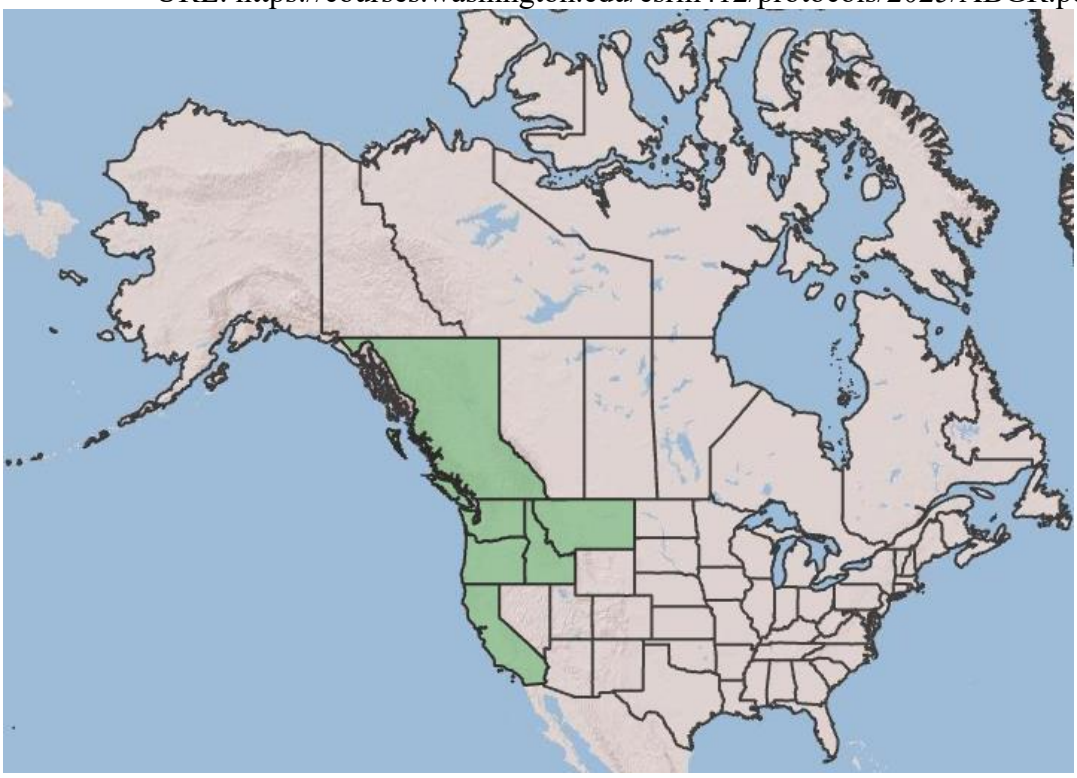
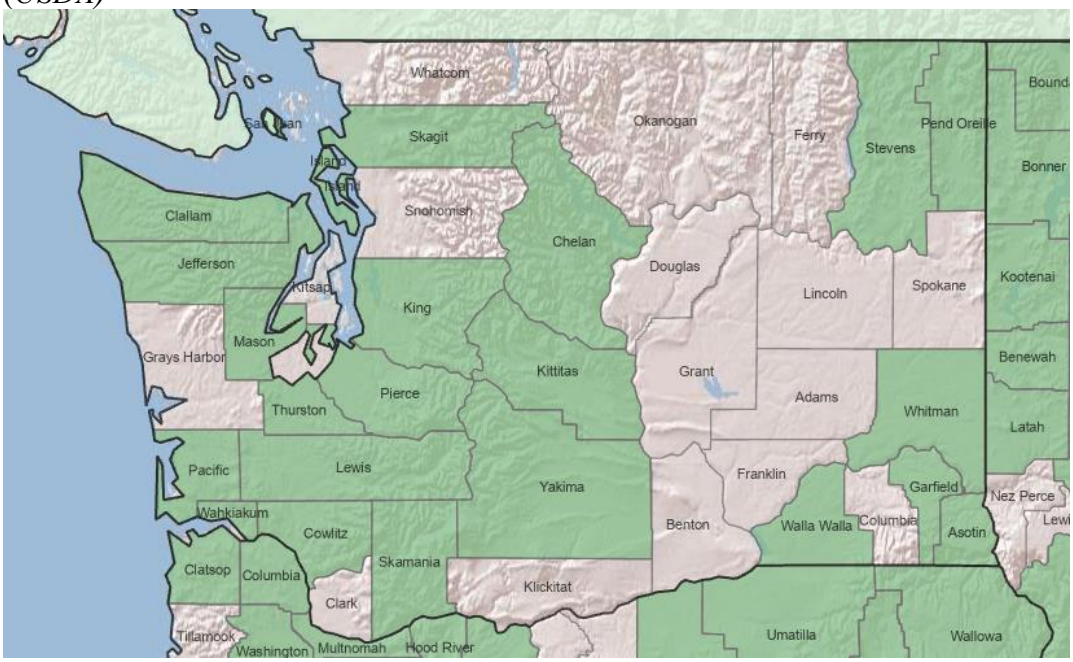
Plant Propagation Protocol for *Abies grandis*

ESRM 412 – Native Plant Production

URL: https://courses.washington.edu/esrm412/protocols/2025/ABGR.pdf



(*USDA)*



(*USDA)*

TAXONOMY	
Plant Family	
Scientific Name	*Pineceae*
Common Name	Pine Family
Species Scientific Name	
Scientific Name	*Abies Grandis* (Douglas ex D. Don) Lindl.
Varieties	*Abies grandis* (Douglas ex D. Don) Lindl. var. *Grandis* *Abies grandis* (Douglas ex D. Don) Lindl. var. *idahoensis* Silba *Abies grandis* (Douglas ex D. Don) Lindl. f. *johnsonii* O.V. Matthews
Sub-species	*Abies grandis* (Douglas ex D. Don) Lindl. ssp. *idahoensis* (Silba) Silba
Cultivar	
Common Synonym(s)	*Pinus grandis* Douglas ex D. Don
Common Name(s)	grand fir, lowland white fir
Species Code (as per USDA Plants database)	ABGR
GENERAL INFORMATION	
Geographical range	See maps above.
Ecological distribution	Grows near coasts and on mountain slopes in coniferous and hardwood forests (Nesom).
Climate and elevation range	Grows in wet areas but is also drought tolerant (Nesom). Elevation ranges from 0-1500 m (*Abies grandis in Flora*).
Local habitat and abundance	Common across its geographic range. Associated species include other conifers such as *Pseudotsuga menziesii, Thuja plicata, Pinus contorta, & Tsuga heterophylla,* deciduous trees such as *Alnus rubra, & Cornus nuttallii,* and understory plants such as *Symphoricarpos albus, Xerophyllum tenax, Rubus parviflorus, & Vaccinium* spp., (Howard, 200).
Plant strategy type / successional stage	Seral and late successional: can tolerate partial shade and grows quickly enough to compete in younger forests, then lives long enough and grows large enough to dominate older forests (*Plant Propagation,* 2009), (Newsom).
Plant characteristics	Evergreen conifer that grows 75-100 meters tall, and its maximum life span is over 300 years (Nesom).

	Like other firs, cones grow upright and fall apart during seed dispersal. Branches grow in cruciform patterns. Needles grow flat and alternate between long and short lengths *(Abies grandis,* Landscape Plants*).* Needles have two white stripes on the bottom (Knoke).
PROPAGATION DETAILS	
Luna, Evans, & Wick, *Propagation protocol for production of Container (plug) Abies grandis (Dougl.) ex D. Don plants 172 ml conetainers*	
Ecotype	Spruce / Fir forest, Glacier National Park, Mt.
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	172 ml conetainers
Time to Grow	2 years
Target Specifications	15 cm tall, firm roots
Propagule Collection Instructions	Collection occurred during early September, with cones that were dark brown but not falling apart. Cones were mostly collected from the upper third of the crown, with an emphasis on collecting as many high-quality cones as possible. Seeds were stored in well-ventilated sacks for several weeks before cleaning.
Propagule Processing/Propagule Characteristics	Seeds were separated from cones using a tumbler. 50,000 seeds per kg, 100% purity, 4-17% germination rate.
Pre-Planting Propagule Treatments	Seeds were soaked in cold water for 48 hours. To overcome physiological dormancy, seeds were cold stratified for 40 days at 1 C°.
Growing Area Preparation / Annual Practices for Perennial Crops	Greenhouse and outdoor nursery
Establishment Phase Details	Seeds were directly seeded on the surface of the soil (so seeds can be exposed to light). Medium used had a ratio 6:1:1 milled sphagnum peat, perlite, and vermiculite. Two fertilizers were used, Osmocote (1g per cell) and Micromax (0.20g per cell). Temperatures were kept between 15-22 C °, and seeds were misted twice a day. Seedlings were thinned after they germinated.
Length of Establishment Phase	4 weeks
Active Growth Phase	Seedlings were protected from direct sunlight. NPK fertilizer was added at a concentration of 100 ppm.

Length of Active Growth Phase	20 weeks
Hardening Phase	NPK fertilizer was added at a concentration of 200 ppm. Irrigation was reduced gradually for 2 months.
Length of Hardening Phase	8 weeks
Harvesting, Storage and Shipping	Harvested from September to October. Saplings overwintered in an outdoor nursery.
Length of Storage	5 months
Guidelines for Outplanting / Performance on Typical Sites	No information available.
Other Comments	All information in this section is from (Luna, 2008)
PROPAGATION DETAILS	
Steinfield, *Propagation protocol for production of Bareroot (field grown) Abies grandis plants*	
Ecotype	No information found.
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Bareroot (field grown)
Stock Type	2+0
Time to Grow	21 months
Target Specifications	15 cm for plants intended for sites in North Oregon and Washington. 10 cm for plants intended for sites in South Orgon and North California.
Propagule Collection Instructions	Seeds were sourced from the wild and from seed orchards under the Forest Service and Bureau of Land Management. Seed collection occurred during the fall.
Propagule Processing/Propagule Characteristics	Seeds were cleaned at Bend Pine Extractory. To store, seeds were dried and put in air tight bags in a freezer at –15 C°.
Pre-Planting Propagule Treatments	Seeds were placed in cold running water for 48 hours. Seeds were then cold stratified for 45 days at a temperature of 1°C. During stratification, seeds were kept moist and checked for mold.
Growing Area Preparation / Annual Practices for Perennial Crops	Seeds were sown in sandy loam soil inside a nursery. To reduce weeds and disease, sawdust was added, and soils were disked regularly.

Establishment Phase Details	Seeds were sown late March-early April using a seed drill. Potassium sulfate and ammonium phosphate fertilizers were added simultaneously. Seeds were then covered with a thin layer (1 cm) of sawdust.
Length of Establishment Phase	3 weeks
Active Growth Phase	Irrigation timing was determined by a soil tensiometer, with irrigation increasing during the summer. 56 kg/ha of ammonium nitrate was added 6 weeks after seedlings began to emerge, then 84 kg/ha at 8 weeks, then 134 kg/ha of ammonium sulfate at 10 weeks, then 112 ka/ha of ammonium nitrate at 12 weeks.
Length of Active Growth Phase	18 months
Hardening Phase	Irrigation was significantly reduced and no fertlizer was added.
Length of Hardening Phase	3 months
Harvesting, Storage and Shipping	Between January and February seedlings were removed from the soil to be transported. During this time, the soil was unsaturated, and temperatures were above –3 C°. Seedlings were then stored at a temperature of 1 C°.
Length of Storage	Up to 5 months
Guidelines for Outplanting / Performance on Typical Sites	No information found.
Other Comments	All information in this section is from (Steinfeld, 2000) After planting, weeds were controlled via hand weeding.
INFORMATION SOURCES	
References	*Abies grandis*. (n.d.). Landscape Plants; Oregon State University. Retrieved May 26, 2025, from https://landscapeplants.oregonstate.edu/plants/abies-grandis *Abies grandis in Flora of North America*. (n.d.). Flora of North America. Retrieved May 26, 2025, from http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=233500007 Howard, J., & Aleksoff, K. (2000). *Abies grandis*. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. https://www.fs.usda.gov/database/feis/plants/tree/abigra/all.html#LIFE%20FORM Knoke, D., & David, G. (n.d.). *Abies grandis*. Burke Herbarium Image Collection. Retrieved May 26, 2025, from https://burkeherbarium.org/imagecollection/taxon.php?Taxon=Abies%20grandis Luna , T., Evans, J., & Wick, D. (2008). *Propagation protocol for production of Container (plug) Abies grandis (Dougl.) ex D. Don plants*

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