STRATEGIES FOR CONTROLLING ONION THRIPS (Thrips tabaci) IN SWEET SPANISH ONIONS

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Many of the products used in this study are not presently registered for use on onions. If in doubt, read the label or consult a company representative or county agent.

Objectives

The purpose of this project was to compare the efficacy of new insecticides on onion thrips control and to determine if rotating different classes of insecticides that result in better thrips control. There is a continuing need to screen new insecticides to determine if they are effective in controlling onion thrips. Because of the number of generations per year, thrips rapidly build up resistance to insecticides. Rotating between different classes of insecticides is one method of reducing resistance.

Materials and Methods

The trial was conducted on the Skeen Farm south of Nyssa. The plots were four double rows 25 feet in length and each treatment was replicated four times. The first part of the trial consisted of a one-time application of 14 different treatments. Thrips counts were made just prior to spraying and at 7 and 14 days after treatment. Normally there would be a count made 3 days after treatment but inclement weather during this time delayed entry into the field. Some of the plots that were showing effective control after 14 days were evaluated again at 21 days after treatment.

The treatments were made with a CO_2 pressurized plot sprayer set to deliver 26.8 gal/ac of water. The center two rows of each plot were used for evaluation. The number of thrips on 15 onion plants in each plot were counted to determine control.

The different products and their application rates for the efficacy trial are listed in Table 1. The synthetic pyrethroids were evaluated with and without a surfactant, with crop oil concentrate, and a 2X surfactant rate.

The second part of the trial consisted of Warrior, Vydate, Guthion and Lannate in various sequences to determine which applications would give the best season-long control. Insecticide applications were made at approximate two week intervals and thrips counts were made just prior to spraying. Three applications were made during the growing season.

Table 1. Insecticides and rates used in the efficacy trial for onion thrips count, Nyssa, OR. 1995.

Treatment		Applications rates	
Product	Formulation	Active ingredient/ac.	Product volume/ac
Fipronil	80% DG	.025 lb	.4 g
Fipronil	80% DG	.05 lb	.8 g
Spinosad	80% DG	20 g	.74 g
Spinosad	80% DG	40 g	1.5 g
Spinosad	80% DG	80 g	3.0 g
Mustang	1.5 EC	0.03	2.6 oz
Mustang	1.5 EC	0.04	3.2 oz
Warrior	1.0 EC	0.03	3.8 oz
"Y"	-	0.07	1.0 oz
Diazinon	4 EC	0.5	1.0 qt

The sequence trial was initiated on June 20 with subsequent applications on July 1st and July 14th. The following products were utilized.

Table 2. Insecticides and rates used in the sequential application evaluation for onion thrips control. Nyssa, OR. 1995.

Treatment		Application rates	
Product	Formulation	Active ingredient/ac	Product volume/ac
Warrior	1.0 EC	0.03	3.8 oz
Vydate	2 WSL	1	2.0 qt
Guthion	2 EC	0.5	1.0 qt
Lannate	2.4 WSL	0.9	1.5 qt

Each treatment received 4 oz/ac of Breakthrough silicon surfactant and 4.0 oz/ac Leffingwell ZKP as a buffering agent.

The sequential applications were made according to the schedule in Table 3.

Table 3. Date of application and materials used in the sequential application trial for onion thrips control. Nyssa, OR. 1995.

1st Treatment	2nd Treatment	3rd Treatment
6/20/95	7/1/95	7/14/95
Vydate	Vydate	Warrior
Vydate	Warrior	Warrior
Vydate	Warrior	Warrior
Vydate	Lannate	Warrior
Vydate	Warrior	Lannate
Guthion	Warrior	Lannate
Guthion	Warrior	Warrior
Warrior	Warrior	Warrior
Warrior	Warrior	Warrior
Warrior	Vydate	Lannate
Warrior	Guthion	Lannate
Warrior	Guthion	Warrior
Warrior	Lannate	Guthion

Results and Discussion

EFFICACY TRIAL

The results of the efficacy trial are shown in Table 4. Although there were significant differences among treatments in thrips populations at 21 days after treatment, all treatments were beginning to lose effectiveness.

Table 4. Onion thrips control results from the insecticide efficacy trial. Nyssa, OR. 1995.

Treatment					Thrips counts		
	a.i./ac	Break-through	COC	Buffer	7 DAT	14 DAT	21 DAT
Fipronil	0.25	4 oz	4 oz		5.4	4.3	13.4
Fipronil	0.5	4 oz	4 oz		5	3.4	17.1
Spinosad	20 g	-	-	-	11.6	14.5	-
Spinosad	40 g	-	-	-	7.7	6.9	-
Spinosad	80 g	-	-	-	10.2	8.2	-
Mustang	0.03	4 oz	-	-	1.8	4.2	-
Mustang	0.04	4 0z	-	-	0.9	2.4	7.8
Mustang	0.04	8 oz	-	-	0.9	3.3	-
Warrior	0.03	-	-	-	1.1	1.2	5.9
Warrior	0.03	4 oz	-	-	1.5	1.6	-
Warrior	0.03	4 oz	4 oz	-	2.3	1.7	5.4
"Y"	0.07	4 oz	4 oz	-	8.8	11	-
Diazinon	0.5	4 oz	4 oz	4 oz	9.3	8.7	14.9
Check	-	-	-	-	11	12.2	18.9
	LSD				4.5	4	6.6

Spinosad showed very little thrips control in this trial. Although other tests have shown it to be active against other types of thrips, it does not appear to have much activity on the onion thrips.

Fipronil provided fair to good control of onion thrips. While the activity is not as good as the synthetic pyrethroid materials, it could have a place as a rotation chemical since it is not advisable to use all synthetic pyrethroids during the growing season because of resistance buildup. The lower rate of Fipronil (0.25 lb a.i./ac) was as effective as the higher rate. Fipronil should be considered for further evaluation.

Although not statistically significant, the higher rate (3.2 oz) of Mustang consistently gave better control than the 2.6 oz rate. The addition of twice the recommended rate of silicone surfactant (8 oz of Breakthrough) did not increase efficacy.

Warrior had the overall highest control rate of the materials tested. The addition of a silicone surfactant and the addition of the surfactant plus crop oil concentrate did not increase control.

Compound "Y" was not effective against onion thrips.

The organo-phosphate diazinon performed as expected based upon past experience with this class of compounds. Thrips resistance to these materials is apparently still high.

SEQUENCE TRIAL

Vydate by itself gave poor thrips control, even when applied back to back (Table 5). Guthion also gave poor control, except for the third application when it kept the thrips population suppressed. Guthion would not be a good choice to apply at the last application if the thrips population was high. Lannate appeared to do a good job in the last spray sequence, probably due to higher temperatures which are necessary to make Lannate effective. Lannate was not as consistent as Warrior, which gave excellent control at each application.

Table 5. Average onion thrips counts after sequential insecticide applications. Nyssa, OR. 1995.

Treatment 1		Treatment 2		Treatment 3		Average Season Control
Treatment 1	Ave thrips count	Treatment 2	Ave thrips count	Treatment 3	Ave thrips count	
Warrior	2.5	Warrior	3.63	Lannate	4.63	3.58
Warrior	2.95	Lannate	4.13	Guthion	4.28	3.78
Warrior	2.95	Warrior	4.28	Warrior	4.78	4
Warrior	3.2	Vydate	5.9	Lannate	3.45	4.18
Vydate	11.93	Warrior	2.68	Warrior	5.1	6.57
Guthion	14.8	Warrior	4.03	Lannate	4.73	7.85
Warrior	4.83	Guthion	13.18	Lannate	5.95	7.98
Warrior	4.05	Guthion	17.98	Warrior	2.93	8.32
Guthion	17.1	Warrior	2.85	Warrior	5.48	8.48
Vydate	16.25	Warrior	2.95	Lannate	7.98	9.06
Vydate	16.15	Lannate	14.53	Warrior	3.65	11.44
Vydate	17.95	Vydate	24.83	Warrior	4.05	15.58
LSD						3.43

The first four treatments in Table 5 are shown graphically in Figure 1 and appear to be acceptable although a straight Warrior-Warrior-Warrior sequence is not recommended because of the quick resistance buildup to the synthetic pyrethroids. The other three treatments performed well and provide a mix of insecticide classes to reduce resistance buildup.

Figure 2 shows the next five treatments, none of which were very acceptable because of the high thrips population which was approaching the yield reduction threshold.

Figure 3 depicts the last three treatments which had unacceptably high thrips averages throughout the season.

Conclusions

1. The synthetic pyrethroid materials (Warrior, Mustang) gave excellent thrips control.

2. Adding a silicone surfactant to the synthetic pyrethroids did not increase control, even at twice the normal surfactant rate.

3. Adding a crop oil concentrate to the synthetic pyrethroids did not increase control.

4. The Rhone-Poulenc material "Fipronil" gave moderately good control and could possibly serve as a chemical to rotate with the synthetic pyrethroids if registered.

5. Neither Spinosad, compound "Y", nor diazinon performed better than the check.

6. The following four treatments were the best combinations for season-long control of thrips.

	1st application	2nd application	3rd application
a.	Warrior	Warrior	Lannate
b.	Warrior	Lannate	Guthion
c.	Warrior	Warrior	Warrior
d.	Warrior	Vydate	Lannate

Figure 1. Sequence Thrips Trial. Nyssa, OR. 1995

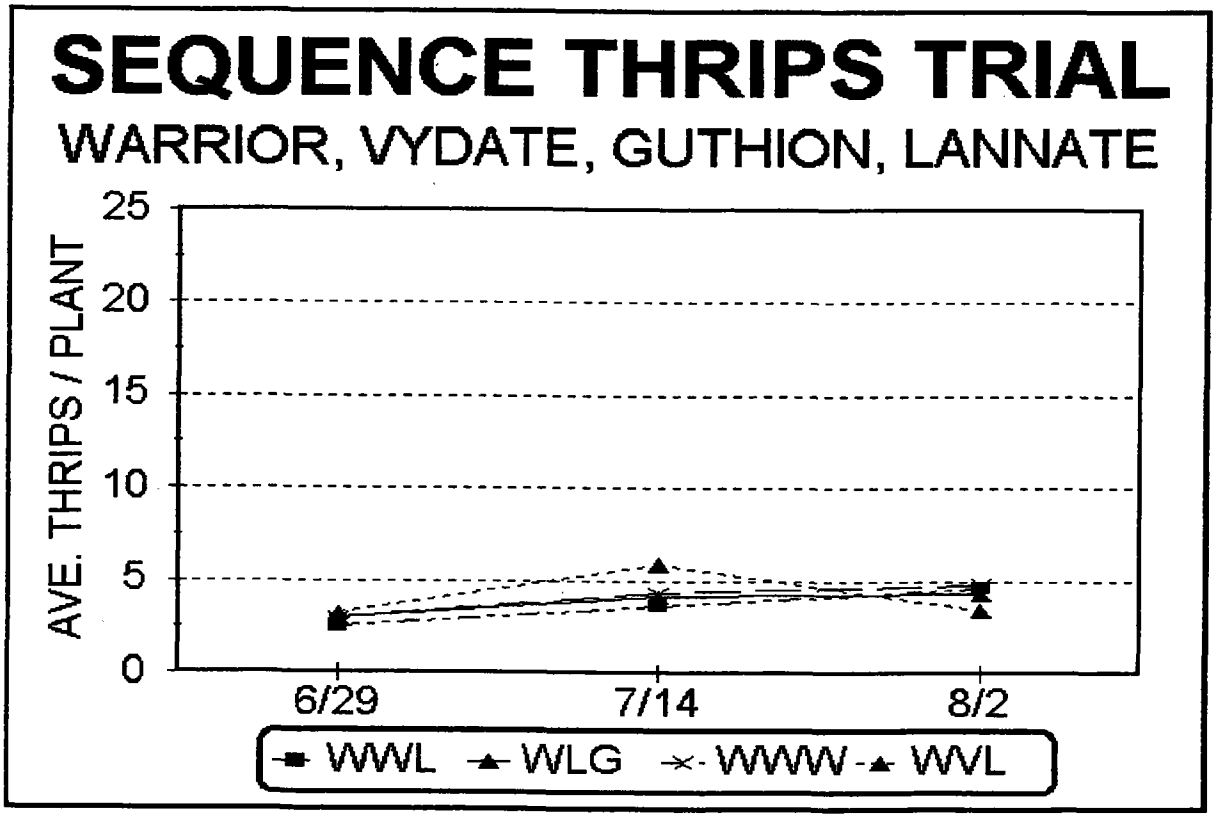

Figure 2. Sequence Thrips Trial. Nyssa, OR. 1995.

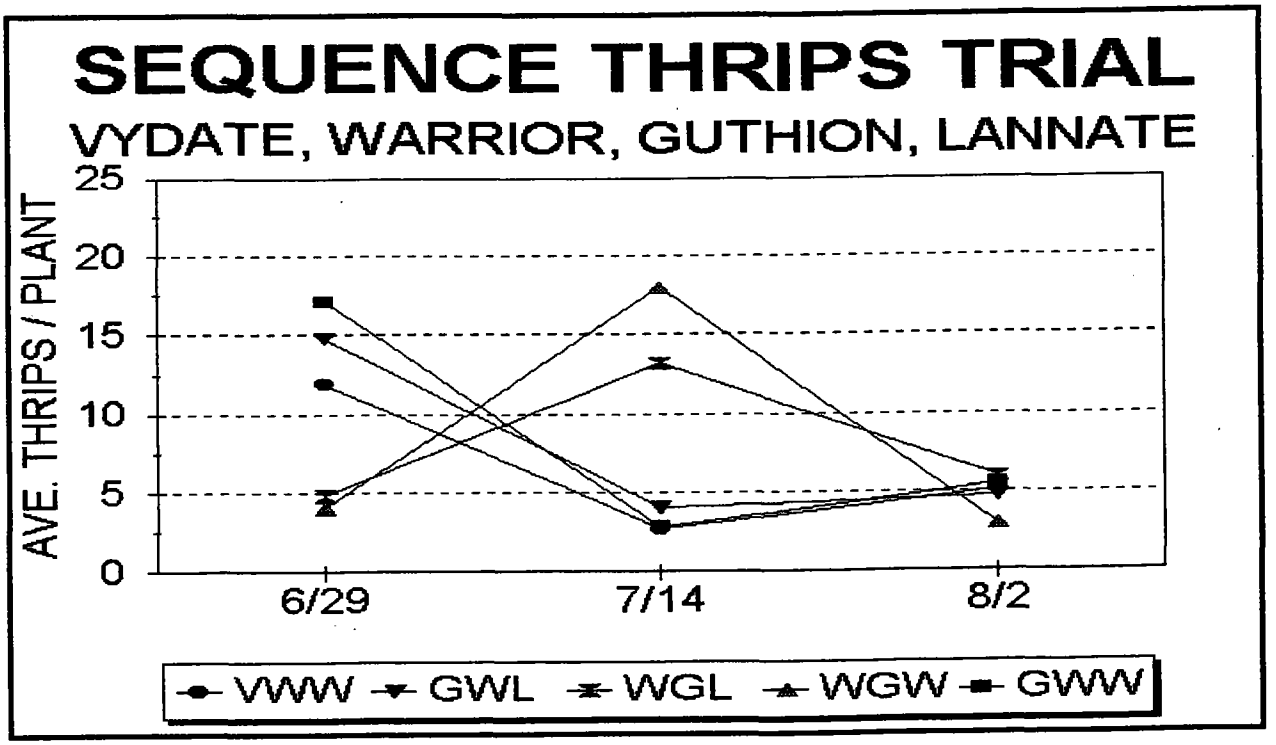

Figure 3. Sequence Thrips Trial. Nyssa, OR. 1995