

## THE USE OF LINDANE AND DIELDRIN AS MOSQUITO ADULTICIDES IN ALASKA<sup>1</sup>

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**INTRODUCTION.** This paper is a summary of one of the projects undertaken by members of the Alaska Insect Control Project for 1951. As lindane and dieldrin had not previously been used against Alaskan mosquitoes it was considered advisable to conduct tests to determine the effectiveness of these chemicals. Since mosquitoes have been found capable of developing resistance to DDT it is possible that resistant strains could develop in Alaska if this insecticide is extensively used. Need would then arise for other insecticides that would effectively reduce the great numbers of mosquitoes found in some important areas of Alaska.

Personnel conducting these tests were selected from the 498th Preventive Medicine Company, Brooke Army Medical Center, Fort Sam Houston, Texas. Three officer entomologists and ten enlisted technicians were assigned to the overall project. Two officers and three enlisted men were concerned especially with testing the two above mentioned insecticides.

**METHODS.** A C-47 aircraft equipped with wing-mounted spray booms was used to disperse the insecticides. This plane was assigned to the Alaskan Air Command and was used in the routine spraying of military bases. The average speed when spraying was 140 miles per hour and the average altitude was 100-150 feet. A swath width of approximately 800 feet was obtained at the above speed and altitude.

Galena, located on the Yukon River in central Alaska, and Umiat, situated ap-

proximately 175 miles southeast of Point Barrow on the Colville River, were selected as the locations of the tests. Galena was treated with both lindane and dieldrin and Umiat was treated with lindane only.

Both lindane and dieldrin were applied in the form of 10 per cent emulsion concentrates at the rate of 0.05 lb. of toxicant per acre. Landing counts were made by observing the number of mosquitoes landing on the front of the HBT fatigue uniform during a two-minute period. Two individuals made a count, each counting the mosquitoes landing on the other. Two counts were then tabulated after the two-minute period.

**FIELD TESTS WITH LINDANE AND DIELDRIN:** 1. *First Lindane Test:* A 10 square mile plot at Galena was sprayed with lindane on 2 July, 1951. A survey indicated the following species of mosquitoes were present at Galena: *Culex territans*, *Culiseta alaskaensis*, *Aedes communis*, *Aedes excrucians*, *Aedes riparius*, and *Anopheles occidentalis*. The last named species was found only in the larval stage.

Average landing count at Galena during the period of the test was 30. Wind velocity at the time of the spray flight was 2-4 miles per hour. Temperature at the time of spraying was 45 degrees F.

Results of the test are as follows: 2 hrs., 45 min. after treatment, 100 per cent reduction; 12 hrs. after treatment, 93 per cent reduction; 24 hrs. after treatment, 77 per cent reduction.

Rain and high winds prevented further checks.

2. *Dieldrin Test:* Dieldrin was applied to a 10 square mile plot at Galena on 9 July, 1951. Landing counts had been reduced to an average of 15 during the period of this test. It is believed that this reduction was due to the cold and wet weather which prevailed during the test

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and not to any residual lindane action. Wind velocity during the test was 2-3 miles per hour and the temperature was 40 degrees F.

Results of the dieldrin test, in terms of per cent reduction after the time intervals named are as follows: 2 hrs., 85 per cent; 12 hrs., 75 per cent; 24 hrs., 50 per cent; 36 hrs., 76 per cent; 48 hrs., 67 per cent; 72 hrs., 30 per cent.

3. *Second Lindane Test*: A 15 square mile plot at Umiat was treated with lindane on 12 July, 1952. Very high pretreatment counts were obtained, the highest being an estimated 800, and the average 350. This average count prevailed in the control area throughout the test period of 9-15 July. Reductions given represent averages between inner and outer zones of the test plot. The outer zone of the plot was that area within one-half mile of the plot boundaries. Wind velocity during the spray flight was eight miles per hour and the temperature was 50 degrees F.

Species found at Umiat included *Aedes nearcticus*, *Aedes communis*, and *Aedes* sp. (probably *A. punctator*). No larvae or pupae were found in the many pools, indi-

cating that the single generation of mosquitoes per year had all emerged. Jachowski and Schultz (1948) studied the biology of mosquitoes at Umiat in 1947 and state that no pupae were found after 5 July.

Results of the test in terms of per cent reduction after the time intervals named are as follows: 15 min., 50 per cent; 5 hrs., 95.5 per cent; 22 hrs., 95 per cent; 43 hrs., 86 per cent; 50 hrs., 82 per cent.

SUMMARY: Field tests with the insecticides lindane and dieldrin were conducted by personnel of the Alaska Insect Control Project during the summer of 1951. Galena, Alaska, was treated with both lindane and dieldrin, and Umiat, Alaska, was sprayed with lindane. Results indicate that a 10 per cent emulsion concentrate of either lindane or dieldrin applied at the rate of 0.05 lb. of toxicant per acre is quite effective as an adulticide for several northern species of mosquitoes for periods of time up to three days.

#### Literature Cited

- JACHOWSKI, LEO A., AND SCHULTZ, CARLOS. 1948. Notes on the Biology and Control of Mosquitoes at Umiat, Alaska. *Mosquito News* 8(4):155-165.

## MOSQUITO AND MALARIA CONTROL IN TAIWAN (FORMOSA)

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Malaria is the most important endemic disease in Taiwan. It affects the majority of the rural inhabitants occupying about 75 per cent of the total population (7,500,000) of the island. Generally speaking, the hilly regions are hyper-endemic, with spleen rate 40-85 per cent and parasite rate 15-40 per cent. The

plains have moderate or low endemicity, with spleen rate 10-40 per cent and parasite rate 2-15 per cent. The coast has low endemicity (i.e., is "healthy"), with spleen rate less than 5 per cent and parasite rate less than 2 per cent.

As early as 1909 the control of malaria was started by the Japanese Government which was then occupying Taiwan. In 1913 the order and regulations for malaria control were issued by the government.

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