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# THE COLORS OF AUTUMN

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Autumn color is a mystery to us gardeners. Is fall color really caused by the weather? Why was the tree red when I bought it at the nursery but is now yellow every year? And why is my "Burning Bush" pink? Shouldn't it be a flaming red instead of flaming pink? Besides spray paint, is there anything that I can do to make it red? Gardeners can get better fall color without resorting to red spray paint. Following is the how and why of fall color, a sort of Basic Fall Color 101 for Gardeners.

## The Autumn Influence

The length of the day is the factor that influences autumn colors the most. As the days grow shorter, the increasing darkness signals the tree to begin preparing for winter dormancy. The base of each leaf has a special layer of cells called an "abscission" or separation layer, and the increasing darkness signals deciduous trees to cut the production of hormones. In turn, the abscission cells swell and form a corky material that then reduces the flow of food and water to the leaf, eventually resulting in the death of the leaf. This process is called senescence, which means "growing old."

## Fall Colors Revealed

As the flow of food and water is restricted, the chlorophyll breaks down and begins to disappear, and the underlying orange and yellow carotenoid pigments and yellow xanthophylls pigments are revealed. This process is similar to a ripening banana. The banana doesn't "turn yellow", rather as the banana ripens, the green chlorophyll breaks down and disappears revealing the more appetizing yellow pigments. Red color is strongly influenced by genetics which influence a different pigment, anthocyanin, within the leaf. However, unlike the yellow pigments which are present but hidden throughout the growing season, these red pigments are made in the fall.

As autumn progresses, the leaves are unable to move food and water as efficiently through the thickening corky layer at the base of the leaf. Sugars build up in high concentrations in the leaves and are converted through a chemical action into anthocyanin pigments that turn the leaf the vivid reds, crimson, purples, and scarlet that we associate with autumn.

Warm sunny afternoons and cool nights accentuate this change; the warmth and sunshine during the day promote the production of sugars in the leaves, while the cool nights cause further swelling of the corky cells, which keep the sugars in the leaves where they build up and are turned into glowing red pigments, resulting in red color without spray paint!

## The Genetic Connection

Genetics also plays a part in fall color. The genetic background of each kind of tree determines whether it turns pale yellow, bright orange, scarlet red, or a combination of colors. Genetics can influence the intensity of the color, as well as the sensitivity to environmental factors. In some instances, it can contribute to the length of time that the tree puts on a color show.

Some trees have the genetic ability to hang onto their leaves through the winter. Some people dislike this trait, but it does seem to extend fall color. Pin oaks, for example, hold onto many of their leaves until the following spring so the leaves appear to go through a very long cycle of yellow and red, turning to russet, then to a rich chestnut brown.

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## Maximizing Fall Color

We can't control the cool night temperatures nor the warm afternoon temperatures, but gardeners can plant to maximize the amount of sun a plant receives, and in turn, red pigment production. Leaves might turn red with inadequate sunlight but color will definitely be enhanced with good light. For example, shrubs like Burning Bush (*Euonymus alatus*) are a brilliant red when planted in the sun, but are pink when grown in the shade.

Other garden practices that are favored are withholding fertilizer as autumn approaches and reducing irrigation in fall. Many gardeners believe that these practices are beneficial for good fall color. Although these alone won't induce fall color if other factors aren't present, the premise behind these practices is to induce plants to enter dormancy sooner. Research practices are but observation seems lend some support to these theories. Regardless, they are good garden practices for other valid horticultural reasons.

## Selecting Trees for Fall Color

Choosing a tree or shrub with the best fall color is an individual decision. There is no single tree with the best fall color. Some people want red leaves, others want gold, and still others want the tree that their grandparents grew. However, the first consideration when choosing a tree should be site, cultural conditions, and eventual size of the tree.

After a tree is selected that is suitable for the location, gardeners can either select specific cultivars propagated for superior fall color if these are available, or they can choose trees in the fall when the trees are showing their fall colors. When selecting a site, they can plant a tree where the tree receives a sufficient amount of sunshine to assist in the production of red pigments. And last, gardeners can revel in the once-a-year pageant of glorious reds, oranges, and gold, and the wonder and mystery of the season.

## References

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