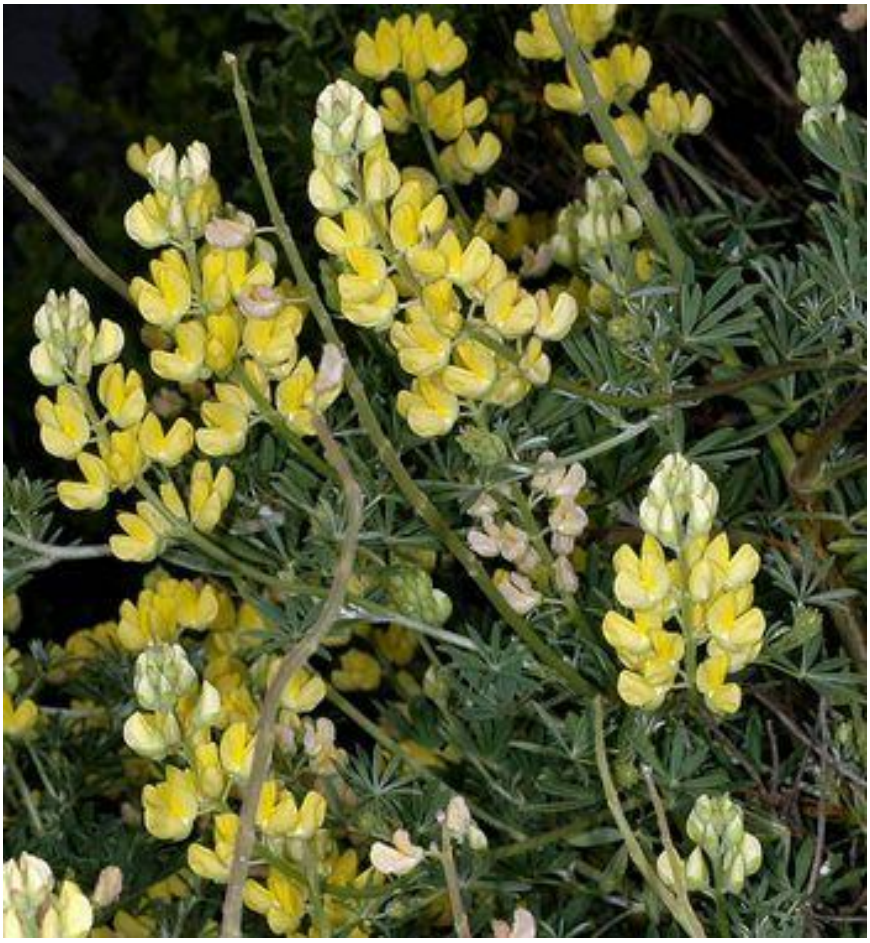
**Plant Propagation Protocol for *Lupinus arboreus***
ESRM 412 – Native Plant Production
Protocol URL: https://courses.washington.edu/esrm412/protocols/*LUAR.pdf*



http://biology.burke.washington.edu/herbarium/imagecollection.php?ID=1908

| **TAXONOMY** | |
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| Plant Family | |
| Scientific Name | Fabaceae/Leguminosae (1) |
| Common Name | Pea family (1) |
| Species Scientific Name | |
| Scientific Name | *Lupinus arboreus* Sims (1) |
| Varieties | *Lupinus arboreus* var. *eximius* (2) |
| Sub-species | N/A |
| Cultivar | N/A |
| Common Synonym(s) | *Lupinus arboreus* Sims (1) |
| Common Name(s) | Yellow bush lupine, coastal bush lupine, tree lupine, bush lupine. (1,2, 3, 4) |

| Species Code (as per USDA Plants database) | LUAR (1) |
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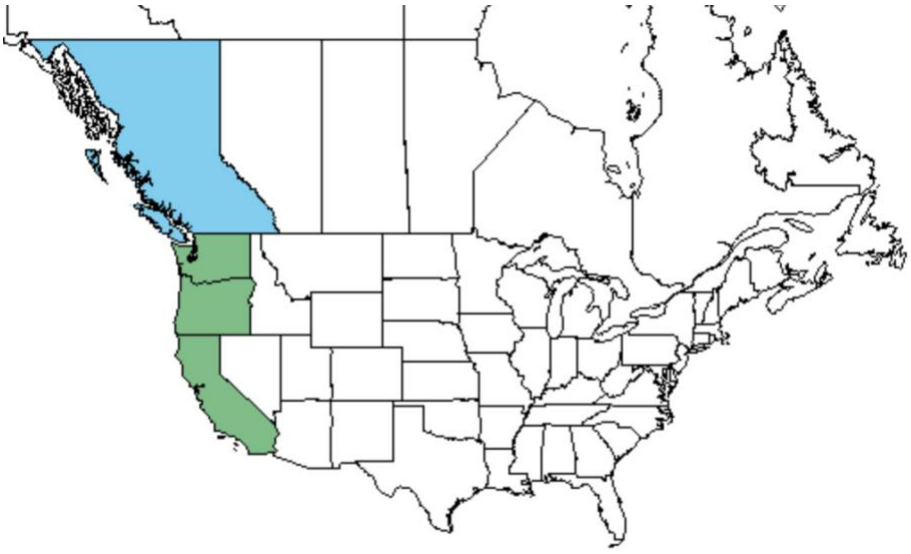
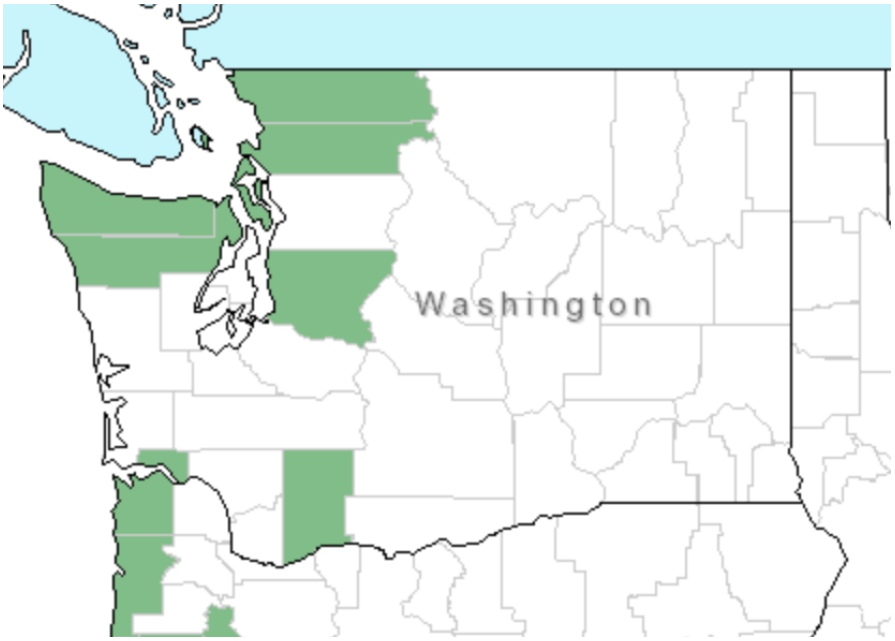
| **GENERAL INFORMATION** | |
| Geographical range |  <br>https://plants.usda.gov/core/profile?symbol=LUAR<br>  <br>https://plants.usda.gov/core/profile?symbol=LUAR<br><br>*Lupinus arboreus* is listed as introduced in several other sources. (5, 6, 7) |
| Ecological distribution | Occurs in western Washington lowlands and along the Pacific Coast from British Columbia to California. Also found on coastal bluffs, sand dunes, coastal scrub, and pine forests close to the coast. (3, 5, 8) |
| Climate and elevation range | Typically found below 30 m. (4, 9) |

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| Local habitat and abundance | Prefer sandy soil and coastal areas. Can become weedy and invasive. In California, it has become declared an invasive species outside its native range. (1, 4, 5, 10) |
| Plant strategy type / successional stage | It is a nitrogen fixer and can become weedy/invasive. (1, 3) |
| Plant characteristics | *Lupinus arboreus* is a perennial evergreen shrub, subshrub, or herb, that quickly grows to 1-2 m tall and 1.2 m wide. It is thickly covered with leaves that have 5-11 leaflets. The pea-like flowers are 14-18 mm long, yellow, and the banner is often a purplish color. The pedicles are 4-9 mm long and the fruits are pods, 40-60 mm long. They bloom from May to September. They have deep, heavy roots. (1, 3, 4, 5, 10) |
| **PROPAGATION DETAILS** | |
| Ecotype | California (8, 9) |
| Propagation Goal | Plants |
| Propagation Method | Seeds |
| Product Type | Container (plugs) |
| Stock Type | Deepot 40 (8, 9) |
| Time to Grow | 4 months (8) |
| Target Specifications | Root system: firm plug in center. (9) |
| Propagule Collection Instructions | Seed collection period is from June until September. Seeds are collected manually and are split easily by hand. Collect before the pods have split and released seeds. (8, 9) |
| Propagule Processing/Propagule Characteristics | There are approximately 6,678 seeds per pound. (8, 9) |
| Pre-Planting Propagule Treatments | Seeds should be removed from their pods before cleaning to reduce the likelihood of insect predation. They should be kept dry in paper bags and stored in a refrigerator. Using fine sand paper (320 grit), the seeds should be gently rubbed at their attachment point to the pod until the seed coat is visibly eroded. Soak seeds overnight in warm water before planting. Rapid germination can be induced by soaking the seeds in hot water, mechanical scarification, or cold stratification for 72 days at 35 degrees F. (7, 8, 9) |
| Growing Area Preparation / Annual Practices for Perennial Crops | Sowing should occur in August through September. Directly sow 1-3 seeds per container into well-watered standard potting mix (peat moss, fir bark, perlite and sand). Cover seeds with a thin layer of soil approximately 2-3 times the diameter of the seed. Water or mist by hand. (8, 9) |
| Establishment Phase Details | Keep freshly-sown seeds and seedlings in a greenhouse with automatic mist (VPD 25-30). Germination occurs within two weeks and the rate was recorded at 95% and 30%. After germination, transplant seedlings into individual deepot 40 containers, if they were not sown individually. Transplant survival rate was recorded at 60%. After plumules emerge, move seedlings to a wire-mesh cage in an outdoor shade house. Continue |

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| | manual misting until true leaves form. (8, 9) |
| Length of Establishment Phase | 3 weeks. (8) |
| Active Growth Phase | Keep plants in an outdoor shade house. Deeply water the plants when they dry to the bottom (approximately 40 minutes per week). Fertilize with NPK 13-13-13 after three months. Survival rate is approximately 90%. (8) |
| Length of Active Growth Phase | 2-3 months. (8) |
| Hardening Phase | N/A |
| Length of Hardening Phase | N/A |
| Harvesting, Storage and Shipping | N/A |
| Length of Storage | N/A |
| Guidelines for Outplanting / Performance on Typical Sites | N/A |
| Other Comments | *Lupinus arboreus* is extremely susceptible to root crown rot. Some preventable measures include a low mist setting, early movement of seedlings to the shade house, and deep, but infrequent watering. (8) |
| **INFORMATION SOURCES** | |
| References | (1) Plant Profile for *Lupinus arboreus* Sims. USDA, Natural Resources Conservation Service. https://plants.usda.gov/core/profile?symbol=LUAR<br><br>(2) *Lupinus arboreus* Sims. 2018. Calflora. Berkeley, CA. http://www.calflora.org/cgi-bin/species_query.cgi?where-calrecnum=5106<br><br>(3) *Lupinus arboreus* – Sims. Plants for a Future. Devon, England. https://www.pfaf.org/user/plant.aspx?latinname=Lupinus+arboreus<br><br>(4) *Lupinus arboreus.* 2010 July 10. Lady Bird Johnson Wildflower Center. The University of Texas at Austin. https://www.wildflower.org/plants/result.php?id_plant=luar<br><br>(5) Giblin, D and Knoke, D. *Lupinus arboreus*. Burke Museum. University of Washington. http://biology.burke.washington.edu/herbarium/imagecollection.php?ID=1908<br><br>(6) Pojar, J and MacKinnon, A. 2013. Alpine Plants of the Northwest. Lone Pine Publishing. Vancouver, BC. |

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| | (7) Young, JA and Young, CG. 1986. Seeds of Wildland Plants. Timber Press. Portland, OR.<br><br>(8) Heimbinder, E and Johnson, CL. 2002. Propagation Protocol for Production of Container (plug) *Lupinus arboreus* Sims. Native Plant Network US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. San Francisco, California. https://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=fabaceae-lupinus-2353<br><br>(9) Young, B. 2001. Propagation Protocol for Production of Container (plug) *Lupinus arboreus* Sims. Native Plant Network. US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. San Francisco, CA. https://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=fabaceae-lupinus-634<br><br>(10) Lyons, C.P. 1999. Trees & Shrubs of Washington. Lone Pine Publishing. Edmonton, AB, Canada. |
| Other Sources Consulted | • Baskin, C and Baskin J. 2014. Seeds: Ecology, Biogeography, and Evolution of Dormancy and Germination. Academic Press.<br>• *Lupinus arboreus.* 2013 May 4. Practical Plants. http://practicalplants.org/wiki/Lupinus_arboreus |
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| Date Protocol Created or Updated | 05/15/18 |