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Field insecticide evaluations of registered and experimental insecticides for managing onion thrips on onion

Onion thrips (*Thrips tabaci* Lindeman) is the most important insect pest of onions in the Great Lakes region. Adults and nymphs use their single sword-like mandible to rupture plant cells on the outer surface of leaves and other plant parts, and then suck out the contents by pressing their mouthparts onto the damaged surface. At first, damaged leaves turn silvery, but with continued severe damage, the leaves completely dry out, hampering photosynthesis and ultimately reducing plant growth and yield. Thrips are also vectors of *Iris yellow spot virus*, which causes a disease that can further reduce yield.

Currently, the most important tool for commercial onion growers to manage onion thrips is the judicious use of insecticides. Insecticides should be used as part of an integrated pest management strategy, keeping in mind the following: (1) before making an application, determine the average number of thrips on your onions, and (2) check the weather forecast, since hot, dry spells will likely increase the numbers of thrips quickly, but cool, wet weather will keep numbers low.

Most onion growers have to make multiple applications of insecticides in a season. Before choosing a product for onion thrips control, the following points should be considered: (1) there are relatively few products registered on onion, so (2) maximum application rates are quickly exceeded if the same product is applied multiple times in a season, therefore, (3) multiple products have to be used in rotation. Its important to use different products within a season, because the more often a product is used, the higher the chances are of onion thrips becoming resistant to it. So we need to find out which rotations/combinations are the most effective at suppressing onion thrips numbers while not exceeding maximum application thresholds and reducing the number of insecticide applications in a season.

METHODS

Thirteen insecticide treatments and an untreated check (Table 1) were tested for their efficacy to control onion thrips in a commercial onion field at Krummrey Farms, near Stockbridge, MI. Dry bulb onions were planted around 26 April 2013 into three-row beds, with 6 in. row spacing and beds spaced 25 in. apart. Treatments were replicated four times in a randomized complete block design. Plots were 15 ft. long. Six treatments out of the 13 focused on testing the efficacy of different types of penetrating surfactants with Movento 240 SC: we tested HyperActive, Dyne-Amic, Silwet-L77, and SuperSpread90 all co-applied with 5 fl oz/A Movento 240 SC. All other treatments in the trial included the non-ionic surfactant Dyne-Amic at a rate of 0.5% v/v to improve penetrability of the insecticide into the onion leaves.

Foliar treatments were applied using a single-nozzle hand-held boom at 50 gallons/acre and 40 psi. Plots were initially sprayed on 27 June when there were about 4 leaves/plant and the density of onion thrips averaged 3 thrips/plant. Thereafter, post-spray counts of adult and nymph thrips on 10 randomly selected plants from each plot were made 5-7 days after each foliar application. Most of the treatments/rotations were designed to run for 8-weeks, however, for the threshold-based treatments, we monitored and sprayed, as needed, throughout the season.

All onion bulbs in each plot were pulled on 11 September 2013 and left in the field to finish drying. On 25 & 26 September, bulbs were taken back to the lab for grading and weighing. US No. 1 grade bulbs were graded as jumbo (≥3 in. diam.), standard (2.0 to 2.9 in. diam.), and boiler (1.5 to 1.9 in. diam.), and the number in each class was recorded and weighed; extremely small or misshapen bulbs were discarded.

Data was log (x+1) transformed prior to analysis. Analysis of variance was used for data analysis and Tukey means separation was used to compare treatment means ($P < 0.05$).

RESULTS

All treatments resulted in a significant reduction of the seasonal mean number of thrips per plant relative to the untreated control (Figures 1 & 2). When testing 8-week insecticide rotations, there were differences among the insecticide treatments (Figure 1). Among these, the

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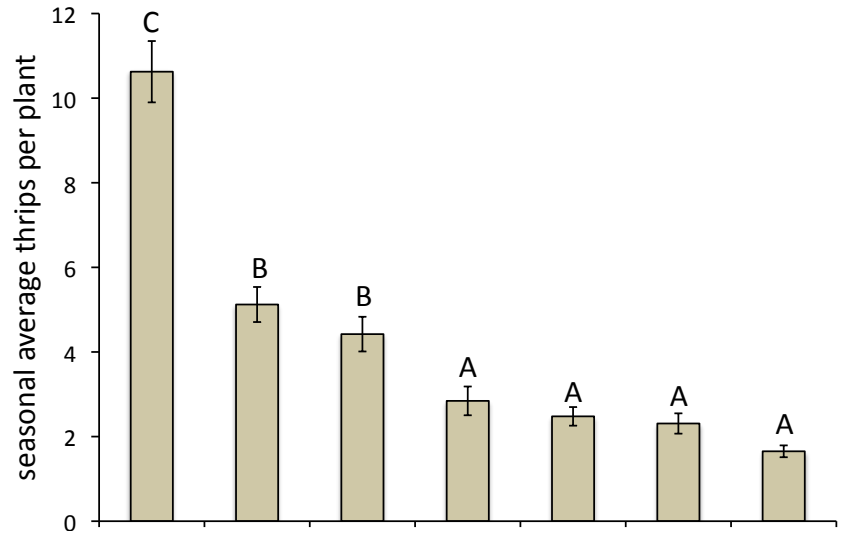
most effective were ones that had Movento 240 SC applied during the first two weeks. Among the Movento + surfactant treatments, the seasonal means were not significantly different from each other (Figure 2), however with just two Movento applications at the beginning of the season, thrips numbers were significantly lower than in the untreated control.

The results of this trial indicate that there are multiple insecticides (both registered and experimental) and insecticide rotations that can provide good thrips suppression in the field. However, since not all insecticides have the same efficacy, the proper sequence of insecticides has to be carefully considered to achieve the best results. The number of new and effective compounds for thrips control is increasing thus growers should remain committed to resistance management practices to help assure that these compounds will remain effective into the future.



week1	-	**Benevia**	**Benevia**	Movento	Movento	Movento	Movento
week2	-	**Benevia**	**Benevia**	Movento	Movento	Movento	Movento
week3	-	Lannate	**Benevia**	**Benevia**	Agri-Mek	Agri-Mek	Agri-Mek
week4	-	Lannate	**Benevia**	**Benevia**	Agri-Mek	Agri-Mek	Agri-Mek
week5	-	Radiant	Radiant	Radiant	**Torac**	**Radiant***	Radiant
week6	-	Radiant	Radiant	Radiant	**Torac**	**Radiant***	Radiant
week7	-	Agri-Mek	Agri-Mek	Agri-Mek	Radiant	Lannate	Lannate
week8	-	Agri-Mek	Agri-Mek	Agri-Mek	Radiant	Lannate	Lannate

Movento – 5 fl oz/A
Lannate – 48 fl oz/A
Agri-Mek – 3 fl oz/A
Radiant – 10 fl oz/A except *
Benevia – experimental
Torac – experimental

Note: all insecticides applied with 0.5% v/v Dyne-Amic, 50 gall/A, 40 psi

* **8 fl oz/A**

Figure 1. Seasonal average number of thrips on onions in 2013 using weekly applications of different insecticide rotations. Letters above bars denote significant differences, bars with the same letters are not statistically significantly different.

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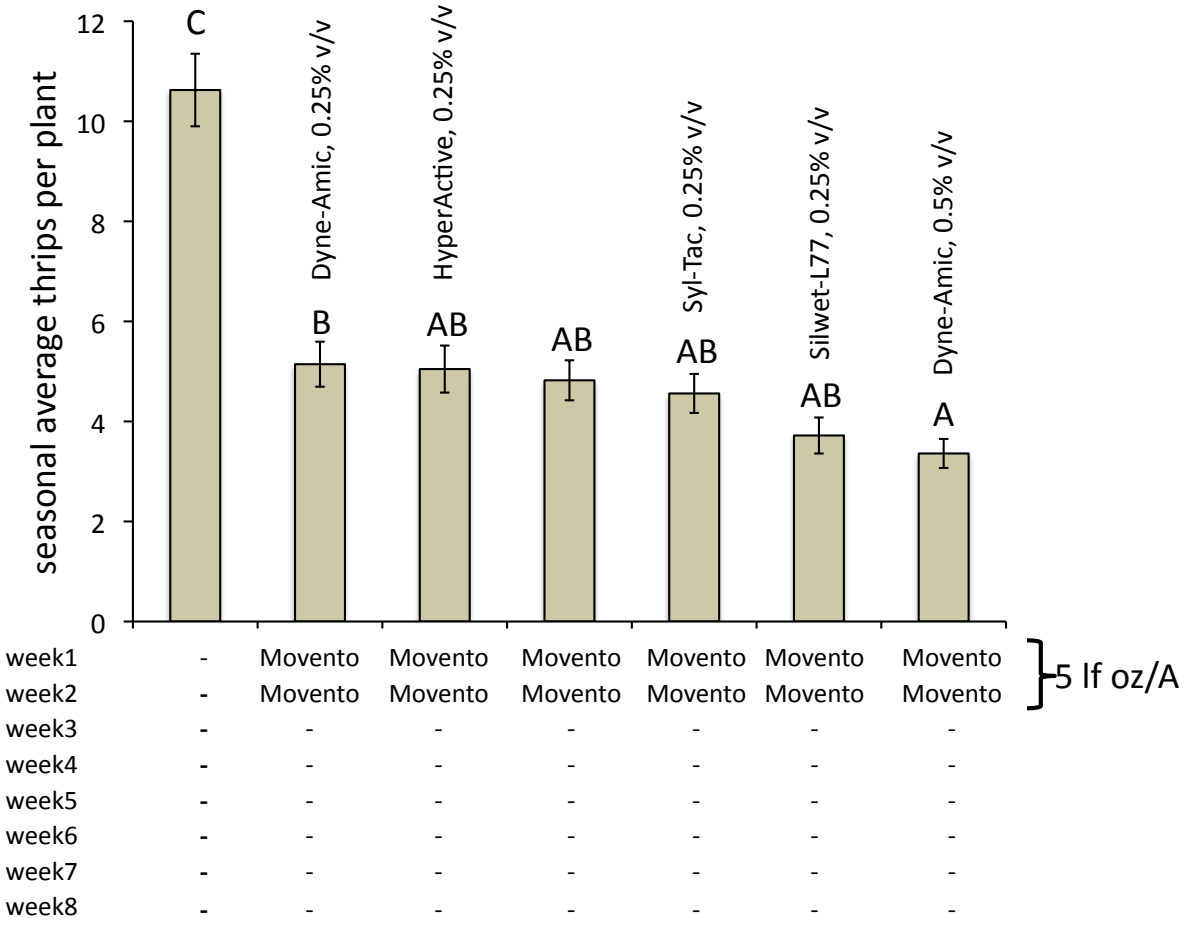

Fgure 2. Seasonal average number of thrips on onions in 2013 using two Movento applications with different surfactants at the beginning of the season. Letters above bars denote significant differences, bars with the same letters are not statistically significantly different.