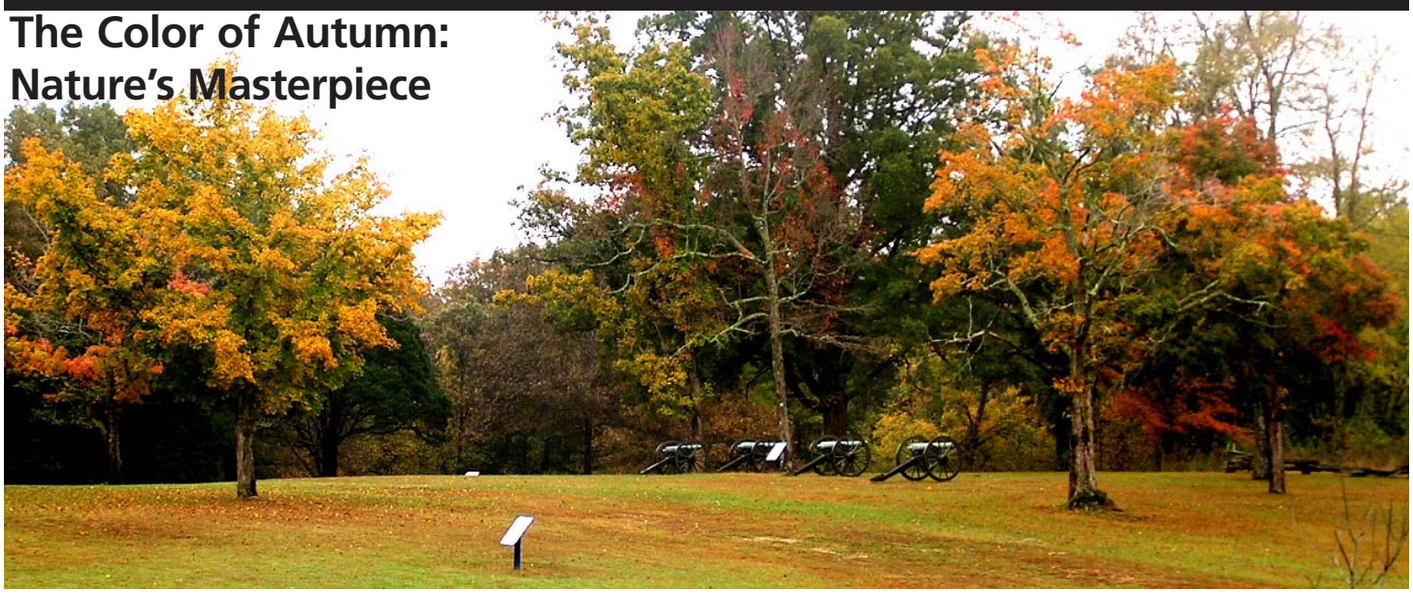
Shiloh

National Park Service
U.S. Department of the Interior

Shiloh National Military Park
Tennessee-Mississippi

The Color of Autumn: Nature's Masterpiece

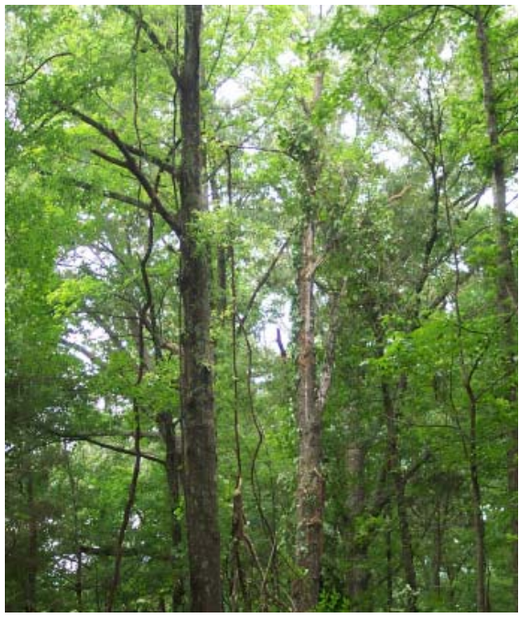


The Arrival of Autumn

Autumn is a season of change. The appearance in leaf color from green to a variety of shades such as red, yellow, orange, and brown is its signature and the reason that many people enjoy this season the most. But what causes the leaves to change colors? Why do specific colors express themselves in some trees, and not in others? Why do leaves of trees appear brighter and more vivid in one region of the country than another?

Why are Leaves Green?

Plants are producers of their own food in a process called photosynthesis. Photosynthesis is a reaction between light, water, carbon dioxide, and a pigment called chlorophyll to produce sugar (the plant's food) and oxygen. Chlorophyll is the most abundant pigment in most all plants, and is essential in a plant's survival. It absorbs all colors except green, and is the reason why leaves appear green in the growing seasons. In the autumn months, the days get shorter and the temperature gets cooler. Plants respond by ceasing chlorophyll production and eventually losing their leaves. As the chlorophyll disappears, the green fades away, and other pigments in the leaf begin to show. These pigments can be divided into 3 categories: carotenoids, anthocyanins, and tannins.



Chlorophyll causes the green in trees.

Anthocyanins

Anthocyanins in various leaves.

Anthocyanins are pigments found in certain species of plants. However, they are not stored in the leaves, like chlorophyll and cartenoids are. They are dissolved in the sap of the plant. This occurs when the leftover sugars produced by photosynthesis mix with certain proteins. When the weather conditions are right, the sap will rise into the leaves. As a result, the leaf will appear anywhere from a bright red to a dark crimson color. These are the first colors to show up in the fall. The trees and shrubs which exhibit this color are red oaks, sweetgum, black cherry, sumac, black gum, and maple.

Carotenoids

Carotenoids are common pigments found in the leaves of most plants. They are used as a secondary light-absorbing pigment to chlorophyll. The chemical make-up of carotenoids is more stable than chlorophyll. As the chlorophyll decomposes and fades away in autumn, the carotenoids are left behind and give the leaf an orange or yellow color. They are the same pigments found in carrots and corn. These colors are usually seen in the leaves after the anthocyanins appear. The trees exhibiting this color are elms, hickories, black walnuts, yellow poplars, and maple.

Carotenoids make leaves turn yellow.

Tannins

Tannins make leaves turn brown.

Tannins are chemicals found in almost every living plant. They occur in large amounts in oaks, as well as beech and chestnut trees. As fall continues and the weather changes, the chlorophyll production ceases, permitting the tan to dark brown color of the tannins will become visible. They are usually the last pigment seen in the fall and will not be visible until after the carotenoids and anthocyanins have disappeared or become less abundant.

Perfect Weather for Expression

Autumn leaf color will be expressed more or less vivid, depending on regional weather conditions. The best conditions which produce the brightest and most vivid color are:

- Sunny days
- Cool nights
- Low humidity (drier weather)
- Low precipitation

Annually each autumn, these weather conditions routinely occur in the northeastern United States, and it is this region where the autumn colors traditionally express themselves in grand splendor.

Shiloh's Canvas

Shiloh National Military Park is populated with a variety of tree species that display remarkable autumn colors. We invite you to plan your fall visit here and enjoy this season of change with us.