INSECTICIDE TRIALS FOR ONION THRIPS (*THRIPS TABACI*) CONTROL

Lynn Jensen
Malheur County Extension Service
Oregon State University
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Introduction

During the past 3 years alternative insecticides have demonstrated superior control of onion thrips when compared to conventional insecticides. Alternative insecticides in this trial are azadirachtin (Aza Direct and Ecozin), neem tree (*Azadirachia indica*, A Juss.) extracts, and spinosad (Success), a bacterial fermentation product. Neither product has been particularly effective in short-term screening trials but when applied throughout the season to plots with added straw mulch they have been very effective in controlling thrips and increasing yields. These insecticides are relatively safe to beneficial predators, thus allowing predator populations to increase while suppressing thrips populations.

Research in 2002 suggested the possibility that increasing the time interval between spraying with conventional insecticides might give similar or better control than more frequent applications. Conventional insecticides are the currently registered products in the synthetic pyrethriod (Warrior, Mustang), organo-phosphate (parathion, malathion, Guthion, Diazinon) and carbamate (Lannate, Vydate) classes.

Materials and Methods

A block of onion 36.7 ft wide by 600 ft in length was planted to onion (cv. 'Vaquero', Sunseeds, Parma, ID) on March 14, 2003. The onions were planted as two double rows on a 44-inch bed. The double rows were spaced 2 inches apart. The seeding rate was 154,000 seeds per acre. Lorsban 15G was applied in a 6-inch band over each double row at planting at a rate of 3.7 oz/1,000 ft of row for onion maggot control. Water was applied by furrow irrigation. The plots were 7.3 ft wide (2 beds) by 50 ft long and were replicated four times.

There were 12 treatments as outlined in Table 1. The application dates for each treatment are shown in Table 2. A new insecticide, 1785, is being evaluated for the FMC Corporation.

Insecticide applications were made with a CO_2-pressurized plot sprayer with four nozzles spaced 19 inches apart. All treatments were made with water as a carrier at 42.6 gal/acre. Thrips counts were made weekly through the growing season by counting the total number of thrips on 20 plants.

The onion bulbs were harvested by hand on September 23 and graded on October 14 and 15. The plot area harvested was 30 ft of the center two double rows.

Results and Discussion

The season average thrips population is shown in Table 3. The product 1785 was not effective at any rate or timing. The best treatments were Success alone or Success in combination with Aza Direct. Weekly applications of Success were better than split applications of Success and Aza Direct rotated every other week.

The effect of thrips on yield is shown in Table 4. Aza Direct applied alone throughout the growing season had a negative impact on yield. The best yields were combinations of Aza Direct plus Success applied weekly or Success applied alone on a weekly basis. The conventional insecticide treatment using Warrior, Warrior Plus, Lannate, or Warrior Plus MSR were applied at 3-week intervals. When applied at these intervals these treatments were no better than the untreated check.

An examination of each treatment yield compared to the season-long thrips populations of each treatment gives an indication of where the economic threshold is located. Figure 1 shows the average season-long thrips population in each of the different treatments, listed from most effective to least effective. Each point on the graph represents the average season-long thrips population of the treatment along with its corresponding yield for each treatment. Figure 2 shows the relationship of thrips population to total yield. Figure 3 shows the same trend for thrips population versus colossal plus super colossal yields. There is a strong trend for decreasing yields of premium-sized bulbs as season-long thrips populations go above an average of seven thrips per plant. The economic threshold has been suggested to be 15-25 thrips per plant but these data would suggest that this number is around 6-8 thrips per plant on a seasonal basis.

Conclusions

Success appears to be an important part of an alternative thrips control program. Weekly applications of Success alone or Aza Direct with Success were better than alternating with other products.

There is a strong suggestion that the economic threshold level for season-long thrips populations may be as low as 8-10 thrips per plant rather than the 15-25 level previously reported.

Table 1. Insecticides evaluated for onion thrips control, Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

Treatment no.	Insecticides applied	Formulated product	Treatment interval
		Rate/Acre	
1	1785 50DF	2.848 oz	21 day
2	1785 50DF	2.144 oz	14 day
3	1785 50DF	1.728 oz	7 day
4	1785 50DF Aza Direct Success	1.728 oz 20.0 oz 10.0 oz	7 day with all products.
5	Aza Direct Success	20.0 oz 10.0 oz	7 day with both products
6	1785 50DF Aza Direct Success	2.848 oz 20.0 oz 10.0 oz	7 day rotating each product (3-week rotation)
7	Aza Direct Success	20.0 oz 10.0 oz	7 day rotating each product (2-week rotation)
8	Aza Direct Success	20.0 oz 10.0 oz	7 day with both products
9	Warrior Warrior & Lannate Warrior & MSR	3.84 oz 3.84 oz + 3.0 pt 3.84 oz + 2.0 pt	21 day rotating each combination
10	Untreated Check	----------	----------
11	Aza Direct	20.0 oz	7 day
12	Success	10.0 oz	7 day

Table 2. Application dates of insecticide treatments for onion thrips, Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

Treatment no.	Insecticides applied	Treatment interval	Date 6/3	6/14	6/25	7/3	7/11	7/25
1	1785 50DF	21 day	X			X		
2	1785 50DF	14 day	X		X		X	
3	1785 50DF	7 day	X	X	X	X	X	
4	1785 50DF Aza Direct Success	7 day all products tank mixed	X	X	X	X	X	X
5	Aza Direct Success	7 day both products tank mixed	X	X	X	X	X	X
6	1785 50DF Aza Direct Success	7 day rotating each product (3 week rotation)	X	X	X	X	X	X
7	Aza Direct Success	7 day rotating each product (2 week rotation)	X	X	X	X	X	X
8	Aza Direct Success	7 day both products tank mixed	X	X	X	X	X	X
9	Warrior Warrior & Lannate	21 day rotating each combination	X			X		
10	Untreated Check	----------						
11	Aza Direct	7 day	X	X	X	X	X	X
12	Success	7 day	X	X	X	X	X	X

Table 3. Average thrips population during 2003 growing season with different insecticide treatments, Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

No.	Treatment	Average
1.	1785 50DF	10.8
2.	1785 50DF	11.1
3.	1785 50DF	12.5
4.	1785 50DF Aza Direct Success	7.6
5.	Aza Direct Success	8.0
6.	1785 50DF Aza Direct Success	10.3
7.	Aza Direct Success	9.5
8.	Aza Direct Success	9.2
9.	Warrior Warrior & Lannate	10.7
10.	Untreated Check	10.9
11.	Aza Direct	10.6
12.	Success	6.9
	LSD (0.05)	1.4

Table 4. Effects of different thrips treatments on onion yield and quality, Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

Treatment	Medium	Jumbo	Colossal	Super colossal	Colossal + super colossal	Total yield
	----------	----------	----------	cwt/acre	----------	----------
1785 50DF	11.7	426.6	529.2	156.7	686.0	1,124.2
1785 50DF	12.3	450.4	514.3	136.4	650.7	1,113.4
1785 50DF	11.9	463.0	461.3	122.3	583.6	1,058.6
1785 50DF Aza Direct Success	11.4	365.1	534.3	270.3	804.6	1,181.1
Aza Direct Success	7.7	357.8	574.5	255.2	829.7	1,195.2
1785 50DF Aza Direct Success	8.1	356.7	547.6	207.8	755.3	1,120.1
Aza Direct Success	5.7	383.8	500.4	204.7	705.2	1,094.7
Aza Direct Success	5.7	389.6	576.2	213.1	789.3	1,184.7
Warrior Warrior & Lannate	10.6	409.9	517.7	214.8	732.6	1,153.0
Untreated check	13.2	457.3	464.5	171.4	635.9	1,106.4
Aza Direct	7.8	489.6	473.0	90.6	563.6	1,061.0
Success	5.0	319.2	616.2	232.0	848.2	1,172.4
LSD (0.05)	5.1	82.3	86.6	68.7	126.3	89.3

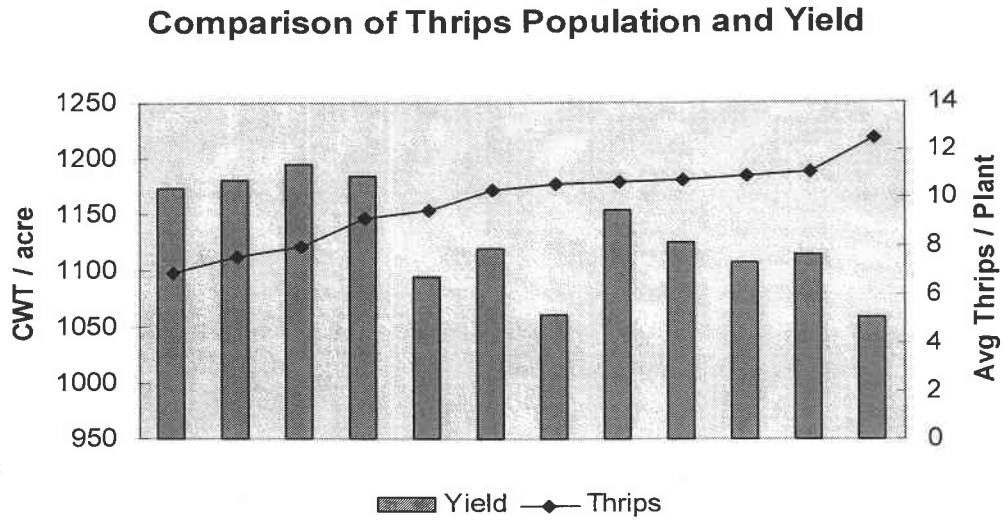


Figure 1. The relationship between season-long thrips population and yield on Vaquero onions. Each point on the line graph represents the average thrips population of 1 of 12 treatments, sorted from most to least effective. Each bar represents the yield associated with each treatment on the line graph. Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

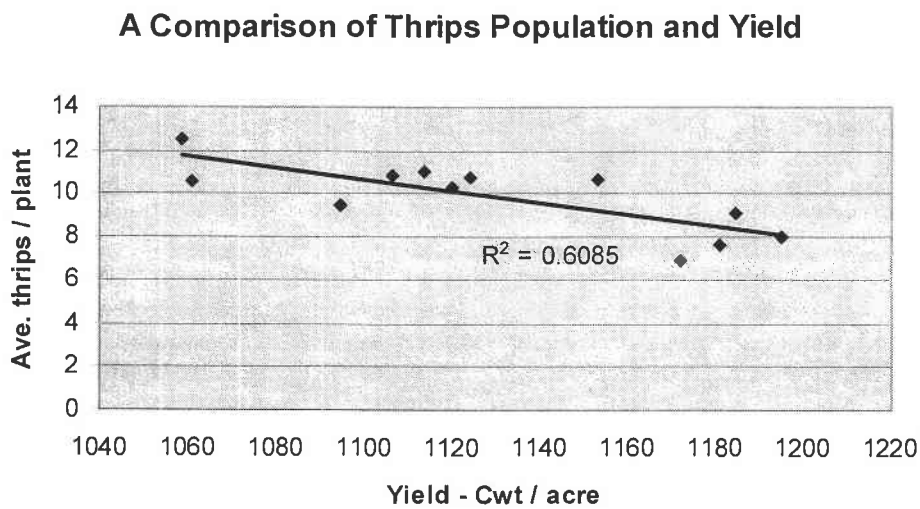
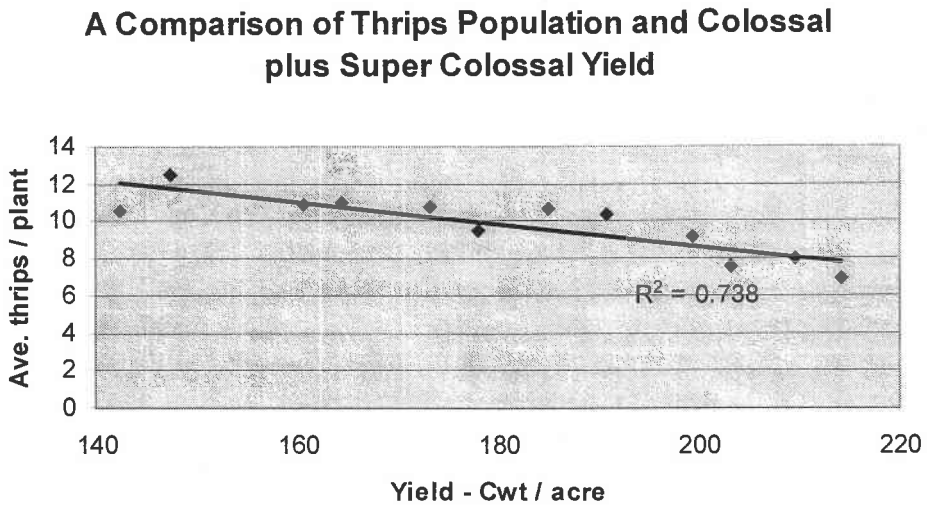


Figure 2. The relationship between season-long average thrips counts and yield on Vaquero onions. Corresponding points on the graph represent the average season-long thrips population and total yield for 1 of 12 treatments. Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.



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