



**Features**

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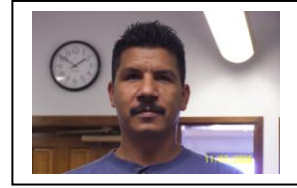
*November, 2011*

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## Thrips Control on Onions

Eric T. Natwick and Martin I. Lopez



**INTRODUCTION:** Western flower thrips, *Frankliniella occidentalis*, and Onion thrips, *Thrips tabaci*, are the main thrips species that occur in onions. Both species are injurious to onions and both adults and nymphs cause damage. Western flower thrips are generally more abundant and difficult to control with insecticides, compared to onion thrips. However, onion thrips transmit Iris yellow spot virus (IYSV). Onion thrips thrive in hot, dry conditions and are usually more damaging in areas where these climatic conditions prevail for most of the production season. High populations of thrips can reduce both yield and reduce the storage life of onions. Leaf scaring is a serious problem on green onions, but thrips feeding during the early bulb development is most injurious to dehydrator onions and sweet onions. Thrips injury is caused by their unique rasping-sucking mouthparts. This injury removes nutrients needed for bulb development, causes scaring and reduces photosynthesis. They cause damage during storage by feeding under the leaf folds and in the protected inner leaves near the bulb.

IYSV was first confirmed Imperial Valley in May 2003 in lesions on scapes from an onion field grown for seed and has been detected in this production area every year since. This virus causes development of necrotic lesions on the scapes and leaves. Lesions on scapes can result in lodging, which can greatly reduce seed production. Also, in some production areas, substantial reduction in bulb size and resultant economic losses has been attributed to the foliar lesions caused by this virus. This has been case for some dehydrator processing onion fields in the Imperial Valley, CA.

Four insecticides (Tolfenpyrad, under development by Valent USA Corp; Movento, Lannate; and Radiant) were evaluated alone, in combination with another insecticide or used in a rotation scheme with other insecticides for thrips control. The four aforementioned insecticides were shown to be efficacious in previous thrips control evaluations on onions. The inclusion of the insecticide rotation schemes was under taken to evaluate efficacy against thrips while rotating modes of action (MoA) from various IRAC groups for insecticide resistance management.

**PROCEDURES:** Nine insecticide treatments were compared to an untreated control for efficacy against Western flower thrips, *Frankliniella occidentalis*, and Onion thrips, *Thrips tabaci*, in onions grown at the UC Desert Research and Extension Center, El Centro, CA during the 2010/11 growing season. The experimental design was randomized complete block design, with four replicates; each field plot measured 50 ft long and 6.67 ft wide; 2 beds/plot on 40" centers. A dehydrator onion (variety: White Creole) was sown 21 October 2010 and sprinkle irrigated through stand establishment, then furrow irrigated until harvest. Insecticide treatments along with rates and dates of application are listed in Table 1. Insecticide treatments were applied using Lee Spider Spray Tractor 2-row sprayer with 3 nozzles/bed, using TJ-60 11003VS nozzles delivering 53 gpa at 30 psi. Plots were sampled for thrips by extracting and thoroughly examining five plants at random per plot counting all thrips. Plants were examined for thrips on 26 January, 8, 22 and 28 February, 8, 14 22, and 28 March, 5, 13, 19 and 26 April, 2011. The results of thrips counts are listed in Table 2. Yield data for each insecticide treatment and the untreated control were taken on 9 May 2011.

**Table 1. Onion Insecticide Efficacy Trial, Thrips, Holtville, California, 2010/11.**

<b>Treatment</b>	<b>Oz/acre</b>	<b>Appl. Dates</b>
<b>1. Untreated check</b>	-----	-----
<b>2. Tolfenpyrad<sup>y</sup> 15EC*</b>	<b>24.0</b>	<b>15 Feb, 1, 15, 29 Mar, 12 Apr</b>
<b>3. Mustang* f/b</b>	<b>4.0</b>	<b>15 Feb, 29 Mar</b>
<b>Lannate LV* f/b</b>	<b>36.0</b>	<b>1 Mar, 12 Apr</b>
<b>Radiant SC*</b>	<b>8.0</b>	<b>15 Mar</b>
<b>4. Admire Pro f/b</b>	<b>14.0</b>	<b>22 Oct</b>
<b>Movento* R/W</b>	<b>5.0</b>	<b>15 Feb, 15 Mar, 12 Apr</b>
<b>Radiant SC*</b>	<b>8.0</b>	<b>1, 29 Mar</b>
<b>5. Admire Pro f/b</b>	<b>14.0</b>	<b>22 Oct</b>
<b>Movento* R/W</b>	<b>5.0</b>	<b>15 Feb, 15 Mar, 12 Apr</b>
<b>Lannate LV*</b>	<b>36.0</b>	<b>1, 29 Mar</b>
<b>6. Movento*</b>	<b>5.0</b>	<b>15 Feb, 1, 15, 29 Mar, 12 Apr</b>
<b>7. Lannate LV*</b>	<b>36.0</b>	<b>15 Feb, 1, 15, 29 Mar, 12 Apr</b>
<b>8. Radiant SC*</b>	<b>8.0</b>	<b>15 Feb, 1, 15, 29 Mar, 12 Apr</b>
<b>9. Tolfenpyrad 15EC + Lannate LV*</b>	<b>24.0 + 36.0</b>	<b>15 Feb, 15 Mar, 12 Apr 1, 29 Mar</b>
<b>10. Tolfenpyrad 15EC<sup>†</sup> f/b Radiant SC<sup>†</sup> f/b Lannate LV<sup>†</sup> f/b Mustang<sup>†</sup></b>	<b>24.0 8.0 36.0 4.0</b>	<b>15 Feb, 12 Apr 1 Mar 15 Mar 29 Mar</b>

<sup>y</sup>Not registered for use on onions at time of publication.

\*Dyne-Amic @ 37.8 ml/4gal (0.25 vol/vol) added to foliar spray mixtures.

<sup>†</sup>NIS @ 37.8 ml/4gal (0.25 vol/vol) added to foliar spray mixtures.

**RESULTS:** All insecticide treatments had post treatment averages (PTA) for thrips that were significantly ( $P = 0.05$ ) lower than the untreated control, Table 2 b. The two insecticide treatments that provided the best thrips control as determined by the PTA were Tolfenpyrad + Lannate LV and Admire Pro followed by Movento in rotation with Radiant. These two treatment schemes had PTA's that were significantly lower than the PTA's for individual components Movento and Tofenpyrad, but were not found to have PTA's different from the individual components of Radiant or Lannate LV. All of the insecticides used against thrips on onions in this experiment showed some efficacy. With few exceptions, all insecticide treatments means that were lower than the untreated control on any post treatment sampling date, Tables 1a and 1b.

### **CONCLUSIONS:**

All insecticides evaluated for control of thrips on onions were efficacious. The rotations or combinations of insecticides from different IRAC MoA groups were at least as efficacious for thrips control as the individual components and some were more efficacious than the individual components. Therefore, it is not only advantageous to rotate insecticides from different MoA groups for insecticide resistance management, but it may also improve the level of thrips control.

### **ACKNOWLEDGEMENTS:**

We wish to express our sincere thanks to the California Garlic and Onion Research Advisory Board for funding this research project. We also express our thanks to Sensient Flavors for donating the onion planting seed used to establish the experiment.

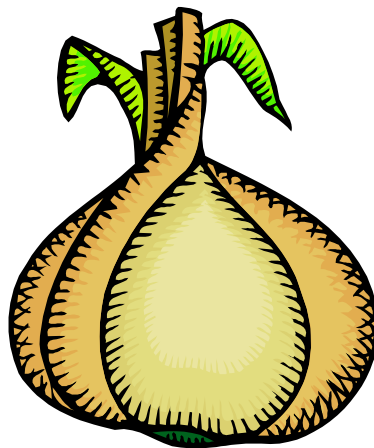


Table 2a. Thrips per Five Onion Plants. Holtville, CA. 2010/11.

Treatment	oz/acre	26 Jan	8 Feb	22 Feb	28 Feb	8 Mar	14 Mar	22 Mar
Untreated check	-----	44.75	46.75 a	48.50 a	53.00 a	34.00 a	32.00 a	68.25 a
Tolfenpyrad <sup>y</sup> 15EC	24.0	47.25	41.25 abc	20.75 cd	24.50 b	12.75 bc	13.00 bc	25.50 b
Mustang f/b	4.0							
Lannate LV f/b	36.0	43.00	27.50 cd	27.00 cd	31.25 b	13.50 bc	21.75 ab	13.50 bc
Radiant SC	8.0							
Admire Pro f/b	14.0							
Movento R/W	5.0	49.00	28.25 cd	31.25 bc	28.00 b	10.00 c	8.25 c	9.50 bc
Radiant SC	8.0							
Admire Pro f/b	14.0							
Movento R/W	5.0	34.25	25.25 d	24.25 cd	24.00 b	11.00 c	11.25 bc	18.25 bc
Lannate LV	36.0							
Movento	5.0	41.50	37.50 abcd	40.25 ab	24.25 b	22.00 b	17.50 bc	7.75 c
Lannate LV	36.0	41.25	43.25 ab	21.75 cd	29.00 b	18.00 bc	17.25 bc	11.25 bc
Radiant SC	8.0	39.75	35.75 abcd	24.25 cd	23.50 b	9.75 c	14.75 bc	25.00 b
Tolfenpyrad 15EC + Lannate LV	24.0 + 36.0	39.50	31.75 bcd	22.75 cd	20.00 b	14.25 bc	9.75 bc	15.50 bc
Tolfenpyrad 15EC f/b	24.0							
Radiant SC f/b	8.0							
Lannate LV f/b	36.0	43.00	24.50 d	18.25 d	16.00 b	9.50 c	11.75 bc	10.25 bc
Mustang	4.0							

<sup>y</sup>Not registered for use on onions at time of publication.

<sup>z</sup> Log transformed data used for analysis; actual means are presented in the table.

Means within columns followed by the same letter are not significantly different via LSD,  $P=0.05$ .

Table 2b. Thrips per Five Onion Plants. Holtville, CA. 2010/11.

Treatment	oz/acre	28 Mar	5 Apr <sup>z</sup>	13 Apr <sup>z</sup>	19 Apr	26 Apr	PTA
Untreated check	-----	89.75 a	148.75 a	153.50 a	99.75 a	92.50 a	75.96 a
Tolfenpyrad <sup>y</sup> 15EC	24.0	36.25 b	78.75 ab	84.50 b	39.25 bc	29.00 c	37.73 b
Mustang f/b	4.0						
Lannate LV f/b	36.0	16.75 c	98.75 ab	70.75 bc	21.75 bc	28.25 c	34.48 bc
Radiant SC	8.0						
Admire Pro f/b	14.0						
Movento R/W	5.0	19.75 bc	17.75 f	38.00 cd	30.00 bc	27.75 c	24.79 e
Radiant SC	8.0						
Admire Pro f/b	14.0						
Movento R/W	5.0	27.00 bc	15.75 ef	58.00 bcd	29.25 bc	30.50 c	25.73 de
Lannate LV	36.0						
Movento	5.0	24.75 bc	38.75 cd	64.75 bcd	20.25 bc	58.75 b	33.17 bcd
Lannate LV	36.0	23.75 bc	31.25 cde	43.75 cd	45.00 b	27.75 c	29.44 cde
Radiant SC	8.0	30.50 bc	28.50 def	37.50 d	13.50 c	36.00 bc	26.56 cde
Tolfenpyrad 15EC + Lannate LV	24.0 + 36.0	16.25 c	18.00 ef	38.75 cd	15.25 bc	45.00 bc	23.90 e
Tolfenpyrad 15EC f/b	24.0						
Radiant SC f/b	8.0						
Lannate LV f/b	36.0	15.50 c	59.75 bc	89.25 b	26.25 bc	28.50 c	29.38 cde
Mustang	4.0						

<sup>z</sup> Log transformed data used for analysis; actual means are presented in the table.

Means within columns followed by the same letter are not significantly different via LSD,  $P=0.05$



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**THE 22<sup>ND</sup> ANNUAL FALL DESERT  
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## 4-day Farm Supervisor Seminar (in Spanish)

Modesto, California, March 13-16, 2012. Topics that will be covered include employee discipline (including how to deal with the most difficult subordinate behaviors), interpersonal negotiation skills, and the importance of praise in day-to-day communications.

Those who attend will participate in numerous role-plays, and receive individualized attention and evaluation. A copy of the individualized participants' scorecard will be sent to each farm enterprise. Registration limited to two individuals per farm operation.

Any questions, contact Gregorio Billikopf at [gebillikopf@ucdavis.edu](mailto:gebillikopf@ucdavis.edu) or 209-525-6800, or Marie Harter at the same phone.

### Seminar contents:

- Effective praise
- Interpersonal negotiation skills
- Employee discipline – 7 steps
- Employee discipline – dealing with difficult behavior
- Understanding piece-rate pay design
- Preventing sexual harassment – power and abuse of authority
- Conflict management
- Listening skills

Participants will have the opportunity to role-play many of the skills discussed.

### Seminar cost:

Cost is \$128 and includes materials and lunches over the four days. **Early registration discount:** Those who register early, by January 31, 2012, can do so for \$97. If sending a check, the envelope must be postmarked by January 31, 2012.

**Payment.** You may pay through check or credit card. **If paying through check:** Make checks out to UC Regents and mail to Workplace Mediation / c.o. G. Billikopf / 3800 Cornucopia Way Suite A, Modesto, CA 95358. If

paying by credit card, go to <http://ucce.ucdavis.edu/survey/survey.cfm?surveynumber=1763>.

### Map to the location:

We will meet in Rooms H & I of the **Stanislaus Building**. <http://www.cnr.berkeley.edu/ucce50/ag-labor/7map.htm>

### Instructors and coaches:

Gregorio Billikopf, Ryan Boothe and Horacio Bertinetti. Invited by not confirmed yet, are: Rodrigo López, Jorge

Wicha, Juan Horacio Grant and Oscar Quezada (coming from Chile).

**CIMIS REPORT AND UC DROUGHT  
MANAGEMENT PUBLICATIONS**



**Khaled Bali and Steve Burch\***

California Irrigation Management Information System (CIMIS) is a statewide network operated by California Department of Water Resources. Estimates of the daily reference evapotranspiration ( $ET_o$ ) for the period of November 1 to January 31 for three locations in the Imperial County are presented in Table 1.  $ET$  of a particular crop can be estimated by multiplying  $ET_o$  by crop coefficients. For more information about  $ET$  and crop coefficients, contact the UC Imperial County Cooperative Extension Office (352-9474) or the IID, Irrigation Management Unit (339-9082). Please feel free to call us if you need additional weather information, or check the latest weather data on the worldwide web (visit <http://tmdl.ucdavis.edu> and click on the CIMIS link).

Table 1. Estimates of daily Evapotranspiration ( $ET_o$ ) in inches per day

Station	November		December		January	
	1-15	16-30	1-15	15-31	1-15	16-31
Calipatria	0.14	0.10	0.07	0.07	0.08	0.09
El Centro (Seeley)	0.13	0.09	0.06	0.06	0.08	0.09
Holtville (Meloland)	0.13	0.10	0.06	0.06	0.08	0.09

\*Imperial Irrigation District.

**Link to UC Drought Management Publications**

<http://ucmanagedrought.ucdavis.edu/>