

Using Kairomone Lures to Monitor Codling Moth in Apple Orchards under Mating Disruption

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Kairomone vs. Pheromone Trap Catches

Kairomone Traps: Male vs. Female Comparison

Kairomone Traps: Mating Status of Trapped Females

INTRODUCTION:

The use of mating disruption to control codling moth in apples has increased in recent years as a variety of effective pheromone materials have been developed. It is critical to monitor codling moth populations in mating disruption orchards to determine if and when supplemental controls will be needed. However, the usual pheromone based monitoring lures are less attractive under a mating disruption regime. A kairomone-based lure derived from pear volatiles has been developed by the USDA in cooperation with Trece, Inc. which may be a more effective attractant in mating disrupted orchards. In addition, the kairomone lure may give a more accurate picture of codling moth activity as it attracts both male and female moths while the pheromone lures attract only males.

PROCEDURES:

Sets of delta style traps were placed in commercial apple orchards in the No. San Joaquin Valley in California. All orchards were using either Suterra (Paramount) puffers or Isomate C+ mating disruption for codling moth control. Each set included 3 traps, each baited with one of the following:

- a kairomone lure (K)
- a supercharged pheromone lure [MegaLure (ML) or BioLure (10X)]
- a standard pheromone lure (L2).

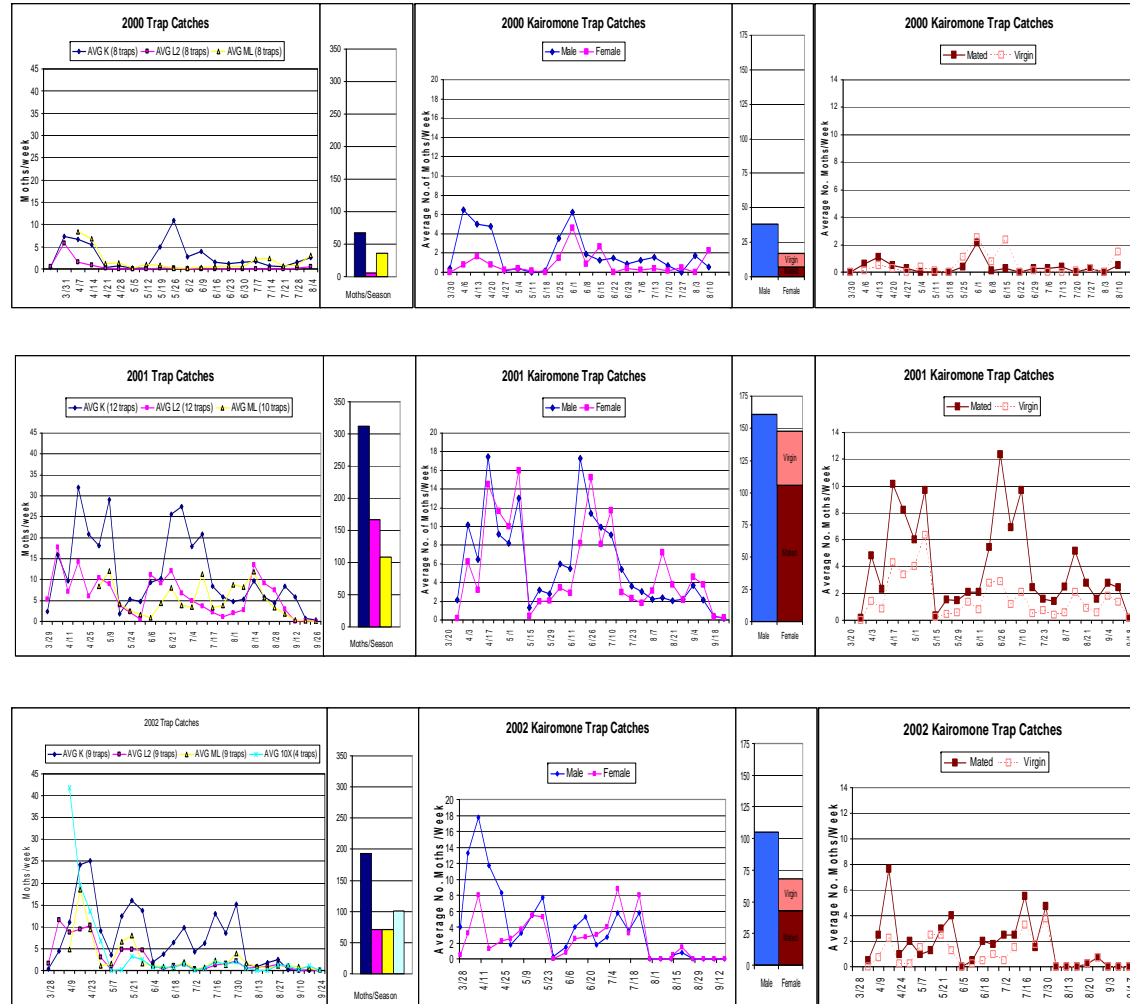
Traps were placed 100 to 500 feet apart (depending on orchard size and layout) and serviced on a weekly basis. Lures were replaced at 8 week intervals (2000, 2002) or 10 week intervals (2001). Over a 3 year period, trap data was collected from 29 sets of traps in 16 orchard sites, as follows:

- 2000: 3 orchards, 8 trap sets
- 2001: 4 orchards, 12 trap sets
- 2002: 9 orchards, 9 trap sets

The moths from the kairomone baited traps were collected each week and brought back to the lab to determine gender and the mating status of the female moths.

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RESULTS:

Under full rates of mating disruption, the kairomone lures caught consistently more moths than the pheromone lures during the 1st and 2nd generation flights. However, in early August, as fruit ripened, the kairomone trap catches diminished and approached those of the supercharged pheromone traps.

In orchards using lower rates of mating disruption, the early season differences between the kairomone and pheromone lures were less pronounced. The kairomone lures did not catch as well as the traditional pheromone lures in orchards not using mating disruption.

The kairomone lures were attractive to both male and female moths. The flight patterns of the both genders were quite similar, although more males than females were caught over the course of the season. This was largely due to higher male catches during the spring flight in some years. The gender ratios were fairly equal during the later flights, although there were slight variations from week to week and among orchards.

The kairomone lures were also attractive to both mated and virgin female moths. Forty to 70% of the female moths caught were mated with a higher percentage of mated females caught in high population orchards.

CONCLUSIONS:

The new kairomone lure represents a significant advance in monitoring for mating disrupted orchards. It is more attractive than pheromone lures for much of the season. However, it is important to remember the decline in attractiveness later in the season in order to correctly interpret trap catches.

The flight patterns of both male and female moths were quite similar throughout the season although higher numbers of males were often found in the spring flight. Spray timing could be improved by sexing the moths during spring biofix to determine a true female biofix. However in these trials, females were usually caught at or within a week of the first date of moth capture.

It is important to remember that the kairomone lure does not perform as well as the pheromone lure in orchards NOT under mating disruption.

The new kairomone lure is commercially available from Trece, Inc.



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