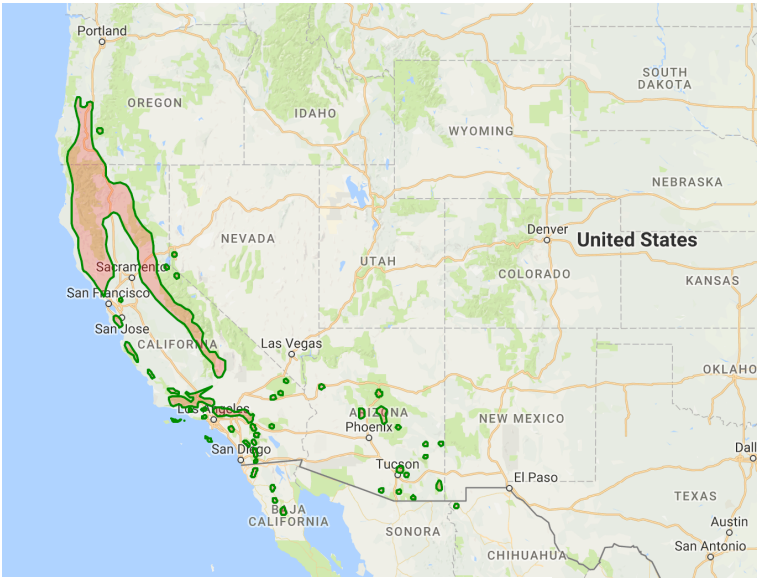


Plant Propagation Protocol for *Quercus chrysolepis*

ESRM 412 – Native Plant Production

Protocol URL: <https://courses.washington.edu/esrm412/protocols/QUCH2.pdf>

TAXONOMY	
Plant Family	
Scientific Name	Fagaceae
Common Name	Beech Family
Species Scientific Name	
Scientific Name	<i>Quercus chrysolepis</i> Liebm.
Varieties	<i>Quercus chrysolepis</i> Liebm. var. <i>chrysolepis</i>
Sub-species	
Cultivar	
Common Synonym(s)	<i>Quercus chrysophyllus</i> Kellogg <i>Quercus crassipocula</i> Torr. <i>Quercus fulvescens</i> Kellogg <i>Quercus oblongifolia</i> R.Br.ter 1871 not Torr 1853 <i>Quercus wilcoxii</i> Rydb.
Common Name(s)	Canyon live oak, goldcup oak, live oak, maul oak, white live oak
Species Code (as per USDA Plants database)	QUCH2
GENERAL INFORMATION	
Geographical range	 <p>Map Legend</p> <p> <input checked="" type="checkbox"/> Canyon live oak - <i>Quercus chrysolepis</i> Native Range Border</p>

Google Plant Maps, 2017⁵

Ecological distribution	Found in the Coast Ranges and Cascade Range of southern Oregon; the Klamath Mountains, coastal mountains, and the Sierra Nevada in California; in scattered populations in southern Nevada, Arizona New Mexico, and northwestern Chihuahua, Mexico. ^{2,4}
Climate and elevation range	Found in canyons, moist slopes, and along stream banks. ^{2,6} Below 6,500 feet elevation. ³ Precipitation ranges between more than 110 inches in the northern part of their range to less than 12 inches in southern California. ⁴
Local habitat and abundance	<p>In southern Oregon, it is codominant in the <i>Pseudotsuga menziesii-Quercus chrysolepis-Lithocarpus densiflorus/ Quercus chrysolepis-Lithocarpus densiflorus</i> climax community type. On steep canyon slopes, it is dominant in the <i>Quercus chrysolepis-Lithocarpus densiflorus-Pseudotsuga menziesii/ Rhus diversiloba/</i> moss community. On benches and ridgetops, it, along with <i>Lithocarpus densiflorus</i>, create the lower tree canopy of the <i>Pseudotsuga menziesii-Pinus spp./ Lithocarpus densiflorus-Quercus chrysolepis-Castanopsis chrysophylla/Pteridium aquilinum</i> community.⁴</p> <p>Canyon live oak has an obligate relationship with mycorrhizal fungi, which provide it with nutrients and moisture, like most oaks.¹ Seedlings and saplings are shade tolerant and can often be found under the canopy of older trees.¹</p>
Plant strategy type / successional stage	Somewhat resistant to sporadic fires, often re-sprouts from base or re-establishing from seedlings. ¹
Plant characteristics	<p>This evergreen tree with round, dense crown generally grows 6 to 20 m tall, though it may grow as a low shrub in dry, open habitats.¹ They live to 300 years.⁴ Mature bark is gray and scaly.¹ Leaves are oblong to elliptic 2 to 3 cm long; flat, firm, with entire or toothed margins. Dark green and shiny above, pale-grayish, and covered with a yellow “felt” below.¹ They are monoecious and wind pollinated.¹ Acorn nuts are 2 to 6 cm long, oblong to elliptic, and mature in less than 2 years. On average, trees have high acorn production once every 2-3 years.¹</p> <p>Flower March to May.¹ Fruits mature August and October.¹</p>
PROPAGATION DETAILS	
Ecotype	Marin County, California
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	Deepot 40
Time to Grow	
Target Specifications	Root system: firm plug in container ³
Propagule Collection Instructions	Collect seeds between September 1 st and December 15 th . Acorns are brown when mature. Collect when acorn base turns brown and acorn is easily removed from the cap. ³

Propagule Processing/Propagule Characteristics	Seed cleaning: place seeds in water. Remove any that float. Collect ones that sink for treatment or moist storage. ³ Seed conditions: Keep seeds moist, store in a refrigerator. ³ Seeds/gram: 2 ³
Pre-Planting Propagule Treatments	Soak cleaned acorns overnight in fresh water. Remove any that float. Drain and rinse in a 5% bleach solution for 1 minute, then rinse. Place acorns in a plastic freezer bag with an equal amount of dry perlite. Keep in refrigerator at 15°C. After 1 month, check for germination. Remove and sow acorns with ¼ inch or longer radicles. Check weekly until all acorns germinate. ³
Growing Area Preparation / Annual Practices for Perennial Crops	Growing area: Shadehouse Direct germinant sowing method: sow 1 acorn sideways and pressed into media 0.5 times the diameter of seed to depth. ³ Containers: 2"x10" tubes (Deepot 40) ³ Media: standard potting mix of peat moss, fir bark, perlite, and sand. Do not let media dry out; keep surface evenly moist. ³ Protect acorns from rodents and birds by placing cages around containers. ³
Establishment Phase Details	The plumule and leaves do not emerge for 1 to 2 months. ³
Length of Establishment Phase	No information found.
Active Growth Phase	No information found.
Length of Active Growth Phase	No information found.
Hardening Phase	No information found.
Length of Hardening Phase	No information found.
Harvesting, Storage and Shipping	No information found.
Length of Storage	No information found.
Guidelines for Outplanting / Performance on Typical Sites	Seedlings should be transplanted as soon as first true leaves mature. ¹
Other Comments	For direct seeding: plant seeds at the beginning of winter in holes that are 10 inches in diameter and 4 to 5 inches deep. Add 1 gram of slow-release fertilizer in the bottom covered by a small amount of soil. Place 6 to 10 acorns in each hole, 1 to 2 inches deep. Cover holes with cages to prevent herbivory by rodents and birds. Towards the end of the first season, thin seedlings to 2 or 3 per hole, and to 1 seedling per hole by the second season. ¹
INFORMATION SOURCES	
References	1. Wilken, Dieter, and Julia Burgher. "Canyon Live Oak: <i>Quercus crysolepis</i> ." <i>USDA Plant Guide</i> (n.d.): n. pag. <i>USDA</i> . Web. < https://plants.usda.gov/plantguide/pdf/pg_quch2.pdf >.

	<ol style="list-style-type: none"> 2. "Plant Database." <i>Lady Bird Johnson Wildflower Center - The University of Texas at Austin</i>. N.p., n.d. Web. 24 May 2017. <http://www.wildflower.org/plants/result.php?id_plant=QUC H2>. 3. Young, Betty. 2001. Propagation protocol for production of Container (plug) <i>Quercus chrysolepis</i> Liebm. plants Deepot 40; San Francisco, California. In: Native Plant Network. URL: http://NativePlantNetwork.org (accessed 2017/05/24). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. 4. Thornburgh, Dale A. "Quercus (chrysolepis)." USDA Forest Service, n.d. Web. 12 May 2017. <https://www.na.fs.fed.us/spfo/pubs/silvics_manual/volume_2/quercus/chrysolepis.htm>. 5. <i>Plant Maps - Plant, Tree, Gardening, Climate and Hardiness Zone Maps</i>. N.p., n.d. Web. 12 May 2017. <http://www.plantmaps.com/nrm/quercus-chrysolepis-canyon-live-oak-native-range-map.php>. 6. Seiler, John, Edward Jensen, Alex Niemiera, and John Peterson. "Quercus chrysolepis Fact Sheet." <i>VTree</i>. Virginia Tech Department of Forest Resources and Environmental Conservation, 2016. Web. 26 May 2017. 7. Zagory, Ellen, Wes Hackett, John Tucker, and Ryan Deering. <i>Stock Block Establishment and Manipulation to Enhance Rootability of Superior Forms of Oaks for Western Gardens</i>. University of Davis Arboretum, 2002. Web. 03 June 2017. <http://slosson.ucdavis.edu/newsletters/Deering_200229017.pdf>.
Other Sources Consulted	<ol style="list-style-type: none"> 1. "Practical Plants." <i>Quercus chrysolepis (Live Oak) - Practical Plants</i>. N.p., n.d. Web. 26 May 2017. 2. "Quercus chrysolepis." <i>Plant Characteristics and Associations - Calflora</i>. Calflora, 2017. Web. 26 May 2017. <http://www.calflora.org/cgi-bin/species_query.cgi?where-calrecnum=6987>. 3. Baskin, Jerry M., Baskin, Carol C. 2002. Propagation protocol for production of container (plug) <i>Quercus chrysolepis</i> Lieb. - plants University of Kentucky. Lexington, Kentucky. In: Native Plant Network. URL: http://NativePlantNetwork.org (accessed 2017/06/03). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries and Genetic Resources.
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Date Protocol Created	05/17/2017

or Updated	
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