

WHY & HOW LEAVES CHANGE COLOR

It's getting to be that time of year. Cooler nights, simply beautiful days and of course the Fall colors. It becomes a mad dash for me at this time of year. I want to be at so many different places at the same time. So what I do, is to pick at least 4 special places each year, that we make a point of visiting during the color months. A good way to start in making a decision like this is to understand what is happening with the trees and foliage at this time of season. Leaf color comes from pigments. Pigments are natural substances produced by leaf cells. The three pigments that color leaves are:

- *chlorophyll (green)*
- *carotenoid (yellow, orange, and brown)*
- *anthocyanins (red)*

Chlorophyll is the most important of the three. Without the chlorophyll in leaves, trees wouldn't be able to use sunlight to produce food.

Carotenoid create bright yellows and oranges in familiar fruits and vegetables. Corn, carrots, and bananas are just a few of the many plants colored by carotenoid.

Anthocyanins add the color red to plants, including cranberries, red apples, cherries, strawberries and others.

Chlorophyll and carotenoid are in leaf cells all the time during the growing season. But the chlorophyll covers the carotenoid -- that's why summer leaves are green, not yellow or orange. Most anthocyanins are produced only in autumn, and only under certain conditions. Not all trees can make anthocyanins. Certain broadleaf trees are noted and can be uniquely identified by their brilliant fall leaf color. In some cases a tree's common name is derived from it's primary autumn leaf color. The most common leaf colors of fall are red, yellow and orange and some species can express several of these colors simultaneously.

Trees respond to the decreasing amount of sunlight by producing less and less chlorophyll. Eventually, a tree stops producing chlorophyll. When that happens, the carotenoid already in the leaves can finally show through. The leaves become a bright rainbow of glowing yellows, sparkling oranges and warm browns. When a number of warm, sunny autumn days and cool but not freezing nights come one after the other, it's going to be a good year for reds. In the daytime, the leaves can produce lots of sugar, but the cool night temperatures prevent the sugar sap from flowing through the leaf veins and down into the branches and trunk. Anthocyanins to the rescue! Researchers have found out that anthocyanins are produced as a form of protection. They allow the plant to recover nutrients in the leaves before they fall off. This helps make sure that the tree will be ready for the next growing season. Anthocyanins give leaves the bright, brilliant shades of red, purple and crimson.

The yellow, gold and orange colors created by carotenoid remain fairly constant from year to year. That's because carotenoid are always present in leaves, and the amount does not change in response to weather. The amount of rain in a year also affects autumn leaf color. A severe drought can delay the arrival of fall colors by a few weeks. A warm, wet period during fall will lower the intensity, or brightness, of autumn colors. A severe frost will kill the leaves, turning them brown and causing them to drop early. The best autumn colors come when there's been:

- *a warm, wet spring*
- *a summer that's not too hot or dry, and*
- *a fall with plenty of warm sunny days and cool nights.*

Now after all that Science talk, here is the fun part. You can use fall leaf color to help identify different tree species. It is also a great way to almost select what kind of Fall color viewing you would like to experience. Are you feeling mellow-yellow, do you want to be slapped with those brilliant reds and scarlets, use some of the Science discussed here and the general rules of thumb list below, to help you enjoy the Fall season even more.

- **Oaks:** red, brown or russet
- **Hickories:** golden bronze
- **Dogwood:** purple-red
- **Birch:** bright yellow
- **Poplar:** golden yellow
- *Maple trees show a whole range of colors:*
- **Sugar Maple:** orange-red
- **Black Maple:** glowing yellow
- **Red Maple:** bright scarlet

Didn't think you could design your very own Fall color experience, did you? Well these things really do work and can be used to do just that. Enjoy the splendor of the Fall colors. GO GET OUTDOORS!