Oaks in El Dorado and Amador County – How to Love Them and Live with Them

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UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources

UC Master Gardener Program
El Dorado County

Master Gardener Mission:
To extend research based knowledge and information on home horticulture, pest management, and sustainable landscape practices to the residents of El Dorado County.

Why should we care about native oaks?

- Great natural beauty that add value to your property. (7-9%)
- They provide shade.
- Iconic emblems of our state.
- In addition -

- They are tough, hardy, drought-tolerant, adapted to our climate, and disease-resistant.

- They are keystones of our natural environment and support a myriad of creatures, great and small.

Oaks are vital to our natural environment-

"Oak woodlands provide extremely important wildlife habitat and have higher levels of biodiversity than virtually any other terrestrial ecosystem in California. At least 300 terrestrial vertebrate species, 1,100 native vascular plant species, 370 fungal species, and an estimated 5,000 arthropod species are associated with California oak woodlands."

USDA Field Guide to Insects and Diseases of California Oaks (2006)

About Oaks –

- Members of the Beech family.
- 300-500 species world wide, existing in the tropics and temperate zones, making them one of the most common species of flowering plants.
- At least 18 -22 species in the state, with many additional subspecies and named hybrids.
- In El Dorado County – 7 trees, 3 shrub species, and subspecies. Amador County has less.

Characteristics of all Oaks

- Always have dangling male catkins that release pollen in the wind.

- Always have a tiny female flower that has 3 stigma.

Characteristics of all oaks – cont.

- Always bear an acorn in a scale-covered cup.

Acorns –

- Tempting packages of carbs, 20-30% fat, and 6-8% protein.

- They were a favored food of Native Americans, and are eagerly feasted upon by animals ranging from deer to wood rats to wild turkey, and all type of insects.

- Some of these creatures are vital in helping distribute the nuts and planting them.

Acorns – cont.

- Scrub jays are a keystone species in oak woodlands in that they are vital in the lifecycle of oaks.

- They bury acorns to have food in winter but forget where many of them are.

Photo by Becky Matsubara

Acorns – cont.

- Most other animals just eat the acorn as they lay – except for acorn woodpeckers.

- They dig holes in trees or fence posts and insert an acorn for the future.

“Mast Years”

- “Mast” is an old English word for meat. It refers to a tree’s crop.

- Oak trees can produce up to 10,000 acorns.

- But…

photo by OJ Gow

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Acorns – cont.

- Oak trees are alternate year producers.
- Some acorns take 2 years to mature.
- Different oaks pollinate at different times and can be adversely affected by climatic conditions.
- So - one particular tree or group of trees might have a productive or “mast” year, but not all acorns in all places will drop at one time.

Subgenus or evolutionary lineages – How oaks are divided

- White – Valley, Blue, Oregon, Scrub, Leather
- Red/black – Black, Interior Live
- Intermediate – Canyon, Huckleberry

Why subgenus/lineage matters -

- Oaks hybridize like crazy, but only within subgenus.
- Galls are unique to species or subgenus.
- Acorns in white oak subgenus ripen in 1 year. Acorns in red/black and intermediate subgenuss ripen in 2 yrs.
- Diseases may affect one subgenus more than others.

Identification of Oaks and the Big 5 for EDC and AC

- Valley oak
- Black oak
- Interior Live oak
- Blue oak
- Canyon oak

- The majority of oaks you will see in these counties are the 5 above, but there are other possible species and hybrids.

Quercus Lobata (Valley oak)

- Huge tree with with massive, horizon-tal limbs and spreading crown.
- Prefers moist bottomlands or riparian habitats.
- Up to 6,500 ft elev.

Valley oak – cont.

- Leaves – 2-4”, deep, blunt lobes, matte green above, pale green below, with felt-like hair.

- Acorns – conical-shaped, in warty cap.

- Bark – Thick, grooved, nearly corky-looking, pewter in color.

- Deciduous member of the white oak subgenus.

Quercus douglasii (Blue oak)

- Moderate size tree that can have a spreading crown or be more upright.
- Can go dormant during summer.
- Up to 3,500 ft. elev., in shallow soils.

Blue oaks – cont.

- Leaves – 1-3”, wavy or shallowly lobed. Most blue in early fall. Underside is pale green.
- Acorns – tapered in shallow, warty cups.
- Bark – Light gray or whitish in narrow, shallow strips.
- Member of white oak subgenus.

Quercus garryana (Oregon oak)

- Moderate sized tree in this area with upright limbs and spreading crown.

- Not very common here.

- 1-4,000', in rocky, gravelly or heavy clay.

Oregon oak – cont.

- Acorns – large and round in small cups w/small scales.
- Leaves – 4-6”, broad, lobed, smooth and spineless. Shiny, dark green on top, lighter underneath and downy.
- Bark – white to grayish, finely fissured.
- Deciduous member of white oak subgenus.

Shrubs in white oak subgenus –

- *Quercus durata*

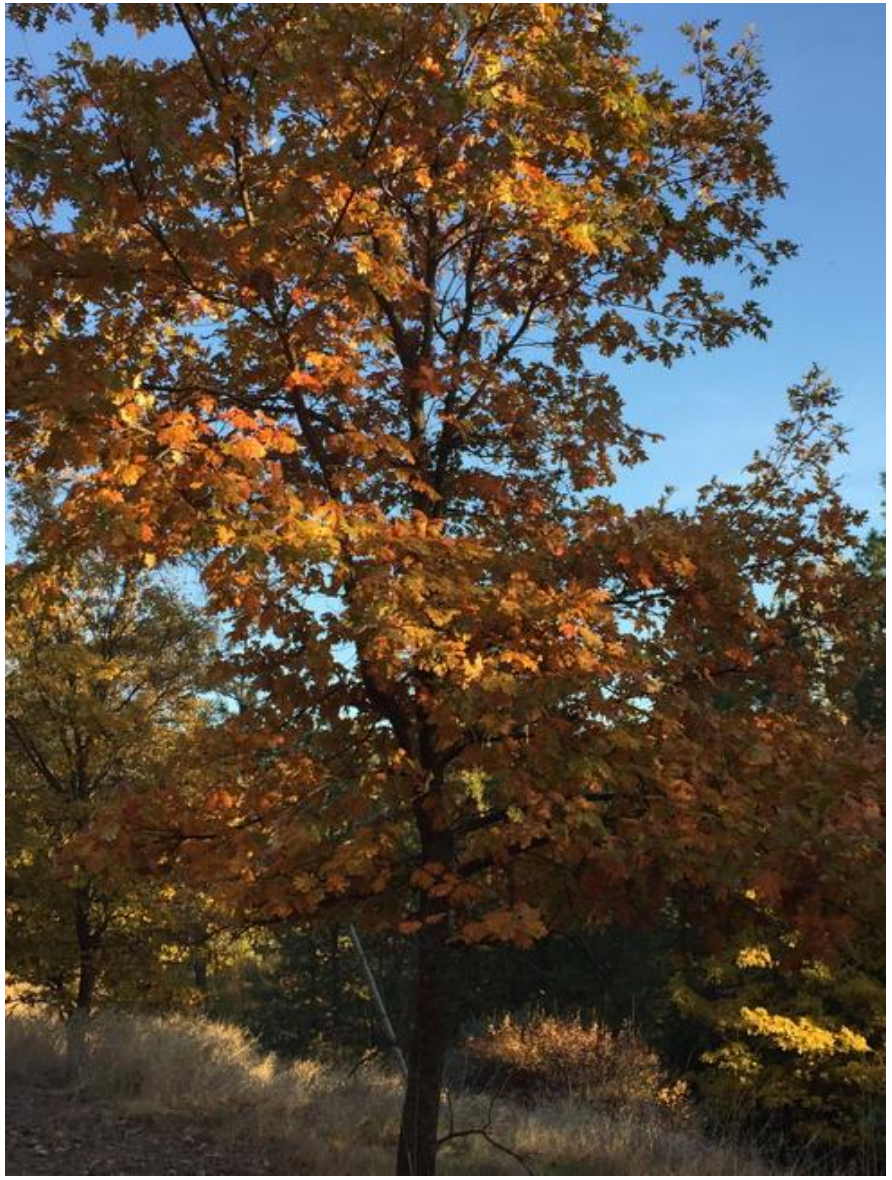
*(*Leather oak)

  - Grows below 6,000’ in serpentine soil only. (Not in Amador County.)
  - Leaves – less than 1”, convex, oval, dull green w/pale-green underside.

- *Quercus berberidifolia* (Inland scrub oak)
  - Below 5,000’ in foothills and upland slopes.
  - Leaves – 1” or less, variable shape and margins, w/rounded tips, shiny green above, dull, grayish below w/small hairs.

Quercus kelloggii (Black oak)

- Tall tree with ascending limbs and open, rounding crown.
- 2-6,000’ elevation.
- Deciduous member of black/red subgenus.



Black oak – cont.

- Acorns – Oblong, in a deep, shaggy cup.
- Leaves – 2-6”, deep angular lobes, with a bristle at tip of each lobe. Shiny green.
- Bark – smooth and gray in youth, becoming blackish and deeply fissured as it ages.

Black oak (left) vs Valley oak

- Note bristle on leaf tip and more angular shape on Black oak leaf.

Quercus wizlizenii (Interior live oak)

- Typically broader than it is tall. Can have multiple trunks.

- Below 5,000'. Flood plains to slopes.

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Interior live oak – cont.

- Leaves – thick, leathery, deep green above, yellowish-green below. Can be smooth, toothed, or spiny.

- Acorn – narrow, sitting deep in a scaled cup.

- Bark – smooth and gray when young, aging to dark
- and fissured.

- Evergreen member of black/red subgenus.

Quercus x morehus (Oracle oak)

- A hybrid of black and interior live oaks. May be partially deciduous. Leaves may change color in fall.

- Grows only where Black and Interior live oak overlap.

Quercus chrysolepis (Canyon oak)

- Medium sized tree, found in all soils, variable habitat and variable form.
- Up to 9,000’ elevation.

Canyon oak – cont.

- Acorns – Up to 2” long, saucer-shaped cup w/fine golden hairs.
- Leaves – 1-2.5”, shiny dark green above, underside gray w/gold hairs.
- Bark – Gray or whitish, smooth, shallow strips.
- Evergreen member of intermediate subgenus.

Quercus vacciniifolia (Huckleberry oak)

- Member of intermediate subgenus.

- Densely leafed spreading shrub up to 4’ tall.

- Grows in mountains up to 10,000’. In this county is rarely found below 5,000’.

Sources for Identifying Oaks –

Oaks of California by Bruce M. Pavlik, et al.

Nice write up on each oak, useful key for id'ing, plus pictures of various leaves and acorns.

The Laws Field Guide to the Sierra Nevada by John Muir Laws.

El Dorado County Oak Ordinance

- Adopted in 2017 as part of the general plan with the intention of preserving our native oak trees.
- More stringent than CA state law, ie. must pay to mitigate if removing oaks from property, unless they are hazard trees.
- Best practice is to contact the county before removal.

Problems with Oaks

Two agents of damage to any plant.

- Biotic – damage caused by pathogens, pests, animals, parasites and other living things.

- Abiotic – damage caused by adverse environmental conditions or poor cultural practices.

    - Humans can make changes to the environment that cause abiotic damage to oaks.

Problems with oaks – cont.

"We have met the enemy and he is us."

Walt Kelly

30% of oaks have been eliminated in this state, mainly through development and agriculture.

But first – I will discuss some of the biotic problems with oaks.

Some common diseases –

- Powdery mildew -
  - Generally caused by too much rain late in the spring.
  - Most obvious on blue oaks, turning them pale blue or almost white.
  - Nothing needs to be done. The trees may loose most of their leaves but they will most likely grow them back by the following spring.

Diseases – cont.

- Armillaria Root Rot or Oak root fungus

  - Favored by warm wet soils.
  - May have actual mushrooms growing at base of tree, or white fungal mycelia growing under bark.
  - No reasonable treatment.
  - May or may not kill the tree.

Diseases – cont.

- Phytophthora Root and Crown Rot –
  - Promoted by excess soil moisture and poor drainage.
  - Leaves discolor, stunt, wilt, or drop prematurely.
  - Roots are dark and decayed. Trees may die.
  - Draining standing water may help.

Diseases – cont.

- Anthracnose –
  Can cause severe defoliation of new growth during wet spring weather.

- Phytophthora ramorum (sudden oak death) -
  Occurs only 50 miles from the coast, so far.

Fungal Diseases

- Visible sign of a fungus, such as a mushroom could mean that the wood is filled with mycelium.

- The fungus itself does not kill the tree, but the damage that is done to the wood can cause structural failure.

- There is little that can be done for a tree that is displaying fungus, though it may take decades for the tree to give up its battle.

Diseases – cont.

- Foamy canker, (alcoholic flux) – White frothy material oozes from wounds. Smells like alcohol. No real treatment.

- Foamy bark canker – a fungal disease spread by western oak bark beetles.
  - New in this area on interior live oak.
  - A pink to white frothy foam that oozes from bark.
  - Also may show a reddish sap that oozes from insect holes.
  - Likely fatal to tree, and can be contagious.

Limb Drop, Summer Branch Drop, Sudden Limb Failure

- A summer phenomenon that often occurs on hot, calm days.
- Branches that break off are frequently horizontal and 3-12’ from trunk. Limbs may be sound.
- Mechanism that causes this are not fully understood.
- Drought stress may induce this but not always.

Dealing with Limb Drop

- Avoid improperly pruning a tree that could create an overgrowth of new wood and leaves on a limb.

- Large, horizontal limbs should be removed if they are in a dangerous location such as over a house, a walkway, or a driveway.

Mistletoe

- Shouldn't kill a healthy tree, but can be pruned. Usually regrows.

- There are sprays but they have to be repeated.

- Provides habitat and food for a variety of animals and insects.

Insects –

- There are a variety of borers, beetles, caterpillars, worms, mites, aphids, scale, and leafhoppers that can infest oak leaves, twigs, bark, wood, and acorns.

- They will generally not kill a healthy tree.

- Treatment is usually not warranted considering the expense and risks associated with large scale spraying.

Insects – cont.

Fruit tree leafroller –

- rolls up young leaves and ties them in silk, causing leaf distortion.
- The caterpillar larvae hang down on silken thread.
- Can completely defoliate a tree, a problem when a tree is otherwise stressed.

Insects – cont.

- Tent caterpillars – several species that affect many types of trees.
    - Make silken tents or mats that they rest in when molting. Unsightly and messy, but will not generally kill a tree.
- California oak worm/oak moth – can defoliate a tree, but will generally not kill it.

Oak Galls -

- Galls are an overgrowth of plant tissue produced in response to chemicals secreted by gall wasp larvae, usually from the cynipid family.

- Gall wasp larvae are no bigger than 1/8” in size.

- Each wasp lays it’s eggs on only one species of tree, or on only trees in one subgenus.

Oak galls – cont.

- Oak galls come in a wonderful variety of shapes, sizes, and colors, each unique to each wasp species.

- Each gall may contain several insects, including the gall wasp larvae, larvae parasites and others who are feeding on the gall itself.

Andricus gigas
gall on blue oak

Possible urchin gall on blue oak

Insects – in conclusion

- Remember - all insect are potential food for hungry wildlife.
- Each insect is a part of the web of life. Native non-beneficial insects are usually balanced by beneficial insects.
- Pesticides can harm beneficial insects (and other creatures).

Identification of Insects and Diseases –

Pest of Landscape Trees and Shrubs
Publication 3359 from UCANR

USDA – Field Guide to Insects and Diseases of California Oaks by Swiecki and Bernhardt

Human Caused Damage -

- The building of homes, driveways, sidewalks, and roads results in compaction of soil which physically damages the roots and starve them of water and nutrients.

- Lawns around oak trees can lead to diseases caused by too much water impacting the trunk or the shallow roots.

- Planting in the root zone of an oak can cause mechanical damage to the roots and watering new plants can lead to diseases. If you must plant select small drought-tolerant plants and plant far away from trunk.

- Overspray from herbicides can damage oaks.

- Raking all the fallen oaks leaves can starve the tree of nutrients.

Don’t panic-
oaks are tough.

There are not many conditions that will kill them outright.

It is best to take a wait and see attitude with most Problems – unless they have been diagnosed with a deadly, contagious disease.

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Care of oaks – Mostly a collection of do nots

- Don't water them – except
  - In extended drought, may justify giving extra water in winter, but – oaks evolved with California's droughts.
- Don't plant within their drip line if at all possible.
- Don't rake up their leaves – they are mulch.

- Don’t cover the crown by backfilling soil up to trunk.
- Keep mulch away from trunk and buttress roots.
- Do not pile rocks on roots or around trunk.
- Avoid damage from string trimmers. Pathogens can enter the wounds.
- Don’t dig into their roots and don’t cover them with cement or stones.

Care of Oaks – cont.

- Do not fertilize around oak trees.
- Do not use herbicides around oak trees.
- Pruning
  - Prune deciduous oaks in winter and evergreen oaks in summer.
  - Prune properly and avoid creating wounds or places where water can gather.

Resources -

Books and Papers

Oaks of California (Bruce M. Pavlik, Pamela C. Muick, Sharon Johnson, and Marjorie Popper)

Pests of Landscape Trees and Shrubs (UC Statewide Integrate Pest Management Program, pub 3359)

The Life of an Oak – An Intimate Portrait (Glenn Keator)

USDA - A Field Guides to Insects and Diseases of California Oaks (Tedmund J. Swiecki and Elizabeth A. Bernhardt)

Resources – cont.

Field Guide to Plant Galls of California and Other Western States
(Ronald A. Russo)

Bringing Nature Home – How You Can Sustain Wildlife with Native Plants, Updated and Expanded (Douglas W. Tallamy)

Secrets of the Oak Woodlands – Plants and Animals Among California Oaks
(Kate Marianchild)

Resources – cont.

Websites –

Calscape.org – What grows in your location, what butterflies and moths those plants support.

https://oaks.cnr.berkeley.edu/ - UC Oaks website

iNaturalist.org – for help with id. Download app to your phone, or you can use it on the computer. Upload photos for help with id.

Pestnotes - http://ipm.ucanr.edu/PMG/PESTNOTES/

Calflora.org – List native plants by county or a polygon.

Resources – cont.

County Oak Ordinance FAQs - https://www.edcgov.us/Government/longrangeplanning/environmental/Documents/FAQ-ORMP-Oak-Conservation-Ord-11-15-17.pdf

Also –

https://www.edcgov.us/Government/longrangeplanning/environmental/Documents/Fact-Sheet-ORMP-Ordinance-11-9-17.pdf

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Help Us Better Serve You!

Our follow-up survey provides us the tools we need to grow and improve the quality of our program.

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