



This research has contributed to the control of a major agricultural pest, the brown marmorated stink bug, which has cost millions in damage to N.C. growers.

Bio-Ecology of the Brown Marmorated Stink Bug for Efficient Management in Vegetable Crops

Who cares and why?

Since its accidental introduction to the U.S in the mid-1990s, the brown marmorated stink bug (*Halyomorpha halys*) has become a major agricultural pest. A voracious eater of most vegetables and fruits – the bug has been shown to feed on more than 100 plant species – with no major predators outside its native Asia to keep its population in check, the pest has spread rapidly and is currently present in 42 states and 63 North Carolina counties. Its damage cost growers in the mid-Atlantic region more than \$35 million in 2010 alone. Many crops in North Carolina are now hosts to the bug. In spite of the increasing threat posed by the bug's spread, it is unclear that N.C. farmers are familiar with the invasive pest, or realize its potential to impact their crops.

The bug has also become a severe residential nuisance pest. When cold weather sets in, adult bugs leave host plants and seek overwintering sites, including homes and other buildings. The presence of bugs, and the unpleasant odor they produce when disturbed, highlight the need to address home and business owners' concerns as well as those of growers.

Currently, bug control relies on applications of broad-spectrum insecticides, which pose environmental hazards and kill beneficial insects. This situation has been particularly challenging for organic growers, who find that their usual tactics are ineffective at keeping bug populations below damaging levels.

This project aims to identify some host plants that can potentially be used as “trap crops,” or crops that can lure the bug away from the main crop, in orchards and vegetable fields. It also aims to better understand the relationship between the bug and the host plants, including the biochemical basis for the bug's behavior toward the plants, its feeding behavior and the stage of plant development at which the bug becomes active.

Findings from this project will contribute new knowledge about the habits and biology of this invasive pest so that control protocols can be developed, with the potential to save the state millions of dollars in lost crops. Additionally, the project offered insights into the insects' preferences, making trap-cropping instead of pesticide use a possibility for controlling their population. Because the insects can also thrive in an urban setting, effective control measures will also help businesses and homeowners.

What has the project done so far?

Researchers at N.C. A&T are focused on developing new management tools that will contain the bug both in urban and agricultural settings. Because integrated pest management depends on knowledge about a pest and a grower's willingness to adopt new control tactics, researchers began by developing a survey to measure small vegetable growers' knowledge of the pest and in using integrated pest management as a means of control. Using the survey results, the researchers organized



educational workshops and presentations at N.C. A&T. Information has also appeared in Extension publications.

In another study, the researchers began laboratory and field experiments on the relationships between the bug and host plants, including studies of the bug's patterns of activity and feeding behaviors. An in-depth study of the biochemical reasons for bugs' attraction to various plants was also begun, and tools to monitor their population put in place. The results of these tests will give researchers the tools they need to combat this invasive, costly pest.

Impact Statement

The brown marmorated stink bug cost mid-Atlantic region fruit and vegetable growers more than \$35 million in 2010 alone. With a voracious appetite, and no major predators in the U.S., the bug poses a severe threat to U.S. agriculture. This project has resulted in increased awareness among small vegetable growers of the bugs' damage potential, as well as their ability to correctly identify it, recognize its damage to different crops and take corrective measures. This research has helped growers develop a trap-cropping strategy that they can easily adopt in place of current pesticidal remedies, improving environmental quality and food safety. Consumers will benefit from a healthier product, and growers will realize increased profits.

What research is needed?

More research is needed on insect behavior and biologically active compounds that can be used as attractants for monitoring and managing the brown marmorated stink bug.

Want to know more?

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