

# KENTUCKY NURSERY BULLETIN

UK NURSERY CROPS TEAM

AUGUST 2022

## Warmer, Wetter Than Average Start to September

The NOAA's Long Range Outlooks are calling for a warmer and wetter than average September, at least for the first half, across most of the commonwealth. The above average chance for higher than normal temperatures is called for almost all of the continental US, excluding Texas and New England. As the precipitation pattern is part of a larger system predicted to impact the southeastern US, the most northern part of Kentucky is less likely to be affected by this.

Moving further into the second half of the month, the picture becomes less clear, with cooler & wetter than average forecasts to the southwest and southeast of Kentucky, warmer than average temperatures along the east coast, putting Kentucky between these patterns.

See **UKAg Weather's Long Range Outlooks** for a variety of forecasts of temperature and precipitation probabilities.



College of Agriculture,  
Food and Environment  
Cooperative Extension Service

## NURSERY CROPS EXTENSION & RESEARCH

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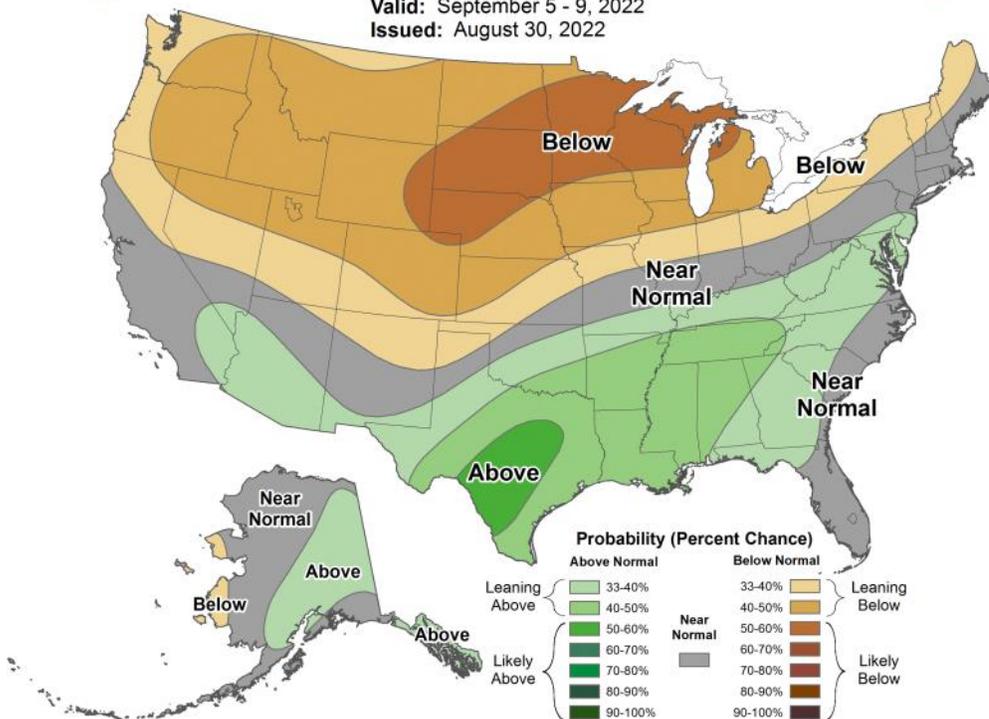
Joshua Knight, Senior Extension  
Associate & Managing Editor



## 6-10 Day Precipitation Outlook



Valid: September 5 - 9, 2022  
Issued: August 30, 2022



Precipitation Probability, Sept 5-9, 2022

Image: NOAA Climate.gov, 30 AUG 2022

- **Growin' with Dr. Owen: PourThru Method for Nursery Crops**
- **Vascular Streak Dieback of Redbud: What Plant Pathologists Know So Far**
- **Christmas Trees 101 Webinar Info**
- **Save The Date: KY Green Industry Winter Expo Info**

# Growin' with Dr. Owen: PourThru Method for Nursery Crops

W. Garrett Owen Ph.D, Extension Professor, Controlled Environment Horticulture

Nutritional disorders are among the many challenges nursery growers encounter during crop production. Nutritional disorders often occur when substrate pH, soluble salts [referred to as electrical conductivity (EC)], and irrigation water quality are not optimal for plant production. To assess substrate pH, EC, and irrigation water quality, growers can implement nutritional monitoring sampling methods.

A **series of infographics** were created to help you quickly and easily perform sampling procedures in-house or to share substrate and leaf tissue with analytical laboratories and are available at the **Nutrition section** of **Grower Resources** at the **Controlled Environment Horticulture Website**.

Resources linked below available at [greenhousehort.ca.uky.edu/nutrition](http://greenhousehort.ca.uky.edu/nutrition)

## Irrigation Water Sampling (CEH-1-IG)

*Irrigation water sampling is an important nutrient monitoring practice to evaluate irrigation pH, electrical conductivity (EC), alkalinity, and nutrient status. Results will allow growers to determine if alkalinity neutralization is needed and to select the appropriate fertilizer for the water source.*



## PourThru Method – Annual Bedding Plants (CEH-2-IG) PourThru Method – Containerized Perennials (CEH-3-IG) PourThru Method – Nursery Crops (CEH-4-IG)

*The PourThru method is a quick and easy procedure to test substrate pH and EC in house without disturbing plant roots or removing substrate.*



## Soilless Substrate Sampling (CEH-5-IG)

*Substrate sampling is an important nutrient monitoring practice to evaluate substrate pH, electrical conductivity, and nutrient status, and to prevent nutrient disorder development.*



## Plant Leaf Tissue Sampling (CEH-6-IG)

*To best identify nutrient disorders or to determine the nutrient status of a crop, growers should sample leaf tissue for nutrient analysis.*



# Vascular Streak Dieback of Redbud: What Plant Pathologists Know So Far

Tara Watkins, Extension Associate, Nursery Crops

There are concerns amongst Kentucky nurserymen and nurserywomen about an emerging disease that is gaining a foothold in the southern growing region of the US and has been making its way closer to Kentucky. Currently, this disease has been confirmed in Georgia, Tennessee, North Carolina, Virginia, and most recently in California. While there have been no cases confirmed in Kentucky by the Plant Disease Diagnostics Laboratories with the University of Kentucky, it is only a matter of time before it is confirmed here.

While redbuds appear to be the primary host affected by this disease, maple, dogwood, magnolia, sweet shrub, spice bush, and wax myrtle have also been found to be affected. Symptoms that MAY be associated with the disease include dieback, defoliation, water sprouts, leaf scorch, and vascular streaking. So far, it has been found to be capable of affecting seedlings, grafted plants, and older stock as well.

A group of researchers at several universities are working together to discover all aspects of this disease. **Below is an article published from Purdue University and Tennessee State University explaining everything that is known about this disease based on work being done at these universities.** We encourage all of our Kentucky growers to read through this to become familiar with the symptoms and current recommended Best Management Practices.

**IF YOU THINK YOU MAY HAVE VASCULAR STREAK DIEBACK IN YOUR NURSERY, PLEASE REACH OUT TO TARA WATKINS ([tara.watkins@uky.com](mailto:tara.watkins@uky.com)). We would like to come collect samples for diagnosis and to monitor the spread of the disease.**

Authors: Janna Beckerman<sup>1</sup>, Tom Creswell<sup>1</sup>, John Bonkowski<sup>1</sup>, and Fulya Baysal-Gurel<sup>2</sup>  
Purdue University<sup>1</sup> and Tennessee State University<sup>2</sup>

## The Problem

In recent years, nurseries in multiple states have reported moderate to severe dieback, chlorosis and stunting of redbud (Fig. 1). Dieback is defined as "the gradual but progressive death of individual branches or shoots from tips toward the main stem." Dieback is a catch-all phrase that describes a constellation of symptoms that include discolored, blighted leaves, followed by wilting, flagging and branch death. Declining trees may produce water sprouts/epicormic shoots below the dead branches. This dieback may continue into the main stem or stems of the tree and ultimately cause tree death. Streaking may be observed within the water-conducting tissue (xylem) of infected branches. This issue is impacting seedlings, grafted plants, older nursery stock produced in container or field production settings and landscape plants.



Figure 1. Discolored foliage, dieback, vascular streaking and injury are a few of the symptoms observed with redbud dieback.

Photos: NCSU Plant Disease and Insect Clinic

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## The Problem Diagnosing the Problem

Multiple laboratories throughout the country have received samples of redbud with symptoms of dieback with vascular discoloration. These laboratories have isolated a diversity of fungi; however, no known redbud pathogens have been identified to date to explain the vascular streaking symptoms. Multiple isolation attempts to check for Verticillium wilt were negative.

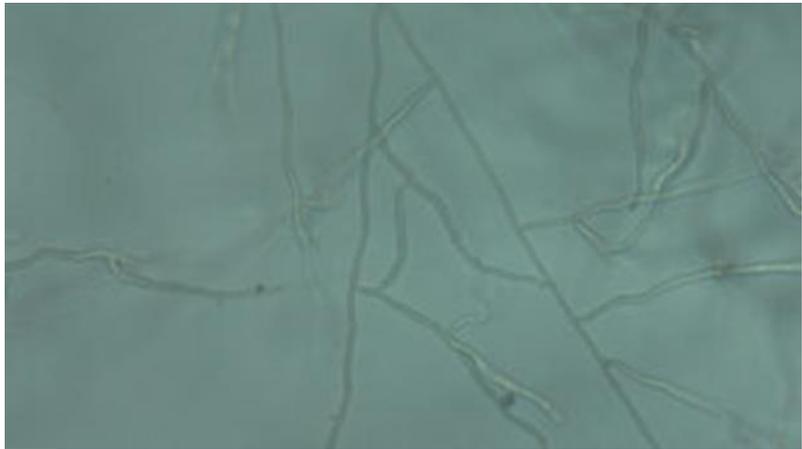


Figure 2. Fungi belonging to the Rhizoctonia complex are characterized by thick hyphae that commonly grow at right angles.

One type of fungus that has been repeatedly isolated from symptomatic

plants has been tentatively named *Rhizoctonia theobromae*. It belongs to the Rhizoctonia complex that includes *Rhizoctonia* species, but also members of *Ceratobasidium*, *Thanatephorus*, and *Tulasnella*. These superficially similar fungi primarily spread via thick hyphae that grow at right angles (Fig. 2). They rarely produce spores, making conclusive identification by microscope alone impossible. Fungi in this group include not only plant pathogens, but also wood-inhabiting endophytes and mycorrhizal associates.

Identifying the causal agent is the first step in diagnosing what is causing this redbud dieback. Remember, these vague symptoms can be due to other plant pathogens and abiotic disorders. To determine if any of these Rhizoctonia-like fungi are causing redbud dieback, Koch's postulates must be performed. Koch's postulates describe a process developed in the 1880s and still used today to reliably and reproducibly confirm that the isolated microorganism is in fact the cause of the observed disease problem. Koch's postulates provide four criteria that need to be fulfilled for an organism to be implicated in causing a specific disease. These criteria are:

1. The causal agent must be consistently associated with symptomatic plants but should not be found in healthy plants.
2. The causal agent must be isolated from a diseased host plant and grown in pure culture (where applicable).
3. Pure culture of the causal agent incites disease when inoculated into a healthy host.
4. The causal agent must again be reisolated from the inoculated, infected host and confirmed as identical to the original specific causative agent.

To date, no one has successfully completed Koch's postulates with the fungus isolated from symptomatic redbud. This is both good and bad news: Good news, in that if this was a virulent pathogen that could spread easily from plant to plant then Koch's postulates would have been confirmed and reported. It is bad news in that we still do not know if a single pathogen is responsible for the symptoms that are being reported in nurseries in multiple states or whether the problems may be attributed to a complex of stress factors or other biotic stressors.

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The fastidious nature of this fungus (hard to isolate, grow and maintain in culture) presents challenges to obtaining sufficient material for DNA analysis and for fulfillment of Koch's postulates.

### **Best Management Practices with Incomplete Information**

It is possible that this issue has been in the United States for some time but has been overlooked and/or misdiagnosed. This problem appears to also involve environmental factors and/or poor cultural practices, so any remediation of underlying problems will go a long way in reducing symptoms and potential infection events. Plants should be planted to the appropriate site, appropriate depth, and properly spaced. Remember, redbud is tolerant of a wide pH range but grows best where the pH is above 7.5; it cannot endure flooding or survive in poorly aerated soils. Drought stress should also be avoided. Keep in mind that redbud are also highly susceptible to phenoxy/2,4-D herbicides and other post-emergent herbicides; care should be taken whenever these are being used around young trees to avoid injury.

Excess nitrogen fertilization has been implicated in increasing plant susceptibility to several plant pathogens. Nitrogen fertility should be on the lean side, 50-100 ppm nitrate when plants are actively growing. Scouting for known pests (borers, Botryosphaeria canker, and Verticillium wilt) coupled with preventative chemical treatments are appropriate along with rigorous sanitation. Any symptomatic plants found during scouting should be sent in for diagnosis. Use only healthy, asymptomatic plants for any type of asexual propagation (chip or bud-grafting).

It is possible that this issue is associated with or exacerbated by co-infections with other soilborne pathogens such as Phytophthora spp., Pythium spp. or Fusarium spp. that are commonly found in woody ornamental nurseries. Proper management of soilborne pathogens might be beneficial in reducing the damage caused by redbud vascular streak dieback issue. At this time, there are no chemical treatments recommendations as a specific pathogen has not been identified. If using preventative fungicide drenches to protect roots against Rhizoctonia and other soilborne pathogens, they should be applied in rotation. **Some recommended rotations include:**

Empress or Heritage (FRAC 11), rotated with

Prostar (FRAC 7) or Medallion (FRAC 12) or Terraguard (FRAC 3).

OR

Mural or Orkestra (both FRAC 7+11) rotated with

Terraguard (FRAC 3) or Medallion (FRAC 12).

**More BMP for tree and shrub production is available at:**

<https://hort.ifas.ufl.edu/woody/documents/BMP-container-production.pdf>

## Register for Now for Christmas Trees 101!

Interested in learning more about Christmas tree production in Kentucky? The University of Kentucky Extension, the Kentucky Horticulture Council, and the Kentucky Christmas Tree Growers Association invite you to join us for a Christmas Tree 101 webinar! This webinar has been designed to give you all the basics you need to know about getting started in Christmas tree production in Kentucky! You will get to hear from experts on marketing, site selection, planting techniques, fertilization, pruning, harvesting, and more. You don't want to miss this. The webinar will be hosted via Zoom on Thursday, October 27 from 9:00 am – 1:00 pm EDT/8:00 am – 12:00 pm CDT.

Click here to register: <https://KYChristmasTrees101.eventbrite.com>

# Christmas Trees 101 WEBINAR

 THURSDAY  
OCT. 27, 2022

 9 AM - 1 PM EASTERN  
8 AM - 12 PM CENTRAL

INTERESTED IN LEARNING MORE ABOUT  
CHRISTMAS TREE PRODUCTION IN KENTUCKY?

Join us for a discussion on  
site selection, planting,  
fertility management,  
pruning and marketing  
your crop

**Register now:**  
<https://KYChristmasTrees101.eventbrite.com>

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# SAVE *the* DATE

January 24-26, 2023

## Kentucky Green

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INDUSTRY CONFERENCE

### WINTER OUTING & EXPO

*presented by KNLA*

Meet us at the Holiday Inn Louisville East!

1325 S. Hurstbourne Pkwy  
Louisville, KY 40222

**January 24** - Business Meeting and Hall of Fame Ceremony

**January 25** - LA, Pesticide & Arborists Presentations, with CEU credits available

**January 26** - LA, Pesticide & Arborists Presentations, with CEU credits available

**Registration will open September 1**

For more information, please contact us at [info@knla.org](mailto:info@knla.org)



The University of Kentucky's **Nursery Crop Extension Research Team** is based out of two locations across the bluegrass to better serve our producers.

The **University of Kentucky Research and Education Center (UKREC)** in **Princeton** serves western Kentucky producers while our facilities and personnel on main campus in **Lexington** serve central and eastern Kentucky producers.

Check out our [YouTube Channel!](#)

Like us on [facebook!](#)

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