

their natural habitats. All strengths of DDT from 1 part per 1000 parts of water to 1 part per 60 million parts killed the larvae. The time required to kill all the larvae depended upon the amount of DDT used. The authors seem to agree with other entomological workers in their findings on the long-lasting properties of DDT. In the strengths tested in the aquaria containing larvae of the above-mentioned species, DDT retained its efficiency for 4 months. The results are arranged clearly in a table.

DDT in colloidal suspensions and as dusts was also tested in accumulations of natural water such as puddles and pools created by heavy rains. In either form this material was successful in killing mosquito larvae, but it was found that larvae died more quickly when DDT was applied in water suspensions than as dusts.

When daily dosages of DDT were administered to a limited number of domestic animals, no injurious effects were noted from the following total dosages, except as indicated: Two dogs each fed 7.75 grams in 31 days; two cats fed 0.315 and 0.048 gram in 6 days and two given intramuscularly 0.048 and 0.072 gram in 6 days; six rats each given orally 1.2 grams in 6 days (1 died); two mice each given intramuscularly 0.015 gram in 5 days (both grew thin), and two mice each fed 0.015 gram in 5 days; three pigeons given intravenously 0.024, 0.034, and 0.041 gram in 5 days, two given intramuscularly 0.015 and 0.034 gram in 5 days, and two fed 0.036 and 0.050 gram in 5 days; one chicken given intravenously 1.0 gram in 5 days, and another fed 2.0 gram in 5 days.

Frogs (*Leptodactylus ocellatus*) and toads (*Bufo marinus*) were exposed 2 to 3 hours daily for 4 days in a vivarium treated with 0.2 gram of DDT per 12,500 liters of water without any ill effects. Some fish which were also exposed succumbed, and experiments are to be continued with other species. The authors believe that DDT used in the proportions they recommend for larvicides would not be harmful to man or domestic animals, or to the frogs and toads tested. The possibility of using DDT in drinking water at the rate of 1 gram per 25,000 liters (approximately 1 part in 25,000,000) is foreseen.

DDT powder has been found to cause no irritation or burning on the skin of man for 24 hours after application in various concentrations or in the pure state.

An added feature of the paper is the English summary, which gives a rather full account of the material presented. The statement in the summary referring to the ovicidal effect of DDT is confusing, but the text makes it clear that mosquito eggs did hatch in treated water and that the larvae died immediately after hatching.

In general the results obtained by Wasicky and Unti are in accord with the findings of Knipling and associates, Calvery, and Neal in the United States, much of which has not yet been published for security reasons. The recording of data on the effect of DDT on various species of mosquitoes under different conditions is of distinct value. The

authors are continuing their work, and we look forward to further progress with this important insecticide under tropical conditions.—Helen Sollers, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, U. S. Department of Agriculture, Washington, D. C.

TOXICITY OF DDT AND THANITE SPRAYS TO ADULTS OF ANOPHELES QUADRIMACULATUS SAY. By Paul L. Rice, Carl B. Huffaker and Richard C. Back. Abstract of a paper read at the Entomological Society meetings in New York City, December 13-15, 1944.

This study was initiated in an attempt to develop satisfactory substitutes for pyrethrum in adult mosquito sprays. Experiments were conducted with *Anopheles quadrimaculatus* adults both in the laboratory and in the field. The laboratory tests were carried out in a Peet-Grady chamber using the standard procedure for flies with two exceptions: (1) only 6 ml. of spray was used and (2) the exposure was reduced to 2½ minutes. Records were kept on the per cent of knockdown at the end of the exposure period and the per cent of kill after 24 hours. Field tests were conducted in a cattle shed, open on one side. Cages containing *A. quadrimaculatus* adults were hung within a test area on the wall comprising 48 square feet, and 6.5 ml. of spray was used to cover this area. Evaluations of the test materials were made on the basis of knockdown after 5 minutes and kill after 24 hours. The toxicants employed in all tests were in solution in deodorized kerosene.

The laboratory tests showed that one per cent DDT gave only a 57 per cent knockdown but a 24-hour mortality of 100 per cent. A one per cent Pyrethrol "20" spray gave excellent knockdown (97 per cent) and kill (94 per cent). One per cent of a combination of 20 per cent DDT and 80 per cent Thanite gave results which compared quite closely with the Pyrethrum, namely, 92 per cent knockdown and 96 per cent kill; while the corresponding results for the spray made up of one per cent of a combination of 40 per cent DDT and 60 per cent Thanite were 86 per cent knockdown and 99 per cent kill.

The poor knockdown produced by DDT alone in the laboratory led the investigators to restrict field tests to combinations of DDT and Thanite, using Pyrethrum as a standard spray for comparison. The results obtained from nine replications were as follows: 1.5 per cent Pyrethrol 20—88 per cent knockdown and 73 per cent kill; 1.5 per cent of a combination of 20 per cent DDT and 80 per cent Thanite—86 per cent knockdown and 94 per cent kill; 1.5 per cent of a combination of 40 per cent DDT with 60 per cent Thanite—84 per cent knockdown and 98 per cent kill. Both the DDT-Thanite sprays gave good results, but the 20-80 combination appears to be particularly promising.

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