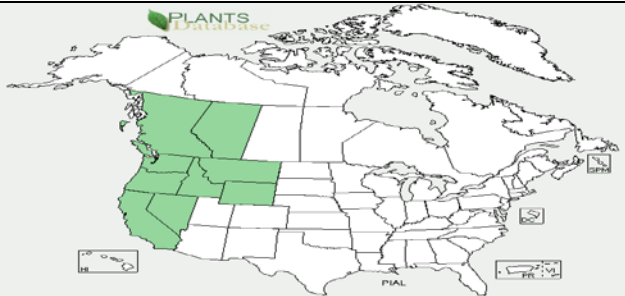
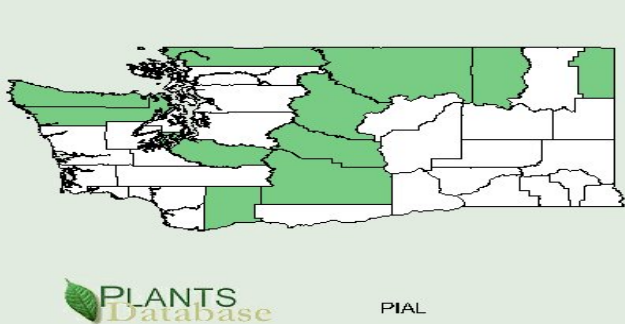



Plant Propagation Protocol for *Pinus albicaulis*
ESRM 412 – Native Plant Production



Photo Courtesy of <http://www.for.gov.bc.ca/hfd/library/documents/treebook/whitebarkpine.htm>

TAXONOMY	
Family Names	
Family Scientific Name:	<i>Pinus albicaulis</i> Engelm (2)
Family Common Name:	Whitebark Pine (2)
Scientific Names	
Genus:	<i>Pinus</i> (2)
Species:	<i>albicaulis</i> (2)
Species Authority:	Engelm (2)
Variety:	
Sub-species:	
Cultivar:	
Authority for Variety/Sub	Engelm (2)

-species:	
Common Synonym(s)	<i>Pinus albicaulis</i> (Engelmann) Rydberg (3)
Common Name(s):	Whitebark pine, whitestem, alpine whitebark, pitch, scrub or creeping pine, white pine (4)
Species Code (as per USDA Plants database):	PIAL (2)
GENERAL INFORMATION	
Geographical range	 (2)  (2) Range of distribution includes British Columbia, the Cascade Mountain Range of Washington and Oregon and the Sierra Nevada (4)
Ecological distribution	Dry, rocky areas in high elevations on the mountain (1) Found growing with other conifers (5) Grows in the highest elevation forest and timberline elevations (5)
Climate and elevation range	Occurs above 6,000 feet in Inland Pacific Northwest (1) Timberline elevations of 1300-3700m (4) Dry, inland slopes confined to high elevation mountains (5)
Local habitat and abundance; may include commonly associated species	<i>Pinus albicaulis</i> grows in southern British Columbia, south in Cascades to Sierra Nevada of California (1), and isolated intermountain ranges of eastern California and Nevada (4) Associated species: Western white pine, Limber pine, Lodgepole pine (1)
Plant strategy type / successional	<i>Pinus albicaulis</i> is a slow growing, long lived tree species. It requires a soil pH range of 4.8-8.0 with a temperature minimum of at least -58 degrees fahrenheit (2). on weakly developed (immature) soils (5)

stage	
Plant characteristics	<p>Needles in fascicles of 5, 1-3 inches in length, green to yellow-green leaves (1)</p> <p>Tree, Perennial (long-lived) (2)</p> <p>Alpine tree around 65 feet tall, bark is thin with white scales over red-brown inner bark (3)</p> <p>Deep red to purple cones clustered at the end of the branches (3)</p>
PROPAGATION DETAILS	
Ecotype	
Propagation Goal	Plants, seeds (6)
Propagation Method	Seed (6)
Product Type	Container (plug) (6)
Stock Type:	Conetainers (6)
Time to Grow	2 years (6)
Target Specifications	Should use conetainer with firm plug for root system(6)
Propagule Collection	<p>Should collect seeds by hand when they are dark-dull purple to dark brown as soon as the seeds ripen in early fall (6). Should keep seeds (cones) in paper bags to stay well ventilated</p>  <p>Photo courtesy of http://www.for.gov.bc.ca/hfd/library/documents/treebook/whitebarkpine.htm</p>
Propagule Processing/ Propagule Characteristics	Has an 8 year seed longevity in sealed containers (6)
Pre-Planting Propagule Treatments	<p>Dry the indehiscent cones immediately to a 7-8% moisture content after collection to prevent molding (6)</p> <p>Soak under running water for 48 hours</p> <p>Morphophysiological dormancy: prolonged germination pattern, can use file to scarify seed coat (6)</p>
Growing Area Preparation / Annual	Can grow in greenhouse and outdoor nursery, plant seed directly (sowing method) and hand water seedlings keeping growing medium slightly moist during germination period (6)

Practices for Perennial Crops	
Establishment Phase	Non-uniform (6)
Length of Establishment Phase:	4-8 weeks (6)
Active Growth Phase	Must grow seedlings under specific greenhouse conditions. Control temperature, moisture and light (6)
Length of Active Growth Phase:	20 weeks 1 st year, 25 weeks 2 nd year (6)
Hardening Phase	During fall months (6)
Length of Hardening Phase:	5 months (6)
Harvesting, Storage and Shipping (of seedlings):	Total harvesting time: 2-3 years Store in sealed container
Length of Storage	5 months (6)
Guidelines for Outplanting / Performance on Typical Sites	Slow growing seedlings. May take 6-8 months to reach a seedling height of 2.5-4 cm tall and another year to establish rooting in container (6)
Other Comments	

INFORMATION SOURCES

References	<p>(1). Johnson, J., G. Charles. 2004. Alpine and Subalpine Vegetation of the Wallowa, Seven Devils and Blue Mountains. USDA-Forest Service, Pacific Northwest Region, 306-307 p.</p> <p>(2). Pinus albicaulis. USDA Plant Database. April 20, 2010 http://www.plants.usda.gov/java/profile?symbol=PIAL.</p> <p>(3). Pinus albicaulis. WA-Burke Museum of Natural History and Culture. April 20, 2010 http://biology.burke.washington.edu/herbarium/imagecollection.php?Genus=Pinus.</p>
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	<p>(4). Pinus albicaulis. The Gymnosperm Database. April 20, 2010. http://www.conifers.org/pi/pin/albicaulis.htm.</p> <p>5). Arno F., Stephen and R.J. Hoff. Whitebark Pine. April 20, 2010. http://www.na.fs.fed.us/spfo/pubs/silvics_manual/Volume_1/pinus/albicaulis.htm.</p> <p>(6). Native Plant Network. Protocol Information. April 20, 2010. http://www.nativeplantnetwork.org/Network/ViewProtocols.aspx?ProtocolID=235.</p>
Other Sources Consulted	<p>Johnson, J., G. Charles. 1998. Common Plants of the Inland Pacific Northwest. USDA-Forest Service, Pacific Northwest Region, 11-12 p.</p> <p>Petrides A., George. 1992. A Field Guide to Western Trees. Houghton Mifflin Company, 39-40 p.</p> <p>Species: Pinus albicaulis. April 20, 2010. http://www.fs.fed.us/database/feis/plants/tree/pinalb/all.html.</p> <p>Whitebark Pine. April 20, 2010. http://www.for.gov.bc.ca/hfd/library/documents/treebook/whitebarkpine.htm.</p>
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