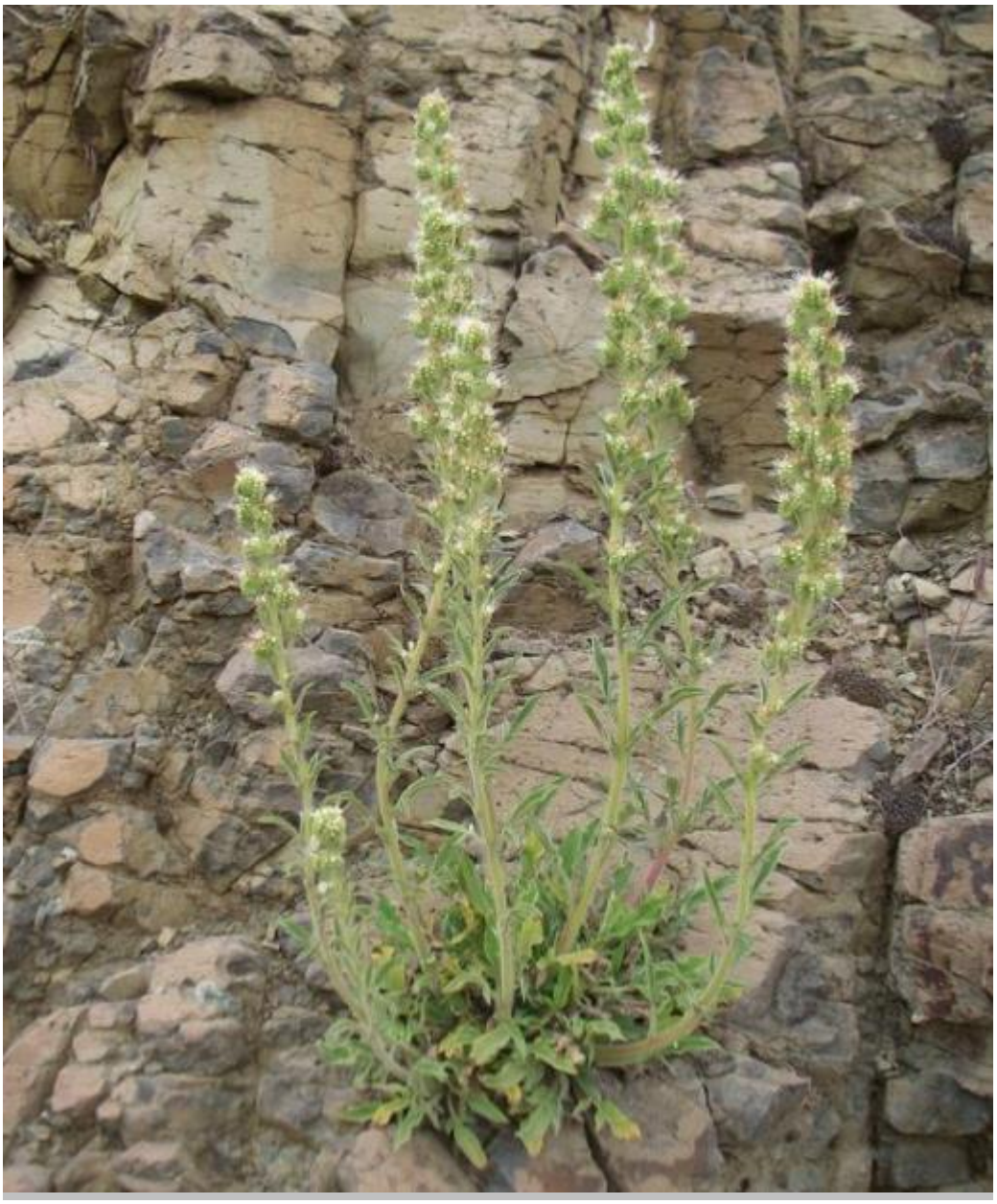
Plant Propagation Protocol for *Phacelia heterophylla*

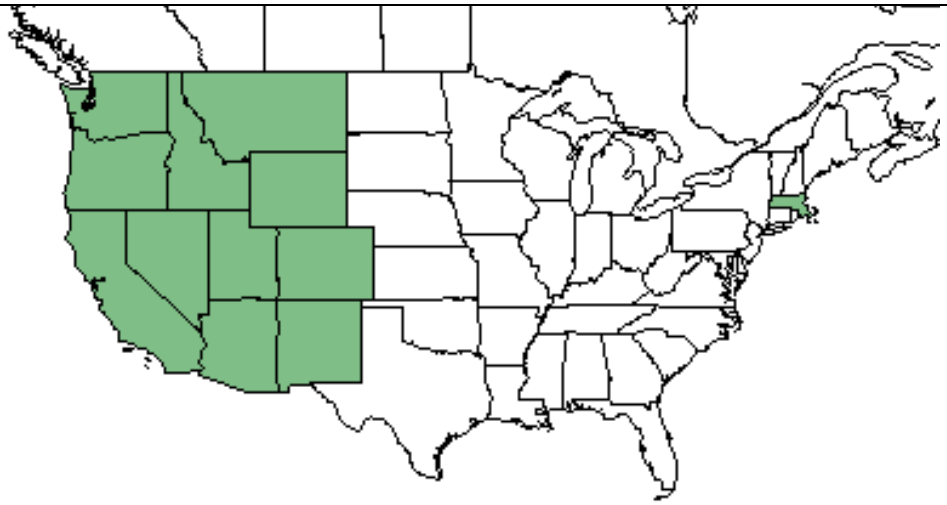
ESRM 412 – Native Plant Production

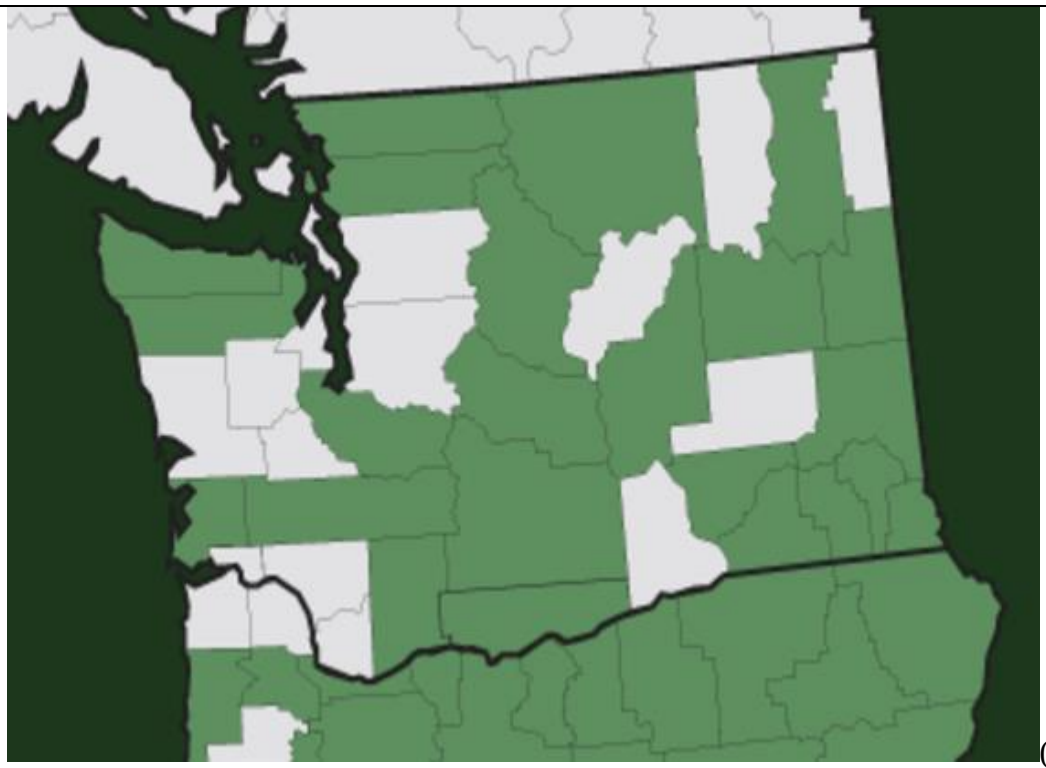
Protocol URL: https://courses.washington.edu/esrm412/protocols/PHHE2.pdf



(2)

TAXONOMY	
Plant Family	
Scientific Name	Hydrophyllaceae (1)
Common Name	Waterleaf family (1)

Species Scientific Name	
Scientific Name	*Phacelia heterophylla* Pursh (1)
Varieties	*Phacelia heterophylla* Pursh var. *virgata* (Greene) R.D. Dorn (5)
Sub-species	*Phacelia heterophylla* Pursh ssp. *virgata* (Greene) Heckard *Phacelia heterophylla* Pursh ssp. *heterophylla* (1)
Cultivar	
Common Synonym(s)	*Phacelia heterophylla* Pursh var. *virgata* (Greene) R.D. Dorn (5)
Common Name(s)	• Vigrate • Varied-leaf Phacelia • Varileaf phacelia (3) (6) (5)
Species Code (as per USDA Plants database)	PHHE2 (1)
GENERAL INFORMATION	
Geographical range	 (1)

	 (3)
Ecological distribution	• Red Fir Forest • Yellow Pine Forest • Northern Juniper Woodland • Found in western North America south to New Mexico • British Columbia east to Montana • It is a facultative upland species (6) (5)
Climate and elevation range	• Elevation is 720 to 9350 feet • Temperature range is 48 to 66 degrees F (5)
Local habitat and abundance	• Plant is found on dry, open, and rocky slopes in the mountains at low to moderate elevations • Meadows, East-side forests, Cascades • It is usually found in dry, open, and rocky areas, especially where there is some disturbance. (9)(3)(5)(6)
Plant strategy type / successional stage	• Is not as viable and does not grow as well when around like plants • Tolerates both dry and cold environments (6)
Plant characteristics	• Forb and herb • Grows to 1 to 3 feet • Biennial or Perennial

	(10) (1) (3) (4)
PROPAGATION DETAILS	
Ecotype	N/A
Propagation Goal	Plants (6)
Propagation Method	Seed (6)
Product Type	Container (plug) (6)
Stock Type	
Time to Grow	3 Months (6)
Target Specification	To have a tight root plug in container (6)
Propagule Collection Instructions	• The fruit is a capsule • The seed has a pitted surface, points out, and is dark brown pitted • The seed is collected when the it starts to shatter in late July and early August • Wear gloves when handling the plant because it has short hairs that will irritate skin • The seed can be removed from the inflorescence • Store seeds in paper bags at room temperature until they can be cleaned • The inflorescence can be clipped off the plant and dried on tarps It was calculated that you there are 1,233 seeds per gram or 559,172 seeds per lb (6)
Propagule Processing /Propagule Characteristics	• Wear gloves and a mask • Small portions should be rubbed to free the seeds • Clean with an air column separator • For large amounts, use a head thresher and clean with air screen equipment • Operator should position themselves so dust will travel the opposite way with the wind • Clean seed should be stored in a controlled environment at 40 degrees F and 40% relative humidity (6)
Pre-Planting Propagule Treatments	Studies have shown that 95% of seeds would germinate without stratification (6)
Growing Area Preparatio	• In January seed is sown in the greenhouse in 10 cubic inches • Use cone containers • Containers should be filled with Sunshine #4 and covered lightly

n / Annual Practices for Perennial Crops	• Keep enough head containers to allow for deep watering • Lay down a thin layer of pea gravel to prevent the seeds from floating Containers should be watered deeply (6)
Establishment Phase Details	• Sow seeds in containers in November and leave outdoors • Cool, moist, and fluctuating temperatures will yield 98% germination • Plants will not ready to be transplanted to the field the same spring • Germination usually begins in 5 days and will be completed in 10 days (6)
Length of Establishment Phase	2 weeks (6)
Active Growth Phase	• Plants should be watered heavily every other day • Fertilize once per week with a water-soluble fertilizer that contains micro-nutrients • Plant growth will be rapid • Older plants may need to be watered everyday (6)
Length of Active Growth Phase	2 to 3 months (6)
Hardening Phase	• Plants should be moved to a cold frame in late March or early April • Plants should be watered every other day if the weather is cool or everyday if it is hot and dry (6)
Length of Hardening Phase	2 to 4 weeks (6)
Harvesting, Storage and Shipping	• Plants should be stored in a cold Storage containers around 33 to 38 Degrees F (7)
Length of Storage	9 months
Guidelines for Outplanting / Performance on Typical Sites	• Transplanting should be done in early May • Use an electronic drill and drill 1.5 inch diameter holes at the planting site Survival of seed increases with plants without competing vegetation • Some plants may flower the same year but most take one more year to produce seed • Plants are short-lived but will perpetuate themselves with their high production of seeds (8)
Other	• Hairs on plant will irritate skin so wear protective equipment accordingly

Comments	• No insect or disease problems were noticed (6)(7)
INFORMATION SOURCES	
References	(1) United States Department of Agriculture. (n.d.). Retrieved May 23, 2017, from https://plants.usda.gov/core/profile?symbol=PHHE2 (2) (n.d.). Retrieved May 22, 2017, from http://biology.burke.washington.edu/herbarium/imagecollection.php?Genus=Phacelia&Species=heterophylla (3) Phacelia heterophylla | varied-leaf phacelia | Wildflowers of the Pacific Northwest. (n.d.). Retrieved May 23, 2017, from https://www.pnwflowers.com/flower/phacelia-heterophylla (4) (n.d.). Retrieved May 22, 2017, from http://www.calflora.org/cgi-bin/species_query.cgi?where-taxon=Phacelia heterophylla (5) (n.d.). Retrieved May 22, 2017, from http://www.calflora.org/entry/plantchar.html?crn=10203 (6) *Native Plant Network*. Reforestation, Nurseries, & Genetics Resources, n.d. Web. 23 May 2017, from https://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=hydrophyllaceae-phacelia-3129 (7) Hydrophyllaceae (Phacelia). (n.d.). Retrieved May 23, 2017, from https://www.rngr.net/npn/propagation/protocols/hydrophyllaceae-phacelia-3351 (8) Skinner, David M. 2006. Propagation protocol for production of container Phacelia heterophylla Pursh plants; Pullman Plant Materials Center, Pullman, Washington. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 6 February 2006). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery. (9) Varied-leaf Phacelia, Varileaf Phacelia. (n.d.). Retrieved May 24, 2017, from http://science.halleyhosting.com/nature/basin/5petal/water/phacelia/varied.htm (10) Sturla, E. (n.d.). Southwest Desert Flora. Retrieved May 24, 2017, from http://southwestdesertflora.com/WebsiteFolders/All_Species/Hydrophyllaceae/Phacelia%20heterophylla,%20Varileaf%20Phacelia.html
Other Sources Consulted	N/A
Protocol Author	Adam Matza

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