

## WATCH FOR GRAY MOLD IN GREENHOUSES

GAELE HOLLANDBECK, PLANT PATHOLOGIST

As spring approaches and temperatures begin to warm, greenhouses start to fill up with spring plants. As the plant population increases, it's important to scout thoroughly and regularly for disease, and treat or dispose of plants accordingly to minimize the disease spread. A common spring disease to watch for is Botrytis blight, caused by *Botrytis cinerea*.

This disease, also known as gray mold, can be found virtually everywhere, from soil to water to even your kitchen, where it produces that common gray, fuzzy growth on your fresh strawberries. It has an extremely wide host range, attacking both annual and perennial plants, including vegetable and fruit plants. It feeds on both living and dead tissue, commonly growing at low levels on dead tissue, such as plant debris, and then moving on to living tissue as it becomes more aggressive. Botrytis blight is the most important greenhouse blight.

Optimal conditions for development and spread of Botrytis blight are moderately cool temperatures, around 60°F, and high relative humidity. Wounded tissue is most at risk for infection.

Kansas Plant Pest Freedom Standards require that when the crop is infected with a Botrytis blight infection that affects more than 10 percent of the foliage



Flower blight on Cyclamen



Leaf spotting on Lilium caused by Botrytis blight

### PROACTIVE MEASURES

- Inspect shipments of plants when they arrive to minimize the risk of incoming plants bringing disease with them. Quarantine new shipments and re-inspect at a later date before integrating with other plants. Continue scouting plants weekly.
- Botrytis survives in dead tissue, colonizing plant debris left in the greenhouse. Remove all plant debris and affected plants regularly and promptly. Control weeds in and around greenhouses, as they can also harbor disease.
- Reused soil and soil left on benches or on the ground may contain survival structures called sclerotia and chlamydozoospores, which Botrytis will produce in order to overwinter in the soil. Clean excess fallen soil from the greenhouse if possible and wash pots thoroughly if you plan to reuse them. Do not reuse potting media.
- Space plants adequately apart to allow good airflow and rapid drying of leaves, and avoid development of a heavy canopy. Botrytis blight can spread by contact, so it is best if plants do not touch each other, and a heavy canopy can exacerbate the disease. Ventilate greenhouses to lower the relative humidity.
- Raise plants off the ground using table benches, or use fabric mat or gravel floor to minimize contact with wet soil and suppress weeds.
- Raise the temperature in the greenhouse to above 60°F. Botrytis does not grow well under warmer conditions.
- Botrytis spores spread readily in water so avoid reusing water and avoid overhead irrigation if possible. Drip irrigation is preferred. Do not overwater. Especially if using overhead irrigation, irrigate in the early morning when dew may still be present on the leaves to minimize the amount of time leaves are wet.

### WHAT SHOULD I LOOK FOR?

- In its earliest stages, this disease is characterized by brown or spotted leaf or stem tissue.
- As it develops a mold will start to form, initially white and turning gray as it ages and spreads. It can grow on all plant tissues, but will be easiest to spot on the aboveground tissues such as leaves, stems, flowers and fruits.
- The plant may also begin to wilt.
- This fuzzy mold is full of a dusty mass of spores that will easily spread by irrigation, moving air current or contact, so if a plant is showing signs or symptoms of the disease, it should be removed promptly from the greenhouse and thrown away.
- If you have not yet applied a fungicide against Botrytis blight, this may also be a good time to apply.
- Be sure to apply a fungicide labeled against Botrytis blight and approved for use on the plants present in your greenhouse.
- Visit <http://ag.umass.edu/greenhouse-floriculture/fact-sheets/botrytis-blight-of-greenhouse-crops> for a list of fungicides labeled for use against Botrytis

# KANSAS SEED LAW

BOB BUHLER, WEST AREA PLANT PROTECTION SPECIALIST

Late in 2016, the regulatory responsibilities of the Kansas Seed Law were transferred to the plant protection and weed control program at the Kansas Department of Agriculture. Changes that some of you will see is your live plant inspector may also conduct a seed inspection. If you sell turf-grass seed, cover-plot seed and deer plot seed (considered agricultural seed in the Kansas Seed Law) and do not currently have a seed license, you may be asked to complete an application to become licensed. Vegetable and flower seed are exempt from the licensing requirements of the law.

Like the Live Plant Verification Program, 300 dealers have been selected from our seed database for verification inspections by our 5 inspectors. Not all of these inspections will be on the nursery trade, with a large percentage conducted at agronomic seed dealers and retail stores that sell seed but

## BULK SEED SALES

- If seed is sold in bulk, a printed seed label is required for every sale of that seed.
- Make sure adequate numbers of photocopied labels are available at all times.
- Another thing to watch for is the mixing of seed by children. Mixed seed will not match the label and should not be sold.
- Another problem we see with bulk bins is that stripes of different colors appear through the transparent side. This is evidence that new seed is being placed on top of old seed that is probably out of test date.
- Make sure old seed is removed from the bin prior to refilling the bin, except when that old seed is from the same lot as the

## LICENSING

All persons selling regulated seed in a retail setting are required to obtain a Seed Retailer's License which costs \$10. If the person is also selling wholesale, then they are required to obtain a Seed Wholesaler's License in addition to the retailer's license. This license is \$175. The definitions of retailer and wholesaler in the seed law is as follows:

- "Retailer" means any person who sells agricultural seed to the end user.
- "Wholesaler" means any person who is in the business selling agricultural seed at wholesale to any person other than the end user.

A Kansas Seed License Application can be obtained at <http://agriculture.ks.gov/docs/default-source/acap/seed-license-application.pdf?sfvrsn=2>

For additional fees, a Kansas Seed License can be purchased with a credit

## TEST DATES

- Regularly examine the test dates on your seed labels. Seed can only be sold if the test date is within 9 months of the present date.
- For example, if the test date is January 2017 the seed can be sold until November 1, 2017. February 2017 up to December 1, 2017, etc.
- If your seed is out of test date, then it cannot be legally sold and has to be removed from the sales floor and marked with a "Not for Sale" sign.
- At this point the dealer can request new seed test labels from the supplier, have the seed tested and print new labels, give away the seed or destroy it.
- The seed cannot be sold again until it is relabeled with an updated label. Rotating your inventory so that the oldest inventory is sold first will help in avoiding problems with test dates.

Month Seed Tested	Non-Compliant Date	Month Seed Tested	Non-Compliant Date
January	November 1	July	May 1
February	December 1	August	June 1
March	January 1	September	July 1
April	February 1	October	August 1
May	March 1	November	September 1
June	April 1	December	October 1

## STAFF UPDATES

### New Plant Pathologist

Plant Protection and Weed Control has a new plant pathologist, Gaelle Hollandbeck. She started in mid-April 2016. Gaelle comes to us from Indiana, having completed her Master's degree in plant pathology at Purdue University in March 2016.

### Retired Staff

Tom Sanders, area field staff, retired in December. He worked for KDA plant protection and weed control for 21 years. He came from the Oklahoma Department of Agriculture and first worked as an inspector in the southwest part of the state. He then worked as the survey coordinator for a year. After that he was an inspector for southeastern Kansas and lastly worked in the northeastern part.

# SPRUCE PROBLEMS

JENNIFER SMITH, KANSAS CITY METRO AREA SPECIALIST

Healthy mature spruce trees are unrivaled in their beauty, but getting them to that point can be a bit of a trick. Spruce are susceptible to a number of insect and disease problems as well as being picky about where they are planted. In many cases they will look healthy for a few years after planting, then suddenly turn brown. When spruce are grouped, you may also see only one out of several trees become stressed and die even though they are all the same variety and have had the same treatment.

Spruce are susceptible to two needlecast diseases (Rhizosphaera and Stigmina), canker diseases (Cytospora), tip blights, spider mites and a number of other pests that may be present on trees that are shipped in from other states. Spruce also display the “Christmas tree effect,” meaning they may be dead but not show any immediate signs. When you finally see brown needles, it is a result of something that happened weeks or even months before.

In a report from Michigan State University, researchers suggest that the fungal pathogens Diplodia and Phomopsis are more common than Rhizosphaera and Cytospora and can also be associated with branch death and decline. However, those fungi are considered weak or secondary pathogens in most cases, so environmental stress is probably still to blame. More work is needed to determine the seriousness of these pathogens and if treatment is an option.

Customers are going to keep asking for spruce, and they will continue to be challenged by the Kansas environment. Besides the items mentioned above to alleviate environmental stress, selective placement and diversification in plantings can help. If you are bringing trees in from out of state, look spruce over carefully and

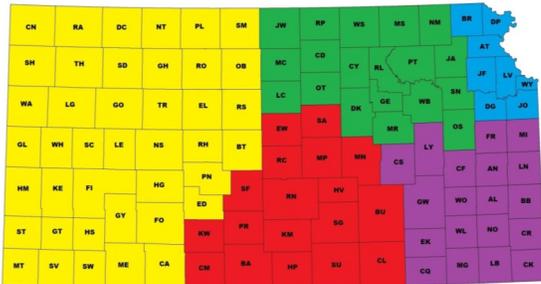
## ENVIRONMENTAL STRESS

- Environmental stress is probably the most common cause of death.
- Environmental stress is caused by warm, dry winters; hot summers; poorly drained soil; and high soil pH. High humidity in summer also favors disease development. High water pH of irrigation water could also affect tree health even if soil pH is in the preferred slightly acidic range.
- Environmental stress can be partially alleviated by amending the soil prior to planting. Use organic matter to improve drainage, or plant in a berm. Test soil pH and use the recommended amount of sulfur to lower the pH (increase acidity) or lime to increase pH (increase alkalinity) to the preferred range. In addition to summer irrigation, be sure to water over extended dry periods in the winter when temperatures are above freezing. Monitor regularly for pests and treat



Spruce displaying symptoms of environmental stress and/or (unconfirmed) disease

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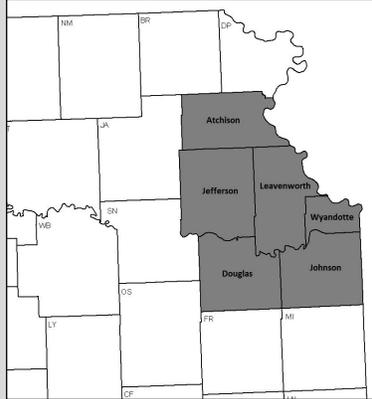
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## TRAPPING AND SURVEY PROGRAMS

### EMERALD ASH BORER

The national trapping survey for emerald ash borer is contracted out by USDA. For information on the emerald ash borer, visit: [www.emeraldashborer.info](http://www.emeraldashborer.info)

On September 19, 2016, one adult beetle was found in a trap in Atchison County near Cummings. On October 14, 2016, several larva were removed while peeling a tree that was girdled and checked over the summer in the City of Atchison. Confirmation of the presence of emerald ash borer (EAB) was made on September 23 by USDA-APHIS-PPQ.



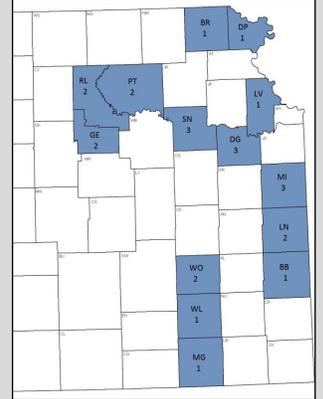
EAB Quarantine counties

Fourteen girdled trap trees were set in seven counties: one in Atchison, two in Cherokee, one in Doniphan, one in Franklin, three in Labette, two in Miami and four in Shawnee county. The trees were girdled in April and then removed and peeled in October.

### EXOTIC WOOD BORERS / BARK BEETLE SURVEY

The survey took place from May to July looking for exotic wood borers and bark beetles. *Cerceris* wasp colonies (native biocontrol wasp) were visually surveyed at 21 sites. No colonies were found.

Traps were set for Japanese pine sawyer, oak ambrosia beetle and black spruce beetle. The traps were placed in 25 sites from May to July.



Counties trapped for wood borers

### PATHWAY SURVEY

This was the second year for the pathway survey which occurred at 35 sites during April to October 2016 at high-risk container yards looking for new exotic plant pest species that are potentially harmful to agriculture/horticulture. The survey occurred in Douglas, Franklin, Johnson, Shawnee and Wyandotte Counties. No target pests were found.

## THANK YOU

We always appreciate the live plant dealers and land owners who let us put traps and surveys 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.

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