

INSECTICIDE SCREENING FOR EFFECTIVENESS IN CONTROLLING THRIPS IN DRY BULB ONIONS, 2010

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Introduction

Controlling thrips (onion and western flower) is becoming increasingly difficult for commercial onion growers in the Treasure Valley. One of the problems is resistance to some of the commonly used insecticides. The objective of this trial was to screen registered and non-registered insecticides to find those that have potential for use in thrips control programs. **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.**

Materials and Methods

A block of onions 29 ft wide by 320 ft in length, soil type Greenleaf silt loam, was planted with the onion variety ‘Vaquero’ (Nunhems, Parma, ID) on March 18, 2010. 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 in a 6-inch band over each row at planting at a rate of 3.7 oz/1,000 ft of row for onion maggot control. Water was applied by drip irrigation. The block was divided into 30-ft plots, each 2 beds wide. There were 10 treatments and each treatment was replicated 4 times.

Treatments were made by a CO₂-pressurized plot sprayer with 4 nozzles spaced 19 inches apart, set to apply 35 gal/acre, with water as the carrier. A non-ionic surfactant was added to all treatments, and Cyazypyr[™], Movento[®], acephate and Lannate[®] were buffered to pH 6.0. Treatments were applied on a weekly basis beginning on June 3. Thrips counts were made on a weekly basis by visually counting the total number of thrips on 15 plants in each plot. Insecticides tested included Agri-Mek[®], Cyazypyr, Requiem[®] (high and low pressure), Movento, acephate, and a combination of Movento plus Cyazypyr. These products were compared to an untreated check and a grower standard. The grower standard consisted of two consecutive applications of Radiant[®] followed by two successive Movento applications, then three consecutive Lannate applications on a 7- to 10-day interval. Radiant is a new insecticide from Dow AgriScience that is closely related to Success[®]. Movento is a new, systemic insecticide being introduced by Bayer. Cyazypyr is a new product being tested by DuPont to determine its effectiveness on thrips. Agri-Mek is a Syngenta product that has received a Section 18 emergency label in Colorado, Washington, and New York this year. Acephate is an old product used mostly on tree fruit. Requiem is a bio-pesticide that is reported to be effective on thrips. Foliage injury ratings were taken as a subjective measurement of foliage damage caused by

thrips feeding and iris yellow spot virus disease (IYSV) symptoms. A scale of 0-5 (0 = no injury, 5 = complete silvering of the leaves) was used. The treatments are listed in Table 1.

Table 1. Insecticide treatments evaluated in the onion thrips efficacy trial. Malheur Experiment Station, Oregon State University, Ontario, OR, 2010.

	Treatment	Rates/acre
1	Agri-Mek	1.0 pt
2	Standard*	-
3	Untreated check (UTC)	-
4	Cyazypyr	13.5 oz
5	Requiem (80 psi)	2.0 qt
6	Requiem (40 psi)	2.0 qt
7	Movento + DyneAmic	5.0 oz 0.25% v/v
8	Movento+ DyneAmic+ AMS (ammonium sulfate)	5.0 oz 0.25% v/v 1.0 lb.
9	Acephate	1.0 pt
10	Movento+ Cyazypyr	5.0 oz 13.5 oz

*Standard = Radiant, Radiant, Movento, Movento, Lannate, Lannate, Lannate, applied consecutively at 7- to 10-day intervals.

The application dates and environmental conditions are listed in Table 2. The onions were harvested September 9-10, 2010, and graded September 14-15, 2010.

Table 2. Application information for insecticide trials in onions. Malheur Experiment Station, Oregon State University, Ontario, OR, 2010.

Application date	Time	Temperature	Relative humidity (%)	Wind (mph)
June 3	4:30 P.M.	68°F	49	7.7
June 14	7:00 A.M.	59°F	59	6.8
June 22	7:30 A.M.	52°F	85	3.8
June 29	6:30 A.M.	65°F	72	6.9
July 6	8:00 A.M.	59°F	58	7.0
July 13	5:00 A.M.	79°F	22	3.1
July 20	6:45 A.M.	57°F	53	3.7

Results and Discussion

Thrips counts were made by counting the total number of thrips on each of 15 plants in each plot (Table 3). Evaluations of thrips and IYSV damage to the onion foliage were taken on July 26 (Table 4). Season average thrips populations are illustrated in Figure 1.

Thrips populations along with foliage damage from feeding and IYSV damage were light compared with 2009 data. The best thrips control was the standard treatment but the acephate, Movento, Movento + Cyazypyr and Agri-Mek treatments did not significantly differ from the standard.

Cyazypyr alone did not control thrips, nor did adding it to Movento increase thrips control over Movento alone.

The addition of AMS (ammonium sulfate) to Movento appeared to have a negative impact on thrips control compared to Movento alone.

Requiem did not give adequate thrips control at either high pressure (80 psi) or low pressure (40 psi). The high-pressure treatment had significantly higher foliage damage, similar to the untreated check.

Requiem (both treatments), Cyazypyr, and the untreated check all had higher levels of foliage damage than the other treatments.

Table 3. Weekly and season average thrips counts in onions. Each number is an average of total thrips/plant, 15 plants/plot, averaged over 4 replications. Malheur Experiment Station, Oregon State University, Ontario, OR 2010

Treatment	8 Jun	16 Jun	24 Jun	1 Jul	16 Jul	26 Jul	Season average
average thrips/plant							
Agri-Mek	5.3	6.6	13.0	14.3	9.5	17.3	10.8
Standard	5.2	8.4	13.0	3.9	6.9	20.3	8.0
Untreated check(UTC)	6.4	16.1	13.7	18.2	14.7	20.2	15.7
Cyazypyr	6.0	10.4	11.4	18.0	15.0	18.6	13.7
Requiem (80 psi)	9.5	17.7	13.6	22.5	17.2	20.2	17.7
Requiem (40 psi)	9.9	19.2	12.9	18.1	15.7	19.3	16.5
Movento	5.8	13.8	8.8	7.6	7.8	7.3	9.5
Movento+AMS	8.0	14.6	10.5	8.4	11.4	8.9	11.2
Acephate	4.5	10.3	3.6	9.6	9.5	19.8	8.3
Movento+Cyazypyr	5.9	9.0	12.2	7.2	5.2	21.0	8.4
LSD (0.05)		7.7	5.5	5.1	4.6	NS	3.1
LSD (0.1)	3.1						

Table 4. Ratings for onion foliage damage caused by thrips feeding and iris yellow spot virus disease (July 26). Malheur Experiment Station, Oregon State University, Ontario, OR, 2010.

	Treatment	Thrips damage rating (0-5)*
1	Agri-Mek	1.1
2	Standard	0.4
3	Untreated Check (UTC)	3.0
4	Cyazypyr	1.8
5	Requiem (80 psi)	2.8
6	Requiem (40 psi)	2.0
7	Movento	0.8
8	Movento+AMS	1.1
9	Acephate	0.6
10	Movento+Cyazypyr	0.6
	LSD (0.05)	0.7

*0 = no feeding damage, 5 = complete silvering of foliage

A comparison of thrips damage vs. average thrips population (Fig. 2) showed a strong relationship ($R^2 = 0.8989$). The higher the thrips population, the more severe the damage from thrips feeding and IYSV.

There were significant differences between treatments in total yield and all the size categories except the jumbo classification (Table 5). Generally, the treatments with the best thrips control also had the highest total yield and the highest yield of colossal and supercolossal bulbs. The grower standard, acephate, Movento, and Agri-Mek all had higher total yield compared to the other products tested.

There was a strong correlation between thrips populations and total yield (Fig. 3) where the R^2 value of the relationship was 0.892. Failure to adequately control thrips had a negative impact on yield.

Table 5. Yield and grade response to insecticide treatments in onions. Malheur Experiment Station, Oregon State University, Ontario, OR, 2010.

Treatment	Medium	Jumbo	Colossal	Super colossal	Yield total
	----- cwt -----				
Agri-Mek	28.0	783.1	123.1	8.0	942.3
Standard	31.8	760.5	141.6	14.0	947.9
Untreated check(UTC)	91.0	682.4	13.7	0.0	787.0
Cyazypyr	45.8	732.8	75.7	4.4	858.8
Requiem (80 psi)	69.2	674.1	28.4	1.8	773.4
Requiem (40 psi)	62.9	675.8	36.2	7.9	782.8
Movento	35.4	738.2	119.8	10.5	903.9
Movento+AMS	31.8	744.2	93.8	21.0	890.8
Acephate	28.3	745.1	159.2	18.9	951.6
Movento+Cyazypyr	48.9	682.1	158.9	11.8	901.6
LSD (0.05)	26.0	NS	55.7	12.9	93.0

Conclusions

Agri-Mek, Movento, and acephate all performed well compared to the standard. Acephate is unlikely to get registered by the U.S. Environmental Protection Agency (EPA) and should not be used by growers. Requiem and Cyazypyr did not effectively control thrips.

If the EPA will again allow states to choose two options for thrips control in 2011, then it is recommended that both Movento and Agri-Mek be requested for use under a Section 18 emergency label.

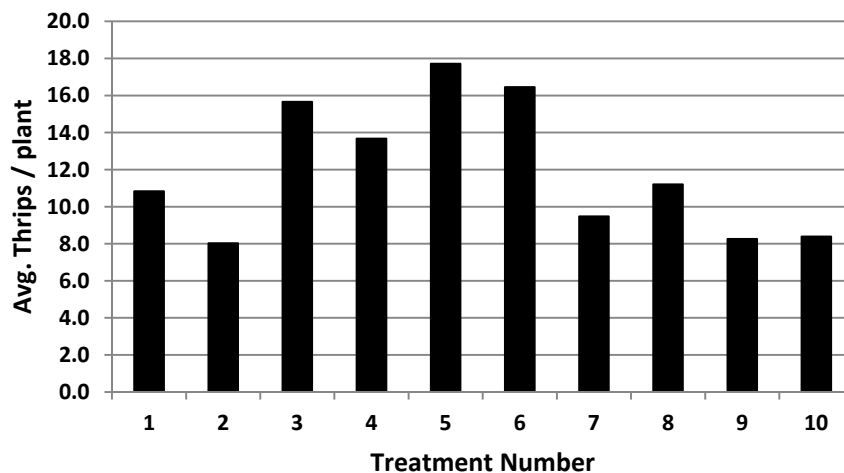


Figure 1. Season average thrips population by treatment in onions. Malheur Experiment Station, Ontario, OR, 2010.

Relationship between thrips population and thrips + IYSV damage

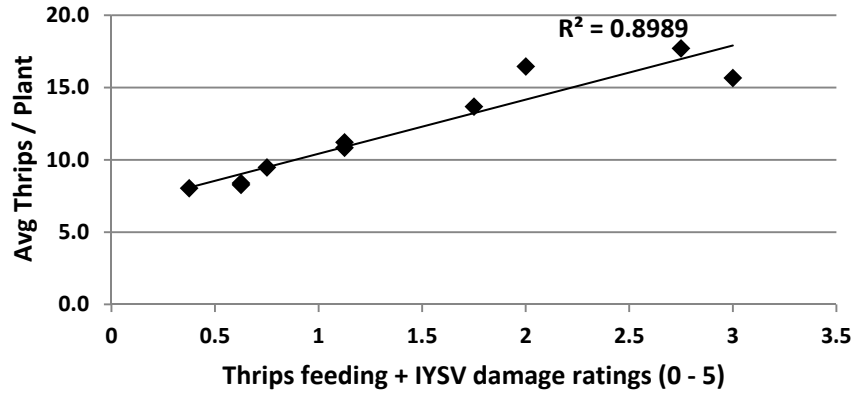


Figure 2. A comparison of thrips damage rating (0 = no feeding, 5 = complete silvering of foliage) vs. average thrips population. Malheur Experiment Station, Oregon State University, Ontario, OR, 2010.

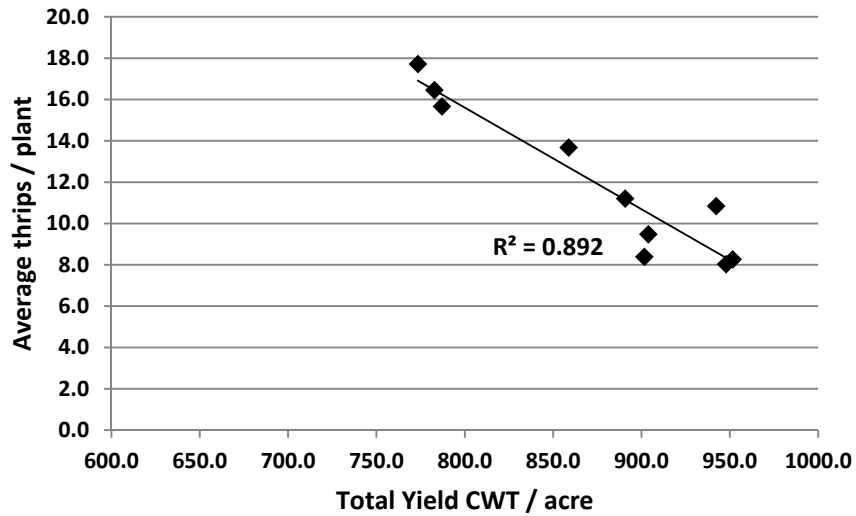


Figure 3. A comparison of average thrips population vs. total onion yield. Malheur Experiment Station, Oregon State University, Ontario, OR, 2010.