Update on Insect Management in Cole Crops

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Management of insect pests of cole crops continues to evolve. Most growers have their crops scouted to determine whether it is cost effective to treat for foliar infesting insect pests. The options for insecticide treatments are also changing. Organic growers can rely on Bt and neem products, pyrethrins and spinosad (Entrust) to provide decent control of the lepidopteran complex (diamondback moth, imported cabbageworm and cabbage looper) and use of Entrust for flea beetles has also shown decent control. Organic control of aphid populations still remains problematic but control of thrips in cabbage can be achieved by using resistant varieties. Cabbage maggot damage can be greatly reduced in organic systems by timing the plantings to avoid peak flights and egg laying. Use of row covers can also be effective for avoiding early season infestations of cabbage maggot and flea beetles.

Conventional growers have more choice for insect control using insecticides. Products of a new class of insecticides (diamides) are showing in the cabbage market and providing very effective and long-term control of Lepidoptera and flea beetles. The three main active ingredients in the diamide class are chlorantraniliprole, cyantraniliprole, flubendiamide. Look for these active ingredients in products registered in NY for cole crops.

Newly invasive insect pests will continue to be a challenge to NY growers. We have worked on the swede midge even before it was discovered in NY in 2004 and developed strategies for its management in conventional and organic systems. These recommendations can be found at http://web.entomology.cornell.edu/shelton/swede-midge/index.html. An even more potentially damage insect that threatens NY is the brown marmorated stink bug (BMSB). BMSB is moving up the Atlantic and has devastated many crops, including cole crops, in our surrounding states. Tests in other states have shown that BMSB is difficult to control with many of the available insecticides.

Onion thrips continues to be a problem in cabbage although it can be controlled with systemic insecticides and resistant varieties. Over the last 25 years, industry has recognized the importance of thrips resistance and produced some lines with high levels of resistance, although the mechanisms of thrips resistance were not known. Unfortunately, these lines may have undesired plant characteristics and do not meet all the requirements of different cabbage markets. With better understanding of resistance mechanisms involved in this plant-pest interaction, breeding programs could produce better resistant cabbage cultivars. Without knowing which mechanism(s) are involved, breeding for resistance is simply a guessing game.

In our previous research, we confirmed that an insect's "choice" whether to infest one variety when given a choice between two varieties does play a vital role in thrips resistance of the cabbage varieties we tested. Therefore we focused our additional research primarily on understanding what drives the host selection of onion thrips and secondarily to identifying other resistance mechanism(s). We confirmed in a laboratory assay that walking female onion thrips adults were attracted toward the volatiles released from 3 out of the 6 tested cabbage cultivars. The volatiles of the other three cultivars triggered neither preference nor avoidance.

The color spectrum of cabbage leaves was recorded and significant differences were found regarding the intensity of the reflectance between the tested cultivars. The more “shiny” the head forming outer leaves were compared to the old leaves of the same cabbage plant, the less number of colonizing thrips adults were found in the small cabbage head.

Overall, our studies confirm that the perceived volatiles and reflected light likely drive the host selection of onion thrips and are at least partly responsible for the “non-choice” resistance of cabbage. Therefore, we plan to conduct additional studies to: 1. determine the volatile constitution of all six of our model cabbage cultivars and 2. confirm the observed correlation between the response of onion thrips and light reflectance of cabbage, so as to identify what volatile components and range of light drive host selection. For the former objective volatiles released by intact cabbage plants will be collected by activated charcoal and then identified by a GC-MS. For the latter objective sticky boards will be produced that have similar light reflectance than our model cabbage cultivars. Their attractiveness to thrips will be tested in a field trial.

The better understanding of the interaction between sensory stimuli and orientation of onion thrips can be utilized by breeding programs, as has occurred with other crops such as corn. With the increased understanding of what drives host selection by onion thrips to cabbage, it should be possible to check for these characters in cabbage breeding lines early in their development to determine whether they will be resistant to onion thrips. This will greatly advance the development of commercially available resistant cabbage lines.