

*Aedes consonensis*, a New Species of the Subgenus *Neomacleaya*  
from South Vietnam (Diptera: Culicidae)<sup>1</sup>

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ABSTRACT

The male, pupa and larva of *Aedes (Neomacleaya) consonensis*, a new species from South Vietnam, are described, illustrated and compared to related species. The structures of the male genitalia for the subgenus *Neomacleaya* are described.

INTRODUCTION

Material of *Aedes consonensis*, new species, was discovered by me in the Southeast Asia Mosquito Project collection during studies on the subgenera of *Aedes* Meigen. Revisions of related species from Southeast Asia have been published by Delfinado (1967, 1968).

A discussion of the structures comprising the male genitalia is given for the subgenus *Neomacleaya* Theobald. The development of the phallosome is quite complex and appears to be developed similarly to members in the subfamily Dixinae.

Nomenclature and chaetotaxy used for the male and male genitalia (except for the phallosome) follow Knight (1970) and Knight and Laffoon (1970a, 1970b, 1971) and those for the pupa and larva follow Belkin (1962). Terminology of the phallosome of the male genitalia follows Belkin (1968).

*Aedes (Neomacleaya) consonensis*, n. sp.  
(Figs. 1,2,3)

MALE. Head. Antenna dark brown, plumose, 0.82 length of proboscis, pedicel blackish-brown; clypeus blackish-brown, bare; maxillary palpus blackish-brown scaled, short, 0.15 length of proboscis; proboscis blackish-brown scaled, 1.17 length of femur I; eyes separated in front; several long, blackish-brown, ocular setae; scales on

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head all broad, decumbent and blackish-brown except for a patch of broad white ones anterodorsally on lateral surface next to eye margin and at level with antepnotum, a small patch of moderately broad white scales on interocular space and extending a short distance laterally on ocular line, and a few short, erect, forked, blackish-brown scales on occiput.

Thorax. Scutal integument dark brown; scutum covered with narrow curved blackish-brown scales except for a small patch of white similar scales on median anterior promontory area and a similar one on anterior scutal fossal area; prescutellar space bare; scutellum with a patch of narrow curved blackish-brown scales on each lobe; blackish-brown setae on following areas: 5 median anterior promontory, numerous acrostichal (anterior and posterior), numerous dorsocentral (anterior and posterior), scutal fossal (4-5 anterior, 3 lateral and 1 posterior), numerous supra-alar, 6 posterior medial scutal, 1 postalar callar and scutellar (5 long and 1-2 short lateral, 5 long and 2 short median); pleural integument dark brown; antepnota widely separated, scales rubbed off but scars present, 12 short and long dark setae; postpnotum with 5 dark posterior setae; propleuron with a patch of broad white scales, 4 dark setae; prosternum, subspiracular area, paratergite, mesomeron and metameron bare; postspiracular area with 3 dark setae; mesepisternum with an upper and a lower patch of broad pale scales, 3 upper and 6-7 posterior setae; prealar knob with 9 dark setae; mesepimeron with a large patch of broad white scales near center, 11 dark setae dorsad of scale patch.

Legs. Coxae I-III each with several dark setae, I with broad brown scales and a small dorsal patch of white ones on anterior surface, II and III each with a patch of broad white scales on outer area of anterior surface, lower scales brownish colored on II; trochanters I-III each with broad brownish colored scales; femora I-II each with anterior surface brown scaled, III with anterior surface pale scaled with a narrow brown scaled stripe which broadens distally, I with posterior surface pale scaled with a ventral brown scaled longitudinal stripe, II and III each with posterior surface pale scaled with a dorsal brown scaled longitudinal stripe which becomes wider distally; tibiae I-III and tarsi I-III each blackish-brown scaled; posttarsi I-III each with 2 ungues, I and II each with ungues unequal, larger ungue with a tooth and smaller ungue simple, III with ungues equal, one ungue with a tooth and the other one simple.

Wing. Dorsal and ventral veins with dark brown scales; alula with several narrow and moderately broad brown scales along margin; upper calypter with dark hairs on margin; 2 remigial setae.

Halter. Pedicel pale; capitellum dark brown scaled.

Abdomen. Terga blackish-brown scaled, I with a rectangular patch of broad white scales on laterotergite, II-VI each with a small laterobasal white scaled patch, remainder of abdomen removed with genitalia; sterna brown scaled; terga and sterna with numerous golden-brown setae, mostly along posterior margins.

Genitalia (Fig. 1). Tergum IX heavily pigmented, formed into a narrow band mesally and expanded laterally on each side into a lobe which is fused with tergum X, setae absent, connected laterally to sternum IX by a narrow heavily pigmented band; gonocoxite short, broad, heavily pigmented, tergo basal portion of mesal surface membranous with minute spicules, dorsal surface with apex extended into a small lobe which bears 3 short and 3 long stout, heavily pigmented setae, several short thin setae on remainder of apical 0.55 basad of the stout ones, ventral surface produced into a large apicomeresal lobe which is heavily pigmented on both tergal and sternal

areas, tergal area of lobe with 2 short, stout setae on outer margin near apex and with several short and very short setae on distal 0.30, sternal area of lobe with 2-3 moderately long, stout, heavily pigmented setae on outer basal portion and several short ones on apical 0.25, several broad scales on ventral and lateral surfaces of gonocoxite; gonostylus heavily pigmented, moderately long, 0.70 length of gonocoxite, basal 0.40 narrow, middle 0.36 expanded and with 35-39 short setae, apical 0.24 narrow, recurved and with 5-6 short setae at base, gonostylar claw absent, attached subapically to gonocoxite; basal mesal lobe broad, lightly to moderately pigmented, covered with small spicules, 14-15 very short setae near center of lobe, 2 heavily pigmented, short, flattened lumps attached to a short caudally produced extension, caudal lump with a short seta arising from near center of dorsal surface, several short setae ventrad of lumps, sternomesal and tergoapical margins fused with gonocoxite, lobes connected mesally by a moderately broad band which forms a shallow trough ventrad of apical portion of prosophaallus; proctiger with paraproct divided into 2 long, heavily pigmented, slightly curved arms, cephalic arm with 3-4 transverse ridges subapically, caudal arm with a short basal projection which extends ventrad and articulates at a point on the dorso-mesal surface of the parameral apodeme near base of opisthophallus, base of proctiger strongly fused with tergum X, cercus membranous and without cercal setae; tergum X moderately pigmented, formed into a plate between proctiger and caudal lateral portion of tergum IX, not connected mesally; phallosome complex, opisthophallus--consists of a moderately pigmented, tergal, transverse bridge between the parameral apodemes, median caudal margin produced into a long, moderately broad, lobe which extends to apex of prosophaallus, base attached to a dorso-mesal extension of the caudal outer portion of parameral apodeme, located dorsad of phallus and prosophaallus and ventrad of proctiger, phallus--formed by a median lobe associated with the gonopore, consists of a pair of short, heavily pigmented, narrowly separated arms which are fused at the base, sternolateral area of base extended laterally into a long arm which is fused to tergomesal portion of prosophaallus base, apex of phallus formed into a tergal penis filament which consists of a pair of bars extending cephalad from phallus apex, bars connected on most of basal 0.40 by a broad transverse bridge, apical 0.60 of bars curved dorsad and attached to sternal surface of opisthophallus, prosophaallus--consists of a pair of long, heavily pigmented, acuminate arms which have their bases widely separated and their apices contiguous, base of arm attached to tergomesal portion of paramere and located ventrad and laterad of phallus, apical portion of arm projecting caudad and dorsad of phallus, prosophaallic arm 2.44 length of phallic arm (measured along midline of genitalia), paramere heavily pigmented, broad, long (1.78 length of phallic arm), articulates at 2 points near middle with caudal area of parameral apodeme, most inner point of apodeme attached to sternobasal area of prosophaallic arm, parameral apodeme--moderately to heavily pigmented, very long, 1.77 length of paramere, outer surface attached to tergo-basal apodeme of gonocoxite; sternum IX heavily pigmented throughout, large, broad with apicolateral areas produced into short flattened areas, lateral surface strongly attached to sternomesal area of gonocoxite, 17 short and moderately long setae along posterior margin.

FEMALE and EGG. Not known.

PUPA (Fig. 2). Description based on 2 skins. Respiratory trumpet. Heavily pigmented; pinna 0.13-0.15 length of meatus; reticulation extending over entire meatus; basal 0.13-0.14 of meatus slightly tracheoid; small hydrophobe, hair-like spicules on apical 0.28-0.30 of inner surface; index 3.00-3.14. Cephalothorax. Setae 1,2-C double or triple; 3-C double; 4-C with 6 branches; 5-C with 5-7 branches; 6-C single or forked 2; 7-C with 5 branches; 8-C with 8-11 branches; 9-C triple or 4 branched. Metanotum. Setae 10, 12-C with 5 branches; 11-C single. Abdomen. Setae 0-II-VIII tiny and single; 1-I with 34-38 branches on basal third; 1-II with 12-16 branches; 1-III with 10-14 branches; 1-IV with 8-9 branches; 1-V with 6 branches; 1-VI with 7 branches; 1-VII with 5-6 branches; 2-I-VII short, stout and single; 3-I triple to 5 branched; 3-II, III single; 3-IV with 5-8 branches; 3-V with 5-7 branches; 3-VI with 4-5 branches; 3-VII with 5-6 branches; 4-I with 7-12 branches; 4-II,III with 6-7 branches; 4-IV forked 2-4; 4-V with 5-6 branches; 4-VI with 7-8 branches; 4-VII with 4-5 branches; 4-VIII triple; 5-I with 5 branches; 5-II with 4-7 branches; 5-III with 6-7 branches; 5-IV, V single; 5-VI double; 5-VII triple or 4 branched; 6-I, II single; 6-III with 5 branches; 6-IV, V triple or 4 branched; 6-VI double; 6-VII with 4-6 branches, well mesad and slightly caudad of 9-VII; 7-I double or triple; 7-II triple or 4 branched; 7-III double to 4 branched; 7-IV forked 2-3; 7-V with 5-6 branches; 7-VI, VII single; 8-III with 4-6 branches; 8-IV, V forked 2-3; 8-VI forked 3 to 5 branched; 8-VII with 4-5 branches; 9-I-VI single; 9-VII single or double; 9-VIII double or triple; 10-III, V double or triple; 10-IV triple or 4 branched; 10-VI, VII single; 11-III-VII single; 14-III-VIII tiny and single. Paddle. Ovoid; small spicules on apical 0.69-0.71 of outer and apical 0.25-0.27 of inner margins; midrib moderately pigmented and reaches apex; 1-P short and single; index 1.36-1.54.

LARVA (Fig. 3). Description based on 2 skins and 1 whole larva. Head. Heavily pigmented; setae 1, 3-C single; 4-C short, thin, double or triple, mesad and slightly cephalad of 6-C; 5-C long, stout, barbed, single or double, caudad and slightly mesad of 6-C but slightly laterad of 4-C; 6-C long, stout, barbed and double; 7-C long, stout, barbed and 4-7 branched; 8, 12-C triple or 4 branched; 9, 13-C triple to 5 branched; 10-C triple to 6 branched; 11-C with 4-8 branches; 14-C single or double; 15-C small, 4-6 branched attached approximately 0.55 distance from collar to base of mental plate; mental plate heavily pigmented with 35-37 teeth; mouth brush with shorter hairs pectinate apically. Antenna. Short, moderately pigmented, several spicules scattered over shaft; 1-A short, stout, barbed, double or triple, attached 0.47-0.52 from base; 2-A long; 3-A short, 0.30-0.32 length of 2-A; 4-A moderately long,

0.56-0.61 length of 2-A; 5-A short, flattened, pigmented portion 0.22-0.24 length of 2-A; 6-A short, peg-like, 0.27-0.28 length of 2-A. Thorax. Seta 0-P with 4-5 branches; 1-P single or double; 2, 14-P double or triple; 3-P triple to 5 branched; 4-P triple or 4 branched; 5, 6, 8, 10, 12-P single; 7-P double; 9-P triple to 7 branched; 11-P double to 4 branched; 1-M triple or 4 branched; 2-M double or triple; 3-M triple; 4-M with 5-7 branches; 5, 7, 10-12-M single; 6, 8-M with 6-7 branches; 9-M with 8-9 branches; 13-M with 12-22 branches; 14-M with 11-12 branches; 1, 6-T single or double; 2-T with 4-6 branches; 3-T with 8-13 branches; 4-T triple or 4 branched; 5, 10-12-T single; 7-T with 5-7 branches; 8-T with 9-16 branches; 9-T triple; 13-T with 7-13 branches. Abdomen. Setae 0-II-VIII minute and single; 1-I, II single; 1-III, IV with 4-7 branches; 1-V, VII with 5-6 branches; 1-VI with 4-6 branches; 1-VIII with 4-5 branches; 2-I-VII single; 2-VIII double; 3-I with 5-8 branches; 3-II with 4-7 branches; 3-III, VIII with 4-8 branches; 3-IV with 5 branches; 3-V triple; 3-VI double to 4 branched; 3-VII with 4-6 branches; 4-I with 8-12 branches; 4-II with 8-13 branches; 4-III, VI triple to 5 branched; 4-IV double to 4 branched; 4-V with 5-8 branches; 4-VII double or triple; 4-VIII single; 5-I, III, VI double to 4 branched; 5-II triple to 5 branched; 5-IV, V double; 5-VII with 4-5 branches; 5-VIII with 6 branches; 6-I single or double; 6-II-VI single; 6-VII with 6-12 branches; 7-I single; 7-II triple to 5 branched; 7-III with 5-10 branches; 7-IV with 4-6 branches; 7-V with 5-8 branches; 7-VI, VII double or triple; 8-II double; 8-III-V single; 8-VI with 6-7 branches; 8-VII triple to 5 branched; 9-I double to 4 branched; 9-II-VI single; 9-VII double; 10-I, III, IV double or triple; 10-II, VII single or double; 10-V double; 11-I, II, VI double; 11-III, IV, VII single or double; 11-V single; 12-II with 4 branches; 12-III triple to 5 branched; 12-IV, V double or triple; 12-VI, VII double; 13-I single; 13-II with 13-15 branches; 13-III with 4-5 branches; 13-IV with 7-8 branches; 13-V, VII with 5-8 branches; 13-VI with 14-22 branches; 14-III-VIII single; comb on VIII composed of 9-12 scales arranged in an irregular row, each scale moderately pigmented with a long, stout, pointed, median spine and short denticles along margins of base; 1-X short and single; 2-X moderately long and with 4-8 branches; 3-X long and single; ventral brush with 10 long setae on grid and 2 short precratal setae, each seta with 4-9 branches; saddle heavily pigmented, acus absent, covered with minute ridges; incompletely rings segment X. Siphon. Heavily pigmented; acus present; index 1.81-2.00; pecten on basal 0.58 of siphon, composed of 14-15 teeth, distal tooth wider spaced than remainder, each tooth with 1-2 small ventral denticles near base; 1-S short, triple to 5 branched, attached on basal 0.70 of siphon and distad of last pecten tooth; 2-S short and single.

TYPE-DATA. Holotype male with associated pupal and larval skins, genitalia mounted in Canada balsam on a microscope slide, SOUTH VIETNAM, Con Son Province, Con Son, 17 November 1966, collector Robert H. Hochman, collection number 2516-001, SEAMP accession number 95, genitalia preparation number T73.306, adult reared from a larva which was collected from a large flood pool containing colored, fresh, non-moving, temporary water with numerous submerged dead leaves, in a heavily shaded area located under

a cluster of trees in open grassland and at an elevation of 32 feet; paratypes, 1 slide with associated pupal and larval skins, the reared adult female associated with these skins was destroyed in transit to SEAMP and is lost, other data same as holotype except collection number 2516-002; paratype, 1 whole larva, mounted on a microscope slide, same collection data as holotype except collection number 2508 and date 15 November 1966.

DISTRIBUTION. Known only from the type-locality.

BIOLOGY. As recorded for holotype in the type-data.

TAXONOMIC DISCUSSION. *Aedes consonensis* belongs to the following assemblage of related species: *abditus* Barraud, *fragilis* (Leicester), *hamistylus* Laffoon, *indecorabilis* (Leicester), *ishigakiensis* Bohart, *nobukonis* Yamada, *pahangi* Delfinado, *robertsi* Laffoon, *siamensis* Delfinado, *uniformis* (Theobald) and *yusafi* Barraud. I have examined specimens of all of the above except *fragilis*, *nobukonis* and *yusafi*.

*Aedes consonensis* can be distinguished in the adult habitus from each of the above species (except *fragilis*) by the following: abdominal terga each with a small, laterobasal, white scaled spot, postspiracular area without scales and mesepimeron with 11 setae on upper area. The other species possess the following characters: postspiracular area with broad white scales (*ishigakiensis*, *nobukonis*, *siamensis* and *yusafi*); abdominal terga II-VII completely dark scaled (*hamistylus*, *pahangi*, *robertsi* and *uniformis*); and abdominal terga each with a lateral, longitudinal stripe of creamy-brown scales (*abditus* and *indecorabilis*). Barraud (1931: 612) reported *yusafi* had 15 setae on upper area of mesepimeron in addition to the presence of scales on the postspiracular area. From the description of *fragilis* by Leicester (1908: 199) there appears to be no difference in the adult habitus of this species and *consonensis*; however, *fragilis* can be separated from the present new species by features of the male genitalia (see illustration of *fragilis* by Edwards, 1917: 222). Since material of *nobukonis* was not available for examination, the description by LaCasse and Yamaguti (1950: 100) was used.

Male genitalia of *consonensis* are similar to the above group of species but are easily separated from them by the paraproct which is developed into 2 long arms while the other species possess only a single arm on this structure. Other distinguishing features of the genitalia of *consonensis* are: shape of sternum IX; gonocoxite with 2 short, stout, heavily pigmented, spine-like setae near apex of ventral apical lobe; and opisthophallus with median caudal margin produced into a long, moderately broad lobe positioned dorsad of and extends to apex of prosophallus (*indecorabilis* and *ishigakiensis* have a similarly developed opisthophallus but are easily distinguished by the other features mentioned).

The male genitalia of species in the subgenus *Neomacleaya* present several interesting modifications in morphological composition which depart from other members of the genus *Aedes*. Most notable of these is the complex arrangement and partial fusion of the integral parts of the phallosome which appear to be similar to forms found in the dixine genera *Nothodixa* Edwards and *Paradixa* Tonnoir (these 2 genera described and discussed by Belkin, 1968). The phallosome of *consonensis* consists of an opisthophallus, phallus, prosophallus, parameres and parameral apodemes. Several of these structures are fused at the joints and have no definite sutures. The basal mesal lobe is modified into a broad plate which is fused along its sternomesal and tergal margins with sclerotized areas of the gonocoxite. The fusion lines are wrinkled and the basal mesal lobe stains slightly differently than the surrounding structures when acid fuchsin is used. Other structures of the genitalia are presented in the description and illustration of *consonensis*. A more complete discussion of the male genitalia and other stages of *Neomacleaya* will be presented in a future paper.

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III. Adult thorax. Mosq. Syst. Newsl. 2(3): 132-146.
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IV. Adult thoracic appendages. Mosq. Syst. Newsl. 2(4): 165-177.
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V. Abdomen (except female genitalia). Mosq. Syst. Newsl. 3(1):  
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Res. F. M. S. 3(3): 18-261.

Fig. 1

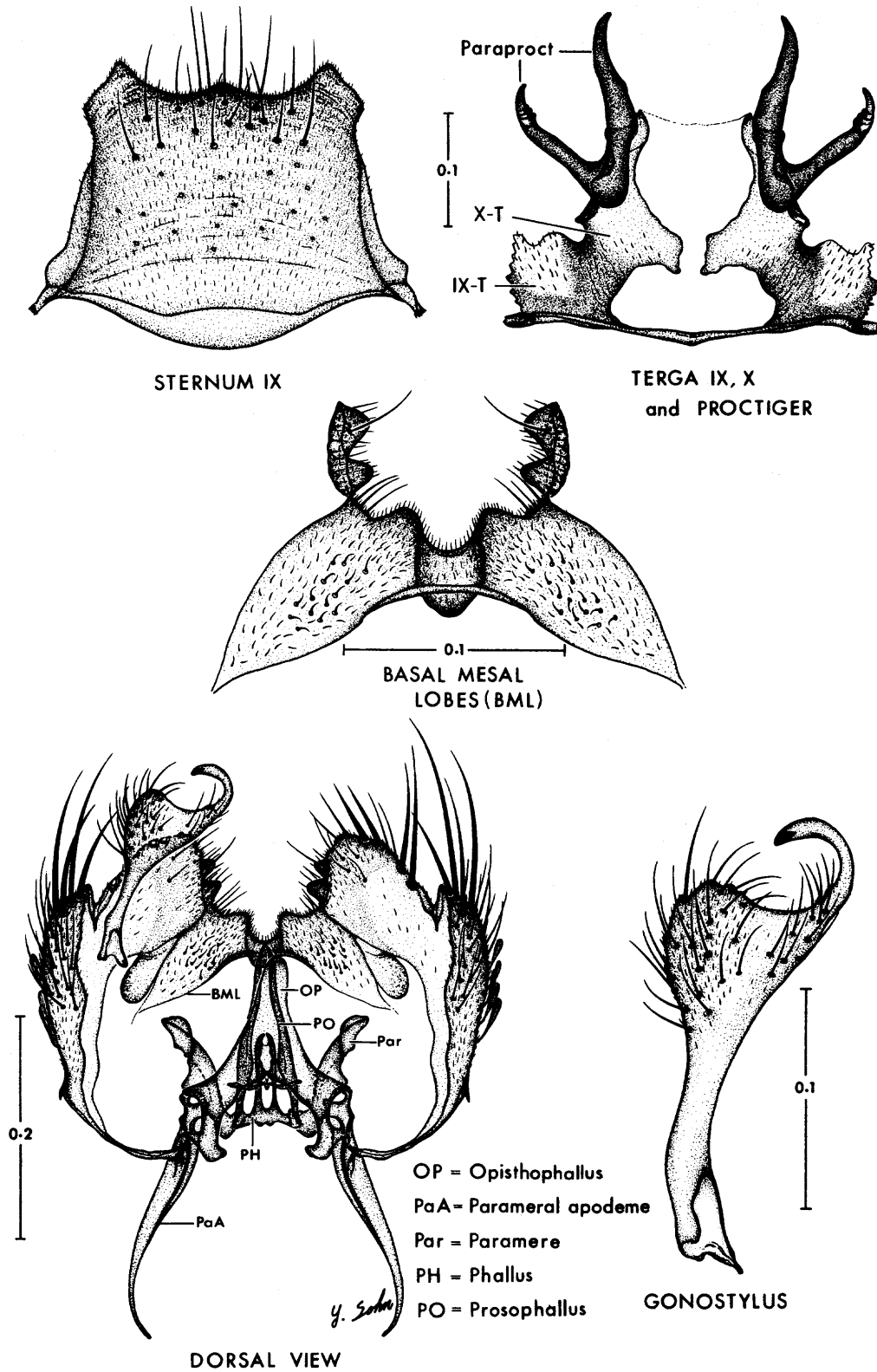


Fig. 1. *Aedes (Neomacleaya) consonensis*, new species, holotype male: genitalia.

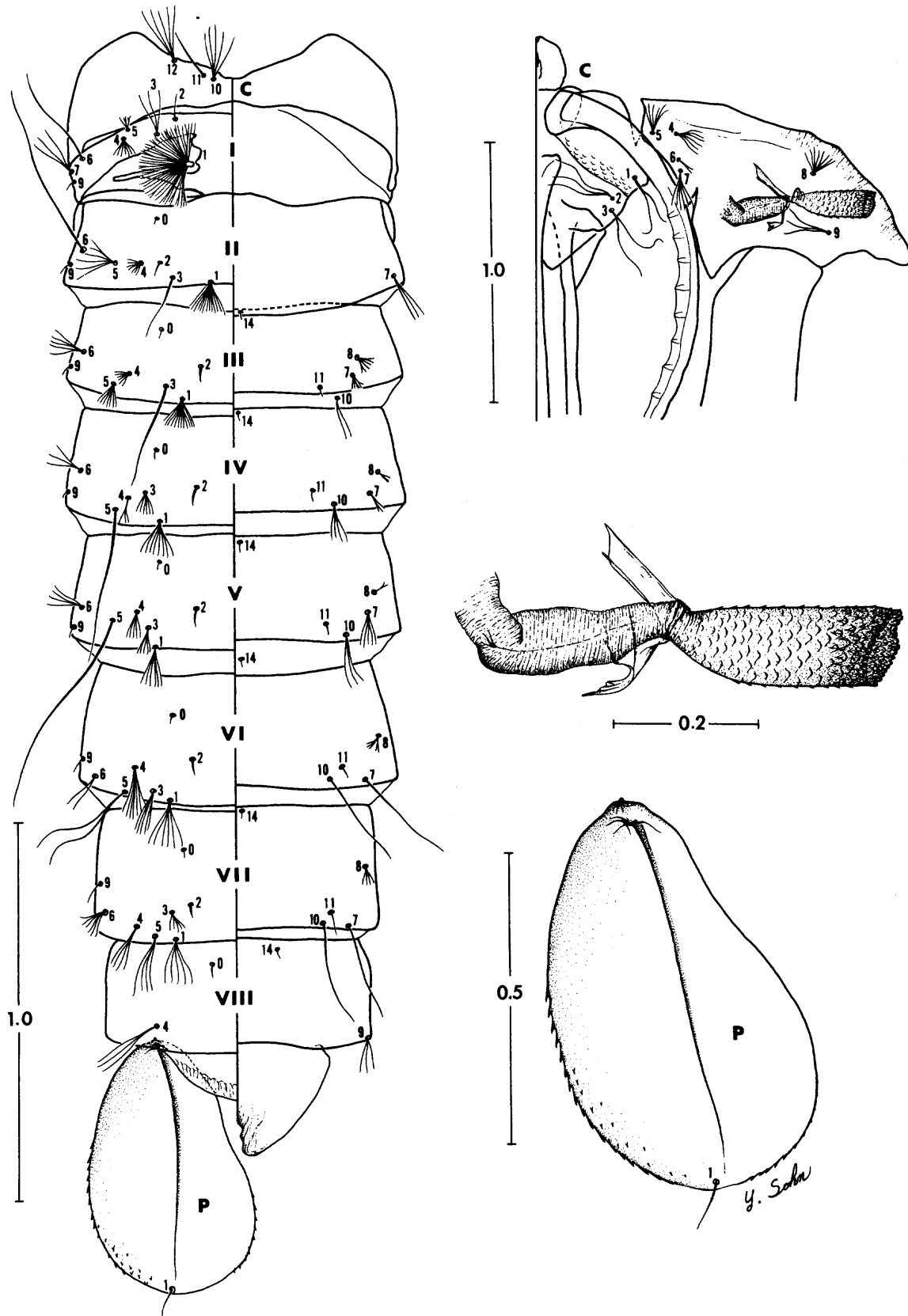


Fig. 2. *Aedes (Neomacleaya) consonensis*, new species, pupa.

Fig. 3

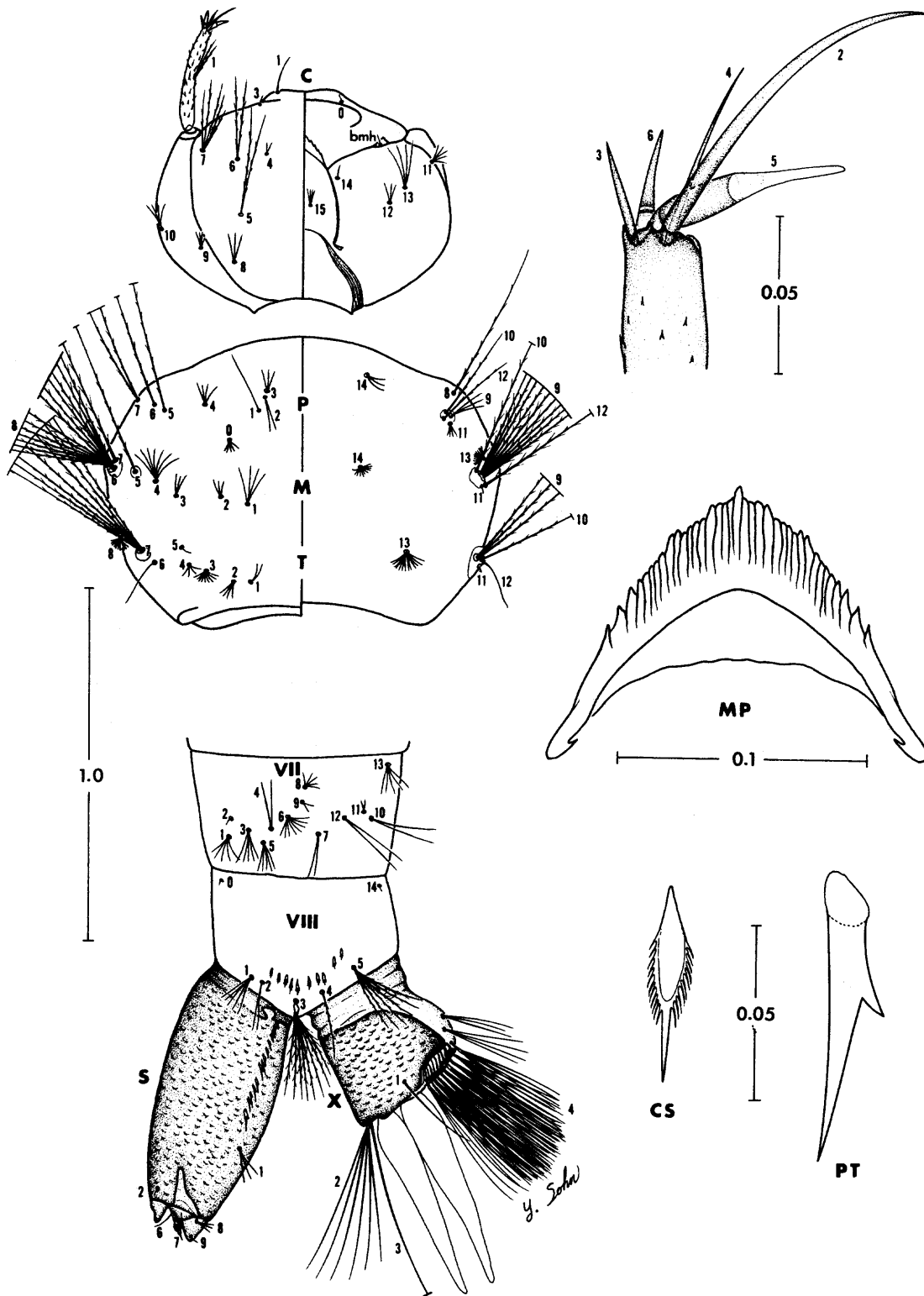


Fig. 3. *Aedes (Neomacleaya) consonensis*, new species, larva.