

BRIEF ACCOUNTS OF MOSQUITO CONTROL ACTIVITIES IN DIFFERENT STATES

(Condensed from reports given at the Chicago AMCA meetings, March 5-8, 1951)

Editor's Note: The following papers were presented in their original form at greater length in the Chicago meetings, and rightly occupied a large portion of the program. These reports form one of the most valuable features of the AMCA meetings each year, since the recapitulation of the state activities in an open meeting affords the best possible means of bringing everyone up to date and offers the perfect opportunity for interchange of ideas.

However, in order to have them all in one issue of *Mosquito News* and at the same time have room for other papers, it was necessary to condense them. These condensations were made by Associate Editors Helen Louise Trembley and William E. Bickley. Just as the Association is grateful to the original authors for presenting the reports at length in the meetings, it is also obligated to the above named staff members who spent many hours preparing the final form for readers of *Mosquito News*. An idea of the amount of work involved may be gained from the fact that 5 reports which originally comprised 24 pages of typed manuscript were condensed to 5 pages. It may be pointed out that if serious omissions were made in the condensation process, the omitted material is probably available in the official annual state and local reports of the region covered.

D. L. C.

ACTIVITIES OF THE VIRGINIA MOSQUITO CONTROL ASSOCIATION. By Perry W. Ruth, Technical Advisor, Norfolk City Mosquito Control Commission. Today, in Virginia, more than two-thirds of the half-million persons living in an area of 914 square miles adjacent to Hampton Roads are receiving mosquito control. Almost one-fifth of this area is composed of inland waterways and marshlands, both difficult and expensive to control.

This is a far cry from the days of 1607-08 when malaria is reported to have almost wiped out Jamestown, and those days of 1855 when yellow fever took its toll in the death of one-third the population of Norfolk.

In 1933, the U. S. Public Health Service and the Virginia State Health Department cooperated in the control of disease-carrying mosquitoes and pest mosquitoes; but later, the U. S. Public Health Service confined its efforts to the disease angle, leaving to the state control of pest mosquitoes. In 1940, Virginia authorized the creation of mosquito control commissions. These commissions now operate in southeastern Virginia, and state funds may be allocated up to 25 per cent of the local funds, providing that the state contribution does not exceed \$10,000 per annum. So, there can be little doubt that mosquito control in Virginia is established on a strong foundation.

In January, 1951, the Honorable John S. Battle, Governor of Virginia, speaking to members assembled for the 4th annual meeting of the VMCA, referred to the advance of mosquito abatement in the Tidewater area and said: "My memory goes back to the time no one would dream of visiting Virginia Beach after August unless he wanted to go home with the chills and fever of malaria. I'm constrained to believe that the wonderfully improved conditions making this area healthful and malaria-free the year-round are due to the work done in mosquito control."

MOSQUITO CONTROL IN FLORIDA. By V. S. Minnich, Director, E. Volusia County Anti-Mosquito District. There are mosquito control districts in 17 of the 67 counties in Florida; 15 of these controlled counties are coastal and 2, inland. Most of the coastal resort counties, on both east and west coasts, which are affected by

salt marsh mosquitoes have districts which are doing effective abatement work.

The comments of two district supervisors are interesting. One director of operations reported that the annoying smoke blown into Miami from fires in the Everglades had no effect on mosquito density. He said: . . . "neither did the hurricane later in the fall. This was a disappointment to many of the residents, who felt that a strong wind was all that was needed to kill or drive the mosquitoes away. This latter was not an unusual experience, as we have yet to see a hurricane reduce the mosquito density."

Another director wrote: "Two other results of this past summer were that fog applied by the Tifa was most effective on *Aedes taeniorhynchus*, and less effective on *A. sollicitans*. A heavy application of DDT, 5 per cent in oil with the Buffalo Turbine, was most effective on *A. sollicitans*." A 10 per cent DDT concentrate in No. 2 Distillate was used in the fog machine at the rate of 20 gallons per hour on mobile equipment, moving between 3 mph and 5 mph. For the Turbine, 5 per cent DDT in No. 2 Distillate was used at a concentration of 2 gallons plus per acre.

The success of mosquito control districts is attested to by the constantly increasing amount of tourist business; this is valued at \$625,000,000 annually. The annual budget for mosquito abatement in the entire state is \$800,000 from local funds plus \$350,000 from State funds.

MOSQUITO CONTROL WORK IN NEW JERSEY IN 1950. By M. M. Stallman. During most of the 50 years that organized mosquito control work has been in effect in New Jersey, water management has been used as a basic practice. Recently, large-scale changes brought about by a rapidly growing population have necessitated the use of temporary chemical control measures. These include dispersal of insecticides through aircraft, fog machines, and mist blowers for the control of adult

mosquitoes where permanent water management is not complete or practicable.

Construction projects and weather conditions have adversely affected mosquito control in many instances.

A Turnpike and a Parkway, each extending 118 miles, have posed serious problems. The Turnpike traversed miles of tidal marshlands, and the hydraulic and dry fills produced temporary conditions favorable for mosquito breeding. Grading in upland areas resulted in numerous small temporary water traps. The expansion of the Newark Airport resulted in landlocked marsh areas between runways.

Extensive residential construction added its problems, temporary breeding places occurring in foundations and cellars and in many improperly installed septic tanks and cesspools.

Storms along the Atlantic Coast, coinciding with peak tides, inundated all coastal meadows and destroyed or damaged numerous dikes, sluice boxes, tide-gates, and drainage ditches.

THE VALUE OF HAVING A STATE ASSOCIATION OF MOSQUITO CONTROL AGENCIES. By Hendrik Van Brederode, Former President, New Jersey Mosquito Extermination Association. New Jersey has pioneered in the methods of mosquito control and in the organization of those activities. In 1902, the State recognized that the only way it could eliminate the mosquito menace was by prevention of breeding. Ten years later, in 1912, the New Jersey Mosquito Act was passed; this set up administrative units, each limited in jurisdiction to county boundaries, and each independent of the other. Coordination was to be effected by the Director of the State Agricultural Experiment Station, who was to supervise the several budgets and lend technical assistance. The State Entomologist has been the representative of the Director in these duties.

On February 20, 1914, the New Jersey Mosquito Extermination Association was formed; and the speaker, Dr. Ralph Hunt,

welcomed the group in the following words: "The objects of such a meeting as this, as I understand it, are that we may come together and hear the statements of the different commissions in regard to how they have done their work, what their problem is, what the cost of the work is, etc., so that we may learn from each other those practical points which come only from the varied experience of many men working along kindred lines. It is always true that any problem may be solved in many different ways. We are beyond the point where we feel that there is only one way by which to attain a given object. We feel that one commission may adopt methods differing in nature and cost from those of another commission, yet that its results may be equally good with those of the one following entirely different lines. It is with the object of instructing one another that we are met together in this convention.

"Again, another thing which brings us here is to educate, if we may, the public; to show them that we are in earnest in this work; that we believe in it; to demonstrate to them in what ways we expect to bring this object about; and to produce the reports from the different commissions showing what work has been accomplished."

The original conception of a State Association has been fulfilled and its value demonstrated in New Jersey. There is cooperation between the state and the county commissions; and there is cooperation among the several commissions. The reports of research carried on by the scholars in the laboratories and the experiences and experiments of the men in the field are presented at the annual meetings of the State Association; and they are preserved in the *Proceedings* as a reservoir of learning that will endure.

MOSQUITO CONTROL IN CALIFORNIA. By Jack H. Kimball, President, California Mosquito Control Association Manager, Orange County Mosquito Abatement District. California, a state over 1,000 miles

long and 200 miles wide, has a mosquito problem of vast proportions and many angles. The size and complexity of the problem are indicated by the total expenditure of \$2,100,000 for mosquito abatement during the 1951 fiscal year.

Historically, mosquito control goes back as far as 1905, when salt marsh mosquito control was under way in the San Francisco Bay area; it was not until 1915, however, that legislation was enacted permitting the formation of Mosquito Abatement Districts. There are now 48 active districts, with a total area of 20,800 square miles, and an annual budget from local funds of more than \$1,700,000.

The Bureau of Vector Control was organized shortly after the close of World War II, to administer, in addition to its other services, a yearly fund of \$400,000 provided by the State for allocation to local agencies where endemic virus encephalitis and/or malaria threatened.

Two especially important problems (discussed in detail by other speakers) are those posed by the Central Valley Water Development Plan, which through the rapid expansion of the already numerous irrigated areas, has increased the opportunities for mosquito breeding; and by the rice fields of the Sacramento Valley, which present unusual and difficult breeding conditions.

A BRIEF MOSQUITO SURVEY OF PACIFIC ISLANDS. By Robert T. Mikuni, Sanitarian, Chief Supervisor, Bureau of Mosquito Control, Department of Health, Honolulu, T. H. In cooperation with the Civil Aeronautics Administration, inspection and clean-up work on Pacific islands where American airports are maintained was initiated in 1949 as a means of preventing the spread of exotic species to Hawaii or the mainland.

The fact that *Anopheles subpictus* was found on Guam for the first time by Reeves in 1948 illustrates the point that new species are introduced into island areas. Japanese B encephalitis also has been reported from Guam; and a potential vector, *Culex quinquefasciatus*, was

found to be abundant in 1949. *Aedes pandani* is considered the worst pest mosquito on Guam, and it is hoped that it will not be introduced into Hawaii.

In December 1949, *C. quinquefasciatus* constituted a nuisance on Wake Island. Subsequent DDT spraying effected control, and it should be possible to eradicate all mosquitoes.

Midway is free of mosquitoes; there are few possible breeding places.

Palmyra Island has a rainfall of about 150 inches per year, and there are many potential breeding places. *C. quinquefasciatus* was evidently introduced during the last war. Some DDT spraying was carried out in 1949. There are fewer than 80 people on the island.

Canton Island, an important stopover for planes from the South Pacific covers about six square miles and has a population of about 300. Apparently *Culex* mosquitoes, introduced during the last war, have been eradicated.

Hawaii serves as a mosquito filter for planes that fly across the Pacific to the west coast of the United States.

BRIEF REPORT ON MOSQUITO CONTROL ACTIVITIES IN NASSAU COUNTY, NEW YORK. After existing for thirty-one years, the Nassau County Mosquito Extermination Commission was superseded in 1947 by a division of the Nassau County Department of Public Works. This change has resulted in closer cooperation, better planning, and altogether improved mosquito control activities.

Emphasis has been placed on reconditioning salt marsh drainage ditches on the south shore, especially the Jones Beach section.

In addition to checking more than 200 miles of fresh water streams and many ponds, swamps, pools and other wet areas, more than 20,000 acres of salt marsh must be patrolled. Five million feet of drainage ditches are maintained, and 25,000 catch basins or street drains are treated every three weeks from April to October. Other problems consist of arti-

ficial recharge basins and drainage channels for discharge of storm water.

A new technicolor movie on County Mosquito Control activities is being assembled during 1951.

MOSQUITO CONTROL IN PENNSYLVANIA. By Russell W. Gies, S.E., Director, Delaware County Mosquito Extermination Commission. Since World War I, Philadelphia has maintained a mosquito control program. As control activities were intensified during World War II in the Philadelphia area, other communities followed the lead of Delaware County in initiating organized control. There are 150 communities in more than 20 counties spending a total of \$150,000 for mosquito control. The work is in cooperation with the Bureau of Sanitary Engineering of the State Department of Health.

The problems vary in different parts of the state. Some examples are polluted water and extensive marshland in and around Philadelphia, woodland breeding in resort areas, holes and pools peculiar to mining regions, and house mosquitoes in towns and cities. Over one million people are protected through the activities of the various mosquito control organizations.

MOSQUITO CONTROL WORK IN MARYLAND IN 1950. By Wm. E. Bickley and George S. Langford, College Park, Maryland. The Maryland State Board of Agriculture through the State Entomologist or his agents is legally authorized to cooperate with any political unit of the state carrying out anti-mosquito work. Although no funds have been appropriated by the state specifically for mosquito control, the State Entomologist and the Extension Service of the University of Maryland in recent years have done extensive educational work and have cooperated with several counties, cities, towns and communities in mosquito control activities. Much of this work has been of an experimental nature, and the emphasis has been placed on demonstrating to the local people some satisfactory and economical means of mosquito abatement. Largely as a result of

this type of demonstration work, some communities have purchased equipment and now carry out their own mosquito abatement work.

In 1950, eight towns operated their own

programs, and cooperative projects on an experimental basis were carried out in eight towns by the Department of Entomology. Excellent results were achieved with a mist-blower using DDT emulsion.

ARTICLES

TOXICITY OF SEVERAL ORGANIC INSECTICIDES TO ANOPHELINE LARVAE¹

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During the last 5 years several thousand organic compounds have been screened at the Orlando, Fla., laboratory for toxicity to larvae of *Anopheles quadrimaculatus* Say. A great many of these compounds showed some degree of toxicity to this species, but only a few were sufficiently promising to warrant field testing as larvicides. Most of the better compounds have been available for several years and many mosquito control workers have tested them against various species. A review of the published information on various new compounds, together with some original data, was published by Travis and McDuffie (1950). Additional tests have now been run with most of the

better materials against the larvae of *A. quadrimaculatus* in the laboratory and against this species and *A. crucians* Wied in the field. Data from tests conducted in 1950 and 1951 are presented in this paper.

LABORATORY TESTS

Screening tests were conducted in the laboratory against fourth-instar *Anopheles quadrimaculatus*. The toxicants were first dissolved in acetone and then introduced into beakers of distilled water in the amounts necessary to give a range of concentrations. Distilled water was used to avoid the effects of suspended matter and dissolved chemicals that occur in other types of water. From 4 to 10 replications of 2 tests of 25 larvae each were made at a range of concentrations with each chemical. DDT was included as a standard of comparison in each series of tests and

¹This work was conducted under funds allotted by the Department of the Army to the Bureau of Entomology and Plant Quarantine.