

These names are abbreviated as follows: Camp Breckenridge: CB; Camp Campbell: CC; Danville: D; Fort Knox: FK; Lexington: L; Fort Thomas: FT.

*Culex pipiens* Linnaeus and *C. quinquefasciatus* Say are not included since it is not known whether identifications were based on examinations of male genitalia. However, the two species are known to comprise a major portion of the mosquito problem during the summer and early fall months.

#### COLLECTION RECORDS

*Anopheles barberi*, June, July, Aug., (6), CC; *An. crucians*, May, (2), CC; *An. punctipennis*, May-Sept., (574), CB, CC, D, FK; *An. quadrimaculatus*, May-Oct., (297), CB, CC, D, FK.

*Toxorhynchites r. septentrionalis*, Oct. 2, 1944, (3), CC.

*Uranotaenia sapphirina*, July, Sept., (2), CC, FK.

*Culiseta inornata*, May, (2), FK.

*Orthopodomyia signifera*, June, Aug., Oct., (38), CC, FK.

*Mansonia perturbans*, July 25, 1945, (1), CC.

*Psorophora ciliata*, July, Sept., Oct., (8), CC, FK; *P. cyanescens*, June-Oct., (208),

CC; *P. ferox*, June, July, (7), CC; *P. horrida*, June 5, 1945, (1), CC; *P. confinnis*, July, Sept., Oct., (25), CB, CC, FK; *P. discolor*, May, July-Oct., (52), CC, FK.

*Aedes canadensis*, May, June, (26), CC, FK; *A. sticticus*, May, June, (12), CC; *A. triseriatus*, May-Oct., (121), CC, FK; *A. vexans*, Apr.-Oct., (163), CB, CC, FK, FT.

*Culex restuans*, Apr.-Oct., (535), CB, CC, D, FK, L; *C. salinarius*, Jan., May-Oct., (198), CC, D, FK; *C. tarsalis*, Sept., Oct., (4), CC, FK; *C. erraticus*, June-Oct., (72), CC, FK; *C. territans*, May-July, Sept., Oct., (62), CB, CC, FK.

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## THE STIRRUP-SHAPED PIECE AS AN AID IN THE TAXONOMIC STUDY OF MOSQUITO LARVAE \*

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The presence of a sclerotised structure, called the stirrup-shaped piece, in the siphon or air tube of mosquito larvae has been known for a long time (Howard, Dyar and Knab, 1912). Marshall (1938) states that the stirrup-shaped piece articu-

lates with the inner flaps of the five valves at the distal end of the siphon. This structure is reported to be movable, and the direction of movement is supposed to determine the positions assumed by the valves. Distal movements of the stirrup-shaped piece causes the valves to diverge from each other, and to form a star-shaped figure. These valves, by adhering to the

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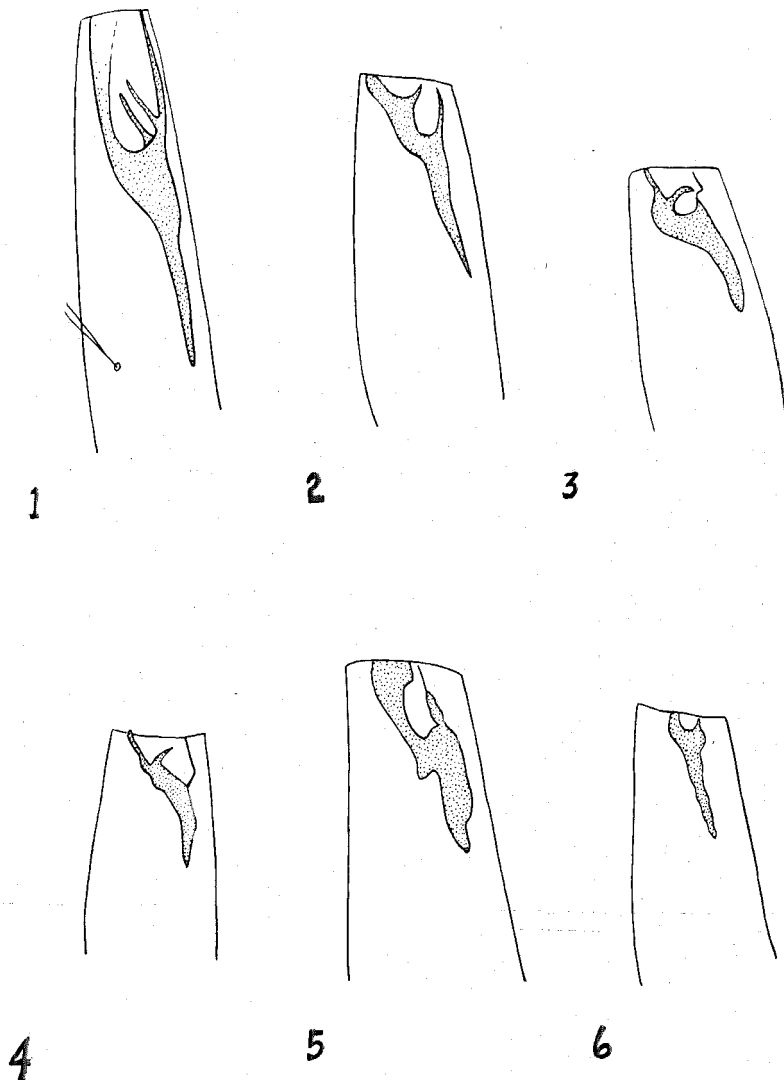


PLATE I

Sketches of the distal end of the siphons of several species of mosquito larvae showing general shape of the stirrup-shaped piece. Sketches were made from permanent slides. The ventral surfaces of the siphons are to the reader's left. Valves and tracheae have been omitted. Fig. 1, *Culex thriambus* Dyar. Fig. 2, *Uranotaenia syntheta* Dyar & Shannon. Fig. 3, *Aedes zoosophus* Dyar & Knab. Fig. 4, *Culiseta inornata* Williston. Fig. 5, *Psorophora howardii* Coquillett. Fig. 6, *Orthopodomyia alba* Baker.

surface film, help to maintain the larva at the water surface. When the larva dives, the stirrup-shaped piece is moved proximally. This movement in turn causes the valves to fold together over the end of the siphon (Marshall, 1938; Natvig, 1948):

So far as could be determined, the stirrup-shaped piece has not been used to any great extent by workers in mosquito larval taxonomy. The writer believes, however, that this structure should be given careful attention in all taxonomic studies of culicine mosquito larvae. It appears likely that it will often prove to be a good supplementary taxonomic feature, and may in some cases, even be of prime importance. The following preliminary observations, with the accompanying sketches, are offered in support of these conclusions.

The stirrup-shaped piece is partially surrounded by the two tracheal tubes which extend to the distal end of the siphon. Since the siphon and tracheae are translucent, the general shape of the structure can usually be seen even in permanent larval holomounts. However, in such studies, details of structure cannot be determined with certainty. All the sketches (Plate I) were made from permanent slides, and this is the reason that no details are shown and the valves are omitted.

The possible importance of the stirrup-shaped piece first came to the writer's attention in a recent study of the larvae of *Culex thriambus* Dyar. This species has been considered to be a synonym of *C. stigmatosoma* Dyar, but was recently restored to specific rank (Galindo and Kelley, 1943). The stirrup-shaped piece of many species of *Culex* has been examined, including species considered to be closely

related to *C. thriambus*. This structure is so outstanding in *C. thriambus* that it is believed the larvae can be determined from the stirrup-shaped piece alone. In no case, except *C. thriambus*, has the writer seen a stirrup-shaped piece with two elongate teeth attached to the dorsal side of its expanded portion (Fig. 1, Plate I).

In addition to possible significance in studies of fourth instar larvae, the stirrup-shaped piece may often be of value in distinguishing between instars. Mr. Robert A. Hedeem, a graduate student of the writer's, has found that the extent of development of the structure is one of the easiest methods of distinguishing between the second and third instars of certain species.

Sketches of the stirrup-shaped pieces of several species of mosquito larvae are reproduced in Plate I. Preliminary studies indicate that the general shape of this structure may have value in distinguishing between genera. Considerably more study and detailed dissections of the stirrup-shaped piece must be made, however, before its ultimate importance as a taxonomic feature can be determined with certainty.

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