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ABSTRACT

The subgenus *Stegomyia* Theobald of the genus *Aedes* Meigen in the Afrotropical Region is characterized. Eleven species groups are recognized and diagnosed. The taxonomy, distribution, bionomics and medical importance of the species of the region are discussed and summarized. Keys and illustrations are provided for the identification of the 11 species groups and 59 species and subspecies known to occur in this region. Information on the present status of the species of the African *Stegomyia* is summarized. Six new species: *Aedes ealaensis*, *ethiopiensis*, *gandaensis*, *hogsbackensis*, *mpusiensis* and *sampi* are recognized. *Aedes blacklocki* Evans is restored to specific status. One subspecies, *denderensis* Wolfs is elevated to specific status.

Key words: Mosquitoes, *Stegomyia*, characteristic, systematics, medical significance, identification, new species, Afrotropical Region

INTRODUCTION

On a worldwide basis, *Stegomyia* Theobald is one of the most important subgenera of mosquitoes from the standpoint of transmitting pathogens. *Aedes aegypti* (Linnaeus) is the classical vector of urban yellow fever in the African and American tropics and is also the primary vector of dengue throughout most of the tropical world. *Aedes albopictus* (Skuse) is also an important vector of dengue. African species in the subgenus *Stegomyia* have been implicated as natural hosts, vectors, and/or reservoirs of eight viruses, six 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* as Huang (1990) has already noted. Various species of *Stego-*

myia are known to be efficient vectors of arboviruses in most regions of the world. Throughout the South Pacific Region several species are common vectors of subperiodic filariasis, although none is yet incriminated in Africa.

Stegomyia is one of the most dominant subgenera of the genus *Aedes* Meigen in the Afrotropical Region, as indicated by the number of species and variety of types. At present, 59 species and subspecies of *Stegomyia* are recognized in this region.

The Afrotropical fauna of the subgenus *Stegomyia* has not been properly defined since Edwards' (1932) classification and this has resulted in the incorrect assignment of some species to it and exclusion of others. As there is no comprehensive review of the subgenus of the region, this paper is intended to clarify some of these taxonomic problems and also to provide a key for identifing the species occurring in the Afrotropical Region.

The subgeneric characters of *Stegomyia* and its affinities to other aedine subgenera and the classification of the species groups are discussed. The 11 species groups of this subgenus, known as the *aegypti, africanus, apicoargenteus*, *dendrophilus*, *metallicus*, *poweri, pseudonigeria, simpsoni, granti, scutellaris* and *unilineatus* groups, occurring in the Afrotropical Region are also characterized. These 11 species groups with their constituent subgroups and 59 species and subspecies recognized here are listed in Table 1. The role of members of the subgenus in the transmission of pathogens is presented. Keys and illustrations for the identification of adults (males and females) and male genitalia of the 11 species groups and 59 species and subspecies of this region are provided. The full illustrations of those species that were published previously (Huang 1988b, 1990, 1997) are not included. Information on the present status of the species and their distribution is summarized in appendices I and II.

Of the 59 recognized Afrotropical species and subspecies of *Stegomyia* mentioned above, six are new. These six new species are described and important characters are illustrated. Information on type data, distribution, bionomics, medical importance and a taxonomic discussion of each species is presented.

Aedes cozi Cornet 1974 is omitted from the key since it is not a *Stegomyia* (Huang 2001, 2002).

The term "Afrotropical Region" as used here includes continental sub-saharan Africa and immediate offshore islands. At the present time, it comprises the following political units: Angola, Benin, Botswana, Burkina Faso, Burundi, Cabinda, Cameroon, Central African Republic, Chad, Congo, Democratic Republic of the Congo (Zaire), Djibouti, Equatorial Guinea (Rio Muni), Ethiopia, Fernando Po (part of Equatorial Guinea), Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Cote d'Ivoire (Ivory Coast), Kenya, Lesotho, Liberia, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Somalia, South Africa, Spanish Sahara, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zanzibar (part of Tanzania), Zimbabwe. 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 Systematic Biology, Entomology Section, 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 (capital letters), administrative divisions where known (italics) and place names (first letter capitalized). Place names that could not be located in available gazetteers 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 venational 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.

Subgenus *Stegomyia* Theobald

Stegomyia Theobald 1901a (June 1), *in* Howard 1901: 235; Theobald 1901b (July 15): 235; Theobald 1901c (Sept.): 4, App. ii; Theobald 1901d (Nov. 23): 283. Type-species: *Culex aegypti* Linnaeus 1762 (see Mattingly, Stone and Knight 1962).

Quasistegomyia Theobald 1906: 69. Type-species: *Q. unilineatus* Theobald 1906,Bahr-el-Ghazal, Sudan; monobasic.

Pseudostegomyia Ludlow 1908: 10. Type-species: *Stegomyia gardnerii* Ludlow 1905, Bulacao, Mindoro Island, Philippines; monobasic [Apparently an error for *Quasistegomyia* Theobald 1906 (see Theobald 1910: 135)].

Kingia Theobald 1910: 135 (non Schloenbach 1866). Type-species: *Stegomyia luteocephala* Newstead (Brunetti 1914: 63).

Aniella Enderlein 1923: 26. Type-species: *Stegomyia africana* Theobald.

Characteristics

The subgenus *Stegomyia* is characterized by the following combination of characters: ADULT (both sexes). (1) Vertex with all broad, flat decumbent scales, erect forked scales not numerous, restricted to occiput; (2) male maxillary palpi not very short, more than 0.5 length of proboscis, 5-segmented, segment 4, 5 subequal, slender and with only a few short setae, total length of apical 2 segments not very short, at least 0.4 length of the remaining segments; in female about 0.14–0.32 length of proboscis, 3- or sometimes 4-segmented, when present segment 4 minute; (3) maxillary palpi with white scales; (4) acrostichal setae absent; (5) prespiracular setae absent; (6) postspiracular setae present; (7) postprocoxal membrane without scales; (8) scutum with all, or mainly narrow scales; (9)

scutellum with broad scales on all lobes; (10) mesopostnotum bare; (11) wing with plume scales narrow; (12) hindtarsus with basal white band at least on one tarsomere. Male Genitalia. (13) Aedeagus strongly toothed; (14) claspette well developed, with numerous setae; (15) gonostylar claw present. Female Genitalia. (16) Insula longer than broad, with minute setae and with 2–10 larger setae on apical 0.25–0.50; (17) cerci short and broad; (18) 3 spermathecae, one larger than the other 2. PUPA. Subgeneric characters not evident. LARVA. (19) Head seta 4-C well developed, branched, closer to 6-C than 5-C, cephalad and mesad of 6-C; (20) 4, 6-C cephalad of antennal base; (21) 6-C cephalad of 5, 7-C; (22) seta 12-I not developed; (23) seta 2-VIII distant from 1-VIII; (24) comb scales in a single row; (25) ventral brush (4-X) with 4, 5 pairs of setae on grid; (26) without precratal tufts. This combination of characters differs from other subgenera of *Aedes.*

Systematics

Edwards (1932) divided the subgenus *Stegomyia* into four groups, which he designated as A, B, C and D. In "Group A (*aegypti* group)" he included 18 species from Africa (except for *Ae*. *aegypti*). Edwards assigned *Aedes chemulpoensis* Yamada and *Ae. mascarensis* MacGregor to Group B (*w-albus* group). Mattingly (1953) transferred *Ae*. *chemulpoensis* and *Ae*. *mascarensis* from Group B to Group A (*aegypti* group). Huang (1974c) redescribed the type-specimens of *Ae*. *chemulpoensis* and designated a lectotype for this species and also confirmed the assignment of *Ae*. *chemulpoensis* to Group A (*aegypti* group). *Aedes amaltheus* was described by de Meillon and Lavoipierre (1944) from Livingstone, Zambia (as Northern Rhodesia). Mattingly (1952, 1953) noted difficulty of fitting this species into Edwards' (1932) system of grouping. Later, Mattingly (1965) began a revision of the main groups of the subgenus *Stegomyia* as defined by Edwards (1932) and summarized the characteristic of the species groups (A, B and D) and subgroups. He recognized three subgroups in Group B (*w-albus* group) and assigned *Ae*. *amaltheus* to his subgroup B3 (*Ae*. *amaltheus* subgroup). Huang (1974a) transferred *Ae*. *amaltheus* from Group B (Mattingly's *Ae*. *amaltheus* subgroup) to Group A (*aegypti* group) on the basis of a critical examination of this species (male and female) and comparison with other members of Groups A, B and C.

Mattingly (1965) subdivided Group A into three subgroups known as Subgroups A1 (*Ae*. *aegypti* subgroup), A2 (*Ae*. *africanus* subgroup) and A3 (*Ae*. *chemulpoensis* subgroup). In "Subgroup A1 (*Ae*. *aegypti* subgroup)," he included 28 species from the Mascarenes and Africa (except for *Ae*. *aegypti*). *Aedes pseudonigeria* (Theobald) was assigned by Mattingly (1965: 22) to his Subgroup A1. In "Subgroup A3 (*Ae*. *chemulpoensis* subgroup)" he included only one species, *Ae*. *chemulpoensis* from Korea and N.E. China. Huang (1988b) removed *Ae*. *pseudonigeria* from Mattingly's Subgroup A1 and defined a new group (*pseudonigeria* group) for it and three related species. *Ae*des *chemulpoensis* from Mattingly's Subgroup A3 was assigned by Huang (1988b: 4) to the *pseudonigeria* group. Huang (1990) defined the *africanus* group, which is practically the same

complex of species as Mattingly's Subgroup A2 (*Ae*. *africanus* subgroup). Huang (1997) removed *Ae*. *dendrophilus* Edwards from Mattingly's Subgroup A1 and defined a new group (*dendrophilus* group) for it and 13 related species. *Ae*des *amaltheus* was assigned by Huang (1997: 7) to the *dendrophilus* group.

The remaining species in Mattingly's Subgroup A1 (*Ae*. *aegypti* subgroup) can be further divided into five species groups, the *aegypti, apicoargenteus*, *metallicus*, *poweri* and *simpsoni* groups. These eight groups in the present paper comprise Mattingly's Subgroup A1, Subgroup A2 and Subgroup A3.

Edwards (1932), in his "Group C (*scutellaris* group)," included 10 species from the Oriental and Australasian Regions, Crete and Africa. Huang (1972c) redefined Group C (*scutellaris* group) and subdivided the *scutellaris* group into two subgroups, the *albopictus* subgroup and the *scutellaris* subgroup. (1) The *albopictus* subgroup is characterized by having the supraalar white line incomplete, not clearly defined and with only narrow scales over the wing root. (2) The *scutellaris* subgroup is characterized by having the supraalar white line complete and well developed, with broad flat scales over the wing root and toward scutellum. *Aedes albopictus* was assigned by Huang (1972c: 4) to the *albopictus* subgroup. *Aedes galloisi* Yamada was originally assigned to Group C (*scutellaris* group), by Edwards (1932). Mattingly (1965) transferred it from Group C. to Group B. Huang (1972a) redescribed the type-specimens of *Ae. galloisi* and designated a lectotype for this species. Based on the great similarity to members of the *scutellaris* group, Huang (1972a) transferred *Ae*. *galloisi* back to the *scutellaris* group and placed it in the *albopictus* subgroup. *Aedes granti* (Theobald) and *Ae*. *unilineatus* (Theobald) were assigned by Edwards to his Group C (*scutellaris* group).

In the following treatment I recognize three species groups from the Afrotropical Region: (1) the *granti* group is erected for the nominate species, *Ae granti* (Theobald) 1901d, from Socotra, (2) the *scutellaris* group is represented by the recently introduced *Ae*. *albopictus*, and (3) the *unilineatus* group is erected for the nominate species, *Ae*. *unilineatus* (Theobald) 1906, from Sudan.

The 59 species and subspecies of the African *Stegomyia* can be further divided into two sections, A and B. (1) Section A is characterized by having the scutum with a distinct patch of broader crescent-shaped white or yellow scales on the fossal area. It is represented by eight species groups, the *aegypti*, *africanus*, *apicoargenteus*, *dendrophilus*, *metallicus*, *poweri*, *pseudonigeria* and *simpsoni* groups. Included also in the *aegypti* group is one Malagasy species, *Ae. mascarensis* from Mauritius. In addition, one Palearctic species, *Ae. chemulpoensis* from Korea, and N.E. China, is included in the *pseudonigeria* group. These two species are not found in the Afrotropical Region and are treated here for comparison. There is one species, *Ae*. *vinsoni* Mattingly, also from Mauritius, that is not treated here, awaiting more adequate material for study. (2) Section B is characterized by having the scutum with a long, median longitudinal white stripe of narrow scales extending from anterior margin to about the level of wing root. It is represented by three

species groups, the *granti*, *scutellaris* and *unilineatus* groups. Thus, the African *Stegomyia* now consists of 11 species groups. These 11 groups with their constituent subgroups, 59 species and subspecies are listed in Table 1.

MacGregor (1924: 409) described *Aedes* (*Stegomyia*) *mascarensis* from Mauritius. Edwards (1932) assigned *Ae. mascarensis* to his Group B (*w-albus* group), and Mattingly (1953) transferred it from Group B to Group A (*aegypti* group). After a critical examination of this species, I agree with Mattingly's (1953) assignment of *Ae. mascarensis* to the *aegypti* group. The adult of *Ae. mascarensis* differs from all the members of the *aegypti* group by the absence of white knee-spot on all femora. This same character state of *Ae. mascarensis* is extremely similar to all the species of the *africanus* group. However, *Ae. mascarensis* can be distinguished from all the species in the *africanus* group by the diagnostic characters given in the key. The male genitalia of *Ae. mascarensis* are extremely similar to those of *Ae. aegypti* in having the apical margin of tergum IX with the middle part deeply concave, with large conical lateral lobes, each with a few very short setae at the tip. However, *Ae. mascarensis* can be distinguished from those of *Ae. aegypti* by the gonostylus, which is not swollen in the middle and strongly elbowed at about apical 0.35 (see Fig. 48C). In *Ae. aegypti*, the gonostylus is somewhat swollen in the middle, with the apical 0.28 rather narrow and curved (see Fig. 35A).

Evans (1925: 121) described *Aedes* (*Stegomyia*) *blacklocki* from Daru, Sierra Leone. *Stegomyia fraseri* was originally described by Edwards (1912: 11) from a single female from Mpumu Forest, Uganda. Later, Edwards (1917: 210) reported "Since then a good series including both sexes has been received by the Imperial Bureau of Entomology from Southern Nigeria; unfortunately the names of the locality and collector have been lost. These specimens agree perfectly with the type female." Edwards (1941: 139) considered *Aedes* (*Stegomyia*) *fraseri* (Edwards) as a single species and synonymized *Ae. blacklocki* with *Ae. fraseri*.

A careful study of Evans' type-specimens of *blacklocki,* Edwards' type-specimen of *fraseri*, and other available material indicates that *Ae. blacklocki* Evans is a distinct species. Thus, *Ae. blacklocki* is removed from synonymy with *Ae. fraseri* and is restored to specific status. The adult male and female of *Ae. blacklocki* are very similar to those of *Ae. fraseri* but can be easily distinguished from *Ae. fraseri* as follows: hindfemur with anterobasal 0.20–0.25 white and with a large white spot 0.60–0.64 from base (white spot not connected with the basal white area). In *Ae. fraseri,* the hindfemur has a broad, white, anterior stripe on the basal 0.50–0.53.

The male genitalia of *Ae. blacklocki* are extremely similar to those of *Ae. fraseri* in having the claspette with distal expanded portion square in dorsal aspect (apicomesal angle formed a narrow thumb-like projection, with a 90° basolateral angle), with numerous simple setae on the expanded distal portion and bearing 3–4 setae on the apicomesal angle. However, *Ae. blackloci* can be distinguished from those of *Ae. fraseri* by the gonostylar claw, which is rather short and stout. In *Ae. fraseri*, the gonostylar claw is long and

slender (see Figs. 38B and 38A). *Aedes blacklocki* is most similar to *Ae. fraseri*, and I consider *Ae. blacklocki* to be the sister species of *Ae. fraseri*.

Aedes (*Stegomyia*) *denderensis* Wolfs (1949: 190) was originally described as a var. of *Aedes* (*Stegomyia*) *apicoargenteus* (Theobald) from Dender, Costermansville, DEMOCRATIC REPUBLIC OF THE CONGO (Zaire). Mattingly (1952, 1953) stated that the larva of *Ae. denderensis* differs from *Ae. apicoargenteus* in having an entirely dark siphon. Mattingly (1953: 13) treated *Ae. denderensis* as a subspecies. However, it is clearly a distinct species. The adult male and female of *Ae. denderensis* are very similar to those of *Ae. apicoargenteus* in having the scutellum with broad white scales on midlobe and with broad, dark scales on lateral lobes. This species can be distinguished easily from *Ae. apicoargenteus* as follows: hindtarsomere 5 with basal 0.33 white to all white on dorsal surface. In *Ae. apicoargenteus*, the hindtarsomere 5 is all dark. Based on discovery that the male genitalia of *Ae. denderensis* differ from other species in the *apicoargenteus* group, I have accorded it specific status. The differences are: claspette with distal, expanded portion square in dorsal aspect, apicomesal angle forming a broad thumb-like projection, and basolateral corner rounded, expanded distal portion bearing numerous simple setae and apicomesal angle with 8–9 setae (see Fig. 37A).

Edwards (1932) originally assigned *Aedes granti* to his Group C (*scutellaris* group). Knight and Hurlbut (1949) subdivided the *scutellaris* group into three subgroups known as Subgroup I. *scutellaris* s. str., Subgroup II. *albopictus* and Subgroup III. *mediopunctatus*, and placed *Ae. granti* in Group C, Subgroup II. (*albopictus* subgroup). Mattingly (1953: 17) considered *Ae. granti* to be clearly the *scutellaris* subgroup, which it resembles in pleural markings. The taxonomic position of *Ae. granti* has been further discussed by Marks (1954: 353). Marks (1954: 353, 382) considered *Ae. granti* by itself as a separate subgroup of Group C (*scutellaris* group). Mattingly and Knight (1956: 100) stated that *Ae. granti* "... is intermediate in its characters between the *Aedes scutellaris* Walker and *Aedes albopictus* Skuse groups of *Stegomyia*."

A careful study of Theobald's type-specimen of *Stegomyia granti* from Dahamish, Sokotra, Leeson's specimens of *Aedes* (*Stegomyia*) *granti* (Theobald) from Mouri, Socotra, and other available material indicates that *Ae. granti* is clearly a remarkable species. It differs from all the members of the *scutellaris* group (the *albopictus* subgroup and the *scutellaris* subgroup) in markings of proboscis, female maxillary palpus, legs, scutellum (see Figs. 5B,D and Figs. 7B,C) and wings (costa with white line on basal 0.5–0.6). Based on the discovery that the male genitalia of *Ae. granti* are differentiated from all other species in the *scutellaris* group by the claspette, which has the distal elevated portion long and narrow in dorsal aspect, with numerous simple setae on the elevated distal portion and bearing no widened specialized setae, and by the gonostylar claw which is long and slender (see Fig. 49A), I have here placed *Ae. granti* in a distinct monotypic species group, the *granti* group (*Aedes granti* (Theobald)).

The larva of *Ae. granti* is very similar to those of all members of the *scutellaris* group, in having the comb scales in a single row and not arising from a sclerotized plate, but can be distinguished from those of the *scutellaris* group by the basal spine of meso- and metapleural setal groups which is strong and bluntly pointed. In this respect it resembles *Ae. desmotes* (Giles) of the *desmotes* subgroup, the *w-albus* group. However, *Ae. granti* can be distinguished easily from that of *Ae. desmotes* by the comb of 9–12 scales in a row, without a sclerotized plate (Leeson and Theodor 1948: 226, 227, Fig.4). In *Ae. desmotes*, comb of 3–5 scales in a row, which is arising from a sclerotized plate (see Huang 1977a: 26, 28, Fig.15C).

The *granti* group shows the strongest affinities with the *scutellaris* subgroup of the *scutellaris* group but can be distinguished easily from the latter by the diagnostic characters given in the key.

Aedes unilineatus was assigned by Edwards (1932) to his Group C (*scutellaris* group). As noted above, Knight and Hurlbut (1949) subdivided the *scutellaris* group into three subgroups and provisionally placed *Ae. unilineatus* in Group C, Subgroup II. (*albopictus* subgroup). Examination of type-specimen of *Quasistegomyia unilineatus* Theobald from Bahr-el-Ghazal, Sudan, type-specimen of *Stegomyia gebeleinensis* Theobald from Gebelein, Sudan and other available specimens of *Aedes* (*Stegomyia*) *unilineatus* (Theobald) from Erkowit, Sudan, Malawi (Nyasaland), South Africa and Cote d'Ivoire (Ivory Coast), and comparison with other members of the *albopictus* subgroup shows that *Ae. unilineatus* is a remarkable species. The adult is very similar to *Ae. albopictus*, *Ae. seatoi* Huang and *Ae. galloisi* in having the scutum with a patch of broad flat white scales on the lateral margin just before the level of the wing root. It differs from *Ae. albopictus* and *Ae. seatoi* in pleural scaling, and in particular in the presence of broad white scales on the hypostigmal, postspiracular and metameron areas. In this respect it resembles *Ae. galloisi*. However, *Ae. unilineatus* can be distinguished easily from all other species in the *albopictus* subgroup by the midfemur with a large, white spot on anterior surface (see Figs. 6B,C). Based on the discovery that the male genitalia of *Ae. unilineatus* are differentiated from all other species in the *scutellaris* group (the *albopictus* subgroup and the *scutellaris* subgroup) by the claspette, which is long, slender, with numerous simple setae and several stouter widened setae on distal part, with a small median mesally directed projection bearing one large seta and with 3–4 smaller setae near to it, and by the gonostylar claw which is long and slender (see Fig. 49B), I have here placed *Ae. unilineatus* in a distinct monotypic species group, the *unilineatus* group (*Aedes unilineatus* (Theobald)).

The larva of *Ae. unilineatus* is extremely similar to those of *Ae. gardnerii gardnerii* (Ludlow), *Ae. gardnerii imitator* (Leicester) of the *w-albus* subgroup, the *w-albus* group, in having the similar shape of the comb scale (with very small and inconspicuous basal denticles), the ventral brush (4-X) with 4 pairs of unbranched setae, and the basal spine of meso- and metapleural setal groups small and straight, but can be distinguished from those of *Ae. g. gardnerii*, *g. imitator* by the anal segment with complete saddle (Hopkins 1952:

158). In *Ae. g. gardnerii*, saddle is incomplete (see Huang 1977a: 48, 52, Fig. 30C). (The larva of *Ae. g. gardnerii* is indistinguishable from that of *Ae. g. imitator*). The larva of *Ae. unilineatus* is also extremely similar to that of *Ae. albopictus*, but can be distinguished from that of *Ae. albopictus* by having 4d-X which is single, very small, much smaller than 4a, b, c-X and without bars, whereas in *Ae. albopictus* 4d-X is well developed, single and with bars (see Huang 1972c: 14, Fig.3C).

The *unilineatus* group shows the strongest affinities with the *albopictus* subgroup of the *scutellaris* group but can be distinguished easily from the latter by the presence of a large, white spot on anterior surface of the midfemur.

Savage et al. (1992: 101) reported that "Eggs of *Aedes albopictus* were collected in oviposition cups from 3 forested areas of Delta State in south-central Nigeria during September 1991 as part of a post-yellow fever outbreak investigation. These eggs were shipped to the Centers for Disease Control in Colorado, where they were reared to the adult stage and identified. This is the first record of breeding populations of *Ae. albopictus* in continental Africa." Eleven adults (6 M, 5 F) and six male genitalia slides are in the mosquito collection of the USNM. The identity of Nigeria specimens with *Ae. albopictus* (Skuse) from the Oriental Region are confirmed (see Fig. 35B).

A new species, *Aedes ealaensis*, from Eala, Democratic Republic of the Congo (Zaire), is recognized. The collection of *Ae. denderensis* and *Ae. ealaensis* from the same area, Eala, Democratic Republic of the Congo (Zaire), suggests that the two species are specifically distinct. *Aedes ealaensis* combines some of the features of *Ae. denderensis* and *Ae. apicoargenteus*. Difference between the adults of *Ae. ealaensis* and *Ae. denderensis*, and the adults of *Ae. ealaensis* and *Ae. apicoargenteus*, are slight but apparently constant. These species form a complex of closely related and very similar mosquitoes within the *apicoargenteus* group.

Two new species: *Aedes ethiopiensis*, from Ethiopia, and *Aedes mpusiensis*, from Mont Mpuse, Democratic Republic of the Congo (Zaire), are recognized. There are two other members of the *poweri* group: *Aedes angustus* Edwards, from SW. Uganda, and *Aedes usambara* Mattingly, from Amani, Tanzania (Tanganyika). All these species share the following derived characters: (1) posterior dorsocentral pale yellow line of narrow scales present, reaching forward to fuse with the fossal white or pale yellow patch; (2) scutellum with broad white or pale yellow scales on all lobes; (3) midfemur with a large, white spot on anterior surface; (4) hindtibia with a white stripe on ventral surface in basal area; (5) hindtarsomere 4 almost all white to all white and (6) hindtarsomere 5 all white on dorsal surface. These species form a small group of closely related and very similar mosquitoes within the *poweri* group.

A new species, *Aedes hogsbackensis*, from Hogsback, Cape Province, South Africa, is recognized. The collection of *Ae. poweri* (Theobald) and *Ae. hogsbackensis* from the same areas, Drakensberg, Natal and Kologha Forest, Cape Province, South Africa, suggests that the two species are specifically distinct. The new species, *Ae. hogsbackensis*, is

most similar to *Ae. poweri*, and I consider *Ae. hogsbackensis* to be the sister species of *Ae. poweri*.

In addition, two new species: *Aedes gandaensis*, from Ganda, Coast Region of Kenya, and *Aedes sampi*, from Mataara (Matahara), Central Region of Kenya, are recognized. The new species, *Ae. gandaensis*, is most similar to *Ae. woodi* Edwards, and I consider *Ae. gandaensis* to be the sister species of *Ae. woodi*.

TABLE 1. Classification of the subgenus *Stegomyia* of *Aedes* in the Afrotropical Region.

GROUP	SUBGROUP	SPECIES AND SUBSPECIES
1. *AEGYPTI*		
		1. *aegypti aegypti* (Linnaeus)
		2. *aegypti formosus* (Walker)
		*** *mascarensis* MacGregor
2. *AFRICANUS*		
		3. *africanus* (Theobald)
		4. *corneti* Huang
		5. *luteocephalus* (Newstead)
		6. *maxgermaini* Huang
		7. *neoafricanus* Cornet, Valade and Dieng
		8. *opok* Corbet and Van Someren
		9. *pseudoafricanus* Chwatt
		10. *ruwenzori* Haddow and Van Someren
3. *APICOARGENTEUS*		
		11. *apicoargenteus* (Theobald)
		12. *blacklocki* Evans
		13. *denderensis* Wolfs
		14. *ealaensis* Huang
		15. *fraseri* (Edwards)
		16. *schwetzi* Edwards
		17. *soleatus* Edwards
4. *DENDROPHILUS*		
		18. *amaltheus* De Meillon and Lavoipierre
		19. *bambusae* Edwards
		20. *deboeri* Edwards
		21. *demeilloni* Edwards
		22. *dendrophilus* Edwards
		23. *hansfordi* Huang
		24. *heischi* Van Someren
		25. *keniensis* Van Someren
		26. *kenyae* Van Someren
		27. *masseyi* Edwards

.....continued on the next page

TABLE 1 (continued)

GROUP	SUBGROUP	SPECIES AND SUBSPECIES
		28. *mattinglyorum* Huang
		29. *muroafcete* Huang
		30. *njombiensis* Huang
		31. *segermanae* Huang
5. *METALLICUS*		
		32. *metallicus* (Edwards)
6. *POWERI*		
		33. *angustus* Edwards
		34. *calceatus* Edwards
		35. *chaussieri* Edwards
		36. *contiguus* Edwards
		37. *ethiopiensis* Huang
		38. *hogsbackensis* Huang
		39. *langata* Van Someren
		40. *ledgeri* Huang
		41. *mpusiensis* Huang
		42. *poweri* (Theobald)
		43. *usambara* Mattingly
7. *PSEUDONIGERIA*		
		44. *mickevichae* Huang
		45. *pseudonigeria* (Theobald)
		46. *saimedres* Huang
		*** *chemulpoensis* Yamada
8. *SIMPSONI*		
		47. *bromeliae* (Theobald)
		48. *gandaensis* Huang
		49. *josiahae* Huang
		50. *kivuensis* Edwards
		51. *lilii* (Theobald)
		52. *sampi* Huang
		53. *simpsoni* (Theobald)
		54. *strelitziae* Muspratt
		55. *subargenteus* Edwards
		56. *woodi* Edwards
9. *GRANTI*		
		57. *granti* (Theobald)
10. *SCUTELLARIS*	*ALBOPICTUS*	
		58. *albopictus* (Skuse)
11. *UNILINEATUS*		
		59. *unilineatus* (Theobald)

*** Species which does not occur in the Afrotropical Region.

In the identification of the species of the subgenus *Stegomyia*, the adult stages appear to be more useful than the immature stages. However, it must be remembered that specific differences between the members of this subgenus tend to be very slight. Some members are highly variable in both adult ornamentation and in the immature stages. Although males of all species can be recognized on the basis of morphological features, females and immatures are extremely difficult or impossible to distinguish in many instances. The male genitalia of all species are distinct and the most diagnostic feature is the claspette of the gonocoxite. In dealing with this structure, special preparations must be made and care taken to study both lateral and mesal views of the dissected claspette as well as undissected aspects.

Affinity

The subgenus *Stegomyia* possesses some rather important basic characters in common with the subgenera *Aedimorphus* Theobald, *Albuginosus* Reinert, *Diceromyia* Theobald and *Pseudarmigeres* Stone and Knight of the genus *Aedes* in the Afrotropical Region: male maxillary palpus 5-segmented, aedeagus with conspicuous teeth, claspette developed, female insula longer than broad, larval seta 12-I not developed, and pecten teeth present. These shared characters indicate the affinity of *Stegomyia* to these four subgenera. Of these four subgenera, *Stegomyia* shares more important characters in both adult and immature stages with *Diceromyia* than with any other subgenus, suggesting the strongest affinities with that subgenus. However, it differs from *Diceromyia* in the development of the male maxillary palpus and in the position of seta 4-C of the larva. The male maxillary palpus of *Stegomyia* has the total length of the apical two segments not very short, at least 0.4 the length of the remaining segments, while in *Diceromyia* the total length of the apical two segments is very short, at most 0.3 the length of the remaining segments, or segment 5 is much shorter than segment 4. The larva of *Stegomyia* has seta 4-C cephalomesad of 6-C while in *Diceromyia*, seta 4-C is caudomesad of 6-C.

CHARACTERIZATION OF THE GROUPS IN THE AFROTROPICAL REGION

THE *AEGYPTI* GROUP

DIAGNOSIS. (1) Maxillary palpus with white scales; (2) scutum with dorsocentral setae; (3) scutum with a distinct patch of broader crescent-shaped white scales on fossal area; (4) subspiracular area with broad white scales; (5) postspiracular area without scales; (6) paratergite with broad white scales; (7) scutellum with broad white scales on all lobes; (8) white knee-spot present on all femora (except in *mascarensis*); (9) all tibiae anteriorly dark, without any white band; (10) hindtarsus with a basal white band on tarsomeres 1–4; and (11) hindtarsomere 5 all white.

THE *AFRICANUS* GROUP

DIAGNOSIS. (1) Maxillary palpus 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; (10) hindtarsomere 4 with a basal white band, or all dark; and (11) hindtarsomere 5 all dark.

THE *APICOARGENTEUS* GROUP

DIAGNOSIS. (1) Maxillary palpus with white scales; (2) scutum with dorsocentral setae; (3) scutum with a distinct patch of broader crescent-shaped 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 forefemur, present on mid- and hindfemora; (8) midfemur with a large, white spot on anterior surface; (9) hindtibia anteriorly dark, with a white stripe in subbasal area; (10) hindtarsus with a basal white band at least on tarsomeres 1–3; (11) hindtarsomere 4 with a basal white band to all white; and (12) abdominal basal white band on terga VI–VII rather long, extended to 0.5–0.9 length of tergum.

THE *DENDROPHILUS* GROUP

DIAGNOSIS. (1) Maxillary palpus with white scales; (2) scutum with dorsocentral setae; (3) scutum with a distinct patch of broader crescent-shaped white or yellow scales on fossal area; (4) subspiracular area with broad white scales; (5) postspiracular area without scales; (6) paratergite with broad white scales; (7) scutellum with broad white scales on all lobes; (8) white knee-spot absent on forefemur, present at least on midfemur; (9) midfemur without a large, median white spot on anterior surface; (10) hindtibia anteriorly dark, without or with a white stripe in basal area; (11) hindtarsus with a basal white band at least on tarsomeres 1 and 2, and tarsomere 3 with or without a basal white band; and (12) hindtarsomere 4 with a basal white band to all white.

THE *METALLICUS* GROUP

DIAGNOSIS. (1) Maxillary palpus with white scales; (2) scutun with dorsocentral setae; (3) scutum with a distinct patch of broader crescent-shaped white scales on fossal area; (4) prescutellar area with all broad, flat, metallic silvery white scales; (5) subspiracular area with broad white scales; (6) postspiracular area without scales; (7) paratergite with broad white scales; (8) scutellum with broad white scales on all lobes; (9) white knee-spot absent on forefemur, present on mid- and hindfemora; (10) midfemur with a large, white spot on anterior surface; (11) hindtibia anteriorly dark, without a white stripe in basal area; (12) hindtarsus with a basal white band on tarsomeres 1–3; and (13) hindtarsomere 4 all dark.

THE *POWERI* GROUP

DIAGNOSIS. (1) Maxillary palpus with white scales; (2) scutum with dorsocentral setae; (3) scutum with a distinct patch of broader crescent-shaped white or pale yellow scales on fossal area; (4) subspiracular area with broad white scales; (5) postspiracular area without or with broad white scales; (6) paratergite with broad white scales; (7) scutellum with broad white or pale yellow scales on all lobes; (8) white knee-spot absent on forefemur, present at least on midfemur; (9) midfemur with a large, white spot on anterior surface; (10) hindtibia anteriorly dark, without or with a white stripe in basal area; (11) hindtarsus with a basal white band on tarsomeres 1-3; and (12) hindtarsomere 4 almost all white to all white.

THE *PSEUDONIGERIA* GROUP

DIAGNOSIS. (1) Maxillary palpus with white scales; (2) scutum with dorsocentral setae; (3) scutum with a distinct patch of broader crescent-shaped white scales on fossal area; (4) subspiracular area with broad white scales; (5) postspiracular area without scales; (6) paratergite with broad white scales; (7) scutellum with broad white scales on all lobes; (8) white knee-spot present on all femora; (9) all tibiae with a white band; (10) hindtarsus with a basal white band at least on tarsomeres 1 and 2, and tarsomere 3 with or without a basal white band; and (11) hindtarsomere 4 all white (African species) or with a basal white band (*chemulpoensis*).

THE *SIMPSONI* GROUP

DIAGNOSIS. (1) Maxillary palpus with white scales; (2) scutum with dorsocentral setae; (3) scutum with a distinct patch of broader crescent-shaped white scales on fossal area; (4) scutum with a pair of submedian stripes; (5) prescutellar area without all broad , flat, metallic silvery white scales; (6) subspiracular area with broad white scales; (7) postspiracular area without scales; (8) paratergite with broad white scales; (9) white knee-spot absent on forefemur, present on mid- and hindfemora; (10) midfemur with a large, white spot on anterior surface; (11) hindtibia anteriorly dark, without or with a white stripe in basal area; (12) hindtarsus with a basal white band at least on tarsomeres 1- 3; and (13) hindtarsomere 4 with a basal white band to all white, or all dark.

THE *GRANTI* GROUP

DIAGNOSIS. (1) Maxillary palpus with white scales; (2) scutum with dorsocentral setae; (3) scutum without a distinct patch of broader crescent-shaped white scales on fossal area; (4) scutum with a long, median longitudinal white stripe of narrow scales externding from anterior margin to about the level of wing root; (5) subspiracular area with broad white scales; (6) postspiracular area without scales; (7) paratergite with broad white scales; (8) scutellum with broad white scales on all lobes; (9) white knee-spot present on all femora; (10) all tibiae with a median white line on anterior surface; (11) midfemur with a median white line on anterior surface; (12) hindtarsus with a basal white band on tarsom-

eres 2-4; (13) hindtarsomere 5 all white; (14) female fore- and midlegs with tarsal claws equal, all simple; and (15) male fore- and midlegs with tarsal claws unequal, the larger one toothed, the smaller one simple.

THE *SCUTELLARIS* GROUP

DIAGNOSIS. (1) Maxillary palpus with white scales; (2) scutum with dorsocentral setae; (3) scutum without a distinct patch of broader crescent-shaped white scales on fossal area; (4) scutum with a long, median longitudinal white stripe of narrow scales externding from anterior margin to about the level of wing root; (5) subspiracular area with broad white scales; (6) postspiracular area without scales; (7) paratergite with broad white scales; (8) scutellum with broad white scales on all lobes; (9) white knee-spot present on all femora; (10) all tibiae anteriorly dark, without any white line; (11) midfemur without a large, median white spot on anterior surface; (12) hindtarsus with a basal white band on tarsomeres 1-4; (13) hindtarsomere 5 all white.

THE *UNILINEATUS* GROUP

DIAGNOSIS. (1) Maxillary palpus with white scales; (2) scutum with dorsocentral setae; (3) scutum without a distinct patch of broader crescent-shaped white scales on fossal area; (4) scutum with a long, median longitudinal white stripe of narrow scales extending from anterior margin to about the level of wing root; (5) subspiracular and postspiracular areas with broad white scales; (6) hypostigmal and metameron areas with broad white scales; (7) paratergite with broad white scales; (8) scutellum with broad white scales on all lobes; (9) white knee-spot present on all femora; (10) all tibiae anteriorly dark, without any white line; (11) midfemur with a large, white spot on anterior surface; (12) hindtarsus with a basal white band on tarsomeres 1–4; (13) hindtarsomere 5 all white; (14) female fore- and midlegs with tarsal claws equal, all toothed; and (15) male fore- and midlegs with tarsal claws unequal, all toothed.

DISTRIBUTION

Before *Aedes aegypti* and *Ae. albopictus,* were introduced through commerce into the New World, *Stegomyia* was known only from the Old World. *Aedes albopictus* is now reported from the United States, Brazil, Mexico and New Zealand (where it has been recently introduced). *Stegomyia* occurs chiefly in the tropical and subtropical zones throughout the Old World but is also represented in the southern portion of the Palearctic Region from Italy and Macedonia (Jagladzlik) eastward through Albania, Greece (Crete), Georgia (Gudauty) to northeast China, Korea (Chemulpo), Russia (Siberia and Sakhalin Island) and Japan (Honshu, Hokkaido).

Members of the African *Stegomyia* are known only from the Afrotropical Region, except for *Ae. aegypti, Ae. albopictus* and *Ae. unilineatus,* which are also known to occur in the Oriental Region. *Aedes aegypti* and *Ae. albopictus* are also known to occur in the Papuan, Western Pacific islands, Hawaiian islands and Malagasy, and *Ae. aegypti* is also

known in the South Pacific and *Ae. albopictus* is also known in the Palearctic (see Huang 1979a: 39). In *Stegomyia*, it appears that there are several widely distributed dominant species and a number of specialized endemic species. The geographical distribution of the species in the Afrotropical Region are given in Appendix II.

BIONOMICS

The immature stages have been found in tree holes, rot holes, bamboo pots, stump holes, cut bamboos, bamboo stumps, tree forks, leaf axils (*Strelitzia*, *Dracaena*, *Colocasia*, *Sansevieria*, banana, pineapple, lily, cocoyam, taro), bored bamboos, fern tree, log hole, tree buttress, rock hole, fallen plant part (spathe), wells and artificial containers (plastic bottles, tin cans, old sink, tires). Females of 46 species and subspecies (*aegypti*, ssp. *formosus, africanus*, *luteocephalus*, *maxgermaini, neoafricanus*, *opok*, *pseudoafricanus*, *ruwenzori*, *apicoargenteus*, *denderensis*, *ealaensis*, *fraseri*, *schwetzi, soleatus*, *amaltheus*, *bambusae*, *deboeri*, *demeilloni, dendrophilus, hansfordi*, *keniensis*, *kenyae*, *masseyi*, *mattinglyorum*, *segermanae*, *metallicus*, *angustus*, *chaussieri*, *contiguus*, *hogsbackensis*, *langata*, *ledgeri*, *usambara*, *mickevichae*, *pseudonigeria*, *saimedres, bromeliae*, *gandaensis*, *simpsoni, strelitziae*, *subargenteus*, *woodi*, *granti*, *albopictus* and *unilineatus*) are known to bite man.

MEDICAL IMPORTANCE

Aedes africanus (Theobald) has been recognized as one of the most important virus vectors in the Afrotropical Region (Haddow 1961). In Uganda, *Ae. africanus* has been incriminated as the principal vector of yellow fever in 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 in Bwamba County (Haddow 1945; Haddow et al. 1947; Lumsden 1951; Haddow 1968). In Nigeria, *Ae. africanus* was shown to be an efficient vector of yellow fever under laboratory conditions (Philip 1929, 1930). This species is recognized as a vector of yellow fever in West Africa (Hamon et al. 1971), in Cameroon (Rickenbach et al. 1971 and Germain et al. 1972), in Central African Republic (Pajot 1972 and Germain, Sureau et al. 1976), and in Nigeria (Bang et al. 1979 and Bang et al. 1983).

Aedes luteocephalus from Yaba, Nigeria, is an efficient vector of yellow fever under laboratory conditions (Bauer 1928). It is recognized as a vector of yellow fever in West and Central Africa. In Nigeria, *Ae. pseudoafricanus* has been a proved laboratory vector of yellow fever (Chwatt 1949). In southeastern Nigeria, *Ae. africanus*, rather than monkeys, constitutes the main reservoir of virus in rain forest and forest relicts to the north (Bang et al. 1983). In the southern Sudan savanna of West Africa, *Ae. luteocephalus* was reported by Cordellier et al. 1977 as a reservoir of yellow fever virus. 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 (McCare and Kirya 1982).

Aedes bromeliae is an important vector of yellow fever virus in East Africa. *Aedes simpsoni* was incriminated in the transmission of yellow fever during an outbreak in Bwamba County, Uganda in 1941 and yellow fever virus were isolated from wild caught mosquitoes (*Ae*. *simpsoni*) from Bwamba, Uganda (Mahaffy et al. 1942). The yellow fever virus has also been isolated from wild caught mosquitoes (*Ae*. *simpsoni*) in Uganda by Smithburn and Haddow (1946). However, the species from which Mahaffy et al. 1942 and Smithburn and Haddow (1946) isolated yellow fever virus was not *Ae. simpsoni*, but *Ae*. *bromeliae* (see Huang 1986a). *Aedes simpsoni* (probably *Ae*. *bromeliae*) from Nigeria has been shown to be a laboratory transmitter of yellow fever (Philip 1929). *Aedes strelitziae* from South Africa can transmit yellow fever virus from one Rhesus monkey to another under laboratory conditions, as shown by Gillett and Ross (1953).

Several viruses have been isolated from wild-caught *Ae. aegypti*, *africanus*, *luteocephalus*, *neoafricanus*, *opok*, *hansfordi* (misidentified as *Ae*. *deboeri* ssp.*demeilloni*) (see Huang 1997: 8–9), *bromeliae* (misidentified as *Ae*. *simpsoni*)(see Huang 1979b, 1986a) and *metallicus* from the Afrotropical Region (Table 2).

TABLE 2. Isolation of pathogens of actual or potential medical significance from *Aedes* (*Stegomyia*) species in the Afrotropical Region

SPECIES	PATHOGEN	LOCATION	COMMENTS	REFERENCE
aegypti	yellow fever virus	Gambia	Isolation	Germain et al. 1980.
africanus	yellow fever virus	Uganda	Isolation	Smithburn and Haddow (1946); Smithburn et al. 1949; Haddow (1968); Kirya et al. 1977.
	Chikungunya virus	Uganda	Isolation	Weinbren et al. 1958; Haddow et al. 1961; McCrae et al. 1971.
	Rift Valley fever virus	Uganda	Isolation	Weinbren et al. 1957.
	Zika virus	Uganda	Isolation	Dick et al. 1952; Weinbren and Williams (1958); Haddow et al. 1964.
	yellow fever virus	Ethiopia	Isolation	Serie et al. 1968.

.....continued on the next page

TABLE 2 (continued)

SPECIES	PATHOGEN	LOCATION	COMMENTS	REFERENCE
	yellow fever virus	Cote d'Ivoire (Ivory Coast)	Isolation	Chippaux et al. 1975.
	yellow fever virus	Central African Republic	Isolation	Germain, Sureau et al. 1976.
	Chikungunya virus	Central African Republic	Isolation	Saluzzo et al. 1980.
opok	yellow fever virus	Central African Republic	Isolation	Germain et al. 1976.
africanus and *opok*	Chikungunya, zika and Bouboui viruses	Central African Republic	Isolations	Germain et al. 1978
neoafricanus and *luteocephalus*	yellow fever virus	Senegal	Isolations	Cornet et al. 1978;Cornet et al. 1979.
luteocephalus	Chikungunya, Zika and Dengue 2 viruses	Kedougou	Isolations	Cornet et al. 1979.
	yellow fever v irus	Kedougou, Senegal; near Jos, Nigeria; and Bobo Dioulasso, Burkina Faso	Isolations	Cornet et al. 1979; Germain et al. 1982.
africanus and *neoafricanus*	Chikungunya virus	Senegal	Isolations	Jupp and McIntosh (1988)
hansfordi (as *Ae. deboeri* ssp. *demeilloni*)	Rift Valley fever virus	Uganda	Isolation from a lot of 60 *Stegomyia*	Smithburn et al. 1948.
bromeliae (as *Ae. simpsoni*)	yellow fever virus	Bwamba, Uganda	Isolations	Mahaffy et al. 1942; Smithburn and Haddow (1946).
metallicus	yellow fever virus	south-east Burkina Faso	Isolation	Baudon et al. 1984.

KEYS TO THE SECTIONS, GROUPS, SUBGROUPS AND SPECIES OF THE SUBGENUS

Males and Females

1. Scutum with a distinct patch of broader crescent-shaped white or yellow scales on fossal area (Figs. 1A; 3B; 4A,D; 8A; 9A,D; 11A,B; 13A,D; 15A; 16A; 17A; 19A; 22A; 24A,B; 25A; 27A; 29A; 31A,B,C; 32A) ..... SECTION A 2
Scutum without a distinct patch of broader crescent-shaped white or yellow scales on fossal area, with a long median longitudinal white stripe of narrow scales extending from anterior margin to about the level of wing root (Figs. 1D; 5A,D) .. ..SECTION B 10

2(1). White knee-spot present on all femora (Figs. 1B; 4B) 3
White knee-spot present at most on mid- and hindfemora, or absent on all femora (Figs. 4C; 8B,C; 9B,C; 10A,B,C; 12A,B,C; 13B,C; 14A,B; 15B,C; 16B,C; 17B,C; 18A,B,C; 19B,C; 20B,C; 21A,B,C; 22B; 23B,C; 25B; 26A,B,C; 27B; 28A,B,C; 29B; 30A,B,C; 32B; 33A,B,C; 34A,B,C; or 2B,C; 3C) 4

3(2). Scutum with lyre-shaped white markings; all tibiae anteriorly dark, without any white band (Figs. 1A,B).....*AEGYPTI* GROUP 13 .....*aegypti aegypti,* ssp. *formosus*
Scutum without lyre-shaped white markings; all tibiae with a white band (Figs. 4A,B)..... *PSEUDONIGERIA* GROUP 51

4(2). White knee-spot present at most on mid- and hindfemora; foretibia with a basal white band (Figs. 4C; 8B,C; 9B,C; 10A,B,C; 12A,B,C; 13B,C; 14A,B; 15B,C; 16B,C; 17B,C; 18A,B,C; 19B,C; 20B,C; 21A,B,C; 22B; 23B,C; 25B; 26A,B,C; 27B; 28A,B,C; 29B; 30A,B,C; 32B; 33A,B,C; 34A,B,C).....5
White knee-spot absent on all femora; foretibia without a basal white band (Figs. 2B,C; 3C)..... 9

5(4). Midfemur with a large, white spot on anterior surface (Figs. 8B,C; 9B,C; 10A,B,C; 12A,B,C; 13B,C; 14A,B; 15B,C; 16B,C; 17B,C; 18A,B,C; 19B,C; 20B,C; 21A,B,C; 22B; 23B,C; 25B; 26A,B,C; 27B; 28A,B,C; 29B; 30A,B,C; 32B; 33A,B,C; 34A,B,C)..... 6
Midfemur without a large, white spot on anterior surface (Fig. 4C) ....*DENDROPHILUS* GROUP 28

6(5). Prescutellar area with all broad, flat, metallic silvery white scales (Fig. 8A) .... *METALLICUS* GROUP *metallicus*
Prescutellar area without all broad, flat, metallic silvery white scales (Figs. 9A,D; 11A,B; 13A,D; 15A; 16A; 17A; 19A; 22A; 24A,B; 25A; 27A; 29A; 31A,B,C; 32A)..... 7

7(6). Scutum with a pair of submedian stripes; if stripes absent, hindtarsomere 4 all dark (Figs. 27A; 29A; 31A,B,C; 32A; and 28B,C; 32B; 33A,B,C; 34A,B,C) .....

.....*SIMPSONI* GROUP 54

Scutum without a pair of submedian stripes; hindtarsomere 4 with a basal white band or all white (Figs. 9A,D; 11A,B; 13A,D; 15A; 16A; 17A; 19A; 22A; 24A,B; 25A; and 9B,C; 10A,B,C; 12A,B,C; 13B,C; 14A,B; 15B,C; 16B,C; 17B,C; 18A,B,C; 19B,C; 20B,C; 21A,B,C; 22B; 23B,C; 25B)..... 8

8(7). Hindtibia anteriorly dark, without or with a white stripe on ventral surface in basal area; abdominal basal white band on terga VI–VII extended at most to 0.4 length of tergum (Figs. 16B,C; 17B,C; 18A,B,C; 19B,C; 20B,C; 21A,B,C; 22B; 23B,C; 25B; and 22C,D; 25C,D) .....*POWERI* GROUP 41

Hindtibia anteriorly dark, with a subbasal white stripe; abdominal basal white band on terga VI–VII rather long, extended to 0.5–0.9 length of tergum (Figs. 9B,C; 10A,B,C; 12A,B,C; 13B,C; 14A,B; 15B,C; and 11C) .... *APICOARGENTEUS* GROUP 22

9(4). Midfemur with 3 large, white patches on anterior surface (on basal, median and apical areas); hindtarsomere 5 all dark (Fig. 3C). ..... *AFRICANUS* GROUP 15

Midfemur without large, white patches on anterior surface; hindtarsomere 5 all white (Figs. 2B,C)..... *AEGYPTI* GROUP *mascarensis*[1]

10(1). Proboscis with a long white line on dorsal surface; all tibiae anteriorly dark, each with a median white line on anterior surface (Figs. 5B; 7B,C) ....*GRANTI* GROUP *granti*

Proboscis dark-scaled, without a long white line on dorsal surface; all tibiae anteriorly dark, without any white line on anterior surface (Figs. 5C; 6B,C)..... 11

11(10). Midfemur with a large, white spot on anterior surface (Figs. 6B,C)..... .....*UNILINEATUS* GROUP *unilineatus*

Midfemur without a large, white spot on anterior surface (Fig. 1C)..... .....*SCUTELLARIS* GROUP 12

12(11). Supraalar white line incomplete, not clearly defined and with only narrow scales over wing root (Fig. 1D).....(*ALBOPICTUS* SUBGROUP) *albopictus*

Supraalar white line complete and well developed, with broad flat scales over wing root and toward scutellum (Huang 1972c, Fig.21A; Huang 1979a, Fig. 30B) ..... (*SCUTELLARIS* SUBGROUP)

Not represented in the Afrotropical Region.

THE *AEGYPTI* GROUP

13(3). White knee-spot present on all femora(Fig. 1B) 14

White knee-spot absent on all femora (Figs. 2B,C)..... *mascarensis*[1]

14(13). Abdominal tergite 1 with a large, median patch of pale scales; female terga II–VII with a row of small white scales along posterior border (Fig. 3E)..... .....*aegypti aegypti*

Abdominal tergite 1 without any median patch of pale scales; female terga II–VII without a row of small pale scales along posterior border (Fig. 3F) .... sp. *formosus*
1 Malagasy species (Mauritius).

THE *AFRICANUS* GROUP

(male of *maxgermaini* unknown)

15(9). Hindfemur anteriorly with a large pale band at base and with 2 large, white patches on median and apical areas (Huang 1990, Figs. 8A, B) ..... *luteocephalus*
Hindfemur anteriorly without such a pale band at base, or hindfemur anteriorly with 3 large, white patches on basal, median and apical areas (Huang 1990, Figs. 2A, B, C; 4A, B, C; 5C; 6A, B, C; 7B, D; 8C) 16

16(15). 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 (Huang 1990, Fig. 7C) ..... *ruwenzori*
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 (Huang 1990, Figs. 1A; 3A, D; 5A, D; 7A)..... 17

17(16). Posterior dorsocentral yellow or white line of narrow scales present (Huang 1990, Figs. 5A, D; 7A) 18
Posterior dorsocentral yellow or white line of narrow scales not developed (Huang 1990, Figs. 1A; 3A, D) 20

18(17). Fossal white patch rather broad at base along scutal margin; prescutellar line well developed, with narrow yellow scales and with some broad, flat, metallic silvery white scales posteriorly (Huang 1990, Fig. 7A)..... *opok*
Fossal white patch rather narrow at base along scutal margin; prescutellar line not developed or, if present, with only narrow yellow scales (Huang 1990, Figs. 5A, D) 19

19(18). Anterior median white stripe rather long, 2.5–3.0 times as long as wide; hindleg with tarsal claws equal and simple (Huang 1990, Figs. 5D, E)..... *pseudoafricanus*
Anterior median white stripe short and broad, about 2 times as long as long as wide; hindleg with tarsal claws equal and toothed (Huang 1990, Figs. 5A, B) ..... *maxgermaini*

20(17). 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 (Huang 1990, Figs. 2A, B, C; 4A; 3B, C)..... 21
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 (Huang 1990, Figs. 4B, C; 3E, F) ..... *neoafricanus*

21(20). Hindfemur with 3 large, white patches on the anterior surface (on basal, median

and apical areas) (Huang 1990, Figs. 2C; 4A).....*africanus*
Hindfemur with at most 2 large, white patches on the anterior surface (on median and apical areas) (Huang 1990, Figs. 2A, B).....*corneti*

THE *APICOARGENTEUS* GROUP

22(8). Scutellum with broad white scales on midlobe and with broad dark scales on lateral lobes (Figs. 9A; 11A,B).....23
Scutellum with broad white scales on all lobes (Figs. 9D; 13A,D; 15A).....25

23(22). Hindtarsomere 5 all dark (Figs. 9B; 10A).....*apicoargenteus*
Hindtarsomere 5 with a basal white band or all white (Figs. 10C; 12A,B,C).....24

24(23). Hindtarsomere 4 with basal 0.40 or less white on dorsal surface (Figs. 12A,B) .....*ealaensis*
Hindtarsomere 4 with basal 0.89 or more white on dorsal surface (Figs. 10C; 12C) .....*denderensis*

25(22). Hindtarsomere 5 all dark (Figs. 9C; 10B).....*schwetzi*
Hindtarsomere 5 with a basal white band or all white (Figs. 13B,C; 14A,B; 15B,C) 26

26(25). Scutum with anterior median white spot of narrow scales; female fore- and midlegs with tarsal claws equal and toothed (Figs. 15A,D).....*soleatus*
Scutum with anterior median white spot of broad scales; female fore- and midlegs with tarsal claws equal and simple (Figs. 13A,D; 14C).....27

27(26). Hindfemur anteriorly with basal 0.20-0.25 white, and with a large white spot 0.60-0.64 from base, the white spot not connecting with the basal white area (Figs. 13B; 14A).....*blacklocki*
Hindfemur anteriorly with a broad white stripe in basal 0.50-0.53 (Figs. 13C; 14B) .....*fraseri*

THE *DENDROPHILUS* GROUP

(males of *muroafcete* and *njombiensis* unknown)

28(5). Hindtibia with a white stripe on ventral surface in basal area (Huang 1997, Figs. 3A,B,C; 4A,B,C; 5B; 6B,C; 7B,C; 8B,C; 9B,C; 13B,C; 14B,C).....29
Hindtibia without a white stripe on ventral surface in basal area (Huang 1997, Figs. 1B,C; 10B,C; 11B; 12B,C).....38

29(28). White knee-spot absent on hindfemur, or represented by few pale scales (Huang 1997, Figs. 3A,B; 5B).....30
White knee-spot present and well developed on hindfemur (Huang 1997, Figs. 3C; 4A,B,C; 6B,C; 7B,C; 8B,C; 9B,C; 13B,C; 14B,C).....31

30(29). Hindtarsomere 5 all dark (Huang 1997, Fig. 5B).....*muroafcete*
Hindtarsomere 5 with basal 0.50–0.75 white on dorsal surface (Huang 1997, Figs. 3A,B).....*bambusae*

31(29). Hindtarsomere 5 all dark (Huang 1997, Figs. 4B,C).....*deboeri*

Hindtarsomere 5 with a basal white band or all white (Huang 1997, Figs. 3C; 4A; 6B,C; 7B,C; 8B,C; 9B,C; 13B,C; 14B,C) 32

32(31). Scutum with anterior median white spot of broad scales (Huang 1997, Fig. 13A). ..... *mattinglyorum*

Scutum with anterior median white spot of narrow scales (Huang 1997, Figs. 5C; 7C) 33

33(32). Hindleg with tarsal claws equal and toothed (Huang 1997, Figs. 2C,D; 7D,E; 8A,D) 34

Hindleg with tarsal claws equal and simple (Huang 1997, Figs. 14A,D) 36

34(33). Female fore-, mid- and hindlegs with tarsal claws equal and toothed (modified tooth); male hindleg with tarsal claws equal and toothed (modified tooth) (Huang 1997, Figs. 8A,D) ..... *hansfordi*

Female fore-, mid- and hindlegs with tarsal claws equal and toothed (normal tooth); male hindleg with tarsal claws equal and toothed (normal tooth) (Huang 1997, Figs. 7D,E) 35

35(34) Hindtarsomere 3 with basal 0.2 or less white on dorsal surface; hindtarsomere 5 with basal 0.47-0.88 white on dorsal surface (Huang 1997, Figs. 3C; 4A).. *kenyae*

Hindtarsomere 3 with basal 0.32-0.41 white on dorsal surface; hindtarsomere 5 all white (female), or with basal 0.84-0.89 white to all white on dorsal surface (male) (Huang 1997, Figs. 7B,C)..... *dendrophilus*

36(33). Female fore- and midlegs with tarsal claws equal and simple; male fore- and midlegs with tarsal claws unequal, all simple (Huang 1997, Figs. 14A,D)..... ..... *segermanae*

Female fore- and midlegs with tarsal claws equal and toothed; male fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple (Huang 1997, Figs. 6A,D; 9A,D) 37

37(36). Midtarsomere 1 with a well-marked white stripe on posterior surface; hindtarsomere 5 with basal 0.40-0.67 white on dorsal surface (Huang 1997, Figs. 9B,C) .... *heischi*

Midtarsomere 1 without a well-marked white stripe on posterior surface; hindtarsomere 5 all white, or all white except tip (Huang 1997, Figs. 6B,C) ... *demeilloni*

38(28). Hindtarsomere 3 with basal 0.11–0.25 white on dorsal surface (Huang 1997, Figs. 10B,C; 11B)..... 39

Hindtarsomere 3 all dark (Huang 1997, Figs. 1B,C; 12B,C) 40

39(38). Scutum with anterior median white spot of broad scales (Huang 1997, Fig. 11C).. ..... *keniensis*

Scutum with anterior median white spot of narrow scales (Huang 1997, Fig. 11A) ..... *njombiensis*

40(38). Scutum with yellow median stripe, the yellow median stripe connects with the anterior median white spot; male fore- and midlegs with tarsal claws unequal, the

smaller one toothed, the larger one simple (Huang 1997, Figs. 12A,E)..... *masseyi*
Scutum with white median stripe, the white median stripe does not connect with the anterior median white spot; male fore- and midlegs with tarsal claws unequal, all toothed (Huang 1997, Figs. 1A,D) ..... *amaltheus*

THE *POWERI* GROUP

(males of *chaussieri* and *poweri* unknown)

41(8). Hindtibia with a white stripe on ventral surface in basal area (Figs. 16B,C; 17B,C; 18A,B,C; 19B,C; 20B,C; 21A,B,C; 22B; 23B,C) 42
Hindtibia without a white stripe on ventral surface in basal area (Fig. 25B) ..... *chaussieri*

42(41). Scutum with a large (crescent-shaped) patch of pale yellow scales on fossal area, fossal pale yellow patch with anterior end extending along scutal margin towards the median pale yellow stripe (Fig. 16A) 43
Scutum with a large patch of broader crescent-shaped white scales on fossal area, fossal white patch without anterior end extending along scutal margin towards the anterior median white spot (Figs. 17A; 19A; 22A; 24A,B) 44

43(42). White knee-spot absent on hindfemur (Figs. 16B,C) ..... *angustus*
White knee-spot present and well developed on hindfemur (Fig. 18A)..*mpusiensis*

44(42). Scutum with anterior median white spot of narrow scales; hindtarsomere 5 all white (Figs. 17A,B,C) 45
Scutum with anterior median white spot of broad scales; hindtarsomere 5 all dark (Figs. 19A; 22A; 24A,B; 18C; 19B,C; 20B,C; 21A,B,C; 22B; 23B,C) 46

45(44). Midtibia with a white stripe on ventral surface in basal area (Figs. 17B,C) ..... *usambara*
Midtibia without a white stripe on ventral surface in basal area (Fig. 18B) ..... *ethiopiensis*

46(44). Midtarsomeres 1 and 2 with white stripe on posterior surface (Figs. 24C1,2; 24D1,2)..... 47
Midtarsomeres 1 and 2 without white stripe on posterior surface (Figs. 24C3–6; 24D3–5) 48

47(46). Hindtarsomere 3 with basal 0.25 or more white on dorsal surface (Figs. 21A,B) ... *calceatus*
Hindtarsomere 3 with basal 0.17 or less white on dorsal surface (Figs. 21C; 22B) ..... *ledgeri*

48(46). Midtibia with a white stripe on ventral surface in basal area (Figs. 18C; 19B,C) 49
Midtibia without a white stripe on ventral surface in basal area (Figs. 20B,C; 23B,C)..... 50

49(48). Female midtarsomere 2 with basal 0.9 or more white on dorsal surface (Fig. 19C) ..... *poweri*
Female midtarsomere 2 with basal 0.6 or less white on dorsal surface; male mid-

tarsomere 2 with basal 0.35 or less white on dorsal surface (Figs. 19B; 18C)..... ..... *hogsbackensis*

50(48). Midtarsomere 2 with basal 0.4 or less white on dorsal surface (Figs. 23B,C) ....*contiguus*

Midtarsomere 2 with basal 0.66 or more white on dorsal surface (Figs. 20B,C) .... *langata*

THE *PSEUDONIGERIA* GROUP

(males of *mickevichae*, *pseudonigeria* and *saimedres* unknown)

51(3). Scutum with anterior median white spot of broad scales (Huang 1988b, Figs. 2A; 3A) 52

Scutum with anterior median white spot of narrow scales (Huang 1988b, Fig. 2C) 53

52(51). Hindtarsomere 3 with basal 0.33 white on dorsal surface; hindtarsomere 5 all white (Huang 1988b, Fig. 3D)..... *pseudonigeria*

Hindtarsomere 3 with basal 0.25 or less white on dorsal surface; hindtarsomere 5 all dark (Huang 1988b, Fig. 2B)..... *saimedres*

53(51). Hindtarsomere 3 all dark; hindtarsomere 4 all white; hindtarsomere 5 all dark (Huang 1988b, Fig. 2D) ..... *mickevichae*

Hindtarsomere 3 with basal 0.33 or more white on dorsal surface; hindtarsomere 4 with basal 0.63 or less white on dorsal surface; hindtarsomere 5 all white (Huang 1988b, Fig. 5) ..... *chemulpoensis*[2]

2 Palearctic species (Korea, N.E. China).

THE *SIMPSONI* GROUP

(males of *gandaensis, kivuensis* and *sampi* unknown)

54(7). Scutellum with broad white scales on midlobe and with broad dark scales on lateral lobes (Fig. 31C) 55

Scutellum with broad white scales on all lobes (Figs. 27A; 29A; 31A,B; 32A) . 56

55(54). Fore- and midtarsi with a basal white band on tarsomeres 1–5; hindtarsomere 4 with basal 0.6 white on dorsal surface (Fig. 26A) ..... *gandaensis*

Fore- and midtarsi with a basal white band on tarsomeres 1,2; hindtarsomere 4 all dark (Figs. 26B,C) ..... *woodi*

56(54). Hindtarsomere 4 with a basal white band or all white (Figs. 27B; 28A; 29B; 30A,B,C) 57

Hindtarsomere 4 all dark (Figs. 28B,C; 32B; 33A,B,C; 34A,B,C) 60

57(56). Hindtarsomere 4 with a basal white band (Figs. 30A,B,C) 58

Hindtarsomere 4 all white (Figs. 27B; 28A; 29B)..... 59

58(57). Hindfemur anteriorly with basal 0.33–0.40 white, and with a large white spot about 0.67 from base, the white spot not connecting with the basal white area; hindtarsomere 5 with basal 0.40–0.67 white on dorsal surface (Figs. 30B,C) .....

..... *subargenteus*

Hindfemur anteriorly with a broad white stripe in basal 0.57; hindtarsomere 5 all white (Fig. 30A)..... *sampi*

59(57). Hindfemur anteriorly with a broad white stripe in basal 0.50, and with a white spot about 0.62 from base, the white spot not connecting with the basal white stripe; tergum I without a median white spot (Figs. 29B,C,D)..... *kivuensis*

Hindfemur anteriorly with a broad white stripe in basal 0.60-0.66; tergum I with a median white spot (Figs. 27B,C,D; 28A) ..... *josiahae*

60(56). Hindtibia with a white stripe on ventral surface in basal 0.25-0.30 (Figs. 28B,C) ..... *strelitziae*

Hindtibia without a white stripe on ventral surface in basal area (Figs. 32B; 33A,B,C; 34A,B,C) 61

61(60). Fore- and midtarsomere 2 with basal 0.80 or more white on dorsal surface; female fore- and midlegs with tarsal claws equal and simple (Figs. 32B; 33A; 34A; and 31D) ..... *simpsoni*

Foretarsomere 2 with basal 0.64 or less white on dorsal surface; midtarsomere 2 with basal 0.75 or less white on dorsal surface; female fore- and midlegs with tarsal claws equal and toothed (Figs. 33B,C; 34B,C; and 31E,F) 62

62(61). Midtarsomere 2 with basal 0.50 or less white on dorsal surface; hindtarsomere 5 with basal 0.50-0.75 white on dorsal surface (Figs. 33B; 34B) ..... *lilii*

Midtarsomere 2 with basal 0.54 or more white on dorsal surface; hindtarsomere 5 all white, or all white except tip (Figs. 33C; 34C)..... *bromeliae*

Male Genitalia

1. Paraproct with a sternal arm (Figs.35A; 36A,B; 37A,B; 38A,B; 39A,B; 40A,B; 41A,B; 42A,B; 43A,B; 44A,B,C,D; 45A,B; 46A,B; 47A,B; 48A,B; 50A; Huang 1990, Figs.10C; 13C; 16C; 20A,B; 23A,B; Huang 1997, Figs.15A,B; 16A,B; 17A,B; 18A,B; 19A; 20A,B; 21C) ..... SECTION A 2

Paraproct without a sternal arm (Figs.35B; 49A,B) .....SECTION B 13

2(1). Apical margin of tergum IX with slightly separated lateral lobe (Figs. 47A; 42A)3

Apical margin of tergum IX with well separated lateral lobe (Figs. 35A; 36A,B; 37A,B; 38A,B; 39A,B; 40A,B; 41A,B; 42B; 43A,B; 44D; 45A,B; 46A,B; 47B; 48A,C; 50A; Huang 1990, Figs. 10C; 13C; 16C; 20A,B; 23A,B; Huang 1977, Figs. 15A,B; 16A,B; 17A,B; 18A,B; 19A;20A,B; 21C) 4

3(2). Aedeagus with short teeth only; gonostylar claw very short, about 0.13 length of gonostylus (Fig. 47A) ..... *SIMPSONI* GROUP *subargenteus*

Aedeagus with lateral teeth longer than distal teeth; gonostylar claw rather long, about 0.32 length of gonostylus (Fig. 42A)..... *POWERI* GROUP *contiguus*

4(2). Aedeagus with short teeth only; paraproct with sternal arm long and slender; apical margin of tergum IX with middle slightly concave to concave (Huang 1990,

Figs. 10C; 13C; 16C; 20A,B; 23A,B)..... *AFRICANUS* GROUP 16
Without this combination of characters 5

5(4). Apical margin of tergum IX with middle flat, or slightly concave (Figs. 39A; 42B; 43A,B; 44D) 6
Apical margin of tergum IX with middle concave, or deeply concave (Figs. 45A,B; 46A,B; 47B; 48A; 35A; 48C; 36A,B; 37A,B; 38A,B; 39B; 40A,B; 41A,B; 50A; Huang 1977, Figs. 15A,B; 16A,B; 17A,B; 18A,B; 19A; 20A,B; 21C) 7

6(5). Paraproct with a sternal arm very short, less than 0.4 length of apical arm; gonostylar claw short and stout; aedeagus with a few very long and slender teeth (Figs. 44C,D).....*METALLICUS* GROUP *metallicus*
Paraproct with a sternal arm not very short, about 0.5 to 1.4 length of apical arm; gonostylar claw longer and slender (Figs. 39A; 42B; 43A,B) .....
.....*POWERI* GROUP 39 *calceatus, ledgeri, langata, hogsbackensis*

7(5). Lateral lobe of tergum IX with long and strong setae; apical margin of tergum IX with middle deeply concave and with widely separated lateral lobe; aedeagus with short teeth only (Figs. 45A,B; 46A,B; 47B; 48A).....*SIMPSONI* GROUP 47
..... *bromeliae, josiahae, lilii, simpsoni, strelitziae, woodi*
Lateral lobe of tergum IX with short, or median size setae (Figs. 35A; 48C; 36A,B; 37A,B; 38A,B; 39B; 40A,B; 41A,B; 50A; Huang 1977, Figs. 15A,B; 16A,B; 17A,B; 18A,B; 19A; 20A,B; 21C)..... 8

8(7). Gonostylus rather short, curved (Figs. 35A; 48C; 50A) 9
Gonostylus simple, elongate (Huang 1977, Fig. 15A,B; 16A,B; 17A,B; 18A,B; 19A; 20A,B; 21C; Figs. 40A,B; 41A,B) 10

9(8). Gonostylus short, curved, tapering, with a slender, short gonostylar claw process at apex; lateral lobe of tergum IX with 1–4 very fine short setae; apical margin of tergum IX with middle deeply concave and with widely separated lateral lobe (Figs. 35A; 48C) .....*AEGYPTI* GROUP 15
.....*aegypti aegypti,* ssp. *formosus, mascarensis*[1]
Gonostylus short and curved, not tapering, with a short gonostylar claw process at apex; lateral lobe of tergum IX with median size setae; apical margin of tergum IX with middle concave (Fig. 50)..... *PSEUDONIGERIA* GROUP *chemulpoensis*[2]

10(8). Lateral lobe of tergum IX with 3–5 short setae; gonostylus long, with a long slender gonostylar claw process near apex; apical margin of tergum IX with middle deeply concave (Huang 1977, Fig. 15A)... *DENDROPHILUS* GROUP *amaltheus*
Lateral lobe of tergum IX with median size setae (Figs. 36A,B; 37A,B; 38A,B; 39B; 40A,B; 41A,B; Huang 1977, Figs. 15B; 16A,B; 17A,B; 18A,B; 19A; 20A,B; 21C) 11

1. Malagasy species (Mauritius).
2. Palearctic species (Korea, N.E. China).

11(10). Gonostylus long, at least 0.66 length of gonocoxite; gonostylar claw very short, about 0.12–0.13 length of gonostylus; apical margin of tergum IX with middle deeply concave (Figs. 40A,B; 41A,B) .....*POWERI* GROUP 39
..... *angustus*, *ethiopiensis, mpusiensis, usambara*
Without this combination of characters 12

12(11). Claspette with apicomesal angle formed a thumb-like projection, or formed a slight projection; gonostylus curved, tapering, with a gonostylar claw process at apex (Figs. 36A,B; 37A,B; 38A,B; 39B) ..... *APICOARGENTEUS* GROUP 22
Claspette without any projecting portion; gonostylus almost straight, not curved, scarcely tapering, with a long slender or short stout gonostylar claw process at apex (Huang 1977, Figs. 15B; 16A,B; 17A,B; 18A,B; 19A; 20A,B; 21C) .....
.....*DENDROPHILUS* GROUP 28
bambusae, deboeri, demeilloni, dendrophilus, hansfordi, heischi, *keniensis, kenyae, masseyi, mattinglyorum, segermanae*

13(1). Gonostylar claw long, at least 0.25 length of gonostylus; apical margin of tergum IX with middle part produced into a lobe (Figs. 35B; 49A,B) 14
Gonostylar claw rather short, at most 0.20 length of gonostylus; apical margin of tergum IX with conspicuous horn-like median projection (Fig. 35B) .....
..... *SCUTELLARIS* GROUP (*ALBOPICTUS* SUBGROUP) *albopictus*

14(13). Claspette with numerous simple setae on the elevated distal portion and bearing no widened specialized setae (Fig. 49A).....*GRANTI* GROUP *granti*
Claspette long, slender, with numerous simple setae and several stouter widened setae on distal part, with a small median mesally directed projection bearing one large seta and with 3–4 smaller setae near to it (Fig. 49B) .....
.....*UNILINEATUS* GROUP *unilineatus*

THE *AEGYPTI* GROUP

15(9). Gonostylus somewhate swollen in the middle, with apical 0.28 rather narrow and curved (Fig. 35A).....*aegypti aegypti,* ssp. *formosus*
Gonostylus not swollen in the middle, with strongly elbowed at about apical 0.35 (Fig. 48C) ..... *mascarensis*[1]

1 Malagasy species (Mauritius).

THE *AFRICANUS* GROUP

(male of *maxgermaini* unknown)

16(4). Claspette with numerous simple setae on the expanded distal portion and bearing no stronger, spine-like seta on the apicomesal corner (Huang 1990, Figs. 10C; 16C) 17
Claspette with numerous simple setae on the expanded distal portion and bearing 1-3 stronger, spine-like setae on the apicomesal corner (Huang 1990, Figs. 13C; 20A, B; 23A, B).....18

17(16). 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 apicomesal portion (dissected) (Huang 1990, Fig. 16C) ..... *luteocephalus*
Claspette with distal expanded portion subtriangular in dorsal aspect (narrows towards the apicolateral angle, becomes broader apicomesally, with apicomesal corner rounded), with numerous simple setae on the expanded distal portion (dissected) (Huang 1990, Fig. 10C) ..... *africanus*

18(16). Claspette with distal expanded portion subtriangular or oval in dorsal aspect (Huang 1990, Figs. 13C; 20A, B)..... 19
Claspette with distal expanded portion square in dorsal aspect (Huang 1990, Figs. 23A, B) 21

19(18). Claspette with distal expanded portion subtriangular in dorsal aspect (narrows towards the apicomesal angle, becomes broader apicolaterally, with apicolateral corner rounded), with 1 stronger, spine-like seta on the apicomesal angle (Huang 1990, Fig. 13C)..... *corneti*
Claspette with distal expanded portion oval in dorsal aspect (Huang 1990, Figs. 20A, B) 20

20(19). Claspette with 2 stronger, spine-like setae on the apicomesal corner; gonostylar claw rather short and stout, about 5.3 times as long as wide (Huang 1990, Fig. 20A) ..... *neoafricanus*
Claspette with 3 stronger, spine-like setae on the apicomesal corner; gonostylar claw long and slender, about 8.5 times as long as wide (Huang 1990, Fig. 20B).... ..... *ruwenzori*

21(18). Apicomesal angle of claspette with a narrow thumb-like projection and bearing 2 stronger, spine-like setae (Huang 1990, Fig. 23B) ..... *pseudoafricanus*
Apicomesal angle of claspette without such a projection, with 1 strong, spine-like seta on the apicomesal angle and with 1smaller spine-like seta laterad of it (Huang 1990, Fig. 23A) ..... *opok*

THE *APICOARGENTEUS* GROUP

22(12). Claspette with distal expanded portion square in dorsal aspect, apicomesal angle formed a thumb-like projection, with numerous simple setae on the expanded distal portion and bearing no spine-like setae on the apicomesal angle (Figs. 36A,B; 37A,B; 38A,B) 23
Claspette with distal expanded portion subtriangular in dorsal aspect (narrows towards apicomesal angle, with apicolateral corner rounded), apicomesal angle formed a slight projection, with numerous simple setae on the expanded distal portion and bearing 2 stong, basally widened spine-like setae on the apicomesal angle (Fig. 39B) ..... *soleatus*

23(22). Apicomesal angle of claspette with a thumb-like projection and bearing at its tip a row of 7–9 setae (Figs. 36A,B; 37A,B)..... 24

Apicomesal angle of claspette with a narrow thumb-like projection and bearing 3–4 setae at tip of the projection (Figs. 38A,B) 27

24(23). Claspette with apicomesal angle formed a narrower thumb-like projection and bearing 9 setae at tip of the projection, with apicolateral corner rounded; gonostylar claw rather short, at most 0.20 length of gonostylus (Fig. 37B) ..... *ealaensis*
Claspette with apicomesal angle formed a broader thumb-like projection, with apicolateral angle pointed (Figs. 36A,B; 37A) 25

25(24). Claspette with basolateral corner rounded; gonostylar claw long, at least 0.26 length of gonostylus (Fig. 37A) ..... *denderensis*
Claspette with basolateral corner drawn into a broad beak-like projection (Figs. 36A,B) 26

26(25). Claspette with lateral side rather straight, with 8–9 setae on the apicomesal angle (Fig. 36A) .....*apicoargenteus*
Claspette with lateral side rounded, with 7 setae on the apicomesal angle (Fig. 36B) .....*schwetzi*

27(23). Gonostylar claw rather short and stout, about 5.5 times as long as wide (Fig. 38B) .....*blacklocki*
Gonostylar claw long and slender, about 7 times as long as wide (Fig. 38A) *fraseri*

THE *DENDROPHILUS* GROUP
(males of *muroafcete* and *njombiensis* unknown)

28(12). Claspette simple, short, rounded apically, with numerous simple setae on the slightly expanded distal portion and bearing no spine-like seta (Huang 1997, Fig. 15A) .....*amaltheus*
Claspette large, lobed, distal expanded portion square, or subtriangular, or oval in dorsal aspect, with numerous simple setae on the expanded distal portion and bearing 1–5 strong, basally widened spine-like setae (Huang 1997, Figs. 15B; 16A,B; 17A,B; 18A,B; 19A; 20A,B; 21C) 29

29(28). Claspette with distal expanded portion square in dorsal aspect (narrows towards apicolateral angle, with basolateral corner rounded) (Huang 1997, Figs. 16B; 18A) 30
Claspette with distal expanded portion subtriangular, or oval in dorsal aspect (Huang 1997, Figs. 15B; 16A; 17A,B; 18B; 19A; 20A,B; 21C) 31

30(29). Claspette with 2 stronger, basally widened spine-like setae on the apicomesal angle; aedeagus with lateral teeth longer and/or stouter than the others (Huang 1997, Fig. 18A) ..... *dendrophilus*
Claspette with 3 (2–3) stout, basally widened spine-like setae on the apicomesal angle; aedeagus with all rather short teeth (Huang 1997, Fig. 16B) ..... *kenyae*

31(29). Claspette with distal expanded portion subtriangular in dorsal aspect (Huang 1997, Figs. 15B; 18B)..... 32
Claspette with distal expanded portion oval in dorsal aspect (Huang 1997, Figs.

16A; 17A,B; 19A; 20A,B; 21C) 33

32(31). Claspette narrows towards apical angle, with a 90° basolateral angle, with 2 stout, basally widened spine-like setae on the basomesal angle; aedeagus with lateral teeth longer and stouter than the others (Huang 1997, Fig. 18B) ..... *hansfordi*
Claspette narrows towards apical angle, with basolateral corner rounded, with 3 (2–4) stout, basally widened spine-like setae on the basomesal angle; aedeagus with all rather short teeth (Huang 1997, Fig. 15B) ..... *bambusae*

33(31). Claspette with lateral and mesal sides more or less parallel (Huang 1997, Figs. 16A; 21C) 34
Claspette narrows towards apex, broadened at base (Huang 1997, Figs. 17A,B; 19A; 20A,B) 35

34(33). Claspette with 2–3 stout, basally widened spine-like setae on the mesal side (Huang 1997, Fig. 16A) ..... *deboeri*
Claspette with 1 strong, basally widened spine-like seta on the basomesal corner (Huang 1997, Fig. 21C) ..... *mattinglyorum*

35(33). Aedeagus with 2–3 teeth distinctly longer than the others (Huang 1997, Figs. 17A,B; 19A) 36
Aedeagus without 2–3 teeth distinctly longer than the others (Huang 1997, Figs. 20A,B) 38

36(35). Claspette with lateral side rather straight, with mesal side rounded, with 2–3 stout, basally widened spine-like setae on the mesal side (Huang 1997, Fig. 17B)..... ..... *segermanae*
Claspette narrows towards apex, broadened at base, with 2–5 stout, basally widened spine-like setae on the mesal side (Huang 1997, Figs. 17A; 19A) 37

37(36). Claspette with 2–3 stout, basally widened spine-like setae on mesal side near the middle (Huang 1997, Fig. 19A) ..... *heischi*
Claspette with 4 (3–5) stout, basally widened spine-like setae on the mesal side in basal 0.67 (Huang 1997, Fig. 17A)..... *demeilloni*

38(35). Claspette with lateral side rather straight, with mesal side rounded, with 3–4 stout, basally widened spine-like setae on the mesal side (Huang 1997, Fig. 20A) .... *keniensis*
Claspette narrows towards apex, broadened at base, with 3–4 stout, basally widened spine-like setae on the mesal side (Huang 1997, Fig. 20B) ..... *masseyi*

THE *POWERI* GROUP

(males of *chaussieri* and *poweri* unknown)

39(2). Apical margin of tergum IX with slightly separated lateral lobe, each with 12–14 strong setae (Fig. 42A) ..... *contiguus*
Apical margin of tergum IX with well separated lateral lobe, each with 12 or less setae (Figs. 39A; 40A,B; 41A,B; 42B; 43A,B) 40

40(39). Apical margin of tergum IX flat, or slightly concave medially; gonostylar claw long, at least 0.25 length of gonostylus (Figs. 39A; 42B; 43A,B) 41
Apical margin of tergum IX deeply concave medially; gonostylar claw rather short, at most 0.14 length of gonostylus (Figs. 40A,B; 41A,B) 44

41(40). Claspette with distal expanded portion subtriangular in dorsal aspect (Figs. 42B; 43A,B) 42
Claspette with distal expanded portion oval in dorsal aspect, with numerous simple setae on the expanded distal portion and bearing 3 stronger, basally widened setae on the apicomesal corner (Fig. 39A) ..... *hogsbackensis*

42(41). Claspette (narrows towards apicomesal angle), with 2–4 somewhat stronger, basally widened setae on the apicomesal angle; aedeagus with lateral teeth longer and stouter than distal teeth (Figs. 43A,B) 43
Claspette (apicomesal corner formed a slight projection, with apicolateral corner rounded), with 3 stronger, basally widened setae on the apicomesal corner; aedeagus with all rather short teeth (Fig. 42B) ..... *langata*

43(42). Paraproct with rather short sternal arm, less the length of the apical arm; proctiger without cercal setae (Fig. 44A) ..... *ledgeri*
Paraproct with a long sternal arm, as long as or longer than the apical arm; proctiger with 2–5 long cercal setae (Fig. 44B)..... *calceatus*

44(40). Claspette with distal expanded portion rounded lobe-like in dorsal aspect (Figs. 40A,B) 45
Claspette with distal expanded portion square in dorsal aspect (Figs. 41A,B) 46

45(44). Claspette rather small, rounded, with numerous simple setae on the expanded distal portion and bearing 5 strong, basally widened spine-like setae on the apical margin (Fig. 40B) ..... *mpusiensis*
Claspette large, rounded,with numerous simple setae on the expanded distal portion and bearing no spine-like setae (Fig. 40A)..... *angustus*

46(44). Claspette with 4 strong, basally widened spine-like setae on the apical side (Fig. 41B) ..... *ethiopiensis*
Claspette with 9 strong, basally widened spine-like setae on the apical side and mesal side (Fig. 41A)..... *usambara*

THE *SIMPSONI* GROUP

(males of *gandaensis, kivuensis* and *sampi* unknown)

47(7). Apical margin of tergum IX with low and slightly separated lateral lobe, each with 8-10 strong setae (Fig. 47A)..... *subargenteus*
Apical margin of tergum IX with middle deeply concave and with widely separated lateral lobe, each with 3-9 setae (Figs. 45A,B; 46A,B; 47B; 48A) 48

48(47). Claspette large and broad, reaching to 0.54 of gonocoxite, distal expanded portion square in dorsal aspect, with numerous simple setae on the expanded distal portion and bearing 2 (1-2) stronger, basally widened spine-like setae on the apicomesal

angle (Fig. 46B) ..... *josiahae*
Claspette large, long, reaching to 0.75-0.90 of gonocoxite, with numerous simple setae, without any stronger, basally widened spine-like setae on the expanded distal portion (Figs. 45A,B; 46A; 47B; 48A) 49

49(48). Claspette long, reaching to 0.90 of gonocoxite, distal expanded portion long and slender, or broad and lobe-like (Figs. 47B; 48A) 50
Claspette rather short, reaching to 0.75-0.80 of gonocoxite, triangular or subtriangular in dorsal aspect (Figs. 45A,B; 46A) 51

50(49). Claspette with distal expanded portion long and slender (narrows towards the apex, becomes broader basally), with numerous simple setae on the expanded distal portion (Fig. 47B) ..... *woodi*
Claspette with distal expanded portion broad and lobe-like, with numerous simple setae on the expanded distal lobe (Fig. 48A,B) ..... *strelitziae*

51(49). Claspette triangular in dorsal aspect, with mesal angle at middle, apicomesal side equal to the length of basomesal side (Fig. 45B) ..... *lilii*
Claspette subtriangular in dorsal aspect (Figs. 45A; 46A) 52

52(51). Claspette with mesal angle closer to base, apicomesal side much longer than basomesal side (Fig. 46A) ..... *simpsoni*
Claspette with mesal angle closer to apex, apicomesal side shorter than basomesal side (Fig. 45A) ..... *bromeliae*

NEW SPECIES OF *AEDES* (*STEGOMYIA*) FROM THE AFROTROPICAL REGION

Aedes (*Stegomyia*) *ealaensis* New Species

(Figs. 11A,C,D,E; 12A,B; 37B)

FEMALE. *Head.* Proboscis dark-scaled, without pale scales on ventral surface, longer than forefemur (1.03–1.09 length of forefemur); maxillary palpus 0.21–0.22 length of proboscis, dark, with white scales on entire dorsal surface of palpomere 3; pedicel covered with white scales except on dorsal surface; antenna with a few dark scales on flagellomere 1; clypeus bare; occiput with few erect forked scales; a row of broad white scales around eye margins; vertex with a median stripe 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. 11A). Scutum with narrow dark scales, and a distinct median stripe of broad white scales on anterior promontory, with a short median longitudinal stripe of narrow pale yellowish scales, reaching to prescutellar area, absent in anterior 0.50–0.66 of scutum; prescutellar line of narrow pale yellowish scales not present; fossal area with a large patch of broader crescent-shaped white scales; posterior dorsocentral pale yellowish line of narrow scales present, reaching to posterior 0.33–0.40 of scutum; a patch

of narrow white scales on lateral margin just in front of wing root; acrostichal setae absent; dorsocentral setae present; 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; antepronotum with broad white scales; postpronotum with a large patch of broad white scales and a few dark narrow scales dorsally; 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 mesepimeral scale patch much reduced, or absent; lower mesepimeron without setae; metameron and mesopostnotum bare. *Wing*. With dark scales on all veins and without a minute basal spot of white scales on costa; cell R_2 2.8–3.7 length of vein R_{2+3}. *Halter*. With dark scales. *Legs* (Figs. 12B; 11D). Coxae with patches of white scales; white knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly dark, with a subapical white stripe on ventral surface in apical 0.33; midfemur with a large, white spot on anterior surface 0.59–0.62 from base, usually with some white scales scattered on anterior surface in basal 0.5 and in apical 0.33; hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.58–0.61; foretibia anteriorly dark with a basal white band; midtibia anteriorly dark, usually with a basal white spot on posterior surface; hindtibia anteriorly with a white longitudinal stripe on ventral surface in basal 0.43–0.52 that narrows 0.20–0.23 from base and not expanded on to anterior surface; foretarsomere 1 with basal 0.11-0.14 white on dorsal surface; foretarsomere 2 with basal 0.30–0.42 white on dorsal surface; midtarsomere 1 with basal 0.18–0.20 white on dorsal surface; midtarsomere 2 with basal 0.91-0.92 white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1-5, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.25–0.27, 0.24–0.30, 0.19–0.23, 0.35–0.40 and 0.27–0.44; fore- and midlegs with tarsal claws equal, all toothed; hindleg with tarsal claws equal, both simple. *Abdomen* (Fig. 11C). Tergum I with white scales on laterotergite; terga II–IV with basolateral white spots only; terga V-VIII each with a basal white band and basolateral white spots which do not connect with the basal white band; basal white band on tergum V usually not complete on middle; basal white band on terga VI–VII usually rather long, extending to 0.8–0.9 length of tergum; sterna III–VII each with a basal white band.

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; palpomeres 4, 5 subequal, slender, dorsally curved and with only a few short setae; antenna plumose, shorter than proboscis. *Wing*. Cell R_2 2.0–2.2 length of vein R_{2+3}. *Legs* (Figs. 12A; 11E). Fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple. *Abdomen*. Terga III–VII each with a basal white band and basolateral white spots which do not connect with the basal white band; sternum VIII with basolateral white spots.

Genitalia (Fig. 37B). Gonocoxite 2.1 times as long as wide (width measured 0.5 from base); claspette large, lobed, distal expanded portion square in dorsal aspect, apicomesal angle formed a thumb-like projection, with numerous simple setae on the expanded distal portion and bearing 9 setae at tip of the projection, with apicolateral corner rounded; gonostylus rather short, curved, 0.52–0.56 length of gonocoxite, with a short, stout claw process at apex; paraproct with a sternal arm; cercal setae absent; apical margin of tergum IX concave medially with 7–8 setae on lateral lobe; sternum IX without setae.

PUPA and LARVA. Unknown.

TYPE DATA. Holotype male (MEP Acc. 725/ #3003, Eala, I-1933, Dr. C. Henrard), with genitalia on slide (MEP Acc. 725, 81/165), Eala (0^{o} 01' N, 18^{o} 30' E), *Cuvette-Centrale*, DEMOCRATIC REPUBLIC OF THE CONGO (Zaire), I-1933 (Dr. C. Henrard). Deposited in the Department of Zoologie, Section d'Entomologie, Musee Royale de l'Afrique Centrale, Tervuren, Belgium [CMT]. Allotype female (MEP Acc. 725/ #3003), same data as holotype [CMT]. Paratypes: 3 males and 1 female as follows, (MEP Acc. 725): 1 male (#3003), with genitalia on slide (81/166), 2 males (#2800), with genitalia on slides (81/137, 81/138) and 1 female (#3003), with genitalia on slide (81/139), same data as holotype. Deposited in the CMT.

OTHER MATERIAL EXAMINED. DEMOCRATIC REPUBLIC OF THE CONGO (Zaire). *Cuvette-Centrale*: Coquilhatville (0° 04' N, 18° 20' E), 10-II-1945, J. Wolfs, 1 F, 1 F gen (MEP Acc. 725, 81/140) [CMT]; same data except 1945, J. Wolfs, 1 F (MEP Acc. 725) [CMT]; same data except 1-III-1946, J. Wolfs, 1 F, 1 F gen (MEP Acc. 725, 81/171) [CMT]. *Haut-Congo*: Yangambi (0° 50' N, 24° 15' E), no date, Dr. Parent, 1 M, 1 M gen (MEP Acc. 725, 81/167) [CMT].

DISTRIBUTION. This species is known only from Democratic Republic of the Congo (Zaire).

TAXONOMIC DISCUSSION. *Aedes ealaensis* is a member of the *apicoargenteus* group. The *apicoargenteus* group can be distinguished from other *Stegomyia* species by the following combination of characters: (1) scutum with a distinct patch of broader crescent-shaped white scales on fossal area; (2) white knee-spot absent on forefemur, present on mid- and hindfemora; (3) midfemur with a large, white spot on anterior surface; (4) hindtibia anteriorly dark, with a white stripe in subbasal area and (5) abdominal basal white band on terga VI–VII rather long, extended to 0.5–0.9 length of tergum.

Aedes ealaensis has the scutellum with broad white scales on the midlobe and broad dark scales on the lateral lobes, and can thus be easily distinguished from all other species of the *apicoargenteus* group except *Ae. apicoargenteus* and *Ae. denderensis*.

The adult male and female of *Ae. ealaensis* are very similar to those of *Ae. apicoargenteus*, but can be distinguished from those of *Ae. apicoargenteus* by the hindtarsomere 5 with basal 0.27–0.44 white on dorsal surface. In *Ae. apicoargenteus*, the hindtarsomere 5 is entirely dark.

The adult males and females of *Ae. ealaensis* are easily confused with those of *Ae.*

denderensis, but can be distinguished by the hindtarsomere 4 with basal 0.35–0.40 white on dorsal surface and hindtarsomere 5 with basal 0.27–0.44 white on dorsal surface. In *Ae*. *denderensis*, the hindtarsomere 4 has basal 0.89–0.94 white on dorsal surface and hindtarsomere 5 has basal 0.33 white to all white on dorsal surface.

The male genitalia of *Ae. ealaensis* are easily differentiated from all other species in the *apicoargenteus* group by the claspette, which has the distal expanded portion square in dorsal aspect, apicomesal angle formed a thumb-like projection, with numerous simple setae on the expanded distal portion and bearing 9 setae at the tip of the projection, with apicolateral corner rounded, and by the gonostylar claw, which is short and stout.

Aedes ealaensis is most similar to *Ae*. *denderensis.* Based on the present collection data, *Ae*. *ealaensis* occurs in habitats with altitudes between 333 and 400 m in areas of yearly rainfall of 177.80 cm.

BIONOMICS. Unknown.

MEDICAL IMPORTANCE. Unknown.

Aedes (*Stegomyia*) *ethiopiensis* New Species

(Figs. 18B; 41B)

MALE. *Head.* Proboscis dark-scaled, without pale scales on ventral surface, slightly longer than forefemur; maxillary palpus 5-segmented, about as long as proboscis, predominantly dark, with a white band at base of palpomeres 2-5, those on palpomeres 4,5 dorsally incomplete; palpomeres 4,5 subequal, slender, dorsally curved and with only a few short setae; antenna plumose, shorter than proboscis; pedicel covered with white scales except on dorsal surface; clypeus bare; occiput with few erect forked scales; a row of broad white scales around eye margins; vertex with a median stripe 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.* Scutum with narrow dark scales, and a distinct median white spot of narrow scales on anterior promontory, with a short median longitudinal stripe of narrow pale scales, reaching to prescutellar area, absent in anterior 0.66 of scutum; prescutellar line well developed, with narrow white scales, connecting with median longitudinal stripe at anterior margin of prescutellar area; fossal area with a large patch of broader crescent-shaped white scales; posterior dorsocentral pale yellow line of narrow scales present, reaching forward to the posterior end of fossal white patch; a patch of narrow white scales on lateral margin just in front of wing root; 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; anteprontotum with broad white scales; postpronotum with a patch of broad white scales and a few dark narrow scales dorsally; paratergite with broad white scales; postspiracular area without scales; hypostigmal area with white scales; patches of broad white scales on propleuron, subspiracular area, upper and lower portions of mesokatepisternum, and on mesepimeron; upper mesokatepis-

ternal 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 2.5 length of vein R_{2+3}. *Halter*. With dark scales. *Legs* (Fig. 18B). Coxae with patches of white scales; white knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in basal 0.4; midfemur with a large, white spot on anterior surface about 0.53 from base; hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.58 that widens about 0.3 from base; foretibia anteriorly dark with a basal white band; midtibia anteriorly dark, without a distinct white longitudinal stripe on ventral surface in basal area; hindtibia anteriorly dark, with a white longitudinal stripe on ventral surface in basal 0.33; fore- and midtarsi with a basal white band on tarsomeres 1, 2; foretarsomere 1 with basal 0.18 white on dorsal surface; foretarsomere 2 with basal 0.20 white on dorsal surface; midtarsomere 1 with basal 0.30–0.33 white on dorsal surface; midtarsomere 2 with basal 0.4 white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1–3, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.32, 0.33 and 0.34; hindtarsomere 4 all white except at extreme apex; hindtarsomere 5 all white except at apex on ventral surface; fore- and midlegs with tarsal claws unequal, all simple; hindlegs with tarsal claws equal, simple. *Abdomen*. Tergum I with white scales on laterotergite; tergum II with basolateral white spots; terga III–VII each with a basal white band and basolateral white spots which do not connect with the basal white band; sterna IV-VI each with a basal white band; sternum VIII with basolateral white spots. *Genitalia* (Fig. 41B). Gonocoxite 2.3 times as long as wide (width measured 0.5 from base); claspette large, lobed, distal expanded portion square in dorsal aspect, with numerous simple setae on the expanded distal portion and bearing 4 strong, basally widened spine-like seta on the apical side; gonostylus simple, elongate, about 0.71 length of gonocoxite, with a short, stout claw process at apex; paraproct with a sternal arm; cercal setae absent; apical margin of tergum IX deeply concave medially with 4–5 median size setae on lateral lobe; sternum IX without setae.

FEMALE, PUPA and LARVA. Unknown.

TYPE DATA. Holotype male (MEP Acc. 723, No data except Ethiopia), with genitalia on slide (MEP Acc. 723, 80/166), ETHIOPIA. Deposited in the Ecologie Virale, Institut Pasteur, Paris [PIP].

OTHER MATERIAL EXAMINED. ETHIOPIA. Manera (7° 40' N, 36° 50' E), Gamma, Goffa Prov., 16-X-1963, P. Neri, No. 684, 1 M, 1 M gen (MEP Acc. 1036, 97/13) [DVBD].

DISTRIBUTION. This species is known only from Ethiopia.

TAXONOMIC DISCUSSION. *Aedes ethiopiensis* is a member of the *poweri* group. The *poweri* group can be distinguished from other *Stegomyia* species by the following combination of characters: (1) scutum with a distinct patch of broader crescent-shaped

white or pale yellow scales on fossal area; (2) scutum without a pair of submedian stripes; (3) white knee-spot absent on forefemur, present at least on midfemur; (4) midfemur with a large, white spot on anterior surface; (5) hindtibia anteriorly dark, without or with a white stripe on ventral surface in basal area and (6) hindtarsomere 4 almost all white to all white.

Aedes ethiopiensis has the scutum with an anteromedial white spot of narrow scales, hindtibia with a white stripe on ventral surface in basal area and hindtarsomere 4 all white except at extreme apex and hindtarsomere 5 all white on dorsal surface, and can thus be easily distinguished from all other species of the *poweri* group except *Ae. usambara*.

The adult male of *Ae. ethiopiensis* is very similar to that of *Ae. usambara*, but can be distinguished from *Ae. usambara* by the midtibia without a white stripe on ventral surface in basal area. In *Ae. usambara* the midtibia has a white stripe on ventral surface in basal area.

The male genitalia of *Ae.* ethiopiensis are differentiated from all other species in the *poweri* group by the claspette, which has the distal expanded portion square in dorsal aspect, with numerous simple setae on the expanded distal portion and bearing 4 strong, basally widened, spine-like setae on the apical side, and by the apical margin of tergum IX, which is deeply concave medially and has 4–5 median size setae on each lateral lobe.

The male genitalia of *Ae. ethiopiensis* are extremely similar to those of *Ae. usambara* in having the claspette with distal expanded portion square in dorsal aspect, but can be distinguished from those of *Ae. usambara* by the claspette with 4 strong, basally widened, spine-like setae on the apical side. In *Ae. usambara*, the claspette has 9 strong, basally widened, spine-like setae on the apical side and mesal side.

BIONOMICS. Unknown.

MEDICAL IMPORTANCE. Unknown.

Aedes (*Stegomyia*) *gandaensis* New Species
(Fig. 26A)

FEMALE. *Head*. Proboscis dark-scaled, without pale scales on ventral surface, slightly longer than forefemur; maxillary palpus 0.28 length of proboscis, dark, with white scales on apical 0.33; pedicel covered with white scales except on dorsal and ventral surfaces; clypeus bare; occiput with few erect forked scales; a row of broad white scales around eye margins; vertex with a median stripe of broad white scales, with broad dark scales on each side interrupted by a lateral stripe of broad white scales, followed ventrally by a patch of broad white scales. *Thorax*. Scutal markings as in *Aedes woodi* Edwards except most of the scales on anterior median area rubbed off; scutum with narrow dark scales, a narrow submedian longitudinal stripe of narrow yellowish scales on each side of midline, reaching to prescutellar area and connecting with prescutellar line of narrow yellowish scales; fossal area with a patch of broader, crescent-shaped white scales; posterior dorsocentral yel-

lowish lines present, reaching to posterior 0.33 of scutum; a patch of narrow white scales on lateral margin just in front of wing root; acrostichal setae absent; dorsocentral setae present; scutellum with broad white scales on midlobe, with broad dark scales on lateral lobes and with a few broad dark scales at apex of midlobe; antepronotum with broad white scales; postpronotum with a patch of broad white scales and a few narrow dark scales dorsally; 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 bare. *Wing*. With dark scales on all veins except for a minute basal spot of white scales on costa; cell R_2 2.5 length of R_{2+3}. *Halter.* With dark scales. *Legs* (Fig. 26A). Coxae with patches of white scales; white knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in basal 0.33; midfemur with a large white spot on anterior surface about 0.60 from base; hindfemur anteriorly with a broad white longitudinal stripe in basal 0.60 that widens at base; foretibia anteriorly dark, with a basal white band; mid- and hindtibiae anteriorly dark; hindtibia without a white stripe at, or near base; foretarsus with a basal white band on tarsomeres 1–5, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.20, 0.66, 0.50, 0.33, and 0.66; midtarsus with a basal white band on tarsomeres 1–5, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.25, 0.50, 0.30, 0.20, and 0.66; 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 0.25, 0.33, 0.60, and 0.60; hindtarsomere 5 all white; fore- and midlegs with tarsal claws equal, all toothed; hindleg with tarsal claws equal, both simple. *Abdomen*. Tergum I with white scales on laterotergite; tergum II with basolateral white spots; terga III-VII each with a basal white band and basolateral white spots not connecting with basal white band; sterna III-VI each with a basal white band; sternum VII with basolateral white spots; segment VIII largely retracted.

MALE, PUPA and LARVA. Unknown.

TYPE DATA. Holotype female (MEP Acc. 719/ Kenya, Ganda (3° 13' S, 40° 03' E), 2:IX:1953, E.C.C. Van Someren/ Taken biting in bush at 8-12 A.M. with 37 *Aedes woodi* and 3 *Aedes simpsoni*), Ganda, KENYA, 2-IX-1953 (E.C.C. Van Someren). Deposited in the British Museum (Natural History), London [BMNH].

DISTRIBUTION. This species is presently known only from the Type locality, Ganda, Coast Region of Kenya.

TAXONOMIC DISCUSSION. *Aedes gandaensis* is a member of the *simpsoni* group. The *simpsoni* group can be distinguished from other *Stegomyia* species by the following combination of characters: (1) scutum with a distinct patch of broader crescent-shaped white scales on fossal area; (2) scutum with a pair of submedian stripes; (3) white knee-

spot absent on forefemur, present on mid- and hindfemora and (4) midfemur with a large, white spot on anterior surface.

Aedes gandaensis has the scutellum with broad white scales on the midlobe and broad dark scales on the lateral lobe, and can thus be easily distinguished from all other species of the *simpsoni* group except *Ae. woodi*. It is extremely similar to that of *Ae. woodi* with which it has been confused and misidentified, but can be distinguished from *Ae. woodi* by the presence of a basal white band on fore- and midtarsomeres 3–5 and hindtarsomere 4 with basal 0.60 white on dorsal surface. In *Ae. woodi*, the fore- and midtarsi have a basal white band only on tarsomeres 1, 2 and hindtarsomere 4 is entirely dark.

Based on the present collection data, *Ae. gandaensis* occurs in habitats with altitudes of <166 m in areas of yearly rainfall of 114.30 cm.

BIONOMICS. The holotype female was taken biting man in the bush between 0800-1200 h, in Ganda, Kenya, along with females of the *Aedes simpsoni* complex and *Aedes woodi*. However, it should be noted that 3 *Aedes simpsoni* mentioned on the type-label are *Aedes bromeliae* (Theobald) (see Huang 1979).

MEDICAL IMPORTANCE. Unknown.

Aedes (*Stegomyia*) *hogsbackensis* New Species
(Figs. 18C; 19B,D,E; 24C6,D5; 39A; 50B,C)

Aedes (*Stegomyia*) *poweri* (Theobald), Muspratt 1953: 83 (M*, F*, L; in part); Muspratt 1956: 72 (M, F*, L) (in part).

FEMALE. *Head*. Proboscis dark-scaled, without pale scales on ventral surface, longer than forefemur; maxillary palpus about 0.20 length of proboscis, dark, with white scales on entire dorsal surface of palpomere 3; pedicel covered with white scales except on dorsal and ventral surfaces; antenna with a few dark scales on flagellomere 1; clypeus bare; occiput with few erect forked scales; a row of broad white scales around eye margins; vertex with a median stripe 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*. Scutum with narrow dark scales, and a distinct median white spot of broad scales on anterior promontory, followed by a narrow median longitudinal stripe of narrow yellowish scales, reaching to prescutellar area; prescutellar line of narrow yellowish scales not present, with only a few narrow yellowish scales; (Drakensberg specimens prescutellar line of narrow yellowish scales usually present, sometimes with only a few narrow yellowish scales, or sometimes absent); fossal area with a large patch of broader crescent-shaped white scales; posterior dorsocentral white line of narrow scales present, reaching to posterior 0.4 of scutum; a patch of narrow white scales on lateral margin just in front of wing root; 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;

antepronotum with broad white scales; postpronotum with a small patch of broad white scales and a few dark narrow scales dorsally; paratergite with broad white scales; postspiracular area without scales; hypostigmal area without scales; subspiracular area without scales; patches of broad white scales on propleuron, 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 without broad white scales; mesopostnotum bare. *Wing.* With dark scales on all veins except for a minute basal spot of white scales on costa; cell R_2 2.8 length of vein R_{2+3}. *Halter.* With dark and white scales. *Legs* (Figs. 19B,D; 24C6). Coxae with patches of white scales; white knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in basal 0.36; midfemur with a large, white spot on anterior surface about 0.55 from base; midfemur with some pale scales scattered on anterior surface in basal 0.50; hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.56 that widens 0.14 from base; foretibia anteriorly dark with a basal white band; midtibia anteriorly dark, with a distinct white longitudinal stripe on ventral surface in basal 0.12; hindtibia anteriorly with a white longitudinal stripe on ventral surface in basal 0.22; foretarsomere 1 with basal 0.12 white on dorsal surface; foretarsomere 2 with basal 0.23 white on dorsal surface; midtarsomere 1 with basal 0.29 white on dorsal surface; midtarsomere 2 with basal 0.55 white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1–3, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.24, 0.32 and 0.26; hindtarsomere 4 all white except at extreme apex; hindtarsomere 5 all dark; fore- and midlegs with tarsal claws equal, all toothed; hindleg with tarsal claws equal, both simple. *Abdomen.* Tergum I with white scales on laterotergite; terga II–VII each with a basal white band and basolateral white spots which do not connect with the basal white band; sterna III–VII each with a basal white band; segment VIII largely retracted.

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; palpomeres 4,5 subequal, slender, dorsally curved and with only a few short setae; antenna plumose, shorter than proboscis. *Thorax.* (Drakensberg specimens subspiracular area with broad white scales). *Wing.* Cell R_2 about 3.0–0.33 length of vein R_{2+3}. *Legs* (Figs. 18C; 19E; 24D5). hindfemur anteriorly with a broad white longitudinal stripe in basal 0.57–0.60 that widens 0.1–0.2 from base; midtibia anteriorly dark, with a distinct white longitudinal stripe on ventral surface in basal 0.12–0.14; hindtibia anteriorly with a white longitudinal stripe on ventral surface in basal 0.23–0.36; foretarsomere 1 with basal 0.13–0.14 white on dorsal surface; foretarsomere 2 all dark, or with only a few white scales on dorsal surface in basal area; midtarsomere 1 with basal 0.23–0.24 white on dorsal surface; midtarsomere 2 with basal 0.30–0.35 white on dorsal surface; hindtarsus with a basal white band on tar-

someres 1–3, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.25–0.27, 0.22–0.27 and 0.16–0.18; fore- and midlegs with tarsal claws unequal, the smaller one toothed, the larger one simple. *Abdomen*. Sternum VIII with basolateral white spots. *Genitalia* (Fig. 39A). Gonocoxite 2.2 times as long as wide (width measured 0.5 from base); claspette large, lobed, distal expanded portion oval in dorsal aspect, with numerous simple setae on the expanded distal portion and bearing 3 stronger, basally widened setae on the apicomesal corner; gonostylus simple, elongate, 0.54–0.56 length of gonocoxite, with a long slender claw process at apex; paraproct with a sternal arm; cercal setae absent; apical margin of tergum IX slightly concave medially with 8–11 setae on each lateral lobe; sternum IX without setae.

PUPA. Essentially as in *Ae*. *ledgeri* (Huang 1981, Fig. 5), with the following diagnostic characters: *Abdomen*. Seta 3-II,III usually single (1–2) and barbed, shorter than segment III; 5-IV-VI usually single (1–2) and barbed, not extended beyond posterior margin of following segment; 9-I-VI small, single, simple; 9-VII usually single (1–2) and barbed, 9-VII,VIII much longer and stouter than 9-I-VI; 9-VIII usually with 4 branches (2–4) and barbed. *Paddle* (Fig. 50B). Oval, about 1.25 times as long as wide; margins with distinct denticles, without fringe of long hair-like spicules; apex notched. Male genital lobe short and broad, much shorter than wide.

LARVA. Essentially as in *Ae*. *ledgeri* (Huang 1981, Fig. 6), with the following diagnostic characters: *Head*. Seta 1-A single, simple. *Thorax*. Basal spine of meso- and metapleural setae groups long, stout, apically pointed. *Abdomen*. Seta 1-VIII usually with 4 branches (3–4), barbed; 3-VIII usually with 5 branches (5–6), barbed; 5-VIII usually with 5 branches (4–5), barbed; comb usually with 6 (6–10) scales in a row, each scale with free portion widened at base and sharply pointed at apex, and with fine denticles at base; saddle incomplete, marginal spicules very small and inconspicuous; seta 1-X with 2 branches, barbed; 2-X usually with 3 branches, rarely 2-branched; 3-X single; 4-X with 4 pairs of setae on grid, each seta 2-branched; no precratal tufts; anal papillae about 4.5–5.0 length of saddle, sausage-like. *Siphon*. about 1.4 times as long as wide 0.5 from base, acus absent; with usually 11 (8–12) pecten spines, evenly spaced, each spine with basal denticles, 2–5 denticles on the ventral side, and 1–3 smaller denticles on the dorsal side; seta 1-S usually with 4 branches (3–4), barbed, inserted beyond apical spine and beyond middle of siphon.

TYPE DATA. Holotype male (MEP Acc. 806/ South Africa 1980, #66-11, Y. M. Huang), with associated larval and pupal skins on slide, with genitalia on slide (81/52), Hogsback (32° 36' S, 27° 01'E), *Cape Province*, SOUTH AFRICA, collected as larva from a medium size stump hole, about 0.2 m above ground, in a plantation, 7-III-1980 (Y.M. Huang). Deposited in the Smithsonian Institution, Washington, D.C. [USNM]. Allotype female (MEP Acc. 806, #66-13), with associated larval and pupal skins on slide, with genitalia on slide (81/53), same data as holotype [USNM]. Paratypes: 3 males: 1 male (MEP Acc. 806, #66-10), with associated larval and pupal skins on slide, same data as holotype [USNM]; 2 males (MEP Acc. 806, #65-10, -11), with associated larval and pupal skins on

slides, with genitalia on slides (81/50, 81/51), collected as larvae from a small stump hole, 7-III-1980 (Y.M. Huang), same data as holotype [USNM].

OTHER MATERIAL EXAMINED. SOUTH AFRICA. *Cape Province*: Kologha Forest (32° 30' S, 27° 20' E), 1952, J. Muspratt, 1M (SAIMR, CSIR-52, Coll. No. A381E/ *Aedes* (*S.*) *poweri* Theo. Det. J.M. 1952) [BMNH]; same data, 2M, 1F (SAIMR/YF/CSIR-52, Coll. No. A379E, A382/E1, A379/E/ *Aedes* (*S.*) *poweri* Theo. Det. J.M. 1952), 2 M gen, 1 F gen (MEP Acc. 719, 81/42, 81/43, 81/41) [BMNH]; same data, 3M (SAIMR, CSIR-52, Coll. No. A382E/ *Aedes* (*Steg.*) *poweri* Theo. Det. J.M. 1952), 2 M gen (MEP Acc. 724, 81/44, 81/45) [ORSTOM]. *Natal*, Drakensberg (29° S, 29° E), 1978, J. Muspratt, 5M, 3F (0000/78/-, 6, -7, -8, -9, -1, -2, -3/ *Aedes* (*Steg.*) *poweri* (Theo.) Det. J.M. 1952), 3 M gen, 1 F gen (MEP Acc. 699, 81/47, 81/48, 81/49, 81/46) [USNM].

DISTRIBUTION. This species is known only from South Africa.

TAXONOMIC DISCUSSION. *Aedes hogsbackensis,* a member of the *poweri* group, has the scutum with an anteromedial white spot of broad scales, midtibia with a white stripe on ventral surface in basal area, hindtibia with a white stripe on ventral surface in basal area and hindtarsomere 5 all dark, and can thus be easily distinguished from all other species of the *poweri* group except *Ae. poweri.*

Aedes hogsbackensis is extremely similar to that of *Ae. poweri* with which it has been confused and misidentified, *but* can be distinguished from *Ae. poweri* by: (1) the female midtarsomere 2 with basal 0.55 white on dorsal surface; and (2) the male midtarsomere 2 with basal 0.30–0.35 white on dorsal surface. In *Ae. poweri*, the female midtarsomere 2 has basal 0.9 white to all white on dorsal surface, and the male of *Ae. poweri* is not known.

The adult male and female of *Ae. hogsbackensis* are also very similar to those of *Ae. contiguus* Edwards, but can be distinguished from those of *Ae. contiguus* by the midtibia with a white stripe on ventral surface in basal area. In *Ae. contiguus*, the midtibia has no white stripe on ventral surface in basal area.

The male genitalia of *Ae. hogsbackensis* are differentiated from all other species in the *poweri* group by the claspette, which has the distal expanded portion oval in dorsal aspect, with numerous simple setae on the expanded distal portion and bearing 3 stronger, basally widened setae on the apicomesal corner, and by the apical margin of tergum IX, which is slightly concave medially and has well separated lateral lobe, each with 8–11 setae.

The male genitalia of *Ae. hogsbackensis* are very similar to those of *Ae. contiguus* in having the claspette with distal expanded portion oval in dorsal aspect, but can be distinguished from those of *Ae. contiguus* by the apical margin of tergum IX with well separated lateral lobe, each with 8–11 setae. In *Ae. contiguus*, the apical margin of tergum IX has slightly separated lateral lobe (very narrow space between them), each with 12–14 strong setae.

Aedes hogsbackensis is apparently a montane forest species that occurs in habitats with altitudes between 1,200 and 1,666 m in areas of yearly rainfall of 101.6–139.7 cm.

BIONOMICS. Larvae of *Ae. hogsbackensis* were collected from stump holes in

Hogsback (type specimens), and from tree holes in Kologha Forest, Cape Province; and from a small tree hole in montane forest, near Drakensberg, Natal, South Africa.

Aedes hogsbackensis has been collected in association with *Ae. aegypti* from a medium size stump hole (MEP Acc. 806, #66), in Hogsback, Cape Province, South Africa.

Mattingly (1953: 30) reported that a number of females were taken biting man in the Kologha Forest (Muspratt 1953). We now know that Musprattís *Ae. poweri* included two distinct species. The specimens from Kologha Forest, Cape Province that Muspratt (1953, 1956) included *Ae. poweri* as well as the new species *Ae. hogsbackensis*.

MEDICAL IMPORTANCE. Unknown.

Aedes (*Stegomyia*) *mpusiensis* New Species
(Figs. 18A; 40B)

MALE. *Head*. Proboscis dark-scaled, without pale scales on ventral surface, longer than forefemur; maxillary palpus 5-segmented, slightly longer than proboscis, predominantly dark, with a white band at base of palpomeres 2–5, those on palpomeres 4,5 dorsally incomplete; palpomeres 4,5 subequal, slender, dorsally curved and with only a few short setae; antenna plumose, shorter than proboscis; pedicel covered with white scales except on dorsal surface; clypeus bare; occiput with few erect forked scales; a row of broad white scales around eye margins; vertex with a median stripe 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*. Scutal markings as in *Aedes angustus* Edwards except most of the scales on the right hand side area rubbed off; scutum with narrow dark scales, and a distinct median longitudinal stripe of narrow pale yellow scales, median pale yellow stripe from anterior promontory, tapering posteriorly and reaching to prescutellar area; prescutellar line well developed, with narrow pale yellow scales, connecting with median longitudinal stripe at anterior margin of prescutellar area; a large (crescent-shaped) patch of pale yellow scales on fossal area, fossal pale yellow patch with anterior end extending along scutal margin towards the median pale yellow stripe; posterior dorsocentral pale yellow line of narrow scales present, reaching forward to the posterior end of fossal pale yellow patch; a patch of narrow pale scales on lateral margin just in front of wing root; 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; antepronotum with broad white scales; postpronotum with a patch of broad white scales posteriorly, and with some dark narrow scales dorsally; paratergite with broad white scales; hypostigmal area with broad white 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 pale scales on costa; cell R_2 about 3.0 length of vein R_{2+3}. *Halter.* With white scales. *Legs* (Fig. 18A). Coxae with patches of white scales; white knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in basal 0.44; midfemur with a large, white spot on anterior surface about 0.61 from base; hindfemur anteriorly with a broad, white longitudinal stripe in basal 0.6 that widens about 0.27 from base; foretibia anteriorly dark with a basal white band; midtibia anteriorly dark, with a distinct white longitudinal stripe on ventral surface in basal 0.16; hindtibia anteriorly dark, with a white longitudinal stripe on ventral surface in basal 0.27; foretarsus with a basal white band on tarsomere 1; midtarsus with a basal white band on tarsomeres 1, 2; foretarsomere 1 with basal 0.11 white on dorsal surface; midtarsomere 1 with basal 0.27 white on dorsal surface; midtarsomere 2 with basal 0.47 white on dorsal surface; hindtarsus with a basal white band on tarsomeres 1–3, the ratio of length of white band on dorsal surface to the total length of tarsomere is 0.27, 0.19 and 0.2; hindtarsomere 4 all white except at extreme apex; hindtarsomere 5 all white except at apex on ventral surface; fore- and midlegs with tarsal claws unequal, all simple; hindlegs with tarsal claws equal, simple. *Abdomen*. Tergum I with white scales on laterotergite; terga II-VII with basolateral white spots only; sternum VIII with basolateral white spots. *Genitalia* (Fig. 40B). Gonocoxite 2.5 times as long as wide (width measured 0.5 from base); claspette rather small, with distal expanded portion rounded in dorsal aspect, with numerous simple setae on the expanded distal portion and bearing 5 strong, basally widened spine-like setae on the apical margin; gonostylus simple, elongate, about 0.71 length of gonocoxite, with a short, stout claw process at apex; paraproct with a sternal arm; cercal setae absent; apical margin of tergum IX deeply concave medially with 7 median size setae on each lateral lobe; sternum IX without setae.

FEMALE, PUPA and LARVA. Unknown.

TYPE DATA. Holotype male (MEP Acc. 725/ Mont Mpuse, 20-V-52, L&N No. 1, Wolfs), with genitalia on slide (MEP Acc. 725, 97/53), Mont. Mpuse, DEMOCRATIC REPUBLIC OF THE CONGO (Zaire), 20-V-1952 (J. Wolfs). Deposited in the Department of Zoologie, Section d'Entomologie, Musee Royale de l'Afrique Centrale, Tervuren, Belgium [CMT].

DISTRIBUTION. This species is known only from Democratic Republic of the Congo (Zaire).

TAXONOMIC DISCUSSION. *Aedes mpusiensis*, a member of the *poweri* group, has the scutum with a large (crescent-shaped) patch of pale yellow scales on fossal area, fossal pale yellow patch with anterior end extending along scutal margin towards the median pale yellow stripe, midtibia with a white stripe on ventral surface in basal area, hindtibia with a white stripe on ventral surface in basal area, hindtarsomere 4 all white except at extreme apex, and hindtarsomere 5 all white except at apex on ventral surface. It can thus be easily distinguished from all other species of the *poweri* group except *Ae. angustus*.

The adult male of *Ae. mpusiensis* is extremely similar to that of *Ae. angustus* with which it has been confused and misidentified. *Aedes mpusiensis* can be distinguished from *Ae. angustus* by the white knee-spot present and well developed on the hindfemur. In *Ae. angustus*, the white knee-spot is absent on the hindfemur.

The adult male of *Ae. mpusiensis* is also very similar to that of *Ae. usambara* in having the midtibia with a white stripe on ventral surface in basal area, the hindtibia with a white stripe on ventral surface in basal area, the hindtarsomere 4 almost all white and hindtarsomere 5 all white on dorsal surface. However, *Ae. mpusiensis* can be distinguished from *Ae. usambara* by the fossal pale yellow patch with anterior end extending along scutal margin towards the median pale yellow stripe. In *Ae. usambara*, the fossal white patch has no anterior end extending along scutal margin towards the anterior median white spot.

The male genitalia of *Ae. mpusiensis* are easily differentiated from all other species in the *poweri* group by the claspette, which has the distal expanded portion rather small rounded, lobe-like in dorsal aspect, with numerous simple setae on the expanded distal portion and bearing 5 strong, basally widened, spine-like setae on the apical margin, and by the apical margin of tergum IX, which is deeply concave medially and has 7 median size setae on each lateral lobe.

The male genitalia of *Ae. mpusiensis* are extremely similar to those of *Ae. angustus* in having the claspette with distal expanded portion rounded, lobe-like in dorsal aspect, but can be distinguished from those of *Ae. angustus* by the claspette with 5 strong, basally widened, spine-like setae on the apical margin. In *Ae. angustus*, the claspette has no strong, basally widened, spine-like seta.

Aedes mpusiensis is apparently an East African montane forest species.

BIONOMICS. Unknown.

MEDICAL IMPORTANCE. Unknown.

Aedes (*Stegomyia*) *sampi* New Species

(Fig. 30A)

FEMALE. *Head*. Proboscis dark-scaled, without pale scales on ventral surface, as long as forefemur; maxillary palpus 0.23 length of proboscis, dark, with white scales on apical 0.50; pedicel covered with white scales except on dorsal and ventral surfaces; clypeus bare; occiput with few erect forked scales; a row of broad white scales around eye margins; vertex with a median stripe of broad white scales, with broad dark scales on each side interrupted by a 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 white spot of broad scales on anterior promontory, followed by a submedian longitudinal stripe of narrow yellowish scales on each side of midline, reaching to prescutellar area and connecting with prescutellar line of narrow yellowish scales; fossal area with a large patch of broader, crescent-shaped white scales; posterior dorsocentral yellowish lines present,

reaching to posterior 0.50 of scutum; a patch of narrow white scales on lateral margin just in front of wing root; acrostichal setae absent; dorsocentral setae present; scutellum with broad white scales on all lobes; antepronotum with broad white scales; postpronotum with a patch of broad white scales and a few narrow dark scales dorsally; 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 bare. *Wing*. With dark scales on all veins and without a minute basal spot of white scales on costa; cell R_2 2.2 length of R_{2+3}. *Halter.* With dark scales. *Legs* (Fig. 30A). Coxae with patches of white scales; white knee-spot absent on forefemur, present on mid- and hindfemora; forefemur anteriorly with a narrow, white longitudinal stripe on ventral surface in basal 0.38; midfemur with a large white spot on anterior surface about 0.60 from base; hindfemur anteriorly with a broad white longitudinal stripe in basal 0.57 that widens 0.24 from base; foretibia anteriorly dark, with a basal white band; mid- and hindtibiae all dark; foretarsomere 1 with basal 0.16 white on dorsal surface; foretarsomere 2 with basal 0.40 white on dorsal surface; midtarsomere 1 with basal 0.34 white on dorsal surface; midtarsomere 2 with basal 0.40 white on dorsal surface; midtarsomere 3 with basal 0.35 white on dorsal surface; 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 0.30, 0.36, 0.46, and 0.50; hindtarsomere 5 all white; fore- and midlegs with tarsal claws equal, all toothed; hindleg with tarsal claws equal, both simple. *Abdomen.* Tergum I with white scales on laterotergite; terga II-VII each with a basal white band and basolateral
white spots not connecting with basal white band; sterna III-VII each with a basal white band; segment VIII completely retracted.

MALE, PUPA and LARVA. Unknown.

TYPE DATA. Holotype female (MEP Acc. 808/ Matahara, 18-I-68, No. 1131), KENYA, 18-I-1968. Deposited in Division of Vector Borne Diseases, Ministry of Health, Nairobi, Kenya [DVBD].

DISTRIBUTION. This species is presently known only from the Type locality Matahara = Mataara (0° 54' S, 36° 53' E), Central Region of Kenya.

TAXONOMIC DISCUSSION. *Aedes sampi* is a member of the *simpsoni* group. It has the scutum with an anteromedial white spot of broad scales, scutellum with broad white scales on all lobes and hindtarsomere 4 with a basal white band, and can thus be easily distinguished from all other species of the *simpsoni* group except *Ae. subargenteus* Edwards. *Aedes sampi* is extremely similar to *Ae. subargenteus* with which it has been confused and misidentified, but can be distinguished from *Ae. subargenteus* by: (1) the hindfemur anteriorly with a broad white stripe in basal 0.57; and (2) the hindtarsomere 5 all white. In *Ae. subargenteus*, the hindfemur anteriorly has basal 0.33-0.40 white, and has

a large white spot about 0.67 from base (the white spot not connecting with the basal white area), and the hindtarsomere 5 has basal 0.40-0.67 white on dorsal surface.

BIONOMICS. Unknown.

MEDICAL IMPORTANCE. Unknown.

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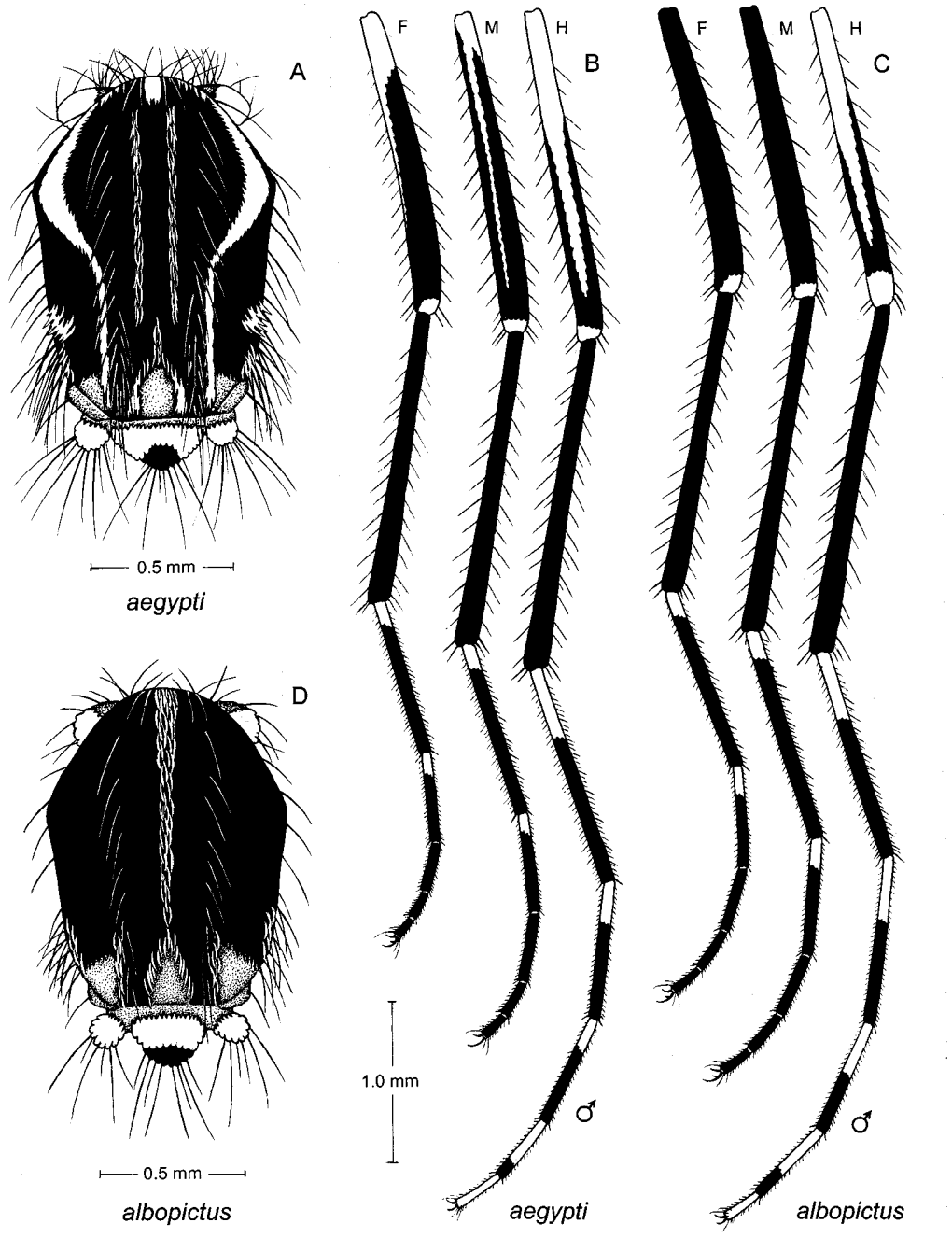


FIGURE 1. *Aedes* (*Stg*.) *aegypti* — A, thorax (dorsal view); B, male fore-, mid- and hindlegs (anterior view); *Aedes* (*Stg*.) *albopictus* — C, male fore-, mid- and hindlegs (anterior view); D, thorax (dorsal view).

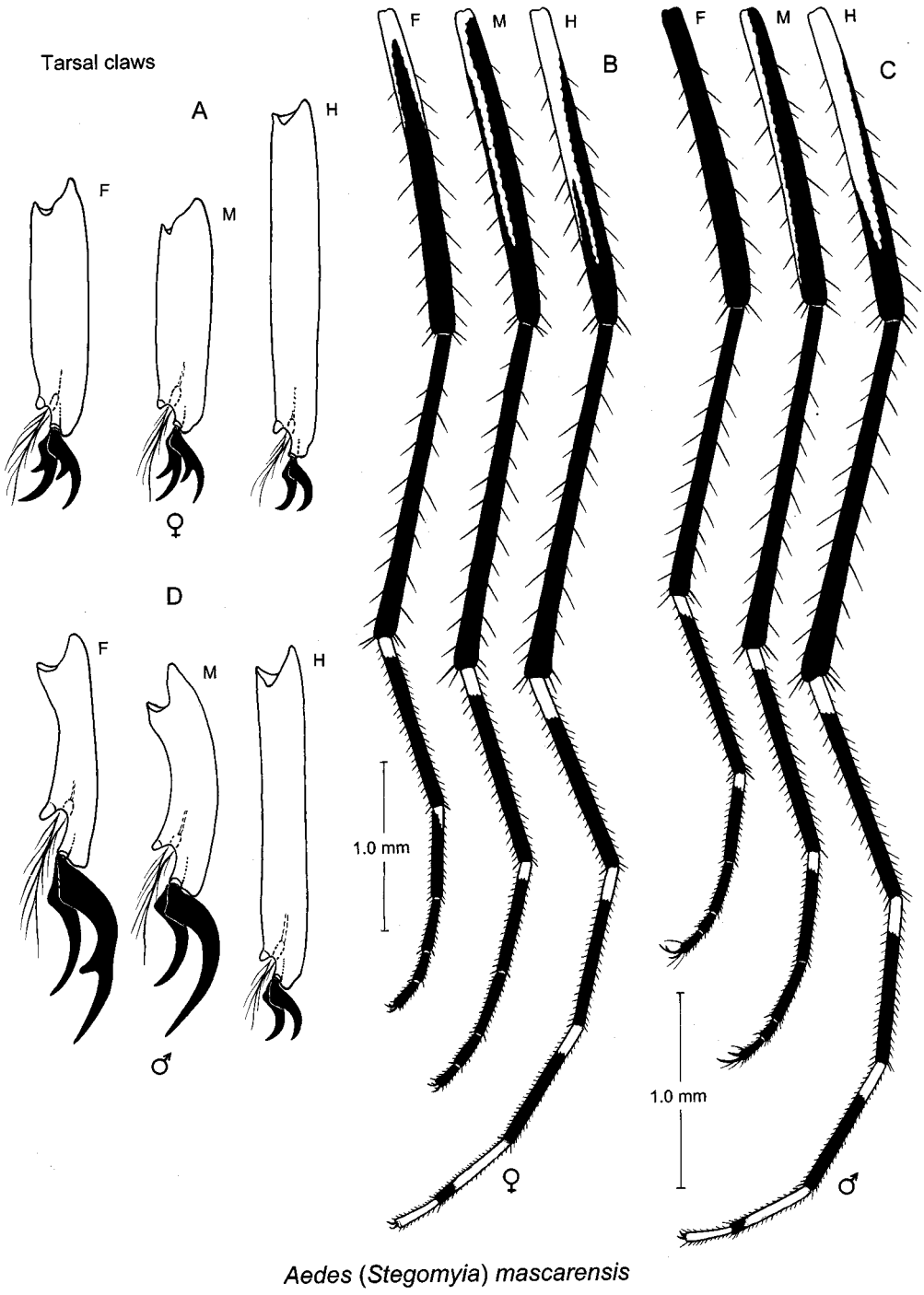


FIGURE 2.*Aedes* (*Stg*.) *mascarensis* — A, female tarsal claws (fore-, mid- and hindlegs); B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view); D, male tarsal claws (fore-, mid- and hindlegs).

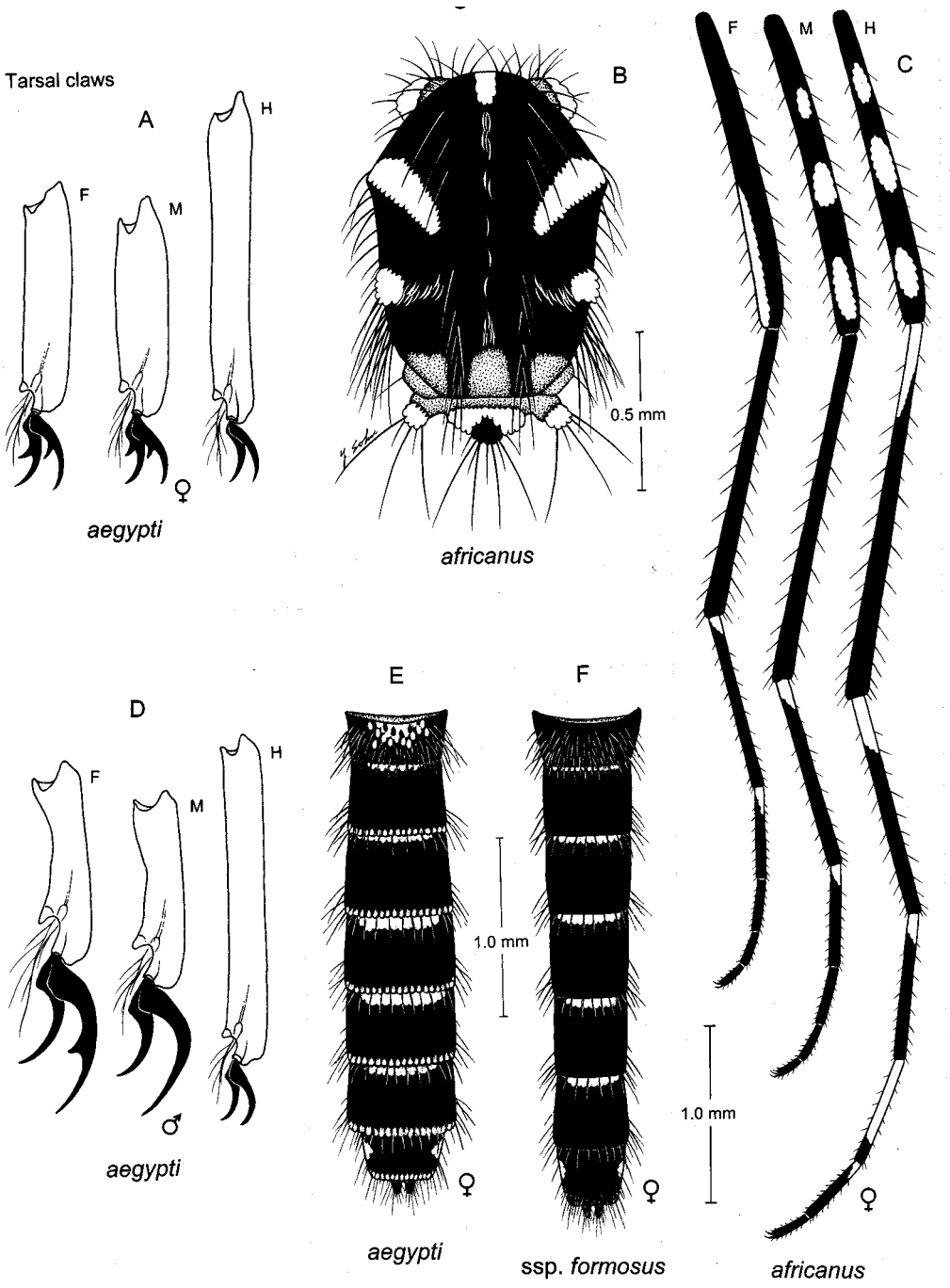


FIGURE 3. *Aedes (Stg.) aegypti* — A, female tarsal claws (fore-, mid- and hindlegs); D, male tarsal claws (fore-, mid- and hindlegs); E, female abdomen (dorsal view); ssp. *formosus* — F, female abdomen (dorsal view); *Aedes (Stg.) africanus* — B, thorax (dorsal view); C, female fore-, mid- and hindlegs (anterior view).

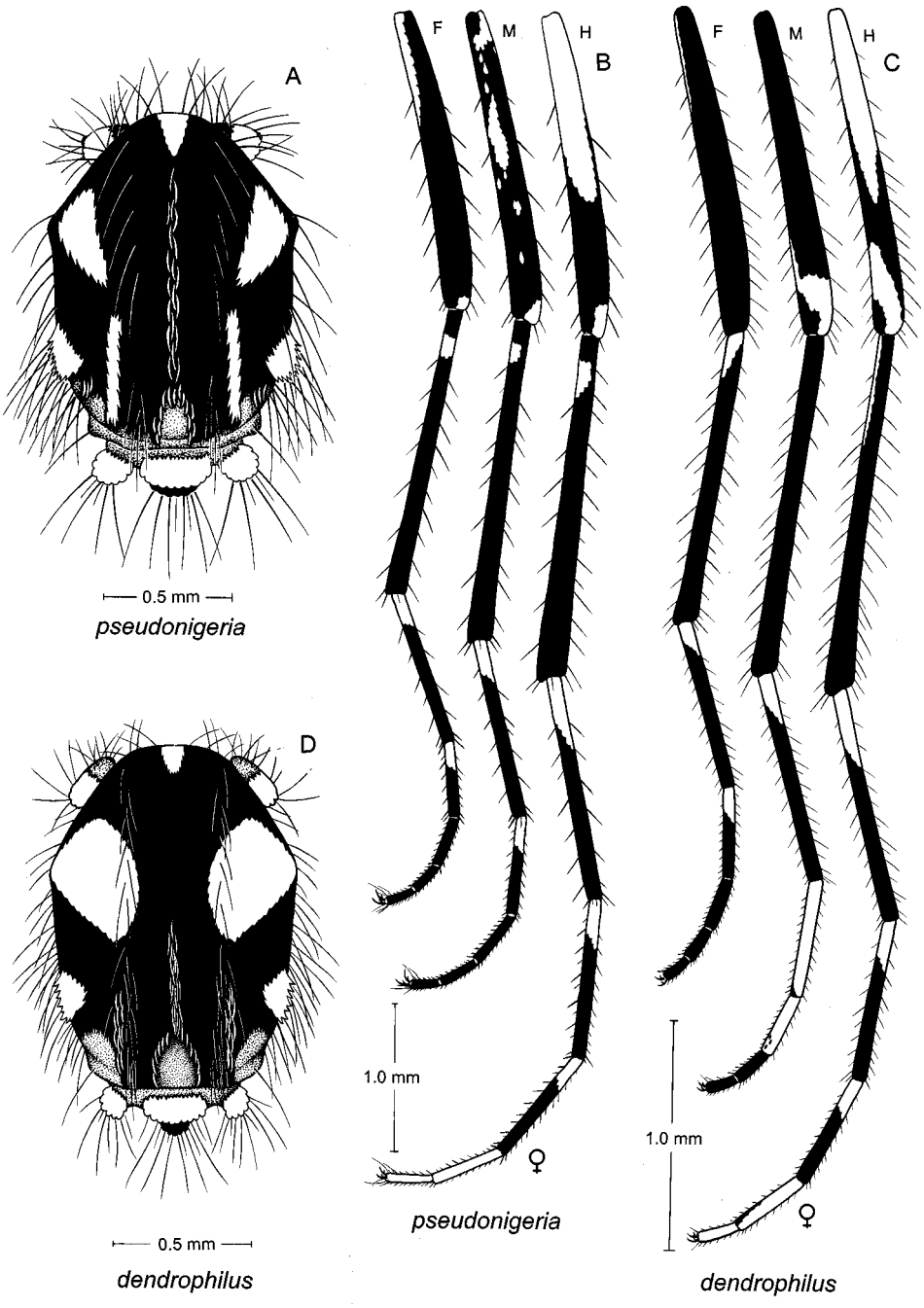


FIGURE 4. *Aedes (Stg.) pseudonigeria* — A, thorax (dorsal view); B, female fore-, mid- and hindlegs (anterior view); *Aedes (Stg.) dendrophilus* — C, female fore-, mid- and hindlegs (anterior view); D, thorax (dorsal view).

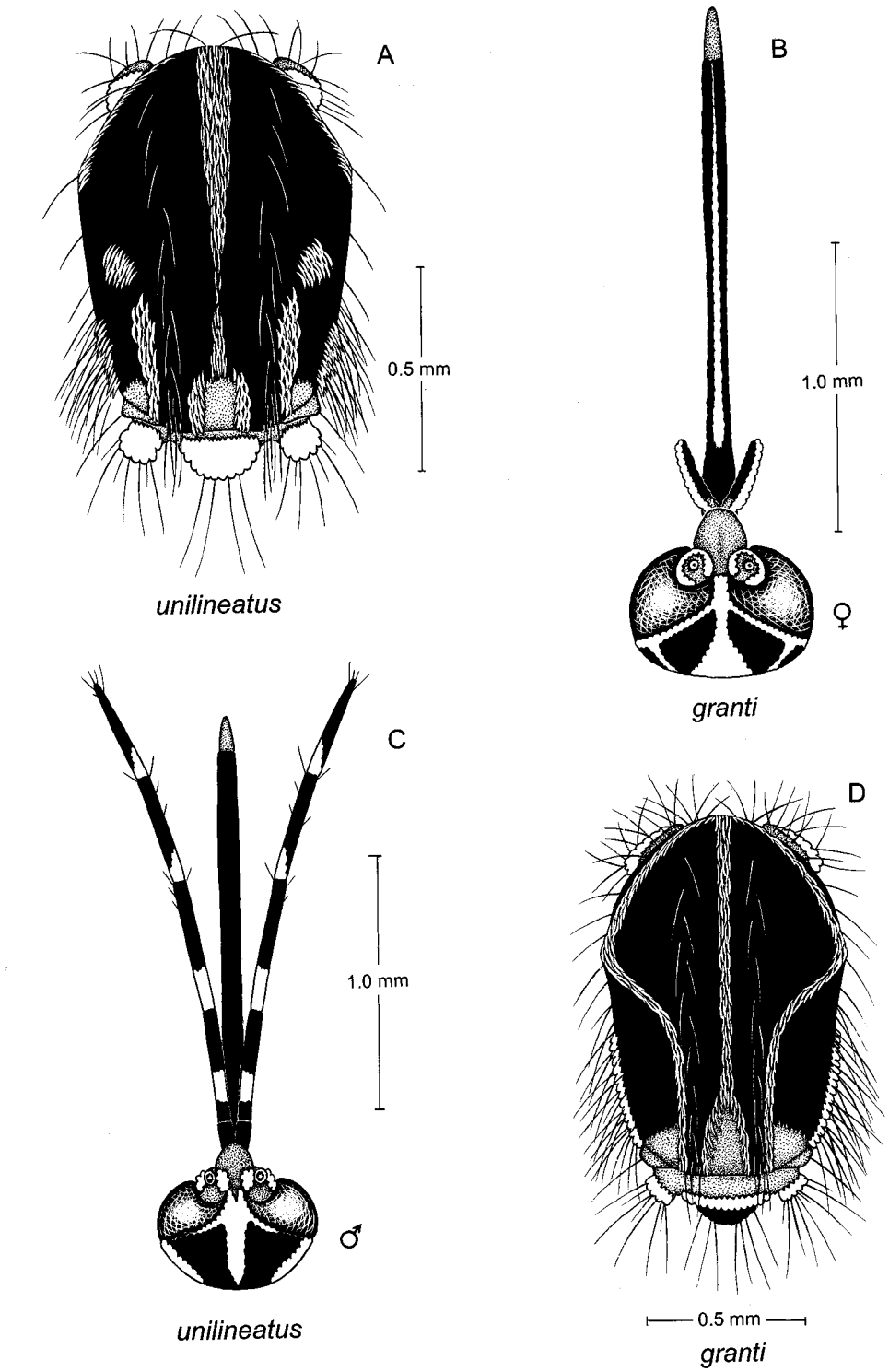


FIGURE 5.*Aedes* (*Stg*.) *unilineatus* — A, thorax (dorsal view); C, head and proboscis (dorsal view); *Aedes* (*Stg*.) *granti* — B, head and proboscis (dorsal view); D, thorax (dorsal view).

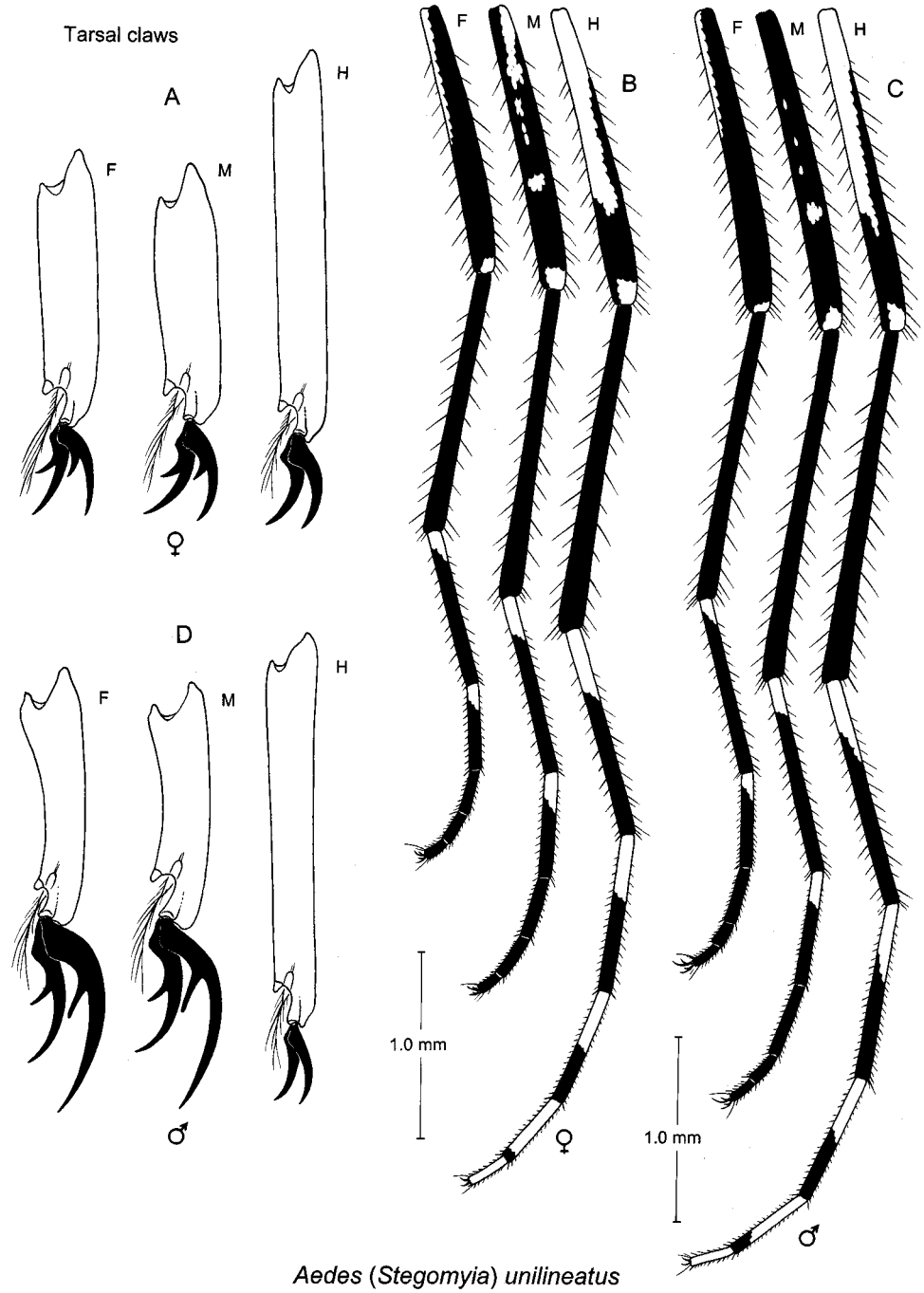


FIGURE 6.*Aedes* (*Stg.*) *unilineatus* — A, female tarsal claws (fore-, mid- and hindlegs); B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view); D, male tarsal claws (fore-, mid- and hindlegs).

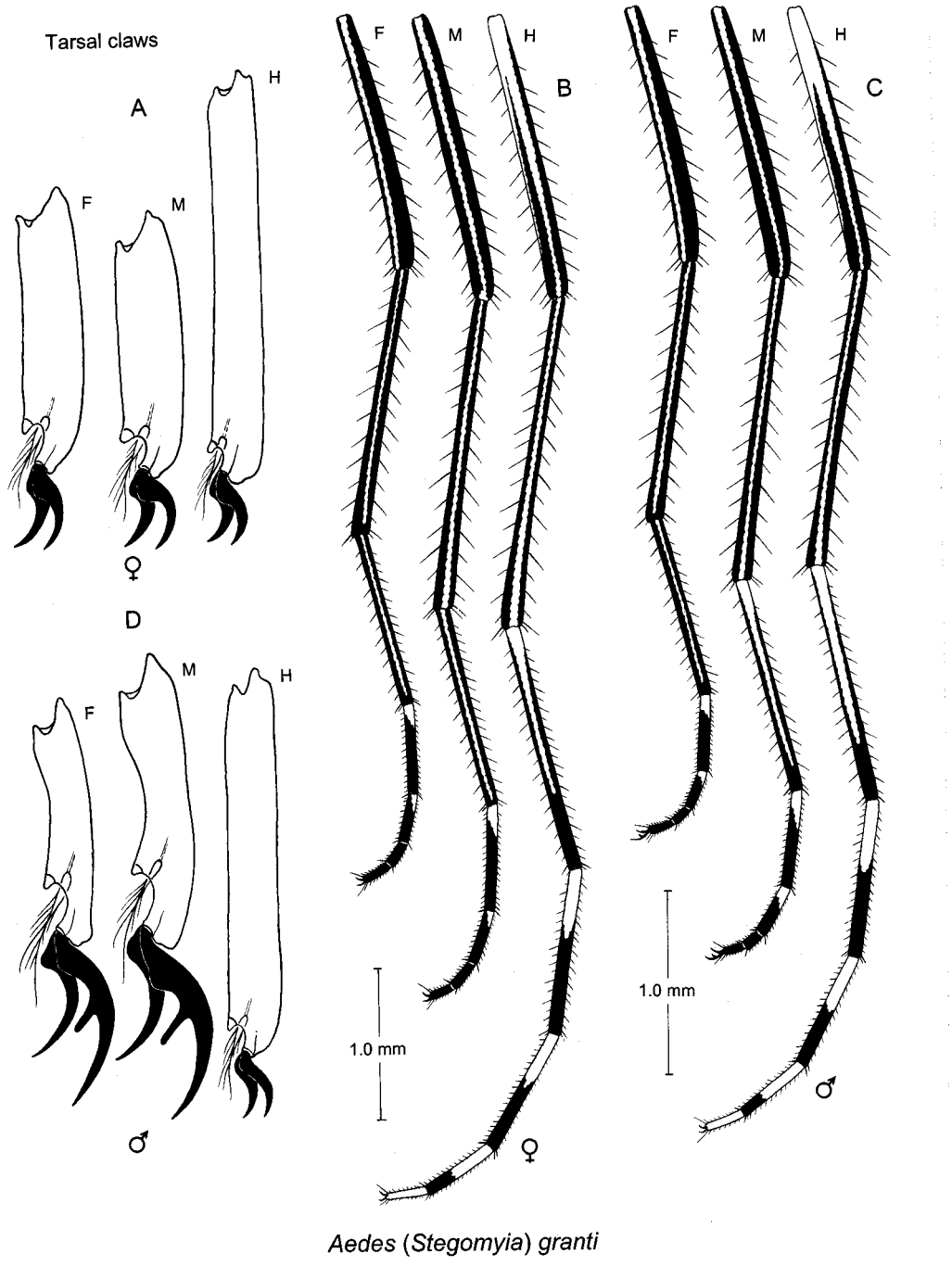


FIGURE 7.*Aedes* (*Stg*.) *granti* — A, female tarsal claws (fore-, mid- and hindlegs); B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view); D, male tarsal claws (fore-, mid- and hindlegs).

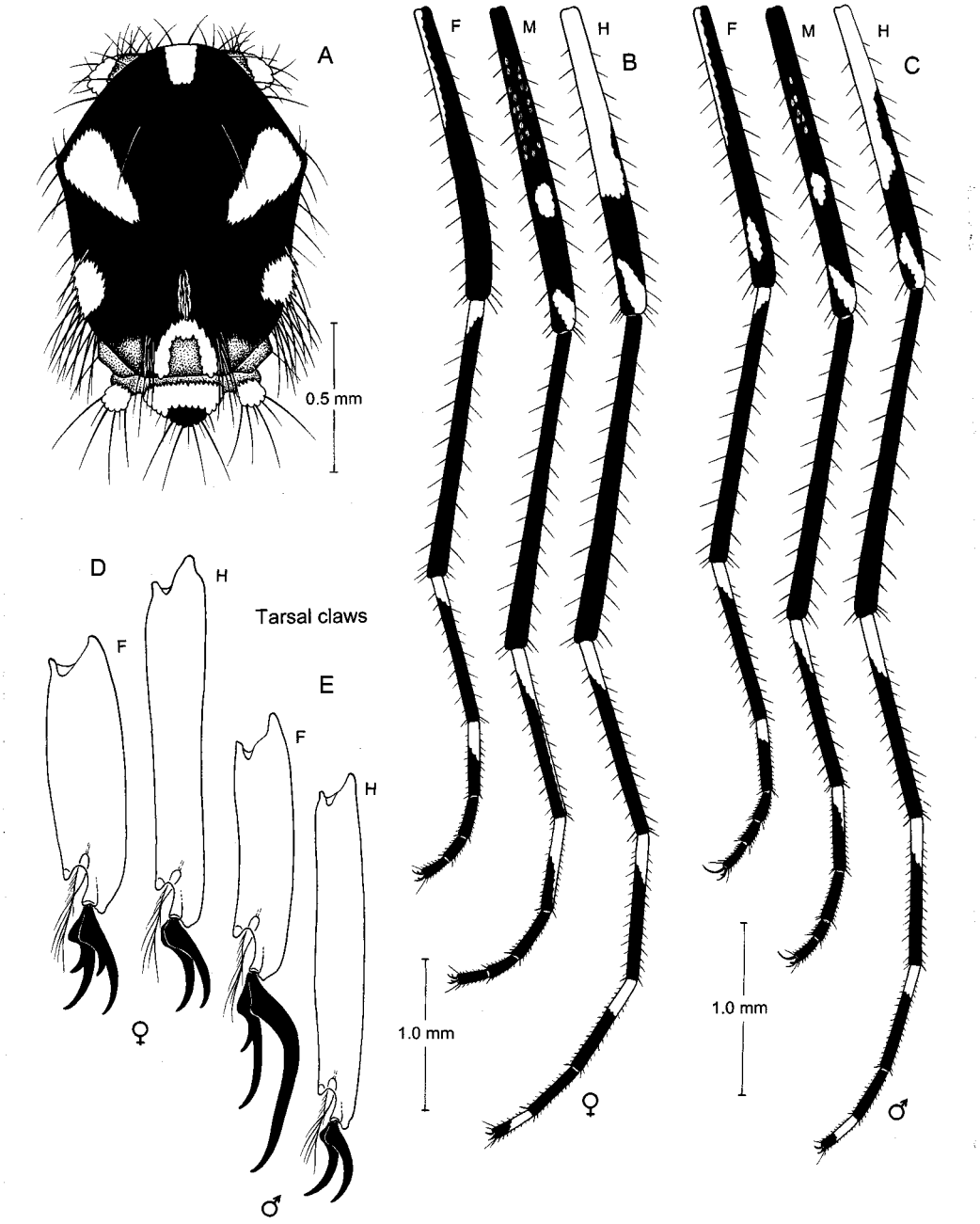


FIGURE 8.*Aedes* (*Stg*.) *metallicus* — A, thorax (dorsal view); B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view); D, female tarsal claws (fore- and hindlegs); E, male tarsal claws (fore- and hindlegs).

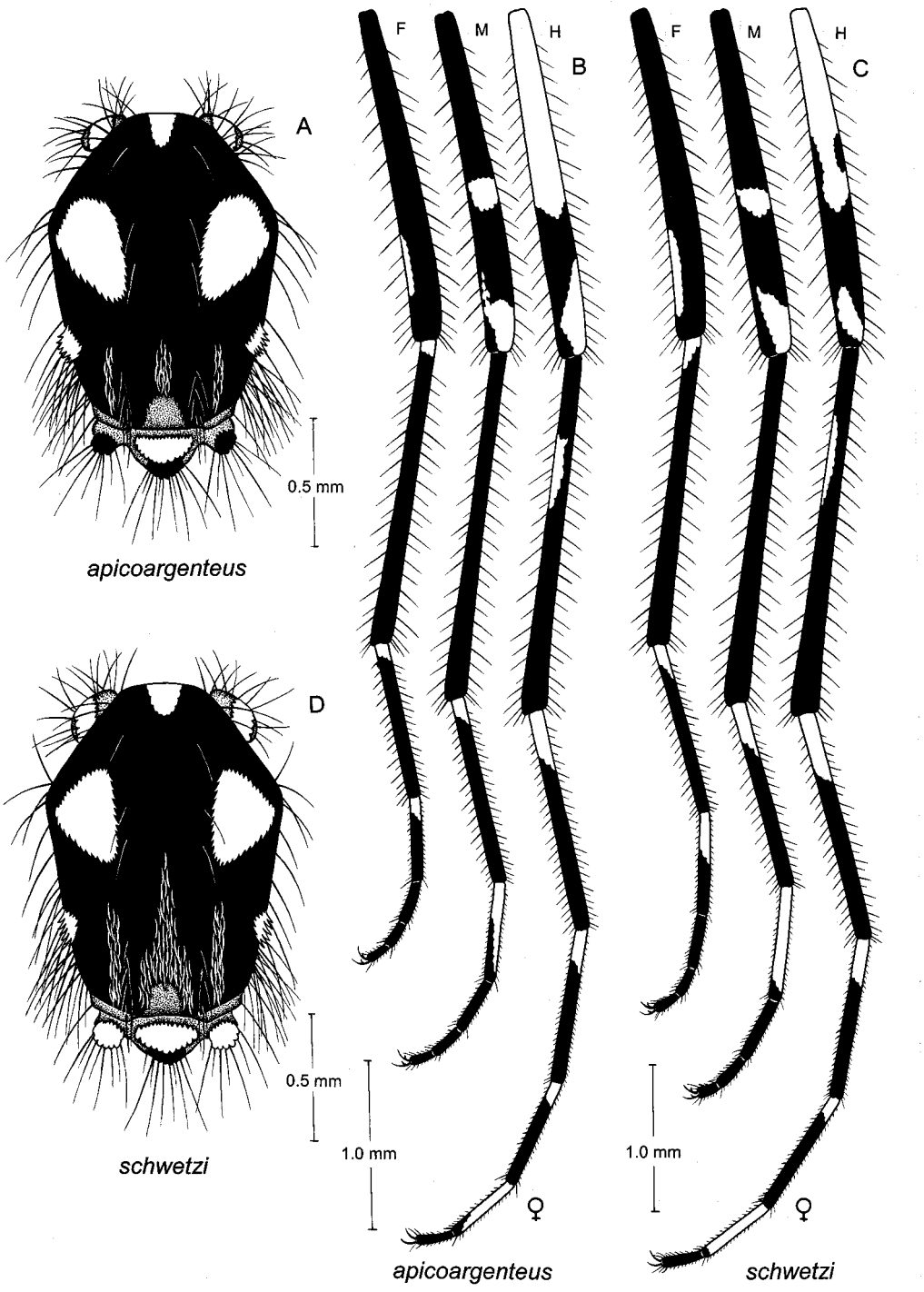


FIGURE 9. *Aedes* (*Stg.*) *apicoargenteus* — A, thorax (dorsal view); B, female fore-, mid- and hindlegs (anterior view); *Aedes* (*Stg.*) *schwetzi* — C, female fore-, mid- and hindlegs (anterior view); D, thorax (dorsal view).

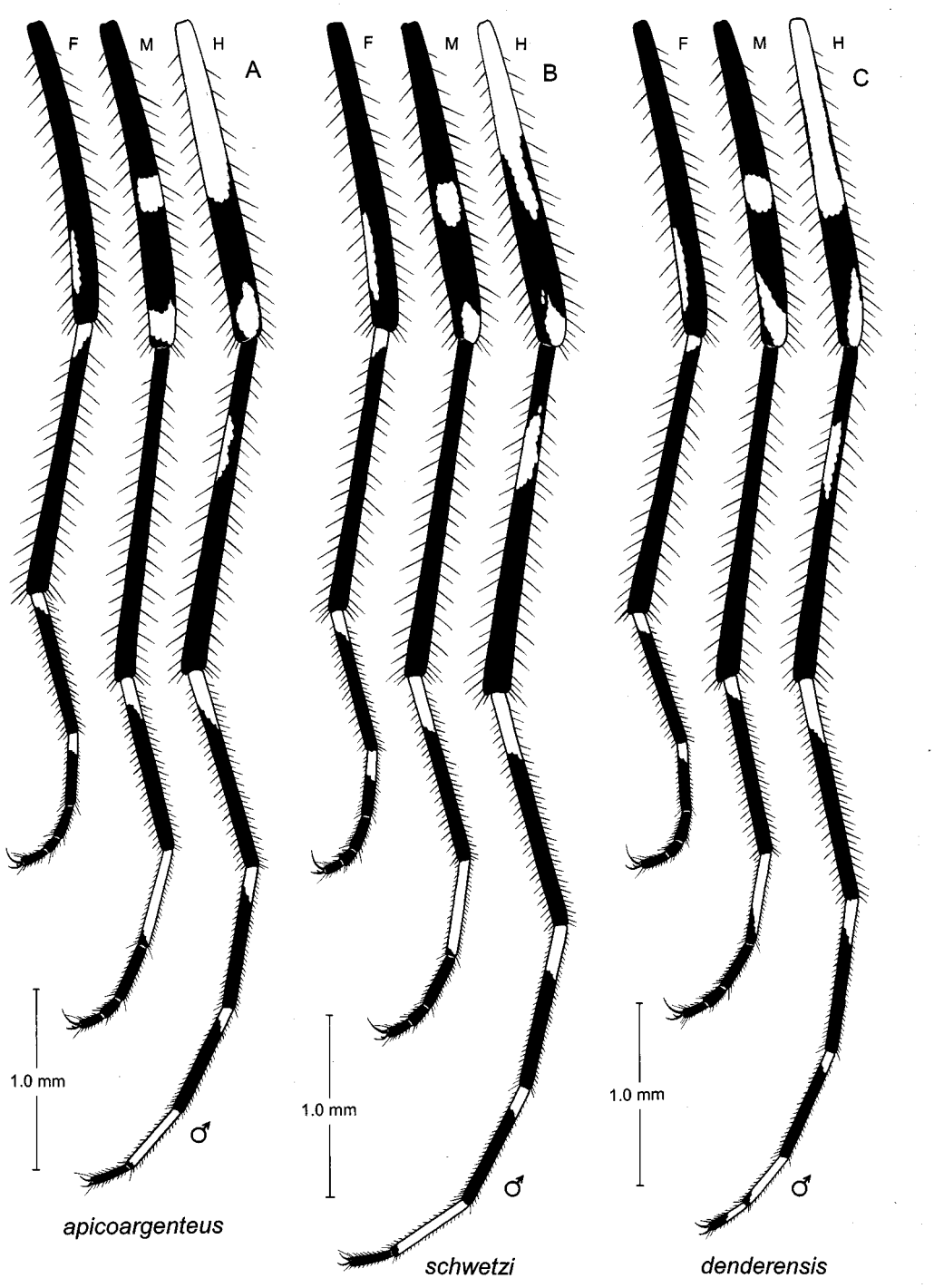


FIGURE 10.*Aedes* (*Stg.*) *apicoargenteus* — A, male fore-, mid- and hindlegs (anterior view); *Aedes* (*Stg.*) *schwetzi* - B, male fore-, mid- and hindlegs (anterior view); *Aedes* (*Stg.*) *denderensis* — C, male fore-, mid- and hindlegs (anterior view).

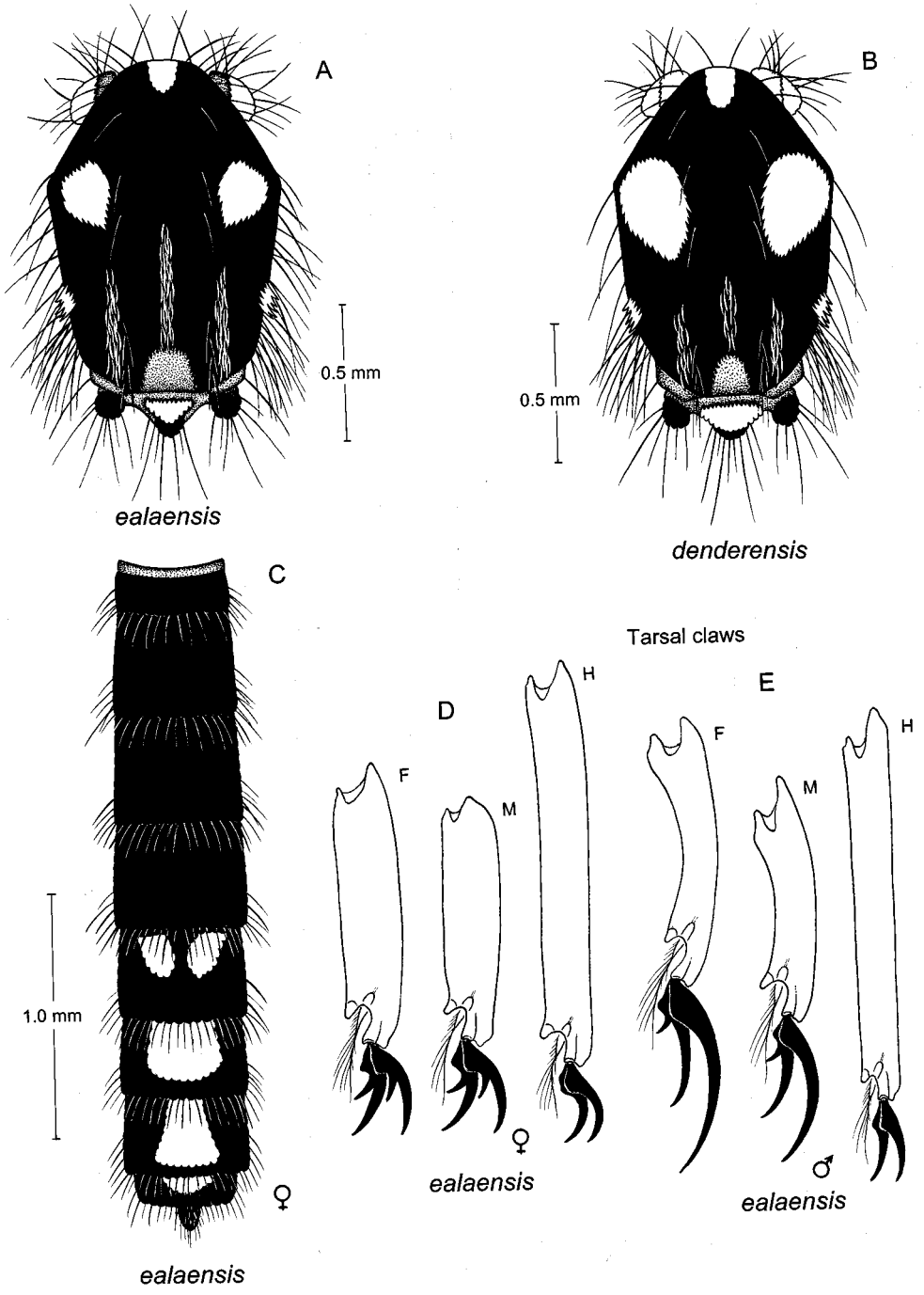


FIGURE 11.*Aedes* (*Stg.*) *ealaensis* — A, thorax (dorsal view); C, female abdomen (dorsal view); D, female tarsal claws (fore-, mid- and hindlegs); E, male tarsal claws (fore-, mid- and hindlegs); *Aedes* (*Stg.*) *denderensis* — B, thorax (dorsal view).

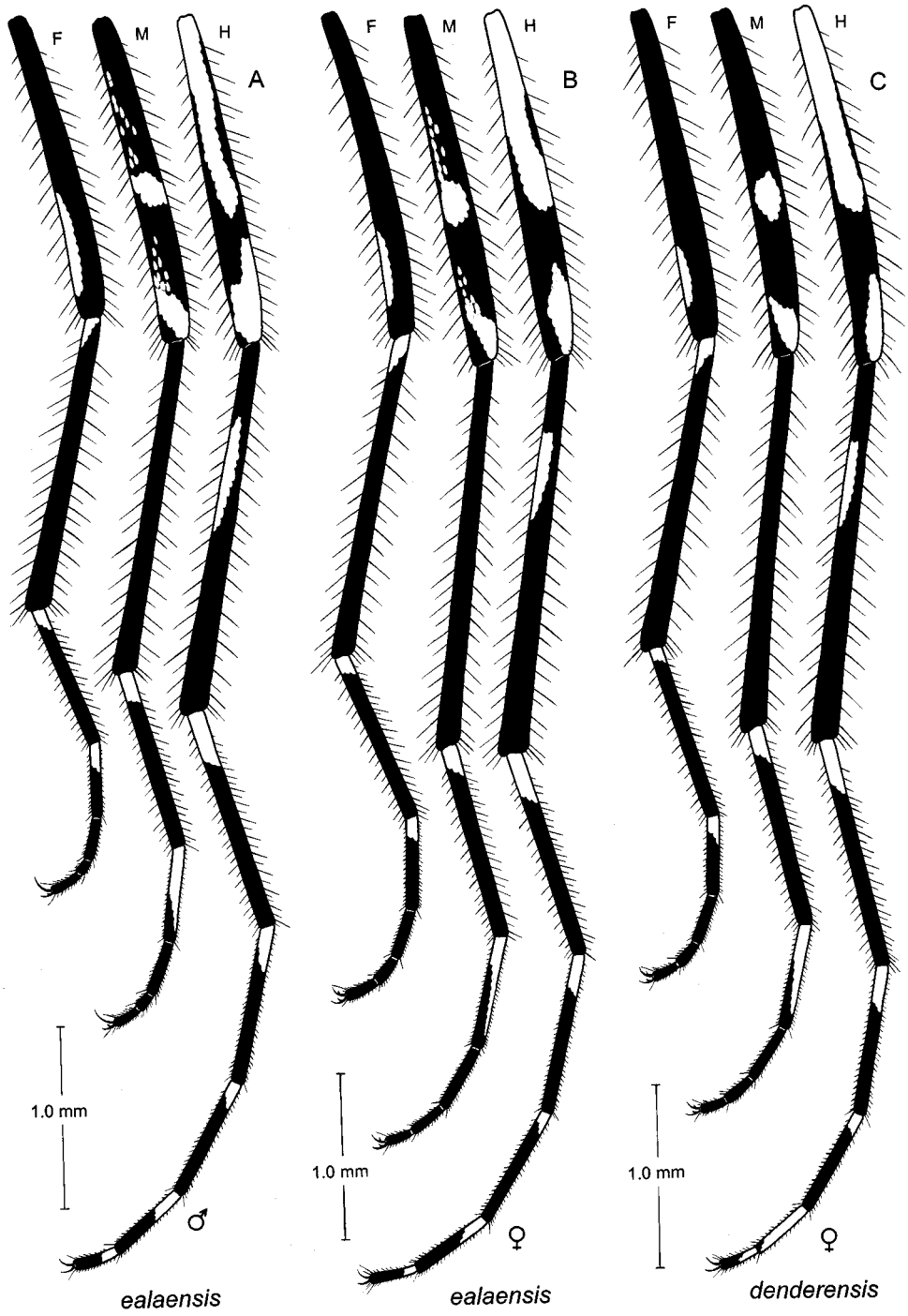


FIGURE 12.*Aedes* (*Stg.*) *ealaensis* — A, male (Holotype) fore-, mid- and hindlegs (anterior view); B, female fore-, mid- and hindlegs (anterior view); *Aedes* (*Stg.*) *denderensis* — C, female fore-, mid- and hindlegs (anterior view).

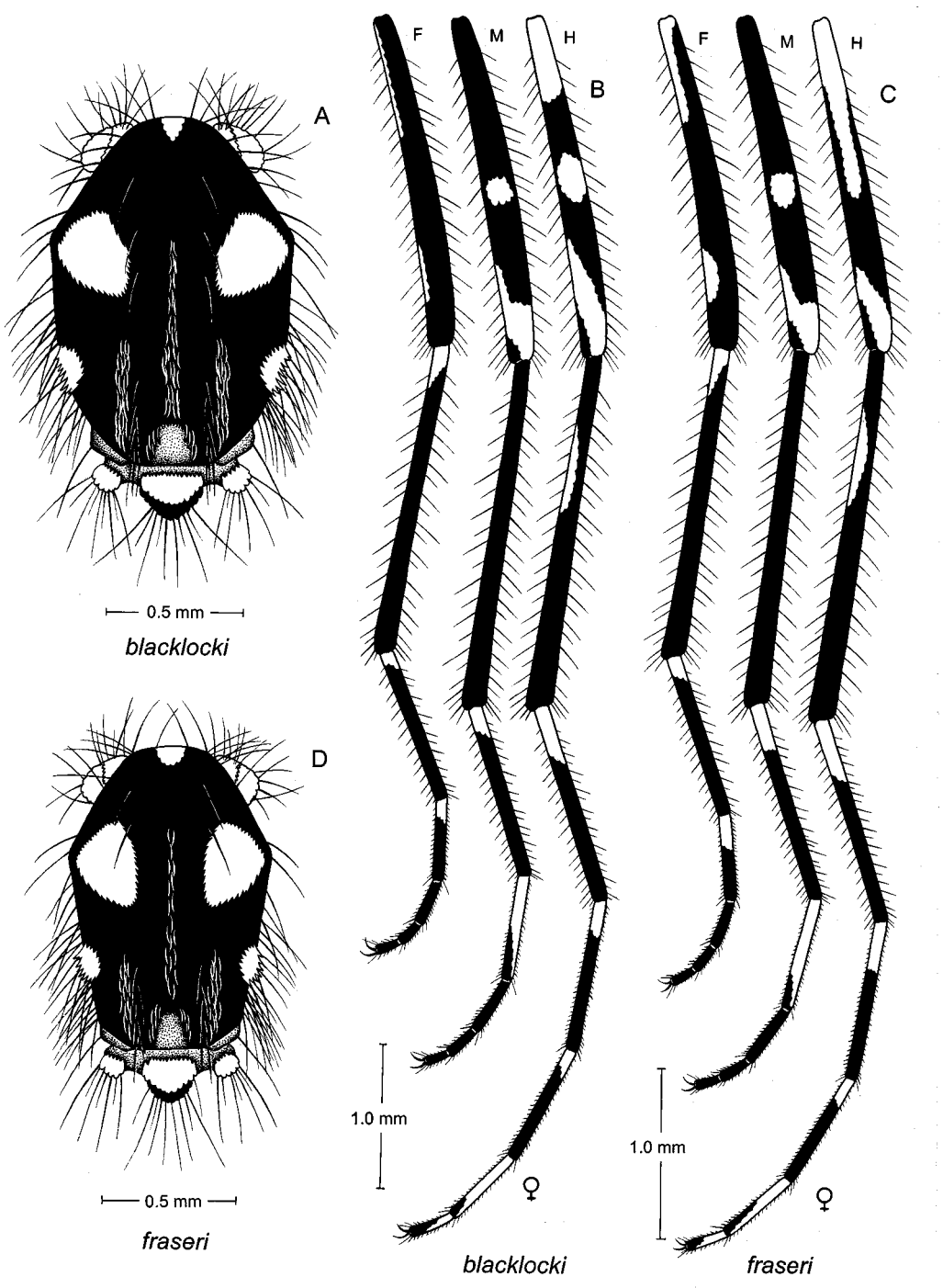


FIGURE 13.*Aedes* (*Stg.*) *blacklocki* — A, thorax (dorsal view); B, female fore-, mid- and hindlegs (anterior view); *Aedes* (*Stg.*) *fraseri* — C, female fore-, mid- and hindlegs (anterior view); D, thorax (dorsal view).

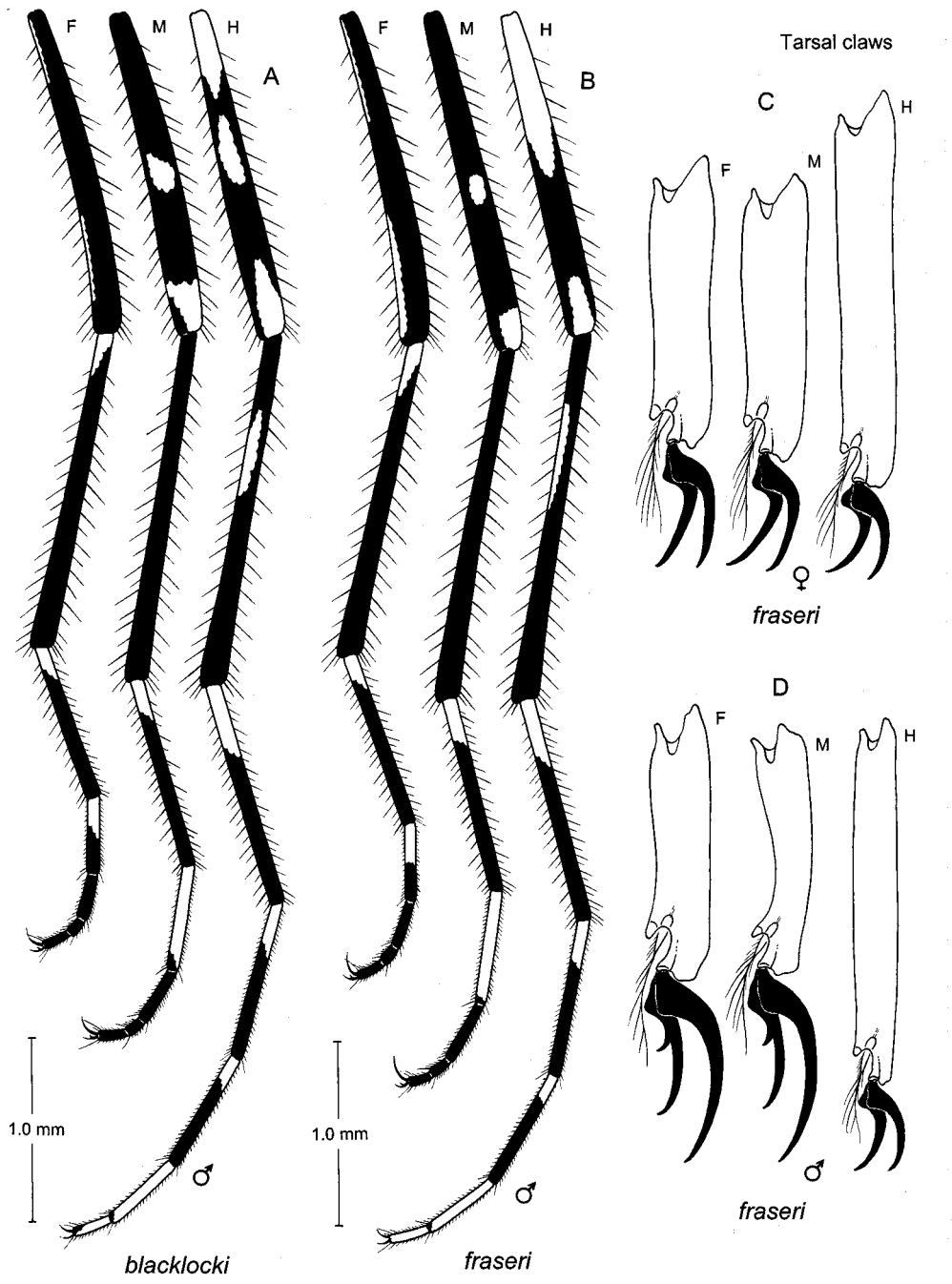
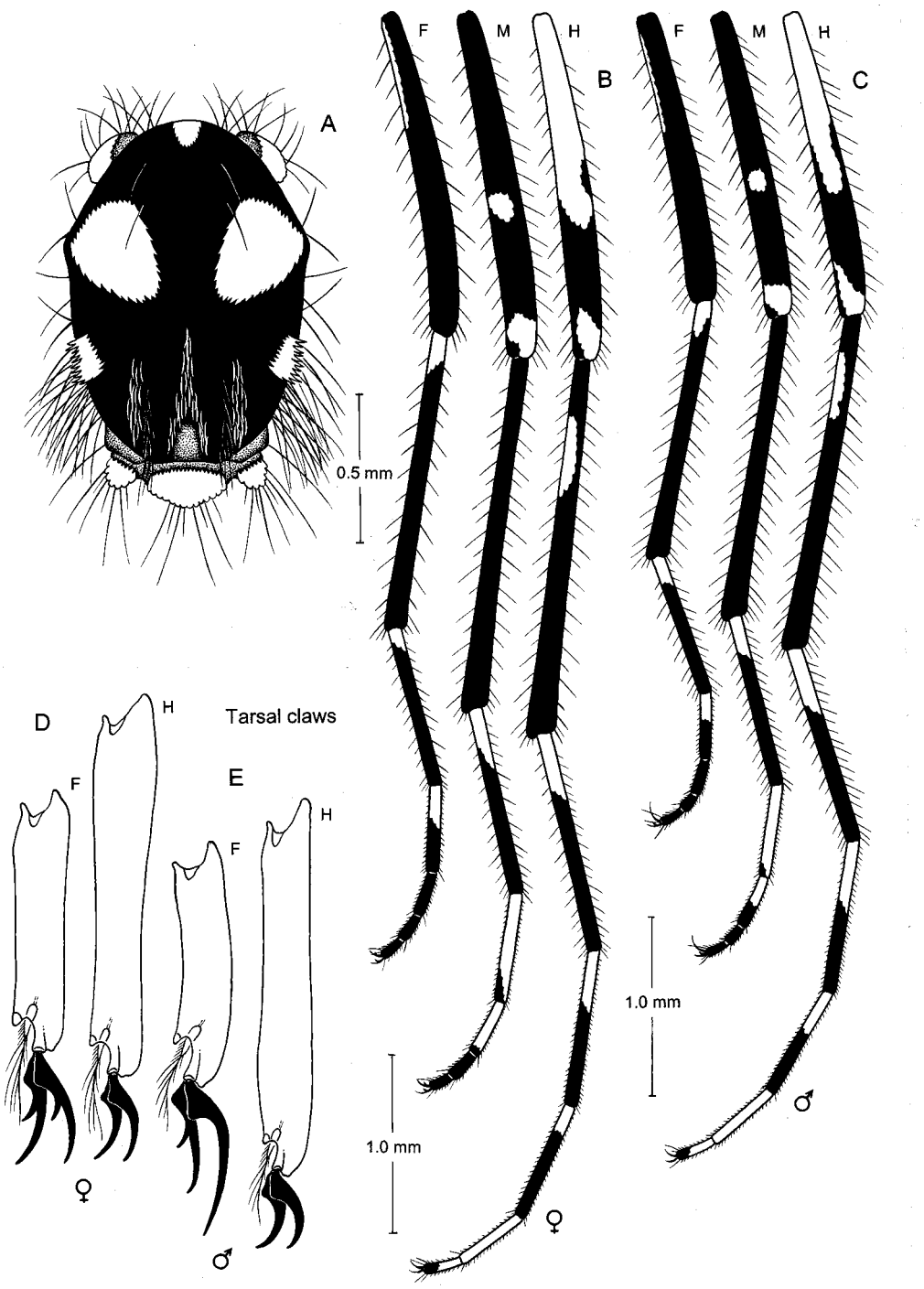


FIGURE 14.*Aedes* (*Stg.*) *blacklocki* — A, male fore-, mid- and hindlegs (anterior view); *Aedes* (*Stg.*) *fraseri* - B, male fore-, mid- and hindlegs (anterior view); C, female tarsal claws (fore-, mid- and hindlegs); D, male tarsal claws (fore-, mid- and hindlegs).



Aedes (*Stegomyia*) *soleatus*

FIGURE 15.*Aedes* (*Stg.*) *soleatus* — A, thorax (dorsal view); B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view); D, female tarsal claws (fore- and hindlegs); E, male tarsal claws (fore- and hindlegs).

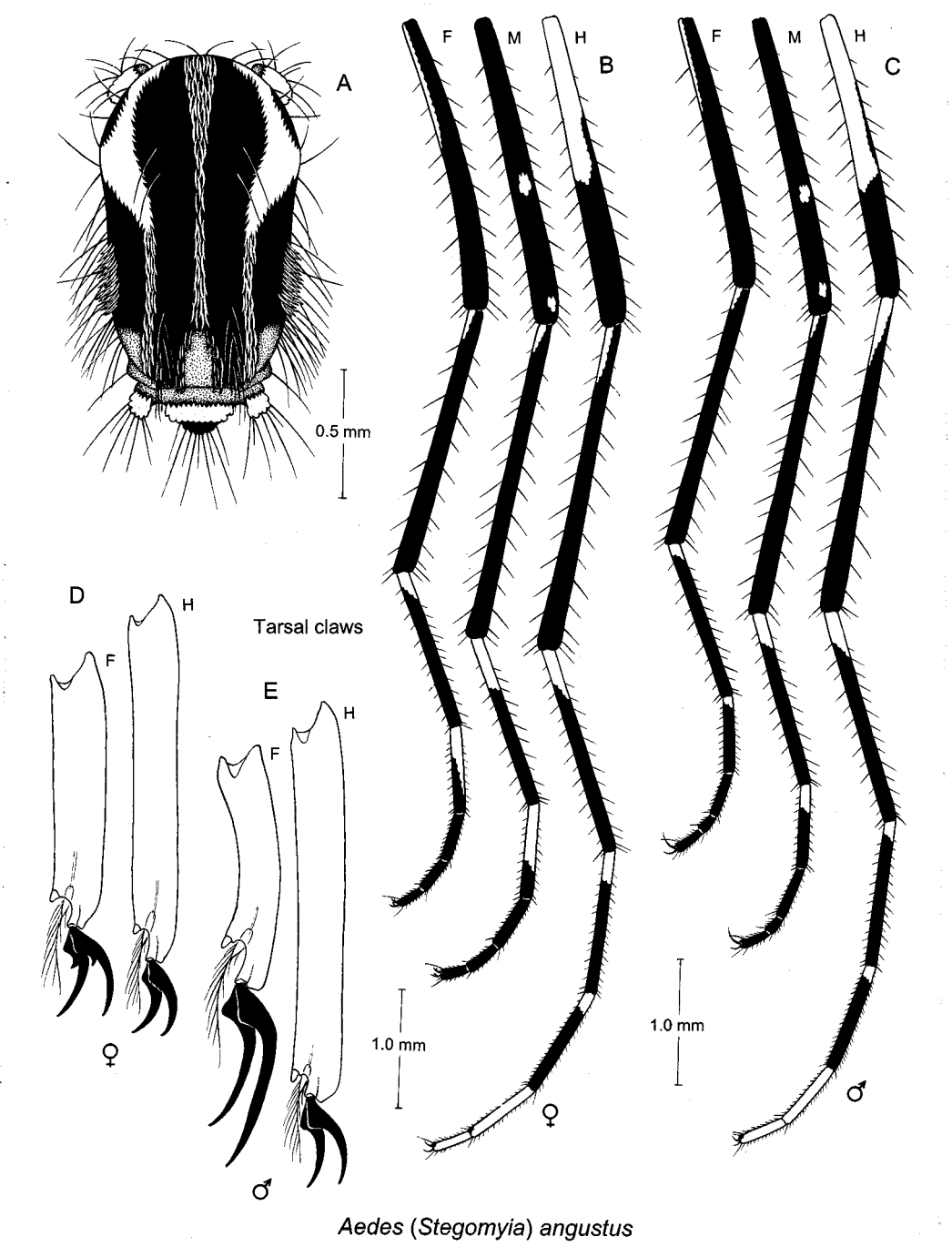
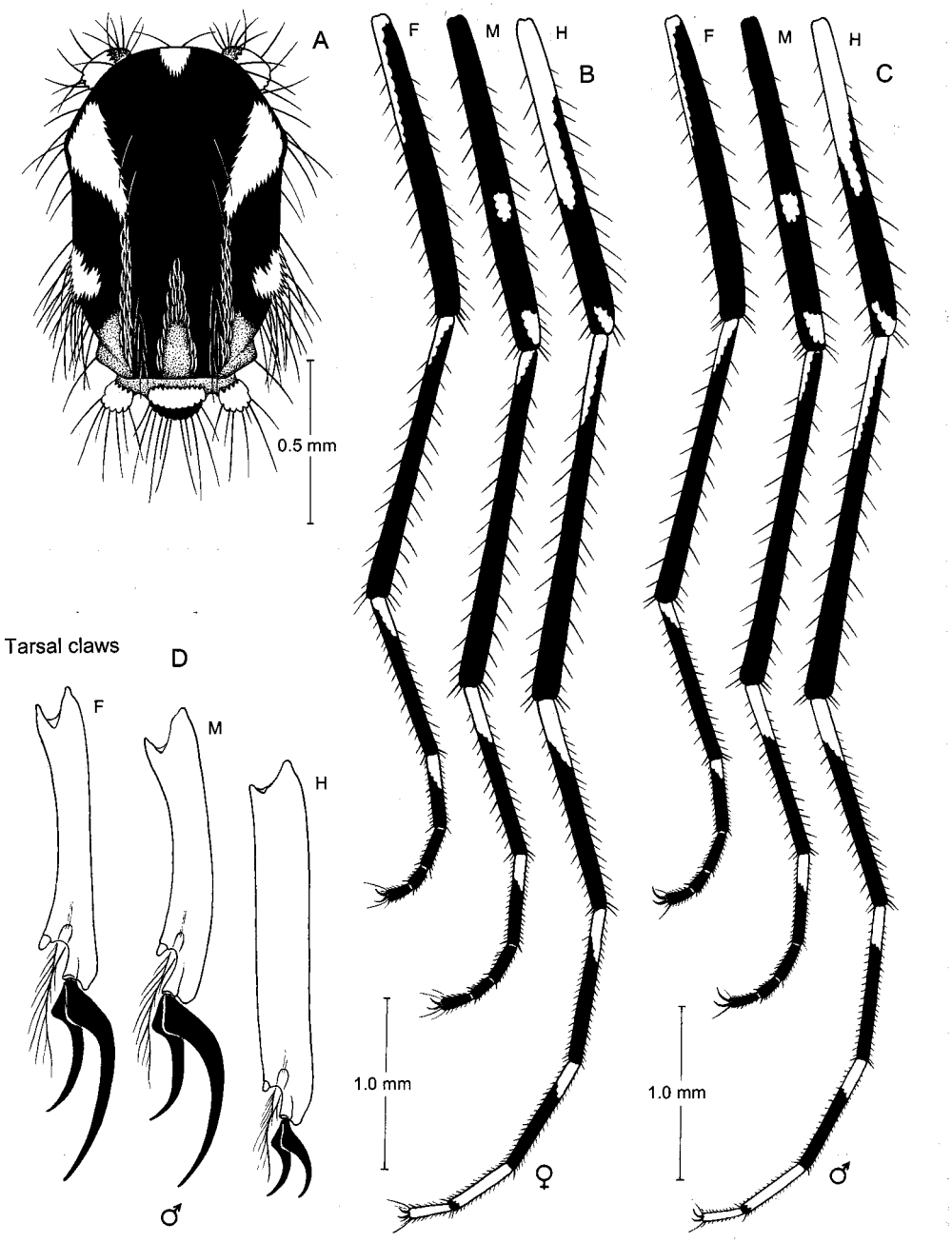


FIGURE 16.*Aedes* (*Stg*.) *angustus* — A, thorax (dorsal view); B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view); D, female tarsal claws (fore- and hindlegs); E, male tarsal claws (fore- and hindlegs).



Aedes (*Stegomyia*) *usambara*

FIGURE 17.*Aedes* (*Stg*.) *usambara* — A, thorax (dorsal view); B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view); D, male tarsal claws (fore-, mid- and hindlegs).

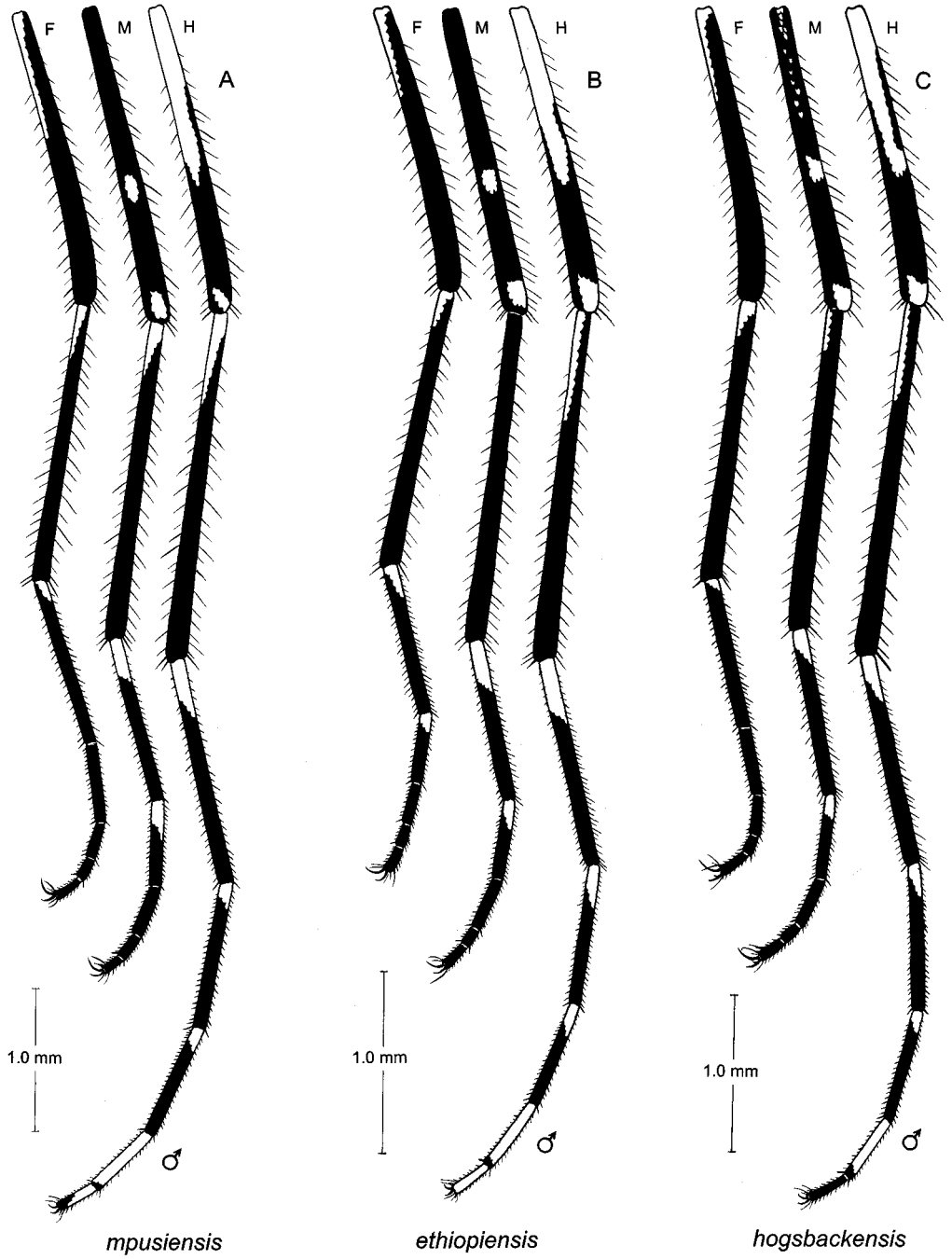


FIGURE 18.*Aedes* (*Stg*.) *mpusiensis* — A, male (Holotype) fore-, mid- and hindlegs (anterior view); *Aedes*(*Stg*.) *ethiopiensis* — B, male (Holotype) fore-, mid- and hindlegs (anterior view); *Aedes* (*Stg*.) *hogsbackensis* — C, male (Holotype) fore-, mid- and hindlegs (anterior view).

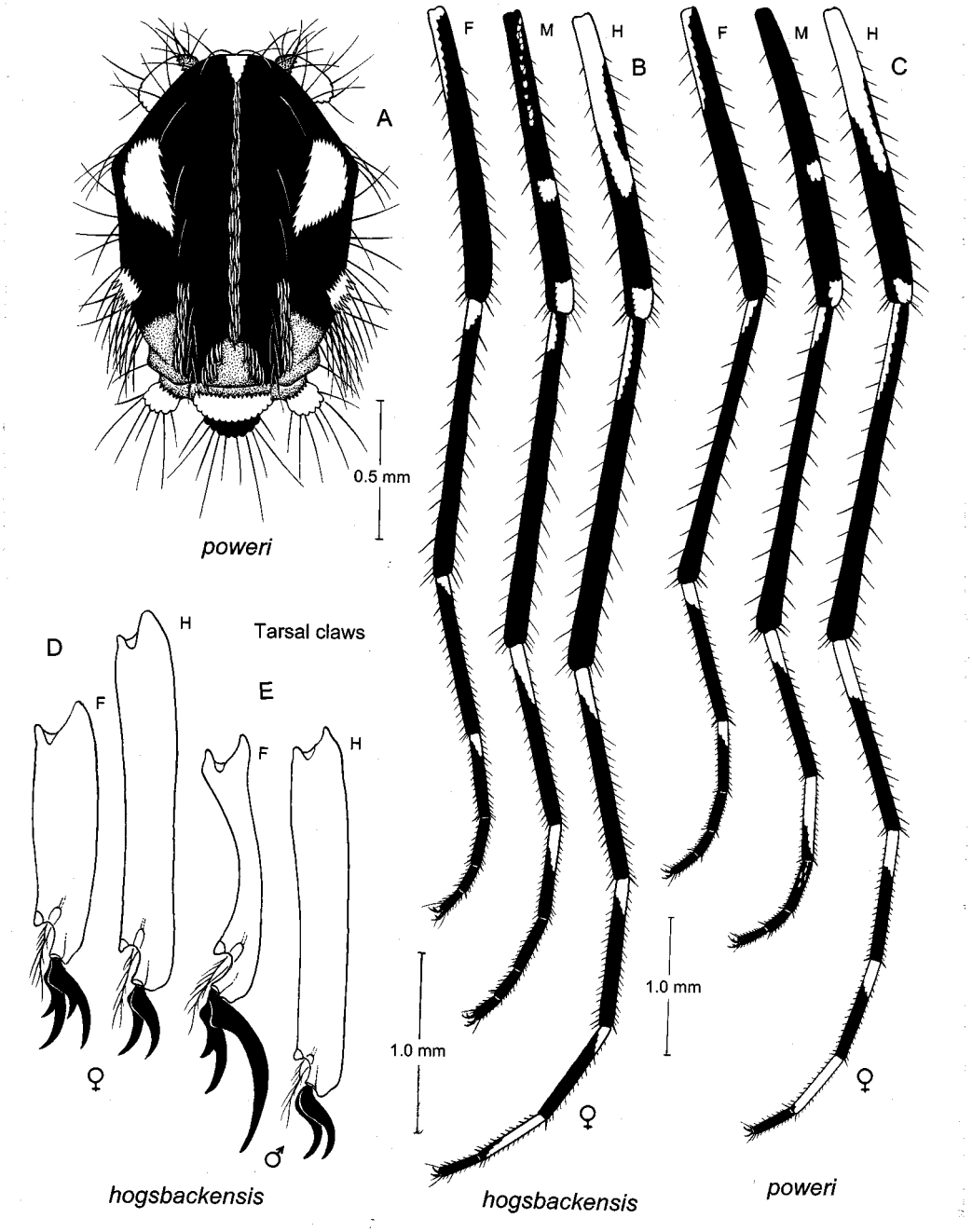


FIGURE 19.*Aedes* (*Stg*.) *poweri* — A, thorax (dorsal view); C, female fore-, mid- and hindlegs (anterior view); *Aedes* (*Stg*.) *hogsbackensis* — B, female fore-, mid- and hindlegs (anterior view); D, female tarsal claws (fore- and hindlegs); E, male tarsal claws (fore- and hindlegs).

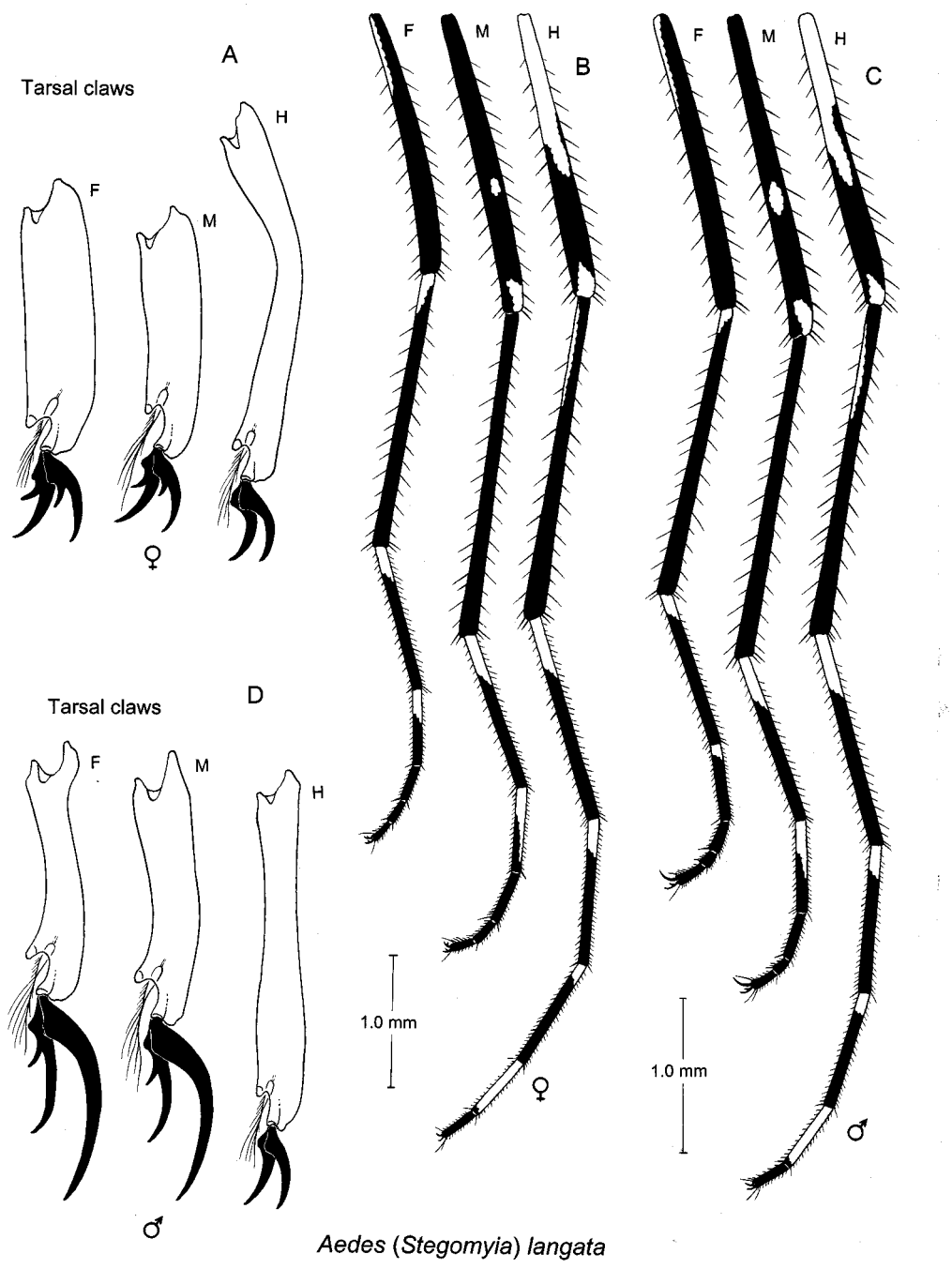


FIGURE 20.*Aedes* (*Stg*.) *langata* — A, female tarsal claws (fore-, mid- and hindlegs); B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view); D, male tarsal claws (fore-, mid- and hindlegs).

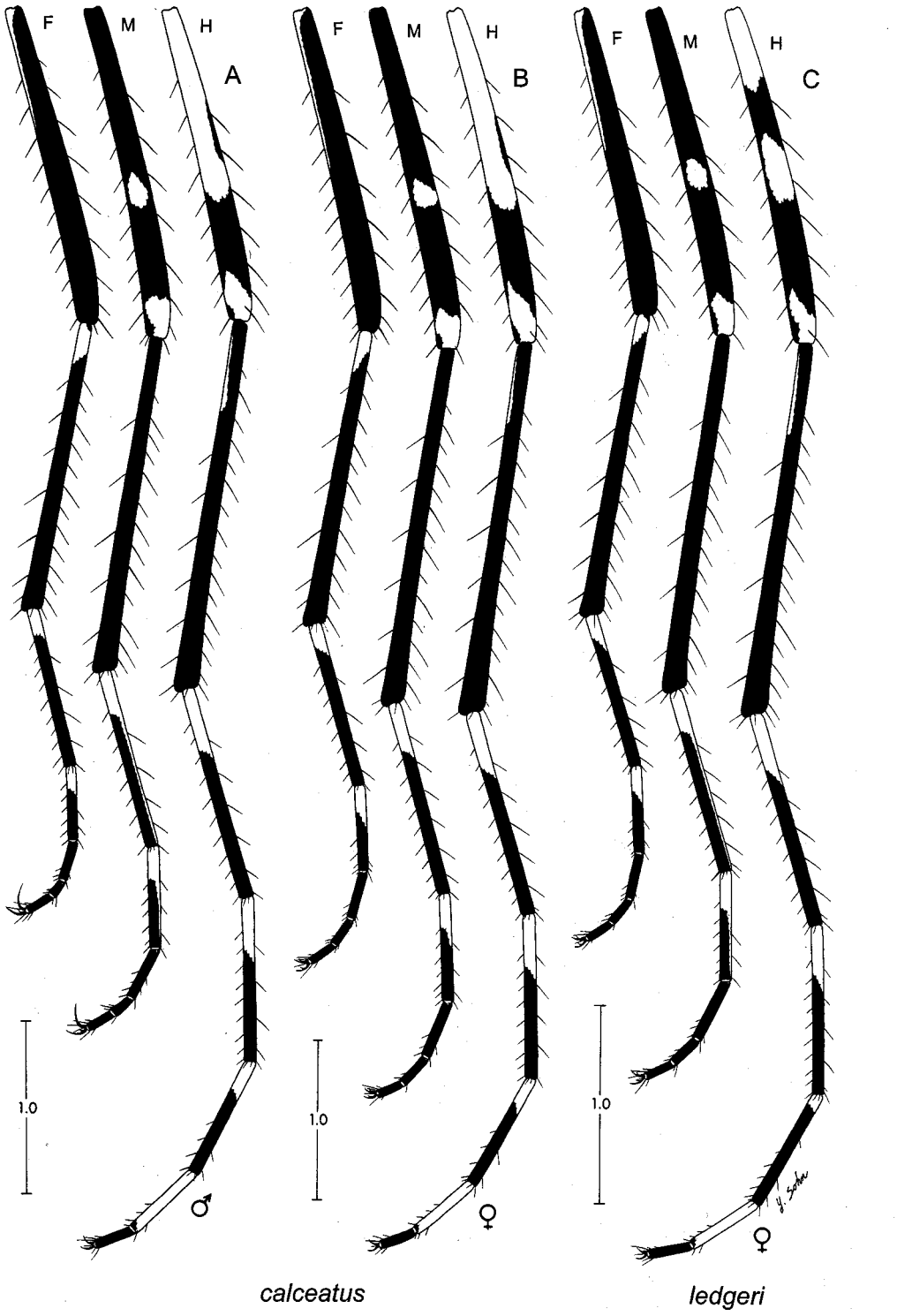
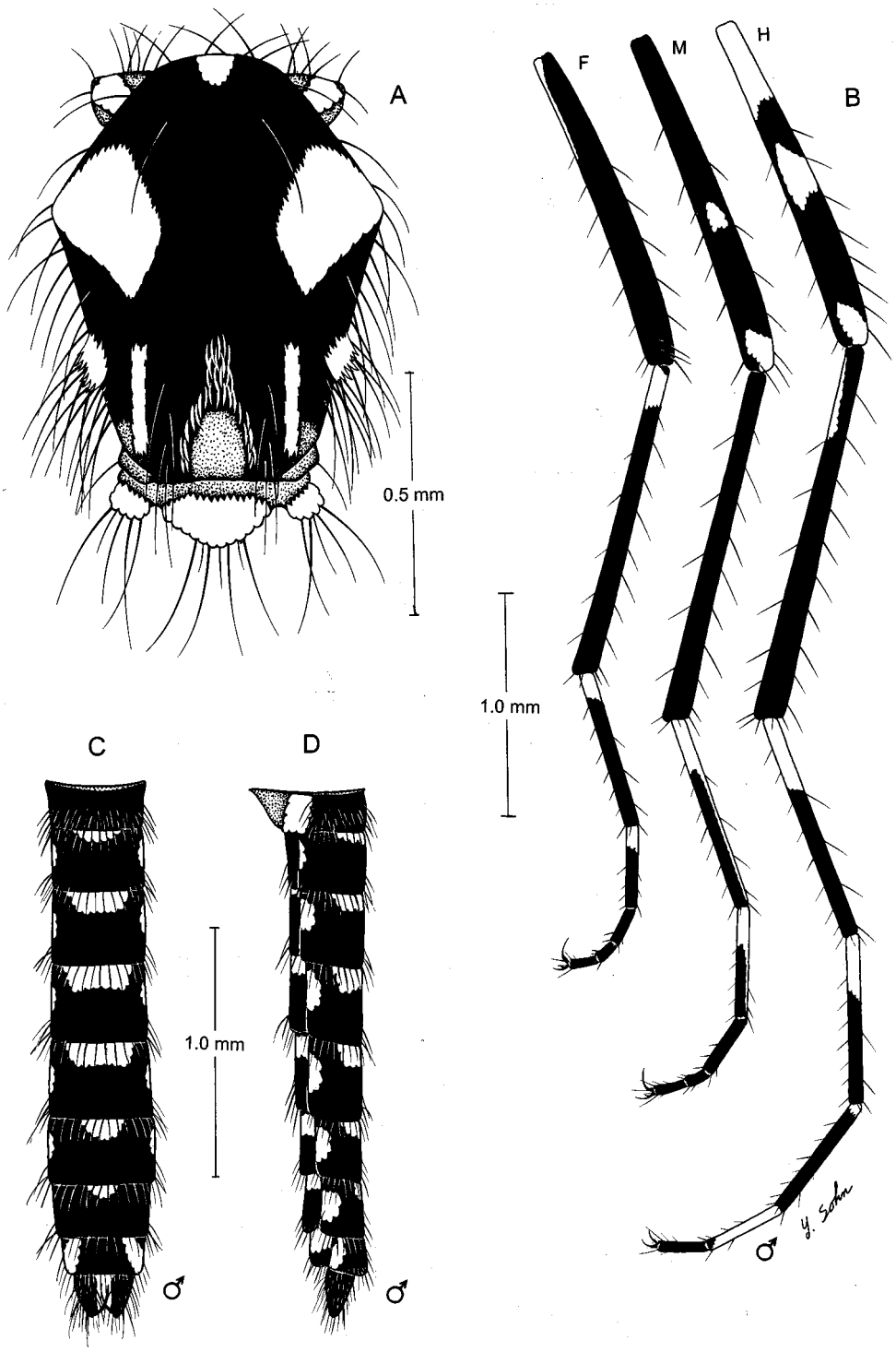


FIGURE 21.*Aedes* (*Stg*.) *calceatus* — A, male fore-, mid- and hindlegs (anterior view); B, female fore-, mid- and hindlegs (anterior view); *Aedes* (*Stg*.) *ledgeri* — C, female fore-, mid- and hindlegs (anterior view).



Aedes (*Stegomyia*) *ledgeri*

FIGURE 22.*Aedes* (*Stg*.) *ledgeri* — A, thorax (dorsal view); B, male fore-, mid- and hindlegs (anterior view); C, male abdomen (dorsal view); D, male abdomen (lateral view).

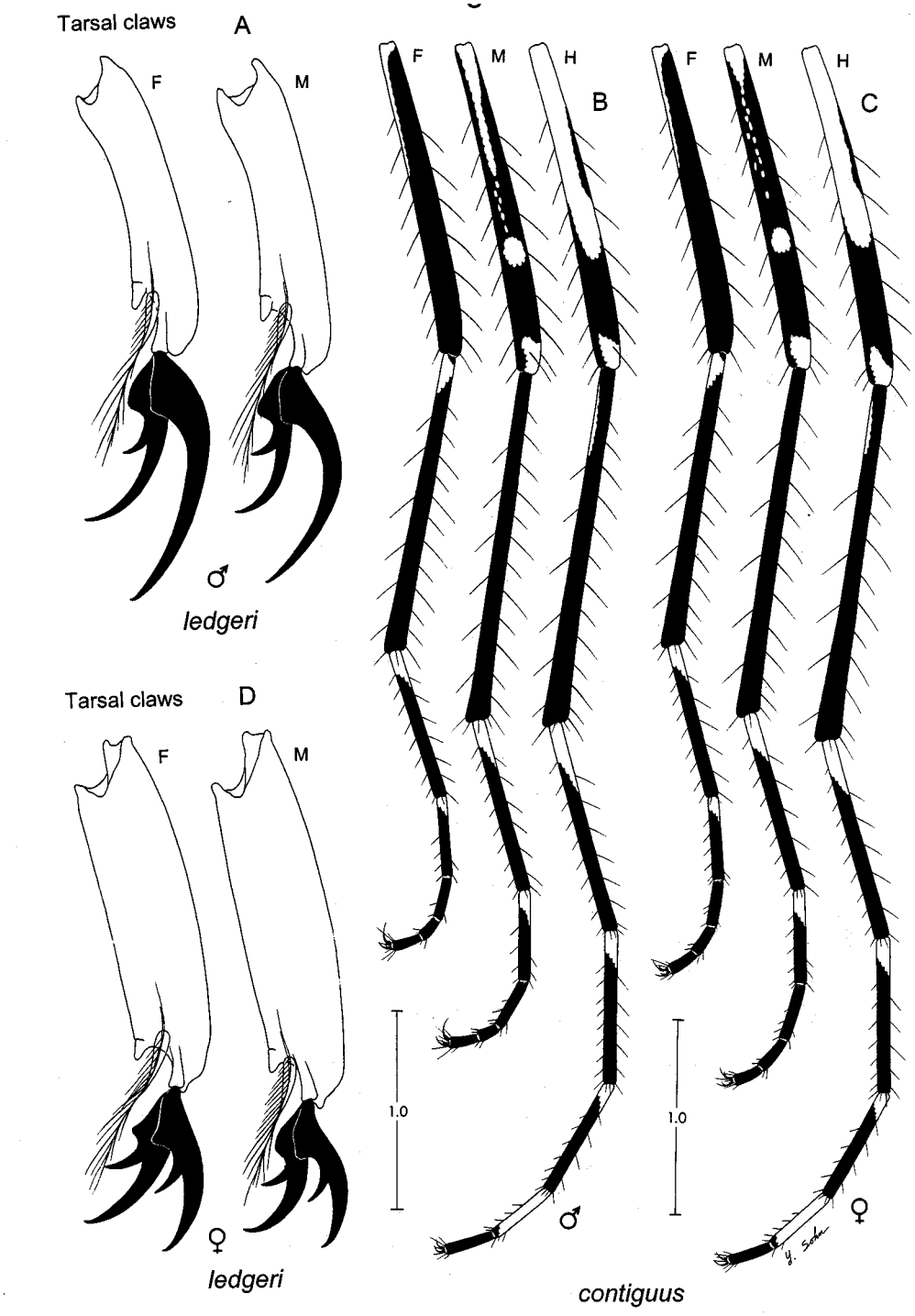


FIGURE 23.*Aedes* (*Stg*.) *ledgeri* — A, male tarsal claws (fore- and midlegs); D, female tarsal claws (fore- and midlegs); *Aedes* (*Stg*.) *contiguus* - B, male fore-, mid- and hindlegs (anterior view); C, female fore-, mid- and hindlegs (anterior view).

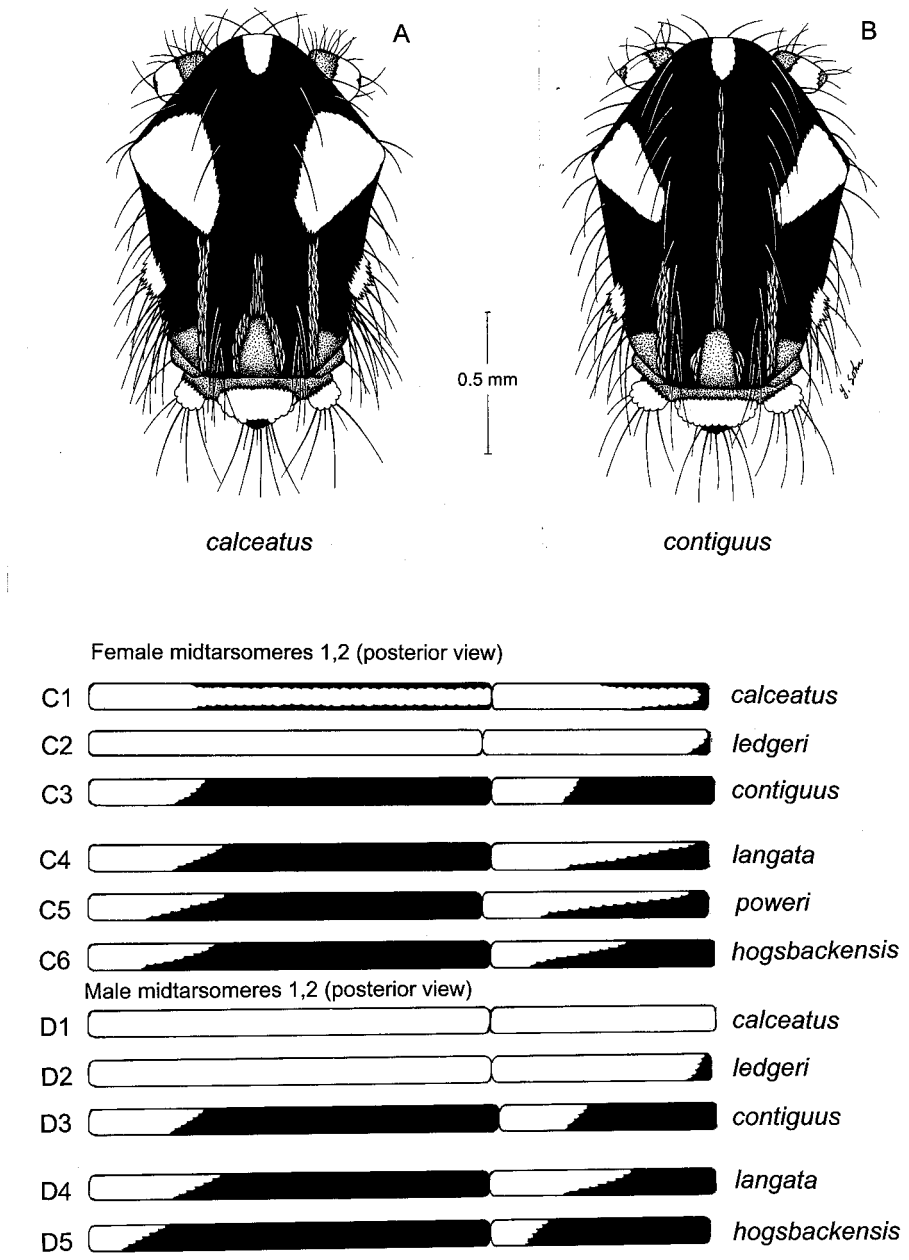
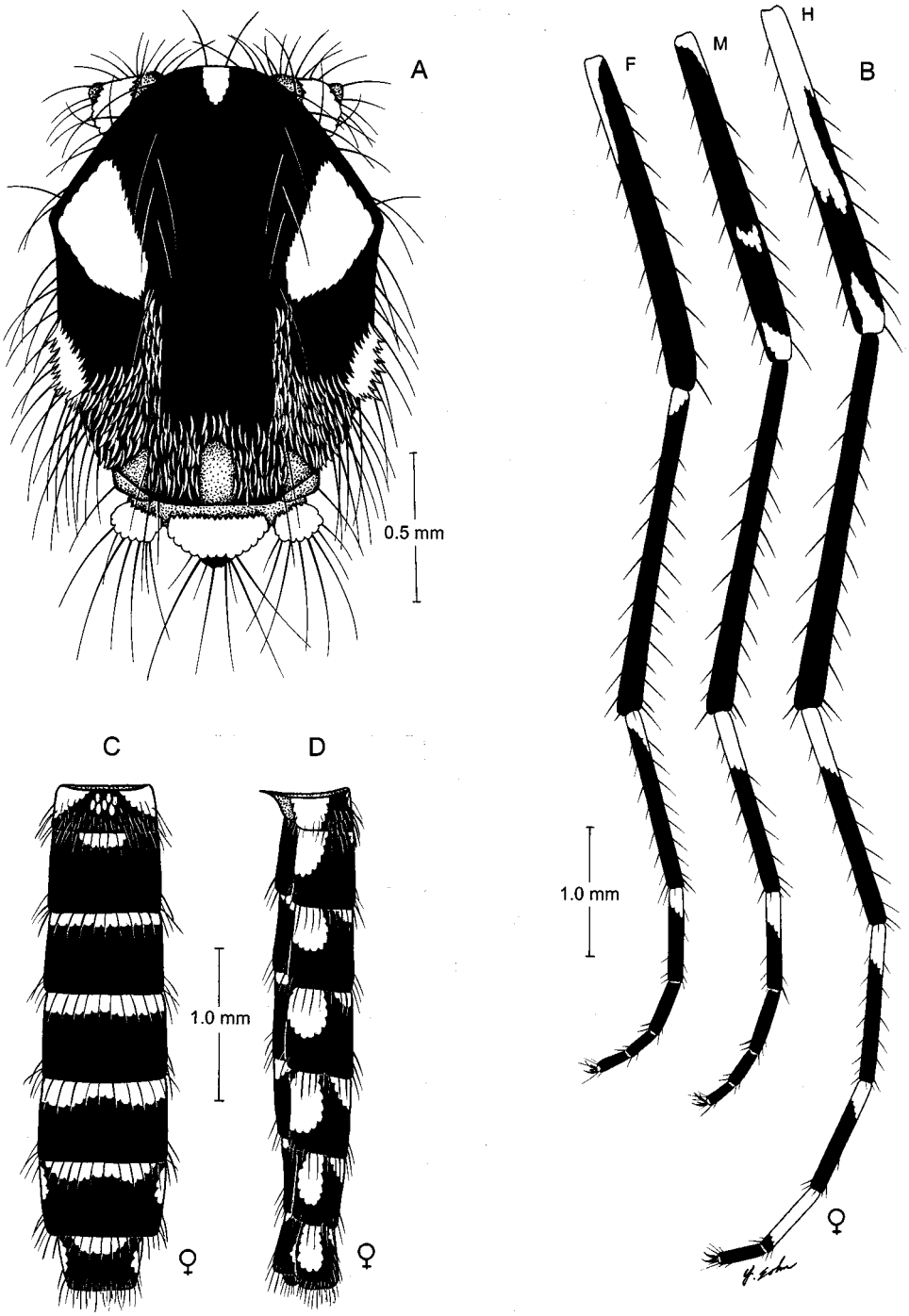


FIGURE 24.*Aedes* (*Stg.*) *calceatus* — A, thorax (dorsal view); *Aedes* (*Stg.*) *contiguus* — B, thorax (dorsal view); *Aedes (Stg.*) *calceatus* — C1, female midtarsomeres 1, 2 (posterior view); *Aedes* (*Stg.*) *ledgeri* — C2, female midtarsomeres 1, 2 (posterioa view); *Aedes* (*Stg.*) *contiguus* — C3, female midtarsomeres 1, 2 (posterior view); *Aedes (Stg.*) *langata* — C4, female midtarsomeres 1, 2 (posterior view); *Aedes (Stg.*) *poweri* — C5, female midtarsomeres 1, 2 (posterior view); *Aedes* (*Stg.*) *hogsbackensis* — C6, female midtarsomeres 1, 2 (posterior view); *Aedes (Stg.*) *calceatus* — D1, male midtarsomeres 1, 2 (posterior view); *Aedes* (*Stg.*) *ledgeri* — D2, male midtarsomeres 1, 2 (posterior view); *Aedes (Stg.*) *contiguus* — D3, male midtarsomeres 1, 2 (posterior view); *Aedes (Stg.*) *langata* — D4, male midtarsomeres 1, 2 (posterior view); *Aedes (Stg.*) *hogsbackensis* — D5, male midtarsomeres 1, 2 (posterior view).



Aedes (*Stegomyia*) *chaussieri*

FIGURE 25.*Aedes* (*Stg*.) *chaussieri* — A, thorax (dorsal view); B, female fore-, mid- and hindlegs (anterior view); C, female abdomen (dorsal view); D, female abdomen (lateral view).

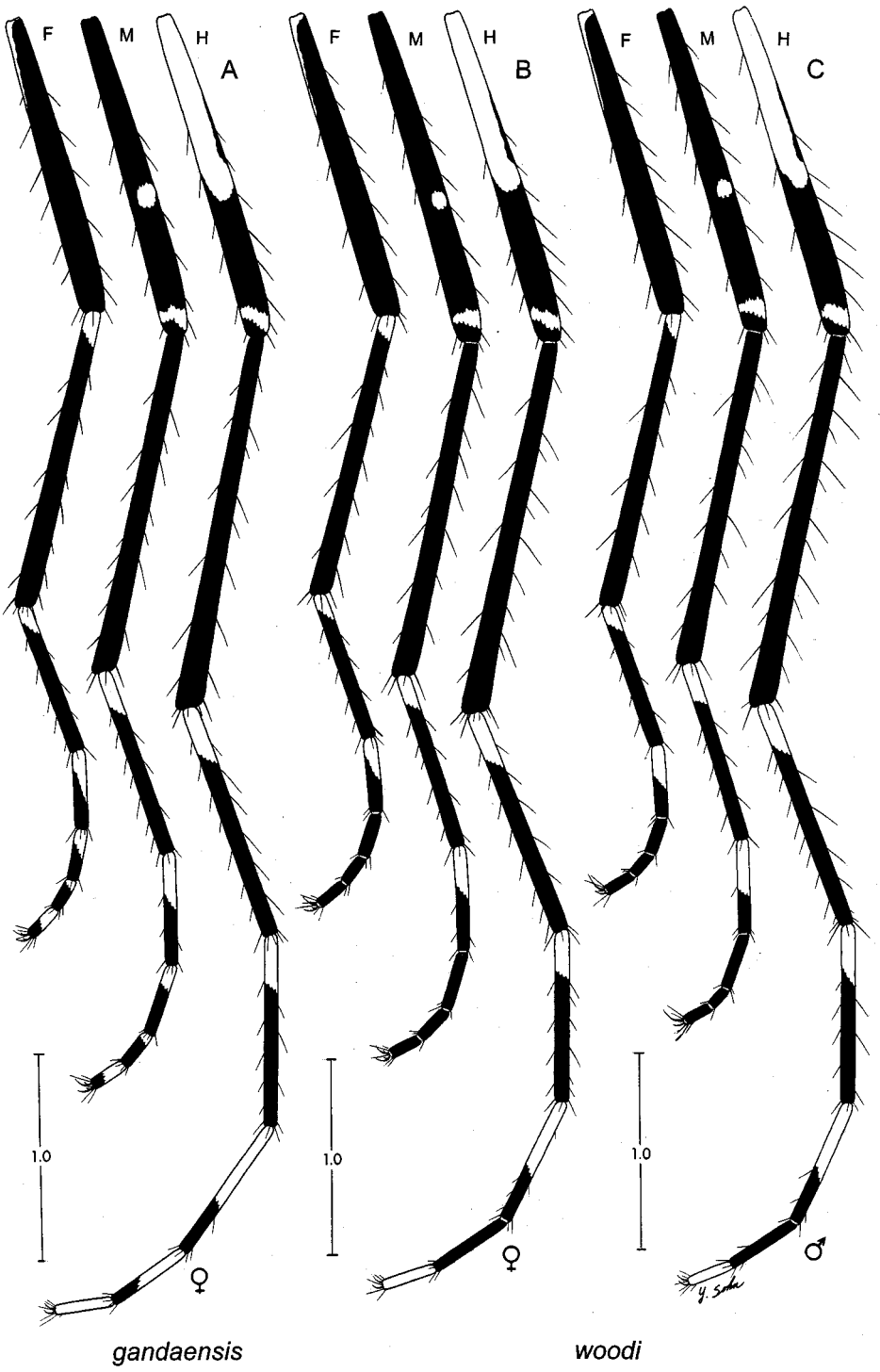


FIGURE 26.*Aedes* (*Stg*.) *gandaensis* — A, female (Holotype) fore-, mid- and hindlegs (anterior view); *Aedes* (*Stg*.) *woodi* — B, female fore-, mid- and hindlegs (anterior view); C, male fore-, mid- and hindlegs (anterior view).

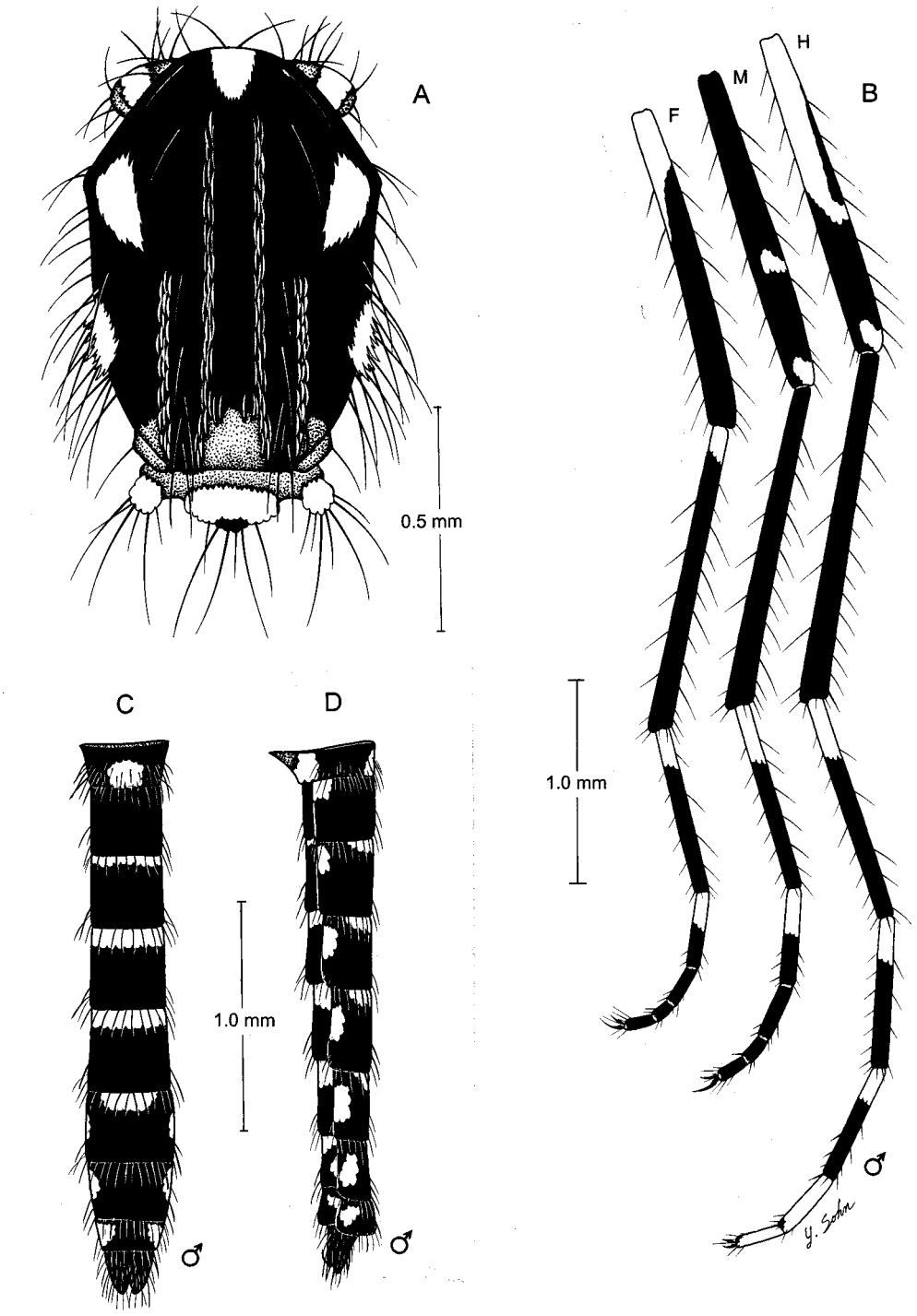


FIGURE 27.*Aedes* (*Stg*.) *josiahae* — A, thorax (dorsal view); B, male fore-, mid- and hindlegs (anterior view); C, male abdomen (dorsal view); D, male abdomen (lateral view).

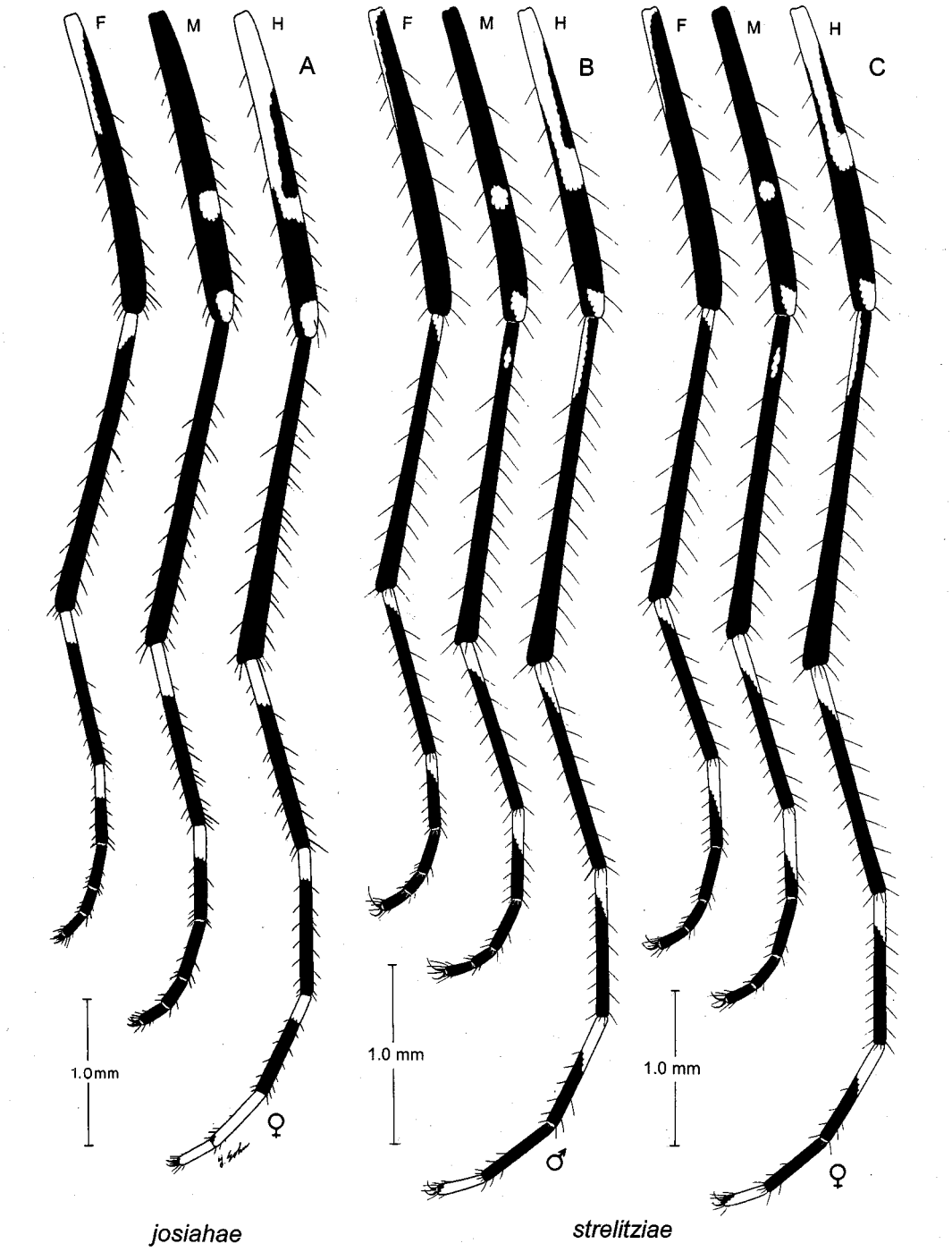
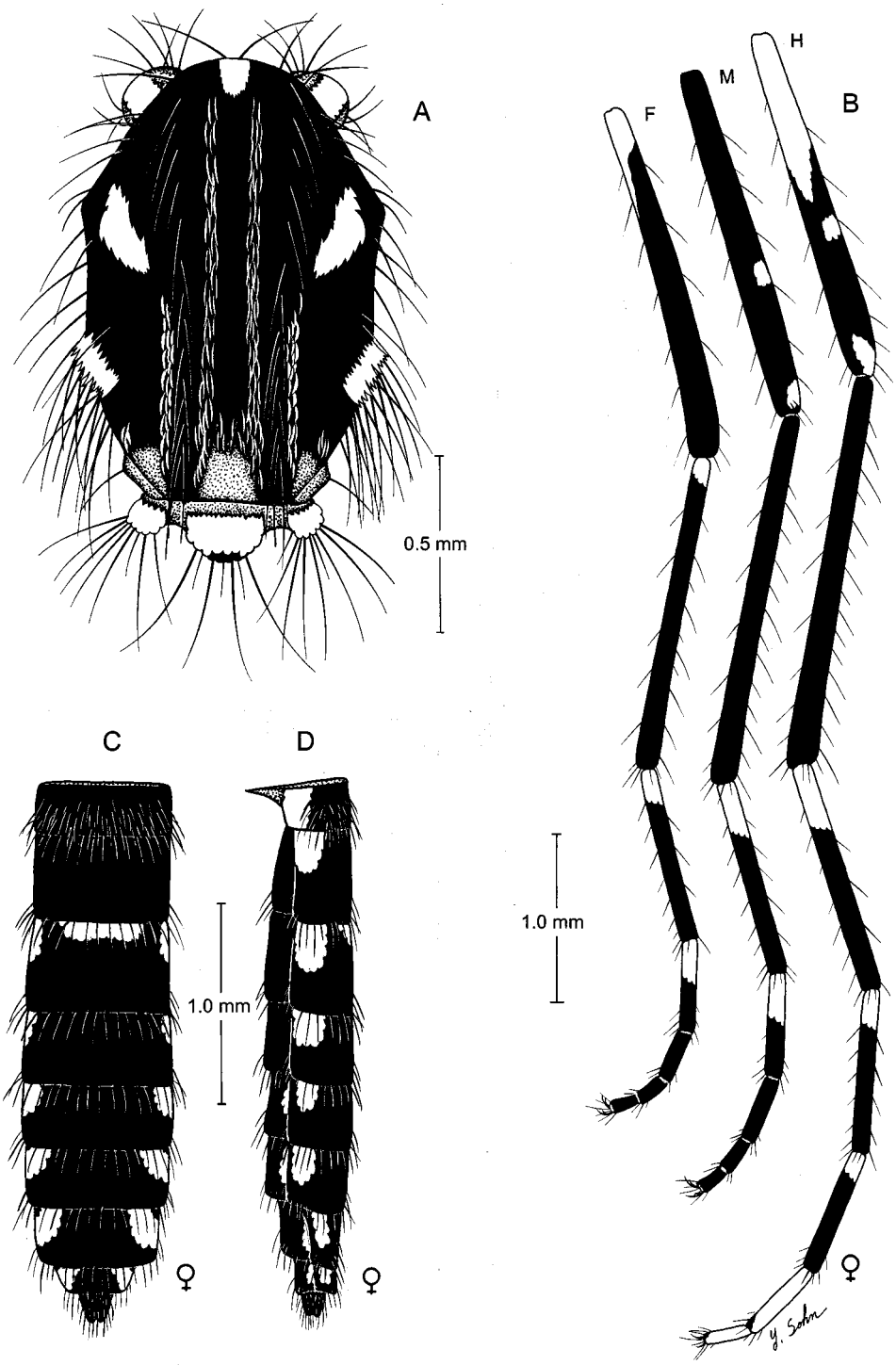


FIGURE 28. Aedes (Stg.) josiahae — A, female fore-, mid- and hindlegs (anterior view); *Aedes* (*Stg*.) *strelitziae* — B, male fore-, mid- and hindlegs (anterior view); C, female fore-, mid- and hindlegs (anterior view).



Aedes (*Stegomyia*) *kivuensis*

FIGURE 29.*Aedes* (*Stg.*) *kivuensis* — A, thorax (dorsal view); B, female fore-, mid- and hindlegs (anterior view); C, female abdomen (dorsal view); D, female abdomen (lateral view).

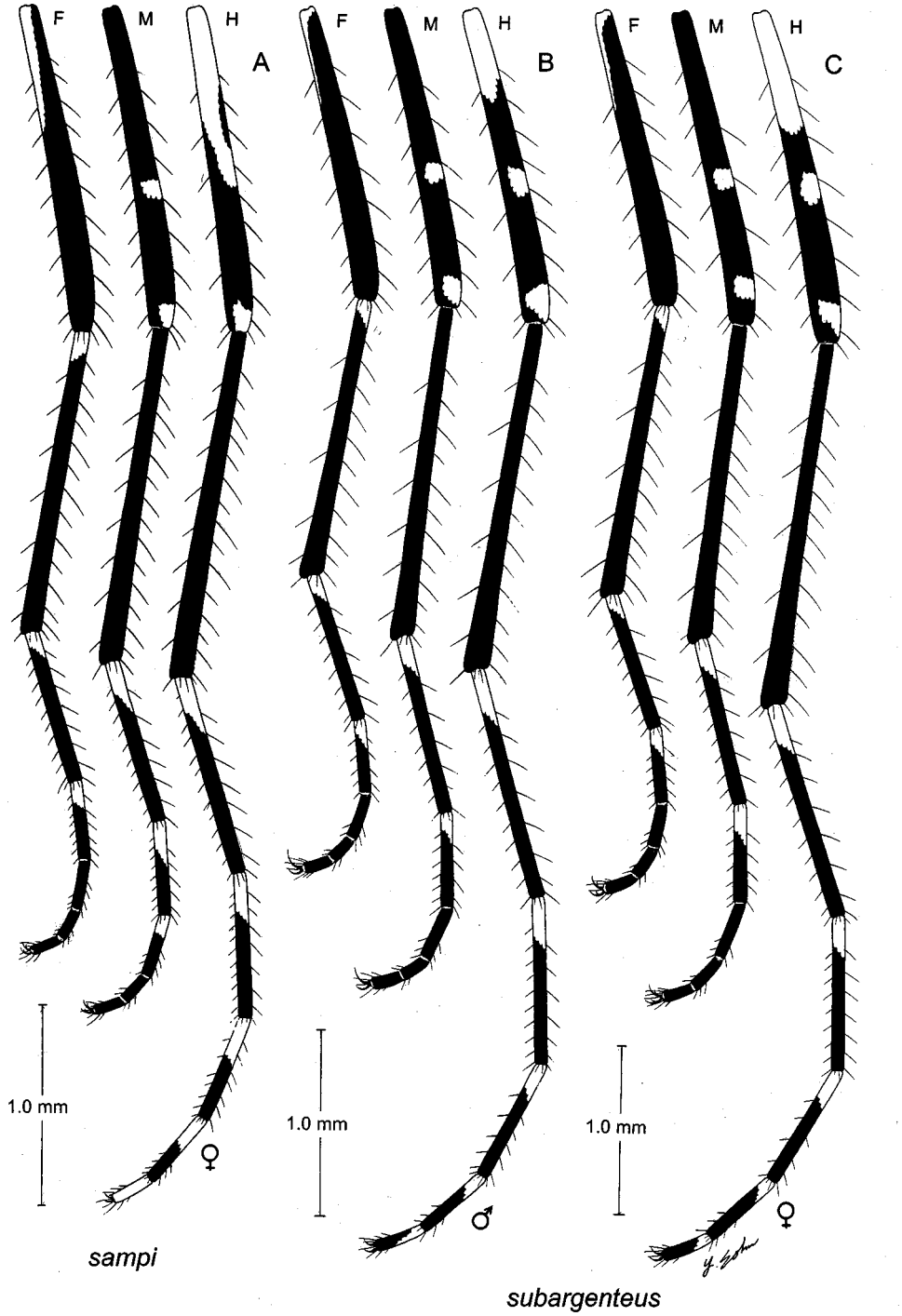


FIGURE 30.*Aedes* (*Stg*.) *sampi* — A, female (Holotype) fore-, mid- and hindlegs (anterior view); *Aedes* (*Steg*.) *subargenteus* — B, male fore-, mid- and hindlegs (anterior view); C, female fore-, mid- and hindlegs (anterior view).

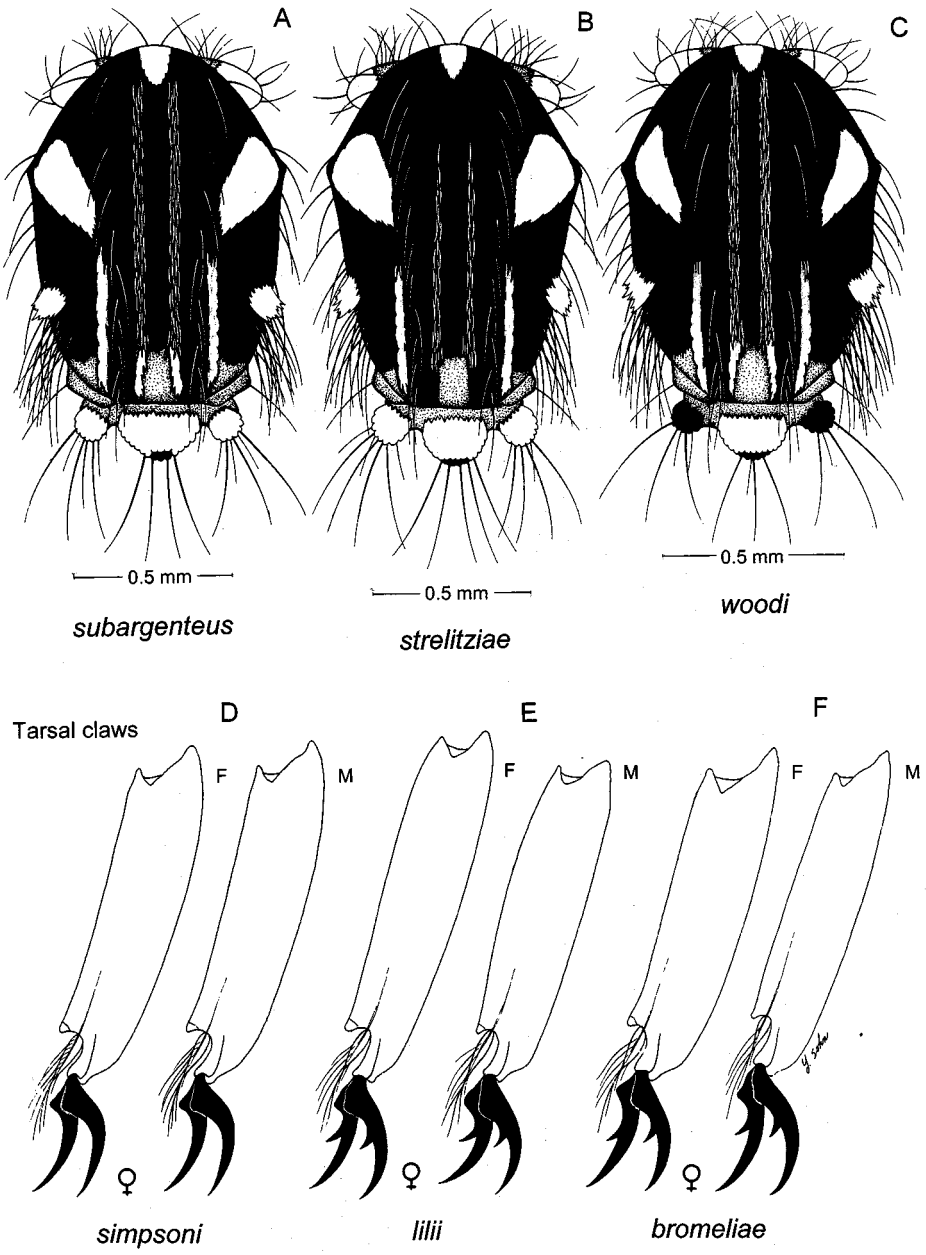
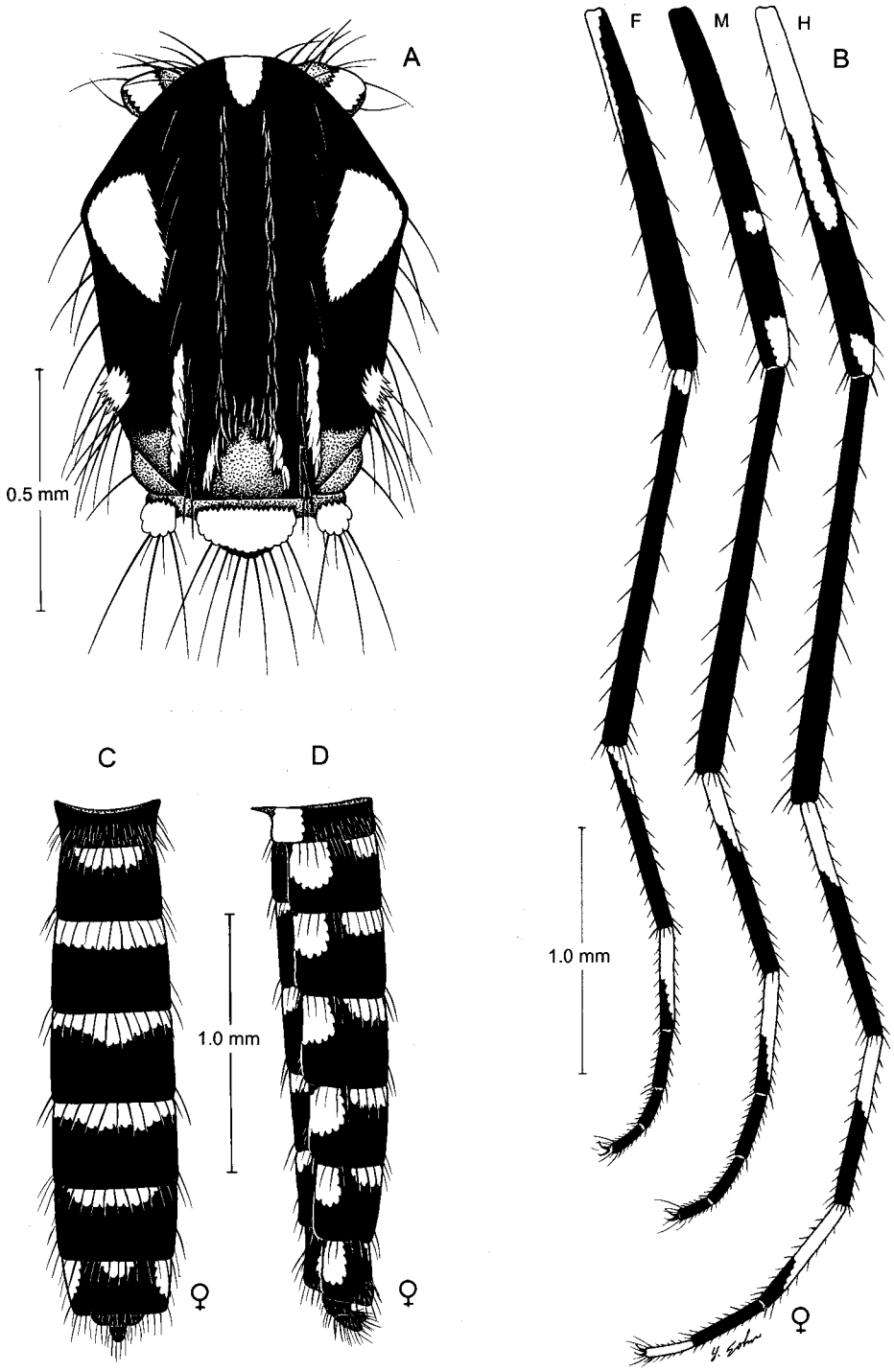


FIGURE 31.*Aedes* (*Stg*.) *subargenteus* — A, thorax (dorsal view); *Aedes* (*Stg*.) *strelitziae* — B, thorax (dorsal view); *Aedes* (*Stg*.) *woodi* — C, thorax (dorsal view); *Aedes* (*Stg*.) *simpsoni* — D, female tarsal claws (fore- and midlegs); *Aedes* (*Stg*.) *lilii* — E, female tarsal claws (fore- and midlegs); *Aedes* (*Stg*.) *bromeliae* — F, female tarsal claws (fore- and midlegs).



Aedes (Stegomyia) simpsoni

FIGURE 32.*Aedes* (*Stg*.) *simpsoni* — Lectotype female: A, thorax (dorsal view); B, female fore-, mid- and hindlegs (anterior view); C, female abdomen (dorsal view); D, female abdomen (lateral view).

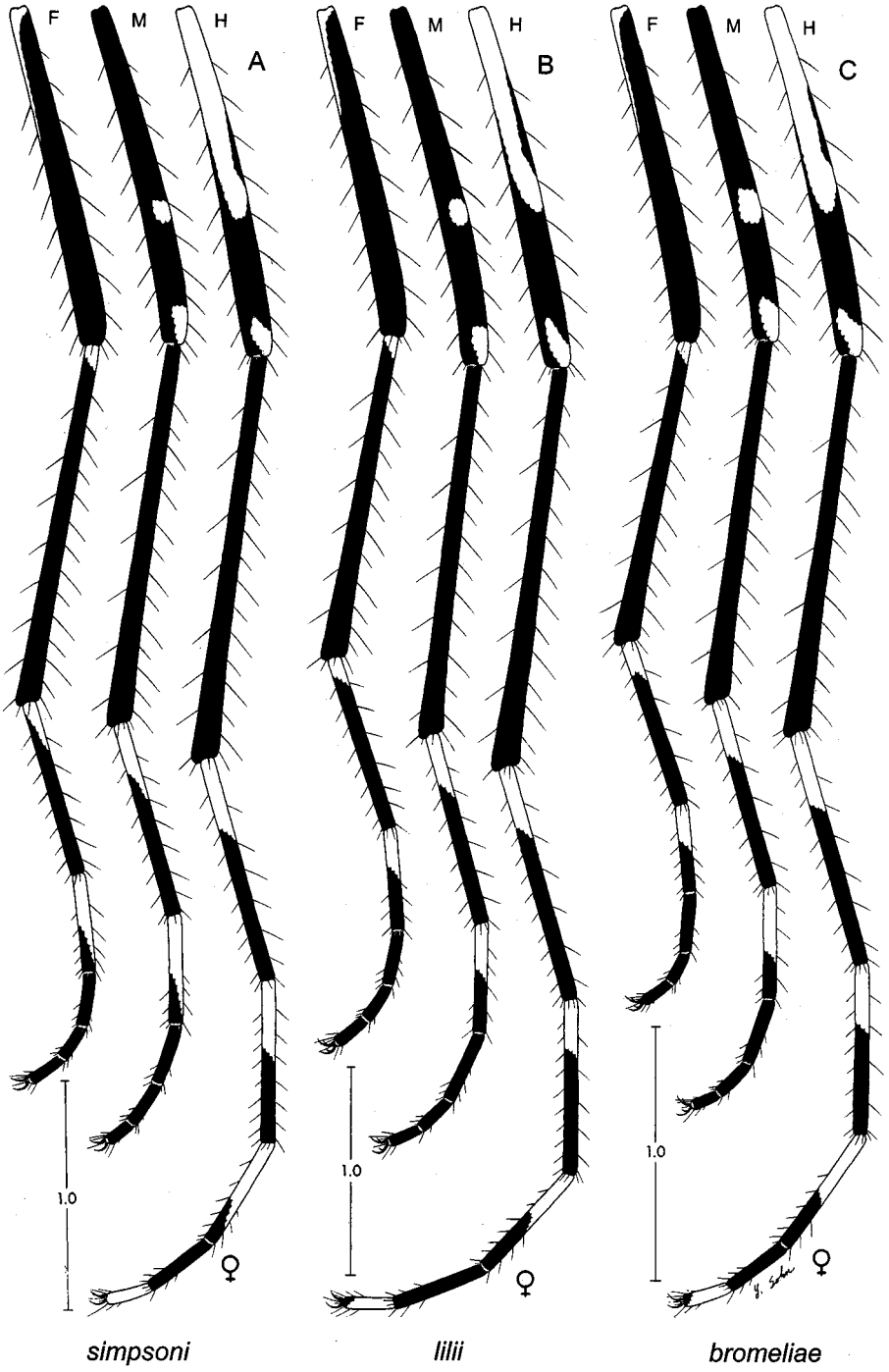


FIGURE 33.*Aedes* (*Stg*.) *simpsoni* — A, female fore-, mid- and hindlegs (anterior view); *Aedes* (*Stg*.) *lilii* — B, female fore-, mid- and hindlegs (anterior view); *Aedes* (*Stg*.) *bromeliae* — C, female fore-, mid- and hindlegs (anterior view).

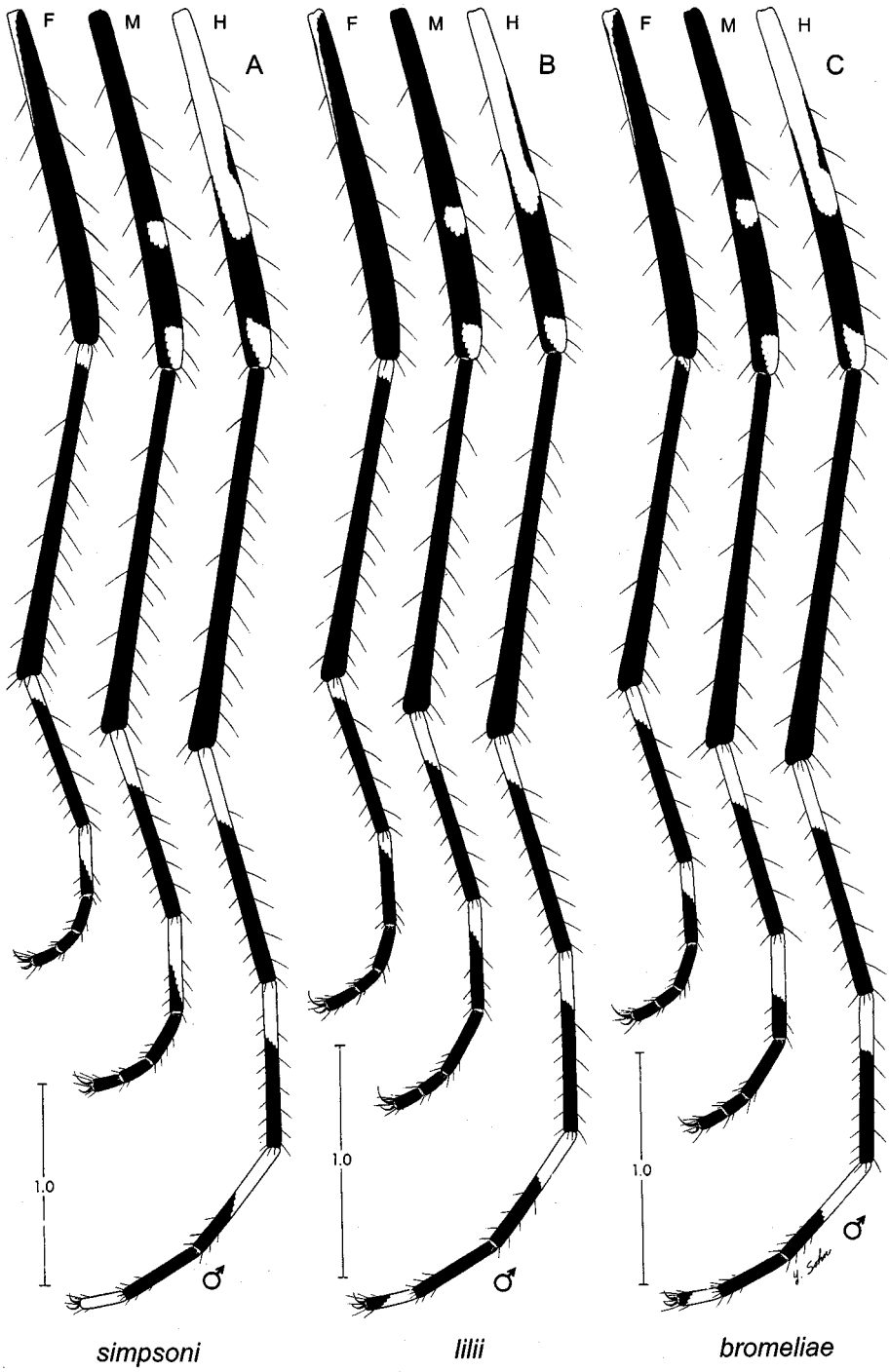


FIGURE 34.*Aedes* (*Stg*.) *simpsoni* — A, male fore-, mid- and hindlegs (anterior view); *Aedes* (*Stg*.) *lilii* — B, male fore-, mid- and hindlegs (anterior view); *Aedes* (*Stg*.) *bromeliae* — C, male fore-, mid- and hindlegs (anterior view).

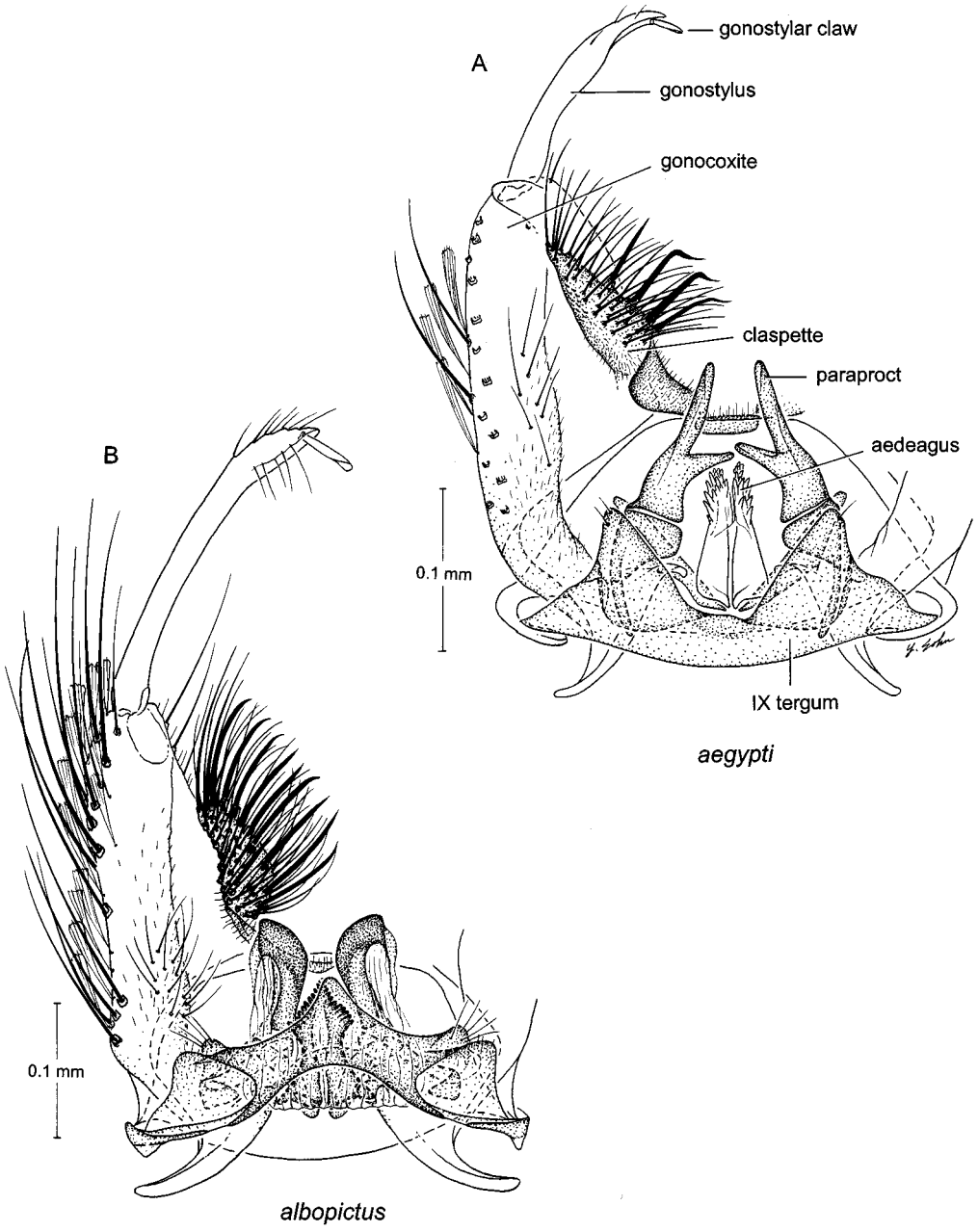


FIGURE 35. *Aedes (Stg.) aegypti* — A, male genitalia; *Aedes (Stg.) albopictus* —B, male genitalia.

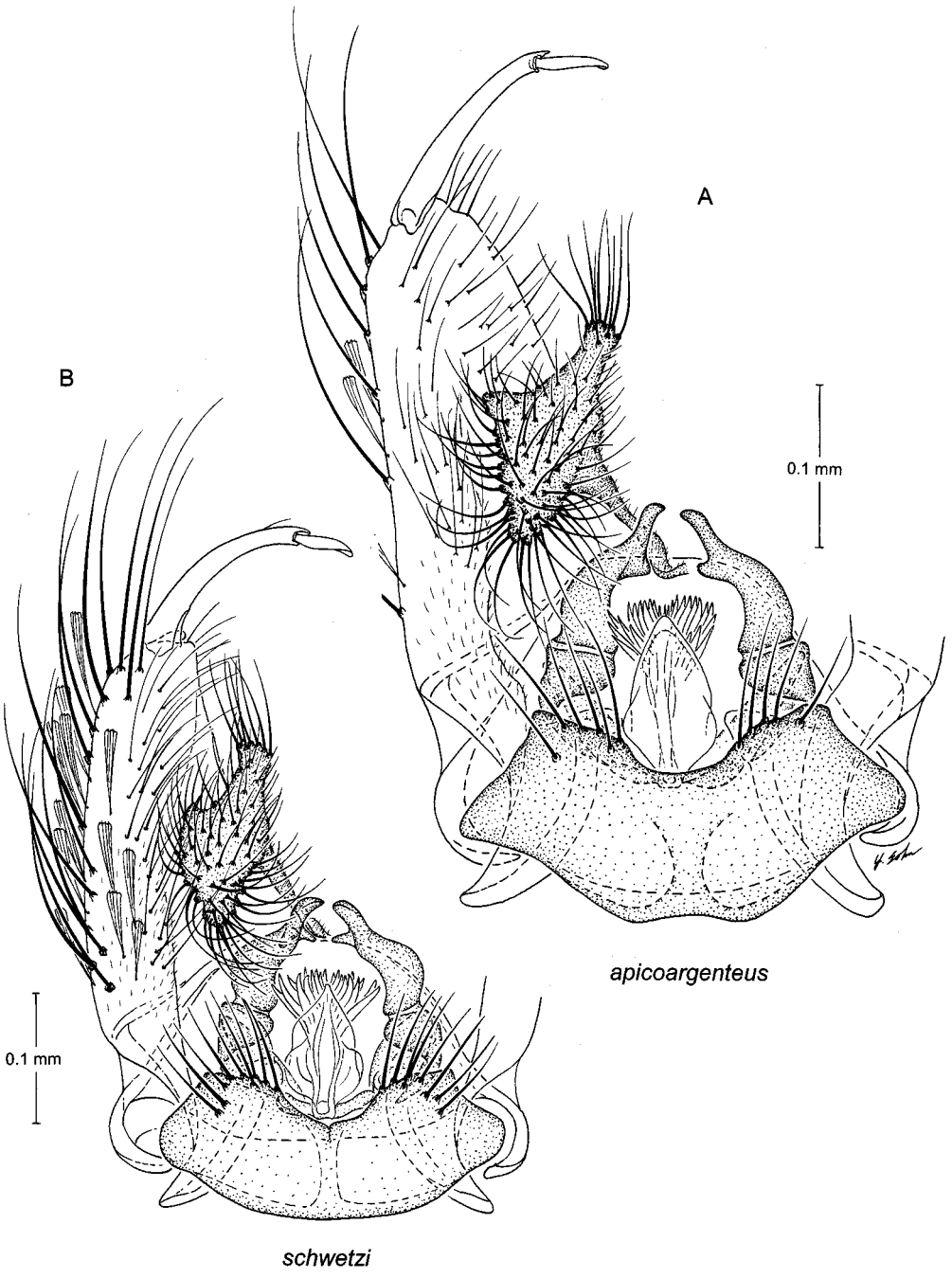


FIGURE 36.*Aedes* (*Stg*.) *apicoargenteus* — A, male genitalia; *Aedes* (*Stg*.) *schwetzi* — B, male genitalia.

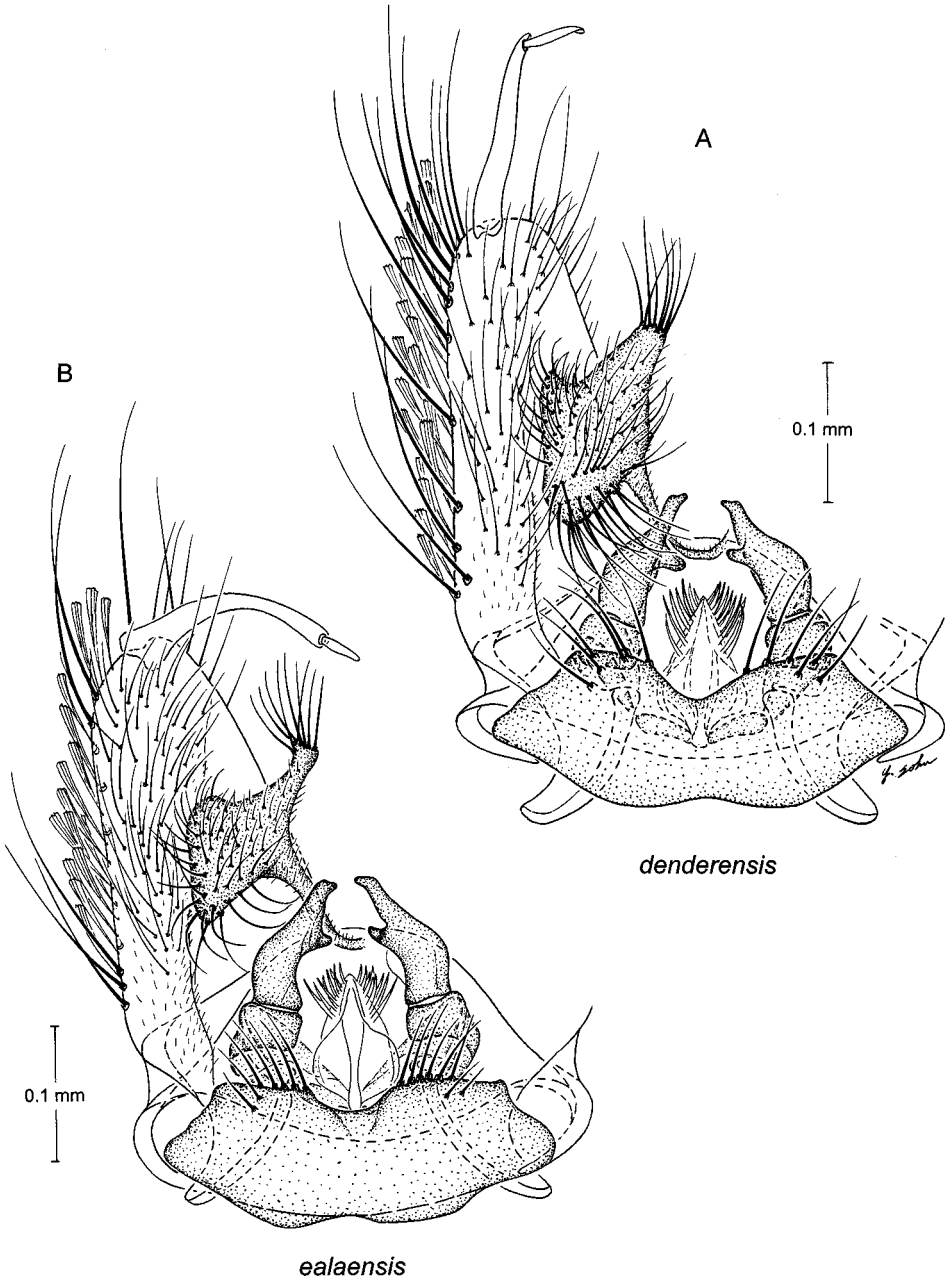


FIGURE 37.*Aedes* (*Stg*.) *denderensis* — A, male genitalia; *Aedes* (*Stg*.) *ealaensis* — B, male genitalia.

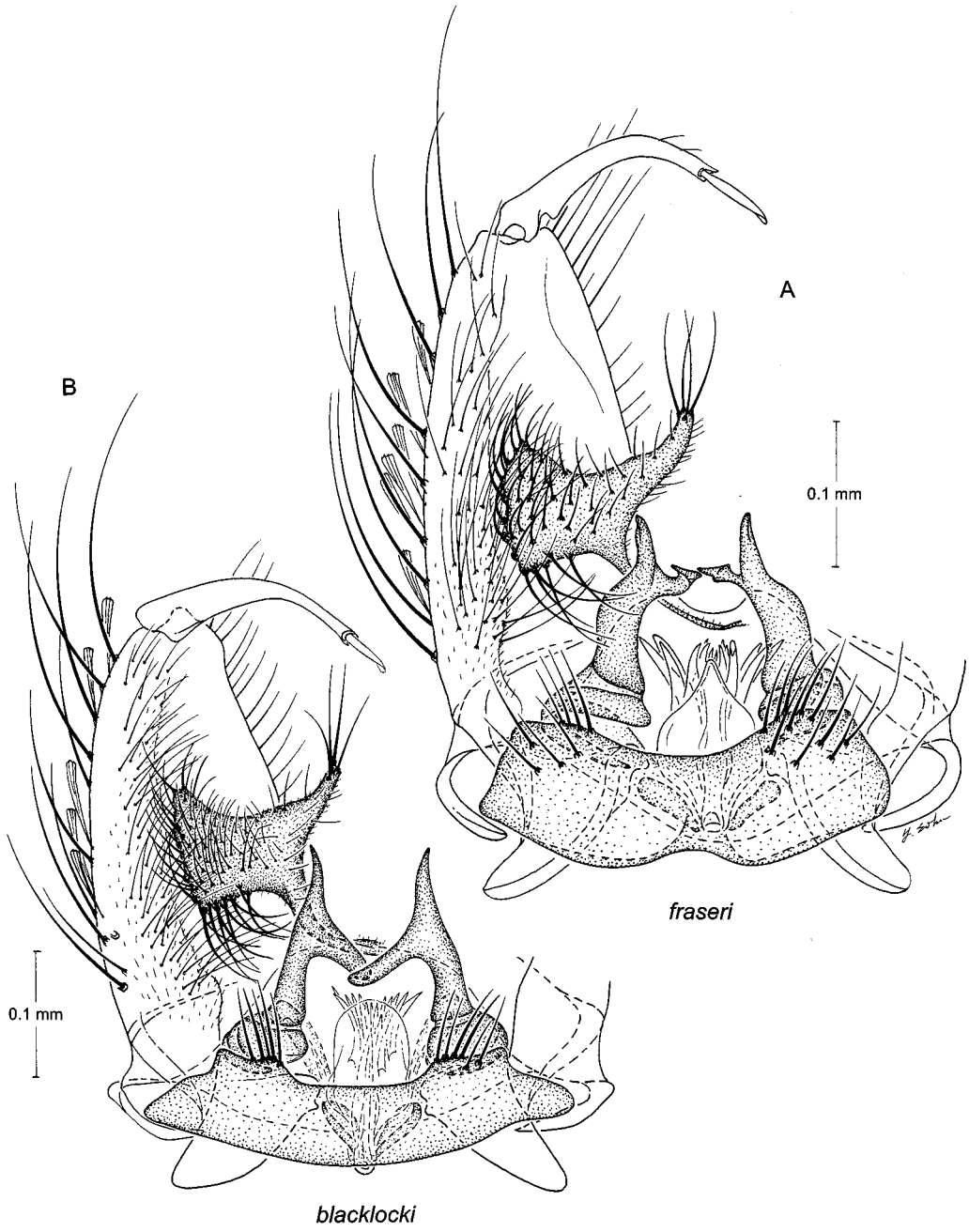


FIGURE 38.*Aedes* (*Stg*.) *fraseri* — A, male genitalia; *Aedes* (*Stg*.) *blacklocki* — B, male genitalia.

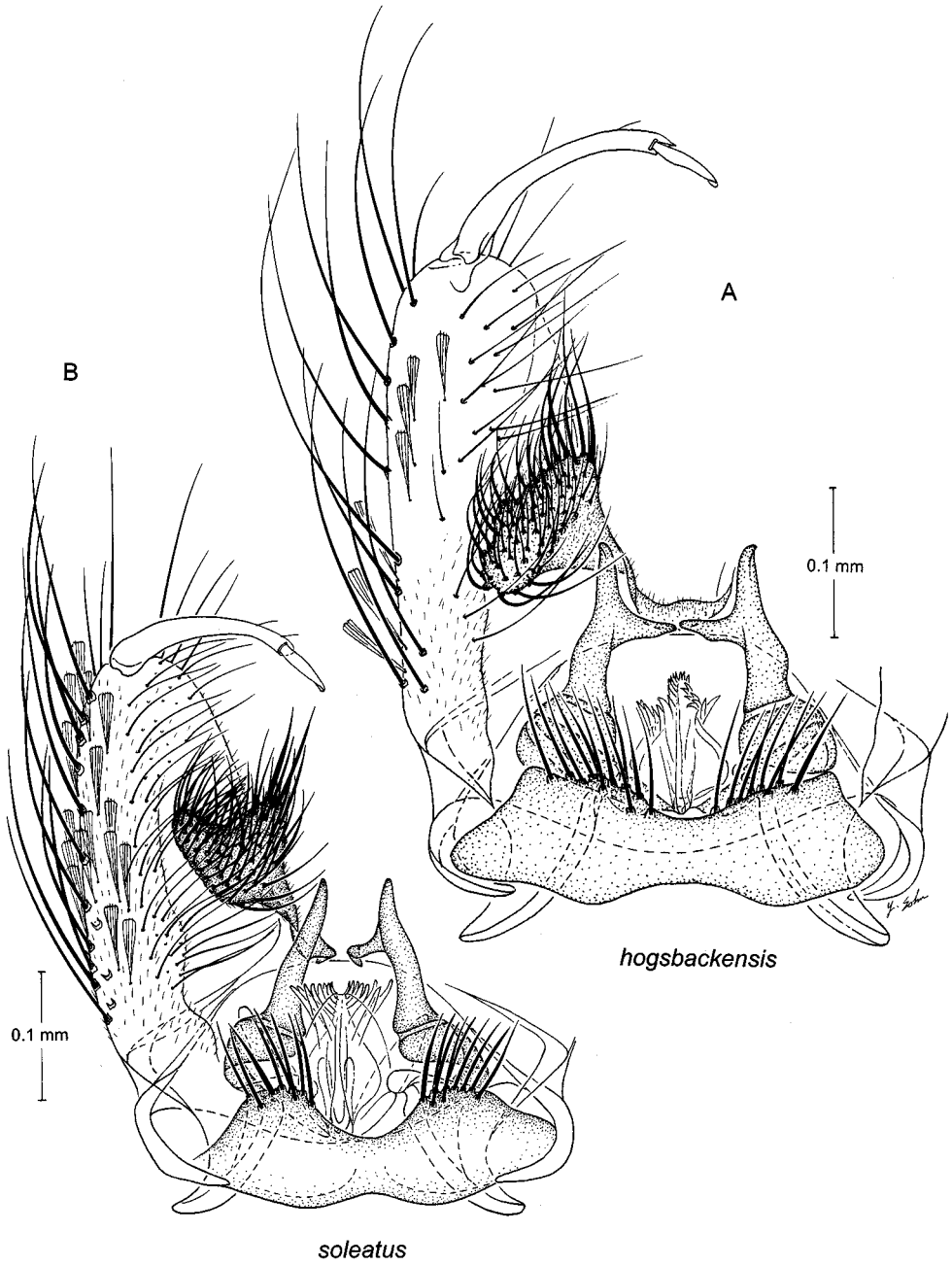


FIGURE 39.*Aedes* (*Stg*.) *hogsbackensis* — A, male genitalia; *Aedes* (*Stg*.) *soleatus* — B, male genitalia.

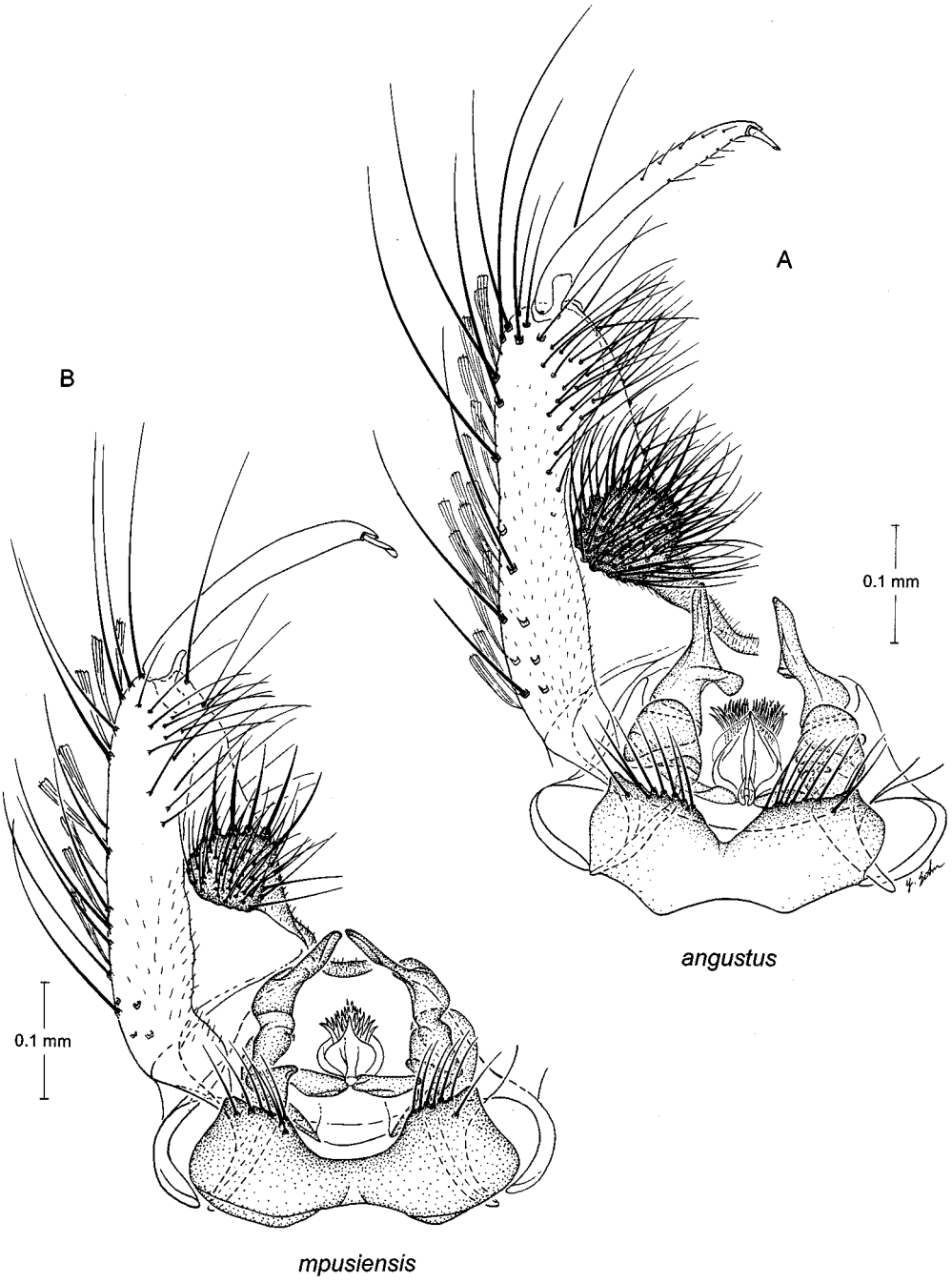


FIGURE 40.*Aedes* (*Stg*.) *angustus* — A, male genitalia. *Aedes* (*Stg*.) *mpusiensis* — B, male genitalia;

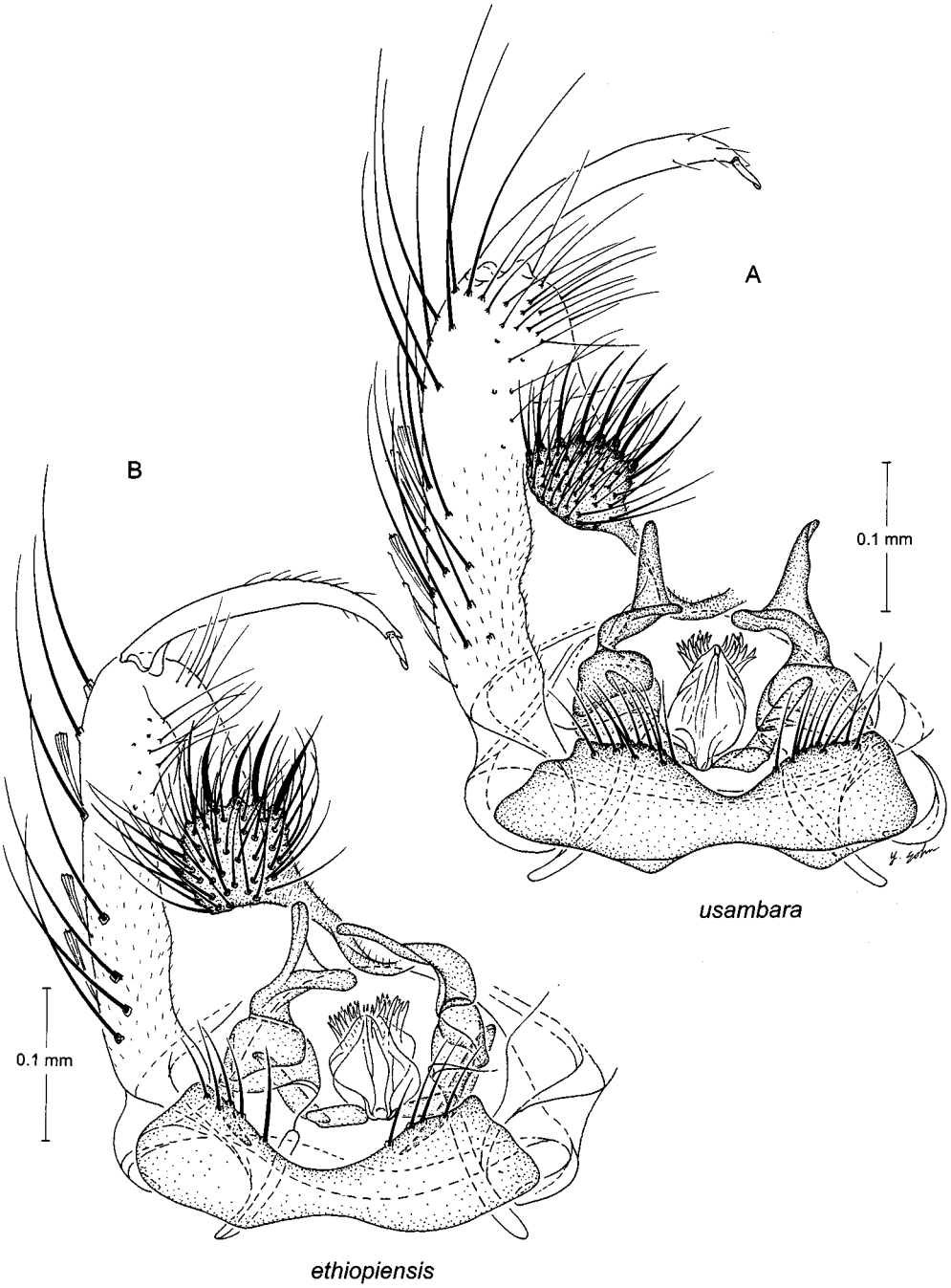


FIGURE 41.*Aedes* (*Stg*.) *usambara* — A, male genitalia. *Aedes* (*Stg*.) *ethiopiensis* — B, male genitalia;

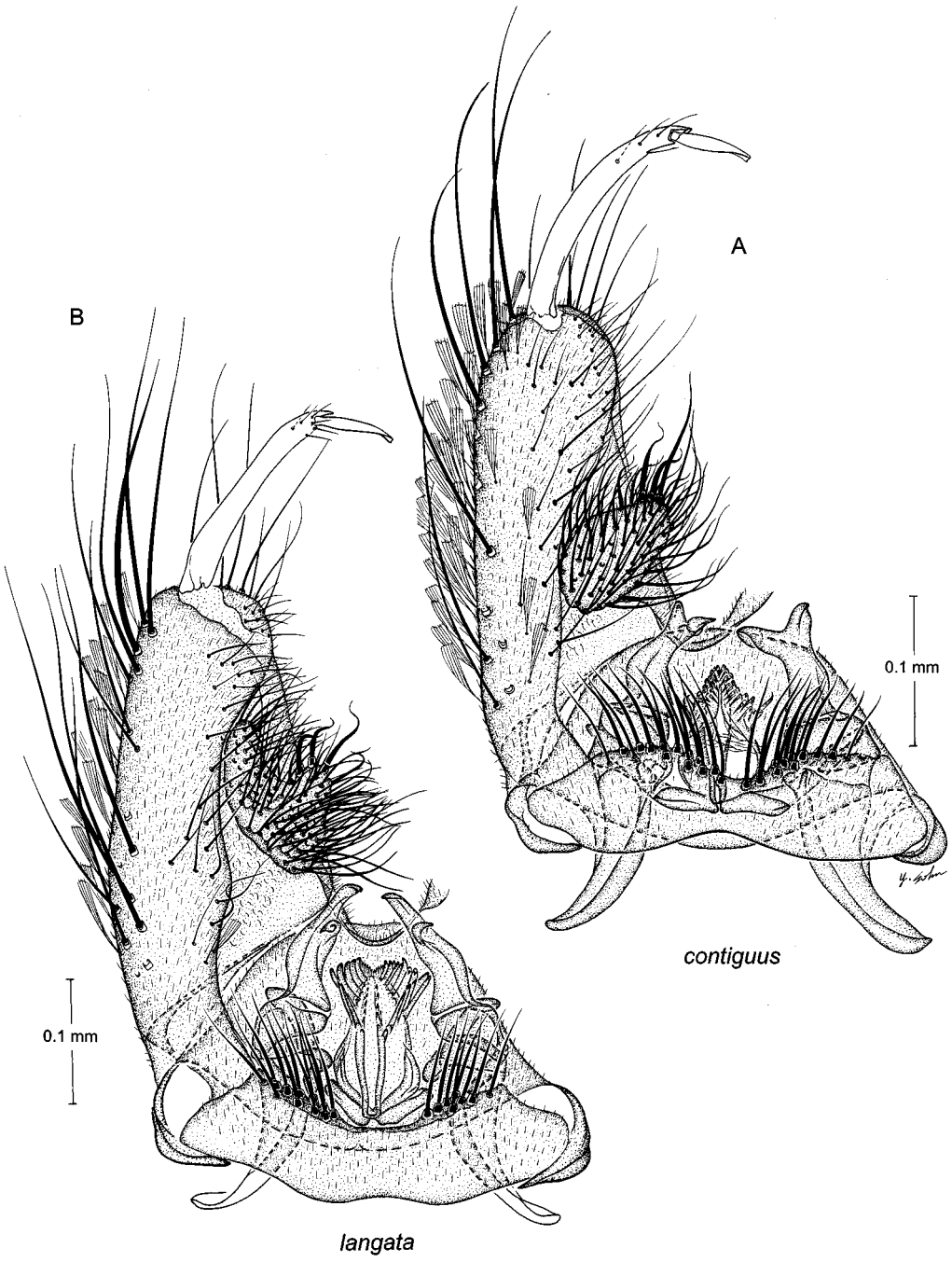


FIGURE 42.*Aedes* (*Stg*.) *contiguus* — A, male genitalia; *Aedes* (*Stg*.) *langata* — B, male genitalia.

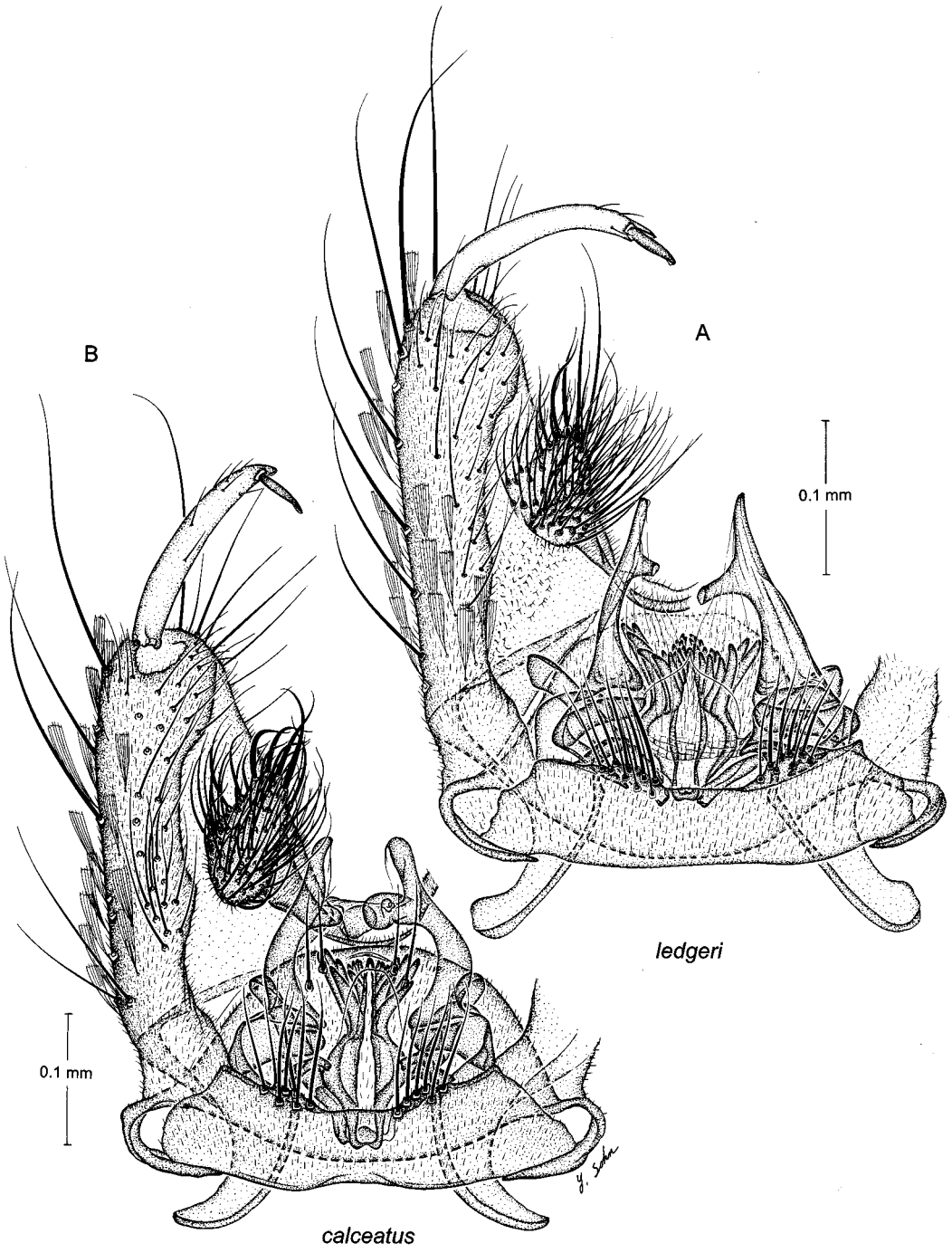


FIGURE 43.*Aedes* (*Stg*.) *ledgeri* — A, male genitalia; *Aedes* (*Stg*.) *calceatus* — B, male genitalia.

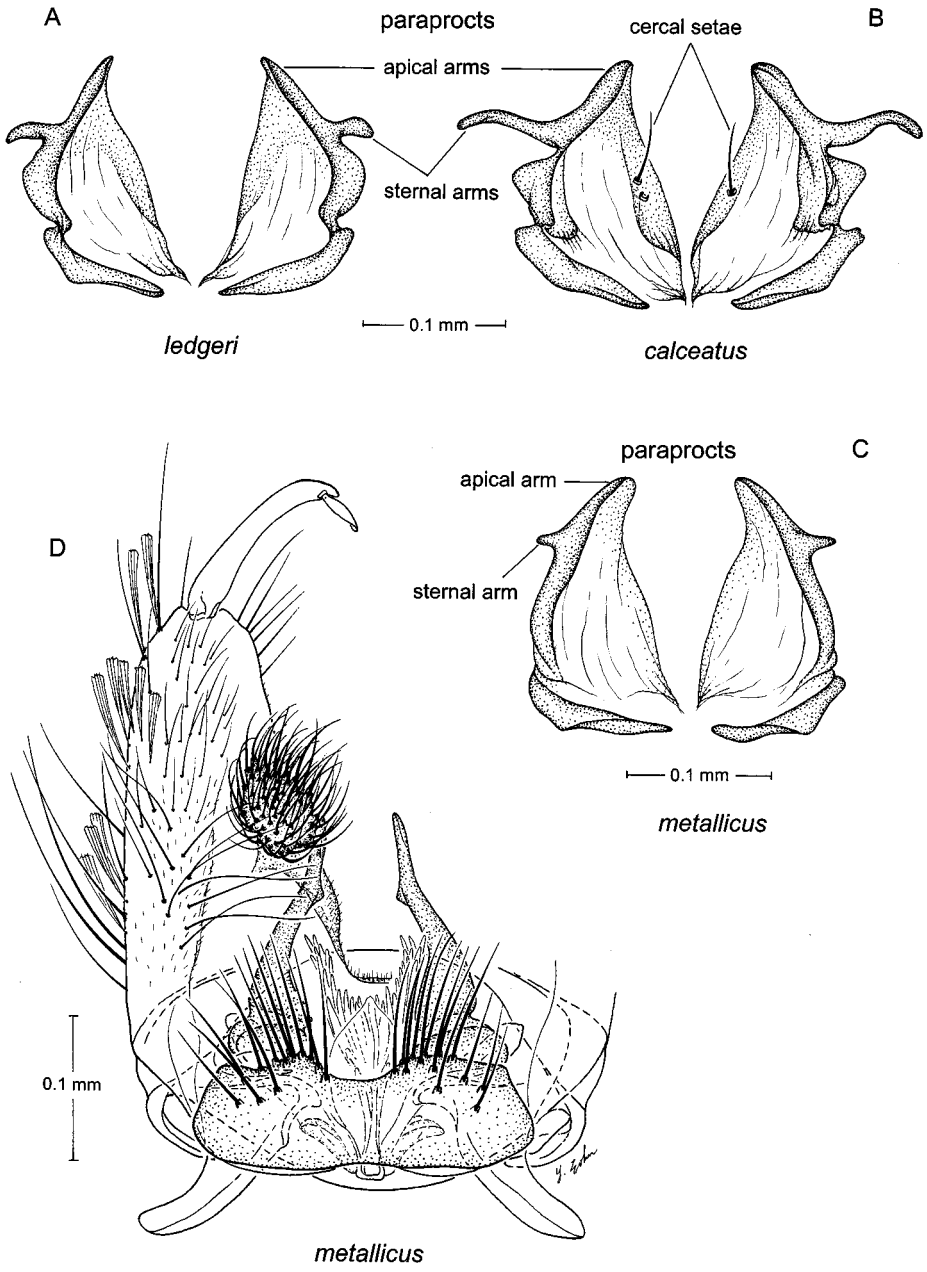


FIGURE 44.*Aedes* (*Stg*.) *ledgeri* — A, paraprocts; *Aedes* (*Stg*.) *calceatus* — B, paraprocts; *Aedes* (*Stg*.) *metallicus* — C, paraprocts; D, male genitalia.

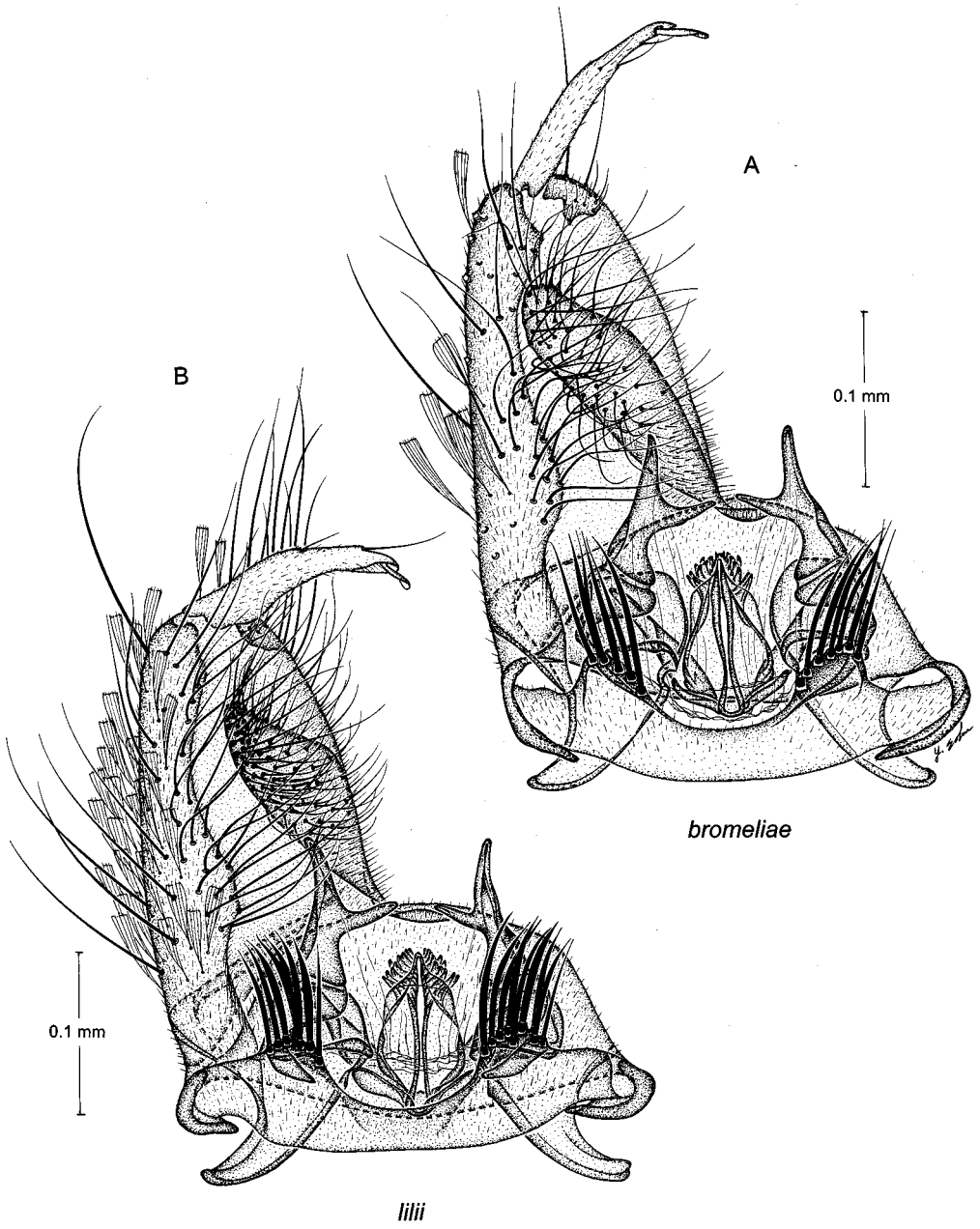


FIGURE 45.*Aedes* (*Stg*.) *bromeliae* — A, male genitalia; *Aedes* (*Stg*.) *lilii* — B, male genitalia.

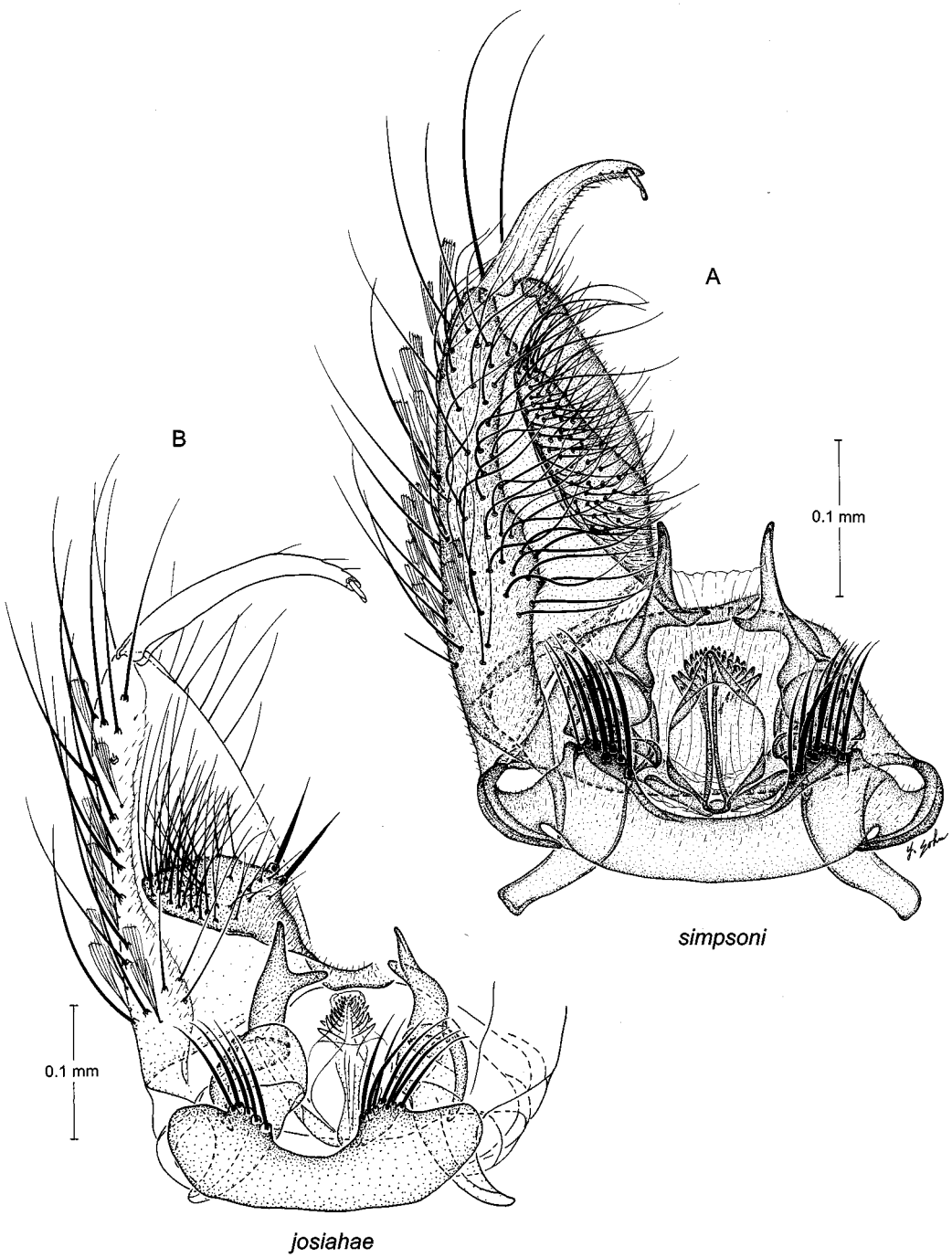


FIGURE 46.*Aedes* (*Stg*.) *simpsoni* — A, male genitalia; *Aedes* (*Stg*.) *josiahae* — B, male genitalia.

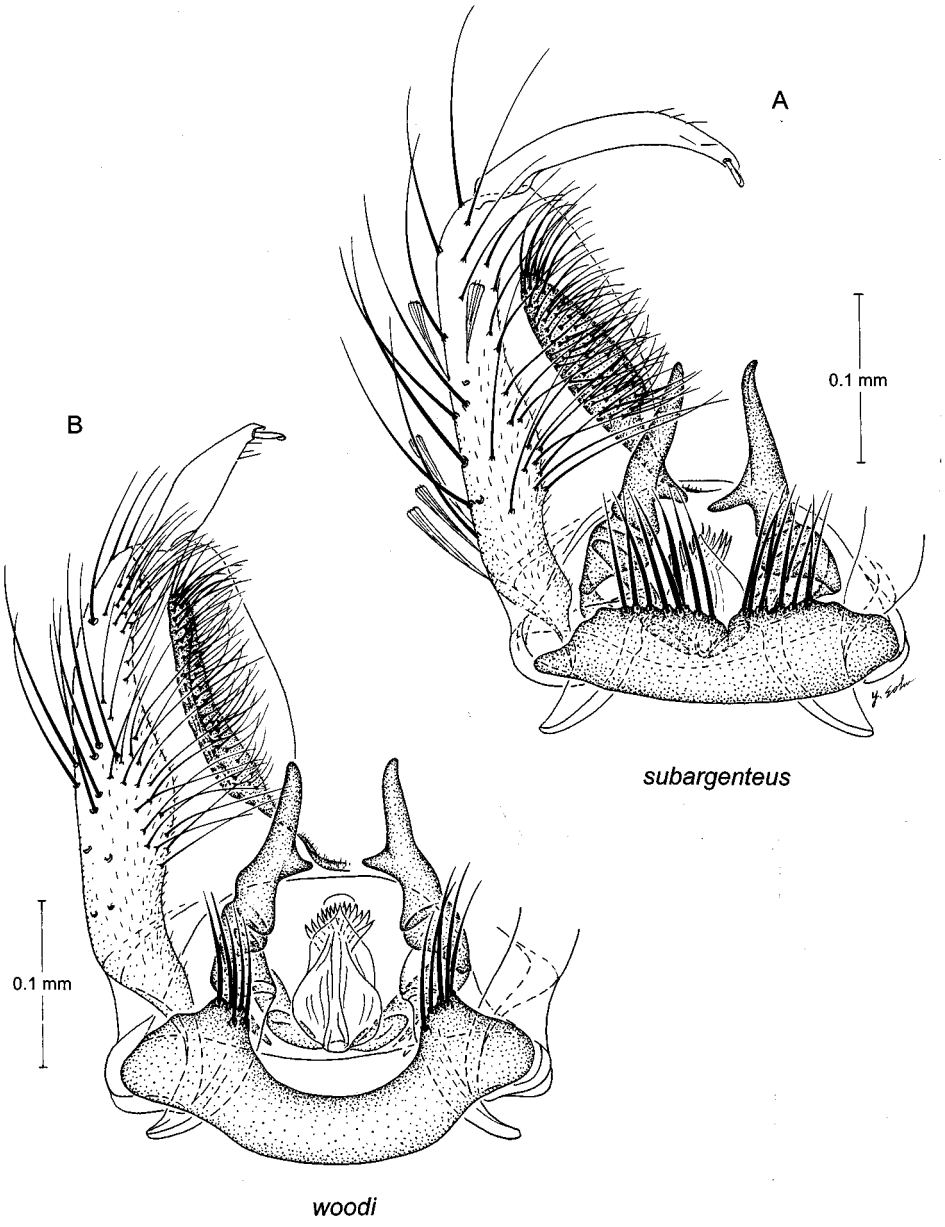


FIGURE 47.*Aedes* (*Stg*.) *subargenteus* — A, male genitalia; *Aedes* (*Stg*.) *woodi* — B, male genitalia.

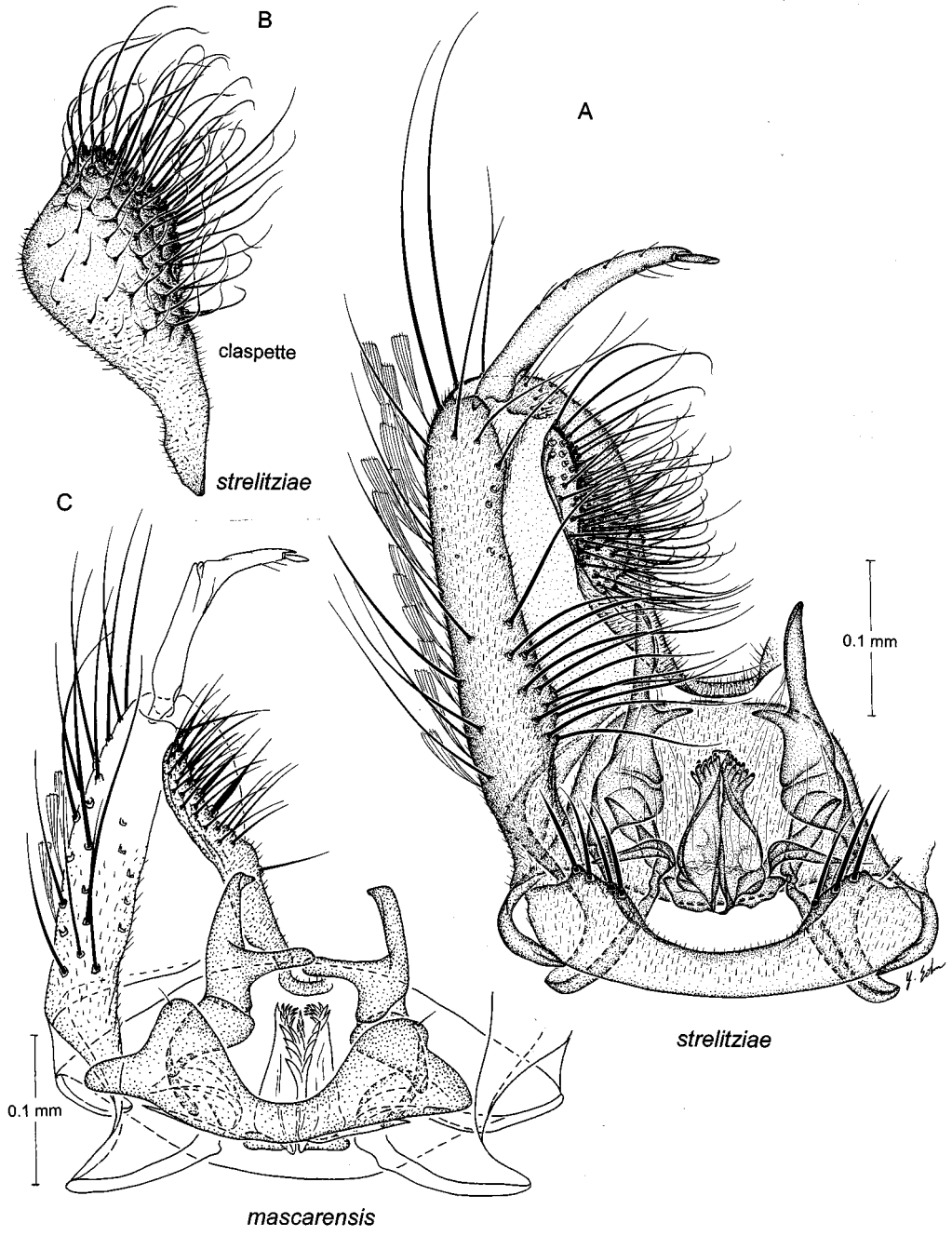


FIGURE 48.*Aedes* (*Stg*.) *strelitziae* — A, male genitalia; B, claspette; *Aedes* (*Stg*.) *mascarensis* — C, male genitalia.

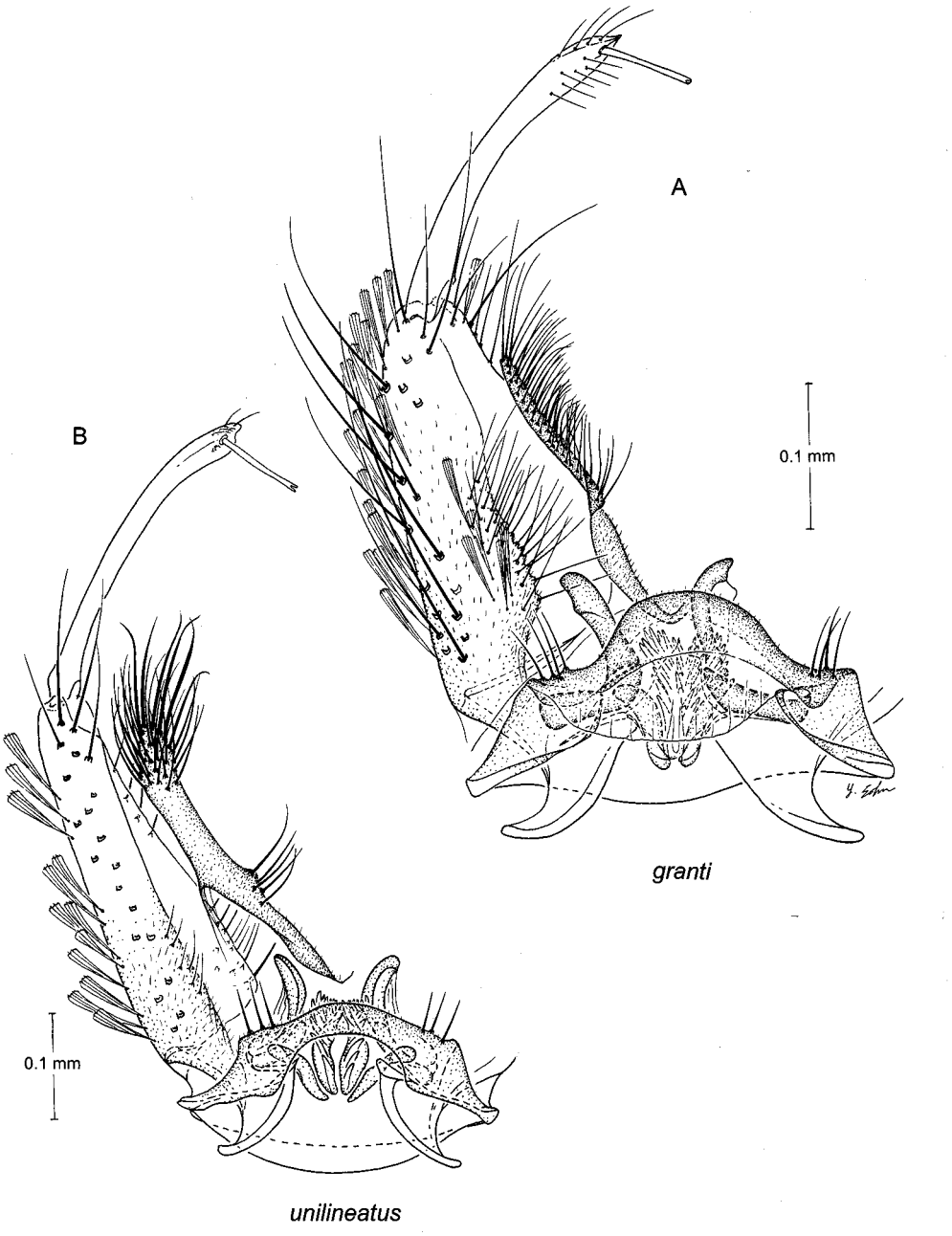


FIGURE 49.*Aedes*(*Stg*.)*granti*—A,malegenitalia;*Aedes*(*Stg*.)*unilineatus*—B,malegenitalia.

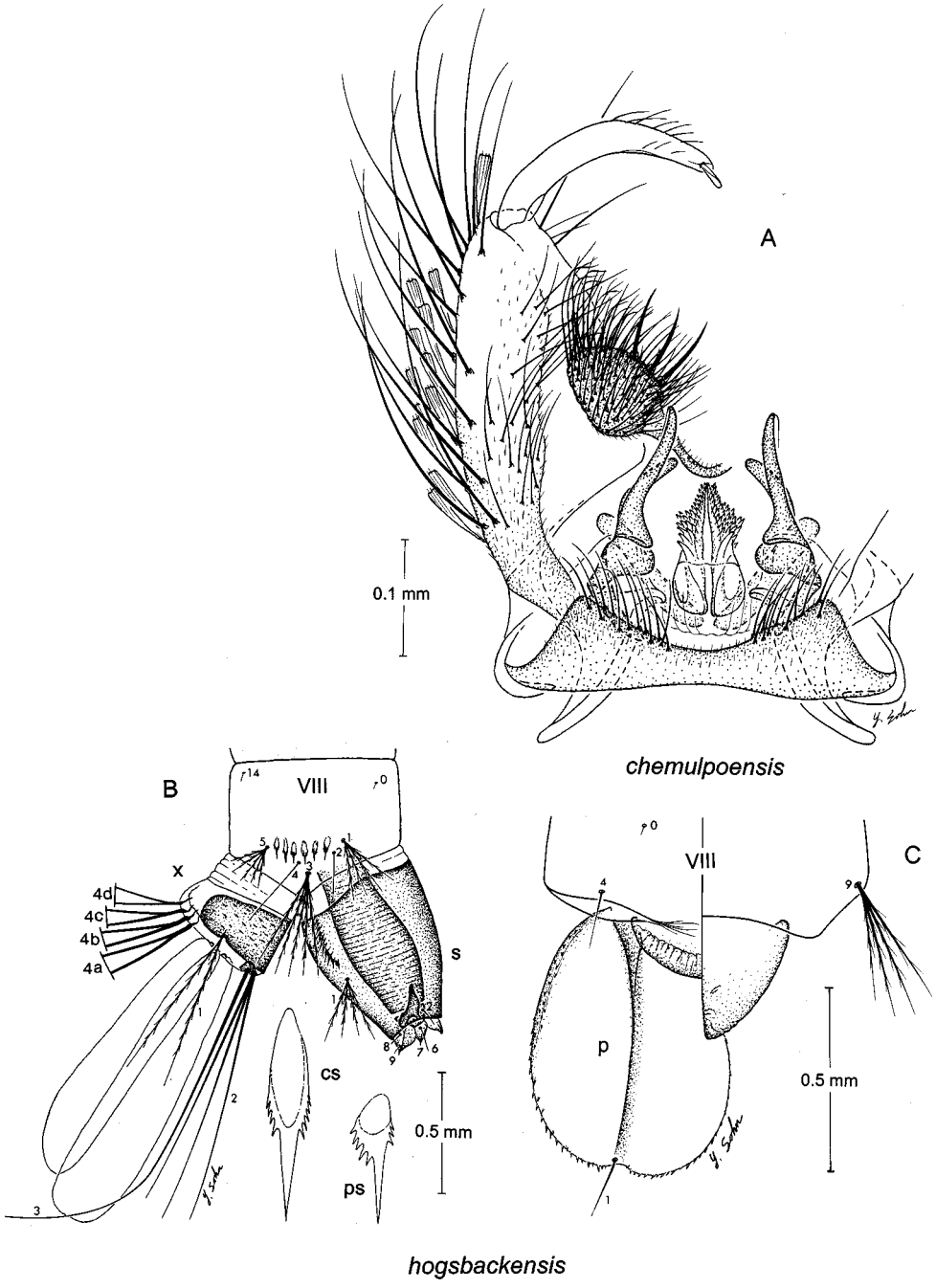


FIGURE 50. *Aedes* (*Stg*.) *chemulpoensis* — A, male genitalia. *Aedes (Stg*.) *hogsbackensis* — B, larva; C, pupa.

Map 1

APPENDIX I. Present status of the species of *Aedes* (*Stegomyia*) in the Afrotropical Region.

SPECIES	STAGES					BIONOMICS
	A		P	L	E	
	M	F				
aegypti group						
aegypti aegypti	X*	X*	X*	X*	X*	Immature habitats known, female bites man
ssp. *formosus*	—	X	—	—	—	Immature habitats known, female bites man
mascarensis[1]	X*	X*	—	X*	—	Immature habitats known, female bites man
africanus group						
africanus	X*	X*	X*	X*	X*	Immature habitats known, female bites man
corneti	X*	X*	X*	X*	—	Immature habitats known, female unknown
luteocephalus	X*	X*	X*	X*	—	Immature habitats known, female bites man
maxgermaini	—	X*	—	—	—	Immature habitats unknown, female bites man
neoafricanus	X*	X*	—	X*	—	Immature habitats known, female bites man
opok	X*	X*	—	—	—	Immature habitats known, female bites man
pseudoafricanus	X*	X*	X*	X*	—	Immature habitats known, female bites man
ruwenzori	X*	X*	X	X*	—	Immature habitats unknown, female bites man
apicoargenteus group						
apicoargenteus	X*	X*	—	X*	—	Immature habitats known, female bites man
blacklocki	X*	X*	—	—	—	Immature habitats known, female unknown
denderensis	X*	X*	—	X	—	Immature habitats known, female bites man
ealaensis	X*	X*	—	—	—	Immature habitats unknown, female bites man
fraseri	X*	X*	—	X*	—	Immature habitats known, female bites man
schwetzi	X*	X*	—	X	—	Immature habitats known, female bites man
soleatus	X*	X*	X	X*	—	Immature habitats known, female bites man
dendrophilus group						
amaltheus	X*	X*	X*	X*	—	Immature habitats known, female bites man
bambusae	X*	X*	X	X	—	Immature habitats known, female bites man
deboeri	X*	X*	X*	X*	—	Immature habitats known, female bites man
demeilloni	X*	X*	X*	X*	—	Immature habitats known, female bites man
dendrophilus	X*	X*	X*	X*	—	Immature habitats known, female bites man
hansfordi	X*	X*	X*	X*	—	Immature habitats known, female bites man
heischi	X*	X*	X*	X*	—	Immature habitats known, female unknown
keniensis	X*	X*	—	X*	—	Immature habitats known, female bites man
kenyae	X*	X*	—	X	—	Immature habitats known, female bites man
masseyi	X*	X*	—	?X*	—	Immature habitats known, female bites man
mattinglyorum	X*	X*	X*	X*	—	Immature habitats known, female bites man
muroafcete	—	X*	—	—	—	Immature habitats unknown, female unknown
njombiensis	—	X*	—	—	—	Immature habitats unknown, female unknown
segermanae	X*	X*	—	—	—	Immature habitats known, female bites man
metallicus group						
metallicus	X*	X*	X	X*	—	Immature habitats known, female bites man

APPENDIX I (continued).

SPECIES	STAGES					BIONOMICS
	A		P	L	E	
	M	F				
poweri group						
angustus	X*	X*	—	X*	—	Immature habitats known, female bites man
calceatus	X*	X*	—	X*	—	Immature habitats known, female unknown
chaussieri	—	X*	—	—	—	Immature habitats unknown, female bites man
contiguus	X*	X*	—	X*	—	Immature habitats known, female bites man
ethiopiensis	X*	—	—	—	—	Immature habitats unknown, female unknown
hogsbackensis	X*	X*	X*	X*	—	Immature habitats known, female bites man
langata	X*	X*	X	X*	—	Immature habitats known, female bites man
ledgeri	X*	X*	X*	X*	—	Immature habitats known, female bites man
mpusiensis	X*	—	—	—	—	Immature habitats unknown, female unknown
poweri	—	X*	—	—	—	Immature habitats known, female unknown
usambara	X*	X*	X*	—	—	Immature habitats known, female bites man
pseudonigeria group						
mickevichae	—	X*	—	—	—	Immature habitats unknown, female bites man
pseudonigeria	—	X*	—	—	—	Immature habitats unknown, female bites man
saimedres	—	X*	—	—	—	Immature habitats unknown, female bites man
chemulpoensis[2]	X*	X*	X*	X*	X*	Immature habitats known, female unknown
simpsoni group						
bromeliae	X*	X*	—	—	—	Immature habitats known, female bites man
gandaensis	—	X*	—	—	—	Immature habitats unknown, female bites man
josiahae	X*	X*	—	—	—	Immature habitats unknown, female unknown
kivuensis	—	X*	—	—	—	Immature habitats unknown, female unknown
lilii	X*	X*	—	—	—	Immature habitats known, female unknown
sampi	—	X*	—	—	—	Immature habitats unknown, female unknown
simpsoni	X*	X*	—	X*	—	Immature habitats known, female bites man
strelitziae	X*	X*	X	X*	—	Immature habitats known, female bites man
subargenteus	X*	X*	X	X*	—	Immature habitats known, female bites man
woodi	X*	X*	X*	X*	X*	Immature habitats unknown, female bites man
granti group						
granti	X*	X*	—	X*	—	Immature habitats known, female bites man
scutellaris group						
albopictus subgroup						
albopictus	X*	X*	X*	X*	X*	Immature habitats known, female bites man
unilineatus group						
unilineatus	X*	X*	X*	X*	—	Immature habitats known, female bites man

X* = Stage or sex described and illustrated.
— = Stage or sex unknown.
X = Stage or sex described.
? = Stage is not known with certainty.

1= Malagasy species (Mauritius).
2= Palearctic species (Korea).

LIST OF COUNTRY ABBREVIATIONS

ANG	=	ANGOLA
BEN	=	BENIN (Dahomey)
BOT	=	BOTSWANA (Bechuanaland)
BUR	=	BURKINA FASO (Upper Volta, Haute-Volta)
CAM	=	CAMEROON (Cameroun)
CEN	=	CENTRAL AFRICAN REPUBLIC
COM	=	COMORES IS.
CON	=	CONGO
DRC	=	DEMOCRATIC REPUBLIC OF THE CONGO (Zaire)
EQU	=	EQUATORIAL GUINEA (Fernando Po)
ETH	=	ETHIOPIA
GAB	=	GABON
GHA	=	GHANA (Gold Coast)
GUI	=	GUINEA
IVO	=	COTE D' IVOIRE (Ivory Coast)
KEN	=	KENYA
LIB	=	LIBERIA
MAA	=	MALAWI (Nyasaland)
MAL	=	MALI
MOZ	=	MOZAMBIQUE
NAM	=	NAMIBIA (South West Africa)
NIG	=	NIGERIA
SEN	=	SENEGAL
SIE	=	SIERRA LEONE
SOC	=	SOCOTRA (Sokotra)
SOU	=	SOUTH AFRICA
SUD	=	SUDAN
SWA	=	SWAZILAND
TAN	=	TANZANIA (Tanganyika)
UGA	=	UGANDA
ZAM	=	ZAMBIA (N. Rhodesia)
ZIM	=	ZIMBABWE(S. Rhodesia)

APPENDIX II. Distribution list of the species of *Aedes* (*Stegomyia*) in the Afrotropical Region.

	AFROTROPICAL REGION							
SPECIES	ANG	BEN	BOT	BUR	CAM	CEN	COM	CON
aegypti aegypti	*		*		X			
ssp. *formosus*	*							
africanus	X			X	X	X		
corneti					X			
luteocephalus	*			X		X		
maxgermaini					X			
neoafricanus								
opok				*		X		
pseudoafricanus								
ruwenzori								
apicoargenteus	*			X	X			
blacklocki					X			
denderensis				X	X	X		X
ealaensis								
fraseri					X			
schwetzi	*							
soleatus	?							
amaltheus			*					
bambusae								
deboeri								
demeilloni								
dendrophilus	?							
hansfordi				X	X	X		
heischi								
keniensis								
kenyae								
masseyi								
mattinglyorum								
muroafcete								
njombiensis								
segermanae								
metallicus	*		*	X				
angustus	?							
calceatus	*							
chaussieri								
contiguus								
ethiopiensis								
hogsbackensis								
langata								
ledgeri			X					
mpusiensis								
poweri								
usambara								
mickevichae								
pseudonigeria	X		*					
saimedres			X					
bromeliae	X	X		X	X	X	X	X
gandaensis								
josiahae								
kivuensis								
lilii								
sampi								
simpsoni								
strelitziae								
subargenteus								
woodi								
granti								
albopictus					*			
unilineatus	*			X		X		

APPENDIX II. (continued)

SPECIES	AFROTROPICAL REGION							
	DRC	EQU	ETH	GAB	GHA	GUI	IVO	KEN
aegypti aegypti	X		X		X		X	X
ssp. *formosus*				*			X	X
africanus	X		X	*		X	X	X
corneti							X	
luteocephalus	X		X		X	X	X	
maxgermaini								
neoafricanus								
opok							*	
pseudoafricanus	X						X	
ruwenzori								
apicoargenteus	X				X		X	X
blacklocki								
denderensis	X				X		X	X
ealaensis	X							
fraseri					X		X	X
schwetzi	X							
soleatus								X
amaltheus								
bambusae	X							
deboeri								X
demeilloni								
dendrophilus	?	*			X		X	
hansfordi							X	X[n]
heischi								X
keniensis								X
kenyae								X
masseyi	X							
mattinglyorum					X		X	
muroafcete	X							
njombiensis								X
segermanae								
metallicus					X			X
angustus								
calceatus								X
chaussieri	X							
contiguus			X					
ethiopiensis			X					
hogsbackensis								
langata								X
ledgeri								X
mpusiensis	X							
poweri								
usambara							*	
mickevichae								X
pseudonigeria								
saimedres								
bromeliae	X		X		X	X	X	X
gandaensis								X
josiahae								
kivuensis	X							
lilii			X				X	
sampi								X
simpsoni								
strelitziae								
subargenteus								X
woodi								X
granti								
albopictus								
unilineatus				*	X		X	

APPENDIX II. (continued)

SPECIES	AFROTROPICAL REGION							
	LIB	MAA	MAL	MOZ	NAM	NIG	SEN	SIE
aegypti aegypti					*	X	X	X
ssp. *formosus*						X		X
africanus	X					X	X	X
corneti								X
luteocephalus						X	X	X
maxgermaini								
neoafricanus							X	
opok			*					
pseudoafricanus						X		X
ruwenzori								
apicoargenteus	X						X	X
blacklocki						X		X
denderensis	X					X	X	X
ealaensis								
fraseri						X		X
schwetzi								
soleatus								
amaltheus								
bambusae								
deboeri								
demeilloni								
dendrophilus								
hansfordi							X	
heischi				*				
keniensis								
kenyae								
masseyi								
mattinglyorum						X		X
muroafcete								
njombiensis								
segermanae								
metallicus					*	X	X	
angustus								
calceatus				*				
chaussieri								
contiguus								
ethiopiensis								
hogsbackensis								
langata								
ledgeri								
mpusiensis								
poweri								
usambara								
mickevichae								
pseudonigeria								
saimedres					X			
bromeliae	X	X				X	X	X
gandaensis								
josiahae								
kivuensis								
lilii	X					X	X	X
sampi								
simpsoni								
strelitziae								
subargenteus		X		X				
woodi		X		X				
granti								
albopictus						X		
unilineatus		X				X	X	

APPENDIX II. (continued)

SPECIES	AFROTROPICAL REGION							
	SOC	SOU	SUD	SWA	TAN	UGA	ZAM	ZIM
aegypti aegypti		X	X		X		X	
ssp. *formosus*		X						
africanus						X		
corneti								
luteocephalus			X		X		X	X
maxgermaini								
neoafricanus								
opok						X		
pseudoafricanus								
ruwenzori						X		
apicoargenteus			X			X		
blacklocki								
denderensis						X		
ealaensis								
fraseri						X		
schwetzi								
soleatus		X			X			X
amaltheus							X	X
bambusae						X		
deboeri								
demeilloni		X						
dendrophilus								
hansfordi		X			X	X		
heischi		X			X			
keniensis								
kenyae								
masseyi					X		X	
mattinglyorum								
muroafcete								
njombiensis					X			
segermanae		X						
metallicus		X	X		X			X
angustus						X		
calceatus					X			X
chaussieri							X	
contiguus		X			X[n]			X
ethiopiensis								
hogsbackensis		X						
langata								
ledgeri		X			X		X	
mpusiensis								
poweri		X						
usambara					X			
mickevichae								
pseudonigeria								
saimedres								
bromeliae		X	X		X	X		X
gandaensis								
josiahae					X			
kivuensis								
lilii			X			X		
sampi								
simpsoni		X		X				
strelitziae		X		X				
subargenteus		X						
woodi		X			X			
granti	X							
albopictus		*						
unilineatus		X	X				X	

X = Areas from which specimens were examined.
* = Record from literatus.
? = Doubtful Record.
X^n = New Record.
ANG:Ribeiro and Ramos (1973).
BOT:de Meillon (1947); Muspratt (1956).
BUR:Germain et al. 1975.
CAM:Fontenille and Toto (2001).
DRC:Mattingly and Lips (1953).
EQU:Mattingly (1952).
GAB:Service (1976).
IVO: Germain et al. 1975; Mondet and Montange (1993).
MAL:Germain et al. 1975.
MOZ:Worth and de Meillon (1960).
NAM:Mattingly (1952); Muspratt (1956).
SOU:Cornel and Hunt (1991).

INDEX

Names of valid taxa are set in roman type; synonyms are in italicized type. Numbers refer to the text references; the suffix "k" indicates mention in a key and the suffix "t" indicates mention in a table. Numbers in parentheses refer to the figures.

About the author

Yiau-Min Huang is a research associate/research entomologist at the Department of Entomology, Smithsonian Institution, Washington, D.C. She received her bachelor of science degree in Entomo-phytopathology from Taiwan Provincial Chung-Hsing University, Taichung, Taiwan, Republic of China, and her M.Sc. and Ph.D. degrees in Entomology at the University of Wisconsin, Madison, Wisconsin, U.S.A. She served as an entomologist at B.P. Bishop Museum, Honolulu, Hawaii, taxonomist and research entomologist in the Southeast Asia Mosquito Project, Medical Entomology Project and Systematics of *Aedes* Mosquitoes Project at the Department of Entomology, Smithsonian Institution, and research associate/ research entomologist at the Department of Entomology and Department of Systematic Biology, Entomology Section, Smithsonian Institution. She also served as a consultant of the World Health Organization on the filariasis vectors of the South Pacific and yellow fever vectors in Africa while working for the Southeast Asia Mosquito Project and Medical Entomology Project. She has published a number of scientific papers and monographs, primarily on mosquito biosystematics. She identified the specimens of *Aedes albopictus* (Skuse), the Asian Tiger Mosquito, from Harris County, Texas which is the first record of breeding populations established in the continental United States. She also has published diagnostic morphological characters to easily identify this species. She received the John N. Belkin Memorial Award in 1999, given by the American Mosquito Control Association (AMCA).

