

7. Mating Disruption/SIR

MATING DISRUPTION OF MOTH PESTS IN MICHIGAN USING THE MSU MICROSPRAYER

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Placement and blend effects: Microsprayers field-tested during 2000 consisted of aerosol cans containing ethanolic solutions of pheromone components and pressurized by the low molecular weight hydrocarbon propellant A70. Pheromone was dispensed from a Ford automotive fuel injector whose solenoid valve was instantaneously opened every 4 min. so as to release 8 microliters of solution as droplets ranging in diameter from infinitely small up to several millimeters. Microsprayers were hung at a density of 2 per acre and placed at an angle in the tree canopy so that some pheromone solution was deposited at all elevations from tree top to orchard floor.

Tests in apples were aimed at oblique-banded (OBLR) and red-banded leafrollers (97% (Z)-11-14:Ac and 3% (E)-11-14:Ac at 820 mg/acre/day), oriental fruit moth ((Z)-8-12:Ac at 260 mg/acre/day) and codling moth ((E,E) 8, 10:OH at 730 mg/acre/day). A hand-applied treatment using Isomate CM/LR was also included in one of the studies. In two large and highly uniform orchards, the effects of Microsprayer placement was evaluated by comparing moth catch in traps sandwiched between Microsprayers or bordered by Microsprayers on one side only. The potential importance of using a more complete blend for OBLR disruption was also evaluated in these large orchards. The complete blend consisted of 97% ((Z)-11-14:Ac, 3% ((E)-11-14:Ac and 0.4% ((Z)-11-14:OH at 820 mg/acre/day).

Moth captures were significantly impacted by trap position relative to the location of Microsprayers. Inhibition of moth catch was consistently higher for traps sandwiched between rows of Microsprayers compared to traps bordered by Microsprayers on one side only (Fig. 1). The addition of (Z)-11-14:OH to the leafroller blend improved the performance of Microsprayers against OBLR, but reduced performance for RBLR. OBLR moth captures were disrupted 95% using the 3-component blend, but only 85% by the 2-component blend. Microsprayers did not provide high levels of disruption for codling moth (CM) and oriental fruit moth (OFM). The provided 70-90% inhibition of OFM moth catch in pheromone traps and about 50% inhibition of CM catches. Isomate products provided very high levels of disruption. Insecticide treatments were also made in all blocks, thus fruit damage was low for all treatments.

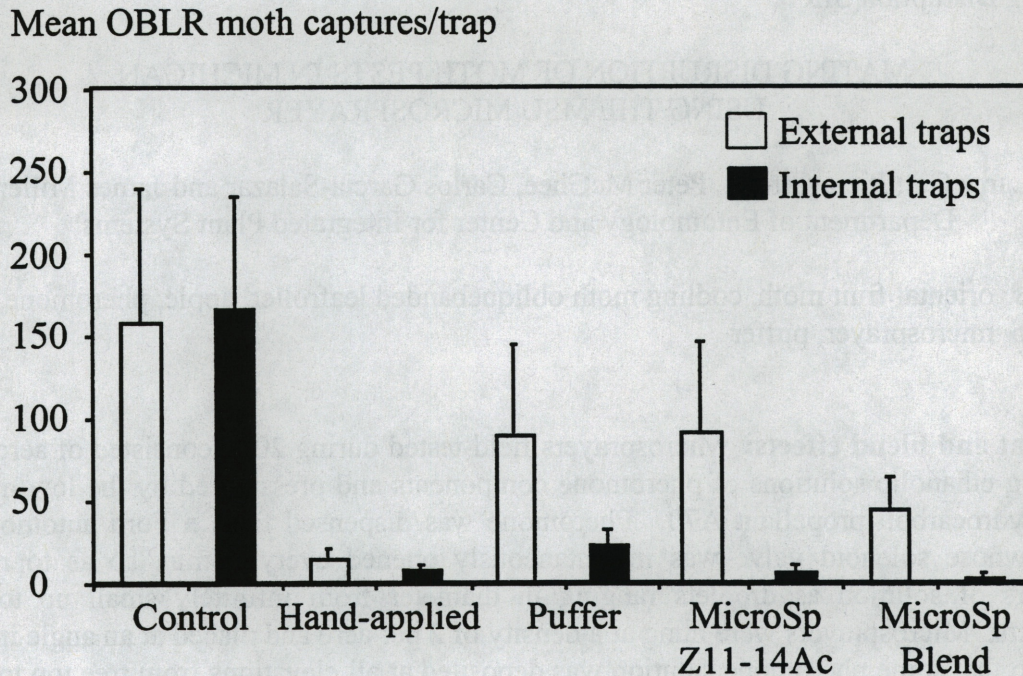


Fig. 1. Effect of trap position relative to disruption source on obliquebanded leafroller moth catch.

Pheromone compatibility: Our poor results for CM were inconsistent with the promising results reported for the Paramount Farming device in tests conducted in the western US. We found no difference in disruption in direct comparisons of the performance of the Microsprayer and the Paramount Farming device. One of the major differences between our tests and those conducted in the west was the combined use of CM and OFM pheromones in our experiments, but the use of CM pheromone alone in the west. Thus, we set up studies to evaluate the compatibility of CM and OFM pheromone components. Experiments were conducted in 1-ac apple blocks at the MSU Trevor Nichols Research Center and a commercial farm in southwest Michigan. Four treatments were compared, CM pheromone only, OFM pheromone only, CM and OFM pheromone combined and no pheromone (ethanol only). A single Microsprayer was placed on the upwind edge. Performance was measured by capturing moths in 30 traps placed in a grid pattern.

Preliminary analysis of the results suggests that CM and OFM pheromones may not be compatible when used in Microsprayers. The active space was different when the combined pheromones were used compared to when the pheromone for one insect only was emitted. Specifically, the active space was small when Microsprayers emitted both pheromones. We plan on expanding on this work in the 2001 season.