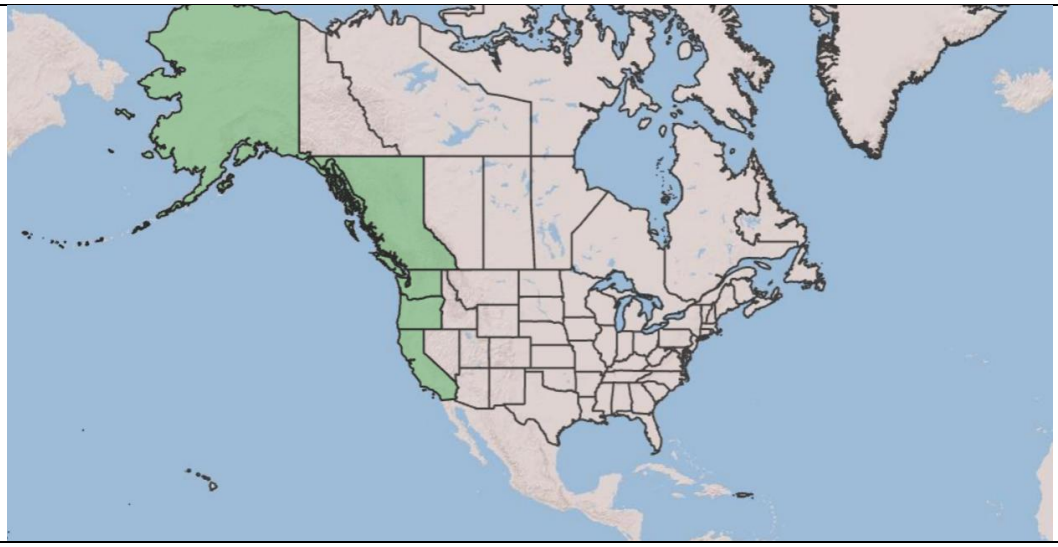
Plant Propagation Protocol for *Abies amabilis*

ESRM 412 – Native Plant Production

TAXONOMY	
Plant Family	
Scientific Name	Pinaceae
Common Name	Pine family
Species Scientific Name	
Scientific Name	Genus: Abies Mill. -fir *Abies amabilis*
Varieties	
Sub-species	
Cultivar	Compacta, Spreading Star (USDA)
Common Synonym(s)	
Common Name(s)	Pacific silver fir, white fir, red fir, lovely fir, Amabilis fir, Cascades fir, silver fir.
Species Code (as per USDA Plants database)	ABAM (USDA)
GENERAL INFORMATION	
Geographical range	

	 (USDA)
Ecological distribution	Typically found in mature and old-growth forests, maritime to submaritime environments. The Pacific silver fir prefers acidic soils (a pH of 5) (USDA). Found in uniform stands or with Western hemlock--another shade-tolerant conifer (USDA).
Climate and elevation range	Cool, high elevation environments on the coastal side of the Cascade range at 1,000-7,000ft. Near the coast it can be found at lower elevations. In its northern range, they can be found lower than 1,000 ft (USDA).
Local habitat and abundance	Prefers locations with high precipitation, moist and acidic soils. Soils are also high is magnesium and calcium (Hill). Precipitation within 40 to 260 inches per year and average summer temperature between 57 and 59 degrees Fahrenheit (USDA). The Pacific silver fir is found in North America from southern Alaska down through the west parts of Canada and the west coast of the lower 48 US states, ending in northern California (USDA).
Plant strategy type / successional stage	Very shade-tolerant, drought-intolerant, Late successional (DNR). Mild frost tolerance (USDA). Young seedlings are hardy and stiff to withstand falling debris from the upper canopy (DNR). Obligate climax species (Hill).
Plant characteristics	This perennial conifer stands 100 to 230 feet tall and has up to 45 inches in diameter at the base. Pacific silver fir is not decay-resistant and therefore most do not live past a couple hundred years (roughly 400 years) (DNR). The seeds are very large, and can provide sustenance for young seedlings for a year or so while their roots establish. Small mammal or wind for seed dispersal method (USDA).
PROPAGATION DETAILS: FROM SEED	

Ecotype	Pacific silver firs preform self-fertilization. Cones can be produced around years 20-30 and are produced 2 years after pollination. The cones will fall apart while still in the tree and be dispersed by mode of wind or small mammal.
Propagation Goal	Plants
Propagation Method	Grows from seed only (DNR)
Product Type	Bareroot or either individually in containers or collectively in flats (USDA)
Stock Type	Container plant (plug) (Baskin).
Time to Grow	One year after being placed in the container to allow for proper growth and hardiness (Crowe).
Target Specifications	Pacific silver firs are ready to be outplanted when they are hardy enough to undergo multiple stressors from the environment. Being a late successional tree, they need to be large enough to withstand possible objects dropping on them and well established root systems (DNR).
Propagule Collection Instructions	Seeds should be collected in mid to late August or right before disintegration of the cone (USDA). Seeds can be stored in bags or sacks at temperatures of 70 and 80 degrees Fahrenheit to allow time for the cone to disintegrate (USDA). A good seed crop occurs every 3 years or so (Crawford and Oliver).
Propagule Processing/Propagule Characteristics	400 seeds per cone with a germination rate of about 6.3% to 35%. (USDA). If trees are treated with GA4/7 along with other growth promoting treatments such as fertilizer, girdling, or tenting (or a combination of the three) enhances cone production and results in more seeds available (Owens).
Pre-Planting Propagule Treatments	Use mechanical separation treatments to isolate seeds (USDA). Physiological dormancy (Baskin). Use cold, dry stratification in a freezer at temperatures of 10 to 30 degrees Fahrenheit for 4-6 months (USDA). Cold stratification increases the viability of seeds. In addition, seeds can be stored in cold storage for 360 days after stratification if redried to a 5-9% moisture content (Hall and Olsen).
Growing Area Preparation / Annual Practices for Perennial Crops	Either individually in containers or collectively in flats (USDA). For bareroot plant production, sow in the spring at a 62.5-125 seed density per acre at 0.25 inches deep in the soil (USDA). Although Pacific silver fir can grow out of various kinds of media, it does best growing on mineral seedbeds rather than organic (Crawford and Oliver).
Establishment Phase Details	Germination occurs in the spring after overwintering beneath the snow. Keep soils cool and moist to allow for germination. Finally, Pacific silver fir undergoes epigeal germination (Crawford and Oliver). Sow seeds in a greenhouse in February (Plants). Germination is best when temperatures are between 30 and 40 degrees Fahrenheit (USDA).

Length of Establishment Phase	6 to 8 weeks from seed to germination (Plants).
Active Growth Phase	Full sunlight is important for rapid growth, although will grow slowly in shade due to its shade-tolerance (Crawford and Oliver).
Length of Active Growth Phase	When the plants are large enough to be handled, separate them into separate pots (Plants). 20 weeks (Riley)
Hardening Phase	Pacific silver fir saplings need to be able to withstand heavy shaded environments where there is a chance of debris falling from the upper canopy or wet snow (Crawford and Oliver). Saplings are moved outdoors in September and no other treatment is applied (Riley).
Length of Hardening Phase	3 to 4 weeks (Riley)
Harvesting, Storage and Shipping	Harvest date is sometime mid-October after the hardening phase. Shipped in containers after being watered. (Riley)
Length of Storage	3 to 4 months (Riley)
Guidelines for Outplanting / Performance on Typical Sites	Outplant in the spring or early summer when the risk of frost is gone (Plants).
Other Comments	
INFORMATION SOURCES	
References	Hill, T. (2005). *Pacific silver fir, Abies amabilis*. https://courses.washington.edu/esrm412/protocols/2005/ABAM.pdf Riley, Lee. (2020*). Abies (amabilis)*. https://rngr.net/renderNPNProtocolDetails?selectedProtocolIds=pinaceae-abies-1 Washington state Department of Natural Resources. *Pacific silver fir (Abies amabilis)*. https://www.dnr.wa.gov/publications/lm_hcp_west_oldgrowth_guide_psf_hires.pdf Santa Barbara Botanic Garden and USDA NRCS National Plant Data Center. *PACIFIC SILVER FIR (Abies amabilis) (Dougl. ex Loud.) Dougl.*. https://plants.usda.gov/plant-profile/ABAM Plants for a future. (2025). *Abies amabilis - Douglas. ex Forbes*.https://pfaf.org/USER/Plant.aspx?LatinName=Abies+amabilis Crawford, P and Oliver, C. (1990). *Abies amabilis Dougl. ex Forbes, Pacific silver fir*. .https://permanent.fdlp.gov/lps1296/www.na.fs.fed.us/pubs/silvics_manual/Volume_1/abies/amabilis.htm

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