

**Fall Colors of Trees** - Part of the allure of fall foliage is color variation. There are trees that turn red, purple, yellow, orange and brown. Why is this?

Specific plant pigments determine individual colors. Foliage derives its normal green color from chlorophyll, the substance that captures the energy of the sun. Other pigments produce fall colors. Reds and purples are caused by anthocyanins, yellows by xanthophylls, and oranges by a combination of carotenes and xanthophylls. Browns are the result of tannins present in the leaf. Most of these substances are present throughout the growing season but are masked by the green color produced by chlorophyll. Anthocyanins are the exception and are produced after the chlorophyll is destroyed in the fall.

If you have ever seen pictures of New England in the fall, you have probably wondered why trees in Kansas usually do not color as well. This difference is partly because of the tree species prevalent in New England. Certain oaks and maples naturally produce good color. Coloring also is influenced by the weather.

Warm, sunny days and cool nights are ideal for good color. The sunny days encourage photosynthesis and, thus, sugar accumulation in the leaves. As fall progresses, each leaf develops an abscission layer at the base of the petiole, or leaf stem, that prevents these sugars from being transported down the trunk to the roots for storage. This high sugar content in the leaves produces more intense colors. Cloudy days and warm nights prevent some of the sugar accumulation in the leaves and results in less vibrant colors.

Weather during other parts of the growing season also can have an effect. Heavy rains in the early spring or hot, dry weather during the summer can both have a deleterious effect on fall color. The length of time a tree maintains fall color also depends on weather. Reds, yellows and oranges are short-lived when trees undergo frosts and freezes.