HEALTHY FOOD SYSTEMS • HEALTHY ENVIRONMENTS • HEALTHY COMMUNITIES • HEALTHY CALIFORNIANS

University of California
Agriculture and Natural Resources
Making a Difference for California

The Green Scene

UCCE

October 2019

Meetings and Announcements

Several newly revised Pest Notes are available. These are: Palm Diseases in the Landscape, Pocket Gophers, Roses: Cultural Practices and Weed Control, and Wood Decay Fungi in the Landscape.

Fall Color Development in Trees and Shrubs

One of the most colorful displays of nature is a landscape ablaze with fall color. In the northern United States, especially in the hardwood forests from Michigan to New England, each tree may give startling impact to the scene, and no two trees are exactly alike. Some species are noted for fall color, such as the scarlet sumac covering many Midwest hillsides, and around Bakersfield the bright liquidambars and Chinese pistache.

Why the different shades of color? Chlorophyll is the green pigment that captures the energy of sunlight, making photosynthesis possible, the formation of sugars from carbon dioxide and water. During the growing season chlorophyll is produced as long as a plant remains healthy.

In late summer and early autumn, the spectacular unveiling of color begins as day length triggers the process. Metabolism in the leaf, including chlorophyll production, slows. Nitrogen, phosphorus, and potassium are pulled back into twigs while calcium and magnesium remain in leaves. Cells begin to break down. How much and how fast chlorophyll is destroyed differs among plant species. For example, Norway maple leaves lose almost all their chlorophyll while those of lilac lose only 40 percent. The average chlorophyll loss across many species is about 85 percent.

As chlorophyll breaks down, pigments that have been present during the growing season but were masked by the abundance of chlorophyll begin to be visible. Carotenoids are a class of pigments with over 60 members found in plants and animals. The most familiar carotenoid is carotene, the orange pigment found in carrots. Another closely related chemical group, even more plentiful in plants, is the xanthophylls. Both groups of compounds are yellow-to-orange in color. Tree genera, such as ash and willow, produce carotenoids and xanthophylls and display these characteristic colors when autumn arrives.

But what about the reds and purples? Plants including viburnums, Boston ivy and liquidambar can synthesize new pigments in the autumn. The mechanism to form these compounds isn't active at other times of the year, but in autumn sugars are synthesized to form pigments called anthocyanins, named from the Greek words "anthos," a flower, and

"kuanos," azure blue. Each specific compound has a particular color, which may be crimson, scarlet, blue-violet, red, purple or mauve. The color depends on the chemical structure of the pigment.

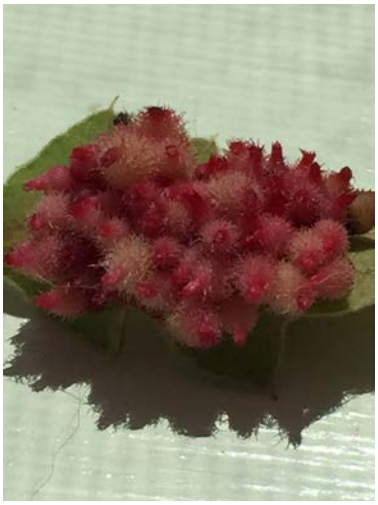
Sunlight and weather conditions favoring accumulation of sugars also favor production of anthocyanins. The best conditions for glorious fall color are sunny dry weather with cool but not freezing night temperatures. These conditions are more likely to be found in the mountains than on the Valley floor. Frost does not encourage development of fall color. Rather, leaves may be killed or injured before coloring processes are complete.

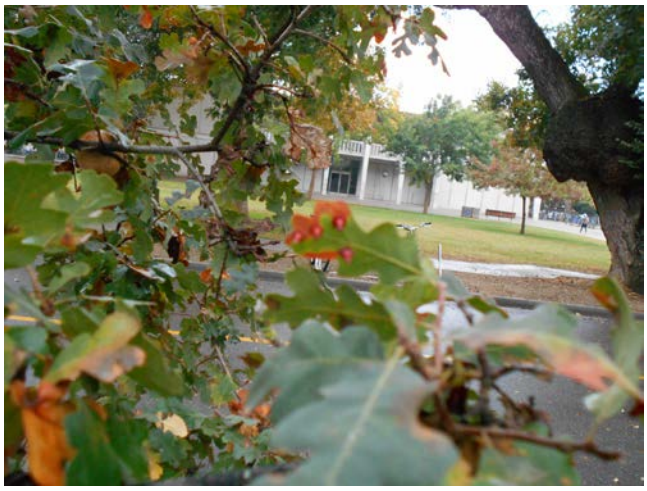
Liquidambar and Chinese pistache are among the most colorful shade trees found on the southern San Joaquin Valley floor. Willows, birches and poplars contribute yellows. Perhaps the most colorful shrub visible in the Kern Canyon is poison oak, but this plant is not recommended for landscapes!

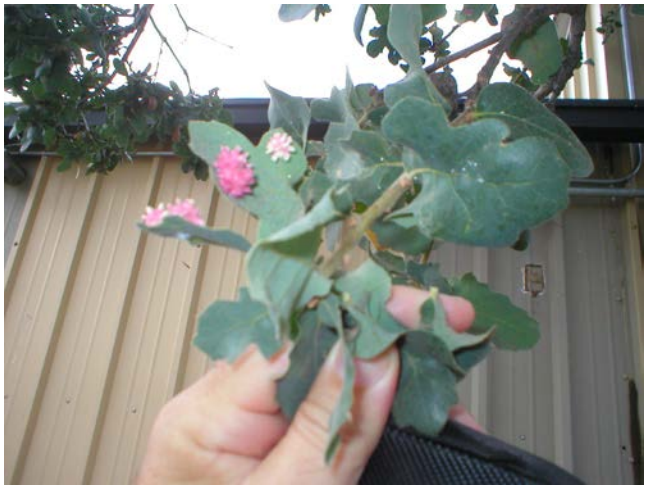
Galls of Oak Leaves

Oak leaves in the autumn may display a number of colorful galls. These are plant tissue, caused to grow as influenced by a tiny insect larva inside. These larvae will pass through a pupal stage and become adults, gall wasps of the family *Cynipidae*. Usually the galls are just an interesting and colorful addition to oak leaves. Control is difficult to impossible, and in almost all situations unnecessary, since little or no long-term injury occurs to oak trees. There is further information on the UCIPM website about these insects at http://ipm.ucanr.edu/PMG/GARDEN/PLANTS/INVERT/oakgallwps.html.

Photos of various oak galls are shown below, all of which were collected in Kern County.







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