

Implementation Programs

Pear

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This study was conducted in a block which had been in a mating disruption and oil program for the past three years. Due to buildup of codling moth within the plot, Comply was tested in 1994. Control of codling moth was significantly improved but hemipteran damage was not affected by the Comply treatment. In 1995 the block was treated entirely with Comply at petal fall and three chemical treatments aimed at plant-feeding hemipterans were tested within the block. Treatments were applied when plant-feeding bugs first appeared in significant numbers, which was not until mid-June in 1995. The three chemical treatments evaluated were endosulfan, dimethoate and diazinon. A control with just the mating disruption, oil and Comply program was also included in the trial. All treatments were replicated three times. Plots were 0.1 acres, approximately 80 trees, half of which were Anjou and half Bartlett. Chemicals were applied with a handgun sprayer at a rate of 400 gal per acre.

Pear psylla. All three chemicals showed elevated post-treatment levels of pear psylla adults, immatures and resultant fruit staining (see Tables 1-3). Dimethoate gave the most pronounced effect and had a significantly higher level of pear psylla immatures than any of the other treatments.

Hemipterans. True bug damage was reduced by the chemical treatments, with diazinon showing less effect than either endosulfan or dimethoate. Diazinon did not reduce the level of boxelder bugs as measured by limb tapping. However, none of the chemical treatments had more than 1% of the Bartlett fruit with boxelder bug eggs, whereas the check had boxelder bug eggs on over 3% of the Bartletts. Contrary to published reports it appears that boxelder bug can complete its life cycle on pear, as we found all stages present through the course of the season.

Mites. Pear rust mite was lower in the chemical treatments than in the check, with diazinon again showing the least effect. The diazinon treatment had a higher level of twospotted mite than the check while the other two treatments had lower levels than the check.

Codling moth. The chemical treatments appeared to increase the level of codling moth damage. In fact, on Bartletts endosulfan had a significantly higher percentage of entries than the untreated check. It may be that under a selective program such as mating disruption, oil and Comply where codling moth is largely, but not completely, kept under control, egg predation can then play a significant role. The fact that the chemical treatments seemed to impact the level of earwigs, a reported egg predator, along with the fact that diazinon, the least active of the three chemicals tested, gave the lowest degree of stimulation of codling moth, seems to support the finding that natural control of codling moth was disrupted by these broad spectrum insecticides.

Anjous, which were harvested one month after the Bartletts and are inherently more tolerant of codling moth, did not show this effect, but they did show a very significant effect with regard to fruit location. Virtually all the codling moth damage recorded in the Anjous was from fruit in the top of the tree. As this effect has not been observed in the selective program used here, it is probably the result of uneven spray residue from the third cover application of Imidan, but further investigation may be warranted.

Table 1. Evaluation of chemical treatments within a mating disruption, oil and Comply program; results from limb tapping, Hanley site, Anjou cultivar, Medford, OR, 1995.

Treatment	Pear psylla adults	Boxelder bug	Earwigs
Endosulfan	10.1	0.0	0.0
Dimethoate	21.2	0.0	0.1
Diazinon	10.3	0.3	0.0
Check	7.4	0.2	0.4

Table 2. Evaluation of chemical treatments within a mating disruption, oil and Comply program; results from leaf brushing, Hanley site, Anjou cultivar, Medford, OR, 1995.

Treatment	Post-treatment mean per leaf		
	Twospotted spider mites post-embryonics	Pear psylla immatures	Pear rust mite
Endosulfan	1.3	0.7b	3.0
Dimethoate	2.0	2.2a	2.5
Diazinon	4.5	1.0b	4.4
Check	3.9	0.6b	8.0

Means within a column followed by the same letter or no letter are not different as determined by Fisher's Protected LSD test ($P=0.05$). Data were transformed using $\log(x+1)$, untransformed means are shown above.

Table 3. Evaluation of chemical treatments within a mating disruption, oil and Comply program, results from fruit examination at harvest, Hanley site, Anjou and Bartlett cultivars, Medford, OR, 1995.

Treatment	Percent of fruit			
	Codling moth entries (B)	Hemipteran injury (A+B)	w/boxelder bug eggs (B)	Pear psylla staining (A)
Endosulfan	9.0a	3.0	0.3	1.3
Dimethoate	5.3ab	2.8	0.3	3.7
Diazinon	3.0ab	4.0	0.7	3.3
Check	1.7b	5.0	3.3	0.7

Means within a column followed by the same letter or no letter are not different as determined by Fisher's Protected LSD test ($P=0.05$). Percent data were transformed using the arcsine transformation, untransformed means are shown above.