

Redescription of *Culex (Culex)*
bihamatus Edwards with a Discussion
of its Affinity (Diptera: Culicidae)¹

Sunthorn Sirivanakarn
Medical Entomology Project
Smithsonian Institution
Washington, D. C. 20560

ABSTRACT. The male holotype of *Culex (Culex) bihamatus* Edwards 1926 is re-described, the male genitalia illustrated and its affinity as determined from comparative studies of genitalia of related species in the *Sitiens* group is discussed.

In the preliminary study of the type material of Oriental *Culex* at the British Museum (Natural History), I have also examined for comparative purposes the types of a number of extralimital species which were previously described from regions closely adjacent to or at the periphery of Southeast Asia. One of these is *C. bihamatus* Edwards from Timor--a major island in the Lesser Sundas, which has been considered to be within the Australasian region. This species is known only from the single male holotype. It appears very likely that it may be found among the nearby islands in eastern Indonesia to the north and east of Timor. As the original description of *bihamatus* by Edwards (1926: 107-108) is very brief and no figure of the male genitalia is provided; it appears most appropriate to redescribe the type and to illustrate the male genitalia of this species so that when encountered it will be readily recognized and distinguished from other Oriental forms of *Culex (Culex)*. In addition, an attempt has also been made to compare in detail the adult morphology and the genitalia of *bihamatus* with other *Culex (Culex)* species and to provide a sounder interpretation as to its identity and affinity.

Culex (Culex) bihamatus Edwards

Culex bihamatus Edwards 1926: 107(♂).

Culex (Culex) bihamatus Edwards, Edwards 1932: 203 (taxonomy).

FEMALE. Unknown

MALE. Medium-sized species; wing length about 4.0 mm. *Head*: Narrow decumbent scales on vertex entirely pale whitish; erect scales numerous, dingy white in center, dark brown on posterolateral areas; lateral patch of broad appressed scales whitish. Palpus longer than proboscis by about the

1

This work was supported by Research Contract No. DA-MD-17-74-C-4086 from the U. S. Army Medical Research and Development Command, Office of the Surgeon General, Washington, D. C.

length of segment 5; segment 2 entirely dark scaled; segment 3 with median pale band on dorsal surface, ventral surface with a row of several short setae which are somewhat flattened, more or less scalelike in distal portion, apical 0.4 with ventrolateral tuft of about 20 bristles; segments 4 and 5 with basal pale bands and densely long plumose, lateral and mesal bristles of segment 5 and distal portion of segment 4 yellowish, apex of segment 5 largely pale to tip. Proboscis with distinct median pale ring and a ventral tuft of about 20 relatively short setae proximad of median pale ring. *Thorax*: Mesonotal integument dark brown; mesonotal scales narrow, moderately dense, largely pale whitish except for some dark ones forming small streaks or patches laterad of prescutellar space; scales on prescutellar space and scutellar lobes entirely whitish. Anterior and posterior pronotum with several pale scales. Pleural integument paler than mesonotum, without definite pattern of dark and pale bands; propleuron, upper corner and posterior border of sternopleuron and anterior upper mesepimeron with distinct patches of broad pale scales; propleural bristles about 8, all entirely pale. *Legs*: Anterior surface of femora of fore- and midlegs extensively speckled with numerous pale scales; anterior surface of hindfemur largely pale, with mottling of some scattered dark scales; apex of all femora with distinct subapical pale spot; pale bands at joints of tarsomeres 1-4 of all legs largely basal. *Wing*: Scales on all wing veins narrow, dense and entirely dark. *Abdomen*: Tergites II-VII with narrow, even basal pale bands.

MALE GENITALIA (Fig. 1). *Segment IX*: Tergite narrow; tergal lobe poorly developed, bearing 1, 2 rows of 8 moderately strong setae. *Basimere*: Normal, conical; inner tergal surface with 2, 3 irregular rows of several strong, flattened lanceolate setae, extending from near base to level of subapical lobe. *Subapical lobe*: Small; proximal division with 3 rodlike setae (*a-c*); distal division with 1 narrow lanceolate leaflet (*g*) and 1 strong seta (*h*); setae *d-f* absent. *Distimere*: Sickle-shaped, rather short and distally tapered into a blunt apex; dorsal crest of spicules absent; 2 dorsal and 1 ventral short tiny setae present distad of middle of curvature; subapical claw (or spiniform) small, short and simple. *Phallosome* (Aedeagus): Lateral plate relatively simple, with distinct inner (most sternal) and outer (most tergal) divisions; inner division minutely spiculate, sternal apical portion slender, elongate and strongly curved tergal, tergal apical portion with several distinct denticles at base and a prominent lobe bearing 2, 3 lanceolate teeth projected tergally; outer division glabrous, represented by a large simple spinelike process which is distally curved outwards. *Proctiger*: Apical crown of paraproct medium-sized, composed of several coarse, flattened, dark spicules; basal sternal process absent or not developed; cercal sclerite largely membranous; cercal setae 3.

PUPA and LARVA unknown.

TYPE-DATA. Holotype ♂, INDONESIA, Timor [Island], Atamboea, collected by Dr. Labaar, date of collection not specified. Male type in British Museum (Natural History).

DISCUSSION. *C. bihamatus* is evidently closely related to *vicinus* (Taylor 1916) from Australia and with the latter apparently falls into a

distinct lineage of the *Sitiens* group of *Culex* (*Culex*). In comparing the *bihamatus* holotype with 2 males and 1 female of *vicinus* from Darwin, Northern Territory, Australia (G. F. Hill, 1916) at the British Museum, I found that they are similar in most features of the male genitalia but are quite different in the coloration of the adults, agreeing well with the descriptions by Edwards (1924: 393; 1926: 107-108). In comparing both forms with all known Oriental species, the type of *bihamatus* is more or less similar to *whitmorei* (Giles 1904) and that the specimens of *vicinus* strongly resemble *gelidus* Theobald 1901 in the color of the head and mesonotum as figured by Bram (1967: 248; 254). The male genitalia of *bihamatus* as figured and described here and that of *vicinus* are strongly differentiated from the Oriental *gelidus* and *whitmorei* as figured and described by Bram (1967: 247-253; 253-257) in the type of phallosome, the absence of basal sternal process of the proctiger and in the reduction of the number of setae of the subapical lobe. In the detailed diagnosis of the adults, *bihamatus* can be readily separated from *gelidus* and *vicinus* by (1) pale erect scales of vertex of head dingy white (pure or silvery white in *gelidus* and *vicinus*); (2) scales of mesonotum moderately dense and largely whitish (very dense, pure white on anterior 0.70-0.75, dark or black on posterior 0.25-0.30 in *gelidus* and *vicinus*) and (3) anterior surface of fore- and midfemur with extensive speckling of pale scales (entirely dark or not speckled in *gelidus* and *vicinus*); from *whitmorei* by (1) larger size; (2) basal bands of abdominal tergites narrow and even in width (triangular in *whitmorei*) and (3) mesonotal and pleural integument dark brown (deep chestnut brown to almost black in *whitmorei*).

Edwards (1932: 201-203), in his classification of the *Sitiens* group, placed *bihamatus* and *vicinus* with *gelidus* and *whitmorei* in the *Gelidus* series. This treatment was based largely or exclusively on the resemblance in the external adult characters. Because of several fundamental differences in the male genitalia among these forms, Edwards' classification does not appear to be justified. It is, however, most probable that *bihamatus* and *vicinus* are representative of a distinct complex or subgroup which, on the basis of comparative male genitalia, is apparently more closely related to *C. annulirostris* Skuse 1889 of the *Annulirostris* complex of Belkin (1962) and to *C. starckeae* Stone and Knight 1958 and others of the *Bitaeiorhynchus* series of Edwards (1932: 202) or subgroup of Belkin (1962) and Bram (1967) than to others in the *Sitiens* group.

ACKNOWLEDGMENTS

I wish to thank Ronald A. Ward and E. L. Peyton for reviewing the manuscript, Dr. P. F. Mattingly for the loan of *bihamatus* holotype from the British Museum (Natural History), Thelma Ford for preparing the illustration and Owilda Curtis for typing the manuscript.

REFERENCES CITED

- Belkin, J. N. 1962. The mosquitoes of the South Pacific (Diptera, Culicidae). Univ. Calif. Press, Berkeley and Los Angeles, 2 vols, 608 and 412 pp.
- Bram, R. A. 1967. Contributions to the mosquito fauna of Southeast Asia. II. The genus *Culex* in Thailand (Diptera: Culicidae). Contrib. Am. Entomol. Inst. 2: 1-296.
- Edwards, F. W. 1924. A synopsis of the adult mosquitos of the Australasian region. Bull. Entomol. Res. 14: 351-401.
- Edwards, F. W. 1926. Mosquito notes. - VI. Bull. Entomol. Res. 17: 101-31.
- Edwards, F. W. 1932. Diptera, Family, Culicidae. In Wytsman, Genera Insectorum, Fasc. 194. Desmet-Verteneuil, Brussels. 258 pp.

