

# DDT EMULSION FOR THE CONTROL OF CULICINE MOSQUITOES IN CISTERNS

R. P. HOLDSWORTH, JR.,<sup>1</sup> CHRISTIAN C. DEONIER,<sup>2</sup> AND Z. D. HARRISON<sup>1</sup>

In Key West, Fla., one source of drinking water is rain that runs off roofs into concrete cisterns. Many of these cisterns have been abandoned and are now prolific sources of culicine mosquitoes, especially *Culex quinquefasciatus* Say and *Aedes*

*aegypti* (L.). These abandoned cisterns were used for testing the effectiveness of various concentrations of DDT (1-trichloro-2,2-bis (*p*-chlorophenyl) - ethane) against culicine mosquitoes.

<sup>1</sup>Lieutenant, U.S.N.R.

<sup>2</sup>Entomologist, U.S.D.A., Agr. Res. Adm., Bureau of Entomology and Plant Quarantine, working under a transfer of funds, recommended by the Committee on Medical Research, from the Office of Scientific Research and Development to the Bureau of Entomology and Plant Quarantine.

The DDT was applied as an emulsion made from a concentrate containing 20 percent of DDT, 60 percent of xylene, and 20 percent of *Triton X-100* (an aralkyl polyether alcohol). The applications were made by mixing the concentrate with about a gallon of water from the cistern

TABLE I. Effectiveness of various DDT emulsions against culicine mosquitoes in cisterns at Key West, Fla.

Concentration of DDT <i>P.p.m.</i>	Cistern		Date of Treatment 1943	Weeks Effective Number
	Surface Area <i>Square Feet</i>	Depth <i>Feet</i>		
5	80	1.0	Dec. 15	31 <sup>1</sup>
	144	1.0	Nov. 2	37 <sup>1</sup>
	90	3.5	Dec. 14	31 <sup>1</sup>
	45	2.0	14	31
	144	1.0	15	31 <sup>1</sup>
	100	.5	15	19 <sup>2</sup>
	100	1.0	15	17 <sup>2</sup>
2	108	1.0	Nov. 2	17
	120	2.0	Dec. 14	14
	140	1.0	14	14
	80	1.0	15	14
	52	1.5	15	31 <sup>1</sup>
	88	2.5	14	15
1	70	2.0	Nov. 2	37
	30	2.5	Dec. 14	31
	48	1.5	15	17
	130	1.0	Nov. 2	37
	48	4.0	2	14
	228	2.5	Dec. 15	13
	96	4.5	15	21 <sup>3</sup>
.05	120	3.5	15	3
	100	2.0	14	5
	150	1.0	14	3
	140	1.0	Nov. 2	Initial kill only
	80	.5	2	
.025	120	3.0	2	No control
	90	3.5	2	
	210	2.0	Dec. 15	Initial kill
	70	2.0	15	100
	100	2.0	14	per
	60	3.5	14	cent

<sup>1</sup>Treatment still effective on July 1, 1944, when the experiment was terminated.

<sup>2</sup>Cistern dry.

<sup>3</sup>Pupation prevented for 9 weeks after fourth instars appeared.

being treated, and stirring in the resulting emulsion.

The various concentrations of DDT were tested for both initial kill and residual effect, and the insecticide was considered to have lost its residual effect when living fourth-stage larvae were found.

Although 31 cisterns were used, this number is not considered sufficient to bring out the true variation in results that would be expected from an experiment of this sort. The results are given in table 1. The final reading was made July 7, 1944, at which time the concentration of 5 p.p.m. was still effective.

Since the quantity of the concentrate required to give 1 p.p.m. is only 0.14 ml. per cubic foot, it was difficult to measure out the minimum dosages required for initial kill in some of the small cisterns.

In these tests it was observed that the

treatments had no effect on continued oviposition. Since females are not repelled, they do not seek untreated places to oviposit. The eggs hatched and the newly hatched larvae succumbed to the DDT. As the effectiveness of the DDT decreased, a few late instar larvae survived, but in one cistern, although fourth-instar larvae were numerous, no pupae were present until 9 weeks after the appearance of the mature larvae.

Many factors influenced the effectiveness of the treatments. Some of the cisterns were open, while others were covered. Many were full of trash. A few were highly polluted, and pollution undoubtedly affects dosage requirements. A highly polluted breeding place requires more DDT for initial kill, and a shorter residual control is obtained.