

Codling Moth Control with Rimon (Novaluron)
2005 Demonstration
Kaysville Plant Science ‘Golden Delicious’ and ‘Gala’ Apples

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Objective: To demonstrate the efficacy of a 4-application novaluron (Rimon 0.83 EC) program for first and second generation codling moth management in apple.

Methods:

Plot Design

The Rimon efficacy demonstration was conducted in a 1.04-acre ‘Golden Delicious’ and ‘Gala’ apple orchard at the Utah State University research farm in Kaysville, UT. The orchard was 10 rows wide by 18-25 trees in length (11.5 ft × 18 ft spacing) (9 rows of ‘Golden Delicious’ and 1 row of ‘Gala’) (see plot map). The entire orchard was treated with the Rimon insecticide program. An untreated control plot (four rows wide by five trees long) was approximately 100 yards distance from the Rimon plot in a 2.1-acre apple orchard of mixed cultivars.

In addition to the trial treatments, the study orchard received the following general pest management sprays: Dormant oil and Lorsban (Apr 5), Bayleton (Apr 15 and Jun 27), Procure (Apr 26 and May 27), Flint (May 14 and Jun 13), and Agrimycin (May 15). All insecticide trial treatments were applied with an orchard air blast sprayer at 70 gpa of dilute spray.

Treatments

Rimon Efficacy Demonstration (Crompton Protocol 183)

1. Rimon 0.83 EC @ 32 oz/acre + 0.25% v/v horticultural mineral oil
Additional insecticides were applied to cover each entire generation of CM:
1st CM generation:
1st spray: Rimon at 50-75 DD after biofix (prior to egg-laying); May 14
2nd spray: Repeat Rimon 14 days later; May 27
3rd spray: Calypso @ 6 oz/acre; Jun 13
4th spray: Intrepid @ 16 oz/acre; Jun 27
2nd CM generation:
5th spray: Rimon at 1000 DD after biofix; Jul 14
6th spray: Repeat Rimon 14 days later; Jul 28
7th spray: Intrepid @ 16 oz/acre; Aug 11
2. Untreated control plot in nearby apple orchard
Plot was mistakenly treated with Calypso on May 28 and with Intrepid on Jun 10; no insecticides were applied during the 2nd CM generation

Insect Monitoring

Codling moth male populations were monitored with a pheromone trap placed in the study orchard on May 19. First moth catch, or biofix, was determined in an adjacent orchard and was used to initiate the degree-day model for timing of first and second generation sprays. Moth densities per trap per night are graphed to show adult densities and the progression of generations.

Codling Moth Injury Sampling

One thousand and 2,000 fruits were inspected for codling moth injury (stings and larval entries) in each the Rimon and untreated plots after the first codling moth generation on Jul 12 and after the second generation on Sep 14, respectively. For each sample, 100 or 200 fruits were randomly selected from each row across the plot for the first and second sampling, respectively. Fruit surface injury from Campyloomma bug (raised, corky bumps) and thrips feeding (pansy spots) was also observed in the plots. The percentage of fruit with codling moth stings and larval entries, and other insect injury, were compared between the Rimon and untreated control treatments with analysis of variance on each sample date (Proc GLM, SAS).

Results:

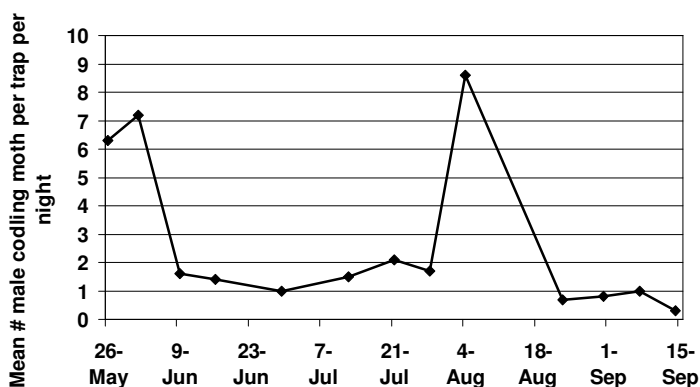
Fruit Injury

Codling moth injury was low in both treatments on Jul 12 following the first generation (Table 1). The untreated plot was mistakenly treated with the insecticides Calypso on May 28 and with Intrepid on Jun 10, and this was reflected in the low level of codling moth injury on Jul 12. No further insecticide treatments were applied to the untreated plot. On Sep 14, codling moth injury to the fruit had increased, especially in the untreated plot (Table 1). There was significantly more fruit with codling moth stings and larval entries in the untreated plot than in the Rimon-treated plot on Sep 14. The percentage of fruit with stings in the Rimon plot, 8.3%, may be higher than some growers will accept, however, larval entry injury in the Rimon plot was very low, 0.1%. There was a total of seven cover sprays applied to the Rimon plot. In addition to the four Rimon sprays timed for the beginning of egg-laying and larval emergence in each generation, one or two other insecticide applications (Calypso and Intrepid) were used to cover the latter part of the generations. Timing of the Rimon sprays was accurate with the degree-day model; however, fruit may not have been fully protected at the end of the second generation in late Aug after the final Intrepid residues had diminished. There was a low level of Campyloomma bug injury in the Rimon plot and a low level of thrips injury in the untreated plot (Table 1), but neither exceeded economic thresholds.

Codling Moth Population

Codling moth biofix occurred on May 1. First and second generation moth flights peaked on approximately Jun 1 and Aug 4, respectively (Fig. 1). Relative codling moth male population size was moderate as compared to other apple orchards in Utah, with peak flight numbers ranging from 6-9 moths per trap per night.

Figure 1. Male codling moth trap capture in Rimon study orchard at Kaysville, UT, 2005.



Phytotoxicity

Foliage and fruit of the Rimon and untreated plots were inspected for signs of phytotoxicity (russet, markings, and necrosis) before the first Rimon application on May 12 and following each Rimon application on May 19, Jun 1, Jul 21, and Aug 4. No phytotoxicity signs were observed.

Table 1. Mean apple fruit injury caused by codling moth (CM) and other insects following completion of the first (Jul 12) and second CM generations (Sep 14) in 2005.

Treatment	% fruit with injury (Jul 12)				% fruit with injury (Sep 14)			
	CM Stings	CM Entries	Campy ^a	Thrips ^b	CM Stings	CM Entries	Campy ^a	Thrips ^b
Rimon	2.9	0	0.4	0	8.3 b	0.1 b	0.8	0
Untreated ^c	1.0	0.5	0	1.0	22.8 a	3.3 a	0	0.3

Means within the same column with different letters were significantly different ($p < 0.05$) and separated with Waller-Duncan k -ratio t -test.

^aFruit with Campyloomma bug injury had raised, corky bumps on the surface.

^bFruit with thrips injury had pansy spots.

^cThe "Untreated" plot was mistakenly treated with Calypso on May 28 and with Intrepid on Jun 10.