Plant Propagation Protocol for *Agrostis hallii*
ESRM 412 – Native Plant Production
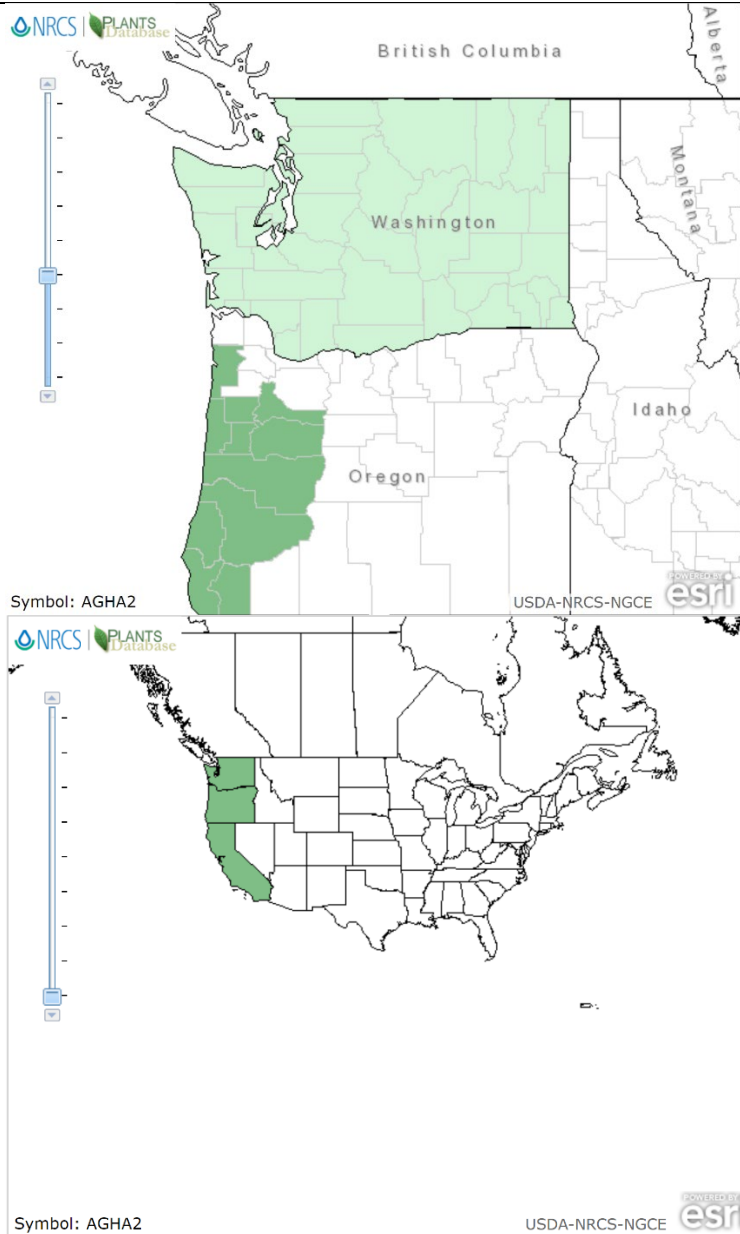

Photo courtesy of Calflora

TAXONOMY	
Plant Family	
Scientific Name	Poaceae
Common Name	Hall's bentgrass
Species Scientific Name	
Scientific Name	*Agrostis hallii*
Varieties	*Agrostis hallii* var. *pringlei*
Sub-species	N/A
Cultivar	N/A
Common Synonym(s)	N/A
Common Name(s)	N/A
Species Code (as per USDA Plants database)	AGHA2

GENERAL INFORMATION

Geographical range	 Symbol: AGHA2 USDA-NRCS-NGCE Symbol: AGHA2 USDA-NRCS-NGCE Maps courtesy of USDA NRCS plants database
Ecological distribution	Native to the west coast of the United States from far southern Washington to central California, where it grows in the woodlands and forests of the coastal mountain ranges.[1] Popular on golf courses[2]
Climate and elevation range	Elevation range sea level – 1800m[3] Temperature range 24-52 F, December low 34F, July High 88F, Annual precipitation 24-97 inches[4]
Local habitat and abundance	Forested sites, meadows, open spaces, pastures etc.

Plant strategy type / successional stage	Wind pollinated, rhizomatic,
Plant characteristics	Perennial graminoid, grows up to 1m tall[5]
PROPAGATION DETAILS	
	RNGR Propagations of *Agrostis* species[6,7,8]
Ecotype	Seed 3 different Yosemite National Park accessions periodically collected and produced from 1988 to 2000. Grassland and forest ecological zones include tufted hairgrass/sedge and lodgepole pine habitats. Elevation range 2,198 m to 2,256 m (7,212 ft to 7,400 ft)
Propagation Goal	Seeds
Propagation Method	Seed
Product Type	Propagules (seeds, cutting, poles, etc.)
Stock Type	Information not included
Time to Grow	4-9 months[4]
Target Specifications	Harvest yields vary due to weather and age of stand. Average annual production is 142 kg/ha (127 lbs/ac).
Propagule Collection Instructions	Wildland collection occurs mid-August to early September when caryopsis are tan-brown, at the hard dough stage, and not yet shattering (natural dispersal) from the open panicle; easily hand-harvested. One collection hour/person will yield an average 77 grams (2.7 oz.) clean seed (ranged 23 to 168 grams and varies by year, stand density, and collector experience).
Propagule Processing/Propagule Characteristics	**Seed Processing:** Seed is spread out on a tarp in a dry, sheltered environment and turned daily for approximately 3-5 days, until no moisture or warmth is detected. After drying, material is processed with a Wintersteiger plot combine at concave closed, speed 700 rpm, and no wind. Seed is threshed with a hammermill through a 4/64' round hole screen, and air-screen processed on a Clipper M2B or Eclipse cleaner over a 1-24" round hole screen. Due to tiny seed, presence of fluff and other seed debris, and poor seed flow, this species is modeerately difficult to clean. Larger seed lots are processed most efficiently with mechanized cleaning equipment and smaller seed lots usually require more hand labor. **Germination:** 98%. **Seeds/Kg:** 9,500,000. **Purity:** 100%
Pre-Planting Propagule Treatments	**Seed Treatments:** Seeds placed in 0-1§C (32-34§F) for 10-day cold stratification treatment and then exposed to 22-25§C (72-77§F).
Growing Area Preparation / Annual Practices for Perennial Crops	**Propagation Environment:** Seedbed is firm and free of weeds with good field moisture to 4" depth.
Establishment Phase Details	**Sowing Date:** Spring or fall.

	seed/ft. (0.3 m) row, irrigated 91cm (36 in) row spacing, seeded with 2-row double-disk planter with depth bands, optimum seeding depth 0.6 cm (0.25 in). **Establishment Phase:**). Soil surface is kept moist throughout the 14-16 day germination and emergence period (also helpsprevent soil crusting); lower rates of Buctryl or romoxynil are applied at 3-5 leaf stage to control broadleaf weeds. Fertilizer application is not recommended the first year, as it generally stimulates weed growth and competition.
Length of Establishment Phase	2 seasons
Active Growth Phase	**Rapid Growth Phase:** <u>Spring to fall</u>; broadleaf weed control with herbicides must occur prior to boot stage; soil moisture is critical during boot stage, milk stage of seed development, and post harvest to pre-freezeup - no irrigation is applied during flowering (pollination); fertilizer is broadcast at 100 lbs actual N/40 lbs actual P/acre in mid-September.
Length of Active Growth Phase	2 to 3 growing seasons.
Hardening Phase	N/A
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	**Harvest Date:** Cultivated harvest occurs late July to late August, with a mean harvest date of August 3 at the Bridger Plant Materials Center. A John Deer swather is used to cut stems into windrows for direct combining, or, to minimize seed loss, a temporary "diaper"- a heavy piece of plastic or canvas clipped under belt draper - is attached for direct catchment. **Seed Storage:** Seed is placed in plastic seed bags and stored in a cool, dry environment. **Seed dormancy:** Seed dormancy is classified as physiological dormancy.
Length of Storage	5-7 years
Guidelines for Outplanting / Performance on Typical Sites	Not included
Other Comments	None

INFORMATION SOURCES

References	1. "Hall's Bentgrass, Agrostis Hallii." California Native Plant Society, calscape.org/Agrostis-hallii-(). Accessed 25 May 2020. 2. The Editors of Encyclopaedia Britannica. "Bentgrass." Encyclopædia Britannica, Encyclopædia Britannica, Inc., 11 Apr. 2017, www.britannica.com/plant/bentgrass. Accessed 25 May 2020.

	3. "Agrostis Hallii." The Jepson Herbarium , Regents of the University of California, 2020, ucjeps.berkeley.edu/eflora/eflora_display.php?tid=12290. Accessed 25 May 2020. 4. "Plant Characteristics and Associations." Calflora, www.calflora.org/entry/plantchar.html?crn=146. Accessed 25 May 2020. 5. "Agrostis Hallii VaseyShow All Hall's Bentgrass." Natural Resource Conservation Service Plants Database, USDA, plants.usda.gov/core/profile?symbol=AGHA2. Accessed 25 May 2020. 6. "Native Plant Network – Agrostis (scabra)." Reforestation, Nurseries and Genetics Resources, npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=poaceae-agrostis-1372. Accessed 25 May 2020. 7. "Native Plant Network -Agrostis (Exarata)." Reforestation, Nurseries and Genetics Resources, npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=poaceae-agrostis-4004. Accessed 25 May 2020. 8. "Native Plant Network - Agrostis (Hyemalis)." Reforestation, Nurseries and Genetics Resources, npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=poaceae-agrostis-400. Accessed 25 May 2020.
Other Sources Consulted	
Protocol Author	James Joseph Spallino
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