

## TANOAK

*Lithocarpus densiflorus* (Hook. & Arn.) Rehd.

Plant Symbol = LIDE3

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### Alternate Names

Tan oak, tan bark oak

### Uses

**Ethnobotanic:** Historically, acorns were the most important staple plant food for Native American groups in the coastal ranges of California. Native Californians harvested, and still harvest today, several species of acorns including tanoak, coast live oak (*Quercus agrifolia*), canyon oak (*Q. chrysolepsis*), black oak (*Q. kelloggii*), and valley oak (*Q. lobata*). California tribes are estimated to have harvested from 500 to 2000 pounds of acorns per family per year (Hoover 1977). A single tanoak tree can produce over 200 pounds of acorns in a good year and produces at least a partial crop every year (Baumhoff 1963).

Tanoak acorns were the preferred acorns for the Salinan, Costanoan, Pomo, Yurok, Hoopa, and other groups residing within the trees range (Baumhoff 1963; Merriam 1967; Heizer & Elsasser 1980). The ripe acorns are harvested in the fall. They were spread out in the sun to dry and then stored in baskets or storage bins. Many tribes constructed outdoor

storage bins, either above or below ground, to protect the dried acorns from robbing squirrels and chipmunks. The Salinan built outdoor acorn granaries on the ground next to their homes (Mason 1912). The granaries were constructed in a basket-like fashion from white willow twigs that were then covered with grass. The Pomo used tanoak leaves to line aboveground bins that they constructed from redwood (*Sequoia sempervirens*) boughs (Hoover 1977). The Costanoan and Chumash stored acorns in baskets made from interlaced white willow twigs (Brusa 1975). The baskets were about 1 m in diameter at the bottom and sloped up gradually inward into a cone about 0.5 m with a 0.5 m opening. Hollow tree trunks also served as storage bins (Hoover 1971).

The acorns were pounded into flour as needed. Stone, bedrock, and wooden mortars were used to crush the acorns into a meal. Sometimes the acorns were soaked overnight to help crack open the shells. After soaking, the acorns were removed from the shells and spread out onto open-work baskets to dry. The Salinan cracked open the acorns individually using a small, hard stone hammer and then set them out in the sun to dry (Mason 1912). The dried acorns were then placed into a stone, bedrock, or wooden mortar and pulverized into flour using a long pestle. Some tribes used a hopper mortar basket (a bottomless basket either glued with tar to the stone mortar or held down with the legs) to keep the pounded flour from bouncing up out of the mortar. Mason (1912) notes observations of remnant pitch or asphaltum circles surrounding mortar depressions within the Salinan area. After pounding, acorn flour must be leached to remove the tannic acid. There are various methods for completing this step, but they all include pouring water through the meal repeatedly until all traces of the bitter tannins are washed away. The Salinan placed the finely pounded flour into a specially made leaching basket. The basket was woven closely enough to hold the meal but to allow the leaching water to percolate through (Mason 1912).

The majority of the California tribes, including the Costanoan, Yokuts and Luiseño peoples, leached acorn flour by using carefully constructed basins of clean sand near a stream or river. The flour was leached many times by pouring the water over a bundle of leaves to keep the water from splashing sand into the meal. Other tribes made leaching

frames from branches of incense cedar. The cedar leaves kept the meal from washing away while imparting a spicy flavor to the meal (Murphey 1959). Another leaching method was to bury the whole acorns in the bed of a running stream and leaving them for as long as a year (Merriam 1967).

The finely pulverized acorn meal was mixed with water and cooked in a special watertight cooking basket by placing hot, round stones that had been heated in the fire into the basket. The acorn mixture was stirred constantly to keep the rocks rolling around and prevent them from burning the basket. The meal was cooked in this manner to make porridge and also a thick soup called *atole*. The cooked mixture could be used to make pancakes and breads by pouring it onto a hot, flat rock that served as a griddle. The Salinan baked acorn bread in an earth-oven and made acorn cakes about 8cm in diameter by wrapping them between two layers of grass and cooking them overnight (Mason 1912). The Pomo used to wrap loaves of acorn bread dough in leaves and place it in the coals of a fire to cook (Goodrich et al. 1990). The Yurok made a dry form of acorn bread, baked on hot stones, which kept for a month or more (Merriam 1967).

Tanbark acorns were also used for medicinal purposes such as treating coughs. A single acorn was popped into the mouth and sucked on like a cough drop. The tannins are said to help soothe the throat. Some California tribes made a type of penicillin from acorn meal (Murphey 1959). Moist meal was wrapped and allowed to sit until it developed a moldy film. Then the film was peeled off into a roll, which was stored in a damp place until needed. Pieces of the mold were placed upon boils and other sores to draw out inflammation. The Coastanoan made an infusion from the bark that they used as a medicinal wash for sores on the face and as a mouthwash to treat loosened teeth and toothaches (Bocek 1984).

Whole tanbark acorns with their caps can be strung together to make a musical instrument that is played by twirling it in a special way.

The Wintu made candy from the gum-like sap that they gathered in the fall (Dubois 1935). The Wintu and other tribes used the soot from burnt oak galls to make tattoos (Knudtson 1988).

**Wildlife:** Tanoaks are important for cover and are used for resting, hiding, and nesting by many wildlife species (McMurray 1989). The trees provide cover for northern flying squirrels (*Glaucomys sabrinus*), dusky-footed woodrats (*Neotoma fuscipes*), arboreal

salamanders (*Aneides lugubris*), and black salamanders (*Aneides flavipunctatus*). House wrens (*Troglodytes aedon*), northern flickers (*Colaptes auratus*), downy woodpeckers (*Picoides pubescens*), red-breasted nuthatches (*Sitta Canadensis*), white-breasted nuthatches (*Sitta carolinensis*), and brown creepers (*Certhia Americana*) nest in cavities in tanoak trees.

Mule deer (*Odocoileus hemionus*) graze on tanoak leaves and acorns. Tanoak acorns are a source of food for black bears (*Ursus americanus*), chipmunks (*Eutamias spp.*), California ground squirrels (*Spermophilus beechyi*), Douglas squirrels (*Tamiasciurus douglasi*), pocket gophers (*Thomomys bottae*) and black-tailed deer (*Odocoileus hemionus*). The acorns were once relished by grizzly bears (*Ursus arctos*), the state emblem of California, which have been extinct in this state since 1924 (Storer & Usinger 1963). Birds that rely on tanoak acorns as a source of food include the Steller's jays (*Cyanocitta stelleri*), band-tailed pigeons (*Columba fasciata*), varied thrushes (*Ixoreus naevius*) and acorn woodpeckers (*Melanerpes formicivorus*).

**Livestock:** Ground acorns are sometimes added to chicken feed. Tanoak is considered of low forage value for livestock because of its low palatability due to tannin content. When cattle and other livestock consume tanoak, it is an indication of overgrazing, as the animals will generally only resort to this food source after higher quality forage has been consumed (McMurray 1989).

**Erosion control:** Tanoaks may be used for erosion control on sites that experience frequent disturbance. The trees help to stabilize soils as they have an extensive root system with a deep taproot and they quickly reestablish after disturbance through sprouting from a lignotuber, which is an underground regenerative organ (McMurray 1989).

**Other:** Tanoak wood is of high quality, being of good strength and hardness with a fine grain, however the wood is not widely used because of limited supply. Tanoak wood has been used for a variety of purposes including flooring, paneling, decking, plywood, garden tools, baseball bats, and firewood. The bark has high tannin content and was once used extensively by industry in California for curing leather.

### **Status**

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's

current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

### **Description**

*General:* Oak family (Fagaceae). Tanoak is an evergreen hardwood tree or shrub native to the west coast ranges from Southern Oregon to Southern California. The plants can reach 20 to 45 meters in height with the stems of large trees reaching up to 1 meter in diameter. The form and size of tanoak is variable depending on the environment. Taller forms generally occur in shady forests and shorter forms in open areas where sunlight is more abundant. However, the trees can have a shrub-like form with multiple stems when access to light is prevented, such as when growing in a dense forest understory. Mature trees growing in a more open forest have a single, short trunk with horizontal branches.

The thick, leathery evergreen leaves are oblong in shape with pointed tips (4 to 10 cm long). The leaves have noticeable parallel side veins on the undersides that are evenly spaced and run from the central vein of the leaf ending in a pointy tooth at the leaf margin. New leaves are covered with reddish-brown hairs, which turns whitish as they mature. Older leaves are a smooth green on top with lightly pubescent gray-green below. The evergreen leaves remain on the tree about 3 to 4 years before they are shed. The light reddish-brown bark develops deep fissures as the trees age. Large clusters of tiny white flowers bloom in the summer months in the leaf axils of the current seasons growth. The flowers are erect catkins and have an odor that is not pleasant. The acorns are from 2.5 to 5 cm long with a diameter of about 1.5 to 1.8 cm and grow singly or in cluster. Tanoak acorns have hairy, rather than scaly caps of the true oak. Acorns ripen in the fall of the second season.

*Distribution:* Tanoak occurs on fertile mountain slopes and ridges below 1200 meters in the Coast Ranges from the Santa Inez Mountains in Southern California, to the Cascade Ranges in Southwestern Oregon. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

*Habitat:* The tree form is a major part of the coastal redwood forest, Douglas fir forest, and mixed evergreen forest while the shrub form is a component of chaparral communities.

### **Adaptation**

Tanoak is adapted to cool coastal areas with mild temperatures and little summer rainfall. The plants

do not do well in interior valleys and areas of extreme temperatures. Tanoaks grow best in deep, fertile soils but are also known to grow well on stony or shallow soils. The trees prefer well-drained loam to gravelly soils.

### **Establishment**

The Kashaya Pomo name for tanoak means “beautiful tree” (Goodrich et al. 1990). Tanoak is an attractive tree that is shade tolerant.

Tanoak can be easily propagated by seed. Use only fresh seeds, as the seeds do not retain viability. The seeds of tanoak require no pretreatment and germinate quickly. Tanoak acorns germinate faster if they are planted with their point facing upward in the soil (McMurray 1989). The seeds may be directly sown into the ground or planted into flats or pots using a light soil mixture or peat moss. If flats are used it is necessary to transfer the seeds into pots or the ground once they have germinated. Pots should be of the kind that are long and deep to allow for the taproot to develop. Set the seeds or seedlings into a carefully chosen spot keeping in mind that they can be long lived, with an average age of about 180 years and a maximum to 400 years. Seedlings do best in a moist area with partial shade. Do not plant in areas with frequent irrigation. Give seedlings an occasional deep watering until established.

### **Management**

Tanoak trees need to be carefully pruned while young in order to develop into a nicely shaped, dense, well-branched tree. The trees should be placed in a spot where they will be protected from extreme temperatures and hot winds, which may burn the leaves during hot, dry weather. Established trees should not be watered unless there are severe drought conditions.

### **Pests and Potential Problems**

Tanoak is among the several species in northern and central California that have been affected by the *Phytophthora* fungus, in what is called “sudden oak death syndrome.” The disease is easily spread by beetles attracted to the sap of the infected trees. Contact with infected roots and wood, and infected soil may be transported on tools, tires or shoes (Brenzel 2001). To keep trees healthy, apply a thick layer of mulch to the root zone area beneath the crown and do not garden or disturb this area in any way. Also avoid frequent irrigation, prune only from June to September (when the fungus and insects are less active), and fertilize if the tree shows signs of deficiency (Švihra et al. 2001). Prunings and firewood from infected trees should be enclosed in

heavy, clear plastic for 6 months in order to trap and kill beetles that may emerge and infect nearby living trees (Brenzel 2001). Other pests include aphids, greedy scale, mealybug, oak scale and white fly.

### **Cultivars, Improved, and Selected Materials (and area of origin)**

There are two varieties of *Lithocarpus densiflorus*: var. *echinoides* is a shrub that is a component of chaparral communities, and var. *densiflora* is a tree form which grows in mixed coastal evergreen forest communities. Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under "United States Government." The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture."

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