Viruses and Box Tree Moth Strike Again!

Research and News on the latest pest management techniques

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Pest Talks

COMING UP THIS WEEK:

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Viruses Love Thrips, Too
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Viruses ... Again?

I have some awful-looking vinca and New Guinea impatiens (NGI) plants in my research greenhouse. Now, don't get me wrong. Good-looking plants are sources of joy, but problem-ridden plants simply send tingling excitement down the spine of this entomologist and pretend plant pathologist.

Symptoms on vinca reminded me of an e-GRO Alert article from more than 10 years ago in which Brian Whiper of North Carolina State University described symptoms of tomato spotted wilt virus (TSWV) infection on vinca. Leaf mottling? Check. Leaf necrosis and tan lesions? Check and check.

The symptoms on the NGI are quite different from those on the vinca. There's no ring spot, necrosis or mottling. The leaves of the NGI seem stunted and distorted, compared to the normal ones on plants next to them. In another e-GRO Alert article on TSWV on NGI, again by Brian Whipker and again more than 10 years ago, I saw that the terminal leaves appeared stunted and distorted. So is TSWV also affecting NGI?

Just like the case of impatiens necrotic spot virus (INSV) on impatiens that I'd described in an earlier issue of this newsletter, I know better than trying to diagnose diseases based on symptoms. I still had some immunostrips from last time, so I meshed up some symptomatic vinca and NGI leaves and tested for the presence of viruses.

By golly, both viruses are in both plant species. I don't know how common TSWV-INSV coinfection is in bedding plants. Apparently, co-infection isn't always a good thing. According to this paper published in 2025, TSWV and INSV are antagonistic and co-infection can actually reduce viral replication of both species in the host plants.

Also, I don't know which virus is dominant on which plant since the test stripes don't tell me the relative quantity of the viral particles or infection severity. All I know is that both viruses are transmitted by thrips. Oh, I have thrips in my research greenhouse alright and I'm not about to get rid of them soon since I still need them for some experiments.

How Do Thrips Transmit TSWV?

Thrips are vectors of TSWV and INSV. At least nine thrips species can vector TSWV, with western

flower thrips and tobacco thrips being the major vector species in the South.

INSV is vectored by three or four species of thrips, but mainly by western flower thrips. (Now, you may think that the scientific name of tobacco thrips is *Thrips tabaci* since the word “tabaci” is the New Latin genitive form of tabacum or tobacco. You’d be wrong—*Thrips tabaci* is onion thrips and *Franklieniella fusca* is tobacco thrips. Another glance into the wonderful and confusing world of common and scientific names.)

So how do thrips vector TSWV and INSV? Let’s take a look at the fascinating and complex mechanism of virus transmission, using TSWV as an example. The mechanism is similar for INSV and other tospoviruses.

Let’s deal with the first question: Which thrips life stage transmits the virus? Nymphs? Adults? It’s both. Nymphs can only transmit viruses within a crop or within dispersible distance because they don’t have wings, but adults can fly or are carried by the wind for some distance so viral transmission within a larger landscape is done mainly by adults.

But the answer is different when thinking about the life stage that can acquire viruses from an infected plant. Only the first-instar (and to some extent the second-instar) nymphs can ingest viruses from the plants. Adults cannot acquire viruses because the viruses are unable to pass from the adult gut to the salivary glands.

This weird life stage difference in virus acquisition has important implications for tospovirus management. The fact that only nymphs can acquire viruses means that only the viruses on plants that thrips are reproducing (thus have nymphs) can be spread to other plants. That points to the importance of removing infected plants before a thrips population has a chance to establish and reproduce, and before adult thrips are produced and spread the disease.

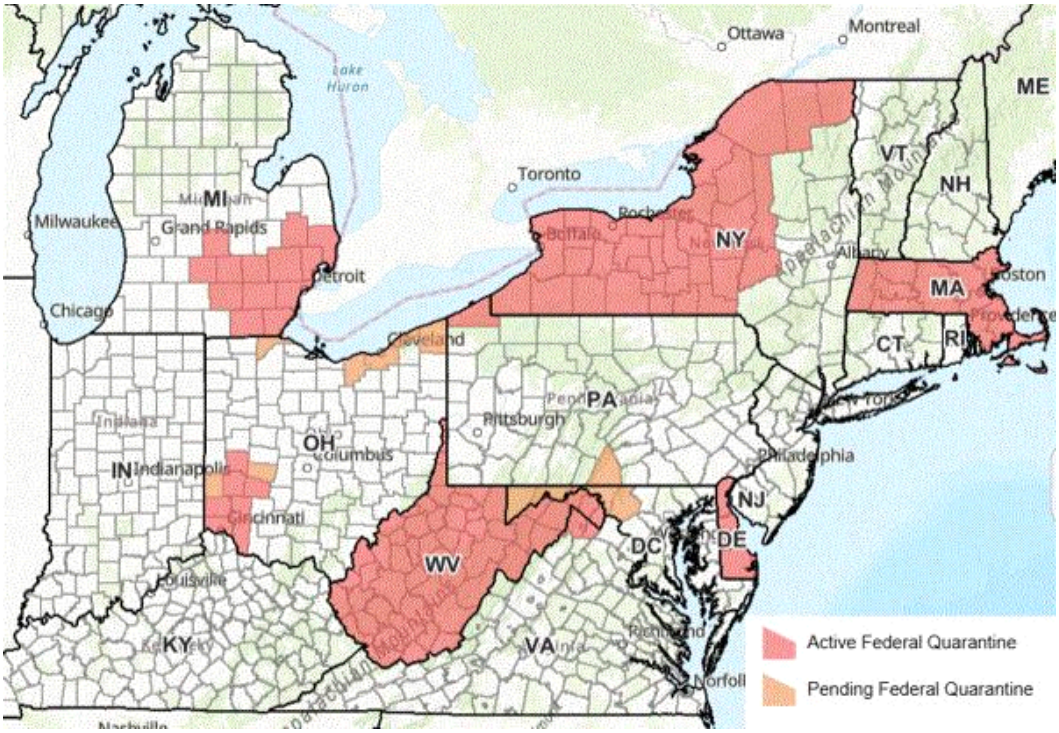
Fifteen to 30 minutes of feeding is enough for a nymph to acquire a virus from an infected plant. After ingestion by nymphs, viruses will first infect cells in the midgut and then spread from cell-to-cell to the salivary glands. The viruses will continue to replicate in the salivary glands (so the infection is permanent) and will pass from younger nymphs through to adults. Molting doesn’t get rid of the virus. The viruses will then pass on to plants whenever the older nymphs and adults split out or inject saliva into plant tissues when they feed.

There’s a latent period of three to seven days between acquisition and successful transmission. It’ll take about one to three weeks since injection before the virus spreads throughout a plant and becomes available for acquisition. This delay is also important to management, especially when the disease is only detected on a small group of plants, because it buys time for a grower to do a thorough job of discarding infected plants and reducing thrips populations. A good enough job may just be able to save some of the crop.

Box Tree Moth Quarantine in NJ

The New Jersey Department of Agriculture (NJDA) announced on June 25 that box tree moth quarantine has been established for Cape May County after an infestation at private residences was confirmed on June 10 by USDA-APHIS. Go HERE for the quarantine order.

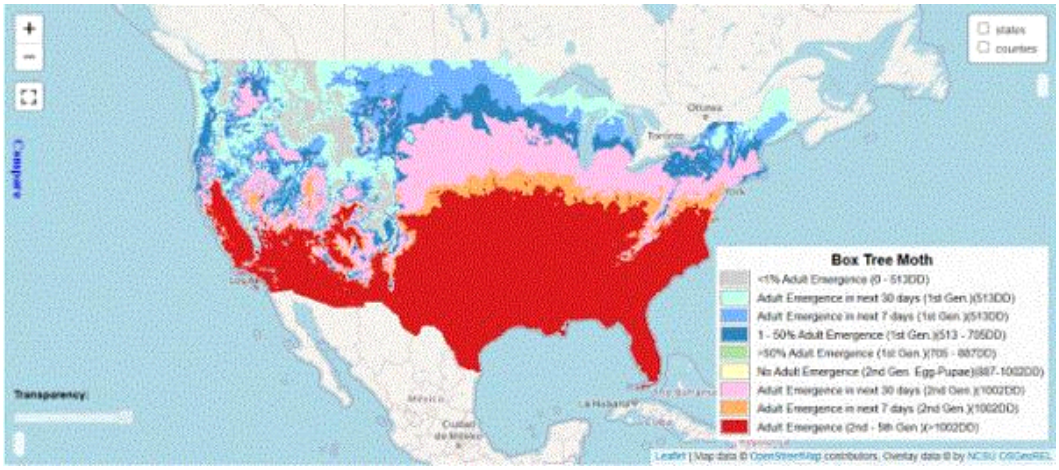
Regulated items include live or dead boxwood, including debris and items made from boxwood sourced in the quarantine area. No regulated item may be shipped out of the quarantine area without permission of and a signed compliance agreement with NJDA. Infested and dead boxwood must be disposed of in the quarantine area. NJDA is also asking for citizens’ assistance in reporting any suspected box tree moth infestation via its website.



Box tree moth federal quarantine boundery map as of July 5, 2026. Active quarantine is currently imposed on counties colored red and quarantine is pending for those colored orange. (Source: USDA-APHIS.)

This follows the announcement of quarantine in Virginia in March 2026 and increases the number of quarantined states (entire state or some counties) to nine. The New Jersey quarantine hasn't been updated on the USDA-APHIS quarantine map at the time this newsletter was uploaded, so pay close attention to the map above. You'll see that several counties are colored orange, meaning that federal quarantine is pending. These counties include Ashtabula, Clark, Cuyahoga, Lake, Lorain, Lucas and Preble County in Ohio; Franklin County in Pennsylvania; and Allegany, Frederick, Garrett and Washington County in Maryland. It's anybody's guess when these new quarantines will be finalized or activated, but keep an eye for the announcements.

USDA-APHIS's website on box tree moth is a pretty good place to find information on this pest, including areas where quarantine has been imposed and insecticide options for managing an infestation. I also found a couple of predictive models for adult emergence and larval activity when digging through the website. The adult emergence model suggests that second-generation adults will start emerging in the next 30 days in some of the highest risk areas. I'll have to study the models and see how accurate they may be.



Second-generation adult box tree moths are expected to emerge within 30 days in the areas colored pink. (Source: USDA-APHIS.)

Pest Prevention in Off-Shore Cutting Production

An e-GRO Alert article that came out last month by Heidi Lindberg and Roberto Lopez of Michigan State University piqued my interest. It's about how offshore vegetative cutting producers work on preventing pests and diseases in their facilities. Based on the pictures, I assumed Heidi and Roberto made a trip to understand the system in person. But they didn't identify the country or facility where the story was based on.

I know I'd given offshore propagators a hard time in the past, but I know that they're also working hard to improve pest management and make sure their customers receive clean cuttings.

Figures 8 and 9. Employee vacuuming insect pests off stock plants to reduce their population and examining the contents of the bag.

Vacuuming is a common sampling and pest management method in offshore cutting production facilities. I've seen the same in cut flower production facilities in Columbia. All I can say it I wouldn't be able to afford this method if I had an operation in the U.S. (Photo: Heidi Lindberg and Roberto Lopez, Michigan State University, e-GRO Alert.)

As noted in the article, a successful facility has its foundation on a "clean" stock program. Cutting producers go a long way to make sure the stock plants are as free of pests and diseases as possible from the original stock plants to the subsequent nucleus stock plants and the final generation stock plants from which cuttings are sourced. Sanitation, cleanliness and constant monitoring, and indexing and management of pests and diseases are keys to keeping the final products clean. The program is often more stringent than those required by USDA-APHIS's Offshore Greenhouse Certification Program.

This is an interesting read—I recommend it if y'all have your own stock plant program. You might find some insights useful in your own operation.

Drones at Cultivate'26

Are you using or considering drones for pesticide application in your nursery? If so, there's an educational session at Cultivate I'd like to recommend to you.

On Sunday from 2:45 to 3:45 p.m. in Room A223, Tim Swaback of Bailey Nurseries will explore how drone technology is being used for inventory tracking, crop monitoring, pest management, decision making and all sorts of other tasks at Bailey. Tim has had a lot of hands-on experience of using drones in nurseries—so much so that I relied on Tim's guidance and suggestions when writing sensible, drone-friendly pesticide labels!

I'm sure you'll find this session useful. Who knows? You might just decide to give drones a try after seeing what Tim has done with them.

See y'all at Cultivate!

JC Chong
Editor-at-Large
PestTalks

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