

Plant Propagation Protocol for *Abies magnifica*

ESRM 412 – Native Plant Production


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



Images¹

TAXONOMY

Plant Family	
Scientific Name	Pinaceae
Common Name	Pine Family
Species Scientific Name	
Scientific Name	<i>Abies magnifica</i> A. Murray bis
Varieties	<i>Abies magnifica</i> A. Murray bis var. <i>magnifica</i> <i>Abies magnifica</i> A. Murray bis var. <i>shastensis</i> Lemmon
Sub-species	
Cultivar	
Common Synonym(s)	<i>Abies magnifica</i> A. Murray bis var. <i>magnifica</i> <i>Abies magnifica</i> A. Murray bis var. <i>shastensis</i>
Common Name(s)	California red fir Shasta red fir
Species Code (as per USDA Plants database)	ABMA
GENERAL INFORMATION	
Geographical range	This species is distributed on the west coast of North America in Oregon, California and Nevada. ² The species also occurs on the east coast in New York state's Ulster county. It has now distribution in Washington State.

	
Ecological distribution	<p>The species occurs in coniferous forest in California, Nevada and Oregon. The species often grows in extensive high elevation stands in the Sierra Nevada Mountains. It is a close relative of <i>Abies procera</i>. Both species grow in relatively isolated populations in the mountain tops. Areas where the two species meet in southern Oregon and Northern California, intermediate populations exist. These intermediate populations have been called <i>A. magnifica</i> var. <i>shastensis</i>.³</p>
Climate and elevation range	<p>The species grows in elevation of 1400-2700 m.³ The climate the species occurs in is characterized by warm and dry summers which are short, and cold long winters with much snow. The annual precipitation of the</p>

	climate varies between 750-1,500 mm (80% which occurs as snow). ⁴
Local habitat and abundance	It has no local habitat in Washington as it does occur in the state. However as stated previously it occurs in mixed coniferous forest. Its commonly associated with <i>Pinus</i> spp., <i>Abies concolor</i> , <i>A. procera</i> , <i>Pseudotsuga menziesii</i> , <i>Calocedrus decurrens</i> , <i>Juniperus occidentalis</i> , and at higher elevations <i>Abies lasiocarpa</i> and <i>Tsuga mertensiana</i> subsp. <i>grandicona</i> . Common shrubs are e.g. <i>Ceanothus cordulatus</i> , <i>Chrysolepis sempervirens</i> and <i>Arctostaphylos nevadensis</i> . ⁴
Plant strategy type / successional stage	<i>Abies magnifica</i> are a climax vegetation species. It established well in opening and after disturbances in forests. ⁵ <i>Abies magnifica</i> A. Murray bis var. <i>shastensis</i> is a late seral or climax community dominant, this depends on its associates. ⁵ It has high frost tolerance. ⁷
Plant characteristics	Is an evergreen pine tree which grow between 20-60m ⁶ , very a narrowly conic crow, gray-ish bark that thickens with age and becoming deeply furrowed, twig arrangement is opposite and whorled. ³ This species is monoecious, with male strobili(cones) and female cones who are borne erect on branches of 1 years or older. Female cones are usually found in the upper crown. Flowering time is late June. Seed reach maturity in mid-August while maturing occurs until seed fall. ⁷ The species can start producing seed only when it reaches an age of 35-45 years. ⁹ Seeds are mainly disbursed by wind. ¹⁰ This species cannot tolerate atmospheric pollution. ⁸
PROPAGATION DETAILS:	
Ecotype	
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Bareroot
Stock Type	Large Treepot for germinating seedlings.
Time to Grow	5 years ¹¹
Target Specifications	Cold hardy saplings with well-established root systems.
Propagule Collection Instructions	Collect seed from mature tree (age 50+). Collect from September to mid-October. ⁷ The cones of the species bear two seeds at the base. The mature seeds have large wings which are ovoid to oblong. Seeds store best in a dry, cool environment. ¹⁴
Propagule Processing/Propagule Characteristics	California red fir seeds average 14,110/kg (6,400/lb). Shasta red fir seeds average 16,095/kg (7,300/lb). ¹⁵ The seed remains viable for up to 5 years if it is well stored. ¹³
Pre-Planting Propagule Treatments	Stratify seeds for 28 days in cold moist stratification.
Growing Area	Growing media for Establishment phase: mineral soil or light litter. ⁷

Preparation / Annual Practices for Perennial Crops	Container types are large treepots Sow seed in greenhouse or outdoors if starting in March. ¹³
Establishment Phase Details	Sow seed in February to early spring. ^{13,14} Growth is best with sun to shade. ⁷ Keep moist with medium water use. ¹⁴ 30-45% germination rate. ⁷
Length of Establishment Phase	1 year ⁷
Active Growth Phase	Transplant to seedbeds outside with heavier litter and in full sun. ⁷
Length of Active Growth Phase	4 years
Hardening Phase	Cold hardiness has already been established with growing phase exposure to overwinter. Sapling may be kept under same conditions as Growth phase. ¹³
Length of Hardening Phase	Can be transplanted after Growth phase, however may be kept until age 10 (5 additional years) to increase potential of full growth once release from suppression. ¹² However it is important to note tree should be transplanted into their permanent positions when they are quite small or root systems will be impacted. ¹³
Harvesting, Storage and Shipping	
Length of Storage	
Guidelines for Outplanting / Performance on Typical Sites	Plants produce seed only when mature at age 35-45 years. ⁹
Other Comments	California red fir does not reproduce vegetatively. ⁷
INFORMATION SOURCES	
References	<ol style="list-style-type: none"> 1. "CalPhotos". calphotos.berkeley.edu. Retrieved 2016-05-25. 2. "Taxonomy - GRIN-Global Web v 1.9.6.2". npgsweb.ars-grin.gov. Retrieved 2016-05-25. 3. "Abies magnifica in Flora of North America @ efloras.org". www.efloras.org. Retrieved 2016-05-25. 4. "Abies magnifica (California Red Fir, Red Fir)". www.iucnredlist.org. Retrieved 2016-05-25 5. "Abies magnifica". www.fs.fed.us. Retrieved 2016-05-25. 6. "Lady Bird Johnson Wildflower Center - The University of Texas at Austin". www.wildflower.org. Retrieved 2016-05-25. 7. "Abies magnifica A". www.na.fs.fed.us. Retrieved 2016-05-25. 8. "Abies magnifica Californian Red Fir, Shasta red fir PFAF Plant Database". www.pfaf.org. Retrieved 2016-05-25. 9. Edwards, D. G. W. 1982. Collection, processing, testing, and storage of true fir seeds--a review. In: Oliver, Chadwick Dearing;

	<p>Kenady, Reid M., eds. Proceedings of the biology and management of true fir in the Pacific Northwest symposium; 1981 February 24-26; Seattle-Tacoma, WA. Contribution No. 45. Seattle, WA: University of Washington, College of Forest Resources; Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station: 113-137. Retrieved 2016-05-25</p> <p>10. Laacke, Robert J. 1990. <i>Abies magnifica</i> A. Murr. California red fir. In: Burns, Russell M.; Honkala, Barbara H., technical coordinators. <i>Silvics of North America. Volume 1. Conifers. Agric. Handb.</i> 654. Washington, DC: U.S. Department of Agriculture, Forest Service: 71-79. Retrieved 2016-05-23</p> <p>11. Bancroft, Larry. 1979. Fire management plan: Sequoia and Kings Canyon National Parks. San Francisco, CA: U.S. Department of the Interior, National Park Service, Western Region. 190 p. Retrieved 2016-24-05</p> <p>12. Barbour, Michael G. 1988. Californian upland forests and woodlands. In: Barbour, Michael G.; Billings, William Dwight, eds. <i>North American terrestrial vegetation</i>. Cambridge; New York: Cambridge University Press: 131-164. Retrieved 2016-22-05</p> <p>13. "Abies magnifica Californian Red Fir, Shasta red fir PFAF Plant Database". www.pfaf.org. Retrieved 2016-05-25.</p> <p>14. "Lady Bird Johnson Wildflower Center - The University of Texas at Austin". www.wildflower.org. Retrieved 2016-05-25.</p> <p>15. Schopmeyer, C. S., tech. coord. 1974. Seeds of woody plants in the United States. U.S. Department of Agriculture, Agriculture Handbook 450. Washington, DC. 883 p. Retrieved 2016-22-05</p> <p>16.</p>
Other Sources Consulted	C. M. Blankensop, R.Z. Callaham (June 1960). "Research Note" (PDF). <i>Forest Service-US Department of Agriculture</i> . Pacific Southwest Forest and Experiment Station. Retrieved 05/24/2016
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