

FIELD TESTS OF DDT* IN SOLUTION IN CRANK CASE OIL AS A LARVICIDE AGAINST ANOPHELINE LARVAE

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These tests were done during the period June to October, 1943, inclusive, in western Tennessee and eastern Arkansas. The species of anophelines tested were *A. punctipennis* and *A. quadrimaculatus*. Nearly 100 breeding places of a great variety of type were tested.

By crank case oil is meant the waste lubricating oil collected in the crank cases of internal combustion engines. We have used successfully solutions of 2% to 10% but have recently been using 5%; the last being very effective as a larvicide, more economical of DDT and readily got into solution at room temperature. Crank case oil was chosen in preference to other petroleum oils because almost universally available and very inexpensive. Further, DDT crank case oil spreads remarkably well over water; we have dispensed with all kinds of sprayers, and have not found it necessary to filter or otherwise prepare the oil for use. Waste is avoided since in many breeding places of larvae it is applied at only one or two points. It is very floatable, can be used in almost any kind of weather, and when used in ordinary larvicidal doses has done no harm to the human operators, domestic animals, fish or rice.

As methods of dispersal we have successfully used an oil can or a simple oil gun. Further, a mixture in the proportion of 1 cc. of DDT crank case oil in 10 cc. of sawdust has proved very effective for scattering the larvicide. Lacking sawdust, dry sand or dirt has proved very effective.

*DDT was first found to be an effective mosquito larvicide by E. F. Knipling, C. C. Deonier and others at Orlando, Fla., and samples were obtained from them under a contract recommended by the Committee on Medical Research, between the Office of Scientific Research and Development and the Bureau of Entomology and Plant Quarantine.

Cork dust is useful when great floatability is necessary.

Area of Spread and Dosage. Spread of DDT crank case oil is much farther than in the mere film. In still water, we have found a dose of 2 cc. applied at one point effective over an area of 2x17 yards; a dose of 10 cc., similarly applied, over an area of 5x47 yards. In stream, a dose of 150 cc. was effective for about 400 yards, a dose of 360 cc. for about $\frac{3}{8}$ mile in a larger stream. In general, in still waters we have found effective a dosage of 50 cc. of DDT crank case oil per 1,000 square meters. Much less has been effective in waters treated soon after a rain or otherwise free from scum or other debris. For very scummy waters a larger dosage is recommended. Vertical or overhanging vegetation offers no significant obstruction. It cannot be too strongly emphasized that heavy doses such as those used commonly for larvicidal oils are wasteful, add unnecessarily to transportation, and may destroy a part of the fish. The essential advantages of the DDT crank case oil larvicide are its spreading power and its extreme toxicity to anopheline larvae. For culicine larvae like *Psorophora* we have found necessary somewhat large dosage than for anophelines.

Permanence of a single treatment has been hard to measure because of lack of suitable untreated controls. In any case, the interval between necessary doses is much lengthened, and in some ponds has apparently extended to several weeks. Application of this larvicide is so easy that permanence is less necessary.

We are now experimenting with devices which may greatly lessen the necessity of frequent dosage and may make possible the simple treatment of large areas. Among these is the utilization of the gradual freeing of the oil by slowly dissolving salts, by plaster of Paris, or by wicks.