

Plant Propagation Protocol for [*Aesculus californica*]

ESRM 412 – Native Plant Production

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



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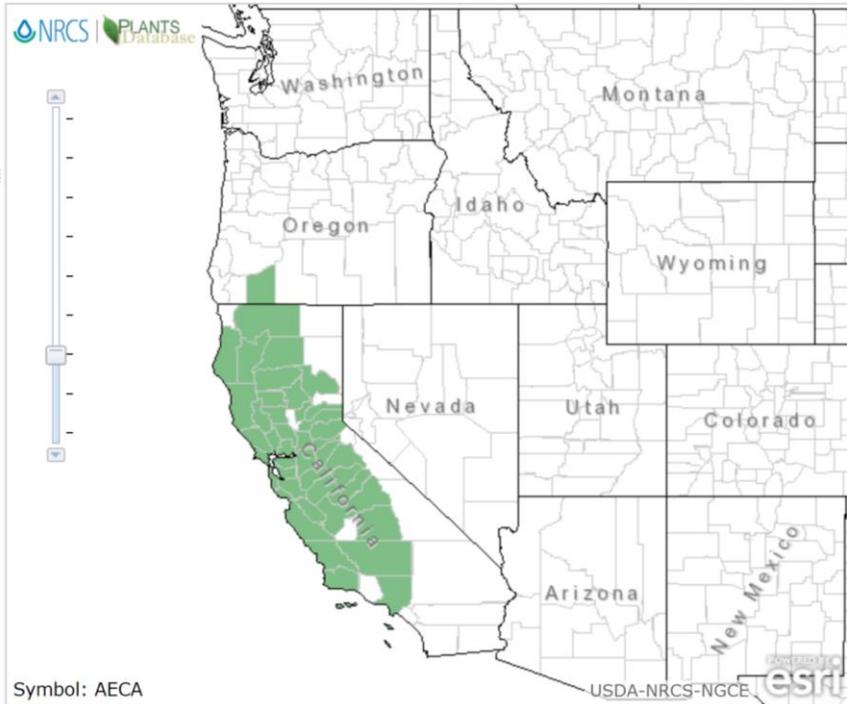
TAXONOMY

Plant Family	
Scientific Name	Hippocastanaceae
Common Name	Buckeye Family; Horse Chestnut family
Species Scientific Name	
Scientific Name	<i>Aesculus californica</i>
Varieties	
Sub-species	
Cultivar	
Common Synonym(s)	<i>Calothyrsus californica</i>
Common Name(s)	California Buckeye, Horse chestnut; de-sa' ka-la' (Pomo); far'-sokt (Nomlaki); sympt'-ol (Yuki); ah'-te (Coast Miwok)

Species Code (as per USDA Plants database)	ACGL
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GENERAL INFORMATION

Geographical range *Aesculus californica* is endemic to California and parts of Oregon. It occurs in the Klamath and Coast Ranges from Siskiyou County south to Los Angeles County. In the Cascade Range and the foothills of the Sierra Nevada, it occurs from Shasta County south to Kern County. California buckeye is occasionally found in the Central Valley in Yolo, Colusa, and Stanislaus Counties. (Howard, 1992).



(Retrieved from: <https://plants.usda.gov/core/profile?symbol=AECA>)

Ecological distribution *Aesculus californica* is found growing in a wide range of conditions from crowded, moist, semi-shaded canyon bottoms to dry south-facing slopes and hilltops, along waterways (Anderson, 2006).

Climate and elevation range *Aesculus californica* occurs below 4000ft in a Mediterranean climate with cool moist winters and hot dry summers. The mean annual rainfall is less than 14 inches, and temperatures are in excess of 100 degrees Fahrenheit (38 degrees C) for several successive days every summer (Young, 2001, Howard, 1992). It occurs in sandy, sandy-loam, or gravelly-loam soils.

Local habitat and abundance	<i>Aesculus californica</i> is recognized as a distinct plant community, and can also be found co-dominating with oak woodland, interior live oak, and blue oak. In chaparral, it is sometimes a dominant shrub or tree (Howard, 1992).
Plant strategy type / successional stage	<i>Aesculus californica</i> occurs as widely scattered individuals in open grasslands. It also occurs as an understory shrub in mixed evergreen forest. It is a climax indicator in chaparral and mixed oak communities and in California buckeye woodlands. It sprouts from the root crown after top-kill by fire. Seeds do not survive fire because they are highly susceptible to heat desiccation. Seeds are often transported by water and can be carried to burn sites (Howard 1992).
Plant characteristics	<i>Aesculus californica</i> is a large shrub or tree which can grow up to 23 feet (7 m) tall. The dark green 2-to 6-inch-long (5-15 cm) leaves are deciduous and compound palmately with five leaflets. Flowers are sweet-scented, white to pale pink, and grow on a terminal panicle 4 to 8 inches (10-20 cm) long. The pear-shaped, light brown fruit of the shrubs contains one to six glossy brown seeds 0.8 to 1.2 inches (2-3 cm) in diameter (Howard, 1992). It reproduces by seed. The average tree produces approximately 100 seeds yearly. Dispersal is accomplished primarily by gravity or water. Seeds are viable for only 1 year and are shed from November to mid-February. Germination occurs within several weeks of shedding if the soil temperature is above 40 degrees Fahrenheit (4 degrees C). If the temperature persists below 40 degrees for 2 months or more the seeds are susceptible to fungal infections or desiccation. Germination success rates of 75 percent have been reported under laboratory conditions (Howard, 1992). They have long lifespans of 250-280 years. The tree had multiple cultural uses for indigenous groups, including food and medicinal properties (Anderson, 200 [^]).
PROPAGATION DETAILS	
Ecotype	
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	
Time to Grow	
Target Specifications	Firm plug in container
Propagule Collection Instructions	Seeds collected between September 1 st and December 1 st . Seeds are round brown nuts. Collected from trees or ground nearby.
Propagule Processing/Propagule Characteristics	Husks removed from seeds mechanically. Seeds kept refrigerated and moist while in storage.
Pre-Planting Propagule Treatments	Seeds can be soaked in water for 24 hours prior to planting. Seeds can be chemically scarified by placing them into 5% bleach

	solution for one minute, then rinsed. Place seeds in sterile plastic freezer bag. Keep in refrigerator for 6-8 weeks for cold stratification. Check after six weeks. Sow seeds as radicle emerges.
Growing Area Preparation / Annual Practices for Perennial Crops	Fully controlled greenhouse. Seeds are sown in containers filled with standard potting mix of peat moss, fir bark, perlite, and sand. Seeds are surface sown 1x the diameter of seed depth. Seeds are sown 1 per container. Flats are watered with drip irrigation system to keep soil moist. Sow with “scar” downward.
Establishment Phase Details	
Length of Establishment Phase	21 days after sowing
Active Growth Phase	Transplant seedlings into 1-gallon containers with adequate drainage. Place outdoors with 40% shade and drip irrigation. Provide slow-release fertilization through summer.
Length of Active Growth Phase	June-August
Hardening Phase	Discontinue fertilization at end of summer and decrease frequency of irrigation to encourage. Allow plants to adapt to cooler temperatures.
Length of Hardening Phase	August-November
Harvesting, Storage and Shipping	Keep plants in unheated greenhouse through winter. Plants may be shipped in containers in early spring or in fall.
Length of Storage	Through winter until early spring.
Guidelines for Outplanting / Performance on Typical Sites	Plant seeds in well-drained soil in full sun or light shade. May require summer watering in first year. Grows quickly and may grow up to 10 inches in a year.
Other Comments	The species is often better sown directly in the field. Place 3-5 seeds in planting spot, then thin after germination.
INFORMATION SOURCES	
References	<p>Anderson, K. (2006). CALIFORNIA BUCKEYE <i>Aesculus californica</i> Plant Guide. USDA PLANTS database. https://plants.usda.gov/plantguide/pdf/cs_aeca.pdf</p> <p>Clark, Harold W. 1937. <i>Association types in the North Coast Ranges of California</i>. Ecology. 18: 214-230.</p> <p>Gordon, Aaron; Sampson, Arthur W. 1939. <i>Composition of common California foothill plants as a factor in range management</i>. Bull. 627. Berkeley, CA: University of California, College of Agriculture, Agricultural Experiment Station. 95 p.</p> <p>Howard, Janet L. 1992. <i>Aesculus californica</i>. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences</p>

	<p>Laboratory (Producer). Available: https://www.fs.fed.us/database/feis/plants/tree/aescal/all.html [2020, June 4].</p> <p>Mirov, N. T.; Kraebel, C. J. 1937. <i>Collecting and propagating the seeds of California wild plants</i>. Res. Note No. 18. Berkeley, CA: U.S. Department of Agriculture, Forest Service, California Forest and Range Experiment Station. 27 p.</p> <p>Native Plant Resources. (n.d.). Hippocastanaceae (Aesculus) — Reforestation, nurseries and genetics resources. Reforestation, Nurseries and Genetics Resources. https://rngr.net/npn/propagation/protocols/hippocastanaceae-aesculus-547</p> <p>Plants for a Future. (2010). Aesculus californica californian Buckeye, California Horsechestnut PFAF plant database. https://pfaf.org/user/Plant.aspx?LatinName=Aesculus+californica</p> <p>S., F. A., & Munz, P. A. (1970). A California flora, supplement. <i>Taxon</i>, 19(1), 134. https://doi.org/10.2307/1217936</p> <p>USDA. (n.d.). Plants profile for aesculus californica (California buckeye). USDA PLANTS Database. https://plants.usda.gov/core/profile?symbol=AECA</p> <p>Young, Betty. 2001. <i>Propagation protocol for production of Container (plug) Aesculus californica</i> (Spach) Nutt. plants San Francisco, California. In: Native Plant Network. URL: http://NativePlantNetwork.org (accessed 2020/06/04). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources.</p>
Other Sources Consulted	<p>Cal Flora. (n.d.). Aesculus californica Calflora. Calflora.org. https://www.calflora.org/cgi-bin/species_query.cgi?where-calrecnum=111</p>
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