Plant Propagation Protocol for *Hesperocyparis sargentii*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/*2023/HESA17.pdf*

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TAXONOMY	
Plant Family	
Scientific Name	Cupressaceae[9]
Common Name	Cypress Family[9]
Species Scientific Name	
Scientific Name	*Hesperocyparis sargentii* (Jeps.) Bartel[9]
Varieties	• *Cupressus sargentii* var. *sargentii*[9] • *Cupressus sargentii* var. *duttonii* Jeps.[9]
Sub-species	None Specified
Cultivar	None Specified
Common Synonym(s)	• *Callitropsis sargentii* (Jeps.) D.P. Little[9] • *Cupressus sargentii* Jeps.[9] • *Neocupressus sargentii* (Jeps.) de Laub.[9] • *Cupressus sargentii* var. *sargentii*[9] • *Cupressus sargentii* var. *duttonii* Jeps.[9]
Common Name(s)	Sargent's Cypress[9]
Species Code	HESA17[9]
GENERAL INFORMATION	
Geographical range	This plant is found in Oregon and California, however the Forest Service reports that it is only found in California.[5,6]

	 [11]
Ecological distribution	This plant is usually found on dry slopes, exposed hillsides, ridgetops, streambanks, and lower canyon slopes.[5]
Climate and elevation range	This plant can be found at elevations as low as 200m up to 1,000 m.[5]
Local habitat and abundance	*Hesperocyparis sargentii's* local habitat in California is exposed and protected slopes of foothills and mountains and usually occurs in mixed conifer forest, redwood forest, pine-cypress forest, California mixed evergreen forest, California oakwoods, and chaparral.[5,6] *Hesperocyparis sargentii* also grows in open, fire-maintained, scrubby forest in isolated groves. This tree does not grow well in waterlogged soils.[5] It is the second most common cypress in California.[6]
Plant strategy type / successional stage	*Hesperocyparis sargentii* is a pioneer species and does well in open areas as seedlings are shade intolerant and prefer bare mineral soil.[5]
Plant characteristics	*Hesperocyparis sargentii* is an evergreen shrub/tree that grows 2.5-3.5m tall but can grow up to 22.5m in Northern and Central California.[3,5,9] Its bark is fibrous, thick, and grey or dark brown, and its cones are spherical, rough, and dull brown to grey.[2] It contains both female and male cones. Cones require 2 years to mature and contain about 100 seeds. Fire or old age is needed to open the cones and disperse the seeds. Seed dispersal is usually by wind or rain. Pollination happens in late fall and spring, seeds mature 15-18 months after pollination.[5] This species is susceptible to damping-off fungi and has low germination rate in lab conditions.[5,7]
PROPAGATION DETAILS	
Ecotype	1. Coastal Northern California through Northern Oregon[8] 2. Collected at an Oregon seed orchard for USDA, Forest Service, Dorena Genetic Resource Center, Cottage Grove, Oregon.[3]

	These protocols were prepared for *Chamaecyparis lawsoniana* which is also in the cypress family like *Hesperocyparis sargentii* and may be helpful in its propagation.
Propagation Goal	Plants[8] Seeds[3]
Propagation Method	Seed[3,8]
Product Type	Container (plug)[8] Propagules (seeds, cuttings, poles, etc.)[3]
Stock Type	163 ml (10 in 3) container[8]
Time to Grow	22 weeks[8]
Target Specifications	Plant height and caliper not specified, but there should be a firm plug in a container.[8]
Propagule Collection Instructions	The best time to collect seeds for this species is early fall. This tree produces seed every year but produces a large amount every 4-5 years. Female cones are brown when mature.[8] Seed was collected by hand since it was a small amount.[3]
Propagule Processing/Propagule Characteristics	The number of seeds per pound was 316,318.[3]
Pre-Planting Propagule Treatments	**Cleaning:** Cones were processed in a hand tumbler to remove the seeds from the cones. Then, the seeds were air-screened using an office Clipper with a top screen of #10 or #12 triangle and a bottom screen of #5 triangle with medium speed and low air. After that, seeds were finished using an air column separator with a blower speed of 60 and a feeder speed of 70 (Continuous Seed Blower Model CB, 2001). This was to remove the rest of the inert material and nonviable seed from the seed lot. At the end of the cleaning process, the purity of this seed lot was 98%.[3] **Dormancy Treatments:** To break dormancy, the seeds were put into fine mesh bags to soak in a 1% hydrogen peroxide treatment (3:1 water/3% hydrogen peroxide) for 24 hours. The seeds were then rinsed and placed in water for another 24 hours. After that, the seeds were placed in a refrigerator in sealed containers at 1-3°C for 30 days. The seeds need to be checked weekly to make sure that there is no mold forming. If there is mold, treat the seeds with 1% hydrogen peroxide.[8]
Growing Area Preparation / Annual Practices for Perennial Crops	The seedlings were directly sown into containers and covered lightly with nursery grit. They were grown in a greenhouse.[8] The growing medium used was 40:20:20:20 peat:composted fir bark:perlite:pumice with Nutricote controlled release fertilizer (18N:6P2O5:8K2O with minors; 180-d release rate at 21 °C) at the rate of 0.9 g Nutricote per 163 ml container.[8]
Establishment Phase Details	Germination was complete within 3 weeks of sowing. Once germination was complete, the seedlings were fertilized for 3 weeks with soluble 12-2-14-6 Ca-3Mg at 75-100 ppm.[8] Frequency of fertilization is not specified.
Length of Establishment Phase	4 weeks[8]
Active Growth Phase	The seedlings were fertilized with soluble fertilizer (20-9-20 NPK, 20-18-18 NPK, or 17-5-24 NPK) at a rate of 100-150 ppm applied weekly, but this depends on the weather.[8]
Length of Active Growth Phase	20 weeks[8]

Hardening Phase	During the hardening phase, seedlings were moved to an outdoor growing area in early September, no dry-down to induce dormancy.[8]
Length of Hardening Phase	3-4 weeks[8]
Harvesting, Storage and Shipping	**Harvest date:** mid October[8] **Storage:** seedlings are usually outplanted in the fall so there is no need for storage[8] **Shipping plants:** plants are watered well before shipping in containers[8] **Shipping seeds:** cold storage 33-38°F[3]
Length of Storage	No information available
Guidelines for Outplanting / Performance on Typical Sites	No information available
Other Comments	A disease introduced from Europe, *Phytophthora lateralis*, is a big threat to *Chamaecyparis lawsoniana* populations.[8] *Chamaecyparis lawsoniana* is also a proven host of *Phytophthora ramorum*, a plant pathogem, but *Hesperocyparis sargentii* is not.[1] Young trees are not hearty against fire damage.[8]
	INFORMATION SOURCES
References	1. Animal and Plant Health Inspection Service (APHIS). (2022). APHIS List of Proven Hosts of and Plants Associated with *Phytophthora ramorum.* Retrieved June 3, 2023, from https://www.aphis.usda.gov/plant_health/plant_pest_info/pram/downloads/pdf_files/usdaprlist.pdf 2. Bartel, J.A. (2012). *Hesperocyparis sargentii*, in Jepson Flora Project (eds.) Jepson eFlora. Retrieved May 15, 2023, from https://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=89302 3. California Native Plant Society Calscape. (n.d.). Sargent's Cypress. Retrieved May 6, 2023, from https://calscape.org/Hesperocyparis-sargentii-(Sargent's-Cypress)?srchcr=sc6455b23e60fce 4. Day, L.A. (2010). Propagation protocol for production of Propagules (seeds, cuttings, poles, etc.) *Chamaecyparis lawsoniana* (A. Murray) Parl. seeds USDA FS - R6 Bend Seed Extractory Bend, Oregon. In: Native Plant Network. US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. Retrieved May 5, 2023, from https://NativePlantNetwork.org 5. Esser, L.L. (1994). *Hesperocyparis sargentii*. In: Fire Effects Information System. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. Retrieved May 6, 2023, from https://www.fs.usda.gov/database/feis/plants/tree/hessar/all.html 6. Lady Bird Johnson Wildflower Center. (2022). *Hesperocyparis sargentii*. Retrieved May 6, 2023, from https://www.wildflower.org/plants/result.php?id_plant=HESA17 7. Milich, K.L., Stuart, J.D., Varner, J.M., & Merriam, K.E. (2012). Seed Viability and Fire-Related Temperature Treatments in Serotinous California Native *Hesperocyparis* Species. *Fire Ecology*, *8*(2), 107–124. https://doi.org/10.4996/fireecology.0802107

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