

**2006 Onion – Actigard Studies****October 16, 2006**

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**Objective:** The objective of these studies was to evaluate the effectiveness of Actigard (timing, rate) against Iris Yellow Spot Virus in commercial fields of onion in Colorado.

**Experimental Design:** Yellow seeded onion plots were established on 03/15/06 at the Boxberger/Schnorr field near Fort Collins (Hwy 14/Greenfield Court) with the variety ‘Tioga’, and on 03/25/06 at the Martin Farm field near Greeley (Roads 43/62) with the variety ‘Granero’. All treatments were applied in 25 gallons of water per acre with a CO<sub>2</sub> backpack at 32 psi pressure, using Teejet 8002 flat-fan nozzles (2 per bed of 2 onion lines, 8 inches apart). Plots were two beds 36” wide by 25 feet in length with an untreated spreader bed separating each treatment. Each experiment was a randomized complete block design with 4 replicates. Conventional pesticides were applied to the Fort Collins site, and herbicides only to the Greeley site by cooperators; both sites were furrow-irrigated as needed.

**Actigard Treatments – Timing x Rate:**

1. Control
2. Actigard @ 0.50 oz/A at 4, 3, 2 & 1 week prebulb
3. Actigard @ 0.50 oz/A at 2, 1 week prebulb, bulb, 1 week postbulb
4. Actigard @ 0.75 oz/A at 4, 3, 2 & 1 week prebulb
5. Actigard @ 0.75 oz/A at 2, 1 week prebulb, bulb, 1 week postbulb

Treatment Numbers	Application Date; Plant Growth Stage	
	Fort Collins	Greeley
2 & 4	06/26 ; 6 – 7 leaves	06/27 ; 3 – 4 leaves
2 & 4	07/05 ; 7 – 8 leaves	07/07 ; 7 – 8 leaves
2 – 5	07/12 ; 9 – 10 leaves	07/12 ; 7 – 8 leaves
2 – 5	07/19 ; 10 leaves (bulbing)	07/19 ; 9 – 10 leaves (bulbing)
3 & 5	07/26 ; 8 – 9 leaves	07/24 ; 9 – 10 leaves
3 & 5	08/01 ; 9 leaves	08/01 ; 11 – 12 leaves

**Disease Notes and Evaluations:**

08/01/06 Observed trace incidence of *Iris Yellow Spot Virus* in the control at Greeley  
 08/21/06 Rated incidence of IYSV at Greeley; number of 50 plants with symptoms, converted to %  
 09/07/06 Trace incidence of IYSV at Fort Collins; number of 50 plants with symptoms; converted to %  
 09/08/06 Harvested, topped and graded all bulbs from 10 ft bed of each plot at Greeley  
 09/14/06 Harvested, topped and graded all bulbs from 10 ft bed of each plot at Fort Collins

Ft. Collins		Plot Yield (lbs)		
Treatment	% IYSV	Jumbo	Medium	Total*
1	2.0	4.4	13.6	20.0
2	0.6	6.5	12.6	22.5
3	2.6	4.8	11.8	19.4
4	0.6	7.3	14.5	24.6
5	2.0	4.8	12.4	20.5
C. V. %	106.81	67.18	13.03	17.45
Probability	0.3036	0.7582	0.2242	0.3161
LSD 0.05	Non significant	Non significant	Non significant	Non significant

\* Total includes all components from Jumbo to pre-pack sizes.

Greeley		Plot Yield (lbs)		
Treatment	% IYSV	Jumbo	Medium	Total*
1	55.6	1.5	9.1	13.0
2	60.0	1.0	8.4	12.4
3	67.6	1.6	8.1	12.2
4	62.6	0.4	8.8	11.8
5	77.6	1.8	8.6	12.7
C. V. %	17.31	165.49	30.84	25.89
Probability	0.1226	0.8709	0.9859	0.9883
LSD 0.05	Non significant	Non significant	Non significant	Non significant

\* Total includes all components from Jumbo to pre-pack sizes.

#### Results & Discussion:

The light (Fort Collins) to moderate (Greeley) disease pressure did not provide any statistical difference between the treatments for disease or yield components. There was a trend towards lower disease incidence when Actigard treatments (No. 2 or 4) were started at 4 weeks prebulb compared to later applications (No. 3 or 5) at either rate at both sites. But again these differences were not significantly different from the control.

The Fort Collins site had low disease pressure, with low numbers of thrips (10 and 11/plant on 07/13 and 07/21, respectively). The Greeley site had greater disease pressure, with moderate to high numbers of thrips throughout the season in adjacent plots monitored by Whitney Cranshaw's program – CSU Entomology. Onion thrips counts averaged 23, 18, 25, and 36 per plant in the untreated checks on 07/12, 07/ 20, 07/24 and 07/31, respectively; with populations doubled in many of the conventional insecticide treated plots that were monitored.

#### Excerpts from 2006 Onion Xanthomonas Study – Transplants at ARDEC

	Treatment	Timing	Rate / Acre
1.	Control	-	-
10.	Actigard + Rivet	3,2,1 wks. prebulb	0.5 oz + 0.25% v/v
	ManKocide + Rivet	1,2,3,4 wks. postbulb	2.5 lb + 0.25% v/v
11.	Actigard + Rivet	3,2,1 wks. prebulb	0.75 oz + 0.25% v/v
.	ManKocide + Rivet	1,2,3,4 wks. postbulb	2.5 lb + 0.25% v/v
12.	Actigard + Rivet	3,2 prebulb & 1,2 post	0.5 oz + 0.25% v/v
.	ManKocide + Rivet	1 prebulb & 3,4 post	2.5 lb + 0.25% v/v
13.	Actigard + Rivet	3,2 prebulb & 1,2 post	0.75 oz + 0.25% v/v
.	ManKocide + Rivet	1 prebulb & 3,4 post	2.5 lb + 0.25% v/v

TRT	Plot Yield (lbs)			Xanthomonas Leaf Blight (%)				IYSV (%)	
	Jumbo	Medium	Total	08/01		08/10		08/01	08/10
1	15.8	12.8	31.6	11.25	ab	18.75	a	64.0	73.0a
10	14.1	11.8	29.0	4.75	de	11.25	cde	38.0	59.0ab
11	12.8	12.9	27.2	4.25	de	4.25	f	32.0	53.0ab
12	17.7	12.0	31.6	2.00	e	6.25	ef	44.0	64.0a
13	14.8	14.0	27.1	3.50	de	6.00	ef	50.0	41.0b
Prob.	0.9975	0.6048	0.9218	< 0.0001		< 0.0001		0.1795	0.0545
C.V. %	41.8	24.5	17.7	40.8		26.4		39.3	23.3
LSD0.05	n. s.	n.s.	n.s.	4.6		5.3		n.s.	20.8

IYSV incidence was reduced 22 – 50% and 12 – 44% by the addition of Actigard to Treatments 10-13 when compared to the control (Treatment 1) on the 1<sup>st</sup> and 2<sup>nd</sup> evaluation dates, respectively. Protection was less at the second date, possibly due to added thrips and virus transmission pressures due to canopy attractiveness (greener foliage with less IYSV and Xanthomonas than surrounding plots). So the first evaluation may be more representative of the effect of Actigard against IYSV (and Xanthomonas), and the earlier timing (Treatments 10 and 11) had greater disease control than the delayed timing (Treatments 12 and 13). The higher rate (Trt 11) of Actigard provided 50% reduction of IYSV compared to the lower rate (Trt 10) with a 41% reduction in IYSV incidence.

**Excerpts from 2006 Onion Mulch Study – Transplants at ARDEC**

Treatment	% IYSV	Plot Yield (lbs)		
		Jumbo	Medium	Total
<b>1. Bare Soil – Control</b>	<b>46.3</b>	<b>15.9</b>	<b>8.9</b>	<b>27.2</b>
+ Actigard	47.3	13.6	10.6	26.4
<b>2. Bare Soil – W / L</b>	<b>40.0</b>	<b>15.0</b>	<b>10.2</b>	<b>28.4</b>
+ Actigard	36.0	16.1	9.7	28.5
<b>3. Bare Soil – N / S</b>	<b>42.7</b>	<b>15.6</b>	<b>10.8</b>	<b>28.8</b>
+ Actigard	43.0	14.6	12.1	30.5
<b>4. Mulch – Control</b>	<b>37.0</b>	<b>21.3</b>	<b>9.4</b>	<b>33.2</b>
+ Actigard	41.0	18.7	10.7	32.6
<b>5. Mulch – W / L</b>	<b>37.7</b>	<b>17.0</b>	<b>12.5</b>	<b>32.0</b>
+ Actigard	40.0	15.3	12.8	31.2
<b>6. Mulch – N / S</b>	<b>29.7</b>	<b>16.2</b>	<b>11.9</b>	<b>31.2</b>
+ Actigard	37.3	19.5	10.9	32.9
<b>Mean 1 – 3 (Bare)</b>	<b>43.0</b>	<b>15.5</b>	<b>10.0</b>	<b>28.1</b>
+ Actigard	42.1	14.8	10.8	28.5
<b>Mean 4 – 6 (Mulch)</b>	<b>34.8</b>	<b>18.2</b>	<b>11.3</b>	<b>32.1</b>
+ Actigard	39.4	17.8	11.5	32.2

**Actigard applied 4, 3, 2, and 1 week pre-bulb @ 0.75 oz/A**  
**W = Warrior @ 3.84 oz/A, L = Lannate @ 1.5 pt/A, N = AZA Direct**  
**@ 8 oz/A, S = Spintor @ 6 oz/A.; means from 6 reps, RCB design,**  
**Plot size was 8 beds wide x 25 feet long – ‘Candy’ yellow onion**

This experiment combined cultural practices (straw mulch vs bare soil), insecticide (none, conventional – W/L, biopesticides – N/S), and virus protection (none, Actigard) in a field with history of IYSV. There was no disease control benefit shown by the use of Actigard with any other treatment combination. However, the IYSV means of the 3 mulch treatments (4 – 6) were 6% less with Actigard and 19% less without Actigard. The jumbo, medium and total yield components without and with Actigard were increased with the mulch by 17 and 20%, 6 and 13%, and 13 and 14%, respectively; which is consistent with other mulch trial data from 2006 and previous years.

In summary, the Actigard trials and data were inconsistent at best during 2006 and suggest that additional work is needed to identify desired rates (e.g., 0.5, 0.75, 1 oz) , timing (2 to 4 times pre-bulb, 5 – 10 day intervals) and physiological responses of onion in relation to protection against a viral disease like IYSV.

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