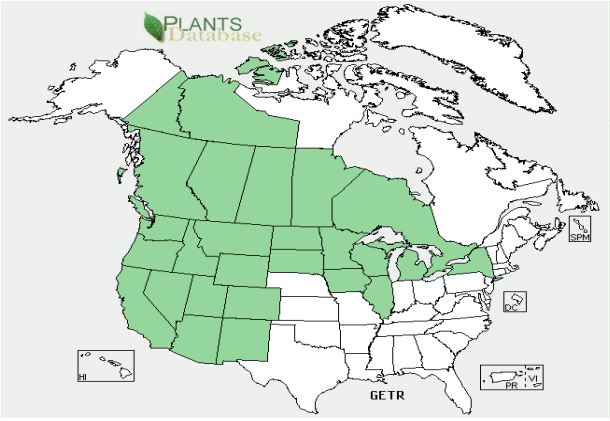
Plant Propagation Protocol for *Geum triflorum*
ESRM 412 – Native Plant Production
http://courses.washington.edu/esrm412/protocols/GETR.pdf

North America Distribution



Washington State Distribution

Source: USDA PLANTS Database

TAXONOMY	
Family Names	
Scientific Name	Rosaceae
Common Name	Rose Family
Scientific Names	
Genus:	*Geum*
Species:	*triflorum*
Species Authority	Pursh
Varieties:	*Geum triflorum* Pursh var. *campanulatum* (Greene) C.L. Hitchc. *Geum triflorum* Pursh var. *canescens* (Greene) Kartesz & Gandhi *Geum triflorum* Pursh var. *campanulatum* (Pursh) Fassett *Geum triflorum* Pursh var. *triflorum*
Sub-species:	
Cultivar:	
Common Synonyms	
Common Name(s)	Old man's whiskers, Prairie smoke, Three-flowered avens, Old man's beard
Species Code (as per USDA Plants database)	GETR

GENERAL INFORMATION	
Geographical range	Found from the Yukon and Northwest Territories, south through British Columbia, Washington, Oregon, the Klamath, Cascade and Sierra Nevada ranges of California, and into northern and central Arizona and northern New Mexico. Its range extends across Canada to Newfoundland.[1] See maps above for distribution in North America and Washington State.
Ecological distribution	*G. triflorum* is found on steep southerly exposed slopes which are free of snow after late April or early May. [2] It can be found within dry to mesic grasslands, meadows, rocky slopes and open forests in the steppe, montane and subalpine zones of British Columbia.[1]
Climate and elevation range	Found at a range of elevations from the subalpine and alpine zones of the western mountains to great lake prairies and old fields in New Jersey Piedmont. In the Pacific Northwest it can be found from lower foothills to subalpine ridges. [1] Prefers well-drained, dry to wet-mesic soils, and full to partial sun. Grows well in zones 3-9. [3]
Local habitat and abundance	There is a wide variety of habitats that *G. triflorum* can be found in. Some examples of site types where it is found are: montane, alpine or high valley grasslands, meadows, balds, tundra, rocky and open moutntain slopes, hillsides, foothills, western grasslands, sagebrush plains, Missouri river bottomlands, great plains, mid-western prairies, grasslands, old fields, woodlands and open forests. [1]
Plant strategy type / successional stage	*G. triflorum* is found to benefit from disturbance. Because of this it is most likely to be found in association with early-successional rather than late successional communities. [1]
Plant characteristics	*G. triflorum* is a perennial forb with erect or ascending stems ranging from 5.9-20 inches tall. It has a thick caudex and produces short thick rhizomes. Will often form clumps 8-16 inches wide. Leaves are pinnately compound with 7-19 leaflets per leaf. The leaves are progressively larger as you move towards the apex. The stalked flowers can be up to 10mm and are perfect flowers. The fruit is a flat achene. Seeds are wind dispersed and ripen individually. [1] Blooms from April-June. [3] In the Olympics it grows 6-8 inches tall with finely dissected foliage. Pink flowers will be followed by a fetching topknot of dusky plumed seeds. [4]
PROPAGATION DETAILS	
Propagation Goal	Plants
Propagation Method	Seed. Easiest and best results when propagated by seed but can also be propagated by crown division in spring or fall. [5]

Product type	Propagules Container (plug) [6]
Stock Type	Wild
Time to Grow	Seeds should be sown in the greenhouse in January[6]
Target Specifications	10 cu. Inches. Tight root plug in container [6] Plants will be fully root tight with 8-15 true leaves after 8 weeks. [7]
Propagule Collection Instructions	Seeds should be collected when they are grey-brown in color and separate easily from flower. Should store in paper bag at room temperature until cleaned. [6] Seeds should be kept in a well-ventilated drying shed. [7]
Propagule Processing/Propagule Characteristics	Style can be difficult to remove. Easiest to remove the style with air column separator. Seed purity is inadequate if cleaning is done by hand. After style is removed seeds should be cleaned using air screens. Seed lots are estimated to be 85-90% pure. After cleaned seed should be stored at 40 degrees F.[6] 696,000 seeds/lb[8]
Pre-Planting Propagule Treatments	Seeds will germinate without pretreatment, but are sensitive to drying during testing. Seeds should be incubated at 60-80 degrees F. [9] Trials conducted found cold moist stratified seeds showed no benefit from the stratification.[6]
Growing Area Preparation / Annual Practices for Perennial Crops	Seeds are small and a coarse grit or small gravel can be applied to the top of the soil to prevent seeds from floating away during watering. Containers should be deeply watered. [6] Growing medium successfully used is 6:1:1 milled sphagnum peat, perlite and vermiculite with Osmocote controlled release fertilizer and Micromax fertilizer at the rate of 1 gram of Osmocote and .2 grams of Micromax per 172 ml Container. [7]
Establishment Phase Details	Medium needs to be kept moist until germination occurs. Begins within 10 days and is complete within 1 month. [6] Root and shoot development occurs rapidly following germination. [7]
Length of Establishment Phase	A month is required for total germination. [9] Length of growth phase is 2-3 months. [6, 7]
Active Growth Phase	Plants should be watered adequately every other day and fertilized once a week with a complete water soluble fertilizer.[6]
Length of Storage	If kept in cold environment (1-3 C), in sealed containers, seed longevity is estimated to be 3 years.[7]

Guidelines for Outplanting / Performance on Typical Sites	Plants should be fertilized every other week until early fall. Irrigation should be gradually reduced in September and October. [6, 7] Does best if grown in full sun conditions. [7]
Other Comments	Seeds are non-dormant at maturity [10]
Protocol Author	Michael Bradshaw
Date Protocol Created or Updated: May 20, 2014	

References:

[1] USDA Forest Service, FEIS Website: http://www.fs.fed.us/database/feis/plants/forb/geutri/all.html

[2] Franklin, Jerry F, and C T. Dyrness. *Natural Vegetation of Oregon and Washington*. Portland, Or: Pacific Northwest Forest and Range Experiment Station, Forest Service, U.S. Dept. of Agriculture [for sale by the Supt. of Docs., U.S. Govt. Print. Off., Washington, 1973. Print. PG 215, 262

[3] Prairie Moon Nursery, "*Geum triflorum* (Prairie Smoke)" WEB: http://www.prairiemoon.com/seeds/wildflowers-forbs/geum-triflorum-prairie-smoke.html

[4] Kruckeberg, Arthur R. *Gardening with Native Plants of the Pacific Northwest: An Illustrated Guide*. Seattle: University of Washington Press, 1982. Print. PG 232

[5] Hartmann, Hudson T, and Dale E. Kester. *Plant Propagation: Principles and Practices*. New Delhi: Prentice-Hall, 1975. Print. PG 852

[6] Skinner, David M. 2007. Propagation protocol for production of container *Geum triflorum* Pursh *ciliatum* (Pursh) Fassett plants (10 cu. in.); Natural Resources Conservation Service - Pullman Plant Materials Center, Pullman, Washington. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 13 May 2014). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

[7] Wick, Dale; Luna, Tara.; Evans, Jeff. 2008. Propagation protocol for production of container *Geum triflorum* (Pursh) Fassett plants (160 ml conetainers); USDI NPS - Glacier National Park, West Glacier, Montana. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 20 May 2014). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

[8] Hassell, Wendell, W. Rocky Beavers, Steve Ouellette, and Thomas Mitchell. *Seeding Rate Statistics for Native and Introduced Species.* USDI National Park Service and USDA Natural Resources Conservation Service. 1996. pp. 730

[9] Young, James A, and Cheryl G. Young. *Collecting, Processing, and Germinating Seeds of Wildland Plants*. Portland, Or: Timber Press, 1986. Print. PG 17

[10] Baskin, Carol C, and Jerry M. Baskin. *Seeds: Ecology, Biogeography, and Evolution of Dormancy and Germination*. San Diego, Calif: Academic Press, 1998. Print. PG 388

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Pojar, Jim, A MacKinnon, and Paul B. Alaback. *Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia & Alaska*. Redmond, Wash: Lone Pine Pub, 1994. pp. 87 Print.