Mating Disruption/SIR

Pheromone Lures to Monitor Codling Moth in Conventional Orchards

Larry J. Gut and Jay F. Brunner
Washington State University Tree Fruit Research and Extension Center, Wenatchee, WA

Keywords: codling moth, lures, red rubber septum, Trécé, luretape, Hercon, Biolure, Consep, gray rubber septa, Agrisense

Summary: Pheromone lures used in traps to monitor codling moth (CM) in conventional orchards were compared for relative efficacy and longevity. The industry standard, a red rubber (RR) septum produced by Trécé, Inc., and loaded with 1 mg of codlemone, proved to have serious shortcomings relative to other lures. Attractancy of the RR lure lasted only about 21 days in spring and 10 days in summer. A lure produced by Hercon, Inc., referred to as "luretape" (LT), captured CM moths for the entire first generation flight and for 45 days during the second generation. Two other lures showed promise. A plastic membrane (MEM) type lure produced by Biolure, Consep, Inc., and a gray rubber septa (GR) loaded with 3 mg of CM pheromone and provided by Trécé, Inc., captured as many or more CM than the RR lure. These two lures performed better in the second CM generation than the first. These results have stimulated interest by pheromone companies to improve their products, and newly engineered lures should be available for testing in 1995.

Standard Lures—Conventional Block Monitoring

Experimental design. The effectiveness of four pheromone lures for monitoring CM was determined. Three of the lures were commercially available products: RR (Trécé, Inc.), MEM (Biolure, Consep, Inc.) and LT (Hercon, Inc.). The fourth lure, GR, was loaded with 3-fold more pheromone than the commercially available gray septa (Agrisense). In addition, an RR was replaced every 10-12 days as a standard. The experimental design was a randomized complete block (six blocks). The number of male moths captured in Pherocon 1CP traps baited with the different lures was recorded every 2-3 days. To minimize position effects, traps were rotated each time they were inspected. Trap bottoms were replaced after a cumulative catch of 40 moths, more often if dirty.

The relative attractancy of the various lures during the first and second generation flights of CM is shown in Figs. 1 and 2. Data are presented as the average moth capture in traps baited with the standard or "control" lure (RR changed every 10-12 days), shown as a value of 1 (broken line) and average moth capture in traps baited with other lures shown as moth catch relative to the "control" lure.

First generation comparison. The LT was the most attractive lure throughout the first generation flight of CM (Fig. 1). It was the only lure that consistently performed better than the RR replaced each sample period. After 53 days of exposure in the field, moth capture remained significantly greater in traps baited with the LT than in traps baited with any of the other lures, including a new RR. In contrast, field aging had a significant negative effect on the attractancy of the RR and MEM lures (Fig. 1). Moth capture in traps baited with either lure declined after the
first 21 days. At least a 50% reduction in moth catch was recorded in MEM or RR baited traps relative to a trap baited with a new RR for the remaining 32 days of the experiment. The performance of the GR was more variable. The attractancy of this lure was equal to that of the RR of the same field age for the first 31 days but increased significantly during the next 22 days. Moreover, the 53-day-old GR was significantly more attractive than a fresh RR.

Differences in pheromone emission rates were probably the major factor affecting the performances of lures. The rate of pheromone release from the various lures is currently being determined. Lures were collected at 10-day intervals during both CM flights. We suspect that dramatic differences in spring and summer attractancy and longevity of lures were due to the effect of temperature on pheromone emission rates. Higher temperatures in the summer appeared to increase the rate of release of pheromone and improve the performance of the gray septa and membrane lures. These lures apparently maintained a high pheromone emission rate for at least seven weeks during the summer. High summer temperatures may have also increased the rate of release from the red septa; however, the performance of this lure was reduced in the summer compared to the spring. Perhaps the RR released pheromone too quickly during the hot summer months.