

Mosquito Control in Impounded Waters

by R. J. VanDerwerker

The Union County Mosquito Extermination Commission of New Jersey has solved a serious mosquito breeding problem in an unusual manner. Surprise Lake, a small fresh water pond, 9000 feet long and very narrow and shallow had a badly overgrown swamp at the head of the pond. The upper 4000 feet of the pond which was about 300 feet wide was overgrown with swamp laurel and brush. After each rain this flooded and produced broods of several species of mosquitoes. *Anopheles quadrimaculatus* were plentiful in the area.

In June 1939, the Commission began working with its Northwest 3/8 yd. Crane to excavate a wide, deep channel through the middle of the swamp. The excavated material was deposited along the edge of the swamp and graded back on a slope. 68,289 cu. yds. was handled of which about 18,289 cu. yds. was grading or re-handling. The Park Commission has graded some of the dirt with a bull-dozer and expect to complete the grading in 1941. Total labor cost for brushing, grading and operating the crane was \$3,898.10. When the pond is full of water the completed area has a center channel 6 feet deep and about 40 feet bottom width with sloping banks and top width of about 80 feet. Abundant small fish, formerly screened out by vegetation can now work through the whole area from the lower part of the lake to prevent mosquito breeding.

Mosquito Oils and Larvicides

by Joseph M. Ginsburg

Mosquito Oils - Laboratory and field tests with various petroleum distillates, conducted

in New Jersey over a period of some twelve years, have shown that petroleum oil films kill mosquito larvae by the following method. While in the process of breathing on the water surface, the larva also draws in oil from the surface film into its tracheal system by the flaps, in case of *Anopheles*, and by the breathing tube in case of other species. After penetration the toxicological effect will vary with the type of petroleum product used. Oils of low boiling range and of high volatility will exert a direct toxic action within a very short time. On the other hand, high boiling, non-volatile, viscous oil will slowly cause death by suffocation, after the tracheal stems have become filled with oil. The rate of penetration seems to be proportional directly to the thickness of the film and inversely to the viscosity of the oil.

The information secured from these experiments have simplified the problem of working out specifications for efficient mosquito oils. In general, the oil should contain enough of a low boiling petroleum fraction to insure quick penetration into the tracheal system and rapid kill of larvae and pupae; and a sufficient quantity of a high-boiling fraction to leave a lasting film. In general, the following specifications should be considered in selecting an efficient mosquito oil.

Oil Specifications

Type of Oil-----	Distillate fuel
Gravity (A.P.I.)-----	27-33
Flash, degrees F.-----	130 or higher
Viscosity S.U.; (a) 100°F-----	35-40
Odor-----	sweet (non-offensive)
Distillation, degrees F. -----	

10% - 430 - 450) - (Killing fraction)
 50% - 510 - 550)

90% - 630 or higher (Lasting fraction)

Such an oil can be readily obtained from most of the oil refineries at a cost varying from 5.5 to 8 cents per gallon depending on quantity purchased and transportation expense. In the field it spreads well, produces practically 100 per cent kill of larvae and pupae within one hour, leaves a stable film, and is not disagreeable to the oiling crew. These specifications are not rigid and can be readily modified to meet different requirements. The low boiling fraction may be decreased in areas where high temperatures prevail and where spreading and penetration are comparatively rapid, and increased where waters are cool or during seasons of low temperatures.

Larvicides - Ever since the New Jersey Pyrethrum Mosquito Larvicide has been developed to control mosquitoes in breeding waters where oil is objectionable, the writer has conducted experiments with various synthetic organic chemicals with the purpose of either entirely or partially replacing the pyrethrum extract, the most expensive ingredient in the formula, without, of course, reducing its effectiveness. The original formula calls for a concentrated emulsion consisting of about 2/3 light petroleum distillate, in which enough pyrethrum extract is incorporated to equal one pound of pyrethrum flowers (analyzing 0.9 per cent pyrethrins) per gallon; 1/3 water and about 0.5 per cent neutral emulsifier, such as sodium lauryl sulfate. This stock emulsion is well mixed and diluted with 10 to 12 parts of water before spraying.

Extensive laboratory and field tests during the last three years have definitely shown that by incorporating a small amount of thiodiphenyl-

lamine (phenothiazine) into the pyrethrum extract, it is possible to increase the toxicity of pyrethrins to such an extent that extract of only about half a pound of pyrethrum flowers per gallon of oil (instead of one pound) is sufficient for the preparation of the larvicide. This offers a substantial financial saving. The new larvicide can, therefore, now be purchased at reduced cost from the Seacoast Laboratories, Inc., 156 Perry Street, New York City, who were licensed by the Endowment Foundation of Rutgers University (owners of patents on this formula) to manufacture and sell this product at fairly low prices.

Mrs. A. S. Chenoweth, Chairman, Mosquito Control Committee of the New Jersey State Federation of Women's Clubs and author of the interesting booklet "Companion to Mosquito Study", has again contributed a valuable idea to the publicity side of mosquito control in New Jersey. She suggested a slogan on a sticker to be used on envelopes by all the Commissions in New Jersey which has been attached below.

MORE EASE, LESS DISEASE
NEW JERSEY
MOSQUITO CONTROL

REVIEW OF BOOKS AND PUBLISHED ARTICLES

"Mosquito Control" a complete and thorough book on mosquito control procedure, organization and problems as practised in California, with suggestions for such units in other areas has been written by William B. Herms and Harold F. Gray of the Alameda County Mosquito Control District, California. It was published by The Commonwealth Fund, New York City and costs \$3.50. Your Committee feels that this book is one of the most useful guides on costs, organization and methods yet published.