

mined in laboratory tests of larvae from treated and untreated areas. Tests were made in six counties in the Valley—Kern, Tulare, Kings, Fresno, Merced, and Madera.

*Aedes nigromaculis* larvae from the treated areas were found to be from three to seven times as resistant to DDT as larvae from the untreated areas. Resistance to toxaphene was less than twice that of larvae from the untreated area except in two areas, in which resistance was from two to three times that of the larvae from the untreated area. Little or no resistance to lindane and aldrin was shown except in one area in the Kern District, where it was twice that of the larvae from the untreated area.

In a few tests with *Aedes dorsalis*, resistance to DDT was 3 to 12 times that of larvae from the untreated area, but no resistance to the other insecticides was indicated.

*Culex tarsalis* larvae from a duck club in the Kern District, where applications of toxaphene and aldrin were failing, were found to be 10, 33, 11, 215, and 1300 times as resistant, respectively, to DDT, toxaphene, lindane, aldrin, and heptachlor as

larvae from an untreated area. Larvae from a nearby duck club had a smaller range of resistance. Parathion was about equally effective on both treated and untreated larvae. DDT at 1 pound per acre was effective against these larvae in the first application and failed in the second. Dieldrin was ineffective at 1.5 pounds per acre.

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## FURTHER OBSERVATIONS ON SEXUAL DIMORPHISM IN MOSQUITO PUPAE (DIPTERA, CULICIDAE)

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Moorefield (1951) pointed out obvious structural differences in the sexes of mosquito pupae as exhibited by the structure of the tenth abdominal segment (genital pouch) which is attached to the sternite of the eighth segment and lies ventral of the paddle. Moorefield illustrates these sexual characters as observed in eight

species of mosquitoes representing five genera studied as follows: *Aedes stimulans* (Walker), *A. trivittatus* (Coquillett), *A. vexans* (Meigen), *Anopheles punctipennis* (Say), *Culex apicalis* Adams, *C. restuans* Theobald, *Culiseta inornata* (Williston) and *Psorophora ferox* (Humboldt).

The writer has checked and verified this character for separating the sexes of mosquitoes in the pupal stage by examining both males and females with associated

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pupal skins of thirty-two species of mosquitoes occurring in North and Central America, representing thirteen genera. The following genera and species were examined: *Anopheles albimanus* Wiedemann, *A. aquasalis* Curry, *Toxorhynchites hypoptes* Knab, *Trichoprosopon digitatum* (Rondani), *Sabethes cyaneus* (Fabricius), *S. chloropterus* (Humboldt), *Wyeomyia scotinomus* Dyar and Knab, *W. arthrostigma* Peryassu, *W. personata* (Lutz), *Limatus durhamii* Theobald, *Uranotaenia geometrica* Theobald, *Culiseta incidens* Thomson, *C. maccrackenae* Dyar and Knab, *Orthopodomyia fascipes* Coquillett, *Psorophora ferox* (Humboldt), *Aedes taeniorhynchus* (Wiedemann), *A. euplocamus* Dyar and Knab, *A. leucocelaenus* Dyar and Shannon, *A. leucotaeniatius* Komp, *A. terreus* (Walker), *A. septemstriatus* Dyar and Knab, *Haemagogus spegazzinii falco* Kumm et al., *H. equinus* Theobald, *H. argyromeris* Dyar and Ludlow, *H. chalcospilans* Dyar, *H. lucifer* Howard, Dyar and Knab, *Culex mollis* Dyar and Knab, *C. quinquefasciatus* Say, *C. bihaicolus* Dyar and Nunez Tovar, *C. secundus* Bonne-Wepster and Bonne, *C. conservator* Dyar and Knab and *C. corrigani* Dyar and Knab.

The size of the tenth segment or genital

pouch corresponds to the size of the genitalia of the adult male or female mosquito in question. The genital pouch of pupae examined for male mosquitoes differed in size according to the genera and species. In some *Culex* species the pouch was only about one-third as long as the pupal paddles, while in some other genera, particularly *Limatus*, it extended to the outer one-third of the paddles. In the males the pouch was always bifurcate to near the base, while in the females it was always shorter than in the males and broadly rounded, sometimes slightly indented posteriorly.

This sexual character can be seen quite readily in the living pupa by taking the specimen up in a transfer pipette as described by Moorefield and rotating the pipette into proper position and examining the specimen under a binocular dissecting microscope or a good hand lens. This means of sexing mosquito pupae is of considerable value when mosquitoes are being reared and associated with their exuviae for taxonomic studies.

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## A FIRST RECORD OF *Aedes diantaeus* H. D. & K. FOR MASSACHUSETTS WITH NOTES ON ASSOCIATED SPECIES<sup>1</sup>

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On April 1, 1951, in a kettlehole about three miles north-northeast of Westhampton, Massachusetts, many first instar larvae of *Aedes diantaeus* were collected

with numerous other Culicine larvae. This species has never been reported from Massachusetts, nor has it been reported south of Dublin, New Hampshire, its type locality. Dyar (1928) reports the distribution as "Canadian forested region from N. H. and Ontario to British Columbia. The species is rare and local, frequenting

<sup>1</sup>Contribution of the Department of Entomology, University of Massachusetts, Amherst, Mass.