OPERATIONAL AND SCIENTIFIC NOTES

SMALL PLOT TEST OF SUSTAINED-RELEASE ALTOSID® (METHOPRENE) PELLETS AGAINST *AEDES TAENIORHYNCHUS* IN BRACKISH WATER

T. G. FLOORE, C. B. RATHBURN, JR., A. H. BOIKE, JR., H. M. RODRIGUEZ AND J. S. COUGHLIN

John A. Mulrennan, Sr. Research Laboratory, Department of Health and Rehabilitive Services, P. O. Box 15277, Panama City, FL 32406

ABSTRACT. Four percent methoprene pellets applied at a rate of 2.2 kg/ha effectively controlled adult *Aedes taeniorhynchus* emergence (93%) for over 3 weeks. Efficacy declined to 38% 4 weeks posttreatment. At a rate of 4.5 kg/ha, 95% control was maintained for 34 days with the exception of the 5th week when only 72% control was observed.

Methoprene has been used in mosquito control programs for more than 15 years because of its selectivity for dipterous insects (Schaefer and Wilder 1972 and Schaefer et al. 1974). It does not affect vertebrate or invertebrate mosquito parasites or predators or most other nontarget invertebrates (Creekmur et al. 1982). Wettable powders, emulsifiable concentrates and briquet formulations have been evaluated (Rogers et al. 1976, Rathburn et al. 1985, Floore et al. 1988). Walker (1987) reported experimental 70-day sustained-release briquets (3.6% AI) effectively controlled *Coquillettidia perturbans* (Walker) in emergent vegetation. The purpose of this study was to evaluate sustained-release methoprene (4%, in Altosid® pellets) against *Aedes taeniorhynchus* (Wied.) in a small plot field test.

All the tests were conducted in specially constructed saltwater plots at the John A. Mulrennan, Sr. Research Laboratory (JAMSRL) (Rathburn and Boike 1975). Water depth was maintained at 25–30 cm by gravity flow from an adjacent saltwater canal. Water salinity ranged from 17 ppt at the start of the test to 6 ppt at the end. Water temperature during the test period (May 25–June 30, 1988) ranged from 26 to 35°C.

Eggs from the JAMSRL *Ae. taeniorhynchus* colony were hatched in 300 ml of 5–8 ppt salt water in 400 ml polypropylene beakers in the laboratory. One thousand newly hatched first larval instars were added to each plot on 2, 9 and 16 days posttreatment. Each Altosid pellet consisted of methoprene in a gray-black inert carrier ca. 0.8 cm long × 0.3 cm diam and weighed 0.1 mg. The desired dosage for each plot, based on the actual square footage of treated water surface, was weighed on an electronic balance. Pellets were applied by hand to each plot. The randomized test consisted of 3 replications of 2 treatments (2.2 and 4.5 kg/ha) plus 2 replications of an untreated control.

An increase in dytiscid larvae and dragonfly naiads 22 days posttreatment necessitated a change in the evaluation method 29 and 34 days posttreatment. Three free-floating beakers containing 100–150 third instar larvae were placed in each plot. Three windows (3 × 8 cm) were cut longitudinally in a plastic 400 ml polypropylene beaker and 14/18 mesh polyethylene window screen fabric was glued to the inside of each beaker. Each beaker was positioned in a 10 cm diam hole cut in the center of a 25 × 25 × 2.5 cm piece of styrofoam so that approximately 8 cm of the beaker was below the water surface to allow larval exposure to the treated water (Chapman et al. 1970). Two catfish food pellets were placed in each beaker as larval food.

Each week following pupation, approximately 100 pupae were removed from each plot or container, placed in labeled styrofoam cups containing water from the respective plot and held in a sheltered area out-of-doors for emergence. The percent emergence was determined by the following formula:

$$\text{CS} + \text{PE} + \text{DP} = \text{Total}$$
$$\text{CS} - \text{DA} = \text{Number emerged}$$
$$\%\ \text{emergence} = \left[\frac{\text{CS} - \text{DA}}{\text{CS} + \text{PE} + \text{DP}}\right] \times 100$$

where:

CS = cast pupal exuviae PE = partially emerged adults
DP = dead pupae DA = dead adults

Corrected % control (i.e., emergence reduction) was determined by applying Abbott's formula to the emergence data (Abbott 1925):

$$\text{Corrected \% control} = \left[\frac{\text{\% emergence check} - \text{\% emergence treatment}}{\text{\% emergence check}}\right] \times 100$$

The results of the Altosid pellet tests against *Ae. taeniorhynchus* in saltwater are shown in Table 1. Both the 2.2 and 4.5 kg/ha treatments gave excellent control for 15 days posttreatment. No emergence was recorded 7 days after treating and >99% control was recorded in all the treated plots 8 days later. More than 90% control was recorded 22 days posttreatment. However, 29 days after treatment only 28% control was recorded in the 2.2 kg/ha treated plots. Possibly because of the change in the method of larval exposure, 28% (1,231:4,362) fewer pupae were collected 29 and 34 days posttreatment than in the previous sampling periods. The 4.5 kg/ha treatment remained effective through 34 days of posttreatment evaluations, and there was no significant difference in control through the test period. Control plots had more than 95% emergence during each sampling period except the last (88.5%, 170 of 192).

In conclusion, Altosid pellets containing 4% methoprene effectively reduced *Ae. taeniorhynchus* emergence for more than 3 weeks at 2.2 and 4.5 kg/ha application rates in saltwater plots. The effectiveness of the 2.2 kg/ha rate was greatly reduced after 22 days posttreatment, but the 4.5 kg/ha treatment continued to be effective for 34 days.

Table 1. Small plot field tests of 4% methoprene pellets against *Aedes taeniorhynchus* in brackish water.

Days post-treatment	Percent control					
	2.2 kg/ha		4.5 kg/ha		Control	
	Mean	± SE[1]	Mean	± SE[1]	Mean	± SE[2]
5	100	0.0	100	0.0	98.1	1.0
7	100	0.0	100	0.0	98.6	0.6
15	99.3	0.7	99.0	0.5	100	0.0
22	93.5	6.5	88.6	8.3	98.8	1.4
29	28.0	4.4	72.0	15.1	95.3	0.9
34	33.4	26.4	98.1	1.3	88.4	1.3

[1] Mean of 3 replicates.
[2] Mean of 2 replicates.

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