MAXIMIZING THE ECONOMIC VALUE OF INSECTICIDE APPLICATIONS FOR THRIPS CONTROL - 2009

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Objective

Determine the economic value of insecticide applications to cultivars that are either sensitive or resistant to thrips feeding and iris yellow spot virus (IYSV) disease damage by determining yield and grade reductions from reduced applications. **Not all insecticides referred to in this report are registered for use on onions. Always obtain and read the insecticide label to ensure that the product is registered for the crop for which it is intended.**

Introduction

There is a need for growers to understand the economic impact of their decision about how often they should apply insecticides for thrips control. Since onion varieties vary in their ability to withstand thrips damage, and have different tolerances for IYSV, it is important to be able to make decisions with some idea about how it will impact the varieties they have planted.

Materials and Methods

Onion plots were 30 ft long by 14.6 ft wide. The plot design was a split plot with one-half of each plot planted on March 20, 2009 to 'Vaquero' (Nunhems, Parma, ID) and the other half to 'Charismatic' (Seminis, Payette, ID). Charismatic is generally believed to be more tolerant of thrips damage and injury from IYSV disease. The onions were planted as 2 double rows on a 44-inch bed. The double rows were spaced 2 inches apart. The seeding rate was 137,000 seeds/acre. Lorsban® 15G was applied at planting in a 6-inch band over each double row at a rate of 3.7 oz/1,000 feet of row for onion maggot control.

Insecticide applications were made with a CO_2-pressurized bicycle sprayer. Materials were applied with water at 38 gpa. Each treatment was replicated four times. Thrips counts were made weekly by visually counting the total number of thrips on 15 plants in each subplot. Thrips and IYSV injury ratings were taken as a subjective measurement of foliage damage caused by thrips feeding.

A scale of 0-5 (0 = no injury, 5 = complete silvering of the leaves) was used. The onions were harvested September 17-18, 2009, and graded on October 14-15, 2009.

The experimental design was a randomized complete block split plot with four replications. Rates, application dates, and sequence are listed in Table 1. Environmental conditions at each application date are listed in Table 2.

Results and Discussion

The thrips data are shown in Table 3 and the foliage damage evaluations in Table 4. Thrips populations were significantly higher in Vaquero than in Charismatic. This was especially true in the untreated check where the season average for Vaquero was 27.9 thrips/plant compared to 19.9 for Charismatic. In Vaquero, the untreated check treatment had significantly higher thrips numbers compared to any other treatment. The Charismatic untreated check treatment also had the highest thrips numbers, but there were three other treatments (4, 5, 6) whose thrips numbers were not significantly different from the untreated check. Treatment 1, which included insecticide treatments every 7-10 days throughout the season, had the best thrips control in each variety. Treatments 3 and 8 were next best in both varieties. The combined thrips populations of both varieties are shown in Figure 1, where Treatments 1, 3, and 8 show the best thrips control. The thrips and IYSV damage ratings were also significantly higher for Vaquero than for Charismatic, probably reflective of the higher thrips population in Vaquero.

Yield information is shown in Table 5. The relationship between total yield, or yield of colossal or supercolossal bulbs and thrips populations was very weak for either variety (Fig. 2). Treatments 7 and 10 gave the lowest yields for both varieties. With Charismatic, Treatment 1 gave the best overall yield and grade, followed closely by Treatment 5. With Vaquero, Treatment 4 gave the best overall yield and grade followed by Treatment 1, however, none of these treatments were statistically different.

Even though Charismatic had lower thrips populations and less thrips and IYSV damage, it was more likely to give a yield and grade response from insecticide applications compared to Vaquero. When looking at the economic impact, Charismatic was likely to give a substantial net return from thrips control applications while Vaquero was likely to show a negative return, unless weekly insecticide applications were made during June and July (Table 6). Net returns were greater when the price differential between jumbo and the larger colossal or supercolossal sizes was high, since controlling thrips had a greater impact on yield of the larger sized bulbs. Insecticide applications were based on a cost of $50/application and net returns would vary, depending on whether a grower's costs are more or less than the $50.

Most treatments varied in their impact on each variety, making it difficult to recommend which reduced treatment strategy might work best. Growers should be aware of market trends and prices, or contract size parameters when deciding to reduce the number of pesticide applications.

Conclusions

Charismatic had significantly fewer thrips and less IYSV compared to Vaquero. Weekly insecticide treatments to control thrips were cost effective for both varieties.

Reducing the number of insecticide applications influenced profitability, sometimes increasing net revenue and other times reducing net revenue. Prices received for jumbo and larger classes influenced profitability, especially if the medium and jumbo prices are near those of the colossal and supercolossal classes.

More work is needed to identify which reduced treatments are best for each variety.

Table 1. Insecticide application dates and applied treatments. Malheur Experiment Station, Oregon State University, Ontario, OR, 2009.

	Application Dates								
	6/5 2009	6/9 2009	6/16 2009	6/24 2009	7/2 2009	7/10 2009	7/20 2009	7/29 2009	
Insecticide applied:	Radiant (8.0 oz)	Radiant (8.0 oz)	Movento (5.0 oz)	Movento (5.0 oz)	Lannate (3.0 pt)	Lannate (3.0 pt)	Lannate (3.0 pt)	Lannate (3.0 pt)	Total number of
Treatment number									insecticide applications
1	X	X	X	X	X	X	X	X	8
2		X		X		X		X	4
3		X	X	X	X	X	X	X	7
4			X	X	X	X	X	X	6
5			X	X	X	X	X		5
6			X	X	X	X			4
7	X		X		X		X		4
8	X	X	X			X	X	X	6
9		X	X	X	X	X	X		6
10									0

Table 2. Insecticide application information. Malheur Experiment Station, Oregon State University, Ontario, OR, 2009.

Application date	Time	Temperature	Relative humidity	Wind
June 4	8:00 A.M.	66°F	65	5.1
June 10	7:00 A.M.	59°F	71	7.0
June 16	7:30 A.M.	57°F	93	3.4
June 23	7:30 A.M.	49°F	77	4.4
July 1	6:30 A.M.	60°F	39	6.1
July 10	6:30 A.M.	56°F	67	1.2
July 20	6:00 A.M.	59°F	45	5.0
July 29	7:00 A.M.	63°F	68	3.6

Table 3. Average thrips per onion plant and season average. Malheur Experiment Station, Oregon State University, Ontario, OR, 2009.

Treatment	6/8/2009	6/11/2009	6/23/2009	7/1/2009	7/9/2009	7/14/2009	7/23/2009	8/3/2009	Season average
Charismatic									
1	8.3	11.5	33.2	18.0	12.2	24.3	7.3	11.8	15.8
2	12.6	12.6	31.6	20.4	12.4	22.7	7.9	12.9	16.6
3	14.7	12.2	25.4	18.8	17.3	20.3	7.3	11.2	15.9
4	14.1	18.4	41.6	14.7	14.7	24.4	7.3	12.1	18.4
5	9.9	16.7	39.9	14.1	14.3	30.7	8.2	11.7	18.2
6	12.7	18.4	47.1	17.7	15.9	21.0	8.9	13.2	19.3
7	8.5	12.8	32.2	16.3	21.8	23.3	7.3	11.1	16.7
8	7.4	11.5	26.4	16.0	23.3	21.9	8.0	13.3	15.9
9	12.8	12.7	36.8	15.9	15.2	25.0	8.7	11.0	17.3
10	14.5	16.6	32.0	28.7	21.6	27.6	7.6	10.6	19.9
LSD (0.05)	4.5	5.1	ns	7.6	ns	ns	ns	ns	2.4
Vaquero									
1	11.5	18.6	35.5	17.3	13.7	24.0	7.6	12.0	17.5
2	21.8	24.5	34.3	37.2	19.3	20.9	7.2	13.6	22.3
3	17.7	21.5	38.8	19.5	14.1	18.2	7.1	13.0	18.7
4	19.8	28.3	48.8	20.2	19.0	18.8	8.0	11.9	21.8
5	18.2	27.5	49.5	17.0	16.9	22.6	7.8	12.8	21.5
6	15.8	25.4	49.6	24.7	20.7	23.2	8.6	12.4	22.5
7	13.4	22.0	51.1	17.1	27.8	26.3	8.5	12.8	22.4
8	12.7	19.5	34.9	17.6	22.4	33.3	7.3	11.4	19.9
9	19.6	22.7	45.9	17.2	16.3	24.2	8.0	10.8	20.6
10	21.7	27.6	55.4	50.6	23.4	25.2	7.6	12.0	27.9
LSD (0.05)	5.9	ns	ns	14.5	ns	ns	ns	ns	4.3

Table 4. Visual ratings of thrips and iris yellow spot virus injury[a] to foliage. Malheur Experiment Station, Oregon State University, Ontario, OR, 2009.

Treatment	Vaquero	Charismatic
1	1.9	1.5
2	2.9	1.6
3	2.3	1.3
4	1.9	1.3
5	2.3	1.5
6	2.8	2.1
7	2.9	2.1
8	2.8	1.9
9	2.0	1.4
10	3.0	2.5

[a]Thrips injury scale 1-5 with 1 = no damage, 5 = complete silvering of foliage from thrips and iris yellow spot virus injury.

Table 5. Yield and grade of two varieties sprayed with insecticides for thrips control at different timing sequences. Malheur Experiment Station, Oregon State University, Ontario, OR, 2009.

Treatment	Medium	Jumbo	Colossal	S. Colossal	Total yield
	----------	----------	cwt/acre	----------	----------
Charismatic					
1	22.7	529.1	416.1	73.2	1041.1
2	22.9	573.3	414.6	20.1	1030.9
3	27.5	591.4	367.2	45.6	1031.8
4	21.2	589.8	365.6	42.4	1019.0
5	27.5	562.9	391.1	60.7	1042.2
6	28.7	619.7	377.6	21.5	1047.6
7	22.4	621.4	309.2	12.3	965.2
8	22.0	669.6	340.5	12.7	1044.8
9	25.2	645.6	357.7	33.6	1062.1
10	26.6	645.0	264.2	16.7	952.5
LSD (0.05)	ns	ns	ns	32.0	ns
Vaquero					
1	20.6	775.0	225.8	32.4	1053.8
2	29.1	804.7	169.2	3.0	1006.1
3	32.8	780.6	214.8	6.5	1034.7
4	28.0	768.0	243.4	48.4	1087.8
5	31.1	774.4	205.1	13.4	1024.0
6	30.6	818.7	148.1	6.5	1003.9
7	25.3	797.5	123.0	6.5	952.3
8	36.4	790.1	172.6	6.5	1005.6
9	28.1	733.6	234.1	16.0	1011.8
10	43.5	785.2	159.5	3.0	991.3
LSD (0.05)	ns	ns			64.7
LSD (0.1)			65.4	25.7	

Table 6. Dollar return from insecticide applications for thrips control in onions with different application scenarios compared to the untreated check. Malheur Experiment Station, Oregon State University, Ontario, OR, 2009.

Charismatic

	Gross return $			Net return $		
Treatment	($5,6,7,7)*	($5,6,7,11)*	($9,11,11,12)*	($5,6,7,7)*	($5,6,7,11)*	($9,11,11,12)*
1	$744	$970	$1038	$344	$570	$638
2	628	641	873	428	441	673
3	606	722	899	256	372	549
4	532	634	768	235	334	468
5	708	884	1029	458	634	779
6	686	706	1046	486	506	846
7	121	103	144	-79	-97	-56
8	630	615	1020	330	315	720
9	769	837	1225	469	537	925
10	0	0	0	0	0	0

Vaquero

1	494	612	763	94	212	363
2	113	113	192	-87	-87	-8
3	330	344	503	-20	-6	153
4	724	906	1138	424	606	838
5	265	307	395	15	57	145
6	81	95	169	-119	-105	-31
7	-249	-235	-389	-449	-435	-589
8	110	124	176	190	-176	-124
9	226	278	270	-74	-22	-30
10	0	0	0	0	0	0

*Dollar price per 100 lb to growers for medium, jumbo, colossal and super colossal size onion bulbs reading across respectively.

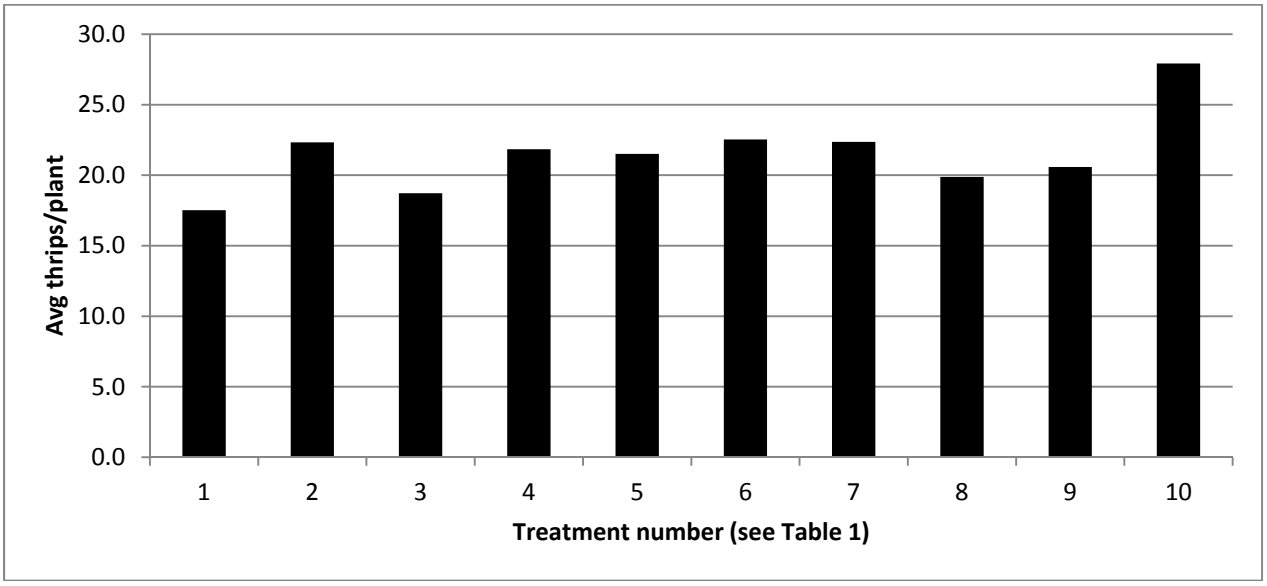

Figure 1. Average thrips populations of Charismatic and Vaquero varieties sprayed at different timing sequences. Malheur Experiment Station, Oregon State University, Ontario, OR, 2009.

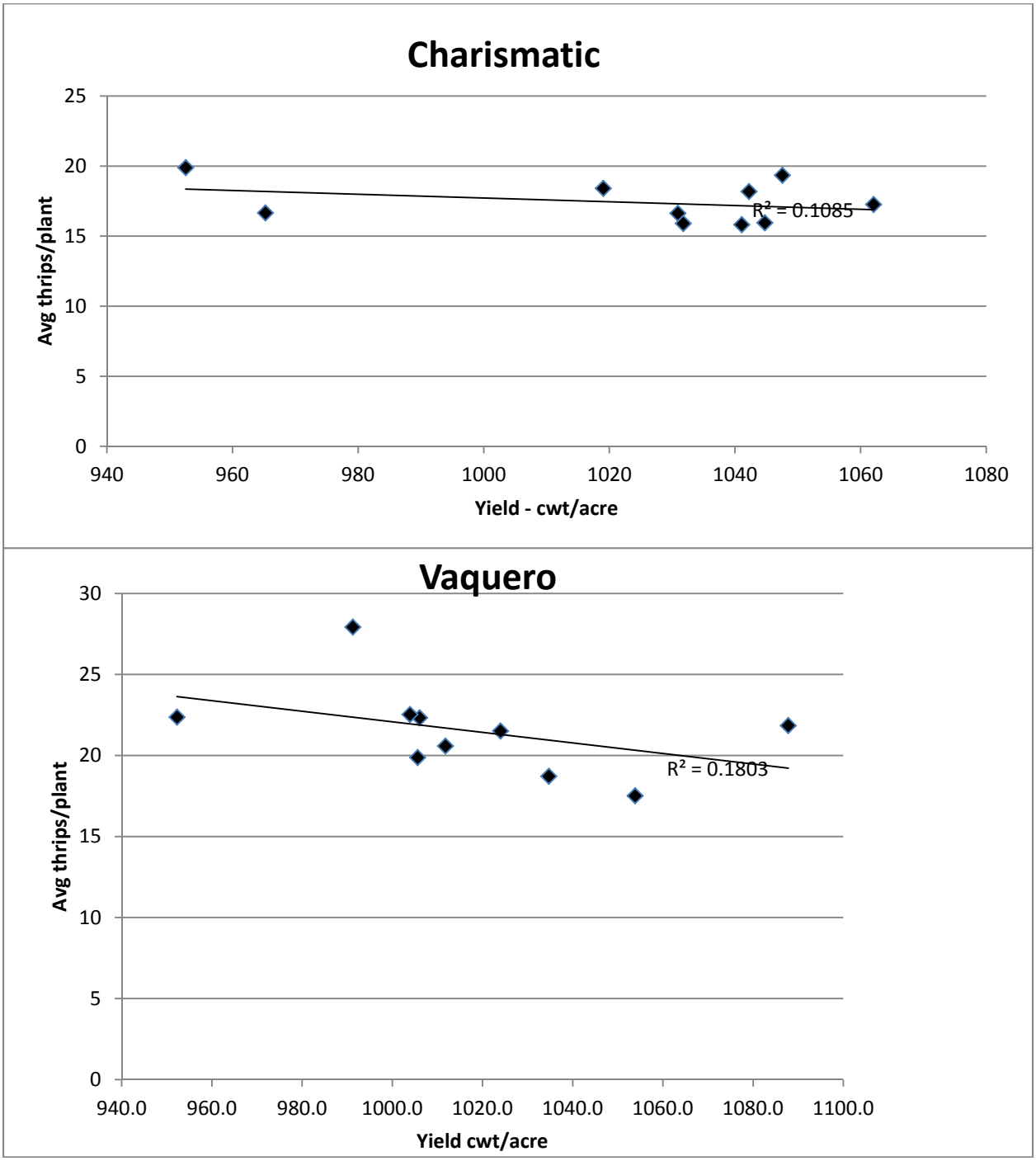

Figure 2. Graphs display weak relationship between thrips population and total yield. Malheur Experiment Station, Oregon State University, Ontario, OR, 2009.