

SEXUAL DIMORPHISM IN MOSQUITO PUPAE<sup>1</sup>

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Structural difference in the sexes of mosquito pupae is so obvious that it seems unlikely this fact should have escaped the attention of so many investigators. However, a review of the literature has revealed no indication of general cognizance of sexual dimorphism in this stage of the mosquito's life history.

Cantrell (1939) pointed out that there is a significant difference in the size of pupae of *Aedes aegypti* (L.) which will permit separation of the sexes of this species prior to emergence. Measurements made on *A. triseriatus* (Say) also demonstrated a difference in range of size, but there was an overlapping in size of the small female pupae and the large males. *A. vexans* (Meig.) was not separable on a size criterion as the range was almost identical in both sexes.

Penn (1949) in his recent papers on mosquito pupae, has illustrated males of some species and females of others, all sexed and correctly labeled, but he has neither mentioned the intraspecific differences nor given the dimorphic patterns of any single species.

Although there were many discrepancies in earlier works, later papers treating the morphology of mosquito pupae (Edwards 1941, Knight and Chamberlain 1948, Penn 1949) are in accord as to the segmentation of the pupal abdomen. Ten abdominal segments are now considered to be present. The ninth segment is fused immovably to the tergum of the eighth segment and lies dorsad of the paddles (on plate I, segment nine is represented by a broken line). Ventrad of the paddles, attached to the sternite of the eighth is the tenth abdominal segment, which has also been termed the genital pouch. It is through the examination of

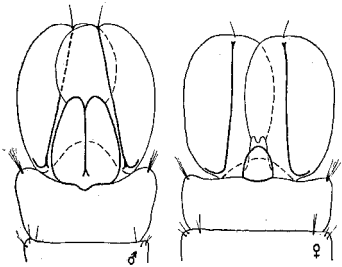
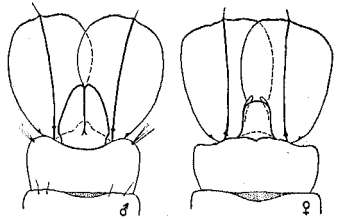
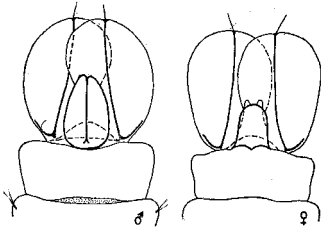
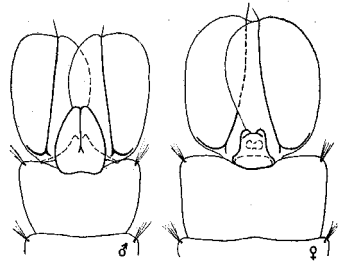
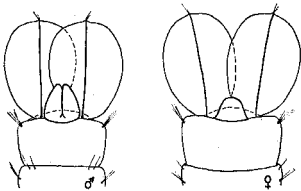
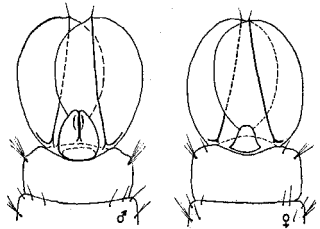
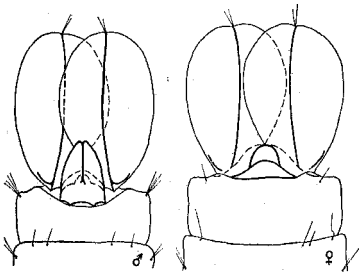
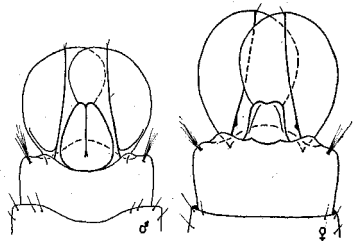
this tenth or genital segment that the sex of the future adult mosquito can be determined prior to eclosion.

The terminal segment of the male pupa, in all of the species studied, was shield-shaped and bifurcate on the distal end. The female genital segment showed much more interspecific variation and was generally more broadly ovate in form. Although the majority of taxonomists working on the classification of mosquito pupae have almost exclusively used the trumpets, paddles and chaetotaxy for identification, the genital segment also appears to possess good, valid, taxonomic characters which should not be overlooked.

In the course of this study, eight common species of mosquitoes, representative of five different genera, have been examined and reared. These were *Aedes stimulans* (Walk.), *A. trivittatus* (Coq.), *A. vexans* (Meig.), *Anopheles punctipennis* (Say), *Culex apicalis* Adams, *C. restuans* Theob., *Culiseta inornata* (Will.) and *Psorophora ferox* (Humb.). In each case there was sufficient morphological difference to permit sexual separation of the pupae before emergence, and the results were all verified by re-examination of the adults. A single exuvium of a male *Megarhinus septentrionalis* D. & K. exhibited features analogous to males of the other species, and dimorphic characters are expected to parallel those depicted, but as there were no female specimens at hand for comparison this species has been omitted from the plate.

A simple technique was employed for separating the living pupae. By cutting off the tapered portion of a medicine dropper and fire polishing the end, a convenient, short, transfer pipette can be made which will take up only a few milliliters of water with the pupa. In a short time, the pupa will come to rest in the meniscus

<sup>1</sup> Contribution from the Entomological Laboratories of the University of Illinois.

AEDES STIMULANS (WALK.)AEDES TRIVITTATUS (COQ.)AEDES VEXANS (MEIG.)ANOPHELES PUNCTIPENNIS (SAV.)CULEX APICALIS ADAMSCULEX RESTUANS THEOB.CULISETA INORNATA (WILL.)PSOROPHORA FEROX (HUMB.)

DIMORPHISM IN REPRESENTATIVE SPECIES OF MOSQUITO PUPAE

(DRAWN FROM VENTRAL ASPECT)

at either the top or bottom of the water column. The surface tension on the trumpets together with the body contact on the walls of the pipette will keep the individual immobile. If reasonable care is exercised and the pupa is not jolted or jarred, the pipette may be turned on its side or in any other position which will offer an examination of the genital segment while the pupa remains *in situ*. This can best be accomplished by means of a binocular dissecting microscope, but a good hand lens will serve equally well after one becomes familiar with the patterns of the species with which he is working. The dimorphic characters can also be recognized in a profile view, and through such aids as comparing the relative length of the tenth segment with that of the ninth and the paddles, one can

soon become quite proficient in sexing mosquitoes in the pupal stage.

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## OBITUARY

### DR. HARRY MARTINDALE SPEECHLY

Dr. Harry Martindale Speechly, the son of the first missionary Bishop of the Anglican Church in Travancore and Cochin, India, was born in Cochin in 1866. He received his primary education at Monkton Combe School in Bath, England, attended Cambridge University, and took his medical studies at London Hospital. His medical degrees were M.R.C.S. (England), and F.R.C.P. (London). The University of Manitoba also conferred on him the honorary LL.D.

Dr. Speechly came to Canada in 1901, settling at Pilot Mound, Manitoba. He was Coroner at Pilot Mound from 1906 to 1916, and Provincial Coroner from 1920 to 1942. During the first World War he served as an army medical officer at Fleet, England, and in the second he was assistant medical officer at King Edward Hospital in Winnipeg.

Dr. Speechly died at Winnipeg on March 17, 1951. He is survived by his wife, Mary; his sons, William of Winnipeg and Leslie G. of Montreal; and by a daughter, Mrs. E. J. Stansfield of Winnipeg.

His chief secular interest was the Greater Winnipeg Mosquito Campaign, of which he served as President and Chairman since its organization in 1926. In 1950 he was elected the first regional Director from Canada in the American Mosquito Control Association.

His was a vibrant and arresting personality indeed, keenly interested in all about him, and with a unique and frequently pungent way of expressing his ideas. Those who had the pleasure of seeing him at technical and professional meetings greatly enjoyed his forthright personality and good practical sense.—  
HAROLD F. GRAY.