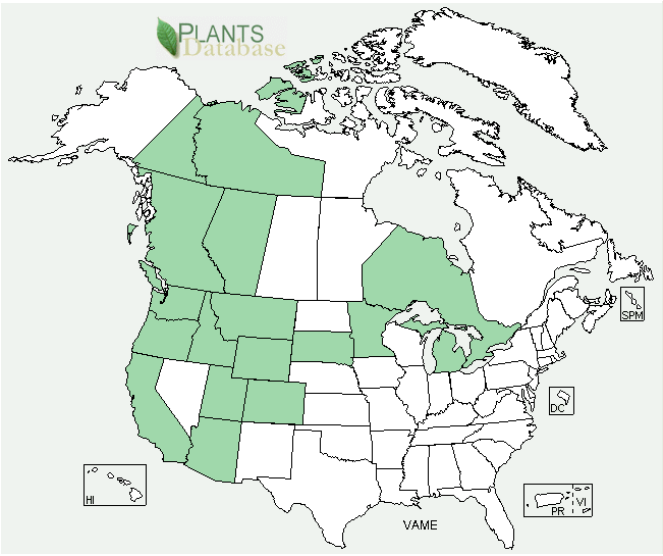
Plant Propagation Protocol for *Vaccinium membranaceum*
ESRM 412 – Native Plant Production
Spring 2012

Images:

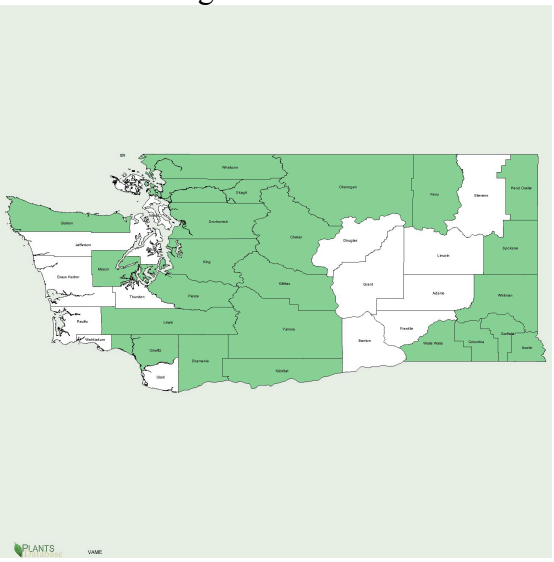
(USDA)

(R.A. Howard @ USDA-NRCS PLANTS Database)

North American Distribution



Washington Distribution



(USDA)

TAXONOMY	
Family Names	
Family Scientific Name:	Ericaceae
Family Common Name:	Heath Family
Scientific Names	
Genus:	*Vaccinium*

Species:	*membranaceum*
Species Authority:	Douglas ex Torr. (USDA)
Variety:	
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	
Common Synonym(s) (include full scientific names (e.g., *Elymus glaucus* Buckley), including variety or subspecies information)	VACO6 *Vaccinium coccineum* Piper (USDA) VAGL *Vaccinium globulare* Rydb. (USDA) VAMER *Vaccinium membranaceum* Douglas ex Torr. var. *rigidum* (Hook.) Fernald (USDA)
Common Name(s):	Black huckleberry, Thinleaf huckleberry (USDA), Big huckleberry, Blue huckleberry (Simonin)
Species Code (as per USDA Plants database):	VAME
GENERAL INFORMATION	
Geographical range (distribution maps for North America and Washington state)	From British Columbia to Alberta and Ontario, north to the Mackenzie Delta area, south to California in the Klamath Range and North Coast Range, and east to Michigan (USDA).
Ecological distribution (ecosystems it occurs in, etc):	Montane and coniferous woods (USDA).
Climate and elevation range	Greatest potential on cool mesic sites with minimal overstory. Prefers northern aspects, moderate to steep slopes (Simonin). It grows in sandy or gravelly soils, ranging from moist to dry growing conditions (10 – 50 inches/year), elevations from 1000-1800 m (USDA).
Local habitat and abundance; may include commonly associated species	Thickets and slopes (USDA). It is common in the Cascades and Olympics usually as an understory of Silver fir and Mountain Hemlock, also a dominant understory species in the eastern Olympics' subalpine fir zone, also associated with Beargrass. Successful in open alpine meadows (Hitchcock, Pojar). Associates with many others species across its broad range (Simonin).
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	Early to late seral stages. Greatest productivity is at 50 years post disturbance (fire, blow down and land slide) (USDA, Simonin).
Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc)	A rhizomatous, frost-tolerant, erect, deciduous, shrub with stems ranging from 12 to 47 inches (30-120 cm) in height. Leaves are alternate, elliptic to oblong, with a long pointed tip and a finely serrated margin, ranging from 0.7 to 2.75 inches (1.8-7 cm) long. Roots may penetrate to 39.4 inches (100 cm) of soil. Rhizomes are usually found within the 3.15

	to 11.8 inch (8-30 cm) range of a soil profile. Largent and others observed a minor occurrence of mycorrhizal symbiosis. Erect, deciduous shrub 0.1-2 m tall. The bell-shaped flowers are creamy-pink, and are found singly on the underside of the twigs. The berries are dark purple or black and edible (USDA and Simonin).
PROPAGATION DETAILS For seed	
Ecotype (this is meant primarily for experimentally derived protocols, and is a description of where the seed that was tested came from):	USFS, Umpqua National Forest, Diamond Lake Ranger District, Calapooya, Oregon; 5000 ft. elevation (Barner)
Propagation Goal (Options: Plants, Cuttings, Seeds, Bulbs, Somatic Embryos, and/or Other Propagules):	Seeds (Barner)
Propagation Method (Options: Seed or Vegetative):	Seed (Barner)
Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	Propagules (seeds, cuttings, poles, etc.) (Barner)
Stock Type:	
Time to Grow (from seeding until plants are ready to be outplanted):	5 months (Barney).
Target Specifications (size or characteristics of target plants to be produced):	6 inches tall (Barney).
Propagule Collection (how, when, etc):	*Seeds*: Collect the berries in the fall (USDA).
Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed longevity, etc):	*Seeds*: METHOD OF CLEANING: Seeds are extracted from fruit by maceration, and are rinsed and screened to remove pulp; seeds are dried on mesh trays. Lot was then air-screened using a office Clipper, with a top screen, 1/18 round and a blank bottom screen, low speed, low air. Number of Seeds per Pound: 1,512,000, Purity: 93%, X-Ray 100 Seeds: 79% Filled. Kept in cold storage, 33-38 F (Barner) Number of seeds per berry: 47 (Simonin). Dry seed can be stored inside plastic bags in a refrigerator at about 34 F for at least 9 years and remain viable. Do not freeze (Stark).

Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	*Seeds*: Run the seeds through a blender with dull blades, straining the pulp with a sieve, and spreading them to dry on a paper towel. Most authors believe that the seeds require no stratification or scarification (Haeussler et al. 1990; Link 1993; Minore and Smart 1978). However, Albright (1996) found poor germination without stratification and recommends over-wintering of seeds in flats outside (USDA).
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	*Seed:* Use larger containers to avoid root binding (Stark).
Establishment Phase (from seeding to germination):	*Seeds:* Germination percentages can be improved by sowing the seed on moist peat in a growth chamber at 18° C (for 12 hours a day) and 13° C (for 12 hours a day). Seven weeks after germination warm the growth chamber to 20 ° C (for 14 hours a day) and 14° C (for 10 hours a day). Fertilize the seedlings after they are 10 weeks old and transplant into a peat-sand soil mixture (1:1) in individual pots after 12 weeks (Minore and Smart 1978) (USDA). Mean germination 42% (Simonin) Sow seeds indoors in January
Length of Establishment Phase:	*Seeds:* 16-21 days from sowing (USDA).
Active Growth Phase (from germination until plants are no longer actively growing):	Fertilize young seedlings every 1 to 2 weeks with a watersoluble fertilizer. The following schedule has proven effective in University of Idaho research: During early spring, use a fertilizer with an analysis of about 9-45-15. This formulation, consisting of 9 percent nitrogen, 45 percent P_2O_5 (phosphorus), and 15 percent K_2O (potassium), encourages early root development. From mid June through July, apply a 20-10-20 fertilizer to stimulate shoot growth. During August apply a 5-11-26 or similar fertilizer to help acclimate the plants for winter. If these particular fertilizer formulations are not available, garden centers sell water-soluble fertilizers suited for containerized plants. Encapsulated, slow-release fertilizers are also available (Barney).
Length of Active Growth Phase:	
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):	In mid August, move greenhouse and indoor-grown plants to outdoor benches under 50 percent shade cloth or slats. Stop fertilizing the seedlings and stop using artificial lights, if you have been using them outdoors. Slowing their growth and exposing the huckleberries to short days and cool nights will help them acclimate for winter. You will notice the leaves turn bright red. This is a normal part of

	acclimation. Continue to water as often as necessary to keep the soil moist but not waterlogged (Barney).
Length of Hardening Phase:	
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):	Plant anytime from early Spring (post frost) to Late Fall. Preferably not Summer without irrigation. Plant 3 feet apart (Barney). Prefers pH of 5.5, loamy silt/clay. Mesic soil preferred. Plant in soils that are fairly acidic or add the peat:sand mixture to the soil before planting. Plants establish well in partial shade (USDA). Flowering 2 to 5 years after sowing (Barney).
Other Comments (including collection restrictions or guidelines, if available):	High fire tolerance. Planting density per acre, 1700 – 2700 stems. (USDA).
PROPAGATION DETAILS For vegetative	
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):	
Propagation Method (Options: Seed or Vegetative):	Vegetative (USDA)
Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	Propagules (seeds, cuttings, poles, etc.) (Barner) Bareroot, container (USDA).
Stock Type:	
Time to Grow (from seeding until plants are ready to be outplanted):	
Target Specifications (size or characteristics of target plants to be produced):	
Propagule Collection (how, when, etc):	Take cuttings from rhizomes in early Spring or Late Summer and Autumn. Dig up the rhizomes and cut into lenths of 10

	cm or longer (USDA).
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):	*Vegetative:* Rhizomes can be placed in shallow nursery flats in a misting bed covered with clear plastic film. After 2 inch roots and shoots transplant into 1-gallon nursery pots with peat moss-based potting soil (Barney).
Establishment Phase (from seeding to germination):	*Vegetative:* Place the cutting in vermiculite at 21 °C. Once the roots are established and meristematic activity is initiated, the small cuttings may be moved to individual pots with peat:sand soil (USDA).
Length of Establishment Phase:	
Active Growth Phase (from germination until plants are no longer actively growing):	
Length of Active Growth Phase:	
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):	In mid August, move greenhouse and indoor-grown plants to outdoor benches under 50 percent shade cloth or slats. Stop fertilizing the seedlings and stop using artificial lights, if you have been using them outdoors. Slowing their growth and exposing the huckleberries to short days and cool nights will help them acclimate for winter. You will notice the leaves turn bright red. This is a normal part of acclimation. Continue to water as often as necessary to keep the soil moist but not waterlogged (Barney).
Length of Hardening Phase:	
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):	Plant anytime from early Spring (post frost) to Late Fall. Preferably not Summer without irrigation. Plant 3 feet apart (Barney). Prefers pH of 5.5, loamy silt/clay. Mesic soil preferred. Plant in soils that are fairly acidic or add the peat:sand mixture to the soil before planting. Plants establish well in partial shade (USDA). Flowering 2 to 5 years after sowing (Barney).
Other Comments (including collection restrictions or	High fire tolerance. Planting density per acre, 1700 – 2700 stems. (USDA).

guidelines, if available):	
INFORMATION SOURCES	
References (full citations):	Albright M. 1996. *Greenhouse Manager*. USDI, National Park Service, Olympic National Park, Port Angeles, Washington. Personal communication with USDA Plant Guide preparer Michelle Stevens. Barner J. 2009. Propagation protocol for production of *Vaccinium membranaceum* Dougl. ex Torr. seeds; USDA FS - R6 Bend Seed Extractory, Bend, Oregon. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 18 April 2012). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery. Barney DL. 1999. Growing Western Huckleberries. University of Idaho Cooperative Extension System http://www.cals.uidaho.edu/edcomm/pdf/BUL/BUL0821.pdf Haeussler S, Coates D, Mather J. 1990. *Autecology of common plants in British Columbia: A literature review*. British Columbia Ministry of Forests. 272 pp. Hitchcock CL, Cronquist A. 1987. Flora of the Pacific Northwest: An Illustrated Manual. University of Washington Press. Largent DL, Sugihara N, Wishner C. 1980. Occurrence of mycorrhizae on ericaceous and pyrolaceous plants in northern California. Canadian Journal of Botany. 58: 2274-2279. Link E. (ed.) 1993. *Native plant propagation techniques for national parks: Interim guide*. USDA, NRCS, Rose Lake Plant Material Center, East Lansing, Michigan. 240 pp. Minore D, Smart AW. 1978. *Frost tolerance in seedlings of Vaccinium membranaceum, Vaccinium globulare, and Vaccinium deliciosum*. Northwest Science 52(3):179-185. Pojar J, McKinnon A. 1994. Plants of the Pacific Northwest: Washington, Oregon, British Columbia and Alaska, B.C. Ministry of Forests and Lone Publishing, Canada. Simonin, Kevin A. 2000. Vaccinium membranaceum. In:

	Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2012, April 18]. Stark, N.; Baker, Stephen. 1992. The ecology and culture of Montana huckleberries: A guide for growers and researchers. Miscellaneous Publication 52. Missoula, MT: The University of Montana, School of Forestry, Montana Forest and Conservation Experiment Station. 87 p. USDA, NRCS. 2012. The PLANTS Database (http://plants.usda.gov, 18 April 2012). National Plant Data Team, Greensboro, NC 27401-4901 USA. http://plants.usda.gov/java/reference?symbol=VAME
Other Sources Consulted (but that contained no pertinent information) (full citations):	Barney DL, Lopez O, King E. 2007 Micropropagation of Cascade Huckleberry, Mountain Huckleberry, and Oval-leaf Bilberry Using Woody Plant Medium and Murashige and Skoog Medium Formulations. HortTechnology July-September 2007 vol. 17 no. 3 279-284
Protocol Author (First and last name):	Matt Maria
Date Protocol Created or Updated (MM/DD/YY):	06/08/12

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

Plant Data Sheet

Species

Black Huckleberry, Big Huckleberry – *Vaccinium membranaceum*

Picture : http://www.cnr.vt.edu/dendro/dendrology/syllabus/vmem.htm

Range

Alaska, British Columbia, South to California, Also found east to Ontario, Wyoming, South Dakota and Minnisota.

Climate, elevation

3000 ft and higher, drier sites

Local occurrence (where, how common)

Common in the Cascades and Olympics usually as an understory of Silver fir and Mountain Hemlock, also a dominant understory species in the eastern Olympics' subalpine fir zone.

Habitat preferences

Open alpine meadows.

Plant strategy type/successional stage

Early to late seral species.

Associated species

Silver Fir, Mountain Hemlock, Subalpine Fir, Beargrass

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

Seed, Cuttings.

Collection restrictions or guidelines

Collect berries in August.

Seed germination (needs dormancy breaking?)

Mean seed germination 42%.

Seed life (can be stored, short shelf-life, long shelf-life)

Seed Storage up to 12 years

Recommended seed storage conditions

Remove seeds from berries (crush and float technique), dry seed, store cool.

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

Vegetative cuttings taken in late June. (Native Plant Network)

Soil or medium requirements

Prefers pH of 5.5, loamy silt/clay. Mesic soil preferred.

Installation form

Transplant seedlings to container.

Recommended planting density

Mature plants should be spaced at least 3 ft apart.

Care requirements after installed.

Water weekly, keep in full sun.

Normal rate of growth or spread; lifespan

Mature in 2 years.

Sources cited

Native Plant Network :
http://www.nativeplantnetwork.org/network/view.asp?protocol_id=106

FEIS database:
http://www.fs.fed.us/database/feis/plants/shrub/vacmem/

Hitchcock, C. Leo; Cronquist, Arthur. Flora of the Pacific Northwest: An Illustrated Manual. University of Washington Press. 1987.

MacKinnon, Andy; Pojar, Jim. Plants of the Pacific Northwest Coast:Washington, Oregon, British Columbia and Alaska. Lone Pine Publishing. 1994.

Data compiled by (student name and date)
Christer Lundstrom – June 10, 2003