

GRANULAR CLAY LARVICIDES FOR THE CONTROL OF SALT MARSH MOSQUITOES

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In Broward County salt marsh mosquitoes have attained a resistance to the conventional insecticides that no longer permits adequate control through space spray adulticiding using concentrations that can be tolerated in residential areas. We are therefore confronted with the necessity of devising a more completely effective program of larviciding for these species.

The extent of our salt marsh is small in comparison with many of the other coastal counties of Florida but it is completely and immediately surrounded with residential development. The average flight of the mosquitoes it produces is less than one-half mile to bring their annoyance to some thirty thousand of our citizens. Under these conditions a larviciding program that is much less than one hundred percent effective cannot be considered.

At least seventy-five percent of the areas in the District that produce salt marsh mosquitoes are not accessible to ground operated larviciding equipment and can be effectively treated only from the air. We have demonstrated in these areas that a reasonably uniform distribution of one-tenth of a pound of the gamma isomer of BHC per acre, if it reaches the surface of the breeding water, will result in a complete kill of larvae within four hours. While pupae may withstand this dosage, we find that the resultant adults die upon emergence.

About half of our breeding areas that can be reached only from the air lie fairly open and can be completely controlled by the plane dispersal of liquid sprays. The balance, however, lie under a cover of white mangrove, sea oxeve, salt marsh, bermuda or other growth ranging from light to very dense. In these areas the amount of liquid insecticide that reaches

the breeding water may range from fifty percent to none at all and the resultant kill of larvae is in direct proportion.

The District has experimented since 1950 with materials that might prove acceptable as vehicles for plane dispersed larvicides in these covered areas. With the very important help of Professor Whitehead of the University of Arkansas, Mr. W. C. McDuffie and Mr. J. C. Keller of the Orlando Laboratory of the Bureau of Entomology and Plant Quarantine, and the California Spray Chemical Company, we are now being supplied by Cal-Spray with a granulated clay product that we have been using since September 1952.

Our initial success in doing a job effectively that had been the main stumbling block to our past larviciding operations, leads us to offer this information to our associated Districts in the hope that they may, by experimenting with it also, aid in the development of cheaper materials and more economical methods of dispersal. The present product too, produced in small quantities on order, could probably be reduced in price if a considerable market could be provided. Having demonstrated over many years the limitations of drainage and tidal flushing programs and realizing that the reclamation of the thousands of acres of existing salt marshes on our most desirable tourist areas will have to be a long range project, chemical larviciding is still the most important weapon that can presently be used in many of our Districts. Such control of salt marsh mosquitoes as has been achieved in Florida has been the result of the work of many agencies who have found a common forum for the discussion of their successes and failures in the meetings of the Florida Anti-Mosquito Association. We feel that this small step in actual large scale use of

a penetrating insecticide can be developed, into a tool that will be of great value to the directors of the Florida districts, all of us.

MOSQUITOES AND THEIR CONTROL IN PRINCE EDWARD ISLAND¹

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INTRODUCTION. Prince Edward Island is the smallest of the Canadian provinces, with an area of 2,184 sq. mi. and a population of about 100,000. Situated in the Gulf of St. Lawrence, it is a gently rolling lowland country with no part far from the sea. Its soil is characteristically red sandy loam, with underlying rock formations principally of red sandstone and red clay shale. A large part of the Island is devoted to diversified farming, but numerous farm woodlots and patches of woodland, scattered trees, and tree-lined roads give it a park-like appearance. Its short, deep rivers are subject to the ebb and flow of the tide. Along its coasts are sand dunes and long stretches of fine sand beaches, especially along the north shore. The surrounding sea has a moderating influence on the climate, and mean monthly temperatures range from 15.5° F. in February to 78.8° F. in August. Precipitation is rather uniformly distributed throughout the year and averages about 43 in., of which 11.6 in. is in the form of snow (5).

In June, 1952, I investigated a mosquito nuisance reported in and near Prince Edward Island National Park. This park extends along the north shore of the Province for nearly 25 mi., from Tracadie Bay on the east to New London Bay on

the west, but contains an area of only about 7 sq. mi. It is made up of three main sections, each bordering the seashore, and known, from east to west, as the Dalvay-Stanhope section, the Brackley Beach section, and the Cavendish or Green Gables section. The mosquito problem in the area was summarized as follows by the Secretary of the P.E.I. Innkeepers' Association (in litt., March 3, 1952): "Our beaches are outstanding and safe, the temperature of the water ideal, we have some nice playgrounds, but on certain days no one can enjoy any of those facilities on account of the mosquitoes. At times they are not annoying, at others they are simply awful, obliging people either to remain indoors or to leave the district. The worst places are around Brackley, Stanhope and Dalvay. In 1951 there were many mosquitoes in June and July, then they all came back during the end of August and September."

MOSQUITO SPECIES. Up to 1940, only 2 species of mosquitoes had been identified from Prince Edward Island. In May, 1940, I collected larvae in and near the National Park representing an additional 9 species. In June, 1952, 11 species were collected, of which 4 are new records for the Province, bringing the total of species recorded to 15. The associations of the species collected in the larval stage in 1952 are shown in Table 2.

Comments of park officials, residents, and visitors confirmed that mosquitoes are

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