

## EFFICACY AND PERSISTENCE OF SUSTAINED-RELEASE METHOPRENE PELLETS IN AN IRRIGATED PASTURE<sup>1</sup>

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### ABSTRACT

The insect growth regulator, methoprene, has recently been formulated as sustained-release Altosid® pellets. The purpose of this study was to evaluate the efficacy and persistence of the pellets against *Aedes* mosquitoes through several flood cycles in an irrigated pasture.

Every other check in an irrigated pasture in eastern Contra Costa County, California, was randomly assigned one of three treatments: 3.4 kg/ha (3 lbs/acre) methoprene pellets, 9.0 kg/ha (8 lbs/acre) methoprene pellets, or control. There were three replicates of each treatment, and the pellets were applied four days prior to flooding.

Emergence rates of *Aedes* mosquitoes were monitored through seven flood cycles (126 days). During each flood cycle, approximately 150 pupae were collected from each check and placed in laboratory emergence cages. The adults were counted, sexed and identified as they emerged, and the mortality rate calculated as the number of pupae dying (not emerging)/number of pupae in the sample. The mortality rate was corrected using Abbott's formula.

*Aedes melanimon* Dyar, *Aedes nigromaculis* (Ludlow), and *Aedes vexans* (Meigen) were found in the irrigated pasture. Emergence was minimal in the treated checks during the first two flood cycles (4 and 20 days post-treatment, respectively), with mortality rates exceeding 98 percent. Mortality then

decreased to 86.9 and 81.0% at the low and high treatment rates, respectively, during the third flood cycle (34 days post-treatment). During the fourth flood cycle, insufficient irrigation resulted in the pasture drying up before the larvae reached the fourth instar.

During the fifth flood cycle (69 days post-treatment), mortality increased to 92.6 and 96.8% for the low and high treatment rates, respectively. The water in each check had drained into low lying areas, and thus the pupae, and perhaps the methoprene, were highly concentrated. This may explain the increase in mortality rates from the third flood cycle. Mortality decreased during the sixth and seventh flood cycles (87 and 115 days post-treatment, respectively) to between 64.6 and 53%.

Mortality in the control checks for flood cycles 1-3 and 5-7 averaged ca. 14, 3, 1, 6, 12, and 26%, respectively. During each flood cycle, rates in the checks treated with methoprene were significantly higher (ANOVA,  $P < 0.05$ ) than in the control checks, but mortality rates between the low and high treatment levels were not significantly different.

In summary, both application rates of methoprene sustained-release pellets provided greater than 98% control of *Aedes* mosquitoes in an irrigated pasture through two flood cycles, or 20 days post-treatment, and greater than 80% control through five flood cycles, or 69 days post-treatment.

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