University of California
Agriculture and Natural Resources
Intermountain Research & Extension Center

RESEARCH REPORT
Number 184, 2018

Thrips Insecticide Evaluation in Onions at IREC in 2017

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Study Location: Intermountain Research and Extension Center, Tulelake CA (Siskiyou County)

Plot Size: 18 x 25 feet, 4 replications

Plot Design: Treatments arranged in Randomized Complete Block

Seed Treatment: Onion seed was treated with Sepresto (clothianidin + imidacloprid) for seedcorn maggot control and F300 fungicide package (Dynasty, Maxim and Apron).

Planting Date: 5/10/2017

Onion Variety: Olam International Processing Variety H602

Crop Maintenance Pesticides:

- 5/10/2017 Fontelis @24 fl. oz/ acre
- 5/18/2017 Prowl H2O@ 2 pt./acre and Dacthal 2.5 pt/acre
- 6/15/2017 Goal Tender @ 3 fl. oz/acre
- 6/20/2017 Goal Tender @ 3 fl. oz/acre and Brox 2EC @ 6 fl. oz/acre
- 9/15/2017 Endura @ 6.8 oz/acre

Cultural Practices:

- 50# N/Acre applied in the form of Urea pre-plant 5/5/2017
- 5/9/2017- Cultimulch and roto-shape beds at 36" spacing center to center
- 5/10/2017- Direct seed trial with 4-row planter
- 6 applications of 25# N/acre applied as UAN32 on 7/11/2017, 7/19/2017, 7/27/2017, 8/4/2017, 8/14/2017, and 8/23/2017.

Application Equipment:

- CO2 pressurized backpack sprayer
- Six-nozzle boom (9 ft. spray width) equipped with twin flat fan nozzle (TJ60-8003VS) calibrated for 37 gal/acre @ 40 psi

Application Dates and Environmental Conditions (found at:

- 1st application 7/12/2017 sunny 75 degrees F with wind between 2-4mph
- 2nd application 7/25/2017 partly cloudy 78 degrees F with wind between 4-5mph
- 3rd application 8/16/2017 sunny 75 degrees F with wind between 4-5mph

Insecticide Treatments:

trt #	1st App.	2nd App.	3rd App.
1	Untreated		
2	Movento	Movento	Radiant
3	Agri-Mek	Agri-Mek	Radiant
4	Minecto	Minecto	Radiant
5	Exirel	Exirel	Radiant
6	Radiant	Minecto	Minecto
7	ISM-555	ISM-555	ISM-555
8	ISM-555 + NIS	ISM-555 + NIS	ISM-555 + NIS

	Treatment	Product Rate/A	Adjuvant
1	Untreated		
2	Movento	5 fl oz	MSO
3	Agri-Mek 0.15EC	16 fl oz	MSO
4	Minecto	10 fl oz.	MSO
5	Exirel	20.5 fl oz./A	MSO
6	Radiant	8 fl oz	MSO
7	ISM-555	485 ml/A	None
8	ISM-555 + NIS	486 ml/A	NIS

Evaluations:

- Necrosis/Plant injury (0= no damage, 10= plant death) and plant feeding damage (0= no plant scaring, 10= heavy plant scaring) assessed starting 14 DAT of 2nd application. Ratings continued every 7 days until 8/30/2017.
- The number of immature thrips per plant recorded weekly from 10 plants of middle row from each plot.
- Yield harvest data collected 10/5/2017
- On 8/8/2017, 8/14/2017, & 8/30/2017, 10 onion plant tops from treatment 1 (untreated) and treatment 8 (ISM-555 + NIS) were collected and washed to collect thrips for identification. An unreplicated composite sample was sent to the UC Davis Entomology Lab to identify the number of thrips species.

Sample Dates:

- Pretreatment- 7/12/2017
- 7 DAT- 7/18/2017

- 14 DAT- 7/25/2017
- 7 DAT 2nd Application- 8/2/2017
- 14 DAT 2nd Application- 8/8/2017
- 21 DAT 2nd Application- 8/16/2017
- 7 DAT 3rd Application- 8/23/2017
- 14 DAT 3rd Application- 8/30/2017
- 21 DAT 3rd Application- 9/6/2017

Meteorological:

- Significant hail damage to crop seedlings occurred 5/29/2017 and 6/25/2017.

Crop Water Use:

- Solid-set overhead sprinkler irrigation. Spacing was 42 feet between lines and 30 feet between sprinklers. Nelson wind fighter sprinkler heads with green (7/64") nozzles were used. At 60psi these nozzles apply .21" water/hour at our spacing. Irrigation quantities were applied to meet seasonal onion crop water use. This was calculated based on ET of the crop. Total irrigation applied to trial was 30.11 inches for 2017.
- Rainfall total for the crop from planting 5/10/2017 through harvest 10/5/2017 was 2.18 inches.

Data Analysis: Data was analyzed using ANOVA and Tukeys HSD significant test.

Results:

Insecticide phytotoxicity- Insecticide phytotoxicity was not observed at any evaluation time for all insecticide treatments.

Thrips per Leaf- All insecticides reduced thrips per leaf 14 days after the first insecticide application. (Figure 1). The number of thrips per leaf following the 2nd insecticide application and 3rd application and cumulatively throughout the season differed between insecticides (Figures 1&2). The insecticide treatment program with Movento applied at 1st application, Movento at 2nd application, and Radiant at 3rd application (Movento-Movento-Radiant) and AgriMek-AgriMek-Radiant had significantly lower cumulative thrips per plant compared to the untreated (Figures 2). ISM-555 treatments had similar or higher cumulative thrips per plant compared to the untreated.

Onion Yield- There were no significant differences in onion yield between treatments (Figure 3).

Thrips Injury- Visual thrips injury (scarring) on onion leaves differed on 8/8, 8/16, and 8/30 between treatments (Figure 4). The Movento-Movento-Radiant treatment had the lowest injury rating at all three evaluations.

Thrips Species Identification- On 8/8/2017 363 onion thrips and 180 Western Flower thrips (WFT) were collected in the untreated control. On 8/14/2017 761 onion thrips and 299 WFT were collected in the untreated control and 249 onion thrips and 280 WFT were collected in treatment 8. On 8/30/2017, 654 onion thrips and 142 WFT were collected in the untreated and 602 onion thrips and 381 WFT were collected in treatment 8.

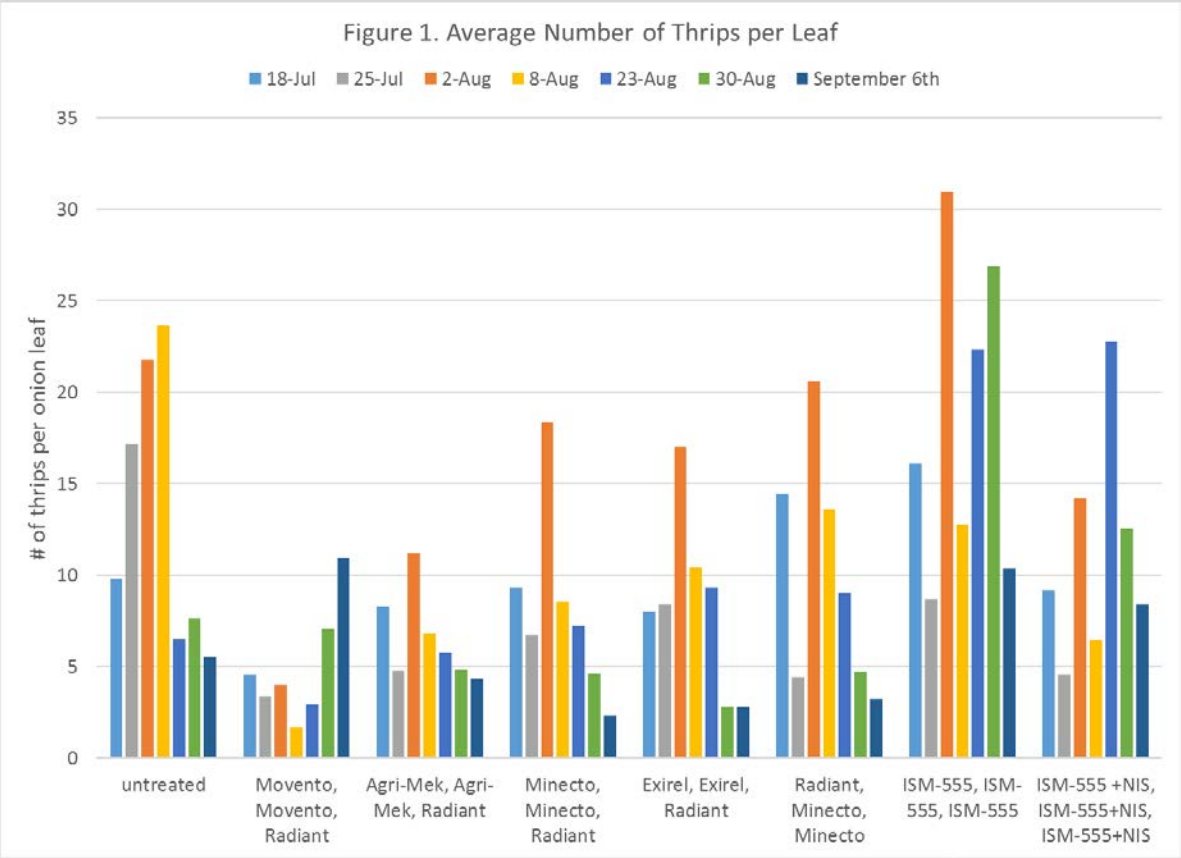
Figure 1. Average Number of Thrips per Leaf
18-Jul
25-Jul
2-Aug
8-Aug
23-Aug
30-Aug
September 6th
# of thrips per onion leaf
35
30
25
20
15
10
5
0
untreated
Movento, Movento, Radiant
Agri-Mek, Agri-Mek, Radiant
Minecto, Minecto, Radiant
Exirel, Exirel, Radiant
Radiant, Minecto, Minecto
ISM-555, ISM-555, ISM-555
ISM-555 +NIS, ISM-555+NIS, ISM-555+NIS

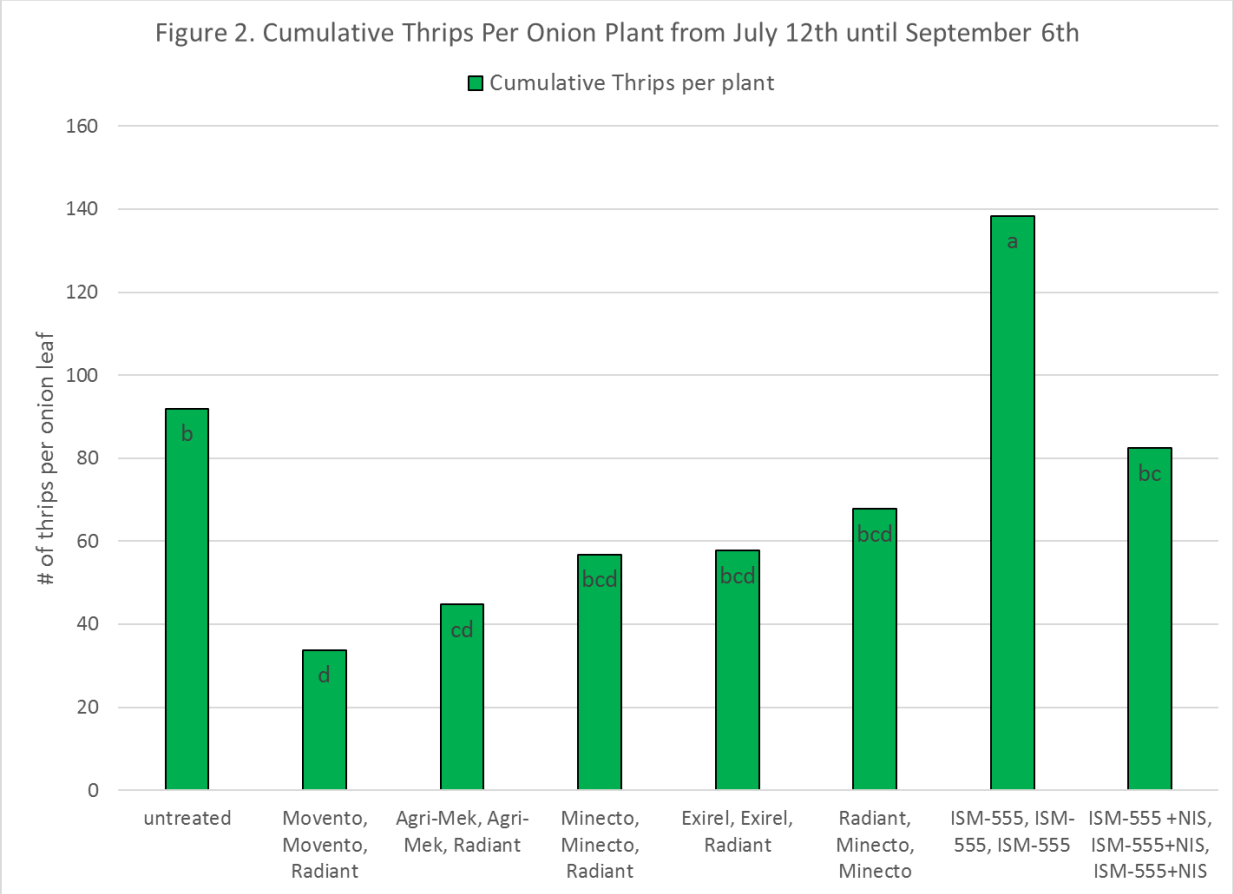
Figure 2. Cumulative Thrips Per Onion Plant from July 12th until September 6th
Cumulative Thrips per plant
# of thrips per onion leaf
160
140
120
100
80
60
40
20
0
b
d
cd
bcd
bcd
bcd
a
bc
untreated
Movento, Movento, Radiant
Agri-Mek, Agri-Mek, Radiant
Minecto, Minecto, Radiant
Exirel, Exirel, Radiant
Radiant, Minecto, Minecto
ISM-555, ISM-555, ISM-555
ISM-555 +NIS, ISM-555+NIS, ISM-555+NIS

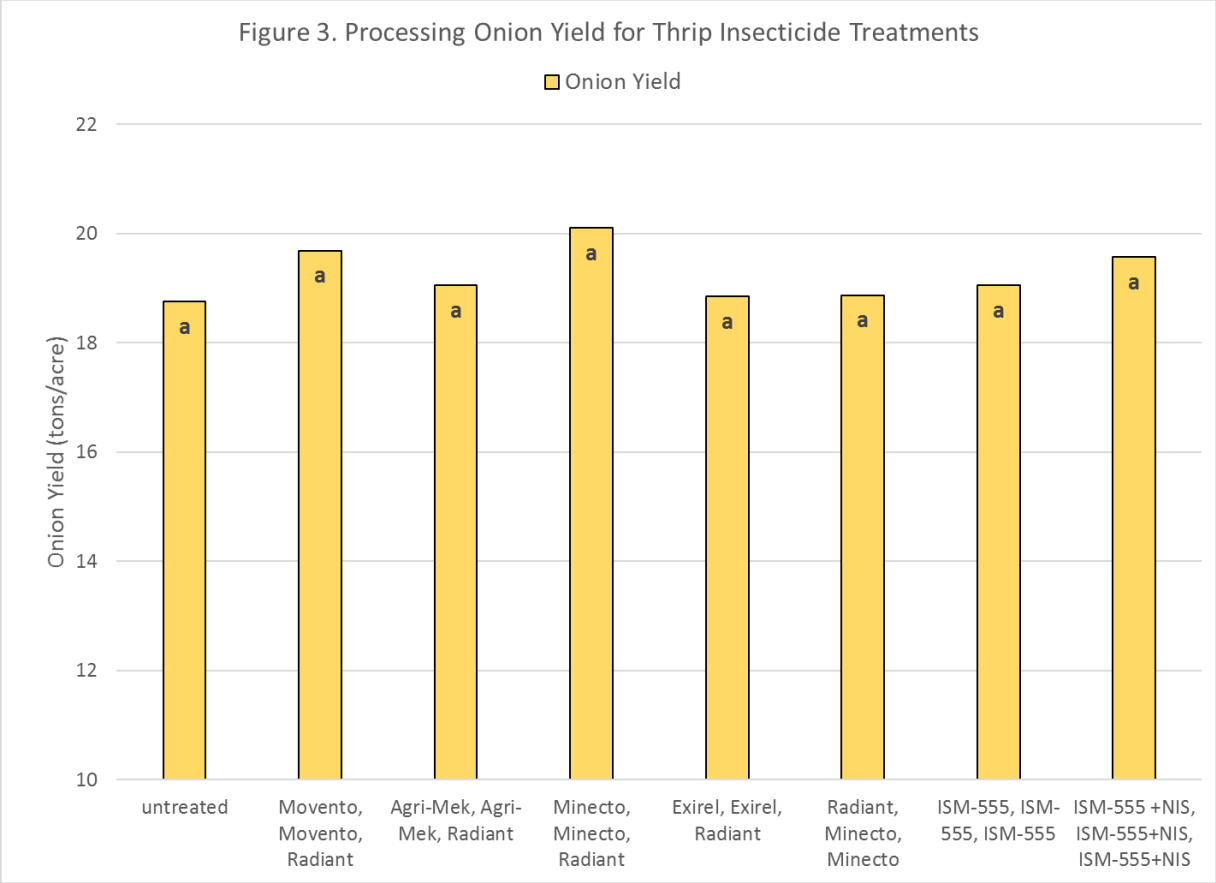
Figure 3. Processing Onion Yield for Thrip Insecticide Treatments
Onion Yield
Onion Yield (tons/acre)
22
20
18
16
14
12
10
a
a
a
a
a
a
a
a
untreated
Movento, Movento, Radiant
Agri-Mek, Agri-Mek, Radiant
Minecto, Minecto, Radiant
Exirel, Exirel, Radiant
Radiant, Minecto, Minecto
ISM-555, ISM-555, ISM-555
ISM-555 +NIS, ISM-555+NIS, ISM-555+NIS

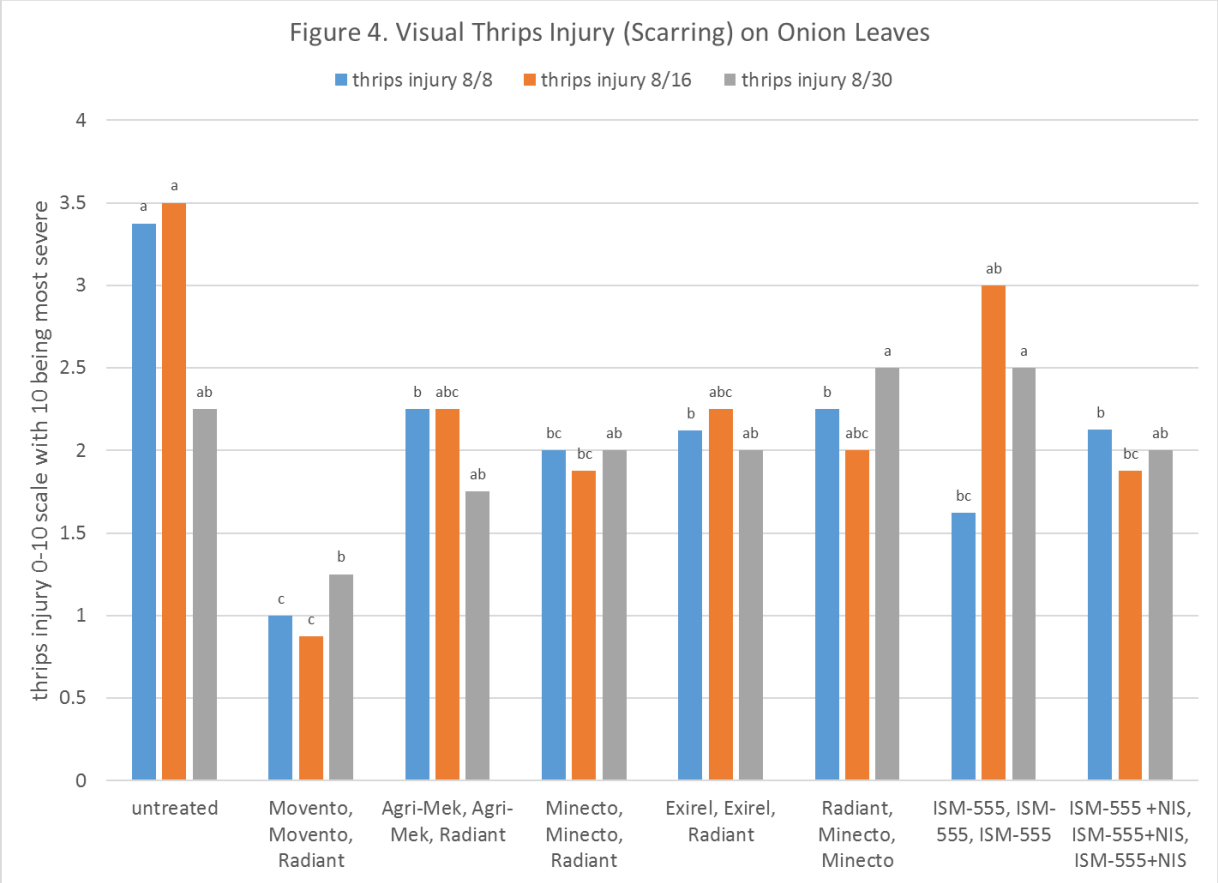
Figure 4. Visual Thrips Injury (Scarring) on Onion Leaves
thrips injury 8/8
thrips injury 8/16
thrips injury 8/30
thrips injury 0-10 scale with 10 being most severe
4
3.5
3
2.5
2
1.5
1
0.5
0
a a ab
c c b
b abc ab
bc bc ab
b abc ab
b abc a
bc ab a
b bc ab
untreated
Movento, Movento, Radiant
Agri-Mek, Agri-Mek, Radiant
Minecto, Minecto, Radiant
Exirel, Exirel, Radiant
Radiant, Minecto, Minecto
ISM-555, ISM-555, ISM-555
ISM-555 +NIS, ISM-555+NIS, ISM-555+NIS