Plant Propagation Protocol for Chamaecyparis lawsoniana, Lawson's Cypress
ESRM 412 – Native Plant Production
Spring 2008

TAXONOMY	
Family Names	
Family Scientific Name:	Cupressaceae
Family Common Name:	Cypress family
Scientific Names	
Genus:	*Chamaecyparis*
Species:	*Chamaecyparis lawsoniana*
Species Authority:	(A. Murray) Parl.
Variety:	
Sub-species:	
Cultivar:	Over 200; include 'Green Hedger,' 'Knowefieldensis,' 'Nidiformis', 'Tamariscifolia'
Authority for Variety/Sub-species:	
Common Synonym(s) (may repeat this section multiple times as needed)	
Genus:	
Species:	
Species Authority:	
Variety:	
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	
Common Name(s):	Port Orford cedar, Lawson's Cypress, Port-Orford white-cedar, Lawson false-cypress, false cypress, Oregon-cedar, white cedar, ginger pine
Species Code (as per USDA Plants database):	CHLA
GENERAL INFORMATION	
General Distribution (geographical range (states it occurs in), ecosystems, etc):	Occurs in Washington, and near the Pacific Ocean in southwestern Oregon and northwestern California. The species' range extends south about 220 miles in Humbolt County, California. (Griffin, James R.) There are some isolated populations throughout California, but most are within 40 miles of the coast. (Hayes, G.)
Climate and elevation range	Occupies many vegetation zones, soil types, and elevations. Commonly grows in mixed stands, can form pure stands. Restricted to moist areas with constant water. Also occurs in bog and dunes. (Uchytil,

	Ronald J.)
Local habitat and abundance; may include commonly associated species	Occurs often with Sitka spruce, western hemlock, white fir, redwood (Sequoia sempervirens), red fir (Abies magnifica), mixed-pine, and mixed-evergreen forests. (Uchytil, Ronald J.) Grows in many vegetation zones, elevations, and soil types, but requires constant seepage of water.
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	Low usefulness for re-foresting projects because of its high susceptibility to root rot caused by two different soil born fungi; Phytophthora lateralis and P. cinnamomi. Also susceptible to cold injury. (Zobel, Donald B.) Can be an early seral invader and long-lived shade tolerant climax species. Reproduces aggressively by seed in stands.
PROPAGATION DETAILS	
Ecotype (this is meant primarily for experimentally derived protocols, and is a description of where the seed that was tested came from):	
Propagation Goal (Options: Plants, Cuttings, Seeds, Bulbs, Somatic Embryos, and/or Other Propagules):	Plants
Propagation Method (Options: Seed or Vegetative):	Seed
Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	Container
Stock Type:	
Time to Grow (from seeding until plants are ready to be outplanted):	1-2 years (Zobel, Donald B.)
Target Specifications (size or characteristics of target plants to be produced):	Up to 200 feet.
Propagule Collection (how, when, etc):	Seeds become fully mature by September or October. (Hayes, G. L.) The seeds are in cones 0.25 to 0.5 inch(0.6-1.2 cm) in diameter.(Harris, A. S.) Port-Orford-cedar seeds have “thin marginal wings.” They each weigh about 2 mg each, and are 3-4 mm long. (Zobel, Donald B) Better germination rate when seeds are collected directly from trees than from seed traps. (Harris, A. S.)
Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed	60,000 to 600,000 seeds per pound. Germination of seeds ranged from 13.8% to 44.2%. (Zobel, Donald B.) Seed can be stored in sealed containers below freezing

longevity, etc):	with moisture less than 10%. Viability of seeds stored for 7 years dropped from an initial 56 to 43 percent. (Harris, A. S.)
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	Stratification has been found to increase germination rate and seedling growth. (Zobel, Donald B.) Red light increases the rate of germination.
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	The a nursery, seeds were sown spaced at 320 to 540/m² and covered by 3 to 6 mm of soil (Harris, A. S.) Sun protection during mid-season was shown to be a help.
Establishment Phase (from seeding to germination):	Naturally, seeds usually germinate the next spring after falling. When planted in nurseries, germination takes 4 weeks.
Length of Establishment Phase:	Seedlings in the open average 36 mm (1.4 in) after 1 year and 78 mm (3.1 in) after 2. Natural seedlings under a canopy take 14 to 31 years to reach about 4.5 ft. Trees in clear cuts and nonultramafic soils take 5 to 11 to reach the same height. (Zobel, Donald B)
Active Growth Phase (from germination until plants are no longer actively growing):	Mean annual increment peaks at 57 to 72 years, but tree can live up to 600 years old.
Length of Active Growth Phase:	Varies throughout its range. (Hawk, Glenn Martin.) New growth starts slowly in April, speeds up in June and ceases in September. (**Mitchell. A. F.)**
Hardening Phase (from end of active growth phase to end of growing season; primarily related to the development of cold-hardiness and preparation for winter):	Begins in September.
Length of Hardening Phase:	
Harvesting, Storage and Shipping (of seedlings):	Protect from cold. Seedlings can be outplanted with cold frame. (**F. Chittendon.)**
Length of Storage (of seedlings, between nursery and outplanting):	1-2 years.
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter growth, elapsed time before flowering):	Extreme shading can cause total mortality. First year seedlings have a 50% mortality rate, (Hayes, G. L.) which rises dramatically after.
Other Comments (including collection restrictions or guidelines, if available):	
INFORMATION SOURCES	
References (full citations):	Griffin, James R.; Critchfield, William B. 1972. The distribution of forest trees in California. Res. Pap. PSW-82. Berkeley, CA: U.S. Department of

Agriculture, Forest Service, Pacific Southwest Forest and Range Experiment Station. 118 p. [1041]

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Hawk, Glenn Martin. 1977. Comparative study of temperate Chamaecyparis forests. Corvallis, OR: Oregon State University. 195 p. Dissertation. [9759]

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RHS Dictionary of Plants plus Supplement. 1956 Oxford University Press 1951

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Other Sources Consulted (but that contained no pertinent information) (full citations):	
Protocol Author (First and last name):	Kayti Rodgers
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Note: This template was modified by J.D. Bakker from that available at: http://www.nativeplantnetwork.org/network/SampleBlankForm.asp

Original Protocol:

Plant Data Sheet

Species

Port Orford cedar, Chamaecyparis lawsoniana (A. Murr.) Parl.

Range

Very limited, covering about 220 miles from north to south. In greatest abundance within 40 miles of the Pacific Ocean in southwestern Oregon and

northwestern California, with patchy distribution farther inland. Found in Siskiyou and Klamath National Forests.

Climate, elevation

Warm, dry summers and cool wet winters. Most stands occur where there is at least 59 inches of annual precipitation near the coast, or where there is at least 49 inches of annual precipitation inland. Elevation from sea level to 5100 feet.

Local occurrence (where, how common)

California and Oregon or cultivated elsewhere. (a prized landscape tree) Common as codominant in mixed-evergreen/mixed-pine forests, in pure stands, or as scattered trees within its range. Susceptible to a fatal root rot caused by 2 Phytophthera fungi. A large percentage of trees have been lost, and old growth forests are being depleted rapidly.

Habitat preferences

Mostly limited to sites with abundant soil moisture or atmospheric moisture. Grows in many vegetation zones, elevations, and soil types. Although within each forest, it is primarily restricted to moist locations such as drainages, or some type of concavity that receives constant seepage of water. Mostly absent from ridges for this reason.

Plant strategy type/successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)

Both early seral invader and long-lived shade tolerant climax species. Reproduces itself in stands by abundant seed. Seedlings become established after disturbances such as clearcutting or fire, but also become established within mature forests.

Associated species

Sitka spruce, white fir, red fir, western hemlock, coast redwood, Douglas-fir, grand fir, lodgepole pine, sugar pine, western white pine, incense cedar

May be collected as: (seed, layered, divisions, etc.)

Stem cuttings, seed.

Collection restrictions or guidelines

Should not be planted outside of its natural range where it is more susceptible to disease or freezing.

Seed: Collect directly from small cones on trees. (Better germination than when seeds are collected from seed traps.) Seed fully developed by September or October. Best germination is from seeds collected during the peak of seed fall.

Cuttings: Take from tips of major branches from the lower crown of young trees, from December to February.

Seed germination (needs dormancy breaking?)

Cold stratification required. In nature, seeds germinate the next spring after falling.

Seed life (can be stored, short shelf-life, long shelf-life)

About 7 years, at which viability has already begun to decline.

Recommended seed storage conditions

In sealed containers with temperatures below freezing and less than 10% moisture content.

Propagation recommendations (plant seeds, vegetative parts, cuttings, etc.)

Seed, cuttings, container, bare root.

Seed: Can sow directly or grow into container stock or bare root. Seedlings from direct sown seed have grown best either when litter is removed and soil spaded, or soil is left completely undisturbed. However, removing litter on its own, or pre-burning both reduce seedling survival.

Cuttings: Root relatively easily if proper methods followed. Auxin treatments may help rooting.

Soil or medium requirements (inoculum necessary?)

Grows on many different soil types (PH 4.1-7.5), but limited to mesic conditions. No salinity tolerance.

Installation form (form, potential for successful outcomes, cost)

Seeds probably lowest cost and pretty successful. Plants grown from seed probably second choice.

Recommended planting density

300-700 per acre. (USDA) 20 to 26 feet apart to avoid spread of fungus by root contact in case one tree gets disease (Uchytil).

Care requirements after installed (water weekly, water once etc.)

Seeds may germinate in dense, young stands, but extreme shading can cause total mortality. Deer exclosures may be necessary.

Best to plant on sites where topography prevents flow of runoff water, and where human activities low so that fatal Phytophthera doesn't reach trees.

Normal rate of growth or spread; lifespan

Long-lived. Can live more than 600 years. Sources vary on growth rate. Uchytil says that seedlings grow quickly, but more slow-growing than other trees after that. USDA says growth rate rapid. Burns says early growth relatively slow.

Seems that overall, plant can reproduce itself well by seed, but not vegetatively. Trees begin to produce seed at 5-9 years of age and produce every year, although heavy seed crops are produced every 4 to 5 years. Germination of seeds can be low.

Sources cited

Burns, R. and B. Honkala. 1990. Silvics of North America. Vol. 1, Conifers. Agricultural Handbook 654. USDA Forest Service, Washington D.C. 675p.

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Data compiled by: Marlo Mytty June 3, 2003