BIOLOGICAL EVALUATION OF THE C-47 AERIAL SPRAY SYSTEM FOR ADULT MOSQUITO CONTROL

DALE W. PARRISH [1] AND CYRIL J. HODAPP [2]

During June and July 1960, a study was conducted at Cannon Air Force Base, New Mexico, to evaluate the effectiveness of aerially dispersed malathion against DDT-resistant culicine adult mosquitoes in a desert habitat. A C-47 aircraft equipped with underwing discharge booms, as described by Husman (1949), was used.

The test zone consisted of 3,000 acres of relatively level terrain situated on the fringe of an extensively irrigated farming belt on the semi-arid plains of Curry County, New Mexico. Vegetative cover in the test zone consisted primarily of prairie grass and other low, sparse vegetation. Untreated control zones were established in adjacent pastureland covered with sparse tree growth surrounding the test zone.

The mosquito species in order of prevalence at the time of the evaluation were *Aedes nigromaculis, A. vexans, A. dorsalis,* and *Culex tarsalis.* During the pre-aerial spray survey larvae were not found in typical breeding sites such as major land depressions, drainage ditches or pot-holes. These areas were either dry due to lack of rainfall or had been treated earlier by Cannon Air Force Base mosquito control personnel.

Adult landing indices were reasonably constant in all areas during the pre-aerial spray period. The adult index in the treated zone varied from a low of 15 to a high of 18, while the index in the control zone ranged from a low of 26 to a high of 32 for the standard counting period.

The test site was sprayed by the U. S. Air Force Special Aerial Spray Flight 30 minutes after daybreak on 24 June 1960 using a single swath pattern with 44 T-jet nozzles. Seven percent malathion in a fuel oil base was applied from an altitude of 150 feet at 140 mph. Malathion was applied at .228 pound per acre in .388 gallon of fuel oil. Wind velocity at the time of the application was 8 mph.

RESULTS. Within 24 hours after the application, control in the treated zone reached a level of 87 percent. During the first week following aerial spraying adult landing counts in the treated zone increased only slightly. For this period the indicated level of mosquito control averaged 86 percent.

TABLE 1.—Mosquito [a] landing counts before and after spraying [b] at Cannon Air Force Base,[c] New Mexico, 1960

Date		Landing counts [d]	Percent reduction
June 23		18	..
24	Aerial Spray	4	78
25		1.3	93
26		1	94.5
27		5	72
28		2	89
29		1	94.5
30		3	83.5
July 1		1	94.5
2		1	94.5
3		0.5	97
4		0	100
5		0	100
6		0	100
7		0	100

[a] *Aedes nigromaculis, A. vexans, A. dorsalis* and *Culex tarsalis.*
[b] 7% malathion in a fuel-oil base.
[c] Continuous ground control program during test.
[d] Average of 15 stations.

[1] Captain, USAF, MSC, Medical Entomologist, 6570th Epidemiological Laboratory, USAF Aerospace Medical Division (AFSC), Lackland Air Force Base, Texas. The opinions stated herein are the private opinions of the authors and are not to be considered the views of the United States Air Force.

[2] Captain, USAF, MSC, Director, Department of Entomology-Parasitology, 6570th Epidemiological Laboratory, USAF Aerospace Medical Division (AFSC), Lackland Air Force Base, Texas.

The second week after aerial spraying, adult indices in the treated zone diminished to zero, while landing counts in the untreated zone were essentially unchanged. It was reported by Preventive Medicine Personnel at Cannon Air Force Base that adult landing rates had increased in the test zone during the third week following aerial spraying.

Conclusions. Results of this evaluation indicate that the aerial application of malathion, when applied by the C-47 spray system under the conditions described in this paper, is effective for the control of desert species of adult mosquitoes for a period up to fourteen days.

Reference Cited

Husman, C. N. 1949. Spray equipment for C-47, UC-64, and L-5 airplanes. Mosquito News 9(4):166–170.

OUTLINE FOR THE DETERMINATION OF MALARIAL MOSQUITOES IN ETHIOPIA

Part I—Adult Female Anophelines

GESWALDO A. VERRONE, USAID/E *
Malaria Eradication Service, Addis Ababa, Ethiopia

Introduction. Existing classification keys to adult female anopheline mosquitoes of the Ethiopian Region (De Meillon, 1947; Evans, 1938; Russell, Rozeboom and Stone, 1943) have proven somewhat inadequate for use by the present Ethiopian Malaria Eradication Service entomology personnel. Occasional misidentification by Malaria Eradication Service workers and the lack of relatively non-technical literature on anophelines of Ethiopia have clearly accented the need for a simple, concise outline to anopheline mosquitoes of this Empire.

The following pictorial key presents a short cut method for reliable identification of anophelines of Ethiopia. It was designed for use by our high school educated entomology staff. Identifying characters shown have been diagrammed from specimens collected within the Empire with few exceptions and which are on file in the Headquarters of the Ethiopian Malaria Eradication Service, Addis Ababa. Characters of seven other recorded species not collected by the Malaria Eradication Service in Ethiopia have been taken from the literature (Evans, 1938; De Meillon, 1947). To facilitate rapid use of the key, outstanding identifying features mentioned in the diagram captions are emphasized with arrows.

Thirty-four anopheline species make up the key, plus two additional representatives of the *Anopheles coustani* group—*A. coustani tenebrosus* and *A. coustani ziemanni*. (See Table 1.) Repeated searches during the past eighteen months throughout Ethiopia have yielded twenty-seven species, including three not previously recorded from the country: *A. natalensis, A. seydeli,* and *A. theileri*. Table 2 indicates anopheline distriblution by Ethiopian provinces as recorded to January, 1962. With the expansion of malaria eradication services and intensification of entomological activities it is expected that further records will be forthcoming. *A. erythraeus,* Corradetti, 1939, and *A. amutis,* de Burca, 1943, as well as *A. gingeroi,* Corradetti and Archetti, 1947, have been excluded because of the lack of any information on adult female specimens. The baffling *A. funestus* group consisting of

* United States Agency for International Development, Ethiopia.