

# INSECTICIDE TRIALS FOR ONION THRIPS (*THRIPS TABACI*) CONTROL-2005

Lynn Jensen  
Malheur County Extension Service  
Oregon State University  
Ontario, OR

## Introduction

Growers continue to seek answers about how to control thrips in onions. The 2005 growing season had unusually high thrips populations that were difficult to control. The iris yellow spot virus, which is transmitted by thrips, also had a significant impact on bulb size and yield. This trial examined the efficacy of old and new insecticide chemistries on thrips control. Carzol<sup>®</sup> and Success<sup>®</sup> were two materials that showed promise in suppressing both thrips and the iris yellow spot virus while improving yields over currently registered products.

## Materials and Methods

A block of onion 42 ft wide by 500 ft in length was planted to onion (cv. Vaquero; Nunhems; Parma, ID) on March 1, 2005. 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 137,000 seeds/acre. Lorsban 15G<sup>®</sup> 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 30 ft long and were replicated 4 times.

Thrips counts were made by counting the total number of thrips on 15 plants in each plot. Treatments were applied (Table 1) and thrips counts were made weekly during the growing season (Table 2). Insecticide applications were made with a CO<sub>2</sub>-pressurized plot sprayer with four TeeJet 8004 flat fan nozzles spaced 19 inches apart. All treatments were made with water as a carrier at 60 gal/acre and a pressure of 90 psi.

There were 20 treatments as outlined in Table 2. Acephate is an older insecticide that is now manufactured by several companies. Carzol is an old product used mostly in the tree fruit industry. Stylet oil is specialty oil designed to control aphids by affecting their ability to feed. Admire<sup>®</sup> is one of the new neonicotinoid insecticides that are effective for insect control in many other crops. Diatect<sup>®</sup> is a natural pyrethrum that other production areas have reported to be effective on thrips. ***Acephate, Carzol, and Admire are not currently registered for use on onions.***

## Results and Discussion

Thrips populations started relatively low, and then increased dramatically through mid-July (Fig. 1). By mid-July the average number of thrips per plant was near 90. The high thrips population caused a lot of foliar damage as well as infecting the crop with the iris yellow spot virus.

Table 2 shows the weekly thrips populations and season average. There were significant differences in thrips populations at each sampling date. The four Carzol rates (8.0, 10.0, 16.0 and 20.0 oz), Aza-Direct<sup>®</sup> + Success (with or without Stylet) and Success (10 oz) + Stylet all gave acceptable thrips control. The two highest rates of Carzol gave the best overall control. The Carzol treatments are illustrated in Figure 2 and the Success treatments in Figure 3. The standard insecticide treatment included Warrior<sup>®</sup> and Lannate<sup>®</sup> or MSR<sup>®</sup> combinations. The late June and early July applications were effective for the standard treatment but control was poor after that. Carzol was particularly effective when applied in July. Admire was not effective when applied as a foliar spray. Diatect was applied during the first part of the season but results were poor, so a standard insecticide plus Prev Am treatment was initiated after July 18. Acephate was very effective in 2004 trials, but was only moderately effective in 2005.

The iris yellow spot virus infected the onions in the trial around mid-July. Two evaluations of iris yellow spot virus severity were made, one on August 3 and again on August 23 (Table 3). When the average thrips population and the August 3 disease severity (ratings) are graphed together it is clear that virus disease severity is related to thrips populations (Fig. 4). About 70 percent of the iris yellow spot disease can be explained by thrips populations.

Yield is shown in Table 4. There were significant differences in all size categories except jumbo. The three highest rates of Carzol gave the highest overall yield and the highest yield of colossal and supercolossal bulbs. The treatments with Success were next highest. There is a strong correlation between total yield and thrips population (Fig. 5). The relationship between iris yellow spot severity and total yield was not as strong as for thrips populations and total yield (Fig. 6). The standard insecticide treatment was not significantly better than the untreated check. Aza-Direct when rotated every other week with a combination of Warrior plus MSR was poor at controlling thrips, which was also reflected in the yield.

## Conclusion

The two highest Carzol treatments gave excellent thrips control and produced the highest yields. Applications of Success were also beneficial in reducing thrips populations and increasing yield compared to the untreated check and the standard insecticide treatment. The standard insecticide treatment was not significantly better than the untreated check. If Carzol becomes registered for use on onions, based on this year's efficacy data, a treatment program might consist of early applications of the

standard program, followed by an early and late July application of Carzol. Both Carzol and Lannate are in the carbamate insecticide class, and because there is already resistance to Lannate, care should be taken with Carzol use, should it be registered.

Table 1. Application data for the onion thrips efficacy trial, Malheur Experiment Station, Oregon State University, Ontario, OR, 2005.

Application date	Temperature °F	Relative humidity %	Wind MPH	Application time
6/7	76	23	1.8	3:30 – 5:30 pm
6/16	83	28	0.9	11:00 am – 2:30 pm
6/23	85	13	0.7	4:00 – 7:00 pm
6/29	80	36	0.5	9:30 am – 1:00 pm
7/6	89	31	2.2	10:30 am – 1:00 pm
7/14	85	14	1.7	9:00 – 11:00 am
7/19	95	23	1.7	9:30 am – 12:30 pm
7/27	89	27	0	8:00 – 11:30 am

Table 2. Weekly thrips population and season average, Malheur Experiment Station, Oregon State University, Ontario, OR, 2005.

Treatment	Rate/acre	14-Jun	20-Jun	27-Jun	5-Jul	11-Jul	18-Jul	26-Jul	2-Aug	6-Aug	Average
-----Thrips per plant-----											
Carzol	8.0 oz	2	6	6	12	16	10	13	24	20	12
Carzol	10 oz	2	5	4	8	17	19	23	27	22	14
Carzol	16 oz	3	6	3	7	13	8	7	23	14	9
Carzol	20 oz	3	6	4	6	9	8	6	16	15	8
Admire	16 oz	2	7	13	32	50	43	38	87	32	34
Admire	24 oz	3	7	13	22	44	37	43	115	59	38
Aza-Direct alternated with Warrior + MSR*	8 oz 3.8 oz + 2 pt	3	6	17	48	64	75	109	146	50	58
Aza-Direct alternated with Warrior + MSR*	16 oz 3.8 oz + 2 pt	3	6	12	38	47	54	60	97	31	39
Untreated check	---	4	9	19	26	47	89	56	141	49	49
Standard <sup>†</sup>	---	3	10	4	9	45	42	35	91	34	30
Standard <sup>†</sup> + Stylet <sup>‡</sup>	---	2	4	4	10	60	36	31	156	51	39
Aza-Direct + Success + Stylet <sup>‡</sup>	16 oz + 10 oz	3	4	4	7	26	14	14	42	29	16
Aza-Direct + Success	16 oz + 10 oz	3	6	5	13	17	14	14	51	17	15
Success + Stylet <sup>‡</sup>	10 oz	2	4	3	9	20	14	13	31	21	13
Success + Stylet <sup>‡</sup>	6 oz	4	4	5	13	37	23	17	58	32	21
Diatect <sup>§</sup> + Standard <sup>†</sup>	2.4 lbs	7	12	8	26	---	---	---	---	---	---
Standard <sup>†</sup> (early season) + Success (late season)	---	3	5	4	9	34	27	18	30	33	18
Diatect <sup>§</sup>	2.4 lbs	5	14	28	28	---	---	---	---	---	---
Success alternated with Admire	10 oz + 16 oz	2	5	4	12	50	25	45	121	28	33
Acephate*	8 oz	2	5	6	10	37	32	23	73	30	24
LSD (0.05) <sup>  </sup>		2	5	8	11	19	30	26	57	23	12

\*Rotated on weekly basis.

<sup>†</sup>Standard = Warrior plus either Lannate (3.0 pt) or MSR (2.0 pt).

<sup>‡</sup>Stylet oil applied at 1 percent v/v.

<sup>§</sup>Application discontinued due to lack of control.

<sup>||</sup>LSD (0.05) Least Significant Difference at alpha = 0.05.

Table 3. Iris yellow spot virus subjective rating in thrips trials, Malheur Experiment Station, Oregon State University, Ontario, OR, 2005.

Treatment	Rate/acre	3-Aug	23-Aug
		----- virus rating* -----	
Carzol	8.0 oz	1.5	2.3
Carzol	10 oz	1.9	2.4
Carzol	16 oz	1.5	2.1
Carzol	20 oz	1.4	1.9
Admire	16 oz	1.9	3.5
Admire	24 oz	2.0	3.5
Aza-Direct alternated with Warrior + MSR <sup>†</sup>	8 oz 3.8 oz + 2 pt	2.6	4.1
Aza-Direct alternated with Warrior + MSR <sup>†</sup>	16 oz 3.8 oz + 2 pt	2.3	3.6
Untreated check	---	3.0	4.0
Standard <sup>‡</sup>	---	2.1	3.5
Standard <sup>‡</sup> + Stylet <sup>§</sup>	---	1.9	3.6
Aza-Direct + Success + Stylet <sup>§</sup>	16 oz + 10 oz	1.1	2.9
Aza-Direct + Success	16 oz + 10 oz	1.4	2.8
Success + Stylet <sup>§</sup>	10 oz	1.4	3.0
Success + Stylet <sup>§</sup>	6 oz	1.8	3.3
Diatect <sup>¶</sup> + Standard <sup>‡</sup>	2.4 lbs	2.3	3.6
Standard <sup>‡</sup> (early season) + Success (late season)	---	1.8	3.4
Diatect <sup>¶</sup>	2.4 lbs	3.0	3.8
Success alternated with Admire	10 oz + 16 oz	2.0	3.8
Acephate <sup>†</sup>	8 oz	1.6	3.3
LSD (0.05)		0.8	0.7

\*0 = healthy, 5 = most foliage dead.

<sup>†</sup>Rotated on weekly basis.

<sup>‡</sup>Standard = Warrior plus either Lannate (3.0 pt) or MSR (2.0 pt).

<sup>§</sup>Stylet oil applied at 1 percent v/v.

<sup>¶</sup>Application discontinued due to lack of control.

Table 4. Yield of onions treated with different insecticides to control thrips, Malheur Experiment Station, Oregon State University, Ontario, OR, 2005.

Treatment	Rate/acre	Mediums	Jumbo	Colossal cwt/acre	Super- colossal	Colossal + super- colossal	Total yield
-----cwt/acre-----							
Carzol	8.0 oz	83	500	118	80	198	781
Carzol	10 oz	38	530	187	154	341	909
Carzol	16 oz	39	553	166	144	309	901
Carzol	20 oz	42	634	176	66	241	918
Admire	16 oz	57	562	86	42	128	747
Admire	24 oz	60	566	99	13	112	738
Aza-Direct alternated with Warrior + MSR*	8 oz 3.8 oz + 2 pt	77	548	22	6	27	652
Aza-Direct alternated with Warrior + MSR*	16 oz 3.8 oz + 2 pt	105	561	30	9	39	704
Untreated check	---	92	546	22	0	22	660
Standard <sup>†</sup>	---	80	551	57	12	70	701
Standard + Stylet <sup>‡</sup>	---	102	536	26	21	47	685
Aza-Direct + Success + Stylet <sup>‡</sup>	16 oz + 10 oz	54	609	120	31	150	812
Aza-Direct + Success	16 oz + 10 oz	52	647	126	19	145	844
Success + Stylet <sup>‡</sup>	10 oz	40	657	123	9	132	830
Success + Stylet <sup>‡</sup>	6 oz	67	556	84	59	143	765
Diatect <sup>§</sup> + Standard <sup>†</sup>	2.4 lb	65	539	57	56	113	718
Standard <sup>†</sup> (early season) + Success (late season)	--- 10 oz	100	543	37	0	37	680
Diatect <sup>§</sup>	2.4 lb	87	490	55	32	87	663
Success alternated with Admire*	10 oz + 16 oz	68	507	110	43	153	728
Acephate	8 oz	56	566	91	26	117	739
LSD (0.05)		42	NS	90	70	141	139

\*Rotated on weekly basis.

<sup>†</sup>Standard = Warrior plus either Lannate (3.0 pt) or MSR (2.0 pt).

<sup>‡</sup>Stylet oil applied at 1 percent v/v.

<sup>§</sup>Application discontinued due to lack of control.

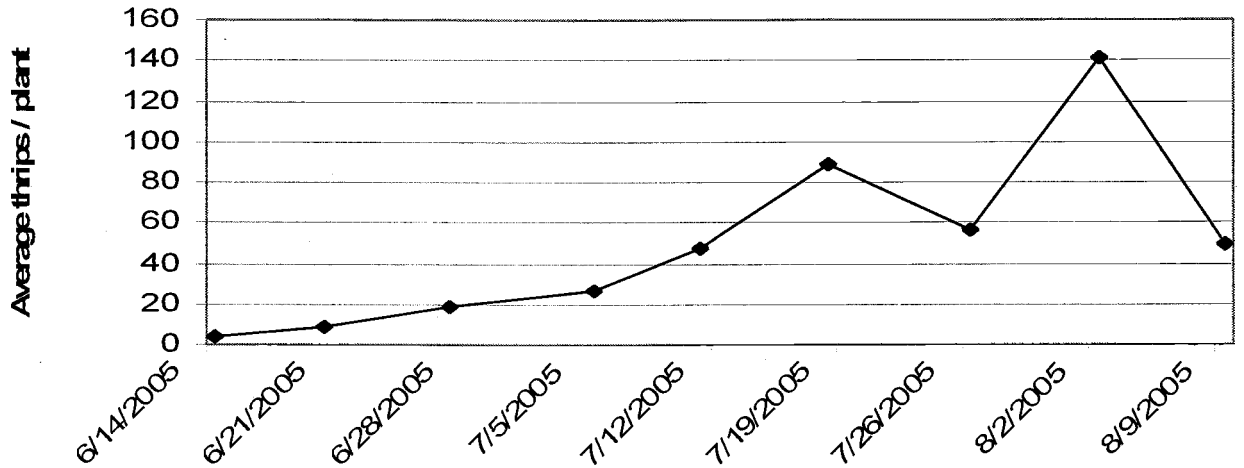


Figure 1. Season-long thrips populations (untreated) on onions in an insecticide efficacy trial, Malheur Experiment Station, Oregon State University, Ontario, OR, 2005.

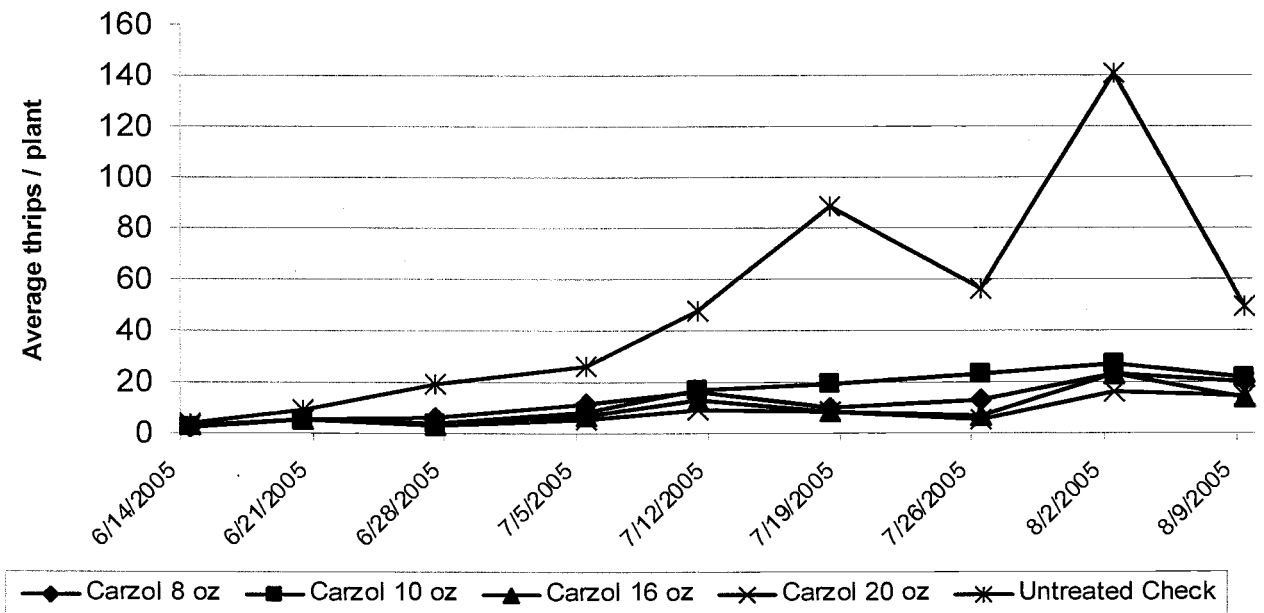


Figure 2. Efficacy of Carzol® insecticide for thrips control on onion, Malheur Experiment Station, Oregon State University, Ontario, OR, 2005.

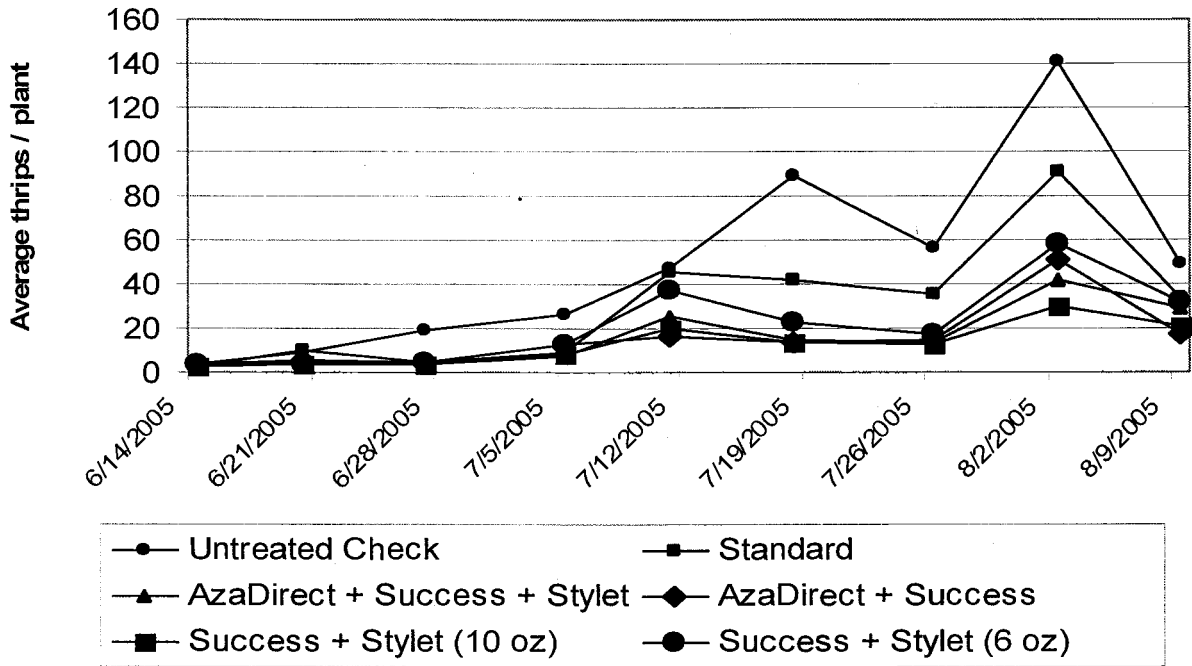


Figure 3. Success<sup>®</sup> combinations compared to standard insecticides and the untreated check for thrips control in onions, Malheur Experiment Station, Oregon State University, Ontario, OR, 2005.

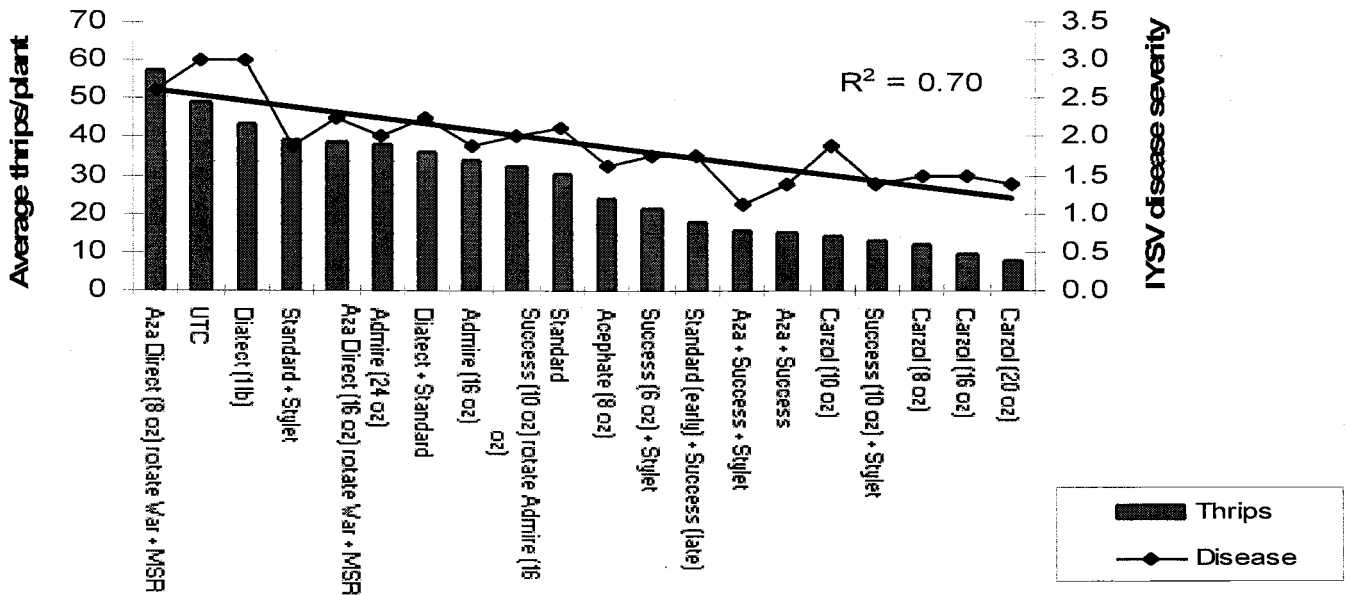


Figure 4. Average thrips populations compared to iris yellow spot virus severity in onions with different insecticide treatments, Malheur Experiment Station, Oregon State University, Ontario, OR, 2005.



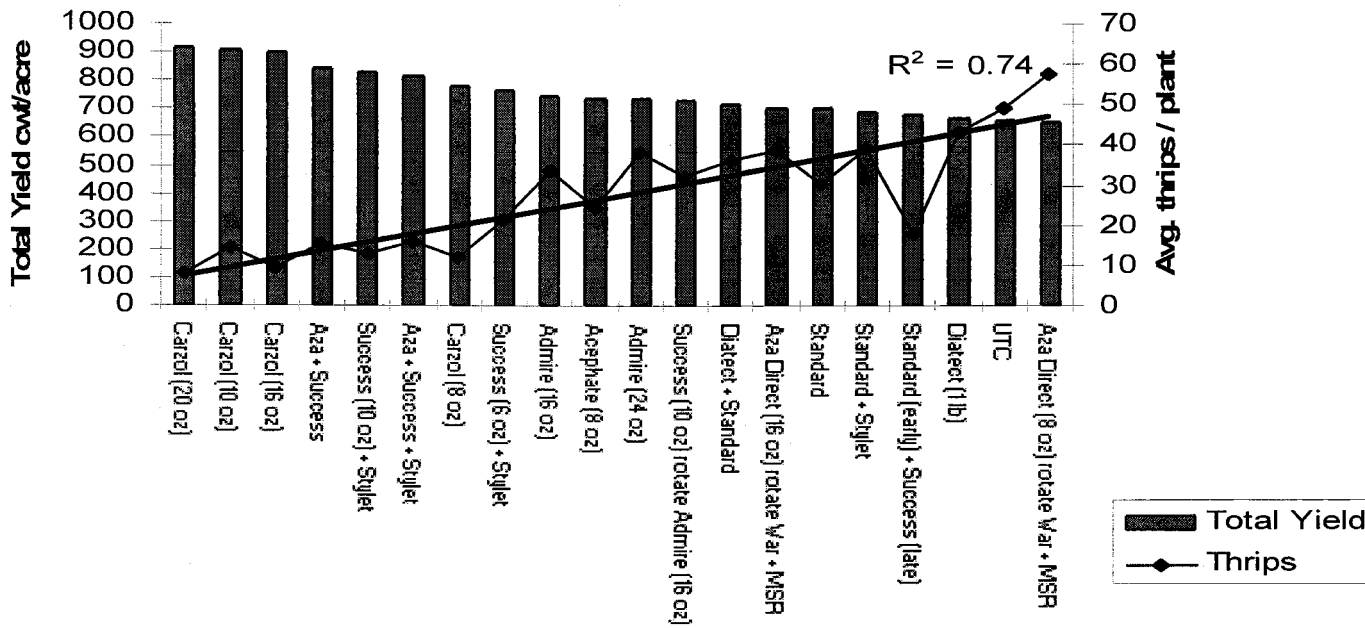


Figure 5. Average thrips populations compared to onion total yield under different insecticide treatments, Malheur Experiment Station, Oregon State University, Ontario, OR, 2005.

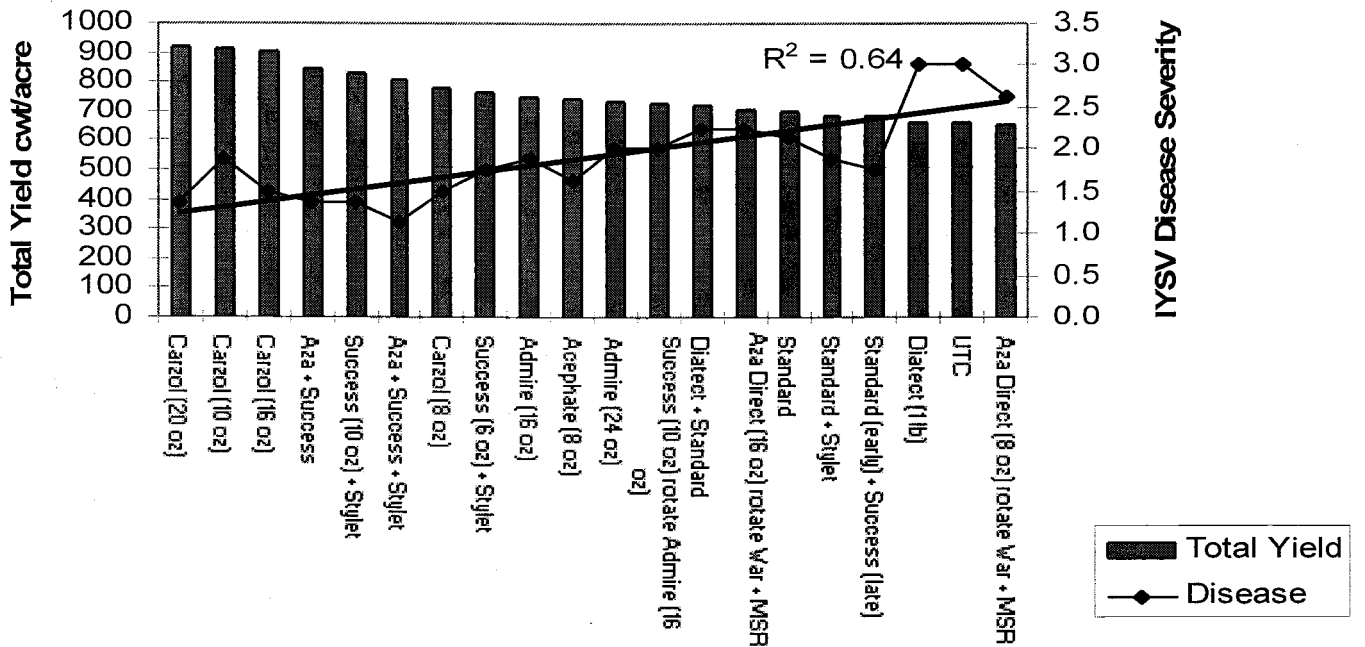


Figure 6. Average disease severity of onion infected with iris yellow spot virus compared to total yield under different insecticide treatments, Malheur Experiment Station, Oregon State University, Ontario, OR, 2005.