

# Fall Color - How Does That Happen?

by Carol Bray, Isanti County Master Gardener

The multitude and subtleties of colors found in nature year-round, but especially in the autumn, are spectacular and are copied in every man-made object we see.

The science of fall color is intriguing. There are three basic pigments for fall color. Chlorophyll, which gives leaves their basic green color. And, we might already know that chlorophyll is necessary for photosynthesis, the chemical reaction that enable plants to use sunlight to manufacture sugars for their food. Our trees store these sugars for winter dormancy. Carotenoids produce yellow, orange and brown colors in such things as carrots, corn, rutabagas, etc. Finally, anthocyanin gives colors to such food as apples, cranberries, blueberries, etc. They are water soluble and appear in the watery liquid of leaf cells.

Chlorophyll and carotenoids are present in the leaf cells throughout the growing season whereas most anthocyanins are produced in the autumn---due to bright light and excess plant sugars within the leaf cells.

Chlorophyll is continually produced, but as night length increases in the fall, chlorophyll production decreases and stops and then is destroyed. At this point, the carotenoids and anthocyanins are the pigments that are still viable and responsible for fall color.

Fall colors are characteristic by species. And, the timing of the color change varies by species. The differences in timing among species seem to be genetically inherited.

The amount and brilliance of the fall colors are related to weather conditions that occur before and during the time chlorophyll in the leaves is dwindling. Temperature and moisture are the main factors. A succession of warm, sunny days and cool and crisp but not freezing nights seem to be the key ingredients to the loveliest of color displays. Lots of sugar and light spur production of the brilliant anthocyanin pigments—reds, purples and crimson. Because carotenoids are always present in leaves, the yellow and gold colors remain pretty much constant year to year.

The amount of moisture in the soil affects colors. And, because we never have identical seasons of weather, we will never have two displays of autumn colors that are *exactly* alike. A late spring or summer drought, will delay fall color whereas a warm period during fall will lower the intensity of fall color. A warm and wet spring with good summer weather and warm and sunny fall days with cool nights is the recipe for the most brilliant autumn colors. I think the recipe this year is delicious.

For more information, visit Isanti County Master Gardeners website at <http://isanticountymastergardeners.com/>, U of MN Ext website at [www.extension.umn.edu](http://www.extension.umn.edu) or call the Isanti Co. Master Gardeners at 763 689 8254. You can also visit us on Facebook: Isanti County Master Gardeners.