

## OPERATIONAL AND SCIENTIFIC NOTES

### OVIPOSITION TRAP SURVEYS CONDUCTED ON FOUR USAF INSTALLATIONS IN THE WESTERN PACIFIC<sup>1</sup>

WILLIAM K. REISEN<sup>2, 3</sup> AND RUBEN G. BASIO<sup>4</sup>

**INTRODUCTION.** As a part of the Pacific Air Forces Aerospace Medicine Program, oviposition trap surveys are required under Air Force Regulation 161-1, PACAF Supplement 1. In accordance with this regulation four oviposition trap surveys were conducted from May 1970 through February 1971 on Tainan Air Station, Taiwan, Naha and Kadena Air Base, Okinawa, and Andersen Air Force Base, Guam. To date oviposition trap surveys have not been reported for these areas although artificial container breeding mosquitoes have been surveyed using alternate methods such as light traps, larval dipping, and light and bite counts.

**DESCRIPTION OF STUDY AREAS.** Tainan Air Station was surveyed from 28 May to 5 June 1970. This installation is situated in the southwest alluvial plain adjacent to the China Sea on the island of Taiwan. The survey was conducted just off-base in a small housing area called "nine-house compound."

Naha AB was surveyed from 1-6 September 1970 while Kadena AB was surveyed from 7-12 September 1970. The bases were located approximately 35 miles apart on the western coast of central Okinawa bordering the East China Sea, and were completely encompassed by the towns of Naha and Kozu, respectively. Traps were placed in the protected portions of the base housing areas adjacent to brush covered hill sides.

Andersen AFB was visited from 7-16 February 1971. This installation was located at the northern portion of the Island of Guam; however, the traps were distributed over the entire island with the greatest concentration being in the North Tipalao, U.S. Navy Housing Area (Reisen, *et al.* 1971).

**METHODS AND MATERIALS.** Oviposition trap surveys were conducted using the National Communicable Disease Center (NCDC) "black-jar"

*Aedes aegypti* (L.) oviposition traps (Pratt & Jakob, 1967). Tongue depressors wrapped in filter paper were used in place of the standard press-board paddles with no apparent reduction in trapping success. Trap placement and overall survey methodology were adapted from Pratt and Jakob (1967). Traps were distributed and allowed to remain in place for 96 hours, then removed. The paddles were then placed in individual plastic bags, and the larvae collected and preserved in 70 percent ethyl alcohol. Both the paddles and the larval specimens were taken back to the Biological Taxonomic Unit where they were examined microscopically, identified, and counted. Eggs other than those identified as *Aedes albopictus* (Skuse) were reared to the adult stage for final identification and/or confirmation.

**RESULTS AND DISCUSSION.** The mosquitoes collected from NCDC "black-jar" oviposition traps are listed in Table 1. With the exception of the Tainan AS survey, *A. albopictus* was the most frequently recovered mosquito species, consistently depositing the greatest numbers of eggs. In Tainan *A. aegypti* predominated in the collections. According to Christophers (1960) Taiwan was the northernmost limit of the range of *A. aegypti* in the Western Pacific. The Ryukyu-Retto lies to the north of Taiwan above the 10°C isotherm and thus was considered unsuitable for *A. aegypti* (Christophers, 1960); however, this species has been collected previously by Bohart and Ingram (1946), Farner *et al.* (1946) and Hsio and Bohart (1946) and has been listed as the principal vector species during the 1931 dengue outbreak on Okinawa by Miyao (1931). In recent years this mosquito has not been reported in U.S. Army surveys on Okinawa (Intermill, 1965, 1966, 1967, 1968). The collection of this species on Okinawa was thus considered significant and demonstrated the value of the NCDC oviposition trap, for in 2 weeks we were able to collect this species which was missed by U.S. Army larval dip surveys for 4 years. Although two larval specimens were collected on Guam by larval dipping (Reisen *et al.*, 1971), *A. aegypti* was not recovered by the oviposition trap method. This species was supposedly eradicated from Guam in 1948 (Hayes and Whitworth, 1969), but has apparently been recently reintroduced.

Four mosquitoes never previously reported from oviposition traps (Pratt and Kidwell, 1969) were recovered during these surveys. *Aedes riversi* Bohart and Ingram and *A. okinawanus* Bohart were occasionally collected on Okinawa, while several *A. vexans nocturnus* (Theobald) and a single specimen of *A. pandani* Stone were recovered from collections on Guam. Additional mosquitoes recovered included an unidentifiable

<sup>1</sup> The views expressed herein are those of the authors and do not necessarily reflect the views of the United States Air Force or the Department of Defense.

<sup>2</sup> Formerly Chief, Entomology Division, 1st Medical Service Wing (PACAF), APO San Francisco 96274.

<sup>3</sup> Present address: Zoology Department, University of Oklahoma, Norman, Oklahoma 73069, USA.

<sup>4</sup> Taxonomist, Biological Taxonomic Unit, 1st Medical Service Wing (PACAF), APO San Francisco 96528.

TABLE 1.—Mosquitoes recovered from NCDC "black-jar" oviposition traps in the Western Pacific.

Location	No. traps set	Species recovered	No. pos. traps	% pos. traps	Ave. no. eggs per pos. trap	No. larvae
Tainan	96	<i>Aedes aegypti</i>	37	38.5%	17.8	2
		<i>Aedes albopictus</i>	9	9.4%	13.1	28
		<i>Aedes</i> sp.	3	3.1%	1.7	0
Naha	120	<i>Aedes aegypti</i>	1	0.8%	1.0	0
		<i>Aedes albopictus</i>	14	11.7%	15.1	1
		<i>Aedes okinawanus</i>	1	0.8%	7.0	0
Kadena	106	<i>Aedes aegypti</i>	4	3.8%	3.8	0
		<i>Aedes albopictus</i>	49	46.2%	14.8	0
		<i>Aedes okinawanus</i>	3	2.8%	8.7	0
		<i>Aedes riversi</i>	1	0.9%	3.0	0
Andersen	105	<i>Aedes albopictus</i>	15	7.0%	8.1	0
		<i>Aedes pandani</i>	1	1.0%	1.0	0
		<i>Aedes vexans nocturnus</i>	5	2.1%	1.8	0

species of *Aedes* from Taiwan; however, these specimens unfortunately died during the rearing procedure, precluding their final identification.

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#### HEAVY MORTALITY OF *GAMBUSIA AFFINIS* REARED ON DIET RESTRICTED TO MOSQUITO LARVAE

S. RAVICHANDRA REDDY AND T. J. PANDIAN  
Zoology Department, Bangalore University,  
Bangalore 1

For a lasting biological control of mosquitoes by larvivorous fish such as *Gambusia affinis*, the mosquito larvae, when they are the only food or a major proportion of it, must supply all the necessary amino acids, vitamins etc. in quantities sufficient to promote the normal growth and reproduction of the fish. While estimating food