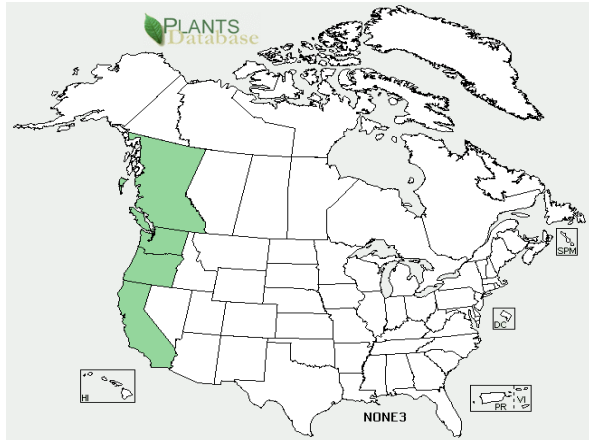
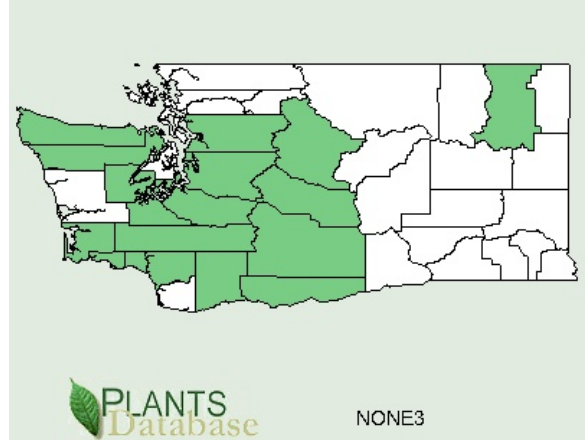


Plant Propagation Protocol for *Nothochelone nemorosa*
 ESRM 412 – Native Plant Production
 Spring 2009

Distribution in the US and Canadaⁱⁱⁱ



Distribution in Washington Stateⁱⁱⁱ



TAXONOMY	
Family Names	
Family Scientific Name:	Scrophulariaceae
Family Common Name:	Figwort family
Scientific Names	
Genus:	<i>Nothochelone</i>
Species:	<i>nemorosa</i>
Species Authority:	(Douglas ex. Lindl.) Straw
Variety:	
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	
Common Synonym(s) (include full scientific names (e.g., <i>Elymus glaucus</i> Buckley), including variety or subspecies information)	<i>Penstemon nemorosus</i> (Douglas ex. Lindl.) Straw ^a
Common Name(s):	wooded beardtongue, woodland penstemon
Species Code (as per USDA Plants database):	NONE3
GENERAL INFORMATION	
Geographical range (distribution maps for North America and Washington state)	From southwestern British Columbia through northwestern California, predominantly along the Cascades, Coast Ranges, and Olympic Mountains, but

^a *N. nemorosa* was moved from genus *Penstemon* to the related genus *Nothochelone*, making it the only member of the latter in North America (Robson et al. 2007). However, it is still frequently treated as a “penstemon.”

	also into Eastern Washington and Oregon. ^{i,ii} See maps above for distribution in the U.S. and Canada and in Washington state. ⁱⁱⁱ
Ecological distribution (ecosystems it occurs in, etc):	Occurs in forest edges, openings, clearings, and trailsides. ^{iv} Kruckeberg (1996) notes that it is often found in “partially sunny glades in the woods, on lightly wooded talus slopes, cliffs, and rock ledges.” Shade tolerant, requiring between 20%-80% sun. ^v
Climate and elevation range	West (and sometimes East) of the Cascades at low to medium-high, high, ^{vi} or sub-alpine ^{vii} elevations.
Local habitat and abundance; may include commonly associated species	No information found on associated species, but appears to thrive as part of the forest understory or in exposed sites.
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	Distribution in exposed montane habitats (as noted above) suggests that <i>N. nemorosa</i> may be a stress-tolerator.
Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc)	<p><i>N. nemorosa</i> is a perennial shrub with a woody base and otherwise herbaceous stems up to 80 cm in height.^{viii} Leaves are opposite, cauline (attached to stem), large-toothed,^{ix} and 4-11 cm in length.^x</p> <p>Like many penstemons, <i>N. nemorosa</i> has a hairy, 5-part calyx and a tubular flower, with a two-lobed upper lip and a three-lobed lower lip comprising the corolla^{xi}; the corolla is usually pink or purple, but Nold (1999) also reports white flowers.^{xii} Also like true penstemons, <i>N. nemorosa</i> has a pair of shorter upper stamens and a pair of longer lower stamens in addition to an anther-less staminode,^{xiii} which in this species is short and very hairy.^{xiv} Unlike true penstemons, <i>N. nemorosa</i> and congeners bear “nectar glands on a disk below the ovary, instead of on minute glandular hairs beside the ovary.”^{xv} Flowering occurs in mid-summer through early fall and produces capsules of roughly 1.5 cm in length, filled with flattened seeds.^{xvi}</p>

PROPAGATION DETAILS

1. Seed Propagation

Ecotype (this is meant primarily for experimentally derived protocols, and is a description of where the seed that was tested came from):	
Propagation Goal (Options: Plants, Cuttings, Seeds, Bulbs, Somatic Embryos, and/or Other Propagules):	Plants
Propagation Method (Options: Seed	Seed

or Vegetative):	
Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	Bareroot or Plug
Stock Type:	Seed
Time to Grow (from seeding until plants are ready to be outplanted):	For plugs, roughly 4 months (mid-winter to spring ^{xvii})
Target Specifications (size or characteristics of target plants to be produced):	For plugs, hardened seedlings. For seed, full-grown adults.
Propagule Collection (how, when, etc):	Collect and dry capsules after fruiting. ^{xviii}
Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed longevity, etc):	Penstemon seeds are reputedly plentiful on a per-plant basis. ^{xix} Penstemon seeds often benefit from dry storage for at least 6 months and may remain viable for five years or longer. ^{xx}
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	After drying, crush unopened capsules and separate propagules from the chaff. Smith (2006) recommends rolling a coffee mug over fruit to liberate seeds. Propagators recommend either sowing seeds outside in the fall ^{xxi} or refrigerating them through the winter ^{xxii} - either method ensures cold-moist stratification. ^{xxiii}
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	For direct seeding, no special preparation is documented. For container cultivation, flats or pots filled with potting soil are recommended; good drainage is essential. ^{xxiv}
Establishment Phase (from seeding to germination):	For direct seeding, plant seeds in the garden (rocky, well-drained soil is best). ^{xxv} Seeds should not be planted deep – Lindgren and Wilde (2003) suggest a thin layer of sand or gravel as sufficient covering for directly seeded penstemons. Alternatively, sow seeds in flats or 2-inch pots, either outside in the fall or inside during the winter (following stratification). Potting soil is sufficient as a medium, but the medium used should <i>always</i> be well drained. ^{xxvi} When spring rains abate, indoor/outdoor plugs can be transplanted to the garden. ^{xxvii}
Length of Establishment Phase:	Presumably during early spring
Active Growth Phase (from	No special care documented

germination until plants are no longer actively growing):	
Length of Active Growth Phase:	From early spring through summer flowering
Hardening Phase (from end of active growth phase to end of growing season; primarily related to the development of cold-hardiness and preparation for winter):	No special care documented
Length of Hardening Phase:	Fall
Harvesting, Storage and Shipping (of seedlings):	
Length of Storage (of seedlings, between nursery and outplanting):	
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter growth, elapsed time before flowering):	
Other Comments (including collection restrictions or guidelines, if available):	
2. Cutting Propagation	
Ecotype (this is meant primarily for experimentally derived protocols, and is a description of where the seed that was tested came from):	
Propagation Goal (Options: Plants, Cuttings, Seeds, Bulbs, Somatic Embryos, and/or Other Propagules):	Plants
Propagation Method (Options: Seed or Vegetative):	Vegetative
Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	Plug
Stock Type:	Cutting
Time to Grow (from seeding until plants are ready to be outplanted):	If collected in summer and outplanted in late spring, roughly 10 months. Smith's (2006) general discussion of penstemon propagation suggests that cuttings may be ready for outplanting in only 2 months.
Target Specifications (size or characteristics of target plants to be produced):	Hardy seedling
Propagule Collection (how, when, etc):	Take a stem cutting during the summer. ^{xxviii}

Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed longevity, etc):	
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	Recommended rooting medium is moist pumice, ^{xxix} perlite, or sand. ^{xxx}
Establishment Phase (from seeding to germination):	
Length of Establishment Phase:	
Active Growth Phase (from germination until plants are no longer actively growing):	Treat cutting with rooting hormones, place in suitable medium, and keep moist but well-drained while roots form. ^{xxxi}
Length of Active Growth Phase:	Several months
Hardening Phase (from end of active growth phase to end of growing season; primarily related to the development of cold-hardiness and preparation for winter):	No special care documented
Length of Hardening Phase:	Fall
Harvesting, Storage and Shipping (of seedlings):	
Length of Storage (of seedlings, between nursery and outplanting):	
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter growth, elapsed time before flowering):	
Other Comments (including collection restrictions or guidelines, if available):	
INFORMATION SOURCES	
References (full citations):	See below
Other Sources Consulted (but that contained no pertinent information) (full citations):	See below
Protocol Author (First and last name):	Jake J. Grossman
Date Protocol Created or Updated (MM/DD/YY):	05/07/09

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

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ⁱ Robson, K.A., A. Richter, and M. Filbert. 2008. *Encyclopedia of northwest native plants for gardens and landscapes*. Portland, OR: Timber Press, pp. 269.

ⁱⁱ Kruckeberg, A.R. 1996. *Gardening with native plants of the Pacific Northwest*. Vancouver, BC: Greystone Books, pp. 173-4.

ⁱⁱⁱ "*Nothochelone nemorosa* (Douglas ex Lindl.) Straw." USDA, NRCS. 2009a. The PLANTS Database (<http://plants.usda.gov>, 7 May 2009). National Plant Data Center, Baton Rouge, LA 70874-4490.

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- iv “*Nothochelone nemorosa*.” 2009a. Native plants for Western Washington gardens and restoration projects (<http://www.wnps.org/landscaping/herbarium/index.html>, 7 May 2009). Washington Native Plant Society, Seattle, WA 98115.
- v “*Nothochelone nemorosa*” 2009a.
- vi Kruckeberg 1996; Stickler, D. 1997. *Northwest penstemons: 80 species of Penstemon native to the Pacific Northwest*. Columbia Falls, MT: Flower Press, pp. 32; Robson, et al. 2008.
- vii “*Nothochelone nemorosa*” 2009a.
- viii “*Nothochelone nemorosa*.” 2009b. WTU image collection: Plants of Washington/Lichens of Washington (<http://biology.burke.washington.edu/herbarium/imagecollection.php?Genus=>, 7 May 2009). The Burke Museum of Natural History and Culture, Seattle, WA 98195-3010.
- ix Kruckeberg 1996.
- x “*Nothochelone nemorosa*” 2009b.
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- xx Lindgren and Wilde 2003.
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- xxvi Smith 2006; Robson et al. 2007.
- xxvii Smith 2006.
- xxviii Robson et al. 2007.
- xxix Robson et al. 2007
- xxx Smith 2006.
- xxxi Robson et al. 2007.