

2005 IR-4 Onion Insecticide Trials Grand Junction Colorado

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Background

Interregional Research Project No. 4 (IR-4) is a federally funded program established in 1963 to conduct the research necessary for obtaining registrations of pesticides needed to grow minor crops. IR-4 works with farmers, agricultural scientists, and extension personnel to conduct research and petition the Environmental Protection Agency (EPA) for tolerances for specific pesticides. IR-4



identified control of thrips on onions as the Pilot Performance Project for 2005 at the Food-Use Workshop in the fall of 2004. The purpose of this research is to identify new compounds or new use-patterns of registered compounds that provide useful control of thrips on onions which may warrant registration. Two trials were conducted in western Colorado during 2005 as part of nation-wide evaluations to screen insecticides for registration. One trial evaluated foliar insecticides, and the other looked at seed treatments and planting time applications.

Plot Details:

Location: Western Colorado Research Center at Orchard Mesa, 3168 B ½ RD, Grand Junction CO

Planting date: April 14, 2005

Irrigation: The onions were furrow irrigated ten times during the growing season.

Foliar trial:

Seeding details: 'Flare' red onion; Two seed rows at 8" spacing per 30" bed; 130,000 seeds per acre. Sprayer: All sprays were applied with a hand-held CO₂ pressures sprayer with a 7.5 ft boom. Four LF4 80 nozzles were mounted at 18 inch spacing. The sprayer was operated at 60 PSI, at walking speed (~3 mph), and calibrated at 30 gal/A.

Plot size: 7.5 ft X 25 ft

Experimental design - Randomized complete block with four replications.

Table 1. Spray dates, weather conditions, plant growth stage.

Spray Date	Time	Temp.	Wind	Growth Stage
6/29	8:30-9:00	~75°	Calm	4-5
7/6	8:00-9:00	~70°	7-10 from the S	5-6
7/13	8:00-8:30	~70°	5-10 m.p.h	6-7
7/20	8:00-8:30	~70°	Calm	7-8

Table 2. Insecticides and rates tested in 2005 foliar trial.

	Active Ingredient	Product	Registrant	Rate
1	Untreated			
2	Calcium Nitrate	Viking Ship Calcium Nitrate		10 lbs./A
3	Abamectin	Agri-Mek 0.15 EC	Syngenta	0.024 lbs. ai/A
4	Methomyl	Lannate SP	DuPont	0.9 lb. ai/A
5	Confidential			
6	Formetanate Hydrochloride	Carzol SP	Gowan	1.25 lbs. ai/A
7	Pyridalyl	S-1812 (High)	Valent	0.25 lb. ai/A
8	Pyridalyl	S-1812 (Medium)	Valent	0.20 lb. ai/A
9	Pyridalyl	S-1812 (Low)	Valent	0.15 lb. ai/A
10	Clothianidin	Clutch 50 WDG	Arvesta	0.1 lb. ai/A
11	Thiacloprid	Calypso 480SC	Bayer	0.250 lb. ai/A
12	Tolfenpyrad	OMI-88 15% EC	Nichino	0.137 lb. ai/A
13		NNI-0101 20% SC	Nichino	81g ai/A
14	Spinosad	SpinTor 2SC	Dow	0.094 lb. ai/A
15	Acetamiprid	Assail 70 WP	Cerexagri	0.148 lb. ai/A

Table 3. Adult thrips - IR4 foliar trial; WFT = Western Flower Thrips, OT = Onion Thrips. Means within a column followed by the same letter are not significantly different (LSD; $P=0.05$).

Insecticide	Thrips per 5 onions									
	27 June		5 July		11 July		18 July		25 July	
	WFT	OT	WFT	OT	WFT	OT	WFT	OT	WFT	OT
Untreated	4.8	1.5	2.5	2.0	1.5	4.8	1.0	1.3	1.0	1.3
Calcium Nitrate	6.5	1.8	2.0	2.0	2.0	2.0	1.3	3.8	1.3	2.5
Agri-Mek 0.15 EC	0.8	0.8	2.0	2.3	2.0	2.0	1.3	2.0	1.5	0.8
Lannate SP	4.5	1.3	2.8	2.5	2.8	2.3	1.5	0.0	3.0	1.5
Confidential	1.3	2.0	1.8	2.0	2.8	4.0	1.3	0.5	0.8	1.3
Carzol SP	5.0	0.8	0.8	1.3	0.8	1.3	0.3	1.3	5.5	1.3
S-1812 (High)	2.3	0.8	2.3	3.3	1.5	3.0	0.8	1.5	1.5	1.8
S-1812 (Medium)	5.0	2.0	2.3	4.5	0.3	1.0	1.8	2.0	1.5	1.0
S-1812 (Low)	7.0	1.0	1.5	3.0	3.3	6.5	1.0	1.3	0.5	1.5
Clutch 50 WDG	3.8	0.8	4.0	2.8	1.5	4.3	0.5	1.3	0.5	0.8
Calypso 480SC	3.0	1.5	4.0	3.3	2.0	3.8	0.3	1.0	0.8	1.5
OMI-88 15% EC	2.5	1.8	1.5	2.8	0.8	1.5	1.0	0.8	1.3	1.3
NNI-0101 20% SC	1.3	0.8	2.3	1.5	2.3	4.8	0.5	2.3	1.5	2.3
SpinTor 2SC	0.8	2.3	2.0	4.8	1.0	2.3	0.8	1.0	1.5	0.3
Assail 70 WP	6.0	4.3	0.8	3.8	2.3	1.8	1.0	2.3	1.0	3.3
P-value	0.003	0.169	0.472	0.581	0.558	0.070	0.766	0.119	0.076	0.680

Table 4. Immature thrips counts - IR4 foliar trial. Means within a column followed by the same letter are not significantly different (LSD; $P=0.05$).

Insecticide	Immature thrips per 5 plants					
	27 June	5 July	11 July	18 July	25 July	Total
Untreated	1.0	23.8	23.5 F	5.0 AB	26.5	79.75 CDE
Calcium Nitrate	3.8	26.5	17.8 CDEF	37.5 D	18.3	104.00 E
Agri-Mek 0.15 EC	6.0	7.3	4.8 ABC	7.0 AB	13.8	38.75 AB
Lannate SP	2.5	5.5	2.0 A	4.0 A	6.3	20.25 A
Confidential	8.8	23.3	6.8 BCDE	8.5 ABC	17.0	64.25 BCDE
Carzol SP	4.3	7.5	2.3 AB	3.8 AB	6.5	24.25 A
S-1812 (High)	11.5	22.8	11.5 CDEF	9.0 ABC	14.8	69.50 BCDE
S-1812 (Medium)	16.0	25.3	10.3 BCDE	16.3 BCD	13.0	80.75 CDE
S-1812 (Low)	10.5	9.8	19.0 DEF	13.5 BCD	29.0	81.75 CDE
Clutch 50 WDG	14.5	23.0	18.3 EF	10.0 AB	17.5	83.25 CDE
Calypso 480SC	7.5	38.5	7.5 ABCD	5.0 AB	6.0	64.50 BCDE
OMI-88 15% EC	2.5	17.0	6.3 ABCDE	6.0 AB	16.0	47.75 ABC
NNI-0101 20% SC	3.3	24.8	17.0 EF	23.5 CD	19.3	87.75 DE
SpinTor 2SC	4.0	20.3	7.5 BCDEF	10.3 ABC	11.0	53.00 ABCD
Assail 70 WP	7.5	5.3	8.0 BCDE	17.8 ABC	18.8	57.25 ABCD
P-value	0.2373	0.5388	0.0042	0.0029	0.5353	0.0037

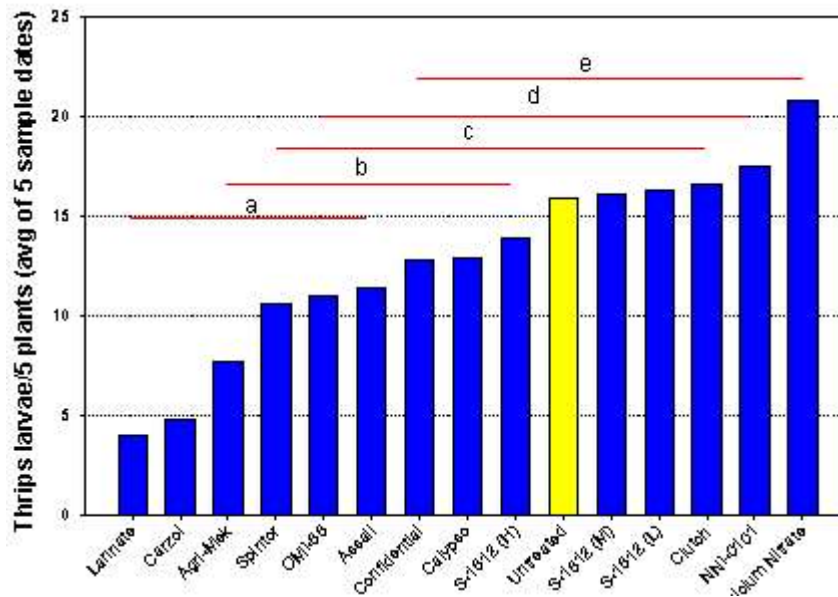


Figure 1. Immature thrips counts (per 5 plants), averaged over all five sample dates. Mean within a red bar grouping are not significantly different (LSD; $P=0.05$)

Seed/ Planting Time Treatment Trial

Seeding details: ‘Millennium’ yellow onion;
Two seed rows at 8" spacing per 30" bed;
130,000 seeds per acre.

Plot size: Individual plots were 5 ft (2-30"
beds, with 2 seed rows per bed) X 40 ft.

Experimental Design: Plots were arranged
in a randomized complete block design with
4 replications.

Seed treatments: Treated by Alan Taylor
(Cornell University). All treatments
(including untreated control) with PRO-GRO
at 2.0 g a.i./100g. All materials applied with
DISCO ‘A’ film coating polymer.



Figure 3. The onion fields were planted at the Western Colorado Research Center at Orchard Mesa on April 14, 2005. A cone-type plot planter was used for all planting except the in-furrow treatments.

In-furrow application: Seed was hand planted in this treatment. The seed furrow was opened to a depth of 0.5-1 inch with a pointed hoe, and seed scattered by hand. The insecticide was applied to the open furrow with a hand held CO₂ pressured sprayer with one LF4 80 nozzle at 60 PSI. The sprayer was calibrated at 30 gal/a. The seed furrow was closed with a rake immediately after the insecticide was applied.

Table 5. Seed and in-furrow treatments.

Active Ingredient	Product	Rate	Application
Untreated			
Spinosad	Entrust	5.0 g a.i./100 g	Seed treatment
Spinosad	Entrust	10.0 g a.i./100 g	Seed treatment
Fipronil	Regent 6.2FS	2.5 g a.i./100 g	Seed treatment
Fipronil	Regent 6.2FS	5.0 g a.i./100 g	Seed treatment
Clothianidin	Poncho	5.0 g a.i./100 g	Seed treatment
Fipronil	Regent 4SC	0.13 lb a.i./a	In-furrow

Table 6. Thrips counts from seed/planting time treatment experiment. Means within a column followed by the same letter are not significantly different (LSD; $P=0.05$)

		Thrips larvae / 5 plants					
		29 Jun	5 Jul	12 Jul	20 Jul	27 Jul	Avg
Untreated		10.25	22.25	43.50	33.25	60.25 bc	33.95 b
Entrust	5.0 g a.i./100 g	9.5	24.75	37.25	71.00	23.50 ab	33.20 b
Entrust	10.0 g a.i./100 g	7.25	27.75	54.00	54.75	57.75 bc	40.30 b
Regent 6.2FS	2.5 g a.i./100 g	1.75	17.25	32.00	22.75	27.75 ab	20.25 a
Regent 6.2FS	5.0 g a.i./100 g	1.75	15.50	39.25	22.00	21.75 a	20.05 a
Poncho	5.0 g a.i./100 g	6.75	35.25	51.50	44.75	65.75 c	40.80 b
Regent 4SC	0.13 lb a.i./a	7.5	32.25	46.00	50.25	69.50 c	41.15 b
P-value		0.1149	0.1226	0.4799	0.2698	0.0164	0.0008

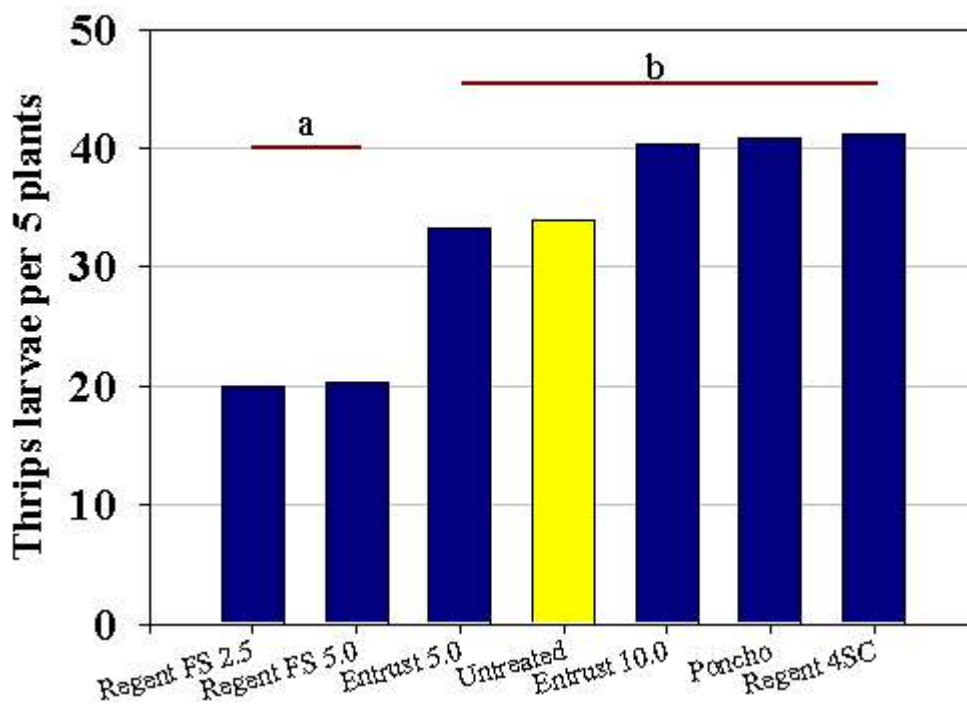


Figure 4. Immature thrips counts, averaged over five sample dates. Regent 6.2 FS seed treatment was superior to any other treatment in controlling thrips. This material worked at both low and high rates. Regent 4 SC applied in furrow was not effective, for some unknown reason.

Discussion: All discussion will refer to immature thrips counts, which have been the most reliable indicator of insecticide performance in our opinion. Thrips counts varied considerably in these trials, which is consistent with counts in prior years. The highest counts were generally recorded in either the untreated or calcium nitrate treatments. Two insecticides, Lannate SP and Carzol SP appeared to be superior to all other materials in controlling immature thrips. Counts were lowest in these treatments consistently throughout the trial. Agri-Mek 0.15EC, Spintor 2SC, OMI-88 15EC, Assail 70WP, and a Confidential material also had generally lower immature thrips counts than the untreated control. These treatments obviously had activity against immature onion thrips.

In the seed/planting time treatment trial, Regent 2FS, at either the 2.5 or 5.0 gm a.i./100g of seed, was superior to all other treatments in controlling thrips. The Regent 4SC, applied in furrow, was ineffective against thrips in our trial for unknown reasons. Entrust and Poncho were also ineffective in controlling thrips.

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