

Apple: codling moth control trial, Red Delicious, 2011, Waterman Farm, Columbus, Ohio

Table 1. Treatment schedule

Trtmt #	Flag color	HIG	Pink	Petal-fall	1C & 2C & 3C (1 st spray at DD ^a indicated; 2 nd & 3 rd sprays each 14 days later)			4C (if flight prolonged)	5C & 6C & 7C	
					Early (100 DD)	Normal (250 DD)	Late (350 DD)		Normal (250 DD)	Late (350 DD)
Target timing					Early (100 DD)	Normal (250 DD)	Late (350 DD)	-	Normal (250 DD)	Late (350 DD)
Actual date			4/19	5/5	5/19, 5/31, 6/16	5/26, 6/9, 6/22	5/31, 6/16, 6/28	7/7	7/28, 8/11, 8/25	8/2, 8/16, 8/30
1 Dupont	Blue	oil 2%	Asana XL: 4.8 fl oz/A	Avaunt 30WDG: 6 oz/A	-	Altacor 35WG: 3 oz/A	-	Imidan 70WP: 3 lb/A	Altacor 35WG: 3 oz/A	-
2 Dupont	Blue/white	oil 2%	Asana XL: 4.8 fl oz/A	Avaunt 30WDG: 6 oz/A	-	-	Altacor 35WG: 3 oz/A	Imidan 70WP: 3 lb/A	-	Altacor 35WG: 3 oz/A
3 Dow (CROP DESTRUCT)	Yellow/black	oil 2%	Closer ^b SC: 3 oz/A	Avaunt 30WDG: 6 oz/A	-	Delegate 25WG: 5.2 oz/A (+ Closer ^b 1.5 oz/A in 2C for aphids)	-	Imidan 70WP: 3 lb/A	Intrepid 2F: 12 fl oz/A + Assail 30SG: 5 oz/A	-
4 FMC (CROP DESTRUCT)	Orange/black	oil 2%	Mustang Max: 4 fl oz/A	F9318 ^c 0.33EW: 18 fl oz/A + oil 0.5%	Beleaf 50SG: 2.8 oz/A	-	-	Imidan 70WP: 3 lb/A	Delegate 25WG: 5.2 oz/A	-
5 standard	Yellow	oil 2%	Lorsban 50W: 3 lb/A	Avaunt 30WDG: 6 oz/A	-	Imidan 70WP: 3 lb/A	-	Imidan 70WP: 3 lb/A	Imidan 70WP: 3 lb/A	-
6 utc	Pink	oil 2%	-	-	-	-	-	-	-	-

^a DD = degree-days after biofix (11 May) based on sustained catch of moths in pheromone traps.

^b Dow's 'Closer' is sulfoxaflor

^c FMC's 'F9318' is zeta-cypermethrin + abamectin

RESULTS

Table 2. Insect injury to apple fruit after treatment by six insecticide programs, evaluated non-destructively on 1 July 2011; mean of four blocked replicates at OSU's Waterman Lab, Columbus, Ohio.

Treatment (product and timing)	% Internal Lepidoptera			% Plum curculio	% Tarnished plant bug	% Clean ^a
	Entry ^a	Sting	Total ^a			
Imidan, normal timing	0.0 C	0.75 C	0.75 C	3.0 ABC	4.00	92.2 AB
Altacor, late timing	0.0 C	1.00 BC	1.00 BC	0.75 C	2.25	96.0 A
Altacor normal timing	0.0 C	1.25 BC	1.25 BC	2.5 BC	2.50	94.0 AB
Delegate (+Closer), normal timing	0.0 C	1.75 BC	1.75 BC	1.5 BC	2.00	94.8 AB
Beleaf (+ F9318), early timing	0.75 B	2.75 AB	3.50 B	6.75 A	1.25	88.5 BC
untreated	2.75 A	5.75 A	8.50 A	6.5 AB	2.75	83.2 C
<i>Probability (ANOVA)</i>	<i>P<0.0001</i>	<i>P=0.0264</i>	<i>P=0.0020</i>	<i>P=0.0382</i>	<i>P=0.48</i>	<i>P=0.0279</i>

^a Within each column, means followed by same letter are not significantly different ($P>0.05$); mean separations by LSD. Values shown are actual percentages but ANOVA based on transformed values.

Table 3. Insect injury to apple fruit after treatment by six insecticide programs, evaluated on 16 September 2011; mean of four blocked replicates at OSU's Waterman Lab, Columbus, Ohio.

Treatment	% Internal Lepidoptera			% Plum curculio		% Tar-nished plant bug	Stink bug	Leaf-roller late	% Clean ^a
	Entry ^a	Sting	Total ^a	Ovi-position	Late feeding				
Altacor, late timing	0.2 C	0.2 D	0.5 C	0.8	1.0	0.8 BC	1.0 B	0.2	95.8 A
Altacor normal timing	0.2 C	1.0 CD	1.2 C	4.2	1.0	1.8 ABC	0.8 B	0.0	91.2 AB
Imidan	1.0 BC	1.8 CD	2.8 BC	1.2	0.2	4.0 A	1.8 B	0.2	90.0 AB
Delegate, Closer, Intrepid+Assail	2.2 BC	1.5 C	3.8 BC	1.5	1.0	3.2 AB	2.5 B	0.8	87.5 AB
Beleaf, F9318, Delegate	2.5 B	4.8 B	7.2 B	3.8	2.0	0.5 C	3.2 B	0.2	84.0 B
untreated	18.5 A	11.0 A	29.5 A	3.0	8.5	0.5 C	15.5 A	1.5	50.0 C
<i>Probability (ANOVA)</i>	<i><0.0001</i>	<i><0.0001</i>	<i><0.0001</i>	<i>0.061</i>	<i>0.057</i>	<i>0.029</i>	<i>0.005</i>	<i>0.056</i>	<i>0.0001</i>

^a Within each column, means followed by same letter are not significantly different ($P>0.05$); mean separations by LSD. Values shown are actual percentages but ANOVA based on transformed values.

Table 4. Mite density on 7/20/2011

Treatment	ERM motiles	ERM eggs	Apple rust mite rating, scale 0-3 ^a	Stigmaeid predator motile's	Phytoseiid predator motiles
Untreated check	0	0	0.0 B	0.61	0
Beleaf et al.	0	0	0.2 B	0.10	0.04
Closer/Delegate	0	0	0.5 B	0.35	0
Imidan	0	0	1.5 A	0.30	0.04
<i>Treatment effect</i>	-	-	<i>P = 0.0016</i>	<i>P = 0.10</i>	<i>P = 0.17</i>

^a Density rating scale: 0 = none; 1 = low (<5 per leaf); 2 = moderate (5 to 50 per leaf); 3 = high (>50 per leaf).

^b Within each column, means followed by the same letter are not significantly different ($P>0.05$), by LSD.

Table 45 Mite density on 8/22/2011

Treatment	ERM motiles	ERM eggs	Apple rust mite rating, scale 0-3 ^a	Stigmaeid predator motile's	Phytoseiid predator motiles
Untreated check	0	0	0.0 B	0.59	0.53
Beleaf et al.	0	0	1.0 A	0.19	0.25
<i>Treatment effect</i>	-	-	<i>P < 0.0001</i>	<i>P = 0.25</i>	<i>P = 0.14</i>

^a Density rating scale: 0 = none; 1 = low (<5 per leaf); 2 = moderate (5 to 50 per leaf); 3 = high (>50 per leaf).

^b Within each column, means followed by the same letter are not significantly different ($P>0.05$), by LSD.