

## HOW LOW CAN YOU GO? THE ECONOMICS OF CONTROLLING ONION THRIPS WITH REDUCED INPUTS

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Insecticides are the backbone of onion thrips, *Thrips tabaci*, management in New York (NY) and recent selective insecticides for onion thrips control (i.e., spinetoram/Radiant SC, spiretetramat/Movento, and abamectin/Agri-Mek SC) have demonstrated equivalent or better levels of control than standard insecticides such as Lannate. These products are, however, more expensive than Lannate, and optimized use of these newer products is needed to maintain a cost-effective control program. The timing of applications and sequence in which these newer products are used can affect their effectiveness and, as a result, total insecticide costs of a thrips control program.

Currently, calendar-based weekly spray programs can result in 6-8 insecticide applications per season. In field studies, equivalent levels of thrips control were achieved using Lannate at 1 thrips per leaf and Radiant at 3 thrips per leaf, but control with Lannate required 7 sprays in 8 weeks while control using Radiant only required 4 sprays in 8 weeks. Reducing the number of insecticide sprays can save insecticide costs, application costs, and reduce soil erosion losses and soil compaction associated with repeated use of heavy equipment in onion fields. Optimizing the sequence of insecticide products based on their chemistry is also important in minimizing costs. Products like Movento are more effective against larvae than adults, so it is recommended that the most cost-effective time to use this product in NY is early in the season, when densities of larvae are higher than densities of adults, as opposed to late in the season when adult populations can be extremely high.

Onion crop costs and revenues can also be affected by other inputs into the system, such as fertilizers. In preliminary studies on the impact of nitrogen (N) fertilizers on thrips and bulb yields, experimental plots receiving lower rates of N had similar yields as plots receiving the recommended rate of 125 lbs N per acre or more. In addition, the low-N plots had significantly fewer onion thrips and a lower percentage of rotten bulbs. If thrips populations can be lowered by optimizing N rates without affecting yield, and thrips infestations can be managed with fewer insecticide applications, this would decrease both fertilizer costs and insecticide costs. In addition, if lower N rates can reduce bulb loss in storage, total marketable yields may actually be higher in fields receiving less N. In NY, an informal survey revealed that growers apply between 50-125% of the recommended N rate. Assuming N costs of \$0.50 to \$0.75 per pound, reducing N inputs by 50% could save growers \$20-60 per acre, or a total of \$4-8 million for the NY onion industry.

More recent work has shown that additives, such as spreader stickers and penetrating surfactants, can affect the efficacy of insecticides and, as a result, insecticide control costs. The level of thrips control achieved using Movento, for example, significantly increased as the rate of

a non-ionic penetrating surfactant (Induce) was increased, with the best control being achieved with the 0.5% vol:vol rate. However, when either Radiant, Movento or Agri-Mek was combined with Chloronil 720, a fungicide that contains a spreader sticker, thrips control was significantly reduced by 12 to 35%. In some cases, this problem was overcome when a high rate of one of the penetrating surfactants was added to the mixture, but not consistently.

Large-scale field trials were conducted in 2011 to estimate costs and revenues associated with an integrated pest management program that included reduced N inputs, minimal use of selective insecticides based on recommended application thresholds of 1 or 3 thrips larvae per leaf, and use of selective insecticides in a specific sequence to maximize their effectiveness. Estimated costs of the recommended program and estimated bulb yield revenues will be presented.