

Year Round Gardening

What happens to deciduous trees and shrubs in the autumn? Why do leaves turn different colors and then fall off?

Fredricka Bogardus, Colorado Master Gardener

“Autumn is a second spring when every leaf is a flower.” Albert Camus

Fall changes to deciduous trees and shrubs are often thought to be due to cooler temperatures. Shortening days are a much more significant influence on the change.

In autumn daylight hours become shorter, and there is less light available for photosynthesis. During the growing season cells containing chlorophyll, enable trees to produce carbohydrates from light, carbon dioxide in air, and various other nutrients taken up by the roots of the tree. Once the light wanes that process is less efficient. The tree responds by not producing any more chlorophyll, thus shutting down photosynthesis. The chlorophyll produced earlier in the season deteriorates, removing the dominant green color from the leaves. The yellow and orange pigments (carotenes and xanthophylls) which have been there all summer, are now visible.

Red colors are another story. Trees that turn red actually produce new pigments (anthocyanins) in autumn. These are same kind of pigments that you find in blueberries. There are several theories why some trees produce this pigment in autumn. One theory is that it prevents the leaves from getting a sunburn as the green pigments fade away.

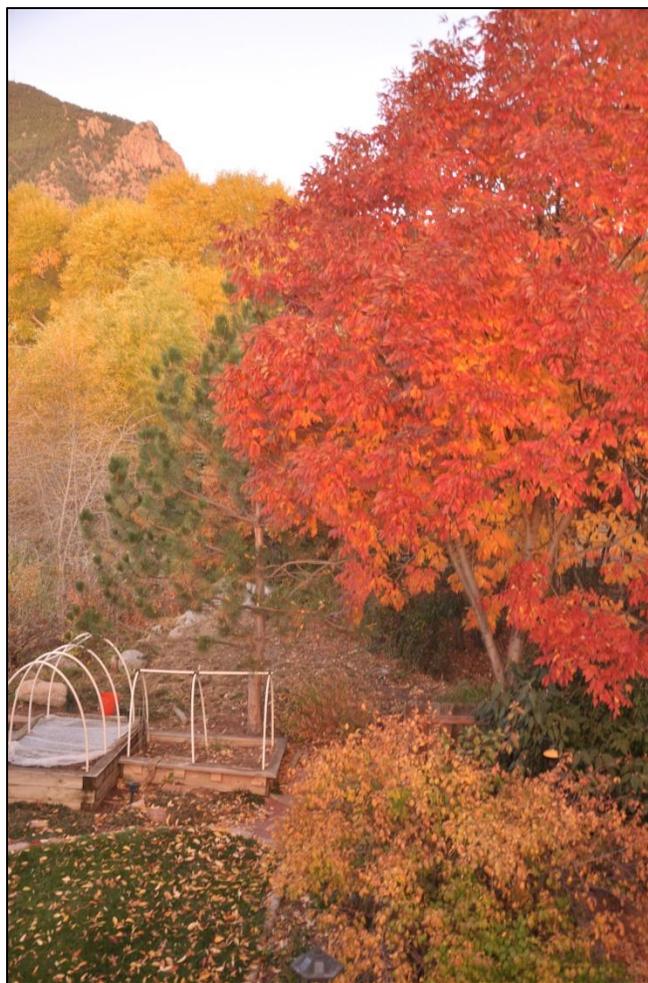


Photo courtesy of Freddie Bogardus

The final color change in autumn is to brown. The yellow and orange pigments are eventually broken down, leaving only brown pigments (tannins) in the leaf.

Since the leaves, bereft of chlorophyll, no longer produce carbohydrates the tree prepares to 'let go' of the leaves. Not all deciduous trees go through this process in autumn, but the vast majority do. The zone on the twig where the leaf attaches is called the abscission layer. This layer allows transport of nutrients and water from the roots to the leaves, and transfer of carbohydrates from the leaves to the roots for storage. That layer is formed in spring. In autumn the tree produces a layer of dry, corky cells at the abscission layer that basically cut off the link between the woody material and the leaf. Since the leaf is cut off, it will fall off.

You may notice that different parts of a tree will be in different stages of these processes. That is because there can be microclimates within different parts of the same tree canopy

Weather during the growing season can influence the quality and duration of the fall colors. Spring drought can cause leaves to shut down and fall off earlier than usual. Sunny and dry conditions in the summer will favor better leaf color. While it is important to make sure trees are adequately watered during the warm months, long rainy periods will mitigate against brilliant fall displays. In autumn windy days will shorten the display time.

October is a great month to determine if some fall color might be a good addition to your garden. One of the attributes deciduous plants can add to a landscape is dramatic color change before the leaves fall. In Colorado yellows and oranges predominate in our fall color, adding a brilliant red tree or shrub can be like splashing paint across a canvas. Next spring perhaps you will think about fall colors as you shop for trees and shrubs.

When you have questions, Colorado State University Extension has research-based answers. Get answers to your horticulture questions by visiting ask.extension.org any time day or night. Follow the El Paso County Master Gardeners on www.facebook.com/ColoradoMasterGardeners.EPC/.

Add Some Reds to Your Autumn Palette

Autumn Blaze® Maple (*Acer X freemanii* 'Jeffsred')

- Large tree up to 50 feet tall and 40 feet wide

'Hot Wings® Tatarian Maple (*Acer tataricum* 'Garann')

- Small tree up to 25 feet tall and 20 feet wide
- will dazzle all summer with bright red samaras (seed pods), and then in fall the leaves turn brilliant orange red

Cut Leaf Sumac (*Rhus typhina* 'Laciniata')

- Large shrub small tree
- Bright red leaves with a reddish pyramidal fruit, fruit persists through winter
- Can sucker aggressively, give it plenty of room

Burning bush (*Euonymus alatus*)

- Brilliant red foliage
- Can be big, standard form can grow up to 20 feet tall and wide
- Cultivar 'compactus' is not as big, but can easily reach 10 feet tall and wide