

THE PURDUE LANDSCAPE REPORT

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Why Fall Color is Sometimes a Dud

(Rosie Lerner, rosie@purdue.edu)



Nyssa sylvatica (black gum) showing early fall color due to drought stress.

Just as sure as you try to predict the weather, it is likely to change. But going out on a limb, I predict that we will have a bit of a dud for fall color display this year. Not a very risky prediction, considering that many plants already are starting to turn color and/or drop leaves in some areas of the state.

So why would the colors be early and/or a bit duller than usual? Certainly, some of the reason why plants display fall colors has to do with the genetic makeup of the plant. That doesn't change from year to year. But the timing and intensity of fall colors do vary, depending on factors such as availability of soil moisture and plant nutrients, as well as environmental signals such as temperature, sunlight, length of day, and cool nighttime temperatures.

The droughty conditions experienced during much of the second half of summer are likely to have decreased the amount of fall color pigment. Southern Indiana has been particularly parched. Despite recent rains in some areas, much of the state remains designated as abnormally dry to moderate drought. You can check your areas conditions at the US Drought Monitor for Indiana <https://www.drought.gov/drought/states/indiana>. Additional maps and data available from the Midwest Regional Climate Center at <https://mrcc.illinois.edu/cliwatch/drought/drought.jsp>.

Growing conditions throughout the season affect fall color as does current weather. Colors such as orange and yellow, which we see

in the fall, are actually present in the leaf all summer. However, those colors are masked by the presence of chlorophyll, the substance responsible for green color in plants during the summer. Chlorophyll allows the plant to use sunlight and carbon dioxide from the air to produce carbohydrates (sugars and starch). Trees continually replenish their supply of chlorophyll during the growing season.

As the days grow shorter and (usually) temperatures cooler, the trees use chlorophyll faster than they can replace it. The green color fades as the level of chlorophyll decreases, allowing the other colored pigments to show through. Plants that are under stress—from conditions like prolonged dry spells—often will display early fall color because they are unable to produce as much chlorophyll.

Yellow, brown and orange colors, common to such trees as birch, some maples, hickory and aspen, come from pigments called carotenoids, the same pigments that are responsible for the color of carrots, corn and bananas.

Red and purple colors common to sweet gum, dogwoods and some maples and oaks are produced by another type of pigment called anthocyanin, the pigment responsible for the color of cherries, grapes, apples and blueberries. Unlike chlorophyll and carotenoids, anthocyanins are not always present in the leaf but are produced in late summer when environmental signals occur. Anthocyanins also combine with carotenoids to produce the fiery red, orange, and bronze colors found in sumac, oaks, and dogwoods.

Red colors tend to be most intense when days are warm and sunny, but nights are cool—below 45° F. The color intensifies because more sugars are produced during warm, sunny days; cool night temperatures cause the sugars to remain in the leaves. Pigments are formed from these sugars, so the more sugar in the leaf, the more pigment, and, thus, more intense colors. Warm, rainy fall weather decreases the amount of sugar and pigment production. Warm nights cause what sugars that are made to move out of the leaves, so that leaf colors are muted.

Leaf color also can vary from tree to tree and even from one side of a tree to another. Leaves that are more exposed to the sun tend to show more red coloration while those in the shade turn yellow. Stress such as drought, poor fertility, disease or insects may cause fall color to come on earlier, but usually results in less intense coloration, too. And stress or an abrupt hard freeze can

cause leaves to drop before they have a chance to change color. So far, weather conditions lead me to think this will be one of those not so showy fall color years. I hope I am proven wrong!

Update on invasive pests new and old

(Elizabeth Barnes, barne175@purdue.edu)

This year has been a rollercoaster of good (e.g. continued progress on the long term fight against emerald ash borer) and bad (e.g. sudden oak death potentially being introduced into the Midwest) news about invasive species. There's been a lot to keep track of, but don't worry if you've missed anything. You can learn all the details, get a chance to ask experts questions, and get CE credit (ISA, CCH, SAF, Master Gardeners and Naturalists, etc.) in this fall's free EABU webinars.

Register to watch live or later at

<http://www.emeraldashborer.info/eabu.php>

Can't watch it live? No problem! All webinars are recorded and posted online after the talks. Make sure to register to be notified when the videos are posted.

CEU credits will be offered (ISA, CCH, SAF, Master Gardeners and Naturalists). Contact Elizabeth Barnes at barne175@purdue.edu for more details.

Cover photo by Daniel Herms, The Ohio State University, Bugwood.org

Fall 2019 Schedule

Putting urban ash wood to good use - lessons from the Urban Wood Network

Don Peterson, Urban Wood Network

Oct. 2nd at 11:00 AM EST

Register here:

https://msu.zoom.us/webinar/register/WN_STpdEZZXsdGRW86vtnaH8w

Don Peterson, Executive Direction of the Urban Wood Network, will discuss how networking together benefits local urban wood economies for cities, towns and their residents and business owners. Don will present municipal models used by Urban Wood Network members that have allowed them to reduce costs associated with disposal of emerald ash borer affected trees through increased wood utilization. These models demonstrate more than just saving trees from a waste stream, they also bolster local industries.

Update on Emerald Ash Borer Biocontrol

Juli Gould, USDA APHIS

Oct 9th at 11:00 AM EST

Register here:

https://msu.zoom.us/webinar/register/WN_HWafXyTIQtO7Y3m4C18E5A

Emerald ash borer has spread across much of the United States leaving a path of destruction behind it. There are many effective ways to keep individual trees alive, but long term, widespread solutions are needed if North American ash trees are to be saved. Biocontrol can be just such a solution. This talk will cover the efforts of the USDA to implement EAB biocontrol.

Life After Shipment: Sudden Oak Death and the Nursery Industry

Janna Beckerman, Purdue University

Oct 16th at 11:00 AM EST

Register here:

https://msu.zoom.us/webinar/register/WN_OXy_l3Q0Sc-9pp9zlg2xlA

In 2019, *Phytophthora ramorum*-infected plants were found in plant nurseries in Indiana, Iowa, Illinois, Kansas, Missouri, Nebraska, Oklahoma, and Washington. This talk focuses on the diagnosis and etiology of *Phytophthora ramorum*, and provides tactics for the management and mitigation of *Phytophthora* species in the landscape.

The Unusual Case of Minnesota and EAB

Val Cervenka, Minnesota Department of Natural Resources

Nov 20th at 11:00 AM EST

Register here:

https://msu.zoom.us/webinar/register/WN_kbwUwabT4-s8oRiKk9NTA

Minnesota has more ash trees than any other state in the country with more than 1.2 billion ash trees and over 1 million acres of black ash. These forests present unique management challenges due to high water tables, remote access and frozen soil requirements for timber operation. New research conducted by the USFS and University of Minnesota on the ecological impacts of different harvesting methods has stimulated a reevaluation of black ash forest management. A review of black ash native plant communities, harvest levels, silvicultural practices and case studies will be presented.

Where are all the gypsy moths? The biology of invasive species and the pathogens that kill them

Ann Hajek, Cornell University

TBD

Hosta - Late Summer Decline

(Tom Creswell, creswell@purdue.edu)

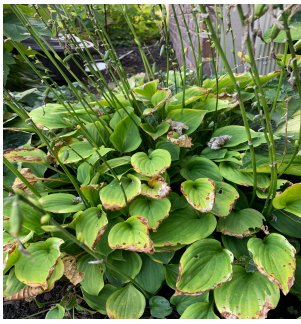


Figure 1. A combination of problems contribute to poor appearance in late summer.

If your hostas are looking a little ratty recently you're not alone (all the photos here are from my garden). Hostas at this time of year tend to have marginal scorch, dieback, leaf spotting and yellowing. A variety of factors may contribute to these symptoms including environment, diseases and insect pests.

Anthracnose, caused by the fungus *Colletotrichum*, shows up frequently on hosta and contributes to leaf yellowing, spots and marginal dieback. Leaf spots caused by *Cercospora* and other fungi, along with slug damage are usually present to some degree and contribute to decline in late summer as well. Insects like blister beetles, grasshoppers and cutworms may chew on hosta leaves and petioles, leaving ragged leaves behind (although you may not catch them in the act). Deer, rabbits and voles all seem to think hosta is a tasty snack, but those problems will have to wait for a future article.



Figure 3. *Cercospora* leaf spot on a white variegated variety.

Normal senescence of lower leaves is to be expected, but factors such as growing in too much sun, inadequate soil moisture or excess fertilizer can cause more rapid decline. When hosta is growing in good conditions these symptoms tend to show up later in the year and affect fewer leaves overall. Some varieties of hosta, especially those with light green leaves or heavily variegated leaves, tend to be more prone to these problems than others. Fungicide and insecticide treatments are generally not needed since the main problem is one of growing conditions.



Figure 2. Anthracnose is usually seen together with other problems, like *Cercospora* leaf spot.

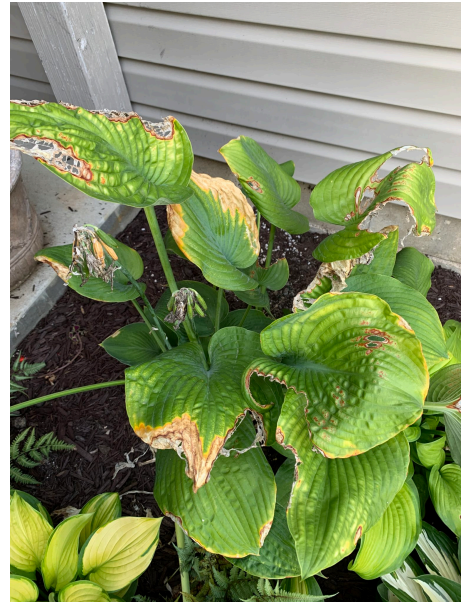


Figure 4. This hosta was robust and healthy in past years but is showing scorch symptoms after being transplanted into a location with more sun and reflected heat from the wall.



Figure 5. These hosta are struggling with drought stress due in

part to competition with the tree they are planted near.

Some suggestions to minimize these problems:

- Select robust varieties that are suited for the location and don't plant in high stress sites; such as full sun or close to the base of trees where tree roots will compete for root space, water and nutrients.
- Mulch properly to conserve moisture and reduce weed competition
- Fertilize lightly during the spring as new growth begins.
- Irrigate during dry summer periods to avoid extremes in soil moisture.
- Remove all dead foliage and flower stalks after frost to reduce build up of Colletotrichum and other pathogens.

If you run into problems you can't identify consider submitting a sample to the Plant and Pest Diagnostic Lab:

<https://ag.purdue.edu/btny/ppdl/Pages/default.aspx>

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