A New *Aedes* (*Finlaya*) of the Niveus-Subgroup

(Diptera: Culicidae)

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ABSTRACT. Both adult sexes, the pupa and the fourth stage larva of *Aedes* (*Finlaya*) *mikrokopion* n.sp. from Malaysia and Thailand are described. The relationship of the new species to other members of the niveus-subgroup is discussed.

INTRODUCTION. While studying specimens of the *Aedes* (*Finlaya*) niveus-subgroup housed in the National Museum of Natural History (NMNH), numerous individuals of this unique species were found among collections made between 1958 and 1976 in Malaysia and Thailand. The earliest specimens found were collected by Dr. William W. Macdonald, then of the Institute for Medical Research, Kuala Lumpur, Malaysia (IMR), during his extensive studies of Malaysian forest mosquitoes in the late fifties. Subsequently, specimens were collected on a number of occasions (1966-68) by Dr. Shivaji Ramalingam, Faculty of Medicine, Department of Parasitology, University of Malaya, Kuala Lumpur, and his team of assistants. All of these specimens had previously been identified as other species of the niveus-subgroup. These misidentifications are easy to understand since positive identification of this species could at that time be made only from the male genitalia and the pupa, and neither of these are routinely examined in sorting heterogeneous field collections.

The earliest Thai specimens of this species in the NMNH were collected in 1964 by U.S. Army Medical Component personnel from the SEATO Medical Research Laboratory (SMRL), Bangkok, Thailand. Subsequently, the extensive study by Dr. Douglas J. Gould, then Chief, Department of Entomology, SMRL, of an endemic filarial disease focus in the vicinity of Ban Nithae, Kanchanaburi, Thailand, disclosed the presence of two new species of the niveus-subgroup. It should be noted that the uniqueness of the Thai specimens was recognized early by SMRL technician Mrs. Rampa Rattanarithikul. One of these species (the team's Sp. 2), determined to be a vector of *Wuchereria bancrofti* (Cobbold) (Gould et al. 1982), was described by Knight (1978) as *Aedes (Finlaya) harinasutai*. The second one, their Sp. 1, is described here.

METHODS. Measurements used for the many ratios given, represent 5-10 examples from an equal number of collections, and include the range and mean (the latter being enclosed in parentheses). The same is true of the few actual measurements given. Setal counts are based on 10 or more examples, and include the range and mode (in parentheses). Abbreviations for generic and subgeneric names are from Reinert (1975).

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ANATOMICAL TERMINOLOGY. The anatomical terminology used in this paper follows Harbach and Knight (1980, 1981). Exceptions and additions to that terminology are noted below.

The detection of previously unnamed species of the niveus-subgroup is usually possible only through examination of male genitalia. At present, most of the male genitalic characters of diagnostic value are found on the gonocoxite, claspette, and aedeagus, and require the dissection of the individual parts of the genitalia.

During the course of an ongoing study of the niveus-subgroup by one of us (KLK), it was determined that the mesal setation pattern of the gonocoxite provides a number of previously unused, diagnostically significant characters for this subgroup. To assist the description of differences in this setation pattern, several new terms (italicized in the following discussion) have been created. The applicability, if any, of these terms to the description of the gonocoxite of other *Aedes* species is not presently known. The use of the above gonocoxal setation pattern requires that the gonocoxites be separated and mounted with the mesal surface flatly uppermost.

The gonocoxite in niveus-subgroup species is setose and scaled on the dorsal and lateral surfaces, but somewhat less so on the ventral surface. To date, characters of diagnostic significance have not been found on any of these surfaces.

The mesal surface of the gonocoxite (Fig. 1), which lacks normal body scaling, has a longitudinal medial non-sclerotized strip, the mesal membrane (MM), from near apex to base. This area widens obliquely basad to the ventral surface at the beginning of the *basoventral swelling* (bs) and obliquely or transversely nearly to the dorsal surface at a point near to the area of the *dorsal attachment of the gonocoxite* (dga) to the lateral arm of the basal piece.

The longitudinal sclerotized area dorsal to the mesal membrane is termed the *dorsomesal sclerotized surface* (DSS), and the longitudinal sclerotized surface ventral to the mesal membrane is termed the *ventromesal sclerotized surface* (VSS) The margins of these two sclerotized surfaces at the mesal membrane (sometimes indistinct along a portion of their lengths)are referred to respectively as the *dorsomesal sclerotized margin* (Dsm) and the *ventromesal sclerotized margin* (Vsm).

Based entirely on the orientation of the setae present, the dorsomesal sclerotized surface is considered to be longitudinally divided into two areas, referred to respectively as the *upper dorsomesal area* (uda) and the *lower dorsomesal area* (lda). There is no structural detail, other than setal orientation, marking the joint border of these two areas. At least some setae are present along the entire length of each of them.

The setae occurring on the upper dorsomesal area are termed the *upper dorsomesal setae* (uds) and appear, at least dorsomarginally, to be a continuation of setae from the dorsal aspect of the gonocoxite. These setae usually increase in length and number from apex to base of the gonocoxite and can be recognized because they are directed dorsally and/or distally, in contrast to the setae of the lower dorsomesal area which are oriented mesally and/or ventrally. The upper dorsomesal setae along about the basal third of the upper dorsomesal area may be clumped in contrast to those distad of this region. In

such case, these setae are termed the *upper dorsomesal setal cluster* (udsc). In some species of the niveus-subgroup, a few or all of the setae of this cluster may be broadened, elongated and striated (scale-like).

The setae of the lower dorsomesal area are termed the *lower dorsomesal setae* (lds) and are of diagnostic importance because of differences in number, distribution and development. In some species, the lower dorsomesal setae are basally clustered in what is termed the *lower dorsomesal setal cluster* (ldsc). The upper and lower dorsomesal setae are confluent distally in all species seen, but may or may not be confluent medially and/or basally, depending on the species.

The partially separated, transverse or obliquely-transverse basal portion of the dorsomesal sclerotized margin, the basal portion of the lower dorsomesal area, has traditionally been termed the *basal ridge* (br). This term is somewhat inappropriate since the area is not a ridge in the true sense of the word. However, in deference to its rather consistent use for species of the niveus-subgroup, its use is continued here. The shape and setation of the basal ridge are specifically diagnostic within the niveus-subgroup.

The basal ridge is usually ventrally separated, to a degree dependent on the species, from the remainder of the dorsomesal sclerotized surface and may be somewhat lobate in appearance. The often apparent pigmentation of at least the more ventral portion of the basal ridge is apparently due to the underlying *basal ridge apodeme* (brap). This apodeme may or may not be fully visible depending on its orientation in any particular slide mount; often only its narrow dorsal margin shows as a refractile strip. It appears that this apodeme serves as a stabilizer for the ventrobasal corner of the gonocoxite by attaching it to the lateral margin of sternum X.

Setae directly associated with the basal ridge are termed the *basal ridge setae* (brs). These setae may be isolated from others or may be confluent with either the upper and/or lower dorsomesal setae, depending on the species.

Setae on the upper ventromesal area, the *upper ventromesal setae* (uvas), when present, are restricted to the area of the ventromesal sclerotized margin. Characteristic of all described niveus-subgroup species, except the present one, is a dense fan-shaped cluster of modified elongate scales extending along the lower ventromesal area from the apex to shortly basad of the middle of the gonocoxite, the *lower ventromesal scale cluster* (lvsc). Elements of the lower ventromesal scale cluster will appear to arise from the ventral surface of the gonocoxite in some specimens, possibly due to excessive flattening of the mount, or to their actual presence in that position, which has not been determined. In undissected genitalia, the paired ventromesal scale clusters appear to be directed obliquely mesad towards each other.

Another modification of the terminology presented by Harbach and Knight (1980) relates to a scutal setal cluster of the adult. In the niveus-subgroup species, the lateral scutal setae arising anterior to the wing root are of two types, an immediate tight cluster of short peg-like setae (presumably the antealar setae) and next anterior a thin scattering of normal setae along the lateral scutal margin. To facilitate description of these two setal groups, the term "antealar" is being confined in the niveus-subgroup species to the first group of setae. For the more anterior grouping, the term *supraparatergal setae*

(sps) is resurrected for use. This term was devised by Knight (1978, 106) but later synonymized by Harbach and Knight (1980, 2).

Aedes (*Finlaya*) *mikrokopion* n. sp.

ADULT (Figs. 2 and 3). Characters common to the two sexes are described under this heading. *Integument.* Brownish-black to black. *Vestiture.* Body setae brownish, unless indicated otherwise. For number of setae within setal groups, see Table 1. Body scaling narrow on palpi, proboscis, wings, halteres, scutum, and legs (femora, tibiae, and tarsi); broad and recumbent on vertex, gena, antepronotum, scutellum, thoracic pleura, legs (coxa and trochanter), abdomen, and genitalia; black in background color, with areas of white scaling on gena, lower antepronotum, scutum, proepisternum, upper mesokatepisternum, ventroposterior mesokatepisternum, mesepimeron (no prealar scale patch in this species, although specimens 1418.15 and 07039-4 each had 1 white scale on this area), trochanter, coxa, femur, and abdomen (segments I-VIII); presence and extent of pale scaling on vertex, scutum, and scutellum sexually dimorphic; vertex with posterior fringe of dark erect forked scales. *Antenna.* Pedicel bare or with few small hairlike dark scales mesoanteriorly. *Proboscis.* Proboscis/forefemur length ratio 1.29-1.44 (1.36). *Head.* Clypeus bare; eyes contiguous. *Thorax.* Postpronotum bare or with 1-4 small broadened dark scales dorsoposteriorly (one male specimen, 07724-(41)-5, was seen with 2 broad white scales on this area). Scutellum trilobed. *Wing.* No remigial setae, upper calypter with dense fringe of fine elongate hairlike scales, alula with sparse row of short narrow forked scales, vein scaling dark. *Halter.* Integument pale, capitellum dark-scaled. *Legs.* Anterolateral white scaling of forecoxa interrupted subdorsally by few dark scales. Midfemur/forefemur length ratio 1.00-1.13 (1.05). Forefemur posteriorly with extensive pale scaling on basal 0.60 except along ventroposterior margin; midfemur posteriorly with ventral white scaling from or near base to beyond middle or even to apex, this marking broadest from basally or subbasally to middle and narrowing distally from thereafter; hindfemur with distal black scaling complete ventrally, dorsally the ratio of the length of this black area to the length of the femur is 0.28-0.38 (0.34) and anteriorly it is 0.23-32 (0.27). *Abdomen.* Tergum I with broad transverse band of white scales along lateral margin; terga II-VII each with prominent basolateral white-scaled area, these areas extended to form medially-interrupted or complete basal or subbasal white bands on terga III-VIII; sterna II-VII each with prominent basal white band; scaling recumbent and normal in length and shape.

MALE. *Antenna.* Flagellar whorls each with many setae (20 plus or minus). *Maxillary Palpus.* Apex of palpomere III and all of IV and V ventrolaterally sparsely setose, V with several distal setae, combined length of IV and V 0.22-0.26 (0.24) length of entire palpus;palpus/proboscis length ratio 0.79-0.86 (0.83). *Proboscis.* Proboscis/forefemur length ratio 1.31-1.44 (1.37). *Head.* Vertex scaling, including erect forked scales, off-white, sometimes with a yellowish tint. *Scutum.* Pale-scaled, with a paired area of dark scales of variable extent posterolaterally (posterior dorsocentral position) above and just anterior to level of wing bases, scutal pale scaling anterior to level of wing bases silvery-white, pale scaling posterior to this level usually appearing off-white or yellowish in tint; prescutellar area usually bordered with pale scales,this pale scaling continuous with silvery-white anterior scutal scaling (except in 0641/2); color pattern of lateral scaling

between prescutellar pale scaling and lateral scutal margin variably dark or light and in extent (specimen 07039.5 without pale scales lateral to prescutellar area). *Scutellum.* Scaling off-white, occasionally scaling of median lobe with darkish suffusion. *Pleuron.* Setae of upper proepisternum, median mesokatepisternum and upper midcoxa usually white. *Legs.* Midfemur/forefemur length ratio 1.00-1.10 (1.05). Fore and midungues unequal, smaller unguis with subbasal tooth, larger unguis bidentate; hindungues equal, simple. *Abdomen.* Terga VI-VIII each with complete dorsal white band, V usually completely banded (except in specimens 06892-6, 07039-100, 07039-102, 07724-(41)-15 and 21), IV sometimes completely banded, III even less often, on some segments the band may be removed from base of segment by one or two rows of dark scales. *Genitalia* (Fig. 4). Segment VIII: Distal tergal margin medially emarginate, with triangular median patch of short spike-like setae present in that area; distal tergal area with 27-44 (32) setae, distal sternal area with 12-17 (15,16) setae; tergal and sternal scales elongate, paddle-shaped, recumbent, alveoli normal. Segment IX: Tergal lobes each bearing 2-5 (3) setae; sternum with 2-3 (2) setae. Gonostylus: Claw/stem length ratio 0.52-0.58 (0.54). Gonocoxite (mesal aspect): Length/width ratio 1.88-2.20 (2.04). Upper dorsomesal setae relatively sparse, short, increasing in length and number from apex to base of gonocoxite, more basal setae not forming a prominent upper dorsomesal setal cluster (as in some niveus-group species), nor are any included setae broadened and striated. Lower dorsomesal setae sparsely confluent distally with upper dorsomesal setae, narrowly discontinuous basally, the lower dorsomesal setae medially few, aligned sporatically along the dorsomesal sclerotized margin, 1-2 setae of distal subgrouping elongate. Mesal membrane sometimes bearing 1-2 setae basally. Basal ridge, when gonocoxite is oriented with mesal surface fully uppermost, can be seen to be fully detached from the lower dorsomesal area (often in slide mounts the gonocoxite lies at a slight angle, with dorsal margin higher than ventral margin and in such cases the basal ridge may appear to be attached to the lower dorsomesal area, as in Fig.4); basal ridge obliquely elongate, bearing one seta at its apex and a preceding irregular line of 3-9 (4) setae that is continuous dorsally with dense cluster of elongated setae, altogether about 18-30 (24,25) setae on basal ridge, proceeding dorsad these setae are progressively longer. Basal ridge apodeme: Normally appearing only as a shadow internal to basal ridge, in specimens where basal ridge is more laterally exposed, it is seen to be short and broad (in Fig. 4 the basal ridge apodeme is obscured by the basal ridge and does not show). Upper ventromesal area with sparse setae of varying lengths, ventromesal scale cluster totally absent. Claspette: Filament/stem ratio 0.72-98 (0.82); filament slightly expanded and somewhat angularly bent medially, evenly pigmented, apex may be downcurved slightly; stem curvature occurring at distal 0.69-0.80 (0.75) of stem's length; stem with one of its 3 normal setae sometimes absent. Aedeagus: Tergomedial concavity large, an aedeagal spicule on each side, this spicule sometimes with 1-2 subdivisions. Paraproct: Apex may be undivided or with 1-2 subdivisions. Paramere and basal piece as figured.

FEMALE (Figs. 2 and 3). *Maxillary Palpus.* Palpomeres not distinctive; palpus/proboscis length ratio 0.12-0.16 (0.15). *Antenna.* Flagellar whorls each with 4-6 short setae; antenna/proboscis length ratio 0.68-0.79 (0.76). *Head.* Dorsal scaling black, small anteromedial silvery white area, this area continuing laterally along ocular margin; lateral scaling pale-brassy, encroaching onto dorsal surface at each side for 0.06-0.19 (0.12) of total width of dorsal surface, lateral pale-scaled area without anterior cluster of dark scales (as occurs in many of the niveus-subgroup species); erect forked scales dark. *Scutum.* Approximately anterior 0.5 white-scaled, remainder black-scaled, black scaling

extending forward as median (usually anteriorly tapered) longitudinal band into white scaling for 0.73-0.95 (0.81) length of white-scaled area, lateral margin of white scaling withdrawn from lateral scutal margin posteriorly from about level of midregion of paratergite (in 3 specimens extending over most of level of paratergite). *Scutellum.* Black-scaled. *Legs.* Forecoxa white-scaled in Malaysian specimens (in 1013.15, from Perlis, this coxa is black-scaled with some white scales above) and black-scaled in the Thai specimens, midfemur/forefemur length ratio 1.00-1.13 (1.06); ungues equal, unidentate on fore and midlegs, simple on hindlegs. *Abdomen.* Terga VI-VIII nearly always with basal white bands, sometimes also V.

PUPA (Fig. 5). Chaetotaxy as figured and recorded (Table 2). *Cephalothorax.* Pigmentation in slide-mounted specimens light, shading medially on postscutal area and mesothoracic wing, metathoracic wing and metanotum darkened; seta 1-CT with 3-8 (7) branches, 4-CT with 3-13 (11), 5-CT with 2-5 (4), 7-CT with 3-6 (4), 8-CT with 2-7 (3), 9-CT with 2,3 (2), 10-CT with 2-7 (4), 12-CT with 3-7 (3); seta 5-CT/1-CT length ratio 1.43-1.81 (1.69) (specimen 396-12 exceptional in having 2.50 ratio). *Trumpet.* Strongly pigmented except for extreme base and distal 0.33; index (length/width at widest point) 4.22-5.43 (4.85), meatus/trumpet length ratio 0.85-0.95 (0.90). *Abdomen.* Pigmentation pale except for ventral darkened anteromedial block-like area on segment III; seta 6-I with 1-3 (1) branches, 7-I with 2-4 (3), 1-II with 2-9 (5), 1-III with 2-8 (5), 5-III with 2-5 (3), 6-III with 2,3 (2); 1-IV with 3-11 (7), 5-IV with 1,2 (1), 6-IV with 2,3 (2); 1-V with 1-4 (4), 5-V with 1,2 (1), 6-V with 1-3 (2); 1-VII with 1,2 (1), 5-VII with 1, 6-VII with 2-4 (4), 9-VII with 4-7 (6); 4-VIII with 1,2 (2), 9-VIII with 9-14 (10); seta 5-VI/5-V length ratio 0.20-0.64 (0.34). *Paddle.* Seta 1-P with 7-17 (12) branches; paddle length/width ratio 1.01-1.48 (1.25), paddle/1-P length ratio 0.44-0.58 (0.52), paddle length 210-310 (263.0) microns.

LARVA (Fig. 6). Chaetotaxy as figured and recorded (Table 3). *Antenna.* Spiculation sparse and slender, basal spicules neither elongate nor flexibly filamentous (as in some other niveus-subgroup species),length of longest spicule distad of base of seta 1-A is 19.2-26.4 (21.9) microns; seta 1-A with 6-11 (9) branches; ratio of distance of 1-A from antennal base/antennal length 0.44-0.48 (0.47), 2-A/antennal length ratio 0.33-0.41 (0.36). *Cranium.* Seta 1-C single, elongate, slender, 4-C with 11-15 (12) branches, 5-C with 6-10 (6), 6-C with 8-12 (10), 7-C with 8-15 (12), 8-C with 1-3 (2);, 9-C with 1-7 (3), 10-C with 2-4 (3), 12-C with 3-6 (4), 13-C with 1,2 (2), 14-C with 2-5 (3), 15-C with 2-6 (4), 6-Mx with 1-5 (2); seta 6-C inserted anterior to level of insertion of seta 7-C; dorsomentum with 9-11 (10) lateral teeth. *Thorax.* Body integument not spiculate, stellate setae not prominent. *Abdomen* (segments I-VIII). Body integument not spiculate, stellate setae not prominent, seta 6-III/6-II length ratio 2.12-3.25 (2.61). Comb (on VIII): Row of 6-10 (8) sharply pointed spines, length of longest spine 72.0-88.8 (80.7) microns, fringe elements graduated in size and development without distal elements being noticeably more spinose or denticulate than the others, fringe elements arising along spines distad to a point that is 0.46-0.59 (0.52) length of spines. Siphon: Siphon length/basal width ratio 3.00-4.20 (3.63), siphon/saddle length ratio 2.59-2.95 (2.84); siphon acus usually attached, irregularly transverse, sometimes in 2 pieces; degree of siphon taper increasing distally from about level of seta 1-S; integument with short transverse straight or crescentric lines most visible basally, no spiculation visible at 400x; seta 2-S is 31-43 (36.7) microns in length, 6-S is 46-65 (57.1) microns; 8-S is 96-144 (121.0) microns. Pecten: Basal teeth generally less developed than distal teeth, 6-16 (12) in number. *Abdomen* (segment X). Saddle: integument with short transverse or

crescentric lines, these with spiculations visible at 400x; dorsocaudal margin with only sparse grouping of short multifid spicules that ends well dorsad to level of seta 1-X, longest spicule 12-22 (17.1) microns in length; seta 1-X/saddle length ratio 1.44-1.91 (1.69); seta 2-X single in Malaysian specimens, with 1-3 (1) branches in specimens from Thailand; ventral brush (seta 4-X) with 7-8 (8) setae, possessing 2-5 (4) branches per seta.

TYPE DATA. The holotype male, with associated larval and pupal skins mounted on one slide, is located in the National Museum of Natural History. It bears the following label data: "Thailand Kanchana, Sangkhlaburi, 07724 (39) 6, 1976, U.S. Army-SMRL." The allotype female, with associated larval and pupal skins on one slide, is also in the NMNH. It is number 07724 (39) 4 and bears the same data as given above for the holotype. Several inaccuracies occur in the data as transcribed above from the label. It will be seen from the information presented below that the province and district in Thailand from which the type collection came should properly be given as Kanchanaburi and Sangkhla Buri, respectively. The three collection numbers, representing the collection, the mother specimen and the offspring in that order are normally connected with hyphens.

An additional 9 males and 12 females, with their associated larval and pupal skins, from collection number 07724 are designated as paratypes. One male from this paratype series is also accompanied by a dissected genitalia slide mount. One male and one female from the paratype series, along with accompanying slides, will be deposited in the British Museum (Natural History) (BMNH).

The collection (07724), from which all types were selected, was made by personnel from the Department of Entomology, SEATO Medical Research Laboratory (SMRL), Bangkok, Thailand. Sangkhla Buri District is located in the northern half of Kanchanaburi Province, approximately 200 km northwest of Bangkok (Fig. 7) (Gould et al. 1982). The topography is hilly and the land is covered by a mixed tropical deciduous and evergreen forest. Collection 07724 consisted of human-biting females collected in a bamboo grove at a distance of over 1,000 m from homes. Three females from collection 07724, numbers 15, 39 and 41, taken while engorged, were subsequently allowed to oviposit on dampened filter paper and the offspring raised to maturity, with associated larval and pupal skins being retained and slide mounted (see additional data under Distribution). In each case, the female parent was also retained and mounted.

The name for this species was selected in recognition of its unusually small pupal paddles (apparently unique in *Finlaya*), and is from the Greek, a noun in apposition, meaning a "very little oar."

DISTRIBUTION. Based on the collection data listed below, *Ae. mikrokopion* appears to be a species that is clearly associated with stands of large-stem bamboo in evergreen and semi-evergreen rain forests. It is presently known from western Thailand near the Burma border (type locality) and extends southward for nearly the entire length of the Thai-Malay Peninsula (Fig. 7).

In Thailand, 6 separate zoogeographical subregions have been recognized based on orography, precipitation and floral patterns: North, Northeast (Korat Plateau), Central

Valley, Western Mountains, Southeast and South (Peninsular) (Boden Kloss 1915, Lekagul and McNeely 1977). According to this scheme and our collection records, *mikrokopion* occurs in the Western, Central Valley and South (Peninsular) regions of Thailand.

In the vicinity of the Thai-Malaysia border, distinct faunal and floral changes occur which quite accurately delimit the north-south distributions of many mosquito species. More precisely, this has been called the "Kangar-Pattani boundary" which generally marks the northernmost extension of the Malay evergreen rain forest, and the southernmost extension of the semi-evergreen rain forest in Thailand (Whitmore 1984). Because of this boundary most mosquito workers in recent years have depicted the Thai mosquito fauna as quite distinct from that found in Peninsular Malaysia. However, *Ae. mikrokopion* is an obvious exception to this trend, and a plausible explanation for its distribution seems coupled to the distribution of the large-stem bamboos (genera: *Dendrocalamus* and *Gigantochloa*). Species of these bamboos typically are most common in wet forests that have been disturbed (e.g., slash and burn agriculture, logging, fire, storms, etc.). Extensive lumbering is currently removing the last large pockets of the evergreen rain forest in Malaysia and the semi-evergreen rain forest in Thailand. Accordingly, large stands of the above bamboos would be common in these disturbed forest areas if they were not also being harvested by man.

Whitmore (1984) indicated that isolated pockets of the semi-evergreen rain forest in Thailand occurred as far north as the southeastern corner next to Kampuchea, the mountains bordering the Central Valley and possibly up the western side of the Kra Peninsula into Burma. The type locality for *Ae. mikrokopion* is very near the Burma border and has extensive pockets of semi-evergreen rain forests, as well as large stands of large-stem bamboos. The other collection localities for this species in Thailand all possess remnants of semi-evergreen rain forest, or evergreen rain forest in the case of the southern Thai collection in Narathiwat.

In Malaysia primary stands of the lowland evergreen rain forest are almost gone, thus, the large-stem bamboos are common in remote disturbed remnants of this forest and in secondary stands of the forest. *Aedes mikrokopion* should occur in Peninsular Malaysia in pockets of evergreen rain forest down to the tip of the Peninsula, and possibly even in Sumatra, Indonesia. An extension of this distribution concept would also project *mikrokopion* to occur in the evergreen/semi-evergreen rain forests of southern peninsular Burma.

COLLECTION DATA.

Malaysia

#0641. Selangor. Ulu Langat, 10 June 1958, W.W. Macdonald. 1 m*,p,l; 1 f,p,l.

#214. Selangor. Ulu Gombak, 23 1/2 miles from, elev. 2500 ft., 16 Sept. 1966, collectors Ramalingam, James and Sulaiman. 1 m*,p,l. From bamboo stump. With *Cx. (Lop.) ganapathi*, *Or. albipes*, *Tx. (Tox.) metallicus*.

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* Indicates presence of male genitalia slide mount.

#226. Selangor. Ulu Gombak, University Field Station, elev. 500 ft., 19 Sept.1966, Ramalingam and Sulaiman. 1 m*, p,l. From tree stump hole by riverside, 4 ft. up. With *Ae.* (*Stg.*) *albopictus*, *Tp.* (*Trp.*) *aranoides*, *Cx* (*Lop.*) *ganapathi*.

#396. Selangor. Ulu Gombak, University Field Station, elev. 500 ft., 13 Mar. 1967, KRK and Sulaiman. 1 m*,p,l. From several bamboo stumps. With *Or. albipes*, *Tp.* (*Trp.*) *aranoides*, *Tx.* (*Tox.*) *metallicus*, *Tr.* (*Trp.*) *vicinus*, *Ae.* (*Fin.*) *jugraensis*.

#578. Pahang. Sungai Temau, Tahan Mines, elev. 100 ft., 14 Apr.1967, KRK, Sulaiman and James. 1 f,p,l. From several bamboo internodes. With *Tp.* (*Trp.*) *aranoides*, *Tx.* (*Tox.*) *funestus*, *Tx.*(*Tox.*) *quasiferox*.

#785. Selangor-Phg. The Gap, 2 miles east, 13 Sept. 1967, Ramalingam, James and Chia. 1 f,p,l. From fallen dry bamboo stump (2). With *Tx.* (*Tox.*) *metallicus*, *Ar.* sp.

#836. Perak. Chior Big Game Forest Reserve, elev. 250 ft., 22 Oct. 1967, Ramalingam, Chia and S.O. Rain forest. From bamboo stumps. With *Tp.* (*Trp.*) *aranoides*, *Tp.* (*Trp.*) *similis*, *Ur.* (*Pfc.*) *lutescens*, *Ae.* (*Scu.*) *albolineatus*, *Ae.* (*Fin.*) *novoniveus*, *Tx.* (*Tox.*) *metallicus*.

#881. Perak. Chior Big Game Forest Reserve, elev. 300 ft., 26 Oct. 1967, James, Chia and Sulaiman. 1 m*. Rain forest. From bamboo stump. With *Tp.* (*Trp.*) *aranoides*, *Tx.* (*Tox.*) *funestus*, *Tx.* (*Tox.*) *metallicus*, *Ae.* (*Fin.*) *dissimilis*, *Ae.* (*Scu.*) *albolineatus*, *Hz.* (*Hez.*) *metallicus*, *Or. albipes*.

#1013. Perlis. Kg. Wang Kelian, Kaki Bukit, elev. 100 ft., 29 Nov. 1967, James, Chia and Sulaiman. 1 f,p,l. Rain forest. From several green and dry bamboo stumps. With *Tp.* (*Trp.*) *aranoides*, *Ae.* (*Stg.*) *albopictus*, *Ae.* (*Scu.*) *albolineatus*, *Cx.* (*Lop.*) *ganapathi*, *Tx.* (*Tox.*) *funestus*, *Tx.* (*Tox.*) *quasiferox*.

#1354. Pahang. Fraser's Hill, elev. 3530 ft., 13 June 1968, James, Chia and Sulaiman, 1 m, 1 f, 2 p.l. Rain forest. With *Tr.* (*Trp.*) *aranoides*.

#1418. Perak. Chior F. R., elev. 200 ft., 27 June 1968, Ramalingam. 2 m*, 2 f. From bamboo stump in a rain forest.

Thailand

#NV-22. Narathiwat. Trail to Mamong, Wang, 15 Jan. 1964, col.by Sahem. 1 m*, 1 f, 2 p. From bamboo.

#NY-148. Nakhon Nayok. Huai Sai Waterfall, Muang, Nakhon Nayok District, 23 May 1964, Kol and Sumeth. 1 m, 1 genitalia (not dissected), 1 p,l. From tree hole. With *Ar.* (*Lei.*) *flavus*.

#01649. Phangnga. Khao Pak Chaung, elev. 200 ft., 13 Oct. 1966, Peyton. 1 m*. Rain forest. From dead bamboo internodes, on ground. With *Tx.* (*Tox.*) *gravelyi*, *Cx.* (*Lop.*) sp.

#02107. Ranong. Ban Chatri, elev. 120 m., 12 July 1967, Kol. 1 m*, 1 p, 3 whole larvae. Rain forest. From bamboo internode. With *Tp.* (*Trp.*) *aranoides.*

#06892. Kanchanaburi. Ban La Wa, elev. 170 m., 10 July 1967, Kol and team. 2 m*, 2 p.l. Bamboo grove in village. From bamboo stump. With *Tx.* (*Tox.*) *splendens*, *Tp.* (*Trp.*) *aranoides*, *Ur.* sp., *Ae.* (*Fin.*) *albotaeniatus*, *Ar.* sp.

#06907. Kanchanaburi. Ban Nongplang Khung, elev. 250 m., 12 July 1974, Kol and team. 2 m, 1 m*, 2 f, 4 p,l. Bamboo grove. From bamboo internodes. With *Ae.* (*Adm.*) *caecus*, *Ae.* (*Stg.*) *pseudalbopictus*, *Ae.* (*Stg.*) *albopictus*, *Ae.* (*Fin.*) *harveyi*, *Ae.* (*Fin.*) *albotaeniatus*, *Ae.* (*Bot.*) *helenae*, *Cx.* (*Lop.*) *ganapathi.*

#06923. Kanchanaburi. Ban Ku Phadu, elev. 160 m., 16 July 1974, Kol and team. 2 m (1*), 2 p,l. From bamboo cup, in village. With *Cx.* (*Lop.*) *minor*, *Cx.* (*Lop.*) *ganapathi*, *Ae.* (*Stg.*) *albopictus*, *Ar.* sp.

#07039. Kanchanaburi. Ban La Wa, elev. 160 m., 17 Aug. 1974, Kol and team. 4 m (1*), 1 f, 2 p.l., 3 p. From bamboo cup in village bamboo grove. With *Cx.* (*Lop.*) *minor*, *Cx.* (*Lop.*) *ganapathi*, *Ae.* (*Stg.*) *albopictus.*

#07040. Kanchanaburi. Ban La Wa, elev. 160 m., 17 Aug. 1974, Kol and team. 3 f.p.l. From bamboo cup in village bamboo grove. With *Cx.* (*Lop.*) *ganapathi*, *Ae.* (*Stg.*) *pseudalbopictus.*

#07066. Kanchanaburi. Amphoa. Sangkhla Buri, elev. 220 m., 21 Aug. 1974, Kol and team. 1 m*, 1 f, 1 p., 1 p.l. From bamboo stump. Bamboo grove. With *Ae.* (*Fin.*) *albotaeniatus*, *Ar.* (*Arm.*) *subalbatus*, *Tx.* (*Tox.*) *gravelyi*, *Ae.* (*Dic.*) *whartoni.*

#07222. Kanchanaburi. Ban Ku Phadu, Sangkhla Buri, elev. 160 m., 12 Oct. 1974, Kol and team. 2 f, 1 p.l. From bamboo cup. In an orchard-plantation. With *Ae.* (*Stg.*) *albopictus.*

#07223. Kanchanaburi. Ban Ku Phadu, Sangkhla Buri, elev. 160 m., 12 Oct. 1974, Kol and team. 1 f.p.l., 1 p.l. From bamboo cup. In an orchard-plantation. With *Ae.* (*Stg.*) *albopictus*, *Tp.* (*Trp.*) *aranoides*, *Cx.* (*Eum.*) *brevipalpis.*

#07224. Kanchanaburi. Ban Ku Phadu, Sangkhla Buri, 12 Oct. 1974, Kol and team. 1 p.l. (other data missing)

#07724. Kanchanaburi. Ban La Wa, Sangkhla Buri, 9 Sept. 1976, Kol and team. 1 f (#15-mother)(offspring: 2 m, 3 f, 5 p.l.);1 f (#39-mother)(offspring: 4 m, 3 f, 7 p.l.); 1 f (#41-mother) (offspring: 11 m, 8 f, 19 p.l.); 5 whole larvae. Females collected biting man in bamboo grove in deciduous forest, more than 1,000 m. from homes. With *Ae.*(*Fin.*) *harinasutai* and *Ae.*(*Fin.*) *niveoides.*

BIONOMICS. Specimens of *mikrokopion* were found in 10 collections from Malaysia and in 15 collections from Thailand (see collections listed under "Distribution"). Apparently, all but one of the 15 collections for which biological data are available were collected as larvae/pupae. The other was of females collected biting humans in a

bamboo grove. The 16 larval/pupal collections having collection site data were taken from bamboo stumps (9 times), bamboo internodes (1), bamboo cups (4) and tree holes (2). Collections were taken throughout the year and at elevations ranging from 30 to 1,077 m above sea level.

Collections of immatures were rich in associated mosquito species, 20 in all being recorded. To allow for their more abbreviated listing elsewhere under specific collection data, the complete scientific name for each associated species is provided here: *Aedes* (*Stegomyia*) *albopictus* (Skuse), *pseudalbopictus* (Borel); *Aedes*. (*Finlaya*) *jugraensis* (Leicester), *dissimilis* (Leicester), *albotaeniatus* (Leicester), *niveoides* Barraud; *Aedes* (*Diceromyia*) *whartoni* Mattingly; *Aedes* (*Scutomyia*) *albolineatus* (Theobald). *Culex* (*Lophoceraomyia*) *ganapathi* Colless, *minor* (Leicester); *Culex* (*Eumelanomyia*) *brevipalpis* (Giles). *Orthopodomyia albipes* Leicester. *Toxorhynchites* (*Toxorhynchites*) *metallicus* Leicester, *funestus* (Leicester), *quasiferox* (Leicester), *gravelyi* (Edwards). *Tripteroides* (*Rachionotomyia*) *aranoides* (Theobald); *Tripteroides* (*Tripteroides*) *vicinus* (Edwards). *Heizmannia* (*Heizmannia*) *indica* (Theobald). *Armigeres* (*Armigeres*) *albatus* (Coquillett).

In the one biting catch, this species was associated with *Aedes* (*Finlaya*) *harinasutai* Knight, another member of the niveus-subgroup and a species that is positively incriminated as the primary vector of a strain of subperiodic *Wuchereria bancrofti* in western Thailand (Gould et al. 1982). Recently, Khamboonruang et al. (1987) located a second, more northern, focus of this subperiodic strain of *W. bancrofti* in Tak Province of Thailand, and again *Ae. harinasutai* is suspected as the vector.

No evidence exists that *Ae. mikrokopion* is involved in the transmission of pathogens to humans. However, a silent jungle transmission cycle of dengue viruses has been known for years in Malaysia (Knudsen 1977), and niveus-subgroup species have just been confirmed and elucidated as the maintenance vector(s) in this cycle (Rudnick and Lim 1986). Therefore, in view of species in the niveus-subgroup being actively involved in the transmission of filarial parasites and dengue viruses, *Ae. mikrokopion* should be considered a potential vector until proven otherwise.

TAXONOMIC DISCUSSION. *Species Differentiation.* This species differs strikingly from the 25 species previously named in the niveus-subgroup in lacking the characteristic tuft of elongate scales along the length of the lower ventromesal area of the gonocoxite. An additionally striking difference is the shorter egg-shaped paddle (broad end basal) and its large multiply-branched seta (1-P). The larva differs, at least from those of the named niveus-subgroup species occurring in the Thai-Malaysian area, in having seta 6-III approximately twice or more the length of seta 6-II. No differences considered significant were detected between the specimens from Malaysia and those from Thailand .

Using only external characters, the male of this species can be separated from the males of the other species presently known from Malaysia and Thailand by the possession of the following characters, considered successively in the order given: 1) Prealar scale patch absent. 2) Scutellar scaling off-white. 3) Pale scales present around the prescutellar bare space. 4) One or more of abdominal terga II-V with median dorsal basal or subbasal white scaling. 5) Midfemur posteriorly with ventral white scaling beginning basally and extending distad to beyond middle. Also, it presently appears

that the possession of a paired posterior dorsocentral black-scaled scutal area will separate *mikrokopion* males from the other niveus-subgroup species of Malaysia and Thailand.

The female of this species can be separated from the females of the other niveus-subgroup species occurring in Thailand and Malaysia by possession of the following combination of characters, considered successively in the order in which they are given: 1) Prealar scale patch absent (one scale was seen in this location on each of two specimens). 2) Scutal anterior white-scaled area divided posteriorly by a median longitudinal band of black scales for 0.73-0.95 (0.81) of its length. 3) Lateral margin of scutal anterior white-scaled area terminating posteriorly at or beyond level of the paratergite. 4) Lateral white scaling of head without an included area of black scales. 5) Midfemur posteriorly with ventral white area broad basally, narrowing from there to 0.75 or more of femur length.

Variations. Except for the following characters, specimen variations are noted where appropriate within the life-stage descriptions. Setal anomalies for which we have no explanation concerned 07066-3 (female). The pupa of this specimen, reared from a bamboo stump, differed markedly from all the other specimens for which the setae were counted (13 in all) in the branching of certain setae, as follows:

	07066-3	All the Others
2-CT	11/16 branches	3-11 (6,7)
1-II	12/12 branches	2-9 (4,5)
1-III	14/17 branches	2-8 (5)
1-IV	13/16 branches	3-11 (7)
1-V	7/6 branches	1-4 (4)

There is one other reared specimen from that collection, 07066-100 (male), and its setal count is normal in all respects.

In most anatomical details, this species fits well into the niveus-subgroup. However, differing as it does from that subgroup in several significant details, it is possible that additional study of *Finlaya* species may well show it to be worthy of a distinct taxonomic category.

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Table 1. Adult head and thoracic setal groups.

Name of Setal Group	Setal Counts	
	Male	Female
Flagellar whorl setae	20+	4-6 (4)
Labial basal setae	4-10 (6)	5-8 (6,7)
Interocular setae	2	2
Ocular setae	6-8 (8)	2-8 (6)
Antepronotal setae	10-14 (12)	7-8 (13)
Postpronotal setae	3-5(4)	3-8 (5)
Lateral anterior promonotory	none	none
Median anterior promonotory	7-9 (9)	6-13 (8,13)
Anterior scutal fossal setae	2-4 (3)	4-9 (8)
Lateral scutal fossal setae	none	none
Median scutal fossal setae	none	none
Posterior scutal fossal setae	none	none
Acrostichal setae	none	none
Dorsocentral setae	none	none
Prescutellar setae	4-9 (6)	7-11 (8)
Supraparatergal setae	6-7 (6)	6-8 (7)
Antealar setae	14-17 (14,17)	8-17 (10)
Supraalar setae	14-18 (14,16)	not counted
Median scutellar setae	8-12 (12)	8-11 (11)
Lateral scutellar setae	5-9 (8,9)	6-9 (7,8)
Mesopostnotal setae	none	none
Upper proepisternal setae	6-8 (7)	4-6 (6)
Lower proepisternal setae	none	none
Prespiracular setae	none	none
Postspiracular setae	4-6 (4)	4-6 (4)
Prealar setae	7-10 (8)	8-14 (9)
Upper mesokatepisternal setae	2-4 (3)	2-3 (3)
Median mesokatepisternal setae	1 (1)	1-2 (1)
Lower mesokatepisternal setae	2-4 (3)	2-5 (4)
Upper mesepimeral setae	4-7 (6)	6-11 (7)
Lower mesepimeral setae	none	none
Remigial setae	not counted	not counted
Forecoxal setae	11-16 (13,14)	9-13 (11)
Midcoxal setae	9-10 (9)	7-10 (9)
Hindcoxal setae	not counted	not counted

Table 2. Number of branches for setae of the pupa of *Aedes* (*Finlaya*) *mikrokopion*.[a]

Seta Number	Cephalothorax CT	Abdominal Segments I	II	III	IV	V	VI	VII	VIII	IX	Paddle P
0	-	-	1	1	1	1	1	1	1	-	-
1	3-8(7)[b]	TNTC	2-9(5)	2-8(5)	3-11(7)	1-4(4)	1,2(1)	1,2(1)	-	-	7-17(12)
2	3-11(7)	1	1	1	1	1	1	1	-	-	-
3	6-12(10)	2	1-3(2)	1-3(2)	6-11(7)	2,3(2)	1-3(2)	1,2(2)	-	-	-
4	3-13(11)	3-8(6)	3-8(6)	1,2(1)	1-3(1)	4-7(6)	2-4(3)	2	1,2(2)	-	-
5	2-5(4)	2,3(2)	2-5(2)	2-5(3)	1,2(1)	1,2(1)	1	1	-	-	-
6	1,2(1)	1-3(1)	1-3(3)	2,3(2)	2,3(2)	1-3(2)	1-3(2)	2-4(4)	-	-	-
7	3-6(4)	2-4(3)	1-4(2)	2-4(3)	1-3(2)	4,5(5)	1,2(1)	1	-	-	-
8	2-7(3)	-	-	2-7(3)	2-7(4)	4-7(5)	4-7(4)	3-5(3)	-	-	-
9	2,3(2)	1	1	1	1	1	1	4-7(6)	9-14(10)	-	-
10	2-7(4)	-	-	1,2(1)	1-3(1)	1,2(1)	1	1	-	-	-
11	1,2(2)	-	0,1(0)	1	1	1	1	1	-	-	-
12	3-7(3)	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	1	1	1	1	1	1	-	-

[a]Based on counts from at least 10 setae on the holotype and 6 other specimens.
[b]Range (Mode).
TNTC-Too numerous to count.

Table 3. Number of branches for setae of the fourth-instar larva of *Aedes (Finlaya) mikrokopion*.[a]

Seta Number	Head	Thorax			Abdominal Segments								
	C	P	M	T	I	II	III	IV	V	VI	VII	VIII	X
0	-	7-15(9)[b]	-	-	-	1	1	1	1	1	1	1	-
1	1	2,3(3)	1-3(2)	3-5(4)	4-7(6)	1	1	1	1	1	1	1	1,2(2)
2	-	1	1-3(2)	1,2(2)	2,3(2)	1,2(1)	1	1	1	1	1	1	1
3	1	3-6(4)	1	5-9(6)	1,2(2)	1,2(1)	1,2(1)	1,2(1)	1	1	2-4(3)	2-6(4)	1
4	11-15(12)	1,2(2)	1,2(2)	2-4(3)	9-14(11)	6-13(8)	2-4(3)	2-4(3)	5-7(7)	1-3(2)	1-5(1)	1	2-5(4)
5	6-10(6)	1,2(1)	1	1,2(1)	2-4(3)	2-5(3)	2-4(3)	2,3(3)	2-4(2)	1-4(2)	1,2(1)	3,4(4)	-
6	8-12(10)	1	3	1	2,3(3)	2	1	1	1	1	6-13(7)	1a-s,	2,3(2)
7	8-15(12)	3-5(3)	1	5-8(7)	1,2(2)	3-9(7)	5-10(8)	4-11(7)	5-11(7)	2-5(3)	1-3(2)1	2-s,	1
8	1-3(2)	4-9(7)	4-7(5)	6-10(9)	-	2,3(2)	1,2(1)	1	1	2-7(5)	7-10(9)	6-s,	1
9	1-7(3)	1-3(2)	4-9(5)	4,5(5)	1-3(2)	1	1	1	1	1	1	8-s,	2-4(3)
10	2-4(3)	1	1	1	1	1	1	1	1	1	1,2(1)	9-s,	1
11	13-21(18)	2-4(2)	1,2(2)	1,2(1)	3-8(5)	1	1,2(1)	1,2(2)	1,2(2)	1,2(1)	1	-	-
12	3-6(4)	1	1	1	1,2(1)	1,2(2)	1,2(2)	1,2(2)	1,2(1)	1	1	-	-
13	1,2(2)	-	12-24(13)	3-6(5)	3-6(5)	6-12(9)	2-5(2)	2-4(2)	2,3(2)	7-11(7)	3-5(3)	-	-
14	2-5(3)	2-3(2)	4-11(9)	-	-	-	1	1	1	1,2(1)	-	1,2(1)	-
15	2-6(4)	-	-	-	-	-	-	-	-	-	-	-	-
18	1,2(1)	-	-	-	-	-	-	-	-	-	-	-	-

[a]Based on counts from at least 10 setae on the holotype and 8 other specimens.
[b]Range (Mode).

LIST OF FIGURES

FIGURE ABBREVIATIONS

Generalized Gonocoxite (Fig. 1)

br	= Basal ridge
bs	= Basoventral swelling
dga	= Dorsal attachment of gonocoxite
Dsm	= Dorsomesal sclerotized margin
DSS	= Dorsomesal sclerotized surface
Gs	= Gonostylus
lda	= Lower dorsomesal area
lva	= Lower ventromesal area
MM	= Mesal membrane
uda	= Upper dorsomesal area
uva	= Upper ventromesal area
Vsm	= Ventromesal sclerotized margin
VSS	= Ventromesal sclerotized surface

Male Genitalia (Fig. 4)

Ae	= Aedeagus
AeSp	= Aedeagal spicule
Bp	= Basal piece
br	= Basal ridge
bs	= Basoventral swelling
CF	= Claspette filament
CSe	= Cercal setae
CSt	= Claspette stem
dga	= Dorsal attachment of gonocoxite
GC	= Gonostylar claw
Gc	= Gonocoxite
MM	= Mesal membrane
Par	= Paramere
Ppr	= Paraproct
udsc	= Upper dorsomesal setal cluster
VIII-T	= Tergum 8
VIII-S	= Sternum 8
IX-T	= Tergum 9

Pupa (Fig. 5)

CT	= Cephalothorax
GL	= Genital lobe
P	= Paddle
Tr	= Trumpet
I-IX	= Abdominal segments 1 - 9

Larva (Fig. 6)

A	= Antenna
C	= Cranium
CS	= Comb scale
Dm	= Dorsomentum
M	= Mesothorax
P	= Prothorax
PS	= Pecten spine
S	= Siphon
T	= Metathorax
I-VIII, X	= Abdominal segments 1 - 8, 10

Mesal Aspect of Gonocoxite
(diagrammatic)

Fig. 1

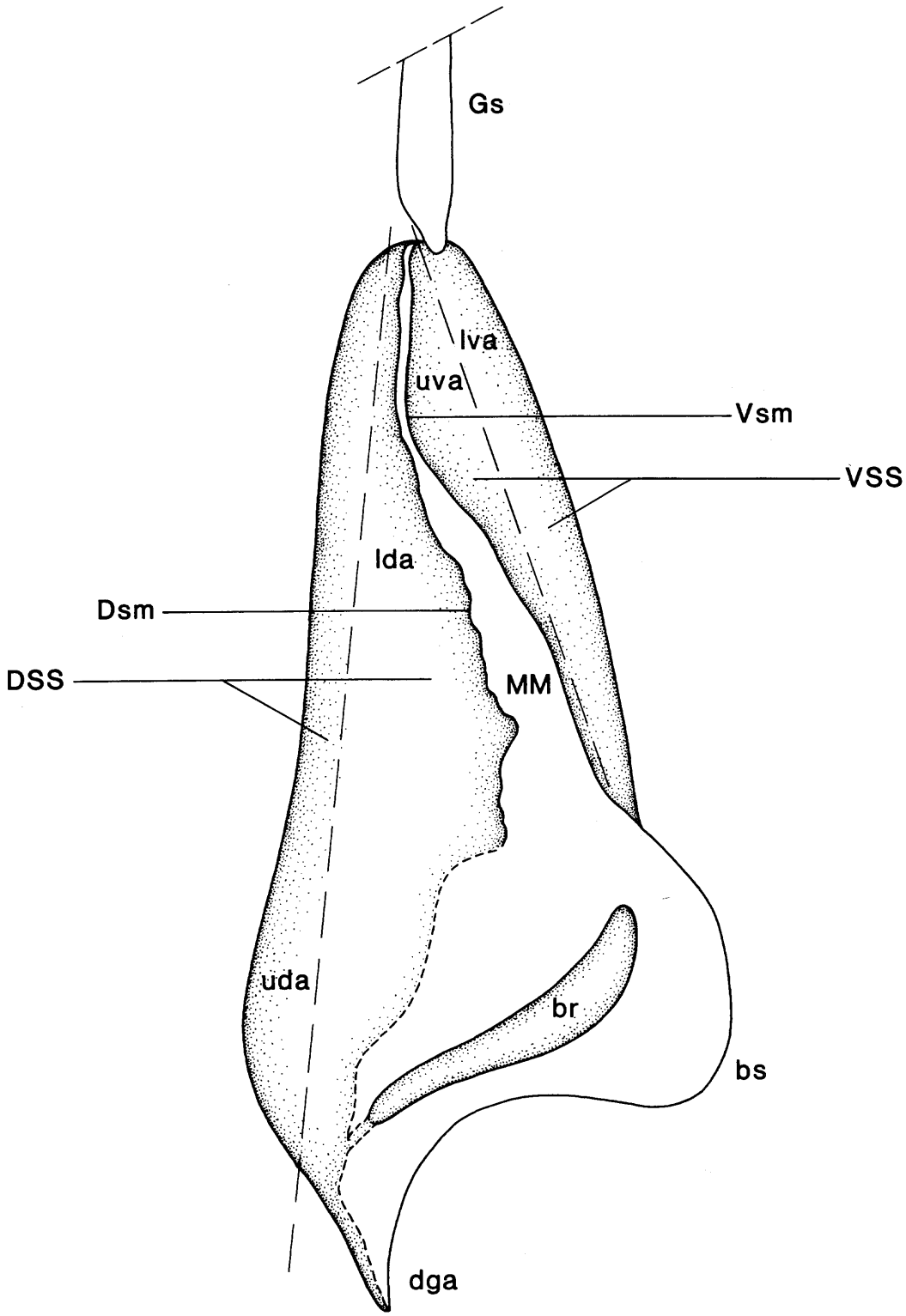


Fig.2

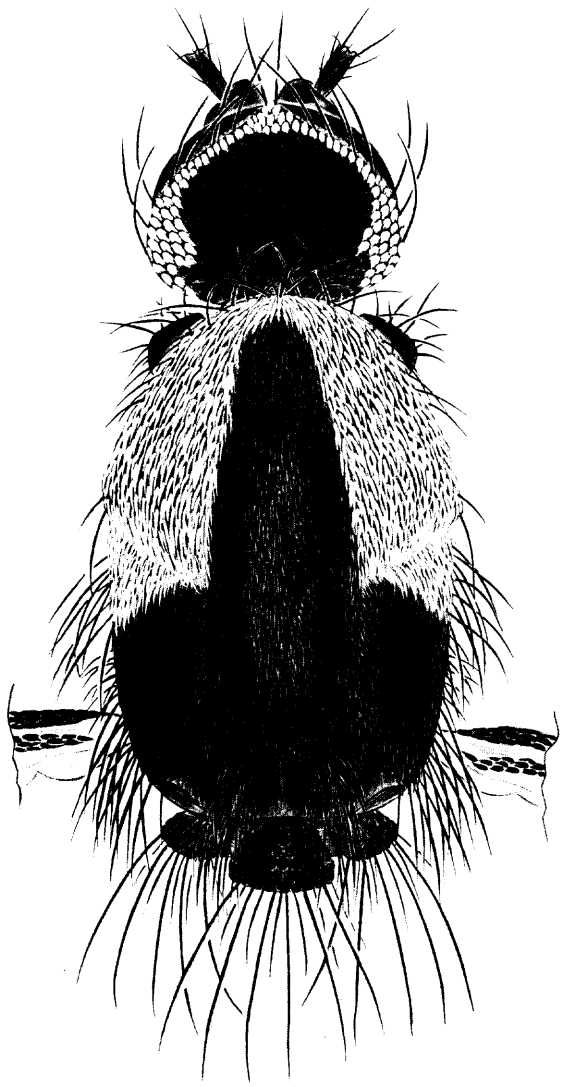
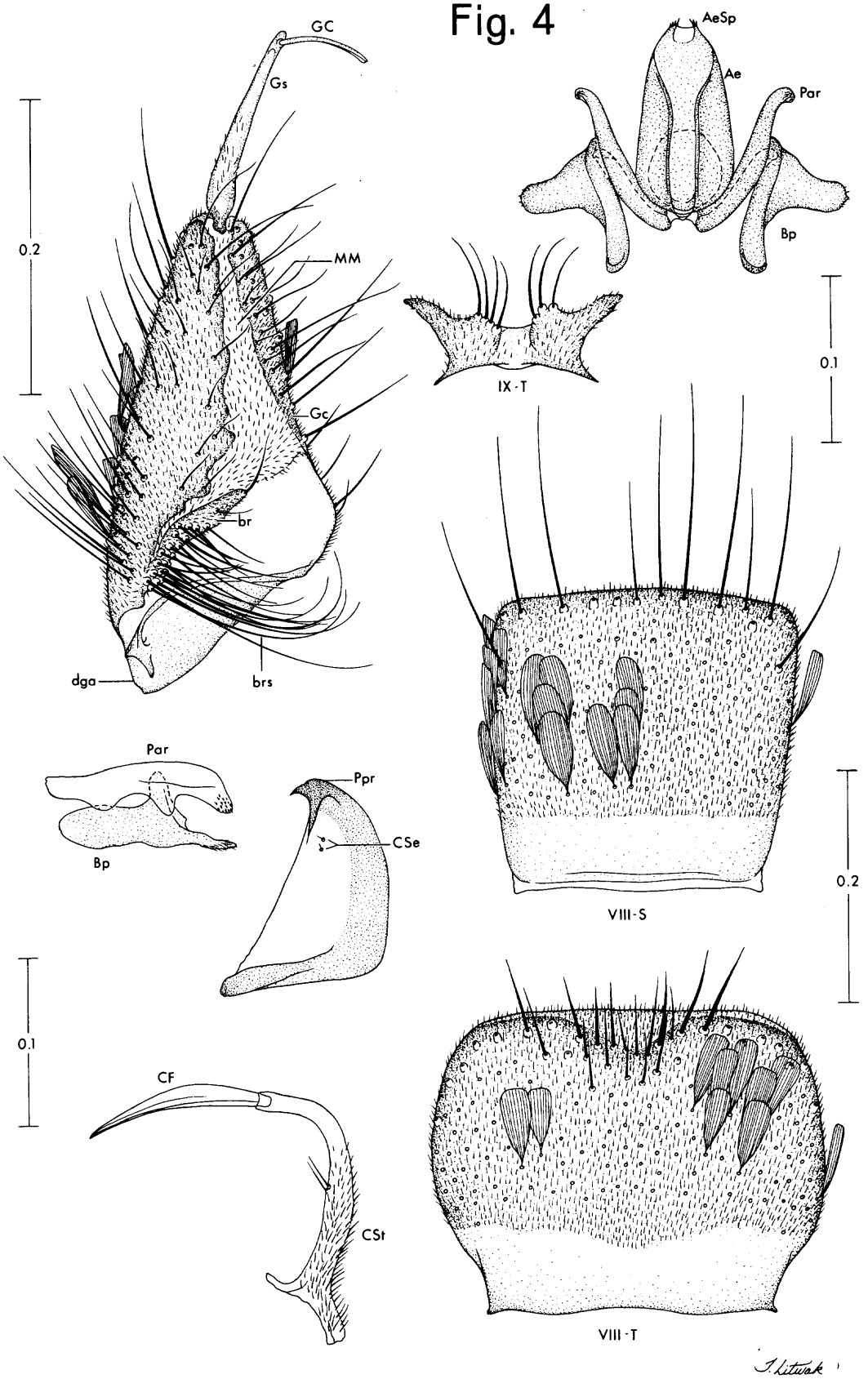


Fig.3

Fig. 4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Gs
0.2
MM
Gc
br
dga
brs
AeSp
Ae
Par
Bp
0.1
IX-T
VIII-S
0.2
Par
Bp
Ppr
CSe
0.1
CF
CSt
VIII-T
T. Litwak

Fig. 5

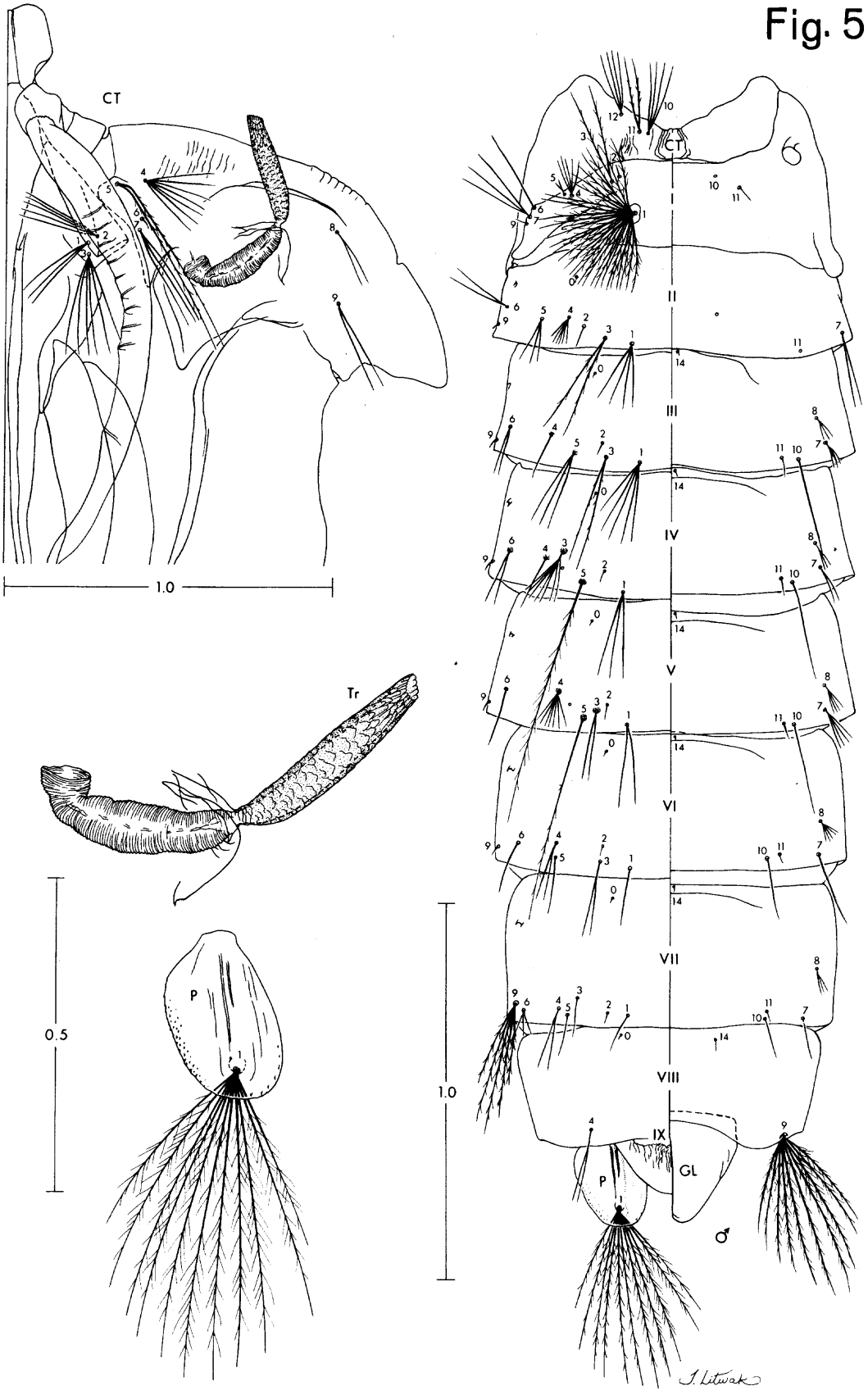
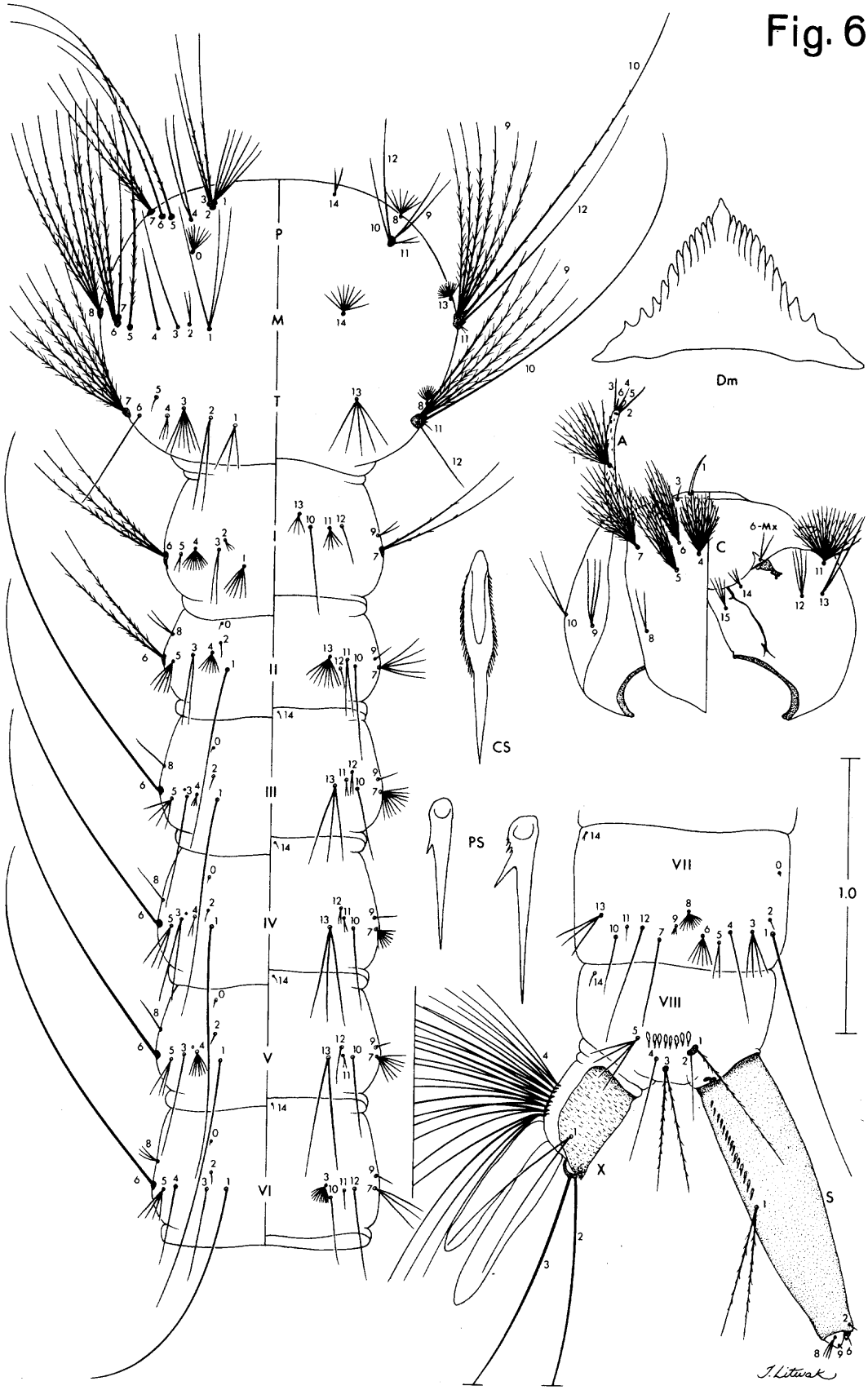


Fig. 6



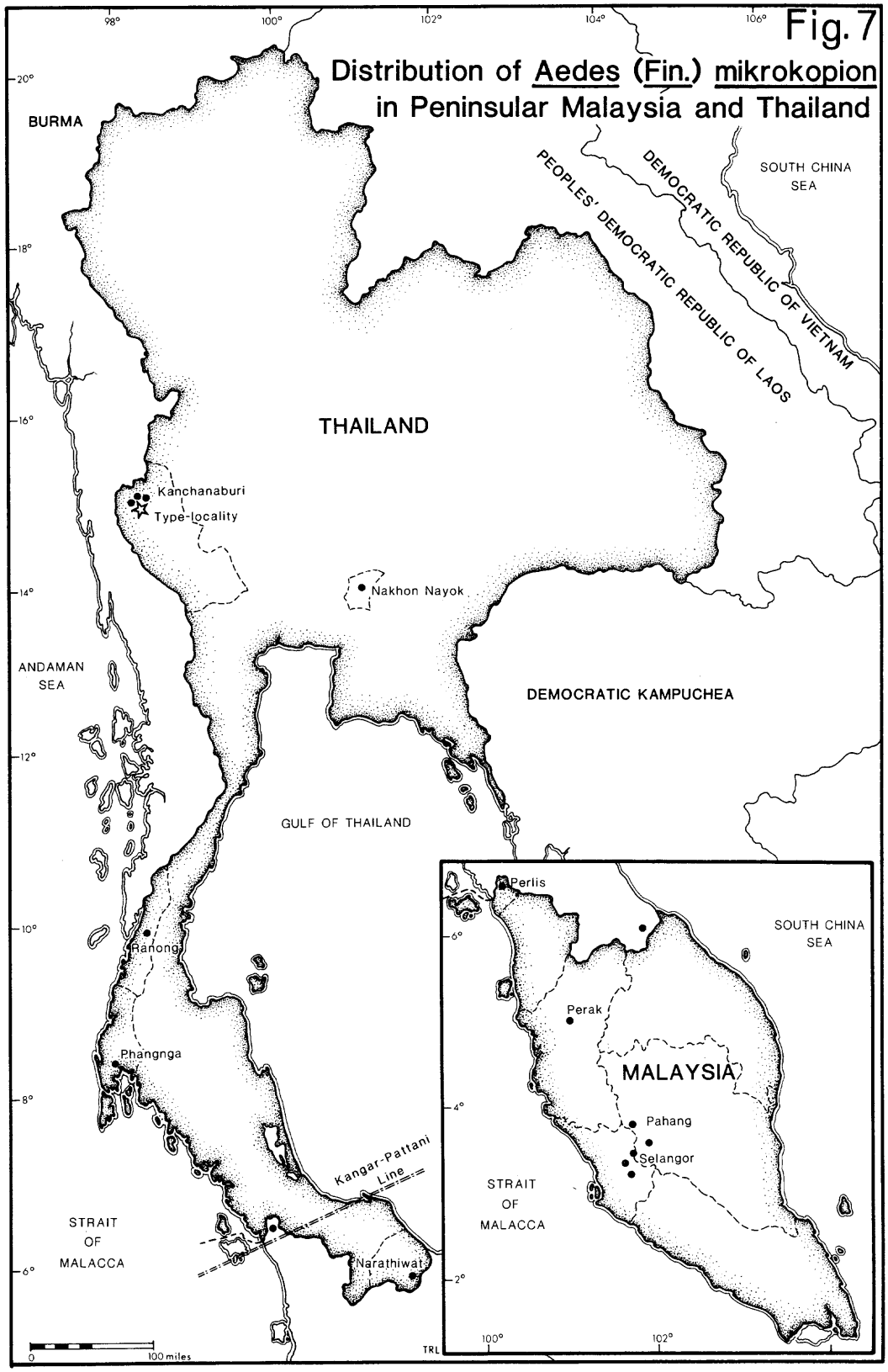


Fig. 7
Distribution of Aedes (Fin.) mikrokopion in Peninsular Malaysia and Thailand
BURMA
THAILAND
SOUTH CHINA SEA
DEMOCRATIC REPUBLIC OF VIETNAM
PEOPLES' DEMOCRATIC REPUBLIC OF LAOS
DEMOCRATIC KAMPUCHEA
Kanchanaburi
Type-locality
Nakhon Nayok
ANDAMAN SEA
GULF OF THAILAND
Ranong
Phangnga
Kangar-Pattani Line
Narathiwat
STRAIT OF MALACCA
0
100 miles
Perlis
Perak
MALAYSIA
Pahang
Selangor
TRL
98°
100°
102°
104°
106°
20°
18°
16°
14°
12°
10°
8°
6°
4°
2°

ERRATA

Knight, K.L. and B. A. Harrison, 1987. A new *Aedes* (*Finlaya*) of the niveus-subgroup (Diptera: Culicidae). Mosq. Syst. 19(3):212-236.

An omission and a minor error were noted in the final manuscript of this paper but too late to allow for their correction before publication occurred. These are adjusted here.

Under "BIONOMICS," the fourth sentence of the first paragraph should read: "The 21 larval/pupal collections having collection site data were taken from bamboo stumps (9 times), bamboo internodes (4 times), bamboo cups (5), bamboo (1) and tree holes (2)." The figures previously given failed to include the data from the 10 Malaysian collections.

Also under the heading "BIONOMICS," on the last line of the second paragraph, the *Armigeres* species shown incorrectly as *albatus* should be *subalbatus*.

A question has been asked about the occasional presence of palish scales on the anterior surface of the midfemur. The inference in our published description is that in both sexes the anterior surface of the midfemur is without white scaling. For all practical purposes this is true. However, to avoid misunderstanding, it should be known that a few (3-7) palish scales may occasionally occur medially along the ventral margin of the anterior surface on the midfemur of the female, and even less often on the male. These palish scales were found to be present in 3 out of 34 male femora examined (9%) and in 8 out of 35 female femora (23%); in only one specimen (female) did these scales even approach white in color. Both femora of a single specimen were seldom visible because of the specimen being glued by a pleural surface to a triangular point, but in the few cases where both midfemora had the anterior surface visible only once were these palish scales present on each midfemur of a single specimen. --- Kenneth L. Knight