ONION THRIPS MANAGEMENT RESEARCH UPDATE

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Onion thrips is the most important insect pest of onions in the Great Lakes region. This insect causes significant economic losses, by reducing yields up to 60%. Damage to young onions is more devastating than on larger plants late in the growing season. The most critical time to protect onions from thrips is during the bulbing stage.

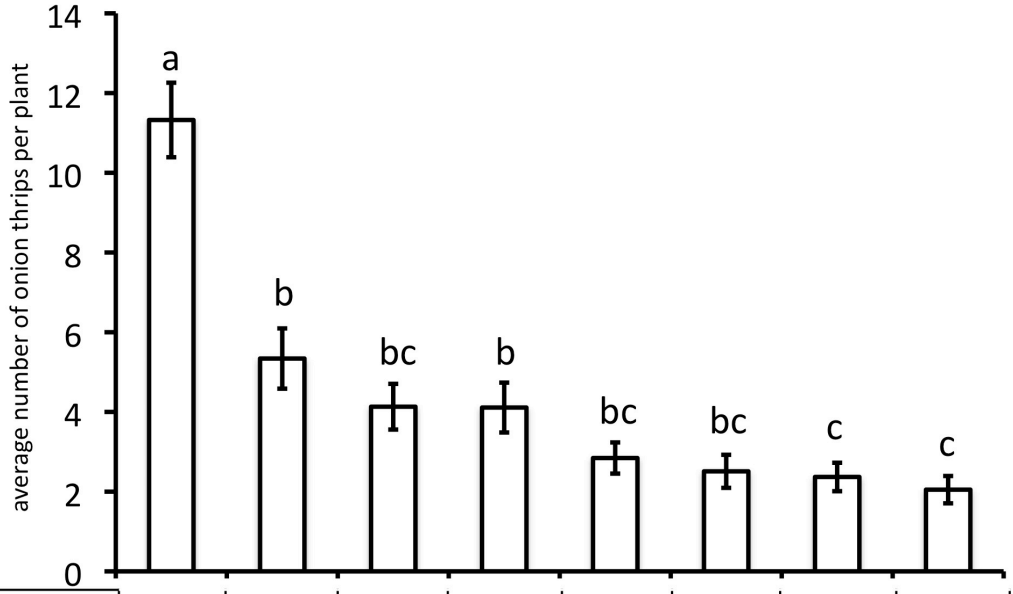
Management. Onion thrips are difficult to control because the mobile stages of this insect are found mainly in the narrow spaces between the inner leaves where spray coverage is difficult to accomplish. In addition, the eggs are laid into the leaf tissues where they may escape control. Reinfestation of fields can occur from surrounding non crop vegetation and immigration of thrips from nearby fields. Currently, the most important tool for commercial onion growers is the judicious use of insecticides. Insecticides should be used as part of an integrated pest management strategy, keeping in mind the following points: (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 help the numbers of thrips rise quickly in the near future, but cool, wet weather will keep numbers low. For example, weather conditions in 2010 were favorable for onion thrips development because of the extended periods of hot and dry weather in many parts of the Great Lakes onion growing regions.

Product choice. 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 and combinations are the most effective, do not exceed maximum application thresholds, and suppress onion thrips numbers the best.

Insecticide rotations. It is best to use one product consecutively two times, rather than spacing them further apart during the season. The rationale for this has to do with how insecticide resistance evolves in the onion thrips. Insecticides are lethal to most, but not all individuals, and those that survive are able to pass on this ability to their offspring. The more resistant survivors are left in a field, the more insecticide-insensitivity will be a problem for growers (i.e. the product won't kill the insects). An onion thrips generation spans about 2-3 weeks under typical growing conditions. If one product is used consecutively, say one week apart, this will limit the number of generations that will be selected (maybe only one or at most two generations will be selected). In contrast, if a product is applied twice during the season and the spacing is 3 to 5 weeks apart, at least two and perhaps as many as four generations could be selected. The Section 18 labels for *Movento* and *Agri-Mek* both specify no more than 2 applications can be made to the onion crop and the applications should be made consecutively. This was specified primarily for resistance management purposes using the rationale above.

MSU Vegetable Entomology onion thrips insecticide trial results. In 2011 the MSU Vegetable Entomology laboratory conducted insecticide trials with multiple products in an eight-week program. This year, all the products were applied weekly, regardless of thrips threshold. Each insecticide within a

sequence was applied twice in a row (~ sprayed two consecutive weeks) for the resistance management purposes described above. There were eight different treatment combinations with the following insecticides: Agri-Mek, Lannate, Movento, Radiant, Tolfenpyrad (an experimental product), and Vydate. Treatment sequences are shown in the figure below. All of our insecticide treatments decreased onion thrips numbers significantly relative to the untreated control. Treatment 7 and 8 suppressed thrips the best when comparing seasonal averages, but this was not statistically significantly different from treatments 3, 5 and 6. The common feature of these treatments is that they all have Radiant in the rotation either at weeks 3-4 or 5-6, applied at a time when population pressure was the highest during the summer. Treatments 5, 7, and 8 contain commercially available and currently registered products and performed the best in our trials. Interestingly, there was no straightforward correlation between the level of thrips control and onion yield, although treatments 7 and 8 had the highest yields among our treatments.



Treatment	1	2	3	4	5	6	7	8
week 1-2	-	Vydate	Radiant	Movento	Vydate	Tolfenpyrad + Lannate	Movento	Movento
week 3-4	-	Assail	Tolfenpyrad + Lannate	Lannate	Agri-Mek	Radiant	Lannate	Lannate
week 5-6	-	Lannate	Agri-Mek	Agri-Mek	Radiant	Agri-Mek	Radiant (low rate)	Radiant (high rate)
week 7-8	-	Radiant	Tolfenpyrad + Lannate	Assail	Lannate	Tolfenpyrad + Lannate	Agri-Mek	Agri-Mek
yield (cwt/acre)	375	463	403	473	437	412	500	492

Rates: Agri-Mek SC (3 fl oz/A); Lannate LV (3 pt/A); Movento 240 SC (5 fl oz/A); Radiant (7 fl oz/A) - except in Treatment 8 (8 fl oz/A); Tolfenpyrad 15 EC (24 fl oz/A); Vydate L 2 pts/A. Application were at 40 psi, 50 gallons/A.

Seasonal average of onion thrips per plant in an insecticide trial conducted in Michigan in 2011.
Bars with the same letters are not significantly different.

Products used in the 2011 MSU onion insecticide field trial.

Product	Active Ingredient	Class	NOTE
Agri-Mek	abamectin	chloride channel activator	Currently used under 'Section 18' exemption; in use since 1989
Assail	acetamiprid	neonicotinoid	Registered on onion
Lannate LV	methomyl	carbamate	Registered on onion; in use since 1973
Movento	spirotetramat	tetramic acid derivative	Currently used under 'Section 18' exemption
Radiant	spinetoram	spinosyn	Registered on onion
Tolfenpyrad	tolfenpyrad	pyrazol, respiration inhibitor	Experimental product; not yet available for sale
Vydate	oxamyl	carbamate	Registered on onion; in use since 1973