

ENTOMOLOGY.—*Revalidation of three species of Armigeres Theobald, 1901 (Diptera: Culicidae).*¹ ERNESTINE B. THURMAN.²

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The need to evaluate the status of four species of mosquitoes in the subgenus *Armigeres* in relationship to the type species of the genus, *Armigeres obturbans* (Walker, 1860), became evident during a study of the specimens of the genus in the collection of the U. S. National Museum in connection with a revisionary treatment of the Culicidae of northern Thailand. *Armigeres joloensis* (Ludlow, 1904), *Armigeres kuchingensis* Edwards, 1915, and *Armigeres durhami* Edwards, 1917, are hereby revalidated to specific rank, and *Armigeres subalbatus* (Coquillett, 1898) is applied to the common Oriental species distributed from Japan, China, and Taiwan south and west through Thailand to India and Ceylon.

A. joloensis was described from specimens captured at Jolo Jolo, Philippine Islands (May, 1903), as a variety of *Desvoidia fusca* Theobald, 1903, which is currently a synonym of *Armigeres malayi* Theobald, 1901. The lectotype male is in good condition in the U. S. National Museum.

Blanchard (1901) proposed the generic

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name *Desvoidia*, incorrectly assuming that *Armigeres* was preoccupied by *Armiger* Hartmann, 1840–1842 (Mollusca). Theobald (1910) considered *Desvoidia joloensis* as a valid species. In 1913 Edwards placed the species in the genus *Armigeres*, revalidating the name and stating that it was not preoccupied by *Armiger* Hartmann, thus it antedated *Desvoidia* Blanchard, 1901 (misspelled *Desvoidia* by Theobald, 1903). Later Edwards (1915) stated that he was in error in 1913 when he synonymized *Armigeres jugraensis* (Leicester, 1908), under *A. joloensis* and that the latter represented only a slight color variation of *A. obturbans*. *A. joloensis* is listed as a synonym of *A. obturbans* by Edwards (1932) and Bohart (1945).

A. kuchingensis was described from two males and six females collected by Edwards, July 24–27, 1914 (females biting), at Kuching Reservoir, Sarawak. In 1917, Edwards described *A. durhami* from Bukit Kutu, Malay Peninsula, as “much as in *kuchingensis* . . . clasper with distinct swelling on the flexor surface a little beyond middle.” Three specimens of *A. durhami* collected by Dr. Durham were named as *Desvoidia fusca* by Theobald (1903). Barraud (1927) placed *A. durhami* as a variety of *A. kuchingensis* along with three varieties from India which he described in the same paper (var. *nongpohensis*, var. *shillongensis*, and var. *dibrugarhensis*). Later Barraud (1934) synonymized these varieties as only individual variations of *A. kuchingensis*. Borel (1930) listed *A. durhami* as a synonym of *A. kuchingensis*, while Bohart (1945) listed *A. kuchingensis* as a synonym of *A. obturbans*.

The type of *A. obturbans*, a female collected on Makassar, Celebes, by Wallace, has been lost; the type of *Culex ventralis* Walker, 1861 (questioned as a synonym of *A. obturbans* by Edwards, 1932), a female collected in Amboyna (Amboina, Moluccas) by Wallace, is not in a condition to be of scientific value (Mattingly in personal communication to Stone, 1955). In 1865, Walker

described a species from New Guinea, which he named *Culex ventralis*, n. sp. This name is invalid as a primary homonym. The type is unknown. The character, as based on descriptions, distinguishing *C. obturbans*, *C. ventralis* of 1861, and *C. ventralis* of 1865, is the coloration of the apex of the hind femur. For *C. obturbans* the hind femur is

described as white beneath; for *C. ventralis* of 1861, there is a purple tomentum, and for *C. ventralis* of 1865, the femur is silvery white with the apex dark. The holotype (female) of *Culex subalbatus*, which is a synonym of *A. obturbans* according to Edwards (1932) and Barraud (1934), is in very good condition in the U. S. National Museum.

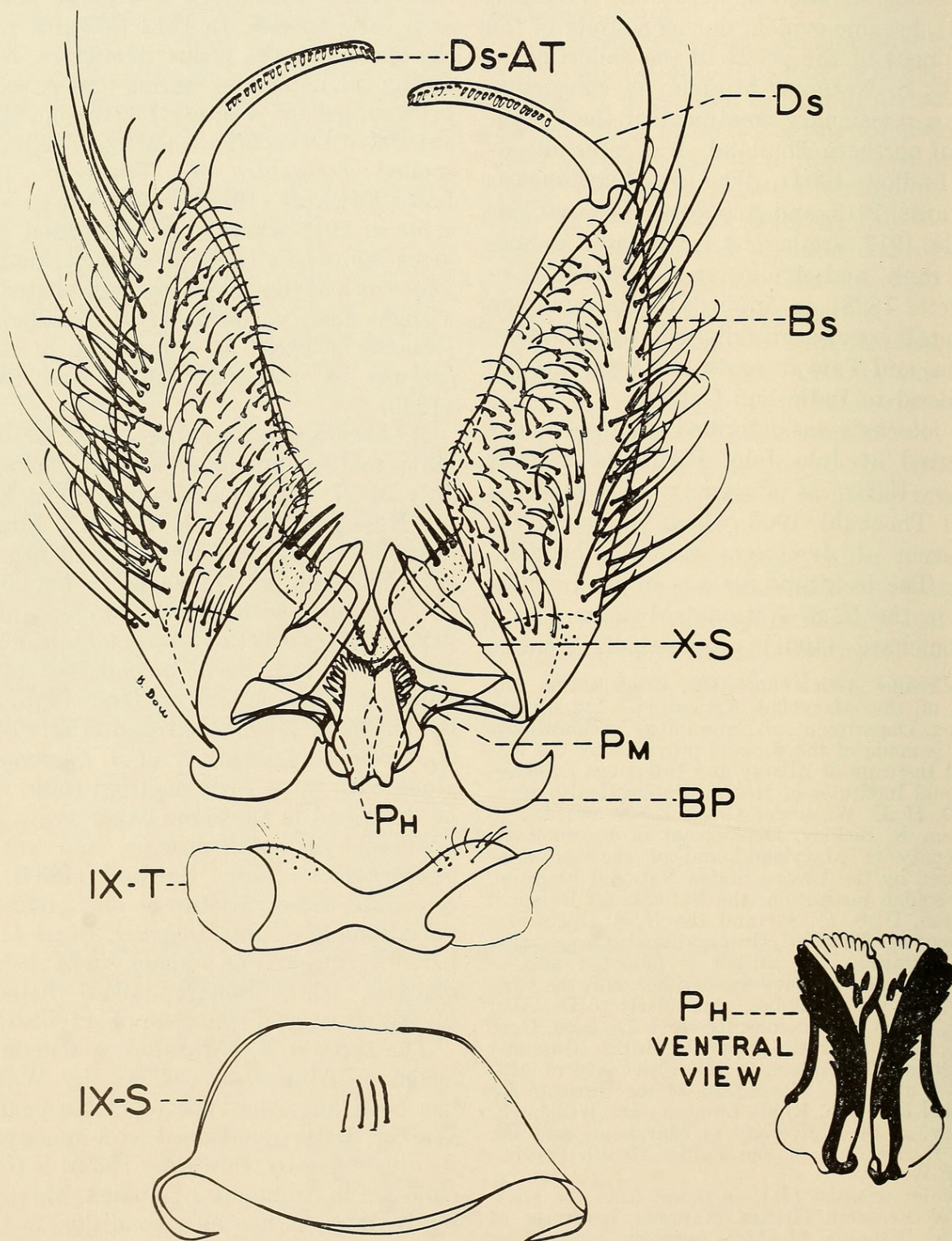


FIG. 1.—*Armigeres subalbatus* (Coquillett): Structures of male terminalia.

The apex of the hind femur of the holotype of *C. subalbatus* is white on the venter and the ventrolateral aspects.

Bohart considered the common Philippine *Armigeres* with a long dististyle in the male, to be *A. obturbans*. This common species Baisas (1935) called *A. kuchingensis*,

though he figured a species with a short dististyle. Stone and E. Thurman (1958) have shown that Baisas was dealing with a species which in general habitus appears to be *A. kuchingensis* though there are significant differences in the structures of the claspette, phallosome, and dististyle. This

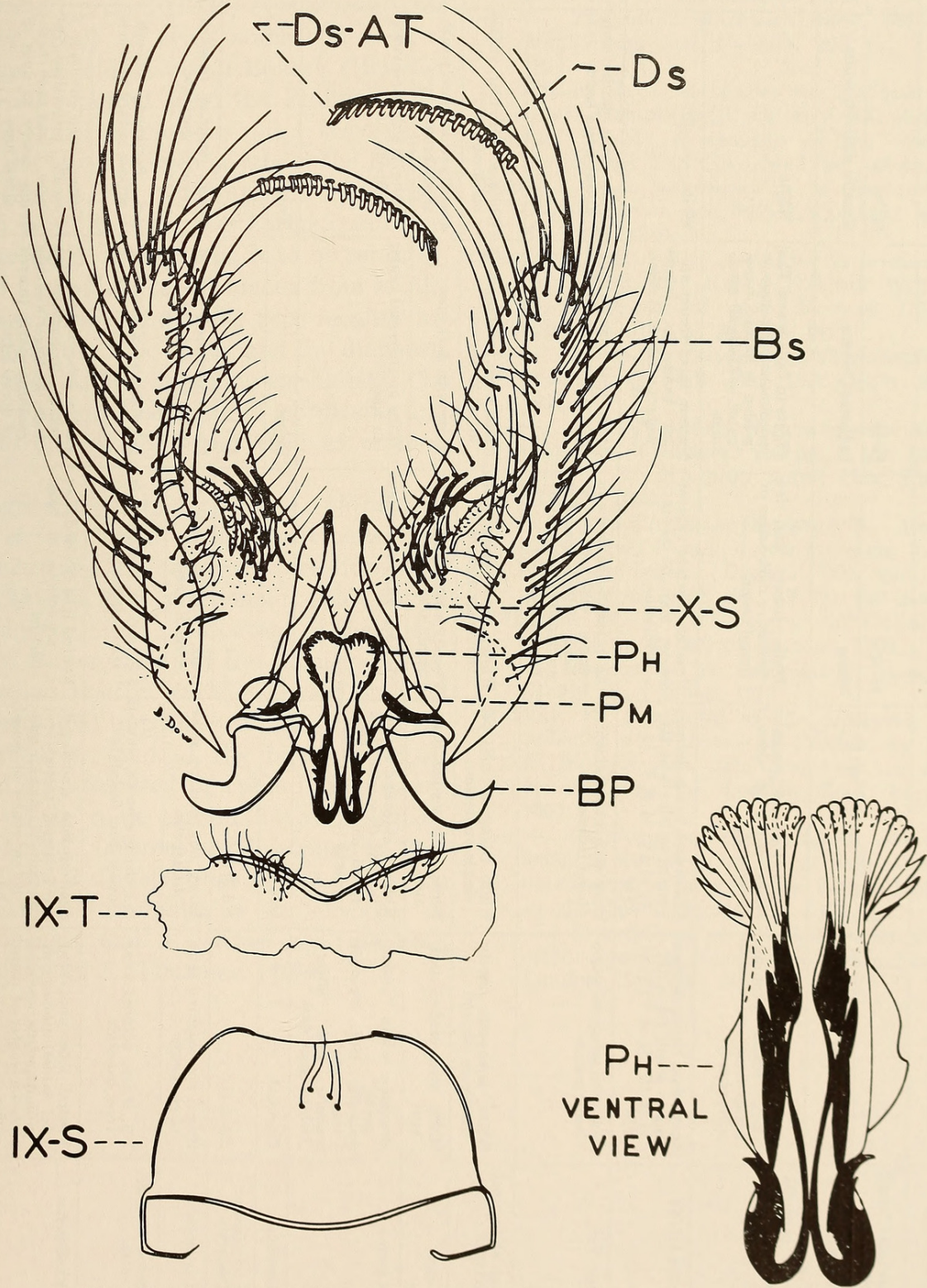


FIG. 2.—*Armigeres durhami* (Edwards): Structures of male terminalia.

TABLE 1.—DIAGNOSTIC CHARACTERS OF ADULTS OF SIX SPECIES OF ARMIGERES THEOBALD, 1901

Characters	<i>A. oburbans?</i> <i>A. ventralis?</i>	<i>A. subalbatus</i> (Fig. 1)	<i>A. joloensis</i> *	<i>A. durhami</i> (Fig. 2)	<i>A. kuchingensis</i> *	<i>A. baisasi</i> *
Female palpi/length proboscis.....	$\frac{1}{4}$ – $\frac{1}{3}$	$\frac{1}{8}$ – $\frac{1}{4}$	$\frac{1}{8}$ – $\frac{1}{4}$	$\frac{1}{8}$ – $\frac{1}{4}$	$\frac{1}{8}$ – $\frac{1}{4}$	$\frac{1}{8}$ – $\frac{1}{4}$
Mesonotal border..	Creamy white	White	White	Indistinct, white	Usually distinct, white	Male wide, white; female narrow or lacking
Posterior pronotal lobe.....	White with narrow curved dark scales forming broad dorsal line beneath white border	White (few have bronzy or dark scales in dorsal patch)	White (rarely find few bronzy or dark scales in dorsal patch)	White in Indian and Thai specimens; with narrow golden or bronzy dorsal patch in Malayan specimens	White	White
Sternites III–VI....	Apical dark bands decreasing in width ($\frac{1}{2}$ of III; $\frac{1}{3}$ of IV; $\frac{1}{4}$ of V; $\frac{1}{5}$ of VI)	Apical dark bands decreasing in width ($\frac{1}{2}$ of III; $\frac{1}{3}$ of IV; $\frac{1}{4}$ of V; $\frac{1}{5}$ of VI)	Usually narrow apical bands; may be as in <i>subalbatus</i>	Narrow, faint bronzy apical bands; or bands wider on III & IV than on V & VI	White	White
Sternite VII.....	Dark with subapical white band narrow	Dark with subapical white band narrow	As in <i>subalbatus</i> ; some females with subapical band wide, medially scalloped nearly covering segment	Dark with narrow subapical white band	Dark with narrow subapical white band	Dark with apical white band
Lateral abdominal markings.....	White, triangular, rarely visible on dorsum	White, triangular, may be visible on dorsum	White, semicircular, not visible on dorsum	White, large, reaching well up on to dorsum	White, semicircular, visible on dorsum (?)	White, semicircular, not visible on dorsum
Fore coxa.....	White with medial dark spot	White with medial dark spot	Usually white; rarely with small bronzy spot	White with dark spot	Usually white; rarely with small bronzy spot	White
Hind femur.....	<i>oburbans</i> : white "underneath," <i>ventralis</i> , 1861: "purple tomentum," <i>ventralis</i> , 1865: "silvery white, apex dark,"	White on sides and venter to apex (few with dark scales on ventrolateral aspects)	White on sides and venter to apex	White on sides and venter to apex	White on sides and venter to apex	White on sides and venter to apex
Male midclaw.....	Unequal	Unequal	Equal	Equal	Equal	Equal
Male terminalia: Basistyle.....	2.5–3:1	2.5–3:1	2.5–3:1	2.5:1	3:1	3:1
Dististyle.....	Short, not reaching setae of claspette	Short, not reaching setae of claspette	Long, reaching base of setae of claspette	Long, reaching base of setae of claspette	Long, reaching base of setae of claspette	Short, not reaching setae of claspette
Setae of claspette.....	2–3, sharp, pointed away from basistyle	2–3, sharp, smooth, pointed away from basistyle	2–3, curved, spatulate at apex, striated	3–4, sharp apex, flattened, striated, curved toward basistyle	4–5, flattened, smooth, curved toward basistyle	2, sharp, pointed toward basistyle
Phallosome.....	Ventral lobe undivided, 5–7 lateral projections; minute points near middle on venter of dorsal lobe	Ventral lobe undivided, 5–7 lateral projections; minute points near middle on venter of dorsal lobe	Ventral lobe divided, 3 or 4 projections in basal portion	Ventral lobe divided, 2–3 small projections at base, 4–5 finger-like ones reaching nearly to apex of dorsal lobe	Ventral lobe divided, 2 small projections at base, 2 long ones reaching nearly to apex of dorsal lobe	Ventral lobe with V-shaped division, 4 or 5 graduated projections from base with sclerotized median process, small points near middle on venter of dorsal lobe

* Illustrations of the structures of the male terminalia of *A. joloensis*, *A. kuchingensis*, and *A. baisasi* are presented by Stone and E. Thurnan (1958).

kuchingensis-like species with a short dististyle Stone and E. Thurman (1958) described as *Armigeres baisasi*.

After much deliberation the author has concluded that: *A. subalbatus* (Coquillett) and of Bohart (1945) represents the common Oriental species, which is the *A. obturbans* of Barraud (1934) *et auctorum* (*nec* Walker, 1860), in areas north and west of Malaya; *A. obturbans* of Bohart (1945) *et auctorum* reported from the Philippine Islands includes *A. joloensis* and *A. kuchingensis*, if the latter species occurs in the Philippine Islands; *A. kuchingensis* of Baisas (1935) is all or in part *A. baisasi*; and that *A. obturbans*, if the name is to be retained, should be applied to specimens from localities near or adjacent to its type locality inasmuch as the type is lost and the diagnosis of the species differs among specialists. The author prefers to consider *C. obturbans* and *C. ventralis* of 1861 and 1865 as *nomina dubia*.

Diagnostic characters of *A. obturbans*, *sensu stricto*, based on literature as well as specimens and unpublished notes from Colless, 1954-56, and Macdonald, 1957-58; of the holotype of *C. subalbatus*; of the lectotype of *A. joloensis*; of the holotype of *A. kuchingensis*; of *A. durhami*, based on Thai specimens and unpublished notes from Colless, 1954-56; and of the holotype of *A. baisasi* are presented in Table I. The structures of the male terminalia of *A. subalbatus* and *A. durhami* are illustrated in Figures 1 and 2. Illustrations of the structures of the male terminalia of *A. joloensis*, *A. kuchingensis*, and *A. baisasi* are presented by Stone and E. Thurman (1958).

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