

### Consider Some Modest Steps to Keep Greenhouse Production Disease Free

*Jon A. Appel, Plant Pathologist*

Keeping to the basics are the best guidance when it comes to successful pest management.

Here are my top six things to remember when it comes to getting ahead and staying ahead of potential pitfalls from a plethora of diseases:

- **Education** – Stay informed by reading trade magazines, information from your plant supplier and attend meetings whether they are trade shows, extension conferences or for pesticide re-certification. If a live plant inspection was carried out last year, look the report over and see what problems were present.
- **Overwintered Plants** – Are you carrying over plants such as succulents, somebody’s favorite plants somewhere tucked away in a corner, parent plants for vegetative propagation and the like? If you are, then insect vectors such as thrips, aphids and viruses like tobacco mosaic and Impatiens necrotic spot should be of concern. Get rid of unneeded house and patio plants and start clean this spring if at all possible. When propagating from your own plants, it is a good idea to test for viruses from a representative sample before taking cuttings (see last step about virus testing). Ideally, green houses should be clean and without plants or debris for a minimum of two weeks prior to spring crops.
- **Sanitation and Cultivation** – Are you raising plants in houses where floors are not covered with gravel or some other barrier material? Are water hoses and tools kept off the floor and properly stored and kept clean? Can you get plants off of the cold damp ground and provide better air circulation? Is drip irrigation possible instead of the hose and nozzle approach? Do you move plants from one house to another



Poor sanitation practices

location without checking for diseases or insects? Are you willing to throw sick plants out cutting your losses and to save the crop? There are many things to consider, but cleanliness in any form cannot be overemphasized. Procedures such as washing hands and filling in puddles of water with gravel can pay huge dividends in getting plants actively growing to fend off disease. Hand wipes can be used in greenhouses for cleaning door knobs and cutting knives that may have plant sap that can carry viruses or fungal spores.

- **Overwatering** is by far the number one cause of disease in the form of damping off (DO). DO is caused by fungi commonly referred to as *Pythium* or *Phytophthora*. Soil mixes should feel like fresh bread spongy and damp but not saturated 2-3 hours after watering. Overwatering causes the soil mix to stay wet throughout the entire day. More frequent lighter amounts of water should be considered when plants are small, cool conditions persist and if crowding is unavoidable. The DO fungi love cool wet conditions whereas plant roots do not. Who wins? Not you, the grower. When damping off is a problem, plants fail to grow uniformly, wilt not from dry soils but root rot, show mineral deficiencies, fungus gnats proliferate, and soil mixes remain wet all day.



Geraniums with damping off, uneven growth and non-uniform color. Would your workers recognize a problem?

- **Pesticides and Application** –How many times have you heard about reading the pesticide label? Aside from just safety, there are many reasons to read labels. Application is very important. Have you calibrated the equipment for application? Pumps and nozzles wear out over time and can affect application. Is the pH of water or use of an **adjuvant** mentioned in the label? Many sources of water are alkaline in nature and will breakdown pesticides when in solution in a matter of hours.

Adjuvants will save you money in pesticide costs. Don't overlook their benefits. Keeping an updated inventory of fresh compounds is a big help in treating pests.

- **Scout Crops Weekly** - It is imperative to look at plantings on a regular basis including when the shipment is received. Look at new shipments in well-lit areas and examine plants from several boxes or trays randomly. Plant Pest Freedom Standards in Kansas protect you the grower and consumer from unwanted insects and disease brought in on plant shipments. Aphids, scale insects, mildews, mites, and thrips are often in hard to look areas such as buds, underside of leaves or on stems of newly received plants. There are commercially developed test strips for various viruses, bacteria and even some fungi. Viruses will express themselves with mosaics, ring patterns, leaf puckering and shape abnormality usually two weeks after being potted. Several test kits are commercially available and are money well spent and simple to use (\$3-5 a test with results in 30 minutes or less). I would recommend for the majority of greenhouse operations to have at least one kit (5 or 25 tests) for Impatiens necrotic spotted wilt. Depending on the size of the operation and plant species other tests include cucumber mosaic, tomato spotted wilt, and tobacco mosaic virus. Test plants when growth is unusual, oddities arise or you are propagating from your own plants. If you find something of concern, don't hesitate to call your Kansas Department of Agriculture Plant Protection area specialist for help. In many cases, digital photos of the concern electronically transmitted can lead to a helpful diagnosis in short time.



Hosta leaf with cucumber mosaic viral spotting. Transmitted with sap or by aphids.

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**Boxwood blight confirmed in Kansas**  
*Jennifer Smith, Kansas City Metro Area Specialist*

Boxwood blight is a leaf and stem blight known to affect boxwoods and pachysandra in several eastern states and in Oregon. The disease was first identified in the U.S. in North Carolina in 2011. The discovery in Kansas in fall 2014 was in a production facility in the Kansas City Metro Area. Production facilities are especially prone to the disease because of the close proximity of plants, high humidity and tendency for overhead watering.

Whether this disease can survive in Kansas' landscape is unknown. The causal fungus, (*Calonectria pseudonaviculata* (syn. *Cylindrocladium pseudonaviculata* and *C. buxicola*) cannot survive several day periods of temperatures over 91° F. However, it does thrive in warm, humid conditions and live plant dealers should be on the lookout for symptomatic plants.

Symptoms include dark or light brown spots on leaves that coalesce with concentric patterns and distinctive dark brown lesions on stems. Infected leaves turn brown and defoliation occurs quickly after symptoms develop. Plants may attempt to regrow, but repeated infection and defoliation typically



Symptom picture: Mary Ann Hansen, Virginia Polytechnic Institute and State University

lead to plant death. Boxwood blight symptoms may be difficult to distinguish from more common boxwood problems, including *Volutella* blight, *Macrophoma* leaf spot, boxwood decline, winter injury, and sunscald. For pictures, refer to: [www.ct.gov/caes/pdio](http://www.ct.gov/caes/pdio)

Suggested management strategies:

- Carefully inspect plants at time of purchase. Familiarize staff with disease symptoms.
- Keep source records if purchasing boxwoods from more than one supplier.
- Ideally, hold plants four weeks before transplanting. Spaced appropriately to allow good air circulation and avoid overhead watering when possible.
- Sanitize tools and equipment between when working with multiple groupings or boxwoods on separate properties.

If Boxwood blight is suspected, contact KDA or the K-State Plant Disease Diagnostic Lab regarding sample collection and testing.

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**Update to the Thousand Cankers Disease of Walnut Quarantine**  
*Jeff Vogel, Program Manager*

The Kansas Department of Agriculture enacted an exterior quarantine, effective, November 20, 2014, and rescinds and supersedes the quarantine issued on July 20, 2010, regarding Thousand Cankers Disease of

Walnut (TCD). The update to the TCD quarantine made the following changes:

- Added approved heat and methyl bromide treatments of regulated articles from states and countries that have the disease or do not survey for the disease.
- Requirements of live walnut plants from states where TCD and/or the walnut twig beetle are found will be determined based on risk. Factors considered include shipment size, location and growing situation in the state of origin.
- Removed the requirement of a compliance agreement for importers of regulated articles from states where a survey is completed and the disease is not known to exist.

Please visit our website to view the full text of the updated TCD quarantine -

<https://agriculture.ks.gov/divisions-programs/plant-protect-weed-control/thousand-cankers-disease>

For a map of TCD states visit -

<http://www.thousandcankers.com>

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### Trapping and Survey Programs

The national trapping survey for emerald ash borer in 2014 consisted of setting 395 purple prism traps throughout Kansas. Of these, 82 were set by KDA and 313 were set by USDA-APHIS-PPQ. The state trapped Barton, Bourbon, Douglas, Ellsworth, Leavenworth, Marion and Osage counties. The traps were to be put up in USDA pre-planned areas. If those areas were not suitable, then the traps were moved to campground sites or other high risk locations. The traps were up from March until September. These traps were placed and monitored by USDA-APHIS-PPQ. For information on the emerald ash borer, visit: [www.emeraldashborer.info](http://www.emeraldashborer.info)



On July 16, emerald ash borer was caught on two girdled trap trees in Lansing in Leavenworth County. Ten girdled trap trees were set, three in Douglas, two in Leavenworth, four in Johnson and one in Wyandotte County. The trees were girdled in April and

then removed and peeled in October.

The third and final year for the oak pest commodity survey occurred at 50 sites in 29 western counties. This detection survey trapped for the rosy gypsy moth, false codling moth, summer fruit tortrix, green oak tortrix, variegated golden tortrix, Asian gypsy moth and European gypsy moth. Kansas has a high population of oak in the eastern part of the state and other large areas throughout the state. The potential loss could be substantial to the ecosystem, agriculture, the lumber and nursery industry and communities if these pests are not detected early. None of these pests were found during the three year survey.

Purple loosestrife bio-control - loosestrife root weevils (*Hylobius transversovittus*) – 100 each were released in Doniphan and Bourbon counties in August.

Farmbill funding was acquired for surveys to trap for agroforestry pests and a grape pest survey.

Trapping for the agroforestry pests , oak ambrosia beetle (*Platypus quercivorus*), oak processionary moth (*Thaumetopoea processionea*) and walnut twig beetle (*Pityophthorus juglandis*), consisted of trapping 35 sites in 21 north central and central counties: Barton, Clay, Cloud, Dickinson, Ellsworth, Geary, Jewell, Lincoln, McPherson, Mitchell, Osborne, Ottawa, Phillips, Reno, Republic, Rice, Riley, Rooks, Saline, Smith, Washington. The traps were placed in oak and walnut trees focusing on areas around saw mills, collection points, plantations and reservoirs in August and were completed in November. All traps were negative but we are still reviewing the walnut twig beetle trap samples.

The grape commodity survey started in July and finished in October. Six traps each were set at 42 vineyards in 13 counties. Pests trapped for were the summer fruit tortrix, silver Y moth, European grape berry moth, European grape vine moth, Egyptian cottonworm and cotton cutworm. Pierce’s Disease and Australian grapevine yellows were also surveyed for in August and September. No target pests were found. Phylloxera and Black Rot were most commonly found during our survey.

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We always appreciate the live plant dealers and land owners who let us put traps on their property. This type of work is of great importance in protecting Kansas. Early detection will improve the odds of eradication and containment success if the pests are found.

\* New website: [agriculture.ks.gov/divisions-programs/plant-protect-weed-control](http://agriculture.ks.gov/divisions-programs/plant-protect-weed-control)

\*Note new address and phone

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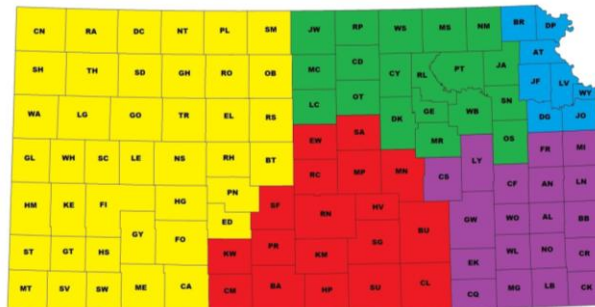
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