

EFFECTS OF ELECTRIC SHOCKS ON *Culex pipiens*HANSJOACHIM SCHOBER<sup>1</sup>Instructor in Biology, State University of  
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In some laboratory experiments in which mosquito larvae and pupae (*Culex pipiens*) were subjected to electric shocks, some mortality occurred and some interesting malformations of adults from surviving larvae were observed.

The larvae and pupae were placed in tap water in small glass dishes (19 cm. in diameter and 8 cm. deep) between two electrodes made from aluminum bars 13 cm. long and 1.3 cm. square, placed parallel 9 cm. apart in just enough tap water to cover them. Using a current of 130 volts at 0.085 amps., two "shocks" of 8 minutes and 6 minutes duration, respectively, an hour apart, were administered to 20 pupae and 16 larvae in the 2nd, 3rd and 4th instars, and one shock of 8 minutes duration was given to 16 fourth instar larvae. Of the specimens which received 2 shocks, all 16 larvae died within 8 hours; 5 of the 20 pupae died without transforming, but 15 pupae survived to become apparently normal adults. Of the 16th fourth instar larvae which had only 1 shock, 14 survived to become adults, but three of them had malformations as follows: On one specimen the third leg on the left side was reduced to a stump beyond the coxa (Fig. 1, A) and each of the other five legs had the tarsus reduced to one small first segment only. (Fig. 1, B). Another specimen had the tarsus of one of the third legs reduced to a stump (Fig. 1, C) while the other 5 legs were normal. In the third specimen, the tarsus of each of the 2nd pair of legs had only the first joint, and this was shorter than normal (Fig. 1, D).

The tentative nature of these observations is obvious, but they are presented here for their intrinsic interest. However, there are many implications that immediately suggest themselves as being of interest to investigate further in more extensive and more precisely controlled experiments. The fact that mortality occurred suggests exploring the possibility of using electric shocking in controlling mosquitoes in situations where chemical control might be dangerous, ineffective, or otherwise objectionable, such as in cisterns, stock drinking troughs, rain barrels, and small pools used by ducks or other birds and animals. These and similar habitats include typical *Aedes aegypti* breeding sites as well as those of *Culex pipiens* and other species of economic and public health importance. The appearance of morphological anomalies in adults, assumed to have resulted from sublethal shocks administered to the larvae, also requires verification and merits further investigation.

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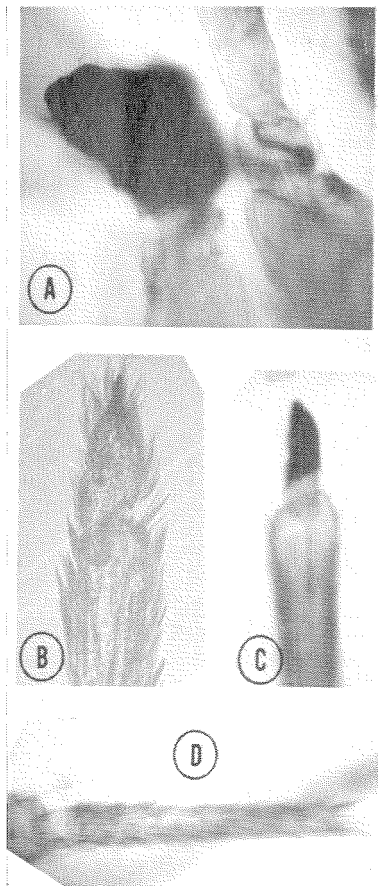


FIG. 1.—Anomalies in legs of *Culex pipiens* adults from electrically shocked larvae.

A SURVEY TECHNIQUE FOR *Mansonia Perturbans*

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During October and November of 1963, a Hennepin County crew of the Metropolitan Mosquito Control District under the supervision of James Linton made a survey for *Mansonia perturbans* breeding. The need for this survey was evident because the adult population of *Mansonia* (as determined from light trap collections) increased 116 percent over the 1962 population.

It is of special interest that the methods and equipment used were both unorthodox and simple. Prior *Mansonia* surveys employed the various techniques and equipment that have proved suc-

cessful in other parts of the United States. The only equipment used in this survey was the same enameled drinking dippers used during the rest of the year to check other mosquito breeding.

Relatively little time was required to check a site. The men waded into the water to about knee depth out to the fringe of plants along the open water. Selecting one plant, they would force their dippers down into the muck near the roots of the plant, then under the roots scraping as close to the main stem as possible and along the roots themselves. This tended to disturb and loosen any larvae present. The dippers were then

carefully raised to the surface. As the mud settled out and the water in the dipper cleared, the larvae were quite visible.

This survey took place from the latter half of October to the middle of November. It seemed the best time to make it since by then the larvae were well-developed fourth instars. The densities of the larvae ranged from one larva in thirty dips to twelve in one dip. Two-man crews were used consuming eighteen man-days. Twenty-five positive breeding sites were found. The size of the sites ranged from two acres to six hundred and sixty-five acres.

#### DDVP AS A KILLING AGENT IN NEW JERSEY LIGHT TRAP

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For routine light trap catches in rural areas of northern West Pakistan we were hesitant to use cyanide as a killing agent owing to its toxicity. A test using DDVP (Vapona, Shell Corporation), which is safe to handle, reveals that this fumigant insecticide is satisfactory as a light trap killing agent. An advantage of using DDVP is the ease of recharging the killing jar.

A one pint jar containing potassium cyanide imbedded in plaster of paris was compared on alternate nights to an identical jar containing two 6 cm. discs of Vapona plastic dispenser cut to fit

into the bottom and covered with cardboard. The comparison was carried out in Garden Town, a suburb of the south edge of Lahore, during April, 1964. A standard New Jersey light trap with 25-watt bulb was used. Catches were relatively small since the trap was hung in a screened porch with only one door left open during the night.

Twenty consecutive catches (10 nights for each killing agent) yielded the following totals:

	Cyanide	DDVP
Culicidae <sup>4</sup>	15	32
<i>Phlebotomus</i> <sup>5</sup>	36	27
Other Nematocera	1869	1426
Calypterata	37	32
Acalypterata	95	88
Lepidoptera	103	99
Coleoptera	46	48
Hemiptera	472	368
	2673	2120

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<sup>4</sup> Only *Culex pipiens quinquefasciatus* Say (= *C. fatigans* Wied.).

<sup>5</sup> *Ph. clydei*, *squamipleuris*, *antennatus*, *babu*, *bagdadis*.