

FALL COLOR AT JASPER RIDGE FROM TONI CORELLI

Who says we don't get "fall color." Look around you now at Jasper Ridge and you will see the signs of fall as leaves begin to change their color and fall to the ground. The plants that lose their leaves completely are deciduous, Latin for "to fall off." These plants will now begin their fall-winter resting period.

Leaf color change is a product of environmental conditions and the naturally occurring pigments within the leaf. "Fall color" is dependent on the amount of moisture, temperature levels, and shorter day length as the seasons change from summer to fall. Heightened color comes when there are warm, bright days, and cool, crisp but not freezing nights.

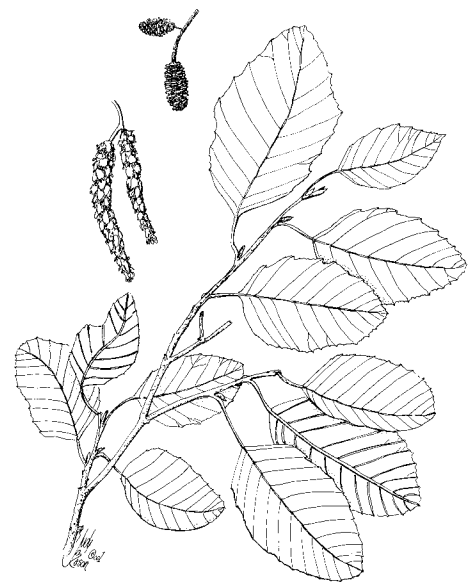
The pigments responsible for leaf color are chlorophyll, carotenoids, and anthocyanins. Chlorophyll and carotenoids are present in the chloroplasts of leaf cells throughout the growing season. Carotene aids in the production of chlorophyll. During the growing season, chlorophyll is continually being broken down and produced. For the deciduous plants, chlorophyll production slows down and eventually stops as day length decreases in the fall. However, the carotene persists, causing the leaf to turn yellow. Most of the plants in our area change leaf color as a result of this process. Carotenoids are also responsible for the colors we see in corn, carrots, daffodils, buttercups, and bananas.

Most anthocyanins are produced in the autumn in response to bright sunny days and cool nights, which causes the leaves to produce a lot of sugar. The veins that carry fluids into and out of the leaf gradually close off and a layer of cells form at the base of each leaf. These clogged veins trap sugars in the leaf and promote the production of anthocyanins. The production of anthocyanin pigments changes the leaves to tints of red, purple, and crimson. In our area we have very few leaves that change to these colors, the one exception is poison oak, which can turn a brilliant red in the fall. Anthocyanins are also responsible for the color you see in cranberries, red apples, concord grapes, blueberries, cherries, strawberries, and plums.

What causes the leaves to actually fall? Each leaf has a specialized layer of cells called an abscission layer that is located between the leaf and/or petiole and the plant. This layer is composed of specialized cells that transport water to the leaf and carry carbohydrates back into the tree. Again, as climatic conditions change in the fall, cells in the abscission layer are triggered by plant hormones to secrete a waxy substance, which begins to swell, and fall color as previously described begins. Eventually all water and carbohydrates are cut off and the abscission layer begins to disintegrate and the leaf falls from its own weight or as a result of wind and weather.



Acer macrophyllum
Illustration by Judy Mason



Alnus rhombifolia
Illustration by Judy Mason

However, not all is lost and the leaves that fall are not wasted. The leaves decompose and create a layer of mulch – adding nutrients to the soil and keeping the soil moist. Fallen leaves also become food for numerous soil organisms that are important to the ecosystem as a whole.

Some of our fall color plants to notice at JRBP:

big-leaf maple	<i>Acer macrophyllum</i>
black cottonwood	<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>
box elder	<i>Acer negundo</i> var. <i>californicum</i>
brown dogwood	<i>Cornus glabrata</i>
California black oak	<i>Quercus kelloggii</i>
California black walnut	<i>Juglans californica</i> var. <i>hindsii</i>
California hazelnut	<i>Corylus cornuta</i> var. <i>californica</i>
Pacific ninebark	<i>Physocarpus capitatus</i>
shining willow	<i>Salix lucida</i> ssp. <i>lasiandra</i>
thimbleberry	<i>Rubus parviflorus</i>
valley oak	<i>Quercus lobata</i>
western poison oak	<i>Toxicodendron diversilobum</i>
white alder	<i>Alnus rhombifolia</i>

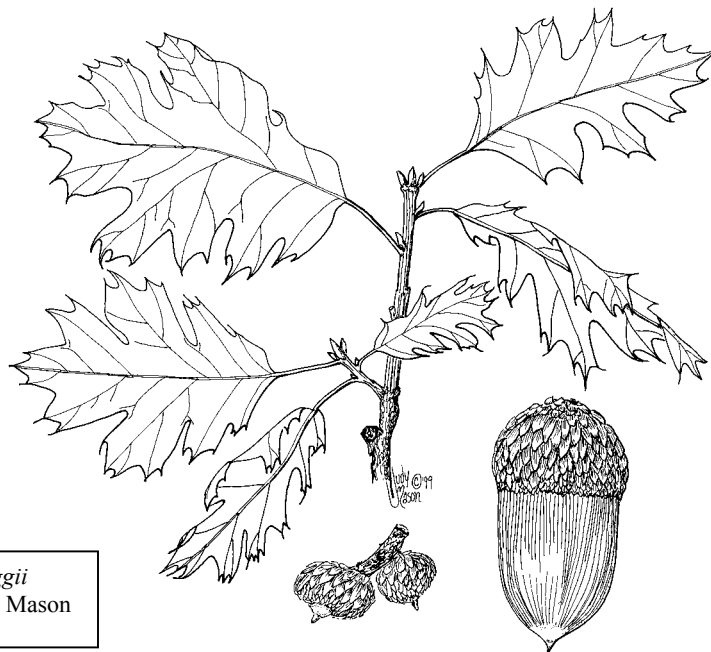


Juglans californica var. *hindsii*
Illustration by Judy Mason

Two trails for fall color: Trail 1 along San Francisquito Creek through the redwoods and Trail 13 along the causeway and Leonard's bridge.

References:

- <http://scifun.chem.wisc.edu/chemweek/fallcolr/fallcolr.html>
- http://www.parks.ca.gov/?page_id=23487 (where to see fall color in California)
- <http://chemistry.about.com/library/weekly/aa082602a.htm>
- <http://www.microscopyu.com/galleries/confocal/abscission.html>
- <http://www.na.fs.fed.us/spfo/pubs/misc/leaves/leaves.htm>



Quercus kelloggii
Illustration by Judy Mason