Propagation Protocol for *Heuchera grossulariifolia* (gooseberry-leaf alumroot)
ESRM 412 – Native Plant Production

Note: This template was modified by J.D. Bakker from that available at:
http://www.nativeplantnetwork.org/network/SampleBlankForm.asp

TAXONOMY	
Family Names	
Family Scientific Name:	Saxifrageaceae
Family Common Name:	Saxifrage Family
Scientific Names	
Genus:	Huechera
Species:	Grossulariifolia
Species Authority:	Rhyd.
Variety:	tenufolia
Sub-species:	NA
Cultivar:	NA
Authority for Variety/Sub-species:	(Wheelock) C.L. Hitchc.
Common Synonym(s) (include full scientific names (e.g., *Elymus glaucus* Buckley), including variety or subspecies information)	*Heuchera grossulariifolia* Rydb. var. *grossulariifolia*[1] *Heuchera grossulariifolia* Rydb. var. *tenuifolia* (Wheelock) C.L. Hitchc.[1]
Common Name(s):	Gooseberry-leaf alumroot[1], Gooseberry-leaved alumroot[1], Currant-leaf alumroot[4]
Species Code (as per USDA Plants database):	HEGR8

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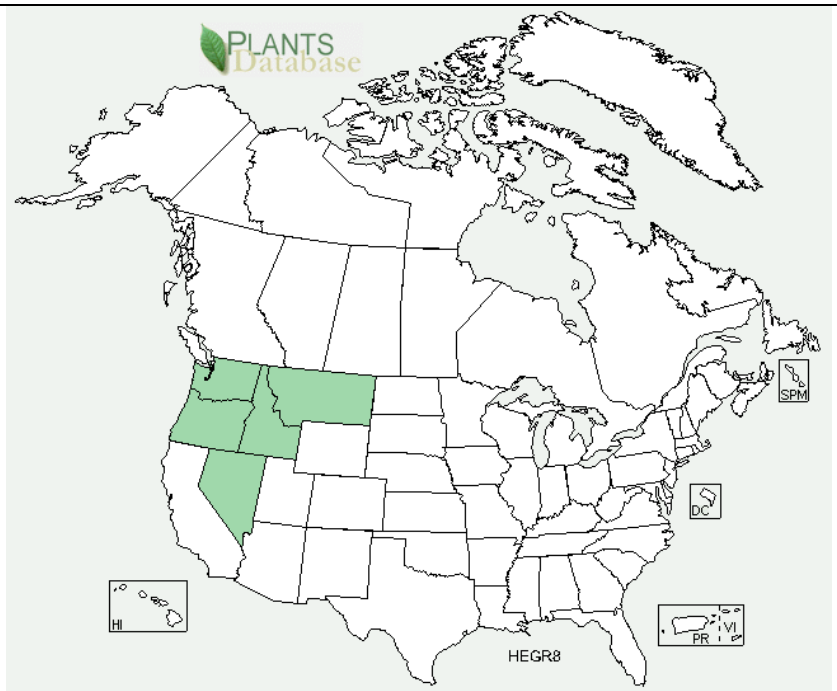
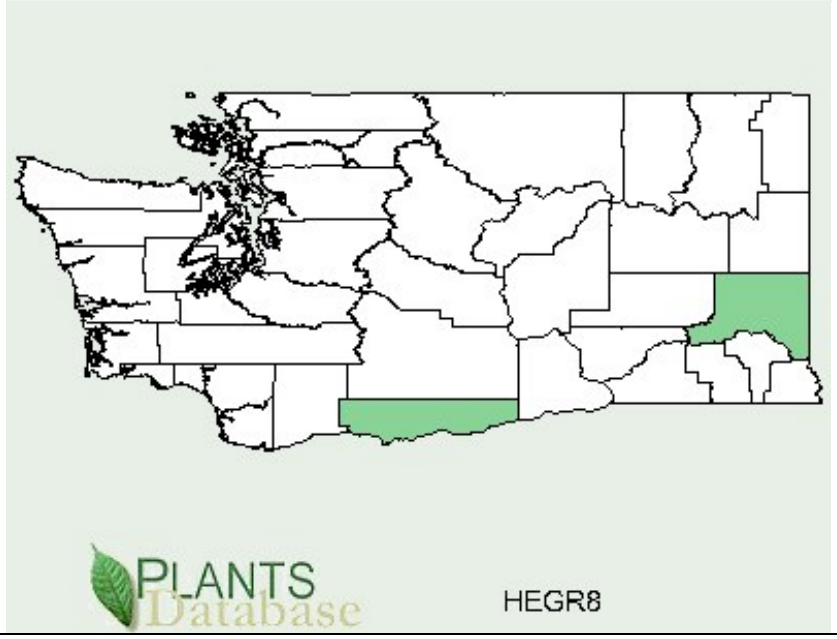
GENERAL INFORMATION	
Geographical range (distribution maps for North America and Washington state)	 
Ecological distribution (ecosystems it occurs in, etc):	-may be found on grassy hillsides, shaded cliffs, talus slopes, and on alpine scree3 - found from mid-elevations to alpine tundra, favors cliff sides (where it usually grows as a solitary plant) and rocky ground where it may grow in clusters[6] - occurs in rocky, well-drained habitats[6] -associates species: Acer glabrum, Pinus ponderosa, Quercus garryana, Lonicera ciliosa, Penstemon rupicola, Corylus cornuta, Arctostaphylos uva-ursi, Sedum spathulifolium, Symphoricarpos albus[6]

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	and Prunus emarginata
Climate and elevation range	USDA Zone 5b: to -26.1 °C (-15 °F)[3] found between the elevations of 100'-1900'[6]
Local habitat and abundance; may include commonly associated species	-Currant-leaf alumroot may be found from the Columbia River Gorge of Oregon and Washington east to the Wallowa Mts. of northeastern Oregon and further east through central Idaho to southwestern Montana[3] -Observed in the Klickitat State Wildlife Area of south-central Washington along intermittent and/or perennial stream channels[6]
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	Late sucessional[6]
Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc)	-Perennial forb/herb[4] -Leafless flower stems from 15-65 cm tall arising from a mass of basal leaves[6] -Leaves are long petioled with the blade orbicular or kidney-shaped with heart-like bases[3] -The inflorescence is a panicle, tightly congested at flowering and 1-6 cm long, elongating to 5-12 cm in fruit[3]
!!PROPAGATION DETAILS FOR CLOSELY RELATED *Heuchera parvifolia*!! Unable to find protocol for ***Heuchera grossulariifolia***	
Ecotype (this is meant primarily for experimentally derived protocols, and is a description of where the seed that was tested came from):	-BLM, Seeds of Success: USFS Land, Eagle County, Colorado: 9078 ft. elevation[10] -Alpine slope, Scenic Point, Glacier National Park, Glacier Co., MT[11]
Propagation Goal (Options: Plants, Cuttings, Seeds, Bulbs, Somatic Embryos, and/or Other Propagules):	-Seeds[10] - Plants[11]

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Propagation Method (Options: Seed or Vegetative):	-Seeds[10] -Seeds[11]
Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	-Propagules (seeds, cuttings, poles, etc.)[10] -Container (plug)[11]
Stock Type:	-160 ml conetainers[11]
Time to Grow (from seeding until plants are ready to be outplanted):	-9 Months[11]
Target Specifications (size or characteristics of target plants to be produced):	-Stock Type: Container seedling -Height: 3 cm, 6 to 10 true leaves -Caliper: n/a -Root System: firm plug in conetainer[11]
Propagule Collection (how, when, etc):	-Very small lot, 0.18 pounds, hand collected into cloth bags[10] -Seeds are collected when capsules begin to turn brown and split in late August. Seeds are black at maturity -Capsules are collected in paper bags and kept in a well ventilated drying shed prior to cleaning[11]
Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed longevity, etc):	-Seed lot is first processed using a Westrup Model LA-H laboratory brush machine, with a #14 mantel, at medium speed. Seeds are then air-screened using an office Clipper, with a top screen: 1/25 round and a bottom screen: 50 x 50 wire, medium speed, low or no air. Number of Seeds per Pound: 2,835,000, Purity: 64%, X-Ray 100 Seeds: 90% Filled[10] -Seeds are cleaned using a hammermill and run over with an office clipper at NRCS -Seed Storage is estimated up to 5 years -Seed dormancy is classified as physiological dormancy. -Seeds/Kg: 15,400,000/kg % Purity: 100%

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	% Germination: 30%[11]
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	-5 month outdoor stratification[11]
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	-Outdoor nursery growing facility. -Sowing Method: Direct Seeding. Seeds are covered with media. -Growing media used is 6:1:1 milled spaghnum peat, perlite, and vermiculite with Osmocote controlled release fertilizer (13N:13P2O5:13K2O; 8 to 9 month release rate at 21C) and Micromax fertilizer (12%S, 0.1%B, 0.5%Cu, 12%Fe, 2.5%Mn, 0.05%Mo, 1%Zn) at the rate of 1 gram of Osmocote and 0.20 gram of Micromax per 172 ml conetainer. -Conetainers are filled and sown in late fall and irrigated thoroughly prior to winter stratification. -Seedlings germinate in spring under fluctuating outdoor temperatures and are grown under full sun exposure. Seedlings are irrigated with Rainbird automatic irrigation system in early morning until containers are thoroughly leached. -Average growing season of nursery is from late April after snowmelt until October 15[11]
Establishment Phase (from seeding to germination):	-Media is kept slightly moist during germination. Initial germination appeared uniform and appeared complete after 2 weeks[11]
Length of Establishment Phase:	-4 weeks[11]
Active Growth Phase (from germination until plants are no longer actively growing):	-Root and shoot development occurs rapidly following germination. 4 to 6 true leaves were evident 3 weeks after germination. Plants were fertilized with 13-13-13 liquid NPK fertilizer during the growing season. Plants were root tight in 12 weeks[11]
Length of Active Growth Phase:	-10 weeks[11]
Hardening Phase (from end of active growth	-Irrigation is gradually reduced in September and October. Plants are leached with clear water before winterization[11]

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phase to end of growing season; primarily related to the development of cold-hardiness and preparation for winter):	
Length of Hardening Phase:	-4 weeks[11]
Harvesting, Storage and Shipping (of seedlings):	-Storage: Cold Storage, 33-38 Degrees Fahrenheit[10] -Total Time To Harvest: 9 months -Harvest Date: August -Storage Conditions: Overwinter in outdoor nursery under insulating foam cover and snow[11]
Length of Storage (of seedlings, between nursery and outplanting):	-5 months[11]
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter growth, elapsed time before flowering):	NA
Other Comments (including collection restrictions or guidelines, if available):	-Alumroot, is derived from its puckery taste, for the roots and stems contain a high concentration of tannin[5] -General consensus is that the easiest method of propagation is by divison[8] - Once spring growth has begun, lift the plant from the ground and remove small sections from around the edge (look for good roots, and 2-3 shoots)[7]
INFORMATION SOURCES	
References (full citations):	1. "PLANTS Profile for Heuchera grossulariifolia | USDA PLANTS."*Welcome to the PLANTS Database | USDA PLANTS*. N.p., n.d. Web. 20 Apr. 2011. <http://plants.usda.gov/java/profile?symbol=HEGR8>. 2. Pojar, Jim, A. MacKinnon, and Paul B. Alaback. *Plants of the Pacific Northwest coast: Washington, Oregon, British Columbia & Alaska*. Redmond, Wash.: Lone Pine Pub., 1994. Print. 3. "Currant-leaf Alumroot, Gooseberryleaf Alumroot, Thin-leaved

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	Alumroot: Heuchera grossulariifolia var. tenuifolia (Synonym: Heuchera tenuifolia)." *Flora and Fauna Northwest*. N.p., n.d. Web. 17 May 2011. <http://science.halleyhosting.com>. 4. "Gooseberryleaf Alumroot (Heuchera Grossulariifolia) | Sagebud | A Directory Of Plants." *Sagebud - A Directory Of Plants*. N.p., n.d. Web. 17 May 2011. <http://www.sagebud.com/gooseberryleaf-alumroot-heuchera-grossulariifolia/>. 5. "Saxif1.html." *Idaho Mountain Wildflowers* . N.p., n.d. Web. 17 May 2011. <http://www.larkspurbooks.com>. 6. "Heuchera grossulariifolia Rydb. var. tenuifolia."*Heuchera grossulariifolia var. tenuifolia*. Washington Department of Natural Resources, n.d. Web. 17 May 2011. <www1.dnr.wa.gov/nhp/refdesk/fguide/pdf/hegrt.pdf>. 7. "Elisabeth C. Miller Library: Gardening Answers Search Results for "Heuchera"." *UW Departments Web Server*. N.p., n.d. Web. 17 May 2011. <http://depts.washington.edu/hortlib/resources/resource_search.php?term=1036>. 8. "Heuchera grossulariifolia in Flora of North America on efloras.org." *eFloras.org Home*. N.p., n.d. Web. 17 May 2011. .<http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250065972>. 9. Nearing, Helen & Scott. "Growing Heucheras From Seed." *Choosing Voluntary Simplicity*. N.p., n.d. Web. 17 May 2011. <http://www.choosingvoluntarysimplicity.com/growing-heucheras-from-seed/>. 10. "Untitled Page." *About the Native Plant Network* . N.p., n.d. Web. 17 May 2011. <http://nativeplantnetwork.org/Network/ViewProtocols.aspx?ProtocolID=3721>. 11. "Untitled Page." *About the Native Plant Network* . N.p., n.d. Web. 17 May 2011. <http://nativeplantnetwork.org/Network/ViewProtocols.aspx?ProtocolID=203>.
Other Sources Consulted (but that contained no pertinent information) (full citations):	
Protocol Author (First and last name):	Jonathan Jue
Date Protocol Created	05/17/11

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