Fall Color

November 12,2021

This has not been the greatest year for fall color.

It has essentially been bad weather for color. A combination of dry summer and warm fall has inhibited much, but not all, of the tree beauty.

Certainly, some of the reasons why plants display fall colors have to do with the genetic makeup of the plant. That doesn’t change from year to year. The timing and intensity of fall colors do vary depending on many factors. The availability of soil moisture and plant nutrients, as well as environmental signals such as temperature, sunlight, and the length of day. The droughty conditions experienced over much of the summer decreased the amount of fall color pigment.

Growing conditions throughout the season affect fall color as does current weather. Colors such as orange and yellow, which we see in the fall, are actually present in the leaf all summer. However, those colors are masked by the presence of chlorophyll, the substance responsible for the green color in plants during the summer. Chlorophyll uses sunlight and carbon dioxide from the air to produce carbohydrates (sugars and starch), which the tree uses for food. Trees continually replenish their supply of chlorophyll, which is used up in making food during the growing season.

As the days grow shorter and temperatures cooler, the trees use chlorophyll faster than they can replace it. The green color fades as the level of chlorophyll decreases, allowing the other colored pigments to show through. Plants that are under stress–from conditions like prolonged dry spells–often will display early fall color because they are unable to produce as much chlorophyll.

Yellow, brown, and orange colors, common to such trees as birch, some maples, hickory, and aspen, come from pigments called carotenoids. The same pigments that are responsible for the color of carrots, corn, and bananas.

Red and purple colors common to oaks, sweetgum, dogwoods, and some maples are produced by another type of pigment called anthocyanin. The same pigment responsible for the color of cherries, grapes, apples, and blueberries. Unlike chlorophyll and carotenoids, anthocyanins are not always present in the leaf but are produced in late summer when environmental signals occur. Anthocyanins also combine with carotenoids to produce the fiery red, orange, and bronze colors found in sumac, oaks, and dogwoods.

Red colors tend to be most intense when days are warm and sunny, but nights are cool–below 45 F. The color intensifies because more sugars are produced during warm, sunny days, the cool night temperatures cause the sugars to remain in the leaves. Pigments are formed from these sugars, so the more sugar in the leaf, the more pigment, and, therefore intense colors. Warm, rainy fall weather decreases the amount of sugar and pigment production. Warm nights will cause what sugars are made, to move out of the leaves so that leaf colors are muted.

Leaf color also can vary from tree to tree and even from one side of a tree to another. Leaves that are more exposed to the sun tend to show more red coloration while those in the shade turn yellow. Stress such as drought, poor fertility, disease, or insects may cause fall color to come on earlier but usually results in less intense coloration, too.

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