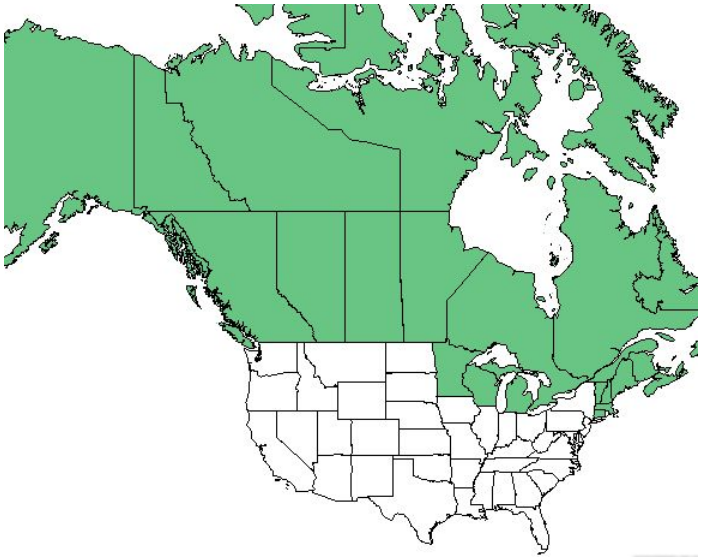
Plant Propagation Protocol for *Vaccineum vitis-idaea*

ESRM 412 – Native Plant Production

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

TAXONOMY	
Plant Family	
Scientific Name	Ericaceae [5]
Common Name	Heath Family
Species Scientific Name	
Scientific Name	*Vaccineum vitis-idaea* L.[5]
Varieties	N/A
Sub-species	*Vaccineum vitis-idaea* L. subsp. *Minus* (Lodd.) Hultén[5]
Cultivar	N/A
Common Synonym(s)	*Vaccineum Vitis-Idaea* L. *Vaccineum vitis-idaea* L. subsp. *Minus* (Lodd.) Hultén[5]
Common Name(s)	Lingonberry [6] Northern Mountain Cranberry [6] Cowberry [6] Alpine Cranberry [7] Shore Cranberry [7] Moss Cranberry [7] Rock Cranberry [8] Bog Cranberry [8]
Species Code (as per USDA Plants database)	VAVI [5]
GENERAL INFORMATION	
Geographical range	Circumboreal species.[1] In North America found from Alaska east through Canada north to arctic coast as

	well as south to New Hampshire and Minnesota.[3, 1] Not present in Washington State.  
Ecological distribution	Northern temperate forests, arctic and alpine communities.[7] Occurs primarily in bogs at the southern portion of its range and in the northern will grow in both wet and dry areas. Also found in high moors, heath barrens, sand dunes, as well as in peatlands, forests and swamps.[7]
Climate and elevation range	Semi shade (light woodland) to full sun.[10] Low to high elevations.[1]
Local habitat and abundance	Found in acid, peaty or rocky soils.[6] Understory dominant in communities of Black spruce/Feathermoss, White spruce, and Jack pine.[7]

	Other common overstory dominant and codominant tree species include tamarack (*Larix laricina*) , aspen and birch (*Betula* spp.) [7]
Plant strategy type / successional stage	Not considered a pioneer species but can appear in plant communities during the early stages.[7] Once established will persist indefinitely unless shaded out.[7] Observations indicate an increase in cover and vigor after fire.[7] Can be slightly invasive in moist acidic humus-rich soils.[2]
Plant characteristics	Low growing, evergreen [6] subshrub that commonly reaches 2”-6” in height.[7] Leaves are sessile, coriaceous and narrowly elliptic to obovate. Leaves are rounded at the apex with leaf margins slightly revolute. Upper portions of leaves are shiny and leathery [2] while the lowers are pale and may be dotted with brown to black glandular hairs [3,2] that are easily visible with a microscope.[8] Flowers are few, white-tinged pink [2] and arranged in short terminal clusters.[8] Flowers have a deep lobed calyx (4-lobed) and cup-shaped corolla.[3] Fruit is a red berry 6-10mm in diameter.[8] Berries are edible and used as a substitute for cranberries. Tart but palatable.[9]
PROPAGATION DETAILS	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Propagules
Stock Type	N/A
Time to Grow	N/A
Target Specifications	Plants able to spread vegetatively and set fruit at end of production phase.
Propagule Collection Instructions	N/A

Propagule Processing/Propagule Characteristics	Seed exhibits best germination rates when fresh.[7]
Pre-Planting Propagule Treatments	Stratification is recommended at 32 to 41 degrees F for at least 5 months.[7, 1]
Growing Area Preparation / Annual Practices for Perennial Crops	Soils that are acidic (ph 5-6), sandy and supplemented with at least 2% organic matter result in better plant establishment and early growth.[7]
Establishment Phase Details	Sow seed in late winter in a greenhouse.[10] Requires light to germinate.[1] Germinates at 18 to 28 degrees C.[1]
Length of Establishment Phase	When seedlings are 5 cm tall, prick them out individually and pot up.
Active Growth Phase	N/A
Length of Active Growth Phase	1 year at least.[10] Locate within shaded area of greenhouse for first winter.[10]
Hardening Phase	N/A
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	N/A
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	Plant in permanent positions in late spring or early summer after the last expected frost.[10]
Other Comments	Flowers June through August with fruit set occurring in August-September.[3] Plants in full sun may produce more seed per fruit.[7]
PROPAGATION DETAILS	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Vegetatively through cuttings.
Product Type	Propagules

Stock Type	N/A
Time to Grow	N/A
Target Specifications	Plants able to spread vegetatively and set fruit.
Propagule Collection Instructions	Take cuttings in July or August when new growth is soft.[4]
Propagule Processing/Propagule Characteristics	N/A
Pre-Planting Propagule Treatments	N/A
Growing Area Preparation / Annual Practices for Perennial Crops	Use a mixture of peat and sand as soil media for cuttings.[4]
Establishment Phase Details	N/A
Length of Establishment Phase	N/A
Active Growth Phase	N/A
Length of Active Growth Phase	Approximately 10 months.[4]
Hardening Phase	N/A
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	N/A
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	Plant in early spring, in a shady position on peat-like soils.[4]
Other Comments	Stem cuttings root easily if planted in the early spring or fall but tend to have slow rhizome development giving way to poor vegetative spread.[7] Plants can also be propagated by root division and layering although information concerning these methods are practically non-existent.[7,10] Nonetheless, it is noted that survival of divided clumps (root division) is highly variable (between 30-90%).[7]
INFORMATION SOURCES	

References	1. Baskin, Jerry M.. 2002. Propagation protocol for production of Container (plug) *Vaccinium vitis-idaea* L. plants University of Kentucky Lexington, Kentucky. In: Native Plant Network. URL: http://NativePlantNetwork.org (accessed 2016/05/23). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. 2. Beckett, Kenneth. *Alpine Garden Society: Encyclopedia Of Alpines Volume Two*. Dorchester, Dorset UK: The Friary Press, 1994. Print. 3. Cody, William J. *Flora of the Yukon Territory*. 2nd ed. Ottawa: NRC Research, 2000. Print 4. Hills, Lawrence Donegan. *The Propagation of Alpines.* New York: Pellegrini & Cudahy, 1950. Print. 5. "Plants Profile For Vaccinium Vitis-Idaea (Lingonberry)". *Plants.usda.gov*. N.p., 2016. Web. 24 May 2016. <http://plants.usda.gov/core/profile?symbol=vavi> 6. “NPIN: Native Plant Database.” *Vaccineum vitis-idaea.* Lady Bird Johnson Wildflower Center, n.d. Web. 23 Apr. 2016. <http://www.wildflower.org/plants/result.php?id_plant=VAVI> 7. Rook, Earl. "Mountain Cranberry". *Rook.org*. N.p., 2016. Web. 22 May 2016. 8. Szczawinski, Adam F, and British Columbia Provincial Museum. *The Heather Family, Ericaceae, of British Columbia*. Victoria: Dept. of Recreation & Conservation, British Columbia Provincial Museum, 1962. Print.

	9. Taylor, Ronald J., and Douglas, George W. *Mountain Plants of the Pacific Northwest : A Field Guide to Washington, Western British Columbia, and Southeastern Alaska*. Missoula, Mont.: Mountain, 1995. Print. 10. "Vaccinium Vitis-Idaea Cowberry, Lingonberry, Northern Mountain Cranberry, Cranberry PFAF Plant Database". *Pfaf.org*. N.p., 2016. Web. 22 May 2016. <http://www.pfaf.org/user/plant.aspx?latinname=Vaccinium+vitis-idaea>
Other Sources Consulted	1. American Rock Garden Society. *Alpines of the Americas : The Report of the First Interim International Rock Garden Plant Conference.* Place of Publication Not Identified]: American Rock Garden Soc., Et. Al, 1980. Print. 2. Evans, Alfred. *The Peat Garden and Its Plants*. London: Dent, 1974. Print 3. Wiggins, Ira L., and Thomas, John Hunter. *A Flora of the Alaskan Arctic Slope*. Toronto: U of Toronto, 1962. Print. Special Publication of the Arctic Institute of North America ; No. 4.
Protocol Author	Shannon Ingebright
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Plant Data Sheet

Species (common name, Latin name)

Mountain cranberry, *Vaccinium vitis-idaea*

Range

Circumpolar, circumboreal species-worldwide. From northwestern Greenland to the Canadian Arctic southward to New England and westward to the Great Lakes and British Columbia. In North America, mountain cranberry is restricted to areas north of the glacial boundary (Tirmenstein, 1991)

Climate, elevation

Variety of climatic regimes, areas characterized by short cool summers and long cold winters. Sea-level to 7,900 ft. (Tirmenstein, 1991)

Local occurrence (where, how common)

Northern temperate forests and alpine communities. In mature forests, plants often grow on top of decaying tree stumps (Rook, 2002)

Habitat preferences

Grows on shallow, poorly developed mineral soil as well as on drained peat. Soils often of low fertility with little calcium but may be high in decaying organics (Rook, 2002)

Plant strategy type/successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)

In many forest communities, requires fire for its maintenance. Not generally considered a pioneer species but does occur in early stages in some communities. Persists indefinitely unless shaded out by conifers (Rook, 2002)

Associated species

Betula papyrifera, Picea spp., *Ledum groenlandicum, Salix* spp., *Carex* spp., *Chamerion angustifolia, Rosa acicularis* (Rook, 2002)

May be collected as: (seed, layered, divisions, etc.)

Reproduces by seed and vegetatively by rhizomes (Rook, 2002)

Collection restrictions or guidelines

Flowers June – July; fruits August – September. Few flowers until plants 5-10 years old. Fruit production varies with site conditions. Plants in full sun produce more fruit/seed. Flowering may last 9 to 27 days. Fruit ripens approximately 78 to 84 days after full bloom (Tirmenstein, 1991) (Rook, 2002) (Diamond and Hsu, 1998)

Seed germination (needs dormancy breaking?)

Cold stratification (32-41°F) for up to 5 months (Rook, 2002)

Recommended seed storage conditions

Fresh seed generally exhibits best germination (Rook, 2002)

Propagation recommendations (plant seeds, vegetative parts, cuttings, etc.)

Generally responds more favorably to fertilizer and irrigation . Mulches such as milled peat can increase fruit production in some instances. Stem cuttings root easily if planted in the spring or early fall but exhibit slow rhizome development and poor subsequent vegetative spread. Clumps can be divided and transplanted onto disturbed sites. (Rook, 2002)

Soil or medium requirements (inoculum necessary?)

Sandy, acidic soil for seeds (pH 5-6) with about 2% organic for establishment and early growth. Rhizomes grow well in peat but can also penetrate to mineral soil (Rook, 2002)

Installation form (form, potential for successful outcomes, cost)

Recommended planting density

Rhizomes may sprout singly or in groups of 1 or 2 per square meter (Rook, 2002)

Care requirements after installed (water weekly, water once etc.)

Survival of these transplants is variable, ranging from 30%-90% (Rook, 2002)

Normal rate of growth or spread; lifespan

Sources cited

2) Perala, D.A. Silvics of North America. http://www.na.fs.fed.us/spfo/pubs/silvics_manual/Volume_2/populus/tremuloides.htm. USDA, Forest Service, Agriculture Handbook 654.December 1990.

3) Rook, Earl. Plants of the North. http://www.rook.org/earl/bwca/nature/flora.html. September 27, 2002.

4) Rose, Robin, Caryn Chachulski, and Diane Haase. Propagation of Pacific Norhtwest Native Plants. Oregon State University Press, Corvallis, OR. 1998.

Tirmenstein, D. 1991. Vaccinium vitis-idaea. In: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2003, April). Fire Effects Information System, [Online]. Available: http://www.fs.fed.us/database/feis/. April 17, 2003.

Diamond, Allaire and Jiasuey Hsu. Web of Species. 1998. http://www.wellesley.edu/Activities/homepage/web/Species/pcranberrym.html. April 17, 2003.

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