ARTICLES

ADDITIONAL OBSERVATIONS ON THE CONTROL OF MOSQUITO LARVAE IN ALASKA WITH DDT[1]

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Observations and larval dipping counts were made during the season of 1950 in Alaska to determine the effect on mosquito breeding of residual DDT from treatments in 1948 and 1949. Further studies were also made on the effectiveness of different DDT formulations for the control of mosquito larvae in Alaska. These studies were a continuation of those carried out in 1949 (Travis *et al.* 1950).

RESIDUAL EFFECTIVENESS OF DDT SPRAYS AGAINST LARVAE. In 1948, an area of 25 square miles at Eielson Air Force Base near Fairbanks, Alaska, was sprayed three times with DDT solutions, each at the rate of 0.1 pound of DDT per acre, for control of adult mosquitoes. The size of the area was enlarged to 100 square miles in 1949 and was treated once for larval control and twice for adult control. The original 25-square-mile plot, which was in the center of the larger plot, received one additional treatment for adult control. These treatments gave a total dosage of 0.7 pound of DDT in 2 years on the central plot, and 0.3 pound in 1 year on the remainder of the large plot. The sprays were applied with a C-47 airplane and consisted of 20 percent DDT in either 60 percent of Paccosol (an auxiliary aromatic hydrocarbon solvent) and 20 percent of fuel oil, or 28 percent of Velsicol AR-50-G (chiefly methylated naphthalenes) and 52 percent of fuel oil.

The residual effect of the treatments was determined by comparing the larval populations in the treated areas with those in adjacent untreated areas, and also by comparing the populations in 1950 with those of 1949. Larval counts were obtained by random dipping every half mile along transects at right angles to a road through the center of the treated area. Each transect was one-quarter to one-half mile long, and none was located closer than one-half mile to the outer boundary of either plot. From 105 to 223 dips were taken along each transect except in one case where water was scarce and only 57 dips were made. Four transects were checked in adjacent untreated areas and larvae were so numerous that an average of only 70 dips was made per transect. The population was largely late third and early fourth instars at the time the observations were made on May 20–21, but a few first-stage larvae were observed in cold marshes and several pupae in warm roadside pools.

The results, as presented in table 1, show 99 percent less larvae in the treated plots than in the adjacent untreated areas. There were 95 percent less in the outer plot in 1950 than before treatment in

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TABLE 1.—Effect of residual DDT from larvicide and adulticide treatments in 1948 and 1949 on mosquito larval populations in 1950 at Eielson Air Force Base, Alaska

Plot	Cumulative DDT per acre (pounds)	Number of dips	Average number of larvae per dip	Percent reduction based on—	
				Untreated areas	1949 population
Outer	0.3[1]	1,253	0.29	98.7	95
Inner	.7[2]	1,253	.08	99.6	89
Check	0	280	21.9	—	—

[1] 1949 treatments.
[2] 0.3 pound of DDT in 1948 and 0.4 pound in 1949.

1949. The inner plot had shown 86 percent reduction in larvae in 1949, following treatment with 0.3 pound of DDT in 1948. After additional treatments totaling 0.4 pound of DDT in 1949, a further reduction of 89 percent was shown in 1950. The only difference between the two plots was in the average number of larvae per dip, there being over three times as many in the outer plot. Most of the difference was due to a high count in the first transect inside the north boundary. This high count may have been due to poor distribution of the spray, since a low larval kill was also noted in this sector of the plot in 1949. If the dipping records for this transect were omitted in figuring the plot average, the number per dip would be 0.10 instead of 0.29, or about the same as in the inner plot.

The reduction in larval populations in the plots may have been caused in part by reduced oviposition resulting from the control work, but it is thought that the destruction of larvae by the residual DDT was the more important factor. This conclusion was supported to some extent by the fact that larval populations were no greater, as a rule, at the outer boundaries of the plots than in the center, whereas a greater amount of oviposition would be expected there due to the infiltration of adults from adjacent untreated areas.

TESTS OF SEVERAL FORMULATIONS OF DDT AS LARVICIDES. Three DDT formulations used in 1949 (Travis *et al.* 1950) were retested on large plots in 1950. The formulations included an airplane spray solution containing 20 percent of DDT, 20 percent of fuel oil, and 60 percent of Paccosol; the 20-percent DDT spray with 1 percent of Triton B-1956 (polyglyceride of a glyptal resin) added; and an emulsifiable concentrate containing 20 percent of DDT, 10 percent of Triton X-100 (mono-iso-octyl-phenyl polyethylene glycol ether), and 70 percent of Velsicol AR-50-G. It was planned to compare the different formulations at dosages of 0.05 and 0.03 pound of DDT per acre, but several plots received a lower dosage when openings in the spray boom became plugged and reduced the flow rate by about two-thirds. The dosages used were approximately 0.01, 0.03, and 0.05 pound of DDT per acre, or 25, 75, and 123 ml. of the 20-percent solutions per acre. The test plots were 3/5-mile wide by 2 miles long, and the treatments were applied with a C-47 airplane equipped with underwing booms. Five dips were made before and after treatment in each of 10 marked pools selected in each plot.

The 20-percent DDT spray was applied when the plots were free of ice, but the other treatments were made on a morning when the pools were covered with ice about one-quarter-inch thick. As the ice in these plots did not melt until nearly 12 hours after treatment, dipping was postponed until 48 and 72 hours after application. There was little difference between the two observations, so only the 72-hour data are presented. In addition to more favorable temperature conditions, the six plots receiving the 20-percent spray were treated more satisfactorily than the others, the swaths being more accurately flown and the altitude of flight lower.

As shown in table 2, all of the formu-

TABLE 2.—Mortality of mosquito larvae after 72 hours in plots sprayed from the air with different formulations of DDT

DDT formulation	Dosage per acre		Average number of larvae per dip	Percent control
	Solution (ml.)	DDT (lb.)		
20% solution	78	0.03	33.3	97
	123	.05	14.4	98
20% solution + 1% B-1956	25[1]	.01	19.1	46
	75[2]	.03	14.4	96
	123	.05	15.3	93
20% emulsifiable concentrate	25	.01	14.9	58
	123	.05	15.3	92

[1] 1 plot.
[2] 2 plots.

lations were highly effective at dosages of 0.03 and 0.05 pound of DDT per acre, larval reductions ranging from 92 to 98 percent. At a dosage of 0.01 pound neither the 20-percent spray with 1 percent of B-1956 nor the emulsifiable concentrate was very effective, but the latter gave slightly higher kills. The results of these tests do not permit a conclusion as to the most effective of the three formulations. They suggest, however, that future evaluation should be made on the basis of somewhat lower dosages than were planned in 1950.

SUMMARY

Observations in large areas treated for mosquito control in Alaska in 1948 and 1949 with accumulative totals of 0.3 and 0.7 pound of DDT per acre showed 99 percent less larvae in 1950 than in adjacent untreated marshes. On the basis of pre-treatment counts, a plot treated with 0.3 pound of DDT per acre in 1949 showed a larval reduction of 95 percent in 1950. Similarly, a plot treated with 0.3 pound in 1948 had showed a reduction of 86 percent in 1949, and after additional treatment of 0.4 pound per acre in 1949 showed a further reduction in 1950 of 89 percent, or 98.5 percent from the original population in 1948.

Tests with several 20-percent DDT formulations gave 92 to 98 percent control of larvae with dosages of 0.05 pound of DDT per acre, 96 to 97 percent with 0.03, and 46 to 58 percent with 0.01 pound of DDT per acre.

Literature Cited

TRAVIS, B. V., K. H. APPLEWHITE, and NELSON SMITH. 1950. Control of mosquito larvae in Alaska with DDT. *Jour. Econ. Ent.* 43(3):350–3.

CHERCHEZ L'HOMME

"While I was working in Nebraska I found a specimen of *Culiseta* that keyed out to *morsitans* on first sight. Later it proved to be something else—the abdominal bands are apical rather than basal and there are other differences. Dr. Harry Pratt and CDC Atlanta checked it and then sent it to Dr. Alan Stone. Dr. Stone believes that it is a new species—on checking the USNM collection he found three more similar specimens from Boston vicinity collected about 1915. All specimens are females and Dr. Stone opposes a description based on females alone. (I agree with him.) I am interested to know if your collection holds any of this species. If I could find a male I would like to co-author on the work."—George A. Thompson, Communicable Disease Center Activities, State Health Dept., Austin 1, Texas.