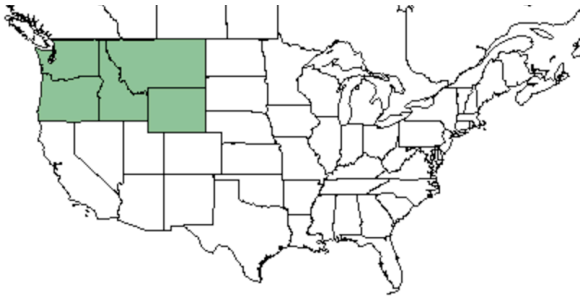
Plant Propagation Protocol for *Penstemon attenuatus* Douglas ex Lindl.
ESRM 412 – Native Plant Production
Protocol URL: https://courses.washington.edu/esrm412/protocols/PEAT3.pdf

United States Distribution



Washington Distribution

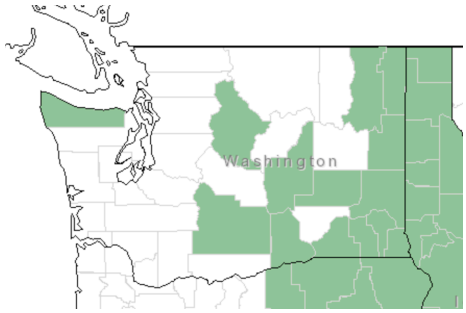
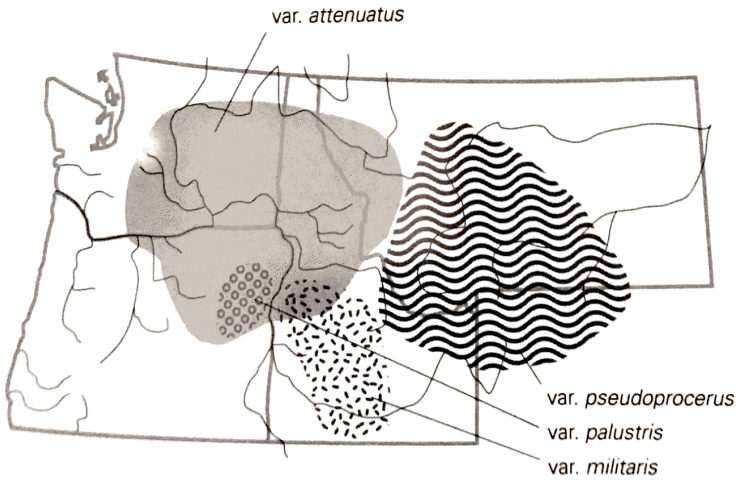


Image Source: USDA PLANTS Database

TAXONOMY	
Plant Family	
Scientific Name	Scrophulariaceae[1]
Common Name	Figwort, Snapdragon[1]
Species Scientific Name	
Scientific Name	*Penstemon attenuatus* Douglas ex Lindl.[2]
Varieties	*Penstemon attenuatus* var. *palustris* *Penstemon attenuatus* var. *militaris* *Penstemon attenuatus* var. *pseudoprocerus*[3]
Sub-species	
Cultivar	
Common Synonym(s)	
Common Name(s)	Taper-Leaved Penstemon, Sulphur Penstemon Sulphur beardtongue (var. *palustris*) South Idaho penstemon (var. *militaris*) Small penstemon (var. *pseudoprocerus*)[3]
Species Code (as per USDA Plants database)	PEAT3[2]
GENERAL INFORMATION	
Geographical range	Central Washington and northeast Oregon to western Montana, southern Idaho, and Central Wyoming.[6]

	 Species Variety Distribution Image Source: Strickler, Dee.[6]
Ecological distribution	Grows in dry meadows and moist, open to wooded slopes in the mountains and foothills.[3]
Climate and elevation range	Penstemon attenuatus is adapted to areas receiving 30 to 64 cm (12 to 25 in) annual precipitation at elevations up to 3,000 m (5,000 ft).[2]
Local habitat and abundance	It grows in well-drained, medium textured soils.[2]
Plant strategy type / successional stage	
Plant characteristics	A native, perennial forb that grows from a dense crown to a height of 10 to 90 cm (4 to 35 in).[2] Tall stems with blue, purple, pink, even sometimes yellow/white trumpet flowers are borne on a low basal clump of paddle-shaped leaves. The species, "*attenuatus*" is named for the leaves - the Latin means "tapering gradually to a slender tip." Leaves are bright green with smooth edges.[4] **Pollinator habitat:** Penstemon attenuatus is a source of pollen and nectar for a variety of bees, including honey bees and native bumble bees, as well as butterflies and moths.[2] **Ornamental:** Penstemon attenuatus is very attractive and easy to manage as an ornamental in urban, water-saving landscapes. It is hardy to USDA Plant Hardiness Zone 4.[2]
PROPAGATION DETAILS Container (plug) Method as Explained by Dave Skinner[5]	
Ecotype	Palouse region south of Moscow, ID
Propagation Goal	Plants
Propagation Method	Seed

Product Type	Container (plug)
Stock Type	10 cu. in
Time to Grow	4 Months
Target Specifications	Tight root plug in container.
Propagule Collection Instructions	Fruit is a capsule. Seed is dark brown in color. Seed is collected when the capsules begin to split in late July and is stored in paper bags or envelopes at room temperature until cleaned. Plants hold their seed well after the capsules begin to split if winds are not excessive.
Propagule Processing/Propagule Characteristics	Small amounts are rubbed to free the seed, then cleaned with an air column separator. Larger amounts are threshed with a hammermill, then cleaned with air screen equipment. Clean seed is stored in controlled conditions at 40 degrees Fahrenheit and 40% relative humidity.
Pre-Planting Propagule Treatments	For this ecotype, 90 or more days of cold moist stratification is required. Unpublished data from trials conducted at the Pullman Plant Materials Center revealed that no emergence occurred without stratification. 45 days of cold, moist stratification resulted in 10% emergence. 90 days of cold, moist stratification resulted in 72% emergence. Containers sown in November and left outside under cool, fluctuating spring temperatures achieved 95% emergence. Seedlings which germinated in the greenhouse thrived in the constant warmth, so it is likely the longer stratification time and not the cool, fluctuating temperature was the factor in the increased germination. Surface sown seed in all treatments germinated at lower rates than covered seed. This, at least in part, may be due to desiccation from fluctuating moisture levels. Seed exposed to light might well germinate at higher levels under more favorable moisture conditions but the high germination and emergence from covered seed under extended cold, moist stratification indicates light is not a factor in germination of this ecotype. Seed of some penstemon species loses dormancy after 2« years (Allen et al 1990).
Growing Area Preparation / Annual Practices for Perennial Crops	In October or November seed is sown in 10 cu. in. Ray Leach Super cell conetainers filled with Sunshine #4 and covered lightly. A thin layer of coarse grit is applied to the top of the planting soil to prevent seeds from floating during watering. Conetainers are watered deeply and placed outside. Conetainers are moved to the greenhouse

	in January. Alternately, seed can be moist stratified in a refrigerator at 35-40 degrees F for 90+ days before sowing in the greenhouse.
Establishment Phase Details	Medium is kept moist until germination occurs. Germination usually begins in 4 days and is complete in 7 days.
Length of Establishment Phase	1 week.
Active Growth Phase	Plants are watered deeply every other day and fertilized once per week with a complete, water-soluble fertilizer containing micronutrients. Plants may require water every day during the final part of the active growth period.
Length of Active Growth Phase	3-4 months.
Hardening Phase	Plants are moved to the cold frame in late March or early April, depending on weather conditions. They are watered every other day if the weather is cool, and every day during hot, dry spells.
Length of Hardening Phase	2-4 weeks
Harvesting, Storage and Shipping	
Length of Storage	
Guidelines for Outplanting / Performance on Typical Sites	
Other Comments	No insect or disease problems have been noted.[5] **Vegetative Propagation:**[7] The vast majority of *Penstemon* species and hybrids cultivated in gardens can be readily propagated using cuttings. Typically, a variety of cuttings can be used, including: tip cuttings, 'second' cuttings, singe node cuttings, flowering stem cuttings, and rosette cuttings. Timing is seldom critical, and both simple and sophisticated techniques and equipment can produce excellent results. Has a natural propensity to form roots in warm, humid conditions. Root readily in a range of media that provide good aeration and free drainage, yet retain adequate moisture. These include: mixtures of medium-grade sphagnum peat and sharp sand, equal parts perlite and sharp sand, and equal parts perlite and horticultural grade vermiculite. Bark may inhibit growth once rooting has occurred. Adequate warmth in rooting medium encourages rooting. A propagation system that provides bottom heat is beneficial. Not an essential requirement unless cuttings are taken in late autumn or winter. Rooting may be slower without, but results can be just as good. Nutrients are not essential initially, but can later be

	supplied to the cuttings by foliar spray. It has become common practice to stimulate root formation in cuttings by treating base with a rooting hormone, typically in powder form.
INFORMATION SOURCES	
References:	1. "Figwort (Snapdragon) Family, Scrophulariaceae (Continued)". 2017. Idaho Mountain Wildflowers. http://www.larkspurbooks.com/scroph3.html. 2. Pavek, P.L.S., and D.M. Skinner 2012. Plant fact sheet for taper-leaved penstemon (Penstemon attenuatus). USDA Natural Resources Conservation Service, Pullman Plant Materials Center. Pullman, WA. 3. Pavek, P.L.S., and D.M. Skinner 2012. Plant guide for taper-leaved penstemon (Penstemon attenuatus). USDA Natural Resources Conservation Service, Pullman Plant Materials Center. Pullman, WA. 4. Penstemon Attenuatus". 2017. Rugged Country Native Plants. http://www.ruggedcountryplants.com/penstemon-attenuatus.htm. 5. Skinner, David M,. 2007. Propagation protocol for production of Container (plug) Penstemon attenuatus Dougl. ex Lindl. plants 10 cu. in.; USDA NRCS - Pullman Plant Materials Center Pullman, Washington. In: Native Plant Network. 6. Strickler, Dee. Northwest Penstemons : 80 Species of Penstemon Native to the Pacific Northwest. 1st ed. Columbia Falls, Mont.: Flower Press, 1997. 7. Way, David, and James, Peter. The Gardener's Guide to Growing Penstemons. Newton Abbot (England) : Portland, Or.: David & Charles ; Timber Press, 1998.
Other Sources Consulted (but that contained no pertinent information):	Baskin, Carol C., and Baskin, Jerry M. Seeds : Ecology, Biogeography, and Evolution of Dormancy and Germination. Second ed. Amsterdam: Elsevier, Academic Press, 2014. Print. Franklin, Jerry F., and Dyrness, C. T. Natural Vegetation of Oregon and Washington. Rev. & Enl. Ed.]. ed. Corvallis?]: Oregon State University Press, 1988. Print.

	Kruckeberg, Arthur R. Gardening With Native Plants Of The Pacific Northwest. 2nd ed. Seattle: University of Washington Press, 1995. Print. MacKinnon, A., Pojar, Jim, and British Columbia. Ministry of Forests, Lands Natural Resource Operations, Issuing Body. Plants of the Pacific Northwest Coast. Vancouver, British Columbia: Partners Publishing : Lone Pine Media Productions (B.C.) : B.C. Ministry of Forests, 2016. Print. Robson, Kathleen A., Richter, Alice, and Filbert, Marianne. Encyclopedia of Northwest Native Plants for Gardens and Landscapes. Portland, Or.: Timber Press, 2008. Rose, Robin, Caryn E. C Chachulski, and Diane L Haase. Propagation Of Pacific Northwest Native Plants. 1st ed. Corvallis: Oregon State University Press, 1998. Print. Young, James A., and Young, Cheryl G. Collecting, Processing, and Germinating Seeds of Wildland Plants. Portland, Or.: Timber Press, 1986. Print.
Protocol Author	Joshua Gawne
Date Protocol Created or Updated	05/24/17