

## Chemical Control/New Products

### Codling moth programs and material evaluations in southern Oregon pear orchards

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*Abstract:* Trials were conducted at the Southern Oregon Research and Extension Center to evaluate materials for their effect on codling moth. In one replicated trial, a spray program of repeated Imidan applications was compared to programs consisting primarily of Dimilin or novaluron treatments. In another replicated trial, seasonal programs of Imidan and Avaunt were compared. As part of the Areawide II project, Imidan was compared to Intrepid in three paired blocks where mating disruption was used throughout. High pear psylla levels necessitated treatment in all cases; however, the materials which were applied for control of pear psylla, i.e., Assail and Danitol, often had activity on codling moth. Five additional orchards using mating disruption implemented programs where only alternatives to organophosphates were employed, specifically, Intrepid, Dimilin, Assail, or Danitol.

### **Results and Discussion**

The results from the trial comparing Imidan to Dimilin and novaluron are shown in Table 1. It should be noted that oil at a rate of 0.25% was added to the Dimilin and novaluron in all cases, and one spray of Imidan (6/27) was applied to all the treatments except for the check. The level of codling moth injury falls into three clear categories, the check sustaining a high level of fruit damage, the Imidan and novaluron treatments with low levels of injury (95% control or better), and Dimilin yielding intermediate results (approx. 80% control). Even given the fairly high codling moth pressure, the program consisting of five applications of Dimilin plus one application of Imidan did not give satisfactory control of codling moth in this trial. Similarly, in the trial comparing Avaunt to Imidan, Imidan on a 21-day schedule provided acceptable control (better than 98%) while the level of control provided by Avaunt on an approx. 18-day schedule was not satisfactory (Table 2). However, since a majority of the codling moth injury in the Avaunt program was in the form of stings, it is likely that Avaunt was causing larval mortality in many cases but too slowly to prevent fruit injury from occurring.

A variety of programs using mating disruption and alternatives to OPs was tested in the three Areawide II orchards and five additional on-farm demonstration blocks (Table 3). All of the programs performed well with respect to codling moth damage. In only one instance was the observed codling moth damage over 0.2% and that was seen in a block of Red Bartletts where fairly high numbers of codling moth had been trapped. It appears that in all of these blocks a program consisting of mating disruption supplemented with non-organophosphate materials provided a high degree of codling moth suppression, and this is particularly true with respect to the winter pear cultivars.

Table 1. Percent fruit injury due to codling moth at harvest (8/26/02) in Packham's pears

Program	Rates (lb ai/acre)	Dates of application	% stings	% exits, larvae, and deep stings
Check	-----	-----	13.25 c	53.75 c
Novaluron* 0.25 (5 sprays) + Imidan (1 spray)	0.25 3.5	4/25, 5/9, 5/23, 7/18, 8/2 6/27	1.25 a	0.75 a
Novaluron* 0.32 (5 sprays) + Imidan (1 spray)	0.32 3.5	4/25, 5/9, 5/23, 7/18, 8/2 6/27	0.5 a	1.0 a
Novaluron* 0.32 (4 sprays) + Imidan (1 spray)	0.32 3.5	4/25, 5/14, 7/18, 8/6 6/27	1.5 a	1.5 a
Dimilin* 0.25 (5 sprays) + Imidan (1 spray)	0.25 3.5	4/25, 5/14, 5/31, 7/18, 8/6 6/27	4.25 b	10.0 b
Imidan (5 sprays)	3.5	5/16, 6/6, 6/27, 7/18, 8/12	1.0 a	2.0 a

\*Treatments included oil at 0.25%.

Means within a column followed by the same letter are not significantly different using Fisher's LSD test,  $p=0.05$ . Data were transformed using the arcsine transformation, non-transformed means are shown.

Table 2. Percent fruit injury due to codling moth at harvest (8/12/02) in Bartlett pears

Program	Rates (form.)	Dates of application	% stings	% exits, larvae, and deep stings
Avaunt (5 sprays)	6 oz/100 gal	5/16, 6/4, 6/21, 7/12, 7/30	13.25 c	10.25 b
Imidan (4 sprays)	5 lb/100 gal	5/16, 6/6, 6/27, 7/19	0.75 a	0.75 a
Check	-----	-----	5.75 b	77.25 c

Means within a column followed by the same letter are not significantly different using Fisher's LSD test,  $p=0.05$ . Data were transformed using the arcsine transformation, non-transformed means are shown.

Table 3. The types of materials applied in various grower demonstration blocks along with the level of codling moth and total insect damage. In the Areawide II blocks, half of block was treated with Imidan and the other half with Intrepid at first cover spray timing.

Orchard	Areawide Blocks			#1		
	1	2	3	Bosc	Comice	Cascade
Cultivar	Bosc	Comice/ Bosc	Comice/Bosc	Bosc	Comice	Cascade
Type of mating disruption	Disrupt CM @ 220/acre		Isomate CTT @ 200 per acre	NoMate 400 per acre		
OPs	1	1	1	0	0	0
Pyrethroids	1	1	0	0	0	0
Neonicotenoids	1	1	2	0	0	0
IGRs	1	1	1 (and 1 border application)	4	3	3
Other synthetics	2	1	2	2	2	2
Inorganics: (oil, sulfurs, kaolin)	3	8	6	3	3	3
% codling moth injury	0	0	0	0.03	0	0
% total insect damage	0.95	0.55	0.3	0.23	2.5	1.6

Orchard	#2	#3		#4	#5	
Cultivar	Bosc	Bosc	Red Bartlett	Red Anjou	Anjou	Bosc
Type of Mating Disruption	Isomate CTT @ 200/acre	Isomate CTT @ 200/acre		Sprayable or Isomate CTT @ 200/acre	Sprayable (applied monthly)	None—Standard program
OPs	0	0	0	0	0	3
Pyrethroids	1	1	1	0	1	1
Neonicotenoids	2	1	1	1	1	2
IGRs	1	1	1	1	1	0
Other synthetics	4	2	1	1	2	3
Inorganics: (oil, sulfurs, kaolin)	4	1	1	6	3	3
% codling moth injury	0	0	0.6	0	0.2	0
% total insect damage	0.2	0.2	1.8	0.1	0.6	0