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Oaks: Biology and significance

By Steve Barnhart

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Oak trees and shrubs are found in many different environments and climatic zones around the world. Some 500 species exist, primarily in temperate, subtropical and tropical regions of North America, South America (Columbia), Europe, North Africa, the near east and Asia, dropping below the equator into Indonesia. Many local populations of oak species exhibit unique characteristics, yet as a group they are able to adapt to a wide range of environmental conditions.

Oaks have been a very important resource for humans over thousands of years. Acorns have been a dietary staple for millennia, most recently for the acorn-gathering and oak-cultivating Native Americans of California. Oaks have also been important for cultural and religious reasons.

All oaks are members of the genus *Quercus*, in the plant family Fagaceae, which includes beeches, chestnuts, chinquapins and tanbark oak. Tanbark oak is not a true oak (*Quercus*) due to a number of significant biological differences, including flower structure and pollination. Other species which bear the term "oak" in their common names are not related at all, e.g. poison oak. Oak trees and shrubs can be deciduous, losing all their leaves seasonally, or evergreen (live oaks). Oaks are mainly identified by their bark, foliage and fruit (acorns).

Approximately 80 native oak species are found in the United States, with 21 of these in California. These species are classified in three evolutionary lineages or sections: White oaks, red oaks and intermediate oaks. In Sonoma County, we are graced with five white oak, four red oak and one intermediate oak species.

Hybridization, or crossing between species, occurs within evolutionary lineages or sections. White oak hybrids are fertile and thus can reproduce with other hybrids or their parental species. A common example in Sonoma County are the hybrids between blue oak and Oregon oak, which exhibit a full range of characters between the two parent species.

In red oaks, the hybrids are typically sterile, like mules. Thus, the only evidences of hybridization among red oaks are plants exhibiting intermediate characteristics between the two parental species, such as the oracle oak, a hybrid between California black oak and the interior live oak.

Oaks perform a very important ecological role in many landscapes. Because of the food resource (acorns) as well as shelter and nesting places, oak-dominated communities have the highest diversity of wildlife species of any California landscape. Here, oaks play a central role in the community food webs, thus filling the niche of an important "keystone" species. Oaks also provide important amenities with regard to watershed integrity, local carbon balance and natural fire fuel breaks.

Unfortunately, the loss of oaks and oak habitat in Sonoma County and throughout California is occurring at an alarming rate. This loss is primarily due to urbanization and the agricultural conversion of wild land habitat. In the growing exurban areas, the ecological integrity of oak woodlands is being severely compromised because of the impact of patchy development upon wildlife species. Added to these factors are the direct impacts of construction and landscaping upon individual specimen trees as well as the increased spread of pathogens and disease. Finally, Sudden Oak Death is having a pronounced impact upon coast live oak, Shreve oak, California black oak and tanbark oak in our local wild lands.

Native oaks are a natural legacy that we all should desire to preserve. Their beauty and landscape utility are obvious, but their evolutionary and ecological significance are even more important to the long-term integrity of our natural landscapes.

*Steve Barnhart has developed research projects and published about north coast oaks for over 30 years. He is currently the Education Director for the Pepperwood Foundation which owns and manages the 3100 acre Pepperwood Preserve in NE Sonoma County.*

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