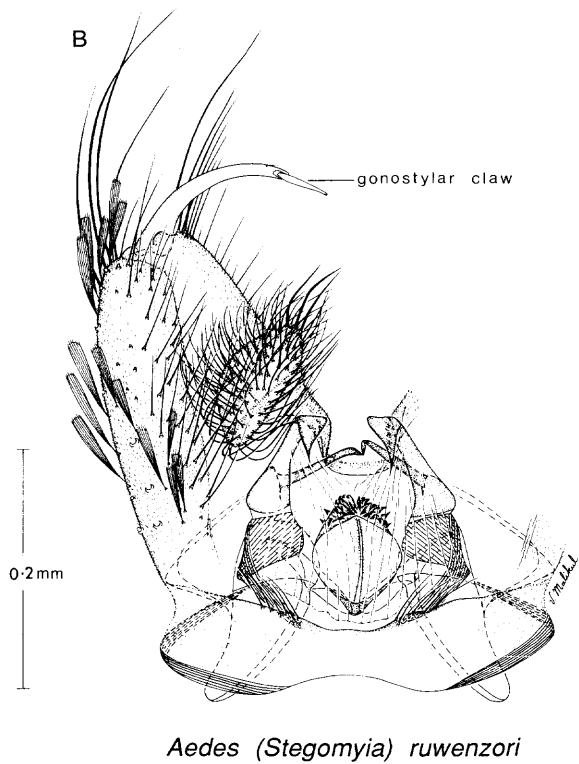
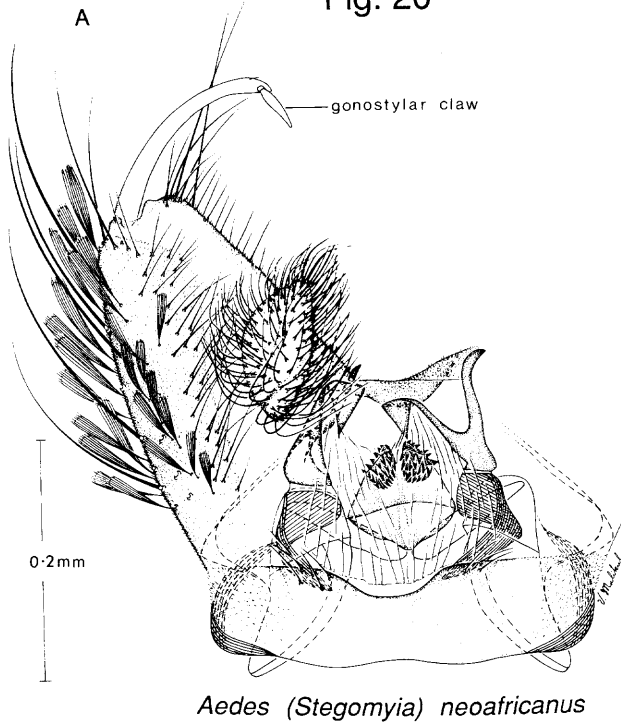


Fig. 21

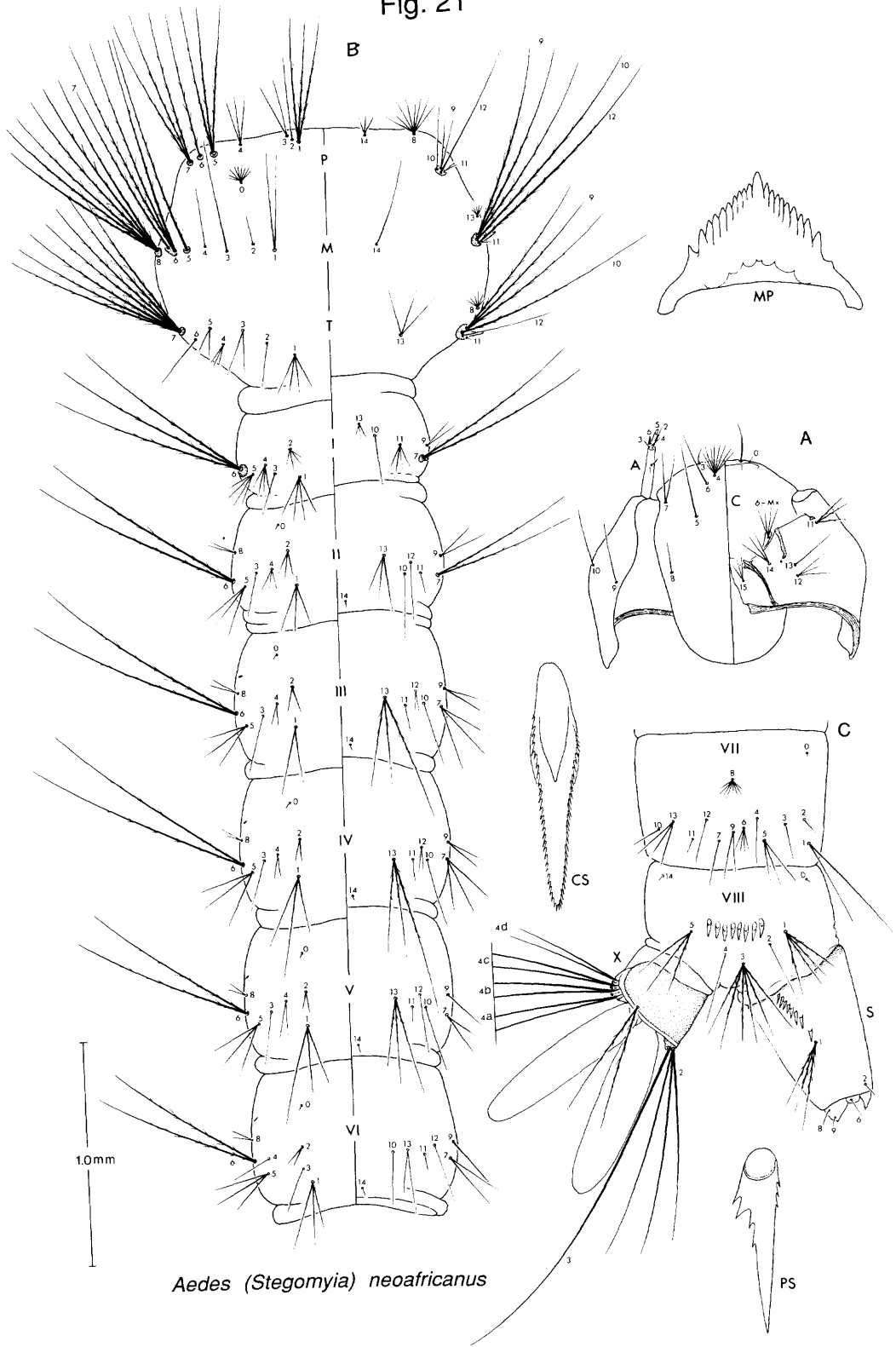
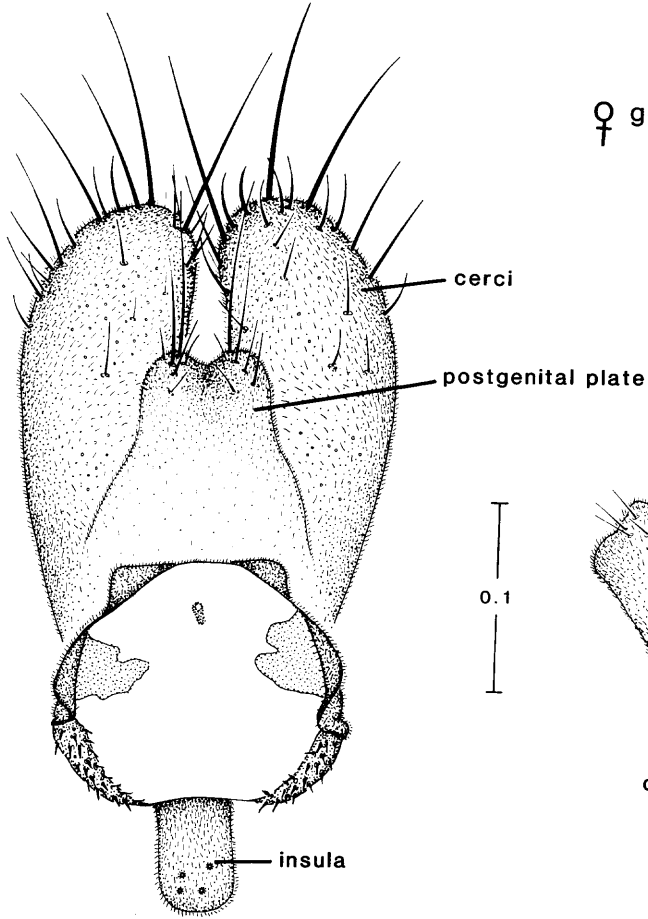


Fig. 22

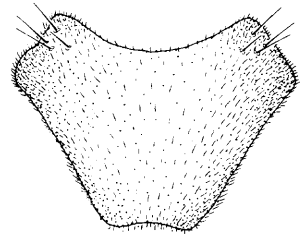
♀ genitalia



sternal aspect

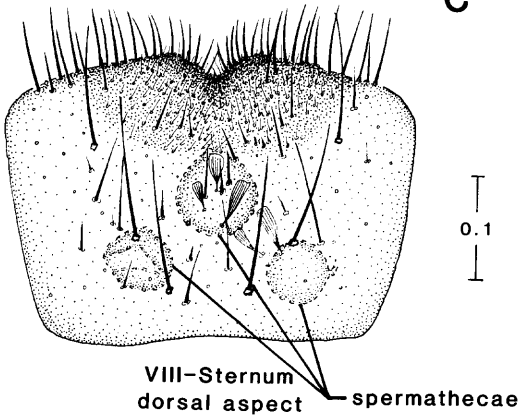
A

0.1



IX-Tergum
dorsal aspect

B

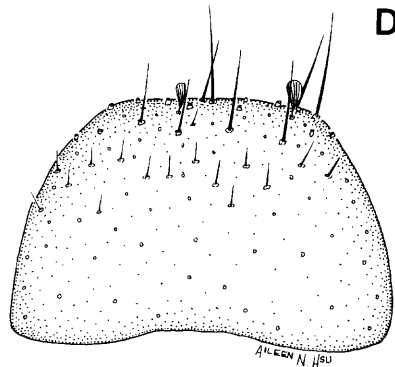


VIII-Sternum
dorsal aspect

spermathecae

C

0.1



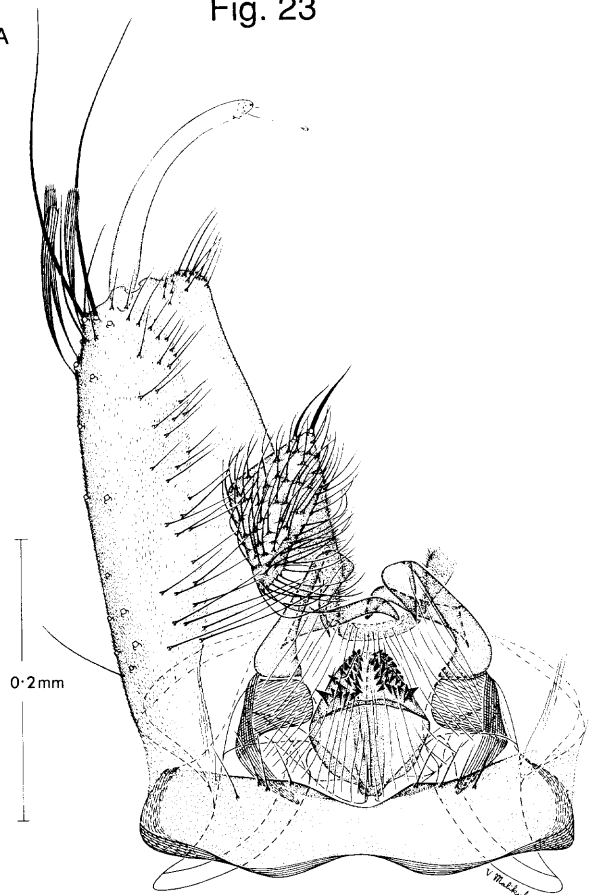
VIII-Tergum
dorsal aspect

D

Aedes (Stegomyia) opok

Fig. 23

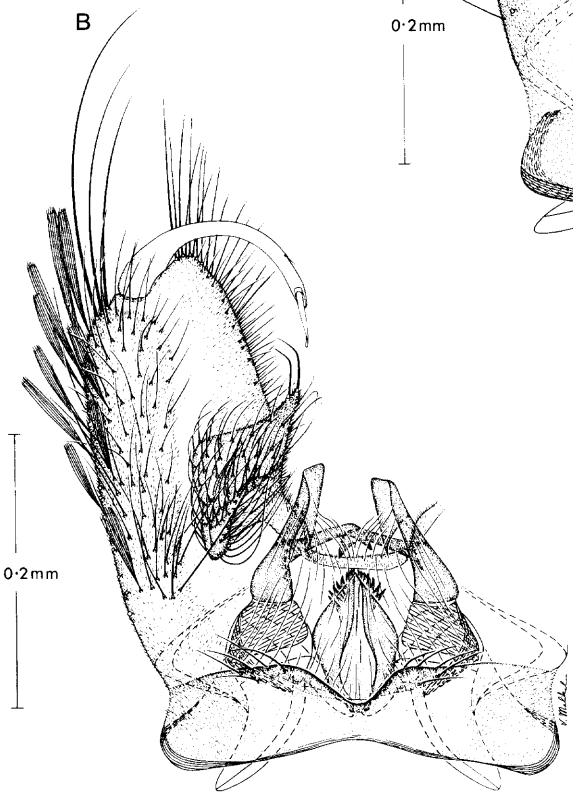
A



0.2mm

Aedes (Stegomyia) opok

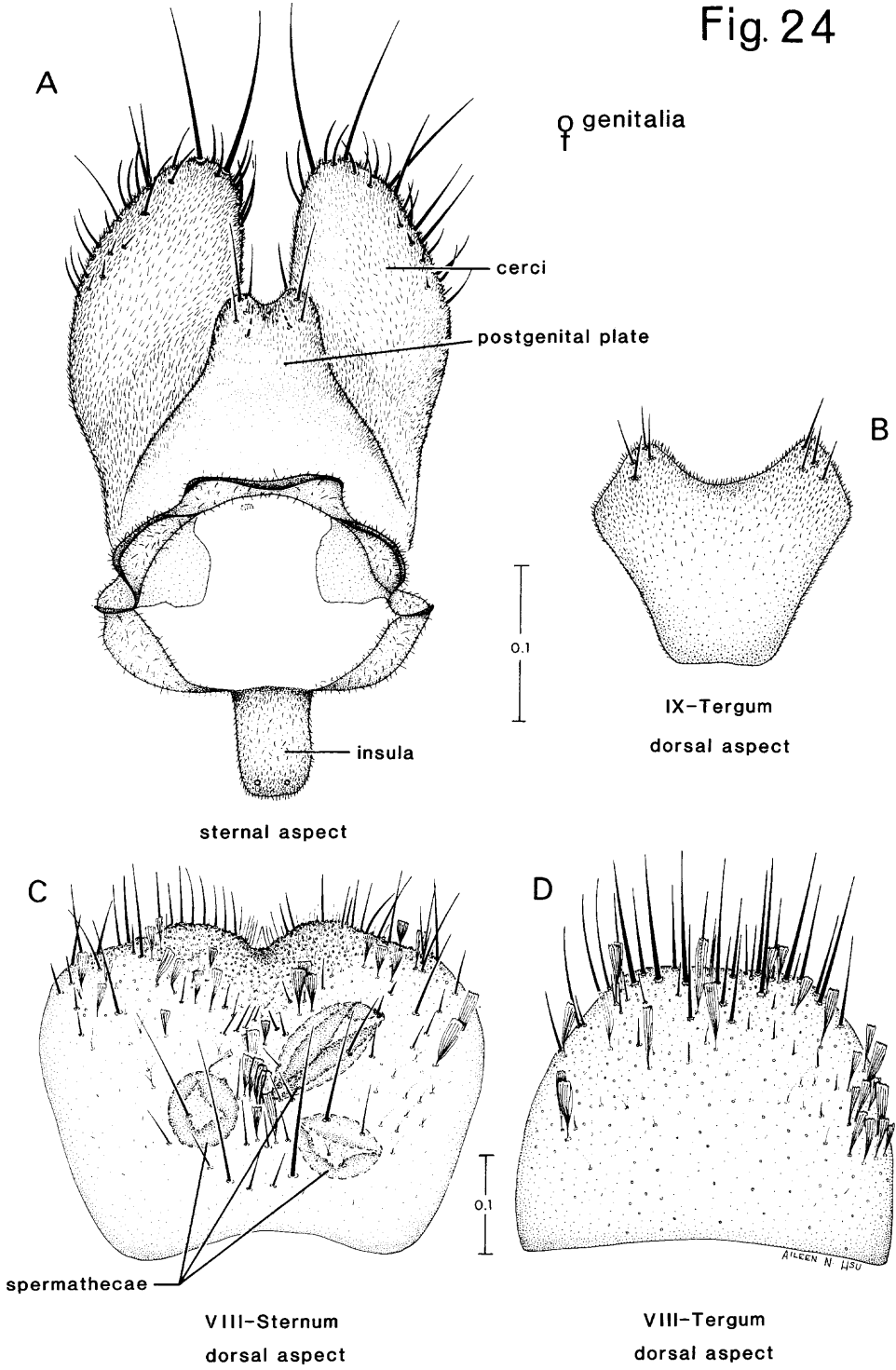
B



0.2mm

Aedes (Stegomyia) pseudoafricanus

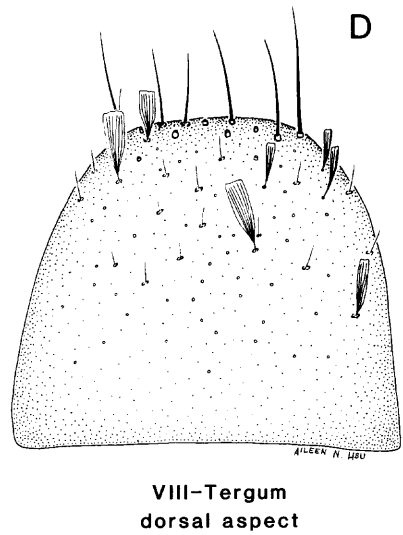
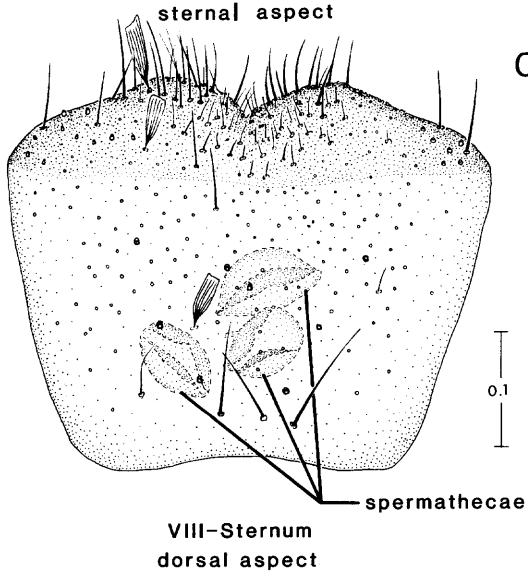
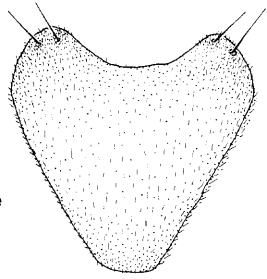
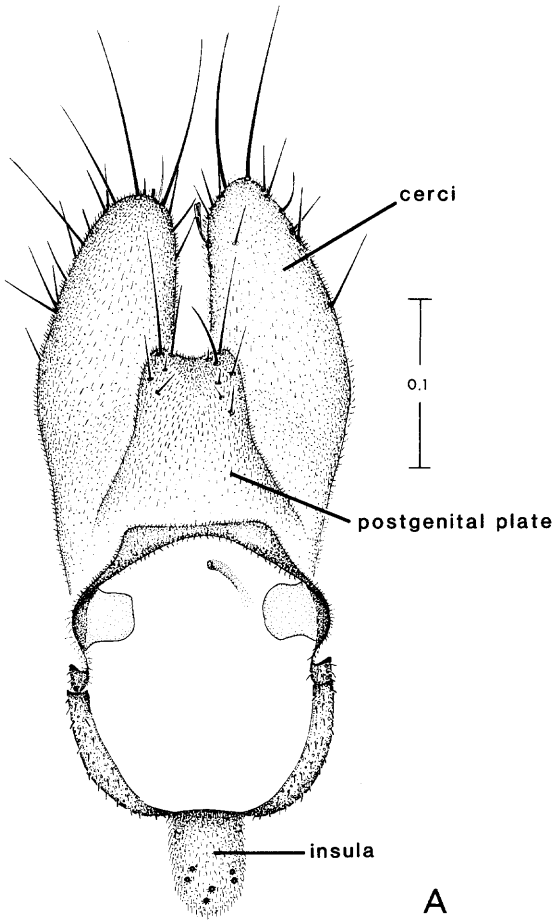
Fig. 24



Aedes (Stegomyia) pseudoafricanus

Fig. 25

♀ genitalia



Aedes (Stegomyia) ruwenzori

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