

## Thresholds, Monitoring and Sampling

### Comparison of Lures for Sampling Codling Moth in Mating Disruption with Low Trap Densities

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Wing traps and 10 mg red lures are the standard recommendations for monitoring codling moth in mating disruption. I have been using these traps in more than 1,000 acres of MD orchards since 1994. The densities range from 1 trap every 5 to 20 acres, depending on the location of the orchard block monitored and the nature of neighboring orchards. With densities so low, the traps and lures must be as efficient as possible. This article describes a search for an efficient, low maintenance system to improve monitoring.

In 1997, I set out a randomized comparison of lures in a MD area known to have a high moth population. Trap density was 1/2.5 acres. Five delta traps were loaded with red septa containing 10 mg of attractant. The lures were changed every 3 wk, as a standard. An additional five traps per treatment were loaded with either one 3-mg gray lure, two 3-mg gray lures placed together, or one experimental Biolure (Consep, Inc.) and used throughout the first flight. Trap positions were rotated twice per wk. Total catch per trap was analyzed with ANOVA after transforming the data with  $\ln(x+1)$ . Mean (and standard error) for each treatment was 10.2 (4.8) for red lures, 6.4 (4.2) for 3-mg gray lures, 5.0 (5.9) for "6-mg" gray lures, and 2.0 (2.9) for the Biolures. The ANOVA was not significant at the 0.05 level.

At the same time, using only delta traps, I used "6-mg" gray lures in a MD orchard of slightly over 1,000 acres and used 10-mg red lures in other MD orchards totaling slightly less than 1,000 acres. The results are reported in the table below. The two areas were similar in 1996: the average percentage of infested fruit was the same. In 1997, although the number of moths caught per trap during the first flight was similar, the damage at harvest was greater in the blocks monitored with gray lures. The percentage of false negatives was also higher. False negatives were defined as the traps indicating populations below threshold (2 moths per trap in at least one trap per block) and above damage tolerance (0.1% infested fruit). These thresholds have been used for four years to provide a sustainable program.

Although the ANOVA indicated no treatment differences, the moths caught by gray and red lures appeared different. The lower performance of the gray lures as measured in the large field trial implies that they are not a perfect substitute for red lures. However, note that by using the gray lures, moth damage was reduced, as desired, between 1996 to 1997.

Performance of two lures in monitoring CM in mating disruption orchards.

Lures	No. traps	Moths/trap	No. fruit sampled	cm fruit 1996	cm fruit 1997	False negatives
gray	88	2.60	88,100	0.26%	0.17%	13%
red	73	2.64	77,000	0.26%	0.09%	7%