

Pause for Plants, October. Why turn red?

In spite of less than ideal local weather, the Upstate is showing some fall color now. Ever wonder why leaves turn red and/or yellow and some lovely shades in between? Turning yellow is pretty easy to explain. As winter approaches fall leaves stop making their green chlorophylls, "leaving" behind the brilliant yellow pigments called carotenoids. Thus we get the bright lemon and golden yellow colors of Elms, Pecans, and Tulip Magnolias, also known locally as Yellow Poplar. Not so with the red pigment anthocyanin. In the "September" of their lives, some leaves produce this pigment and blush red. Familiar examples, now blushing in our region, include native trees such as Dogwood, Red and Sugar Maple, Scarlet, southern Red and other Oaks, Sweetgum, and Sassafras. Exotics now showing red color include Crepe Myrtle and (Dare I mention?) Bradford Pear. And there are blushing native shrubs such as Smooth and Winged Sumac and vines like Virginia Creeper and, yes, Poison Ivy!



Leaves collected in Due West SC. Beginning at the top, then clockwise, White Oak, Sweetgum (2 leaves, small red and larger deep maroon), Dogwood, Red Maple, Virginia Creeper, Sassafras, Sugar Maple, and (in the center) three Crepe Myrtle leaves.



Brilliant red leaves of Winged Sumac.



Fall color on Main Street in Due West. SC. Foreground left, Dogwood, right Japanese Maple. Background, and upper right yellow leaves of Winged Elm.



Fall color of Poison Ivy.

Botanists continue to research in order to understand how leaves use these red pigments (anthocyanins) just before they fall from trees and other deciduous plants. One hypothesis is that anthocyanins protect leaves from damaging overloads of light, sort of like a sunscreen! In Autumn when chlorophyll levels of leaves are dropping, intense light can shut down photosynthesis by what's called photoinhibition. Anthocyanins permit leaves to continue to make food even with lower levels of chlorophyll. Thus, trees can continue to store food energy right up until its leaves separate from the branches. It appears that plants whose leaves turn red actually hang on to those leaves longer. At least one study has found that red leaves in Sugar Maples show delayed aging and leaf fall.

Anthocyanins are also very strong antioxidants which protect leaves from bursts of hydrogen peroxide, produced when they are damaged by predators. But if anthocyanins protect plants in a number of ways, why do only some plants have leaves that turn red? Other than differences in heredity, this hasn't as yet been explained.

And then consider tropical plants, many of whose young leaves are bright red, turning green with age. Research has shown that some of these young red leaves contain antimicrobial chemicals. One study found antifungal chemicals which protect leaves from ant species who use them for fungus gardens in their nests! Will wonders never cease?

As far as we humans are concerned, medical research has repeatedly demonstrated that anthocyanins can protect our tissues from tumor-inducing agents. So, have you had your antioxidant rich helpings of blueberries, blackberries, cranberry and pomegranate juice, or red cabbage today? Or how about a salad of red maple, dogwood, and sweetgum leaves? Just kidding about those leaves, but we should get as many helpings of anthocyanins and other antioxidants by eating good helpings of fresh fruits and vegetables each day.