CONTROL OF MOSQUITOES FOUND IN LOG PONDS IN WESTERN OREGON

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Several species of pest mosquitoes are known to breed in the log ponds of western Oregon. Since the lumber industry has undergone considerable expansion in recent years, the number of log ponds and the acreage involved have also increased. In 1940, 442 mills were in operation in the 19 western counties while in 1947 there were 1295. This change has obviously increased the mosquito potential of the region.

The predominating species in the log ponds are *Culex tarsalis* Coq., *C. stigmatosoma* Dyar, and *Culiseta incidens* (Thompson). *Culex pipiens* (L), *C. territans* (Walk.), and *Anopheles punctipennis* (Say) are found in lesser numbers. Normally, the ponds support larvae from May through September. A seasonal species trend apparently exists, at least in the Corvallis area, in which *tarsalis* and *incidens* predominate in the spring and early summer but *stigmatosoma* is more prevalent in the late summer and fall.

Several experiments on the control of mosquitoes breeding in log ponds have

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TABLE 1.—Control of mosquito larvae in log ponds with DDT in various formulations and dosages

Plot No.	Rate of Treatment: Pounds Per Acre	Rate of Treatment: P.P.M.	Per Cent Mortality after 48 hours	Remarks
	50% W.P.			
4	1.6	0.2	75	Heavy infestation in 14 days.
5	1.5	.1	0	No control.
	5% in oil			
8	0.3	.0167	100	Larvae again in 14 days, many in 30 days.
12	.5	.0336	90	Heavy infestation in 18 days.
3	.5	.0335	90	Heavy infestation in 12 days.
	25% Emul. conc.			
10	0.6	.04	100	Light infestation 18 days, heavy in 30.
1	1.6	.1	100	Protection 30 days or more, infested in 48 days.
2	3.6	.1	100	Light infestation at 30 days, heavy in 48 days.
11	3.4	.2	100	No infestation at 18 days, but heavy in 30.
6	6.1	.2	100	Light infestation at 30 days, heavy in 48.
13	4.4	.2	95	No larvae after 30 or more days.

been conducted by the authors during the last few years. Most of them were with DDT and EPN and were directed toward determining (1) the amount of toxicant required, (2) the most effective formulation, and (3) the length of time a single application would remain effective.

All the test ponds were less than 5 acres in size, and averaged approximately 6 to 7 feet in depth. In the spring season (May and June) water temperatures were between 55° and 60° F.; in September they varied from 62° to 68° F.

A trombone-type hand sprayer was used for all applications. The insecticide concentrate was diluted with water obtained from the intake of the pond being treated and applied at a rate of 1 gallon per acre. In one series of tests (table 1) the toxicant was applied on a parts per million basis after computation of the volume of the pond, and in another (table 2) on a surface-acreage basis as might be in a practical control operation.

Percent control was established from the difference in the average number of larvae recorded in at least 20 dips per pond prior to and 24 and 48 hours after treatment. Only the 48-hour records are presented, but kill was similar at both intervals in most tests.

High initial reduction of larvae of *Culex tarsalis* and *Culiseta incidens* mosquitoes was demonstrated with DDT emulsions at rates of 0.04 to 0.2 p.p.m. and practical control through approximately 30 days at

TABLE 2.—Per cent mortality of mosquito larvae in log ponds 48 hours after treatment with DDT and EPN. 3 applications

Pounds per acre	Emulsion: EPN	Emulsion: DDT	Wettable Powder: EPN	Wettable Powder: DDT
0.0125	76	—	—	—
.025	89	—	—	—
.05	98	86	47	—
.075	99	95	95	—
.1	97	99	96	65
.25	100	100	—	83

0.1 and 0.2 p.p.m. Wettable-powder treatments of DDT were much less effective. Surface oils provided a good initial kill but reinfestation occurred more rapidly than with the emulsions.

On a surface-application basis complete control of *Culex tarsalis, C. pipiens,* and *Culiseta incidens* mosquitoes was obtained with as little as 0.25 pound of DDT or EPN in an emulsion per acre. However, this dosage probably represents the minimum and would no doubt be too low for general practical application, as reinfestation of the ponds was evident within 2 weeks.

When the results with the EPN and DDT emulsions are compared on a basis of 100 percent mortality, no difference in effectiveness is evident. At 0.025 pound of EPN per acre a mortality close to that caused by 0.05 pound of DDT was obtained. These figures do not demonstrate the difference between the two insecticides reported by Yates and Lindquist (1952) and Gjullin *et al.* (1953). Those workers showed that EPN was considerably more effective than DDT.

Because of these seemingly poor results with EPN, a series of laboratory tests was conducted relative to possible variations of effectiveness of either insecticide due to physical or chemical conditions of log pond water and to water temperature within the range of 60° to 80° F. The materials were tested at various dilutions in both tap and pond water against a mixture of *Culex tarsalis* (65%), *C. pipiens* (25%), and *Culiseta incidens* (10%) mosquitoes. The results (table 3) suggest a negative temperature coefficient for DDT in either medium and a slight positive temperature coefficient for EPN in tap water but no difference in pond water. Some apparent reduction of effectiveness in log pond water was indicated, possibly due to the suspended matter present or to an unidentified chemical condition.

TABLE 3.—Per cent mortality of mosquito larvae 48 hours after treatment with DDT or EPN in the laboratory

	At 80° F.		At 60°–70° F.	
P.P.M.	Tap Water	Pond Water	Tap Water	Pond Water
DDT				
0.00167	17	5	56	48
.0025	58	35	91	87
.005	96	—	100	95
.01	85	85	100	100
.02	98	97	100	—
.04	100	—	—	—
EPN				
0.000667	45	—	44	—
.001	82	58	69	51
.00125	93	67	79	59
.00167	99	73	82	78
.0025	—	—	85	78

Literature Cited

GJULLIN, C. M., ISAAK, L. W. and SMITH, G. F. 1953. The effectiveness of EPN and some other organic phosphorus insecticides against resistant mosquitoes. Mosquito News 13(1):4–7.

YATES, W. W. and LINDQUIST, ARTHUR W. 1952. Toxicity of EPN, DDT and parathion to larvae of various species of mosquitoes. Mosquito News 12(4):247.