

2018 Kansas Ornamental Highlights by Gaelle Hollandbeck and Judy O'Mara

Re-occurrence of Tospoviruses in the Greenhouse by Gaelle Hollandbeck

In 2018 several plant viruses appeared, but two that were commonly seen were tospoviruses. The two most well-known tospoviruses to the greenhouse industry are Impatiens Necrotic Spot Virus (INSV) and Tomato Spotted Wilt Virus (TSWV). Both were seen by KDA and the KSU Plant Diagnostic Clinic alike. Tospoviruses are spread via the insect vector thrips but not known to be spread by other means.

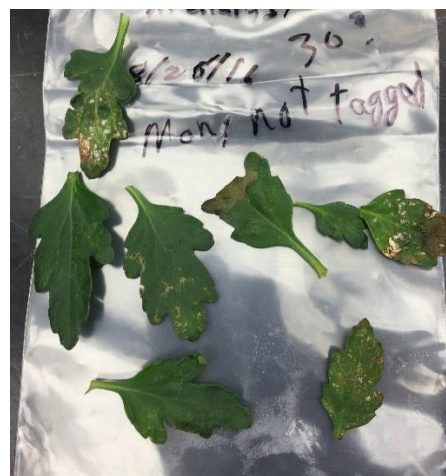
Impatiens Necrotic Spot Virus is one of the most common viruses to the greenhouse industry. Although it is named for Impatiens flowers, its actual host range is quite diverse, infecting vegetables, fruits, ornamental crops, and weeds. This host list includes hundreds of plant species, such as chrysanthemum, begonia, gloxinia, tomato, and pepper. It can manifest in a variety of different symptoms, ranging from ring spots to black leaf spots, veinal necrosis, stem lesions, and wilting, among other symptoms. KDA found INSV on Kalanchoe and pepper plants in 2018.

Tomato Spotted Wilt Virus, although named for tomatoes, actually has over 1000 known hosts including tomatoes, peppers, mums, geraniums, peonies, asters, and petunias, among many other horticultural and agricultural crops. Symptoms vary by host but may include ringspots, black streaks on stems, necrotic leaf spots, or tip dieback. KDA found TSWV on Amaranth and Sedum in 2018.

Once a plant is infected with a tospovirus, it cannot be cured and should be rogued as soon as it is discovered to minimize the risk of spread to other plants. Control of the insect vector thrips using insecticides and scouting/monitoring is also a valid approach for control. Petunia plants and fava bean plants serve well as indicator plants to monitor for presence of thrips as well as both viruses, as they easily show signs of thrips feeding and symptoms of both viruses.



INSV on Impatiens. Photo by Robert Wick, University of Massachusetts, Bugwood.org



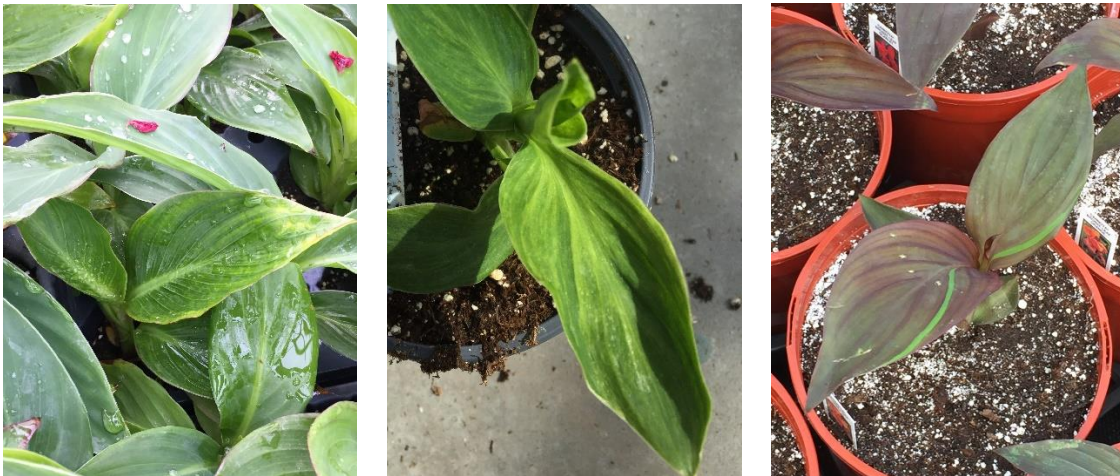
TSWV on mum leaves

Canna Yellow Mottle Virus Found in Several Varieties of Canna by Gaelle Hollandbeck

Spring inspections of commercial greenhouse inspections in 2018 yielded Canna Yellow Mottle Virus in cannas in Southeast, Northeast, and Kansas City Metro areas. Traditionally, cannas are rhizome-propagated, but seed-propagated and tissue culture varieties are also available. The virus was found in both seed- and rhizome-propagated varieties during the inspections. This virus can be seed-transmitted from mother plant to daughter plant. It may also be spread via rhizome propagation or mechanical methods. Unlike other canna viruses such as Bean Yellow Mosaic Virus, Cucumber Mosaic Virus, and Canna Yellow Streak Virus, which are transmitted by aphids, there is no known insect vector for Canna Yellow Mottle Virus. Symptoms consist of yellow mosaic, mottling, and chlorosis or necrosis of veins in the leaves. Canna Yellow Mottle Virus is only known to infect one other host: flowering ginger.

There is no cure for this disease, and no chemical can be applied to control it. The best methods of control are to watch newly planted canna plants for early signs of disease and remove any diseased plants. Do not compost the plants but throw them directly in the trash. When using tools such as clippers or shovels, sterilize between plants and after use. Tissue-cultured plants are typically virus-indexed and are therefore fairly reliably virus-free, so another method of control is to only purchase canna that were grown from tissue culture.

We are expecting to see this again in cannas, especially cannovas, this year so keep a look out when you do your spring greenhouse/nursery inspections.



Symptoms of Canna Yellow Mottle Virus include leaf mottling, mosaic, and discoloration in the leaves.

Hosta Virus X Reappears by Gaelle Hollandbeck

Hosta Virus X was found by KDA in South-Central, Northeast, and Kansas City-Metro areas in 2018 and is a common nursery problem annually within the Hosta trade. Its only host is Hosta; it does not spread to other species of plants. It is spread mechanically, by transmission of infected sap from contaminated tools or hands. The most common symptoms are “ink bleeding” of color in the leaves and leaf mottling and distortion. There is no cure for this disease, nor is there a chemical that can be applied. The best methods of control are to watch newly planted Hosta plants for early signs of disease and remove any diseased plants. Do not compost the plants but throw them directly in the trash. When using tools such as clippers or shovels, sterilize between plants and after use.



Plants infected with Hosta Virus x show mottling and ink bleeding symptoms.

Rose Mosaic Virus Disease Found on Several Occasions in Kansas by Gaelle Hollandbeck

Rose Mosaic Virus disease, caused by Prunus Necrotic Ringspot Virus and Apple Mosaic Virus, was another disease that made an appearance in Kansas greenhouses this spring. Inspectors in the Northeast, Kansas City Metro, and Western areas reported having detected it during inspections. This disease can be mistaken as one that doesn't cause much damage since it typically only affects one cane or a few leaves at a time; however, it does cause decreased vigor in the plant and poorer transplant survival. Symptoms vary by variety and may include chlorotic bands or ringspots, oak-leaf-shape pattern, or yellow/green mosaic on leaves, and color blocking in flowers. These symptoms commonly appear in the spring and are visible the remainder of the growing season. Transmission is only known to be via propagation. As with all plant viruses, the plant cannot be cured. The plant must not be used for propagation and is best rogued to avoid the chance of spread.



Chlorosis and oak-leaf-shape on rose leaves due to Rose Mosaic Virus. Photo by Jennifer Olson, Oklahoma State University, Bugwood.org

Production Issues: Botrytis blight in the GH by Judy O'Mara



Botrytis blight aka Gray mold was seen in KS greenhouses during late winter (2018). The disease is most commonly seen during cool, cloudy winter months (November-March). Botrytis blight is hugely successful because it has a wide host range, survives between crops on plant debris (plus used media), and is favored by moderate temps (55-65F) and humid conditions (>93RH). Botrytis produces a fuzzy gray mold full of spores that spread easily within the greenhouse.

Fungicides are available to manage Botrytis blight, but if a chronic problem is present, that indicates that the predisposing factors are not being addressed. Good sanitation to remove leaf litter from floors and garbage cans will reduce disease inoculum. Botrytis fungal spores require a film of water for 8-12 hours for infection to occur. This means that it is critical to reduce

the humidity in the greenhouse and to keep the leaves dry. This can be done by growing plants on benches and using good spacing. This promotes good air circulation around the plant and keeps the leaves dry. If overhead irrigation is used, watering should be done in the morning so leaves dry out quickly. Venting throughout the day and especially at the end of the day will push out moist air and pull in cool, dry air. This air has to be heated but the tradeoff is lower humidity and way less disease. If fungicides are used as part of the management plan, it will be important to rotate fungicide resistance classes to prevent building up a resistant population of Botrytis.

[http://ipm.uconn.edu/documents/raw2/Botrytis%20blight%20on%20Greenhouse%20Crops/2011 Botrytis%20blightfactsheetpe.php?aid=240](http://ipm.uconn.edu/documents/raw2/Botrytis%20blight%20on%20Greenhouse%20Crops/2011%20Botrytis%20blightfactsheetpe.php?aid=240)

Production Issues: Fusarium wilt on mums in nursery production by Judy O'Mara



Fusarium wilt was picked up in a SE KS nursery during 2018. It is a soilborn fungal disease that can be spread through movement of soil and with vegetative propagation. Fusarium wilt infects the water conducting tissue and can result in a collapse of the plant. During early stages of the disease, plants may recover at night but will eventually go out in sections and then wilt and die. Early stages of the disease may show a brown ring in a cross-section of the lower stem, with more advanced stages of the disease may show discoloration and disintegration of the lower stem and roots. The fungal wilt disease is favored by temperatures above 75F and wet, humid conditions.



Since the disease can survive in the soil for long periods of time (years), it will help to rotate the chrysanthemum growing location within the nursery site. Grow on benches or use fabric matt to make sure to provide a barrier between the container and the soil. Avoid planting highly susceptible cultivars, such as Bravo, Cirbranze, Illini Trophy, Orange Bowl, Royal Trophy, Allegra and Yellow Delaware). Other strategies to reduce disease pressure are: maintain soil pH between 6.5 and 7.0; and utilize a nitrate form for fertilizer. Fungicides may help suppress the disease but likely won't eliminate it from the production site.

(<http://extension.udel.edu/blog/fusarium-wilt-of-chrysanthemum/>)

Production Issues: Potential Boxwood blight shipped into KS by Judy O'Mara

In 2018, an Oregon nursery with infected boxwood plantings shipped to 11 states including KS.



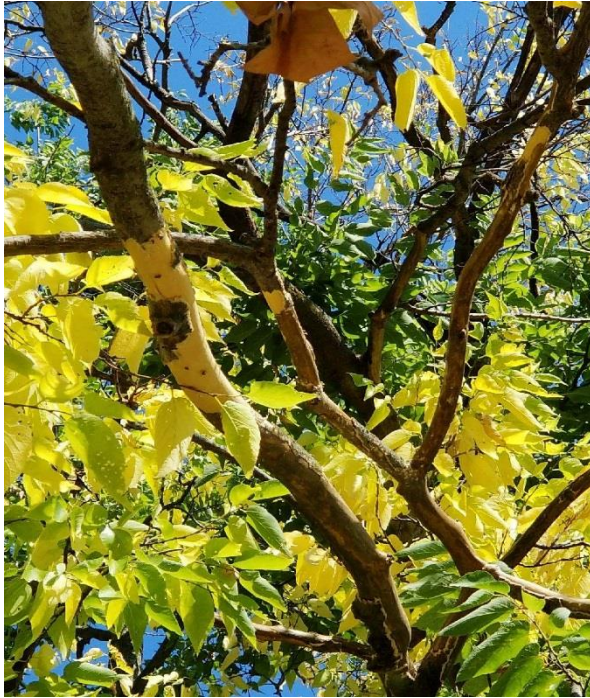
Affected nurseries and garden centers were inspected and boxwood blight was **not** found. Just some quick inspection tips. Infected plants may have blighted shoots with black lesions on the stems. Boxwood blight will cause dark leaf spots and defoliation, so if you see significant defoliation take a closer look at the stems. In Kansas, the most common damage we see on boxwood is actually winter damage. This creates a lot of confusion for landscapers and citizens. In addition to plant symptoms, timing of damage can help sort these problems out.



Obviously, winter damage will follow low temps and desiccating winds during winter months (Nov-March), while disease activity in Kansas is more likely to be spring or fall. This is because boxwood blight likes it cool and wet. The optimum temperature for disease activity is 77F. This needs to be linked to overhead irrigation or periods of heavy rain. Boxwood blight is a devastating disease in landscapes and production in the eastern half of the US. We have picked it up in KS (2014) but so far, it hasn't been an issue. This makes me think that we tend to be too hot and dry in the summer. But, never say never.

Photos: Mary Ann Hanson, Virginia Tech

Odds & Ends: Squirrel damage on Hackberry trees in Manhattan & Topeka by Judy O'Mara



This summer, I noticed that hackberry trees around Manhattan were turning yellowing in sections of the tree. I noticed the same thing while I was at an extension meeting in Topeka. I took a closer look and saw extensive squirrel damage. They did a pretty good job of stripping the bark off these branches. Next year when I drive around town, there will likely be hackberry trees with extensive limb die back. I will have to remember what caused the damage. :)

Odds & Ends in the landscape: Declining oak trees in NE KS by Judy O'Mara



No tree photo here, so just imagine a dying or dead oak tree. Most of the reports in the diagnostic lab were from pin oaks, especially from Kansas city but actually from the eastern half of the state. We did lots of testing for oak wilt and turned up negative on all of them. Commercial landscape companies were removing dead oak trees and injecting nearby trees with fungicides. It took me awhile to sort it out, but eventually I went to the K-State weather mesonet and checked the rainfall patterns for the previous 12 months (October 2017 – September 2018). What I noticed was that there was very little rain from November through March and then very little through August. By late August, Kansas city had received about 19” of rainfall for that ten month time frame. The annual average rainfall for KC is about 40” or just under. Interestingly, rains in September brought the year close to average. Too late though.

To support my winter drought theory of oak decline, I started getting reports of Hypoxylon

canker (KC, Manhattan, Wichita). This disease is triggered by drought stress. This photo is from the oak tree in my yard (bummer).

Odds & Ends in the landscape: Declining trees in KS by Judy O'Mara

Overall 2018 was a low disease year, mostly due to the very dry growing conditions. Inversely, most of the problems that we saw were linked to weather stress. Reports of declining evergreens (pines, cedars, spruce) came in all spring and summer. Clients thought they had pine wilt, but we picked up very little pine wilt last year. The K-State grounds crew removed five pine trees this year and all tested negative for pine wilt. I think we are still seeing the influence of the tough growing conditions last year.

