e-GRO Alert

Beth Scheckelhoff
scheckelhoff.11@osu.edu

Volume 11 Number18 March 2022

Recognizing and Preventing Viral Diseases in the Greenhouse

This alert features key strategies for growers to consider and discuss to manage plant viruses in the greenhouse.

Plant viruses are serious pests of ornamental and edible crops alike and cause significant losses for greenhouse producers. Once infected, a plant will remain infected with the viral disease throughout its lifespan – and may pass the virus along to progeny. There are no chemical or biological products that cure plants infected with a virus. Instead, prevention is key for successful management of viral diseases in greenhouse crops.

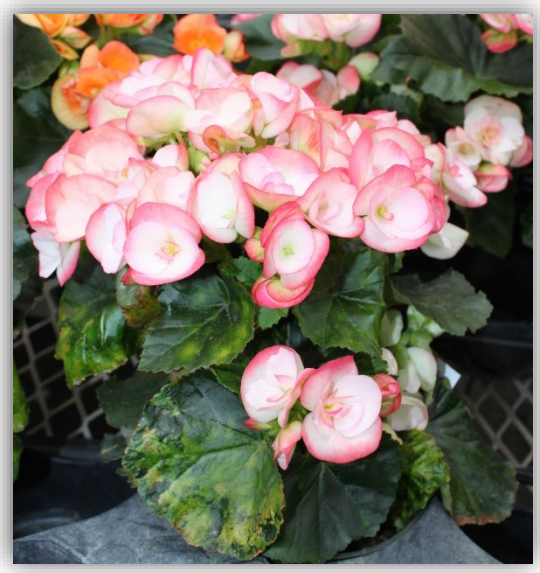

Figure 1. A tuberous begonia with mottled leaves tested positive for Impatiens necrotic spot virus (INSV).

Growers and greenhouse employees should be able to recognize common signs of plant viruses. Viruses can cause unusual physical characteristics like mosaic patterns, ringspots, mottling, leaf distortion, stunting, and yellowing, among others (Figures 1, 2, 3, and 4). While these symptoms may also result from other issues like nutrient disorders, other pests, or even unique attributes like variegation or speckling, training employees to spot usual versus unusual characteristics for a particular plant will help diagnose and correct many production problems. In some cases, infected plants may show no symptoms and evade detection.

Figure 2. Vein clearing, mottling, leaf distortion, and variable coloration are common symptoms found in different *Hosta* cultivars infected with Hosta Virus X (HVX). Infected plants cannot be cured and must be removed from the greenhouse and destroyed.

Start Virus-free. Plant viruses can infect greenhouse crops in many ways. Viruses can come in on plant material – from seeds to cuttings, plugs, and/or mature plants. A grower's first line of defense is to begin with virus-free plant material. How can you start with virus-free plants?

- Choose varieties or cultivars that have genetic resistance to common viruses, when possible. Many food crops and a limited number of ornamental crops have genetic resistance or increased tolerance to one or more viruses.
- If resistance packages are not available for specific plants, purchase certified virus-free seed, cuttings, or plantlets.
- When neither of these options are available for the plants you grow, quarantine incoming plants and train all employees to look for unusual symptoms that may be present or develop over time.

Figure 3. Sweet pepper plants with tobacco mosaic virus (TMV) are stunted with curled and distorted leaves compared to healthy plants. TMV survives in plant debris and on seeds and is often transmitted mechanically through plant wounds.

Viral Vectors. Thrips, aphids, and leafhoppers are well-known vectors of plant viruses in ornamental plants. Monitoring and controlling insect populations are key strategies to prevent virus transmission (Figure 5). Here are some tips to exclude common vectors of plant viruses:

Figure 4. Ringspots and mosaic patterns are hallmark symptoms of rose mosaic disease caused by Prunus necrotic ringspot virus (PNRSV) and/or apple mosaic virus (ApMS)

Figure 5. Numerous thrips are present on this Campanula flower. Monitor thrips populations with yellow or blue sticky cards throughout the growing season. Control measures should be taken when thrips numbers reach threshold levels.

Figure 6. Remove weeds from in and around the greenhouse. Many weed species serve as virus reservoirs and support insect vectors like thrips and aphids.

- Install exclusion screens to keep insects out of growing environments.
- Remove weeds and volunteer plants from in and around greenhouses, retail areas, and buildings (Figure 6). Many viruses can be found in a wide range of host plants – including weeds, native plants, agronomic and vegetables crops, as well as ornamentals. These alternate hosts serve as reservoirs for viruses.
- Grow trap crops to attract insects such as thrips and aphids. Regular monitoring of these plants will alert you insect pressure before reaching more sensitive crops.

Mechanical spread. Viruses can also spread mechanically from our clothing, hands, and tools through routine practices like pruning, deadheading, propagation, and handling of plant material. Routine and frequent disinfection of tools can help prevent spread. Employees should also routinely wash and sanitize their hands when directly handling plant material, especially those suspected of having a virus.

Remain Virus Vigilant. Continue scouting in the greenhouse throughout the growing season, removing suspect plants as they are found. Once plants are infected with a virus, they cannot be cured - but can serve as a reservoir from which other plants become infected. Remove and discard diseased plants.

Suspect plants can be sent to diagnostic clinics across the US. Unsure of which universities have a diagnostic clinic? Check the National Plant Diagnostic Network website (npdn.org) to see plant diagnostic clinics in regions across the US. It is a good idea to contact the diagnostic clinic of your choice to determine their virus testing capabilities. In some instances, plant samples may be directed to another facility for more comprehensive testing.

e-GRO Alert

www.e-gro.org

CONTRIBUTORS

Dr. Nora Catlin
Floriculture Specialist
Cornell Cooperative Extension
Suffolk County
nora.catlin@cornell.edu

Dr. Chris Currey
Assistant Professor of Floriculture
Iowa State University
ccurrey@iastate.edu

Dr. Ryan Dickson
Greenhouse Horticulture and
Controlled-Environment Agriculture
University of Arkansas
ryand@uark.edu

Thomas Ford
Commercial Horticulture Educator
Penn State Extension
tgf2@psu.edu

Dan Gilrein
Entomology Specialist
Cornell Cooperative Extension
Suffolk County
dog1@cornell.edu

Dr. Chieri Kubota
Controlled Environments Agriculture
The Ohio State University
kubota.10@osu.edu

Heidi Lindberg
Floriculture Extension Educator
Michigan State University
wolleage@anr.msu.edu

Dr. Roberto Lopez
Floriculture Extension & Research
Michigan State University
rglopez@msu.edu

Dr. Neil Mattson
Greenhouse Research & Extension
Cornell University
neil.mattson@cornell.edu

Dr. W. Garrett Owen
Greenhouse Extension & Research
University of Kentucky
wgowen@uky.edu

Dr. Rosa E. Raudales
Greenhouse Extension Specialist
University of Connecticut
rosa.raudales@uconn.edu

Dr. Alicia Rihn
Agricultural & Resource Economics
University of Tennessee-Knoxville
arihn@utk.edu

Dr. Debalina Saha
Horticulture Weed Science
Michigan State University
sahadeb2@msu.edu

Dr. Beth Scheckelhoff
Extension Educator - GreenhouseSystems
The Ohio State University
scheckelhoff.11@osu.edu

Dr. Ariana Torres-Bravo
Horticulture/ Ag. Economics
Purdue University
torres2@purdue.edu

Dr. Brian Whipker
Floriculture Extension & Research
NC State University
bwhipker@ncsu.edu

Dr. Jean Williams-Woodward
Ornamental Extension Plant Pathologist
University of Georgia
jwoodwar@uga.edu

Cooperating Universities

Cornell CALS College of Agriculture and Life Sciences

Cornell Cooperative Extension Suffolk County

Iowa State University

University of Kentucky

Penn State Extension

UTIA Institute of Agriculture, The University of Tennessee

Michigan State University

UConn

Purdue University

College of Agricultural & Environmental Sciences, University of Georgia

NC State University

The Ohio State University

DivisionofAgriculture Research & Extension, University of Arkansas System

In cooperation with our local and state greenhouse organizations

Maumee Valley Growers — Choose the Very Best.

Metro Detroit Flower Growers Association

NC Flower Power

Western Michigan Greenhouse Association

Connecticut Greenhouse Growers Association

Indiana Flower Growers Association

LIFGA

Michigan Greenhouse Growers Council

NYSFI — New York State Flower Industries, Inc.

Kentucky Horticulture Council