

RESIDUAL EFFECTIVENESS OF THREE PYRETHROID SPRAYS ON VEGETATION AGAINST TWO MOSQUITO SPECIES IN FIELD CAGE TESTS

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Abstract Application of insecticides to vegetation has become increasingly popular in mosquito control programs in recent years. However, there is very little data that addresses the efficacy of such treatments. This study evaluated the residual effectiveness of three pyrethroid formulations on vegetation against two mosquito species in screened field tests.

The following products were used and applied at their maximum rates: Aqua-Reslin® (20% permethrin and 20% PBO) 10.8 mg/m², Permanone® 10EC (10% permethrin) 10.8 mg/m² and Suspend® SC (4.75% deltamethrin) 21.5 mg/m². Groups of nine potted native southern wax myrtle, *Myrica certifica*, were separately treated with one insecticide. After allowing the plants to dry sufficiently each group was arranged in a semicircle in a corner of 7.3 m (l) x 15.2 m (w) x 2.6 m (h) screened outdoor cages that contained natural vegetation. A similar group of plants treated with water only served as controls and were placed in the opposite corner of each cage. A Latin-square study design was used that rotated treatments through each of the 3 screened cages. Approximately 4,000 *Aedes albopictus* and *Culex quinquefasciatus* adults were released into the middle of each cage each day for 3 consecutive days per week. A MMX mosquito suction trap baited with CO₂ was turned on to monitor mosquito abundance in the immediate area of the treatment and control plants. Evaluation of mosquito reduction in cages continued weekly through 12 weeks from May 10 through August 6, 2004. In order to determine the level of residual activity of insecticide on treated plants, leaves were randomly obtained and bioassays were conducted weekly. Mortality was recorded at 24 hours. All treatments were replicated three times.

For pooled species, deltamethrin exhibited longer residual activity with reduction of 67 to 82% for the first 4 weeks. Permethrin/PBO provided greater than 82% reduction at 0 day, where permethrin achieved 64 to 69% reduction at 0 day and 1 week post-treatment. For *Culex quinquefasciatus*, deltamethrin provided 71 to 84% control at the first 4 weeks, where *Aedes albopictus* reduction ranged from 51 to 79%. Excised leaf bioassays indicated that deltamethrin provided greater than 94% mortality for the entire study. Permethrin/PBO and permethrin formulations followed the trends set by the field cage data, their effectiveness decreased about 1 week after the treatment.

The discrepancy of mortality between cages and leaf bioassay for the deltamethrin treatment may be due to changes in plant architecture. All treated plants had nearly doubled in size by the end of the study, and it is believed that mosquitoes in the field cages were landing in the plants but not contacting, or remaining on, treated leaves long enough to be lethal.

Deltamethrin spray provided the greatest reduction in adult mosquito abundance during the first 4 weeks of the study when compared with the other two insecticide tests. In order to maintain effective control, re-treatment at 4 week intervals is suggested.