venting malaria transmission from infected military personnel to non-infected military personnel and to the civilian population. Here, also, control work is still restricted to the one-mile zone surrounding military establishments where the malaria carrying *Anopheles quadrimaculatus* is prevalent, and where there is a concentration of human malaria carriers.

The work is carried on by mobile malaria control units, consisting of a passenger automobile or station wagon and a 1½-ton truck to carry equipment, materials and supplies for entomological survey and inspections; for the application of larvicide; for minor draining and related work; and for spray-killing of adult mosquitoes.

In addition to their routine duties, these units will also be readily avialable for the control of malaria outbreaks which may occur in the northeastern states.

R. D. G.

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MALARIA SURVEY OF THE DEAD SEA AREA DURING 1942, INCLUDING THE DESCRIPTION OF A MOSQUITO FLIGHT TEST AND ITS RESULTS. By J. M. Shapiro, Z. Saliternik, and S. Belferman. 1944. Roy. Soc. Trop. Med. and Hyg., Trans. 38(2): 95-116, 8 ref., illus.

A study was conducted in several residential sections at the northern end of the Dead Sea to determine the source of anopheline mosquitoes that had been prevalent in that area during the last few years. The four species of *Anophels* present in the Dead Sea are *A. elutus,* the chief carrier of malaria in Palestine; *A. superpictus* and *A. sergenti,* other important vectors; and *A. multicolor,* the malaria-carrying ability of which is not yet definitely known.

In the spring of 1942 adults of *A. multicolor, A. sergenti,* and *A. superpictus* were found in the Kallia area, but it was not known whether breeding occurred here or in the Feshka swamps 6 to 9 kilometers distant. In the entire Kallia area no wadies or swampy areas of recent origin were discovered, but larvae of *A. multicolor* were found breeding in the subsurface of the gravel along the shore line, where it appears that puddles with a salt content of 2½ per cent are created by the rising of the water level at night. Adults of *A. multicolor* evidently lay eggs in the puddles which disappear after sunrise. Larvae then filter through the spaces in the gravel and develop underneath the surface where sufficient moisture exists. After the surface was oiled and covered with soil, a marked reduction in the number of *A. multicolor* in this area was noted within a short time.

Since new breeding places of *A. superpictus* and *A. sergenti* outside the Kallia area had been controlled, any mosquitoes coming into this area from June on originated elsewhere. It was observed that the decline in the numbers of *A. sergenti* in Kallia in July and August corresponded to the lessened activity of this species in the Feshka swamp, and in the autumn, the most active time for *A. sergenti,* adults were found both in Kallia and in Feshka. Although numerous adults, filled with fresh blood, were found in caves at Feshka during the winter months, only one or two were found at this time in Kallia. The importance of caves as a resting place and collecting area for adult mosquitoes was not realized in Palestine before this study was made. Eggs, larvae, and pupae of *A. sergenti* were found at Feshka in the swamp. It was thought that during January and February the mosquitoes obtained blood from the cattle and camels that were transferred by the natives from the villages to the swamp area, where the temperatures were higher and green grass was available for food. The presence of hosts in the swamp as well as rains and cold weather in the Kallia area seems to prevent mosquitoes from coming into this area during the winter.

In order to test the flight range of mosquitoes, about 10,000 adults were released in the Feshka swamp during November and December. The mosquitoes that were released had been sprayed with "gold dust" (a finely powdered bronze preparation). Only one "gold-stained" mosquito, a female *A. sergenti,* was found among among the 3,024 males and females recovered. This female was captured in Kallia about 4.2 kilometers from the point of release. Since a number of adults hav been found to carry pollen on their thorax, it is believed that spraying the mosquitoes with colored pollen might be used to mark them instead of "gold dust."

The authors believe that the Feshka swamp is the source of *A. sergenti* in the vicinity of Kallia, and that this species can fly 6 to 8 kilometers, at least in the Dead Sea area.—Helen Sollers, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, U. S. Department of Agriculture, Washington, D. C.

[redacted]

THE UTILIZATION OF FISH BY A MOSQUITO ABATEMENT DISTRICT; THEIR EFFECTIVENESS AND LIMITATIONS. By Don M. Rees, Ph.D. Author's abstract of a paper read at the 32nd Annual Meeting of the New Jersey Mosquito Extermination Association, at Atlantic City, N. J., March 28, 29, 30, 1945.

There is no unanimity of opinion on this subject, which is to be expected, as control problems differ in different areas. However, every possible agency should be used in mosquito control work, and as fish constitute one of the effective agencies of control in certain districts, their use might profitably be adopted by other districts. Through proper care *Gambusia* can be introduced into more northern states by gradual acclimatization. The most important limiting factor determining the winter survival of *Gambusia* in the more northern states is; that the water in which they live does not freeze over completely for a period longer than a few days at a time. *Gambusia* are probably more effective as a mosquito control measure if introduced into an area than they are in their native habitat. *Gambusia* in Salt Lake City are very effective in controlling pest mosquitoes in small ornamental pools and a satisfactory ratio in such pools is about three fish to every square yard of surface area. In Utah, to date, *Gambusia* have