

Descriptions of Four New Species of *Culex* from Panama (Diptera: Culicidae)¹

PEDRO GALINDO² AND EUSTORGIO MENDEZ²

ABSTRACT

Culex (Melanoconion) johnsoni, *C. (M.) keenani*, and *C. (M.) mesodenticuatus* are described from males. The first-named was taken by sweeping, the others at light. *Culex (Mochlostyrax) arboricolus* is the second described species of its subgenus whose larva has the

scales of the eighth segment arranged in a patch instead of in a single row, and is the second *Mochlostyrax* known to breed in tree-holes; its male, larva, and pupa are described and figured.

Culex (Melanoconion) johnsoni Galindo and Mendez, n. sp.

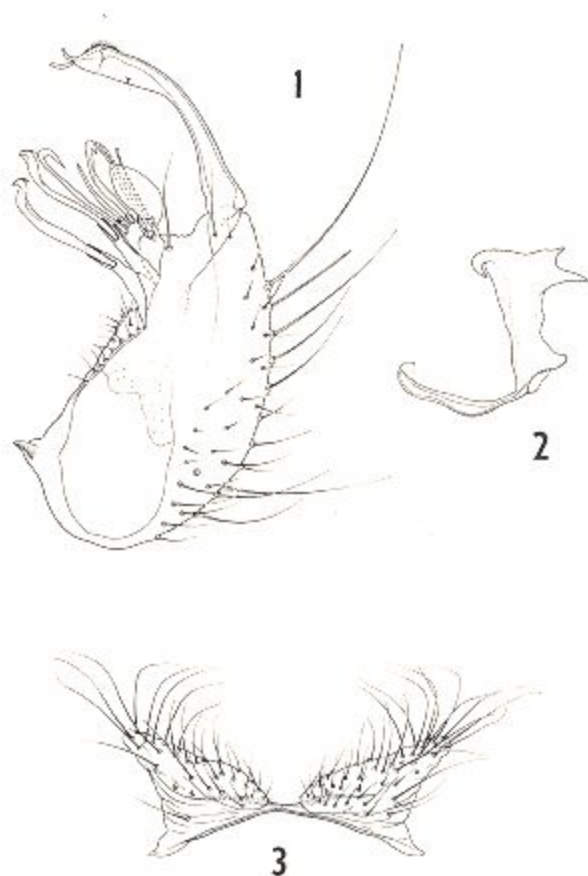
MALE.—Unknown, except for terminalia.

Male Terminalia.—Basistyle conical, about twice as long as its greatest width, bearing the usual deciduous stiff hairs and two prominent setae, one inserted at base of outer division of subapical lobe, the other near insertion of dististyle. Outer division of subapical lobe broadly columnar, bearing a large, clear leaf inserted on a prominent tubercle and the following appendages, starting at the inner corner: a hook-tipped filament; a short, slender, rodlike appendage; a large, bent, broad spine with recurved tip, and three closely appressed filaments with expanded apices. Inner division of subapical lobe with arms about equal in size and widely divaricate from base, appendages subequal in size, sinuate, each ending in a recurved spine. Inner plate of phallosome erect, with three points as follows: a laterally curving horn located at apex of ventral border; a short, pointed tooth inserted on dorsoapical border opposite this horn; and a long, sharp spine more basad on dorsal border. Lobes of ninth tergite conical, with the tip of the cone pointing outward, bearing stiff hairs on its surface which grow progressively longer from base to apex.

Type Material.—Holotype: male terminalia mounted on a slide, from a male collected by sweeping at Pacora, Panama, October 1958. Type to be deposited at the U. S. National Museum.

This species can be separated from all other *Melanoconion* by the shape of the inner plate of the

phallosome and of the lobes of the ninth segment. We take pleasure in naming it after Dr. Carl M. Johnson, Director of Gorgas Memorial Laboratory.



Culex (Melanoconion) johnsoni, new species. FIG. 1.—Style. FIG. 2.—Phallosome. FIG. 3.—Lobes of the ninth tergite.

¹ Partial cost of publication of this paper was met by Gorgas Memorial Laboratory. Accepted for publication September 22, 1960.

² Gorgas Memorial Laboratory, Apartado 6991, Panama, Republic of Panama.

Culex (Melanoconion) keenani Galindo and Mendez, n. sp.

MALE.—A small, light-colored, unmarked *Melanoconion*.

Male Terminalia.—Basistyle slightly more than twice as long as its greatest width, clothed with the usual stiff, deciduous hairs and two prominent setae, one at base of outer division of subapical lobe, the other near insertion of dististyle. Inner division of subapical lobe split into two widely divaricate, unequal arms; lower arm much shorter than upper one, bearing a rather slender appendage ending in a capitate tip, appendage of upper arm similar in shape but shorter and thicker. Outer division narrowly columnar, expanding apically into two arms, inner arm bearing the usual hook-tipped filament accompanied by a much smaller, rodlike appendage, outer arm with three or four closely appressed filaments; inserted between the two arms there are two appendages, an inner one which is slender for most of its length and expands apically into a spatulate tip, and an outer filament bent beyond the middle. Dististyle

slightly less than half as long as basistyle, narrowed at middle, then expanding abruptly on apical third and finally tapering into a truncate, upturned, snout-shaped tip. Inner plate of phallosome erect; dorsal corner produced into a long, narrow point, ventral corner bearing a heavily sclerotized, recurved horn. Lobes of ninth tergite rather small, smooth and hairless apically, and with a basal protuberance clothed with several rows of short, stiff hairs.

Type Material.—Holotype male with terminalia mounted on a slide, collected at light in a Shannon trap at Pacora, Panama, on May 27, 1959. Paratype male with same data as holotype. Holotype to be deposited in the U. S. National Museum; paratype in the Gorgas Memorial Laboratory collection.

This species keys out in Rozeboom and Komp (1950) to *conspirator*; it is easily separated by the lack of a ribbed leaf on the outer division of the subapical lobe and by the shape of the inner plate of the phallosome and of the lobes of the ninth tergite.

We take pleasure in naming this species after Mr. Marvin Keenan, of the Malaria Control Force, USARCARIB, whose enthusiastic and unceasing collecting efforts during the past 10 years have contributed greatly to our knowledge of the insects and mammals of Panama.

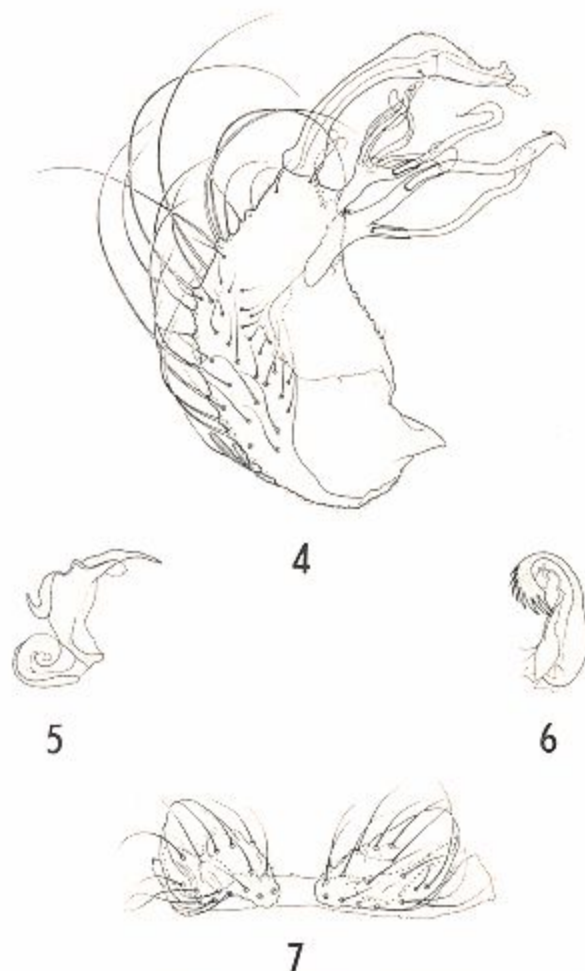
Culex (Melanoconion) mesodenticulatus Galindo and Mendez, n. sp.

MALE.—A small, unmarked *Melanoconion*.

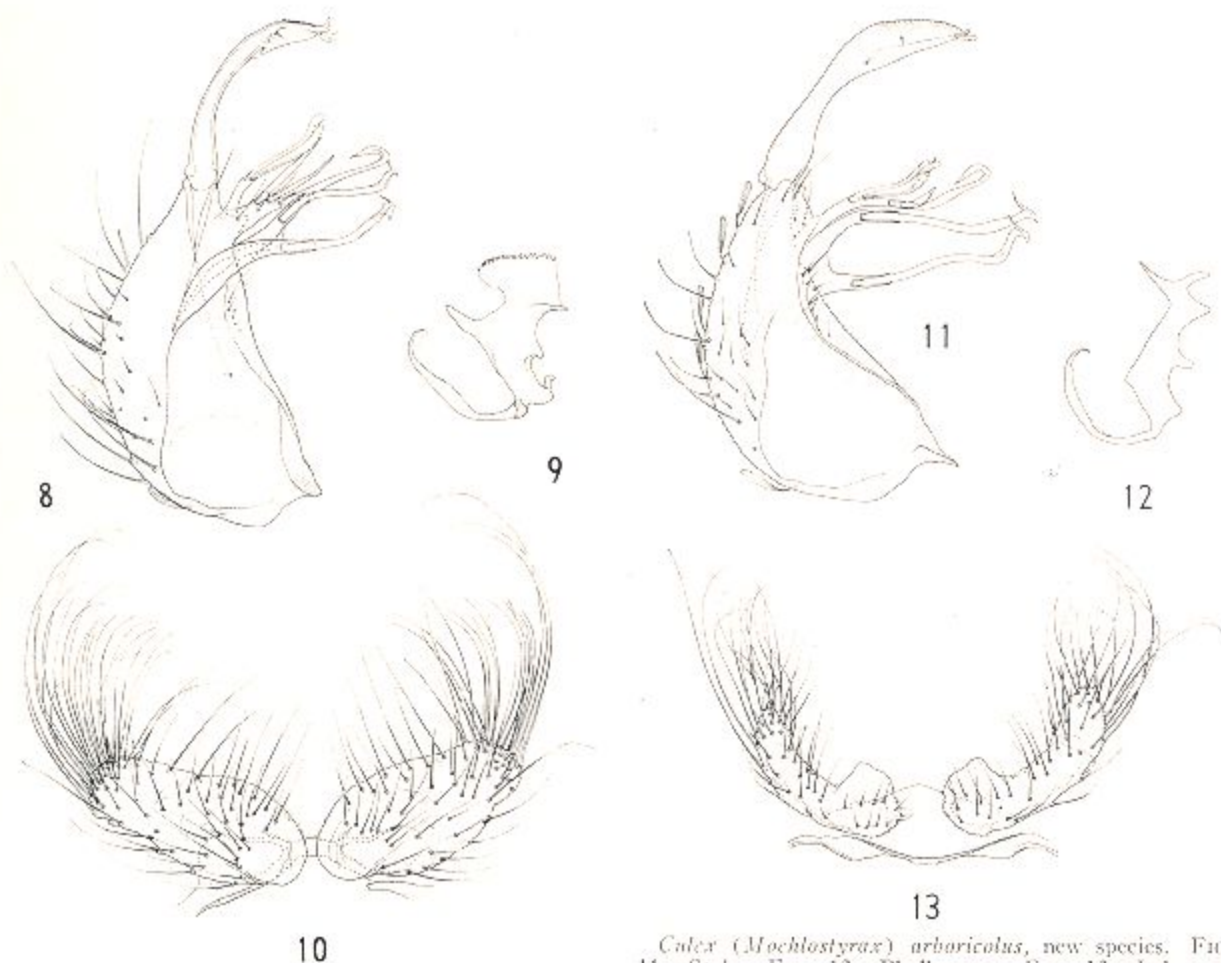
Male Terminalia.—Basistyle slightly more than twice as long as its greatest width, with the usual long, stiff, deciduous hairs along its dorsal margin. Inner division of subapical lobe with two subequal, widely divaricate arms; appendage of inner arm straight for slightly more than half its length, then bending outwardly toward apex and ending in a capitate tip; appendage of outer arm similar in shape, but sinuate from its base. Outer division of subapical lobe divided; inner arm broad, bearing a hook-tipped appendage, a rodlike filament, a flame-shaped filament, and a short, slender seta; outer arm columnar in shape, bearing apically three closely appressed filaments. Dististyle narrowly snout-shaped, with a short, broad, subapical, tongue-like appendage. Lateral plate of phallosome erect, apex broad and bearing a double row of closely appressed, short denticles; dorsal border with a short, heavily sclerotized tooth; ventral border with a long, straight, heavy horn inserted at about the middle. Lobes of ninth tergite ovoid, covered with stiff hairs which grow progressively longer from base to apex.

Type Material.—Holotype: male, mounted on a slide, with terminalia dissected, stained, and mounted separately on same slide. Specimen taken at light in the vicinity of Almirante, Bocas del Toro Province, Republic of Panama, on April 17, 1953. Type to be deposited at the U. S. National Museum.

This species keys out in Rozeboom and Komp (1950) to *C. albinensis*, from which it may be sepa-



Culex (Melanoconion) keenani, new species. FIG. 4.—Style. FIG. 5.—Phallosome. FIG. 6.—Tenth sternite. FIG. 7.—Lobes of ninth tergite.



Culex (Melanoconion) mesodenticulatus, new species. FIG. 8.—Style. FIG. 9.—Phallosome. FIG. 10.—Lobes of ninth tergite.

rated by the long columnar arm on the outer division of the subapical lobe (which is absent in *albinensis*), as well as by the shape of the lobes of the ninth tergite.

Culex (Mochlostyrax) arboricolus Galindo and Mendez, n. sp.

MALE.—A small, unmarked *Mochlostyrax*.

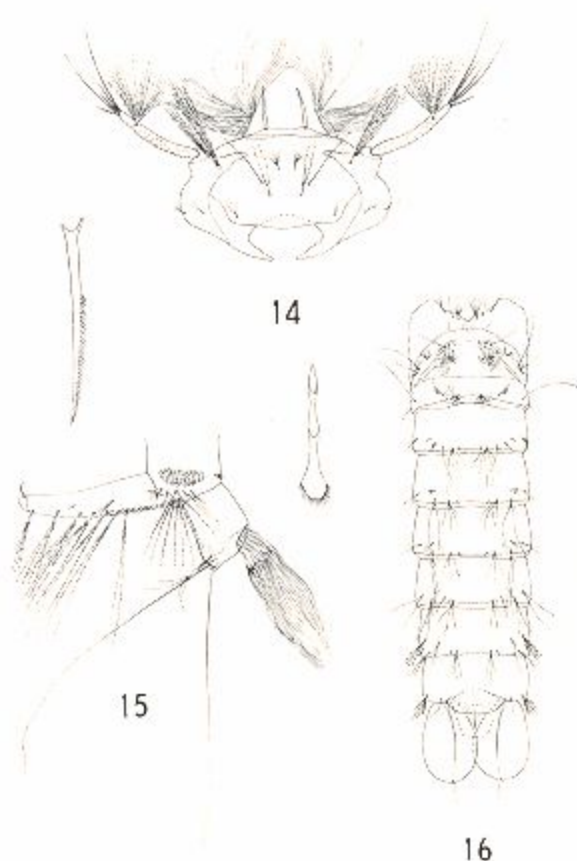
Male Terminalia.—Basistyle conical, over twice as long as its greatest width, bearing the usual stiff, deciduous hairs and scales along dorsal surface, and two conspicuous setae on ventral border, one near base of outer division of subapical lobe and one near insertion of dististyle. Inner division of subapical lobe with widely divaricate arms, each with a long appendage which ends in a capitate tip; outer division of subapical lobe narrowly columnar, inner corner produced apically, bearing a long, recurved spine and (usually) an additional short, broad, tongue-like process, outer corner with a cluster of some four closely appressed, filamentous appendages. Dististyle more or less foot-shaped in outline, narrowed at about the middle, then expanded apically. Lateral plate of

Culex (Mochlostyrax) arboricolus, new species. FIG. 11.—Style. FIG. 12.—Phallosome. FIG. 13.—Lobes of ninth tergite.

phallosome erect, apex with a short, recurved spine pointing ventrally and a long, slender one directed dorsally; ventral border produced subapically into a short, broad, triangular point. Lobes of ninth tergite rather long and slenderly sac-like, with a naked basal protuberance, rest of the lobes mostly covered with long hairs which increase progressively in length from base to apex.

LARVA.—Head wider than long, bulging at the sides. Dorsal head hairs as follows: 4 a small, multiple tuft, 5 double, 6 single, 7 a long tuft with six to eight branches, 8, 9, and 10 very small, double or triple. Antenna spinose, with a long, multiple, subapical tuft. Lateral scales of eighth segment in a broad patch, the individual scales spatulate with spinules at apex. Air-tube about 4x1, tapering gradually from base to apex, tip slightly upturned; pecten teeth on basal third; four to six pairs of long, two- to four-haired, ventral tufts which gradually decrease in size from base to apex; basal tuft within the pecten; a pair of one- to two-haired subdorsal tufts. Anal saddle ringing the segment. Hair 2 a small two- to three-haired tuft, hair 3 single and very long.

PUCHA.—Paddles ovoid, midridge well marked to



Culex (Mochlostyrax) arboricolus, new species. FIG. 14.—Head of larva. FIG. 15.—Terminal abdominal structures of larva. FIG. 16.—Pupa.

apex, apical hair short and single. Chaetotaxy as figured.

Type Material.—All from Cerro La Victoria, Panama. *Holotype*: pinned male, collection number 01306, with terminalia mounted on slide, January 4, 1950. *Allotype*: pinned female, collection number 00356, with associated larval and pupal skins mounted on slide, May 18, 1949. *Paratypes*: three males with terminalia, three larval, and four pupal skins mounted on slides, same data as holotype; two males with terminalia, two larval, and two pupal skins mounted on slides, August 11, 1949; one male with terminalia mounted on slide, January 26, 1950; three males and one female, pinned, two larval and one

pupal skins mounted on slides, same data as allotype; one male terminalia, three larval, and three pupal skins mounted on slides, December 21, 1949; one male terminalia mounted on slide, September 8, 1951. Types are to be deposited at the U. S. National Museum and at the Gorgas Memorial Laboratory collection.

Discussion.—This new species falls close to *C. caudelli* D. and K. and to *C. vexillifer* Komp. It may be separated from the former as follows: (1) In *caudelli* the terminal spines of the phallosome point almost straight outward, thus producing a deep groove between them, while in *arboricolus* they are directed ventrally and dorsally, respectively, so that no groove is formed between them; (2) The lobes of the ninth tergite in *caudelli* bear an acutely triangular basal protuberance, while in *arboricolus* this protuberance is low, rounded, and not nearly as prominent; (3) The apices of the lobes of the ninth tergite are widely expanded and club-shaped in *caudelli*, while in *arboricolus* these lobes are less widely expanded so that they do not appear club-shaped in outline; (4) In *caudelli* the larva has the scales of the eighth segment in a single row, whereas in *arboricolus* these scales are arranged in a large patch. *C. caudelli* is a ground-pool breeder, while *arboricolus* breeds in tree-holes.

From *C. vexillifer*, whose larva also occurs in tree-holes and bears the scales of the eighth segment in a patch, *C. arboricolus* may easily be separated by the shape of the terminal spines of the phallosome, which are very short in *vexillifer* and long in *arboricolus*, as well as by the shape of the lobes of the ninth tergite.

C. arboricolus is the second described *Mochlostyrax* whose larva bears the scales of the eighth segment in a patch instead of in a single row. Rozeboom and Komp (1950) mentioned a third form, occurring in Colombia, whose male terminalia appear exactly as in *C. (M.) alogistus*. We have found the same form in the highlands of Chiriqui, but have postponed its description while awaiting additional material to make a detailed comparison with typical *alogistus* specimens.

REFERENCE CITED

- Rozeboom, L. E., and W. H. W. Komp. 1950. A review of the species of *Culex* of the subgenus *Melanoconion* (Diptera, Culicidae). *Ann. Ent. Soc. America* 43: 75-114.

Reprinted from the