

MESSENGER-INQUIRER



October 7, 2023

Leaves Seem to Magically Change Color in the Fall

The green leaves of trees and shrubs seem to magically turn beautiful shades of yellow, orange, and red. How does this happen? Why are the leaves not all the same color?

Most tree and shrub leaves are green in the summer because of large amounts of chlorophyll within each leaf. Chlorophyll is a green pigment that combines with sunlight to produce the needed food for tree growth during a process called photosynthesis. Other colors are present in leaves, but the large amount of green chlorophyll masks these colors.

As the day length shortens in the fall, a response is triggered in the tree to start shutting down the production of chlorophyll and signals the leaves to form a cork layer of cells at the base of each leaf. This prepares the trees for winter. As the flow of water and minerals in the leaves is restricted, chlorophyll is not replaced. The leaf pigments of yellows, oranges, and browns of carotenoids are revealed.

The production of the anthocyanins group of leaf pigments depends on the breakdown of sugars trapped in the leaves in the presence of bright light later in the summer. The anthocyanins produce blue, purple, and red colors. Their brilliance is affected by the amount of light received.

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The colors of the leaves of the different types of trees are programmed genetically, and they vary in their ability to manufacture the pigments. Plants such as sumacs, red maples, dogwood, viburnum, sourwood, and black gum produce large amounts of anthocyanins in the leaves. Elms, ginkgo, hickory, tulip poplar, and birch produce mainly xanthophyll in the leaves, which makes them golden yellow in color. It is nice to have a variety of trees and shrubs in our landscapes and forests, which produce a wide spectrum of colorful leaves.

The white pine is one tree that we do not think about having fall color. Some yellow needles will appear among the green needles.

In the fall, pines lose a portion of their leaves, which we refer to as needles because of their needle-like shape. Different types of pines vary in the length of time they keep their needles. White pines generally shed about every two years; others, such as the Austrian pine can retain their needles for five to six years.

Unlike other pines, white pines attract attention because their needles turn bright yellow before falling. Yellow needles are highly visible among the green needles in the fall. Other pines may drop their leaves green.

The white pine can be identified by the five needles per needle bundle. The soft, flexible needles are about 2 to 4 inches long and hang downward.

Pines drop their needles after a genetically determined time when the needles consume more energy than they produce. In addition, by dropping the needles in the fall, trees reduce areas where water is lost during the dormant winter season.

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The sudden yellowing of the white pine needles may look like the tree is being attacked by an insect or disease, or under stress due to environmental conditions. To determine if the needles are turning brown due to normal needle fall, look to see where the yellow needles are located. Normal needle fall of white pine and most other pines will have the innermost needles of the limbs, closest to the main stem of the tree, turning brown. Throughout the entire tree on the innermost branches, the needles will be a uniform color of yellow or brown. Normally, the needles will change to a brownish-yellow first, and then abruptly brown. Early in the winter, the needles will fall to the ground again, leaving the tree uniformly green for spring.

A diseased, insect damaged, or environmentally stressed tree has needles turning from green to brown on the tips of the branches while still green toward the inside of the tree. In addition, you may notice that the brown needles appear sporadically throughout the tree or only in one section of the tree.

One way to prevent some problems with white pines is to plant them in a favorable site. The site should have a soil pH of 5.5 but not above 6.4. The soil should be sandy or loamy rather than clay. A large area for root development is also necessary. Avoid areas with compacted soil.

The brightest leaf colors develop when autumn days are sunny and cool, along with nights that are chilly but not freezing. For more information about fall leaf color, contact the Daviess County Cooperative Extension Service Office at 270-685-8480 or annette.heisdorffer@uky.edu.

Annette's tips for the week:

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Two of the woody plants that usually reveal fall color first are black gum and sumac trees. They stop making chlorophyll early. The leaves change from green to red, leaf by leaf. The leaves are described as not all green or red at the same time, resulting in a spotty appearance throughout the trees.

As I look at my amaryllis bulbs, I would like to get them to bloom again. During this process, an amaryllis bulb saved from last year should have a rest period of about two months before encouraging it to bloom again. The rest period is forced by withholding water from it. Bring it inside if it was outside in a pot or planted in the ground. Let the leaves die. Remove the dead leaves and store the bulb where it will not freeze. Wait four to eight weeks and watch for the growing process to begin again.

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