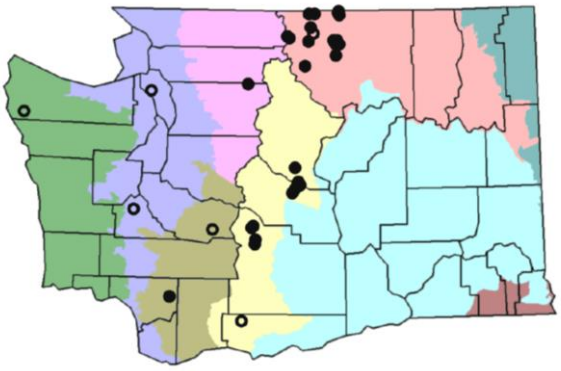
Plant Propagation Protocol for *Agoseris elata*
ESRM 412 – Native Plant Production
Protocol URL: https://courses.washington.edu/esrm412/protocols/*AGEL.pdf*



TAXONOMY	
Plant Family	
Scientific Name	Asteraceae
Common Name	Aster
Species Scientific Name	
Scientific Name	*Agoseris elata* (Nutt.) Greene
Varieties	N/A
Sub-species	N/A
Cultivar	N/A
Common Synonym(s)	*Stylopappus elatus* Nutt.
Common Name(s)	Tall Agoseris, Tall Goat-Chicory
Species Code (as per USDA Plants database)	AGEL
GENERAL INFORMATION	
Geographical range	Washington, Oregon, and California. (See Maps) (eFlora 2015)(DNR 2015)
Ecological	Meadows, prairies, open woodlands, and exposed rocky ridges (DNR 2015)

distribution	
Climate and elevation range	500-7800 ft in WA (DNR 2015) 4600-9200 ft in CA (eFlora 2015)
Local habitat and abundance	Open areas with little to no canopy cover. Species associations vary widely. *A. elata* is sometimes found with *A. aurantiaca* or *A. glauca.* (DNR 2000)
Plant strategy type / successional stage	Weedy/Colonizer
Plant characteristics	Perennial forb.
PROPAGATION DETAILS Propagation by Seed (Skinner 2004) and (Jensen 2007)	
Ecotype	NA
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (2 inch plugs)
Stock Type	Seed
Time to Grow	3 months
Target Specifications	Tight root plug in container
Propagule Collection Instructions	*A elata* flowers from June to August with individual populations tending to flower and set seed at the same time. Seeds are wind dispersed so timing is critical when harvesting seed. Fruits are mature when the spreading action of the drying pappus opens the head. Seeds should be collected by holding a paper bag under the seed head while stripping the seeds from the seed head by hand.
Propagule Processing/Propagule Characteristics	Large chaff can be removed by screening or by hand. The remaining material is rubbed between two boards covered with soft leather. This separates the pappus from the seed. Then use an air column or air screen for final separation. 273,665 seeds per pound were determined for *A. grandiflora* which may work as an estimate for *A elata*.
Pre-Planting Propagule Treatments	*A grandiflora* did not require any stratification, but *A aurantiaca* was cold stratified for 3 weeks. If initial plantings of *A elata* do not germinate well, then stratification should be attempted. Trials conducted by Andrea Raven of the Berry Botanic Garden of various temperature treatments in 2008 can guide future germination trials.
Growing Area Preparation / Annual Practices for	Seeds are planted to the depth of the achene body in a plug tray. Soil mix is 2 parts peat, 2 parts vermiculite, 1 part montmorillonite clay, 1 part #20 quartz silica sand, 1 part native soil that has been steam aerated at 140 degrees for 30 minutes.

Perennial Crops	
Establishment Phase Details	Medium is kept moist until germination has occurred.
Length of Establishment Phase	2 weeks for most seeds.
Active Growth Phase	Plants are watered every 2 to 3 days in a greenhouse. Temperatures maintained at 55-70 degrees F.
Length of Active Growth Phase	8+ weeks.
Hardening Phase	Plants are moved to a cold frame in late March or Early April.
Length of Hardening Phase	2-4 weeks
Harvesting, Storage and Shipping	Plants can be maintained in an outdoor holding area until planting. If retaining plants longer, they may need to be up potted to accommodate root growth.
Length of Storage	One month.
Guidelines for Outplanting / Performance on Typical Sites	A dribble or drill is used to prepare a 1.5 inch hole when using the 2 inch pots. Gently separate the roots while planting if root bound. Survival for *A. grandiflora* can be as high as 90%. *A. elata* may have similar results.
Other Comments	This protocol has been prepared based on protocols for *A. aurantiaca* and *A. grandiflora*. *A. elata* may be a hybrid that includes *A. aurantiaca* and *A. grandiflora* in its lineage. (eFlora, 2015) *A. elata* is listed as G4 S3, meaning that it is generally secure as a species, but many populations are locally threatened and isolated. When collecting seed, care should be taken to only take 25% of the seed on site at most so the wild population is not compromised.
INFORMATION SOURCES	
References	eFlora "Agoseris elata" http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250068018 Accessed 5/17/2015 Jensen, Scott L 2007. Propagation protocol for production of container Agoseris aurantiaca (Hook.) Greene. plants (5.5 cu. in. root trainers.); USDA FS - Rocky Mountain Research Station, Shrub Sciences Laboratory, Provo, Utah. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 17 May 2015). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery. Raven, Andrea. "2008 Annual Report to the Bureau of Land Management on Conservation-Related Activities of the Berry Botanic Garden and Seed Bank Holdings" The Berry Botanic Gardens, 2008.

	http://www.blm.gov/or/programs/botany/files/BBG_annual_report_2008.pdf Accessed 6/5/2015 Skinner, David M. 2004. Propagation protocol for production of container Agoseris grandiflora (Nutt.) Greene plants; Natural Resources Conservation Service - Pullman Plant Materials Center, Pullman, Washington. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 17 May 2015). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery. USDA, NRCS. 2015. The PLANTS Database (http://plants.usda.gov, 17 May 2015). National Plant Data Team, Greensboro, NC 27401-4901 USA Washington Department of Natural Resources (DNR) "Agoseris elata" http://www1.dnr.wa.gov/nhp/refdesk/fguide/pdf/agel.pdf Accessed 5/17/015 Washington Department of Natural Resources (DNR) "Agoseris elata" 2000 http://citeseerx.ist.psu.edu/viewdoc/download?rep=rep1&type=pdf&doi=10.1.1.214.3766 Accessed 5/17/2015
Other Sources Consulted	Barner, Jim 2009. Propagation protocol for production of *Agoseris glauca* (Pursh) Raf. seeds; USDA FS - R6 Bend Seed Extractory, Bend, Oregon. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 5 June 2015). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery. Baskin, Carol C.; Baskin, Jerry M. 2002. Propagation protocol for production of container *Agoseris glauca* (Pursh) Raf. plants; University of Kentucky, Lexington, Kentucky. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 5 June 2015). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery. Gamon, John. "Rare Vascular Plants of the South Puget Sound Prairie Landscape" Washington Department of Natural Resources, National Heritage Program. http://cascadiaprairieoak.org/tech/Rare%20Vascular%20Plants.pdf Accessed 6/5/2015
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