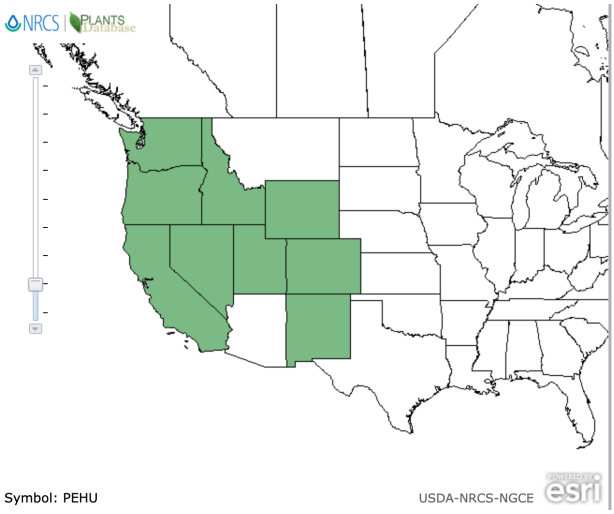
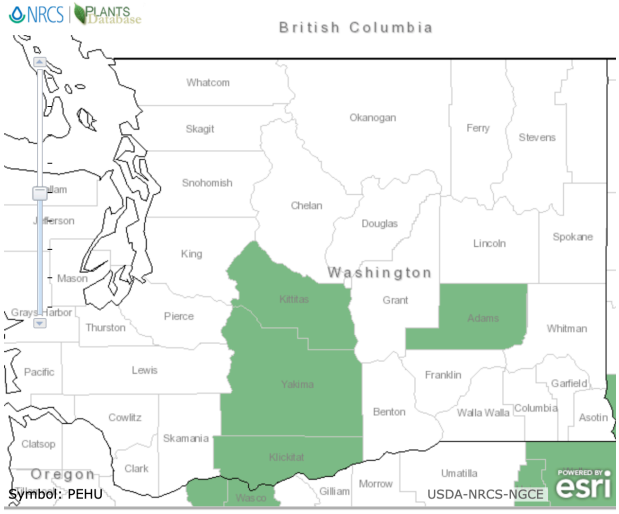
Plant Propagation Protocol for Penstemon humilis
ESRM 412 – Native Plant Production
Protocol URL: http://courses.washington.edu/esrm412/protocols/PEHU.pdf)





TAXONOMY	
Plant Family	
Scientific Name	Scrophulariaceae[2]
Common Name	Figwort Family[2] Low Beardtongue[2]
Species Scientific Name	
Scientific Name	*Penstemon humilis* Nutt. Ex Gray[2]
Varieties	Var. *brevifolius*[2] Var. *deserticus S.L. Welsh*[2] Var. *humilis*[2] Var. *obtusifolius*[2]

Sub-species	Ssp. *brevifolius*[2] Ssp. *humilis*[2] Ssp. *obtusifolius*[2]
Cultivar	N/A
Common Synonym(s)	N/A
Common Name(s)	Low Penstemon[3]
Species Code (as per USDA Plants database)	PEHU[2]
GENERAL INFORMATION	
Geographical range	L48 N – Lower 48 States Native See map above[2]
Ecological distribution	Western U.S. New Mexico to California to Washington[7]
Climate and elevation range	N/A
Local habitat and abundance	Shrub-steppe, East-side forest, Subalpine, Subshrub[3]
Plant strategy type / successional stage	Slow spreading[7]
Plant characteristics	Woody subshrubs perennials (.5-2.5 dm tall) Basal leaves, opposite, entire/toothed leaves Stalked flowers/ flower clusters in axils of upper leaves or leaf-like bracts The tubular corolla is strongly to distinctly two-lipped at the mouth with a two-lobed upper lip and a three-lobed lower lip. There are 4 anther-bearing (fertile) stamens and a single sterile stamen or staminodia that is often hairy at the tip. The fruit is a many-seeded capsule[7]
PROPAGATION DETAILS	
Ecotype	Subshrub perennials[7]
Propagation Goal	Plants[5]
Propagation Method	Seed[5]
Product Type	Container (plug) [5]
Stock Type	164 ml (10 in3) container[5]
Time to Grow	17 weeks[5]
Target Specifications	Stock type: Container seedling[5] Root system: firm plug in container[5]
Propagule Collection Instructions	Collect seeds by hand stripping, the seeds should be hard and dark found in dry capsules Capsules hold seeds very well but the seeds could shatter once the capsules open[5]

Propagule Processing/Propagule Characteristics	Hammer mill or barley debearder could be used to separate seeds from the capsules, and needs to be followed by air screening[5] Cleaned seeds should dry and stored in cool dry area. An after-ripening period of 3-4 months is required[5]
Pre-Planting Propagule Treatments	Seeds are placed in a solution of 250 mg/L GA3, soaked for 24 hours, rinsed, and soaked for an additional 4 hours in water. Seeds are sown into trays filled with stabilized medium plugs (Q-plugs). Trays are sealed inside plastic bags and placed into refrigeration at 1 to 3 °C for 60 days. Trays are checked weekly and kept moist throughout the stratification period. If mold is evident, trays should be treated with 1% hydrogen peroxide. [5]
Growing Area Preparation / Annual Practices for Perennial Crops	Q-plugs are lightly covered with nursery grit. Seedlings are transplanted to target containers approximately 3 weeks following removal from stratification. Growing medium used is 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 21C) at the rate of 0.8 gram Nutricote per 164 ml container. [5]
Establishment Phase Details	Germination is not very uniform, depending on the quality of the seeds, and can take up to 3 weeks to be complete. Following germination (while still in Q-plugs), plants are fertilized with soluble 12-2-14-6Ca-3Mg at 75 to 100 ppm for 2 weeks[5]
Length of Establishment Phase	3 weeks[5]
Active Growth Phase	During the growing season, fertilization depends on weather and physiological needs. Soluble 20-9-20 NPK, 20-18-18 NPK, or 17-5-24 NPK at 100 to 150 ppm is applied weekly throughout the growing season. [5]
Length of Active Growth Phase	14 weeks[5]
Hardening Phase	No dry-down is done to induce dormancy. Seedlings are moved to an outdoor growing area in mid-September[5]
Length of Hardening Phase	2-3 weeks[5]
Harvesting, Storage and Shipping	Harvest Date: Mid-October Storage Conditions: Seedlings are usually outplanted in fall. No storage except in outdoor growing area. Plants are well irrigated prior to shipping and shipped in containers[5]
Length of Storage	12 years[5]

Guidelines for Outplanting / Performance on Typical Sites	Penstemons do best on well-drained soils. Most ecotypes do well on infertile, disturbed soils. They have excellent cold winter and drought tolerance[5]
Other Comments	
INFORMATION SOURCES	
References	See below
Other Sources Consulted	
Protocol Author	Michelle Koo
Date Protocol Created or Updated	05/2519

[1] " Penstemon Humilis Nutt. Ex Gray." *SEINet Portal Network - Penstemon Humilis*, 25 May 2019, swbiodiversity.org/seinet/taxa/index.php?taxon=18533.

[2] *Plants Profile for Penstemon Humilis (Low Beardtongue)*, 25 May 2019, plants.usda.gov/core/profile?symbol=PEHU.

[3] TWC Staff. "Plant Database." *Lady Bird Johnson Wildflower Center - The University of Texas at Austin*, 17 July 2017, www.wildflower.org/plants/result.php?id_plant=PEHU.

[4] Baskin, Carol, and Jerry Baskin. "Native Plant Network." *Reforestation, Nurseries and Genetics Resources*, 25 May 2019, npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=scrophulariaceae-penstemon-1704&referer=wildflower.

[5] Lee, Riley. "Native Plant Network." *Reforestation, Nurseries and Genetics Resources*, 2018, npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=scrophulariaceae-penstemon-3.

[6] Davis, Nicky. "Low Penstemon Penstemon Humilis Scrophulariaceae (Figwort Family)." *Wildutah Photos at Fruitland, Duchesne County, Utah, 5 June 2016, Penstemon Humilis*, 26 May 2019, www.wildutah.us/html/plants_scenery/h_penstemon_humilis.html.

[7] Ogle, Daniel G. "Plant Guide ." *USDA NRCS*, 26 May 2019, plants.usda.gov/plantguide/pdf/pg_pehu.pdf.