

# SALT-MARSH MOSQUITO CONTROL IN NORTH CAROLINA DURING 1955

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Several factors that are not applicable to most of the states represented here have influenced the type and extent of mosquito control in North Carolina.

In many states where extensive salt-marsh mosquito control has been carried on for years, the incidence of malaria has been too low to require control operations comparable to those necessary where this disease constituted a major problem. While many of you were developing large scale programs directed at making the environment more conducive to comfort and good living, we were struggling to protect the health and lives of our people. Most mosquito control facilities available on a state wide basis were directed at *Anopheles quadrimaculatus*. Some local communities, however, did conduct pest mosquito control in a small way.

Another influential factor is the topography of our state. The Outer Banks, which is the name generally applied to the string of islands along the entire sea-

board, being a barrier to navigation, retarded the early settlement and development of the coastal region. While populations were growing and cities being built along the coast in other states that border the ocean, our growth was taking place farther inland. Changes are now apparent and something akin to an economic renaissance is going on in the eastern counties. The tourist business is booming and new recreational facilities are provided every year. Soil reclamation by drainage and recently discovered techniques in farming, as well as animal husbandry, are bringing about increased participation and productivity in the field of agriculture. New industries are moving in while others are exploring the suitability of the region for their types of operations. There is still considerable disproportion between the counties affected by salt-marsh mosquitoes and the rest of the state with regard to population densities and economic status. A recent com-

pilation of data revealed that these counties comprise 20.0 percent of the land area but have only 10.3 percent of the population. The variation in sources of taxation is equally great.

Now that our principal concern with malaria is the prevention of reintroduction rather than the application of control measures in areas of high endemicity, we have time and facilities to devote to pest mosquitoes.

The 1955 General Assembly passed legislation which created the North Carolina Salt Marsh Mosquito Study Commission. There are seven members, four of whom were appointed by the Governor, one is a representative of the State Board of Health, one a representative of the Department of Conservation and Development and one a representative of the Wildlife Resources Commission. The duty of this Commission is to make a study of salt-marsh mosquito problems in eastern North Carolina, investigate the capacity of each county, town and city to provide funds for control operations, and make a report of its findings, along with recommendations, to the Governor, to be transmitted by him to the next meeting of the General Assembly. A sum of \$15,000.00 was provided for expenses incurred in accomplishing the purpose for which it was created.

Embodied in the act is a provision whereby the Governor and Council of State are authorized to allocate from the Contingency and Emergency Fund amounts found reasonably necessary to provide for control of mosquitoes until the 1957 Legislature convenes.

Immediately following the formation of the Commission, help was sought and obtained from the U. S. Public Health Service in making a preliminary survey of the salt-marsh mosquito problem along our coast. The official who assisted us in this survey estimated that a minimum of \$500,000.00 per year would be required to obtain satisfactory protection from salt-marsh mosquitoes. He also emphasized the need for research in breeding, flying and biting habits of these mosquitoes as

well as the development of more effective control methods.

The Governor and Council of State allocated \$15,000.00 from the Contingency and Emergency Fund for control operations and authorized the Commission to spend the \$15,000.00 appropriated with the assurance that additional funds would be provided for continuing the study. We were instructed to use these funds to help those who help themselves.

A questionnaire was prepared and sent to counties, towns, and other community organizations in the coastal areas, in which information was sought concerning the willingness and ability of each community to participate financially in mosquito control. Initial information obtained from these questionnaires revealed a willingness on the part of the communities to spend slightly over \$40,000.00. The amount actually spent by them was greatly increased, however, as the season progressed.

With such a small amount of money, we were faced with the problem of determining how it could be spent to obtain maximum benefits. Consistent with the policy of helping those who help themselves, a rule was followed whereby insecticide materials would be given communities that purchased or already possessed dispersal equipment, and in some instances the equipment was rented by us for use in communities that preferred to furnish the insecticides. In less than a month, most of our funds were either spent or encumbered.

After the hurricanes Connie, Diane and Ione passed through the State, the Federal Civil Defense Agency determined that the vast increase in salt-marsh mosquitoes was a result of these hurricanes and made mosquito control funds available in the affected areas. Help in the amount of approximately \$200,000.00 was obtained from that Agency for adulticiding, and projects in excess of that amount have been approved for the restoration of drainage systems to the condition they were in prior to the hurricanes.

Our long range plan involves the elimi-

nation of salt-marsh mosquito breeding areas of drainage, filling, diking, or other measures but we do not have facilities for successfully undertaking this type of operation now or in the immediate future. With the scanty funds available, lack of trained supervisory personnel, and limited knowledge with regard to the mosquito breeding areas, it was deemed advisable during the season's operations to apply the major part of our effort toward killing adult mosquitoes.

The communities employed thirty-five ground space spray machines of either the mist or fogging type for the dispersal of adulticides and the people on one of the beaches purchased an airplane. The latter was used for both larviciding and adulticiding. Other aircraft acquired on a contractual basis consumed 180 flying hours in the application of larvicides. The U. S. Public Health Service helped during the disaster by providing engineering personnel to assist in the preparation of Federal Civil Defense Agency project, supervision of operations, and evaluation of results. This Agency also lent us four space spray machines and one aircraft and furnished 7500 gallons of pesticides. Throughout the whole operation, DDT in various formulations was the only insecticide used.

The urgency of the problem made it necessary that practically all resources be applied to actual control operations, thus precluding the opportunity to gather entomological or other data to the desired extent for evaluating the effectiveness of results. Observations of mosquito densities in areas before and after the dispersal of pesticides, talks with local officials, as well as other residents, and letters received show that the results were governed by frequency of dispersal, amount and type of supervision given, weather conditions, topographical features, and skill of the operator. Where nightly coverage was given, with other conditions favorable, excellent control was obtained.

With no legislative appropriation for the coming season, operations will again be dependent upon funds given us from the Contingency and Emergency Fund. It is not anticipated that enough money will be available to justify a modification in the type of operations. Again we will concentrate on killing adult mosquitoes where the people are. It is hoped, however, that the 1957 General Assembly will appropriate a sizeable sum and enact legislation that will provide for the formation of mosquito control districts similar to those in other states.