

IR-4 Onion Seed Treatment Trial, 2007, Fruita CO

Robert W. Hammon & Melissa Franklin

Colorado State University Extension, P.O. Box 20,000-5028, Grand Junction, CO 81502-5028
Phone: (970) 244-1838; Fax: (970) 244-1700; E-mail: bob.hammon@mesacounty.us

Methods

A trial was conducted using seed treatment insecticides applied by four different companies for control of onion thrips and seed corn maggot. The treatments were (treatment company in parenthesis): Trigar (Incotec), Entrust (Incotec, Agricoat, GTG, and Seteco), Mundial (Incotec, Agricoat, GTG, and Seteco), Poncho (Incotec, Agricoat, GTG, and Seteco), Entrust/Natural II (Agricoat). All seeds, with the exception of the Entrust/Natural II (Agricoat) treatment, were treated with Thiram and Allegiance in addition to the insecticide.

The furrow irrigated onions were planted April 11, 2007 at the Western Colorado Research Center at Fruita, 1910 L Rd, Fruita, CO (Mesa County). The onions were seeded with a cone-type plot planter at a rate of 130,000 seeds per acre. Plots were 3 ft wide (two 30 inch beds, with two seed rows per bed, spaced at eight inches) x 40 ft long. Onions were irrigated thirteen times during the growing season (Apr 16, May 1, 11, 21, 31, June 6, 10, 22, 28 July 5, 9, 19, 23). The following herbicides were applied to the field for weed control: Dacthal, 12 lb/acre (11 Apr); Starane, $\frac{2}{3}$ pt/acre plus Buctril, 1 pt/acre (May 30); Outlook, 1 pt/acre plus Nortron, 1 pt/acre plus Buctril, $\frac{1}{2}$ pt/acre (June 6); Select, 8 oz/acre (June 6). The field was hand-weeded once, during late July. 200 #/acre of 11-52-0 was applied and incorporated prior to planting. In addition, a total of 50 pounds of blood meal were applied to the west bed of each of the plots on May 1 to attract seed corn maggot flies.

The experiment was arranged as a randomized complete block with four replications.

The field was inspected twice for seed corn maggot damage, at two and four leaf growth stage. No maggot damage was observed, so sampling was not done for this insect.

Plots were sampled for thrips four times, biweekly: week of June 18 (77 DAP), July 2 (91 DAP), July 16 (105 DAP), July 30 (119 DAP). A single replication was sampled in one day, with the entire experiment done over a four day period. Five plants were randomly chosen from each plot and taken to the lab, where they were placed in Berlese funnels for 24 h to extract the thrips into 70% alcohol. In the counting process adult thrips were separated from larvae. Adult thrips were identified to species. That data is not presented, but is available if requested.

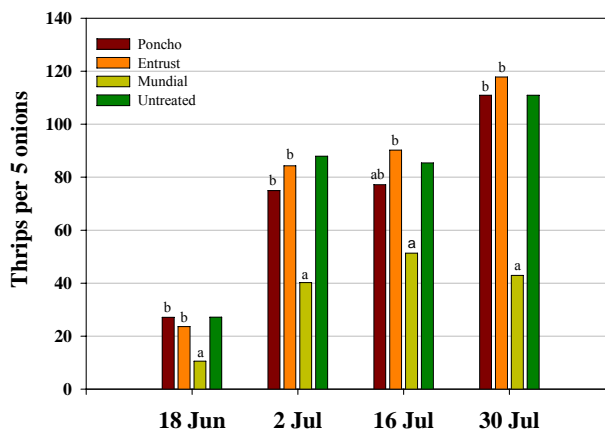


Figure 1. Mundial suppressed thrips populations through the end of July, while the other seed treatments had no apparent activity against them.

Results

The data was analyzed three ways to determine the impact of 1) insecticides common to the treatment companies, 2) treatment companies on Mundial activity and 3) other materials entered into the trial. All data was $(X + 0.5)^{1/2}$ transformed before analysis to reduce variability. Means displayed in the table are actual, but P-values and LSD mean separations were calculated using transformed data.

1) Efficacy of common treatments:

A 2-way factorial analysis of variance was conducted using only those treatments (3) which were in common between companies (4). The data from this analysis is displayed in Table 1.

Mundial had the lowest thrips counts on all sample dates. They were significantly lower than thrips counts in the Entrust or Poncho treatments in all samples. Mundial treated plots had lower immature and total thrips counts on the final sample date 199 days after planting.

2) Impact of treatment company on Mundial activity:

Differences in insecticide efficacy between seed treatment companies (4) were analyzed using only the Mundial treatments. This is because the other insecticides were ineffective in controlling thrips. An analysis of variance was conducted on this data, which is displayed in Table 2.

The Seteco treated plots had the lowest immature and total thrips counts in the first three samples, but differences were statistically significant only in the first sample date.

3) Evaluation of other materials in trial:

An analysis of variance using all treatments entered into the trial is displayed in Table 3.

Neither Entrust/Natural II (Agricoat) nor Trigard (Incotec) had thrips counts lower than the untreated controls on any sample date. This implies that they had no activity against thrips.

Acknowledgements: This research was conducted with funding from IR-4, the Colorado Onion Association and BASF Corporation. It was conducted with the cooperation of the Western Colorado Research Center at Fruita. The plots were maintained by Fred Judson. The assistance of all associated with this project is appreciated.

Table 1. AOV using three insecticide seed treatments common to four treatment companies. Untreated values, expressed as the mean of the two untreated controls, were not included in this analysis, but are displayed for reference. Means within a column followed by the same letter are not significantly different (LSD).

Treatment	Thrips per 5 onion plants											
	June 18 (77 DAP)			July 2 (91 DAP)			July 16 (105 DAP)			July 30 (119 DAP)		
	Adult thrips	Immature thrips	Total thrips	Adult thrips	Immature thrips	Total thrips	Adult thrips	Immature thrips	Total thrips	Adult thrips	Immature thrips	Total thrips
Entrust	6.0 b	17.6 b	23.6 b	21.9 b	62.4 b	84.3 b	13.8 b	76.5 b	90.3 b	7.6	110.2 b	117.8 b
Mundial	3.3 a	7.4 a	10.6 a	11.6 a	28.7 a	40.3 a	7.6 a	43.8 a	51.3 a	8.3	34.7 a	42.9 a
Poncho	6.4 b	20.6 b	27.1 b	19.1 b	55.9 b	74.9 b	13.4 b	63.8 ab	77.2 ab	11.0	105.1 b	116.1 b
p-value	0.0025	0.0002	0.0002	0.0068	0.0033	0.0020	0.0103	0.0164	0.0099	0.2000	0.0003	0.0006
Untreated	6.6	20.5	27.1	20.9	67.0	87.9	14.9	70.5	85.4	11.5	99.4	110.9

Table 2. AOV using only Mundial data for the four treatment companies. Untreated values, expressed as the mean of the two untreated controls, were not included in this analysis, but are displayed for reference. . Means within a column followed by the same letter are not significantly different (LSD).

Company	Thrips per 5 onion plants											
	June 18 (77 DAP)			July 2 (91 DAP)			July 16 (105 DAP)			July 30 (119 DAP)		
	Adult thrips	Immature thrips	Total thrips	Adult thrips	Immature thrips	Total thrips	Adult thrips	Immature thrips	Total thrips	Adult thrips	Immature thrips	Total thrips
Incotec	4.75	12.25 b	17.00 b	9.50	23.75	33.25	8.50	80.00	88.50	10.25	68.25	78.50
Agricoat	2.25	9.75 b	12.00 b	11.25	39.25	50.50	8.00	44.00	52.00	10.25	29.25	39.50
GTG	4.50	6.50 ab	11.00 b	12.75	36.25	49.00	6.50	29.00	35.50	6.50	14.50	21.00
Seteco	1.50	1.00 a	2.50 a	12.75	15.50	28.25	7.25	22.00	29.25	6.00	26.75	32.75
p-value	ns	0.0448	0.0536	ns	ns	ns	ns	ns	ns	ns	ns	ns
Untreated	6.6	20.5	27.1	20.9	67.0	87.9	14.9	70.5	85.4	11.5	99.4	110.9

Table 3. AOV using all data generated in the experiment. All data was $(x + 0.5)^{1/2}$ transformed before analysis. Actual means are displayed. P-values and mean separation (LSD) were calculated from transformed data.

Thrips per 5 plants												
Treatment	June 18			July 2			July 16			July 30		
	Adult thrips	Immature thrips	Total thrips	Adult thrips	Immature thrips	Total thrips	Adult thrips	Immature thrips	Total thrips	Adult thrips	Immature thrips	Total thrips
Entrust (Agricoat)	4.0 abc	10.5 abc	14.5 abc	22.3 bc	84.3 f	106.5 f	11.3	73.5 abcd	84.8 abcd	9.3	145.3	154.5
Entrust (GTG)	5.8 abcdef	13.0 abcd	18.8 abc	22.5 bc	60.0 cdef	82.5 cdef	18.5	81.0 bcd	99.5 cde	9.3	103.8	113.0
Entrust (Incotec)	8.8 def	22.5 cd	31.3 bc	26.3 c	72.3 def	98.5 ef	14.0	99.5 de	113.5 de	8.0	98.3	106.3
Entrust (Seteco)	5.5 abcde	24.3 d	29.8 bc	16.8 abc	33.0 cd	49.8 bcde	11.3	52.0 abcd	63.3 abcd	3.8	93.5	97.3
Entrust/Natural II (Agricoat)	10.0 f	17.8 bcd	27.8 bc	22.5 bc	92.8 f	115.3 f	16.8	137.8 e	154.5 e	8.8	147.0	155.8
Mundial (Agricoat)	2.3 ab	9.8 abc	12.0 ab	11.3 a	39.3 cde	50.5 bcde	8.0	44.0 abc	52.0 abc	10.3	29.3	39.5
Mundial (GTG)	4.5 abcd	6.5 ab	11.0 ab	12.8 ab	36.3 cde	49.0 bcde	6.5	29.0 ab	35.5 ab	6.5	14.5	21.0
Mundial (Incotec)	4.8 abcd	12.3 abcd	17.0 abc	9.5 a	23.8 c	33.3 bc	8.5	80.0 bcd	88.5 bcd	10.3	68.3	78.5
Mundial (Seteco)	1.5 a	1.0 a	2.5 a	12.8 ab	15.5 c	28.3 b	7.3	22.0 a	29.3 a	6.0	26.8	32.8
Poncho (Agricoat)	5.0 abcde	16.0 bcd	21.0 abc	16.8 abc	57.3 cdef	74.0 bcdef	12.3	47.8 abcd	60.0 abcd	8.5	86.8	95.3
Poncho (GTG)	4.8 abcd	21.0 cd	25.8 bc	27.0 c	56.5 cdef	83.5 def	18.0	91.5 cde	109.5 de	16.0	190.8	206.8
Poncho (Incotec)	9.3 ef	24.3 d	33.5 c	23.0 bc	80.5 ef	103.5 f	12.5	55.8 abcd	68.3 abcd	8.8	78.8	88.5
Poncho (Seteco)	6.8 cdef	21.3 cd	28.0 bc	9.5 a	29.3 cd	38.8 bcd	11.0	60.0 abcd	71.0 abcd	10.8	63.0	73.8
Trigard (Incotec)	6.8 cdef	24.5 d	31.3 bc	24.3 c	80.0 ef	104.3 f	16.2	83.0 cd	99.3 cde	8.0	86.8	94.8
Untreated 1	6.8 cdef	20.3 cd	27.0 bc	17.3 abc	79.3 ef	96.5 ef	16.3	78.0 bcd	94.3 cd	14.5	131.0	145.5
Untreated 2	6.5 bcdef	20.8 cd	27.3 bc	24.5 c	54.8 cdef	79.3 cdef	13.5	63.0 abcd	76.5 abcd	8.5	64.8	76.3
p-value	0.0118	0.0122	0.0067	0.0517	0.0989	0.0510	0.2541	0.0934	0.0743	0.3333	0.1722	0.1682