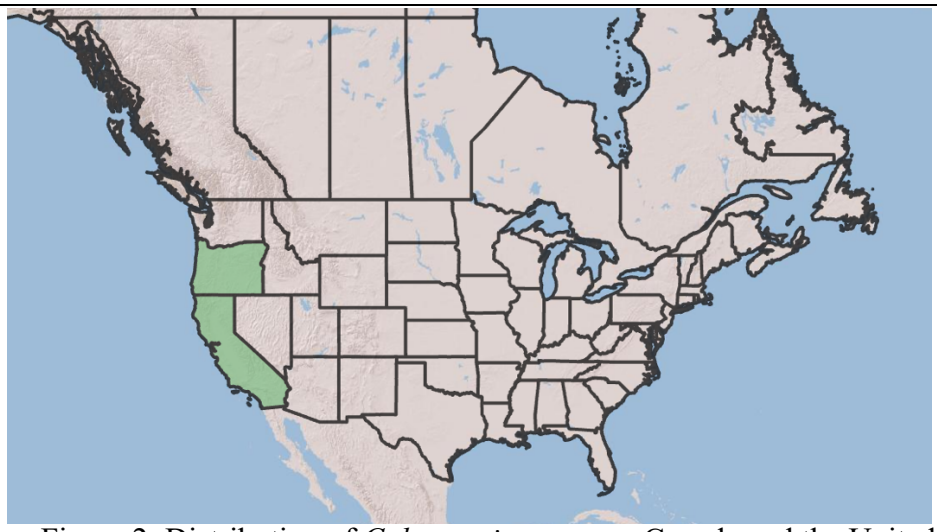
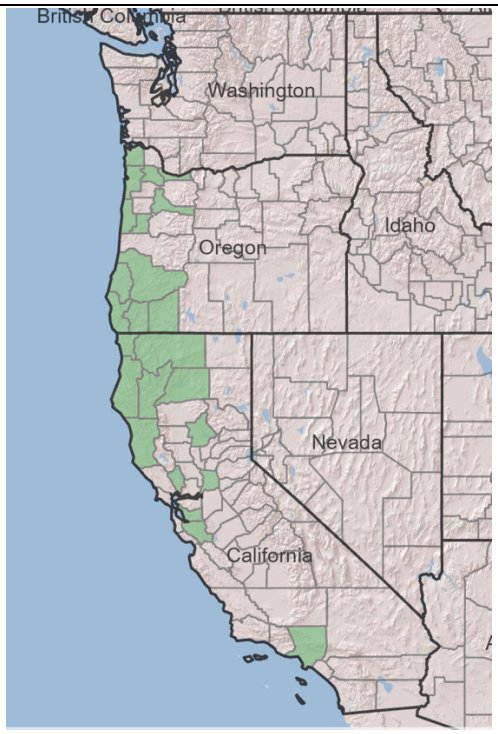
Plant Propagation Protocol for *Chamaecyparis lawsoniana*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/2023/*CHLA.pdf*

Figure 1: *C. lawsoniana* 2009 H. Zell (4)

TAXONOMY	
Plant Family	
Scientific Name	Cupressaceae
Common Name	Cypress family
Species Scientific Name	
Scientific Name	*Chamaecyparis lawsoniana* (A. Murray bis) Parl. (1)
Varieties	**None recognized in USDA Plants database.**
Sub-species	**None recognized in USDA Plants database.**
Cultivar	There are nearly 300 cultivars of *C. lawsoniana* (2), these are a few examples: *Chamaecyparis lawsoniana* 'Alumii' (2) *Chamaecyparis lawsoniana* 'Blue Surprise' (2)

	Chamaecyparis lawsoniana 'Dik's Weeping' (2) *Chamaecyparis lawsoniana* 'Duncanii' (2) *Chamaecyparis lawsoniana* 'Ellwoodii' (2) *Chamaecyparis lawsoniana* 'Golden Showers' (2) *Chamaecyparis lawsoniana* 'Green Globe' (2) *Chamaecyparis lawsoniana* 'Miki' (2) *Chamaecyparis lawsoniana* 'Snow Queen' (2) *Chamaecyparis lawsoniana* 'Treasure' (2) *Chamaecyparis lawsoniana* 'Treasure Island' (2)
Common Synonym(s)	*Cupressus lawsoniana* A. Murray bis (1) *Retinispora lawsoniana* (A. Murray bis) A.V. Bobrov & Melikyan (1)
Common Name(s)	Port Orford cedar (3) Lawson cedar (3) Oregon cedar (3) Port Orford white cedar (3) ginger-pine (3) Lawson falsecypress (2)
Species Code (as per USDA Plants database)	CHLA (1)
GENERAL INFORMATION	
Geographical range	 Figure 2: Distribution of *C. lawsoniana* across Canada and the United States. Obtained from USDA PLANTS Database (1).

	 Figure 3: County wide distribution of *C. lawsoniana* in Oregon and California. Obtained from USDA PLANTS Database (1). The native range of *C. lawsoniana* is from about latitude 40 ° 50’ to 43° 35’ N in southern Oregon and northern California mostly along the Pacific coast (5).
Ecological distribution	*C. lawsoniana* occurs in mountain valleys and often near streams (4). It typically grows in mixed stands but sometimes forms pure stands (6). It grows on concave or sheltered slopes and is most common on slopes, benches, and in drainageways. At inland lower elevations it is restricted to streamsides and ravines (5).
Climate and elevation range	*C. lawsoniana* is distributed over areas that have warm, dry summers and cool, wet winters (Mediterranean climate). Precipitation across its range varies from 35 to 140 inches annually. It is found from sea level to 6,400 feet in elevation (6).
Local habitat and abundance	*C. lawsoniana* grows with a variety of plants and vegetation types. It tends to grow in mixed stands and is an important species in the *Picea sitchensis, Tsuga heterophylla,* mixed evergreen, and *Abies concolor* vegetation zones of Oregon and counterparts in California. It is also grown in smaller communities ranging from dry sand dunes to bogs (5). *C. lawsoniana* is most dominant in wet soils in the *Abies concolor* zone where the forests are dense but slow growing (5). Other commonly assosciated species are *Rhododendron macrophyllum, Vaccinium ovatum, Rubus spectabilis, Gaultheria shallon, Taxus brevifolia, Polystichum munitum*, and many more (5).

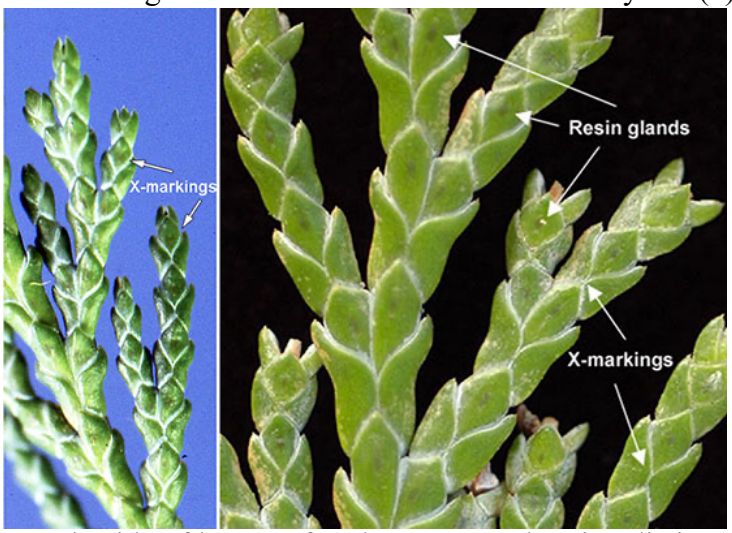
Plant strategy type / successional stage	*C. lawsoniana* is adapted to coarse, medium, and fine textured soils. It has no anaerobic tolerance and a low drought tolerance. It has mid-level fire tolerance. It has low salinity tolerance. It is tolerant to shade (1). *C. lawsoniana* is a slow growing species. It tends to get overtopped, but it continues to grow due to its shade tolerance. It can reproduce effectively after clearcutting and partial cuttings where there is a sufficient seed source present (5). Recently, plantations of *C. lawsoniana* have not been established in the Pacific Northwest outside its native range due to issues with root rot, winter damage, and slow growth relative to other species (5).
Plant characteristics	*C. lawsoniana* is an evergreen conifer tree that grows from 60 to 200 feet tall (4) and up to 40 feet wide at maturity. It is a narrow pyramidal shaped tree that has short upright branches and gently weeping tips (7). The foliage of *C. lawsoniana* are arranged in flattened sprays of blue-green needles. The flattened, frond-like twigs are arranged horizontally. The underside of the foliage has a white X (figure 4) that distinguishes it from the western red cedar that has a white butterfly shape (7). The male pollen of this species forms on the tips of the branchlets and are ovate to oblong and dark brown to red in color when the pollen releases in the late winter. The female flowers are green to blue-green that develop into round seed cones approximately a third of an inch in size. When they mature they open and turn brown (figure 5) (7). The bark is brown and overtime weathers to a gray-brown. The mature bark is fibrous, ridged, deeply furrowed, and reaches 4 to 8 inches in thickness at the base (7). The maximum tree age of the *C. lawsoniana* exceeds 560 years (5).  Figure 4: Underside of leaves of *C. lawsoniana* showing distinct white x marking. OSU 2023 (2).

	 Figure 5: *C. lawsoniana* female cones in late summer and seed (2).
PROPAGATION DETAILS (SEED)	
Ecotype	**No information available.**
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	**No information available.**
Time to Grow	22 weeks (8) to 1 year depending on the size of seedling you desire (5).
Target Specifications	Container seedling with roots firm in pot (8).
Propagule Collection Instructions	Seeds can be collected during seedfall in the late fall. 50-60% of seed falls by mid-January and 85-90% of the seed has fallen by May 1st (5). Cones can be tumbled in a hand tumbler to retrieve seeds from them (9).
Propagule Processing/Propagule Characteristics	*C. lawsoniana* seed weighs in at 209600 seeds per pound (1). Seeds should not be dewinged and should be stored frozen with humidity lower than 10% (10). Seeds under this storage condition lasted 7 years with a drop in germination percentage from 56% to 43%. Storage of up to 16 years is possible with a drop in germination rate down to 13% (10). Seeds can be stored for more than 10 years in cold storage (33-38°F) (5,9).
Pre-Planting Propagule Treatments	Cold stratification increases chances of germination. Red light can accelerate germination, but stay away from far-red light as this can delay germination (5). Before planting, seeds can be placed into mesh bags and be soaked in a 1% hydrogen peroxide solution (3:1 water/ hydrogen peroxide 3%) for 24 hours, rinsed, then placed in water for an additional 24 hours. They can then be placed in sealed containers and refrigerated at 1 to 3° C for 30 days. Checking for mold every day is important (8).
Growing Area Preparation / Annual Practices for Perennial Crops	The growing area is in a greenhouse environment. The seeds are directly sown into the desired containers and covered lightly with nursery grit. An example growing media is: 40:20:20:20 of peat: composted fir bark: perlite: pumice with added fertilizer (8).
Establishment Phase Details	The seeds should be sown in March and April. 320 to 540 seeds per square meter should be sown and covered by 3 to 6 mm of media or nursery grit

	(5,8). Shading the seeds until midseason has shown useful in the success of germination (5).
Length of Establishment Phase	4 weeks (8).
Active Growth Phase	Soluble fertilizers can be applied during this period depending on weather (8).
Length of Active Growth Phase	20 weeks (8) in spring and summer (1).
Hardening Phase	Seedlings can be moved to an outdoor growing area in early September to help develop cold hardiness (8).
Length of Hardening Phase	3 to 4 weeks (8).
Harvesting, Storage and Shipping	The seedlings should be harvested mid-October. The seedlings can be stored in an outdoor growing area until ready to ship. Plants should be well irrigated before shipping and should be shipped in containers (8).
Length of Storage	No storage to very short time in storage (8).
Guidelines for Outplanting / Performance on Typical Sites	After 3 growing seasons, germinants were shown to only have a 5% survival rate when planted in the most favorable soil (5). Seedling growth under a canopy is slow. Experimental seedlings only grew 40 mm tall after their second growing season. Seedlings that grew in the open grew an average of 36 mm after year 1 and 78 mm after year 2 (5). Seed production starts when the tree is 5 to 20 years old (5).
Other Comments	**None.**
PROPAGATION DETAILS (VEGETATIVE)	
Ecotype	**No information available.**
Propagation Goal	Plants
Propagation Method	Vegetative
Product Type	Propagules (cuttings)
Stock Type	**No information available.**
Time to Grow	**No information available.**
Target Specifications	Firm roots in container (8).
Propagule Collection Instructions	Take cuttings between December and February. Take straight cuttings from the tips of major branches from the lower crown of younger trees (5).
Propagule Processing/Propagule Characteristics	**No information available.**
Pre-Planting Propagule Treatments	In general for all cuttings, they can be stored for about 4 months, so long as they are stored in a cool, dark, and moist place (11). Auxin treatments can be applied to aid the cutting with rooting (5). An auxin concentration of 6,000 ppm has shown to give the best results for rooting (12).
Growing Area Preparation / Annual Practices for Perennial Crops	A typical growing media mix for cuttings is perlite and peat moss.

Establishment Phase Details	**No information available.**
Length of Establishment Phase	**No information available.**
Active Growth Phase	**No information available.**
Length of Active Growth Phase	**No information available.**
Hardening Phase	**No information available.**
Length of Hardening Phase	**No information available.**
Harvesting, Storage and Shipping	**No information available.**
Length of Storage	**No information available.**
Guidelines for Outplanting / Performance on Typical Sites	**No information available.**
Other Comments	**None.**
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Other Sources Consulted	**None.**
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