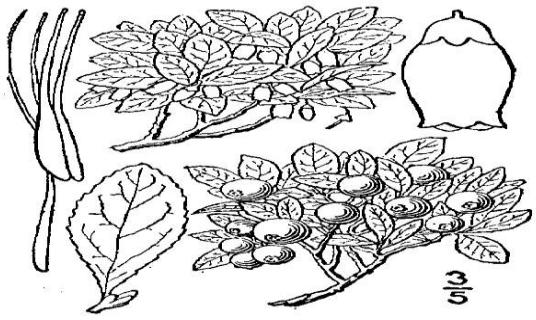
**Plant Propagation Protocol for *Vaccinium cespitosum***

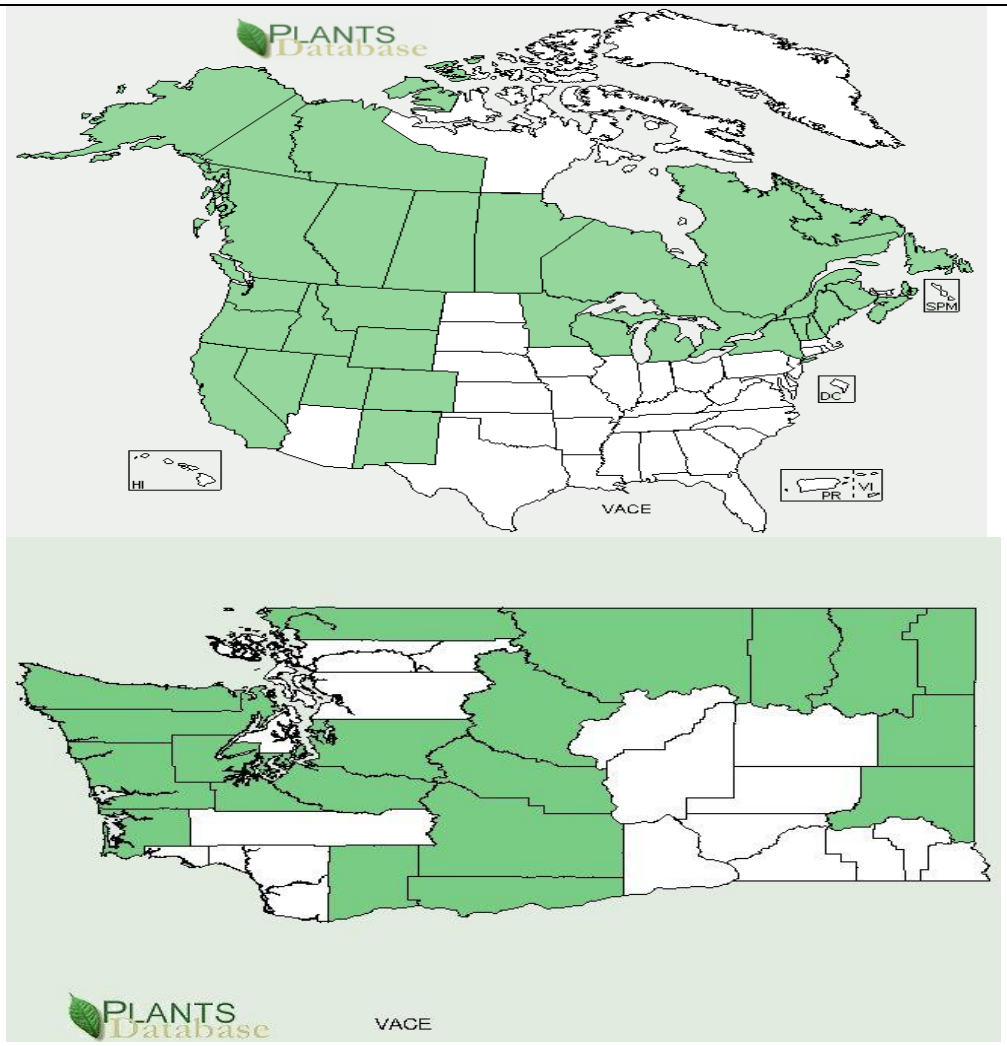
ESRM 412 – Native Plant Production

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



(USDA NRCS, 2014)

| **TAXONOMY** | |
|---|---|
| Plant Family | |
| Scientific Name | Ericaceae |
| Common Name | Heath |
| Species Scientific Name | |
| Scientific Name | *Vaccinium cespitosum* Michaux |
| Varieties | N/A |
| Sub-species | N/A |
| Cultivar | N/A |
| Common Synonym(s) | *Vaccinium caespitosum. var. paludicola, Vaccinium nivictum, Vaccinium cespitosum var. arbuscula, Vaccinium caespitosum, Vaccinium caespitosum var. caespitosum Vaccinium cespitosum var. cespitosum, Vaccinium caespitosum var. arbuscula, Vaccinium cespitosum var. paludicola, Vaccinium arbuscula* (USDA NRCS, 2014). *Vaccinium caespitosum var. angustifolium, Vaccinium caespitosum var. cuneifolium, Vaccinium caespitosum var. pauludicolum* (Tirmenstein, 1990). |
| Common Name(s) | Dwarf bilberry, dwarf huckleberry, dwarf bilberry, dwarf huckleberry, dwarf blueberry, swamp blueberry, Sierra bilberry, whortleberry, dwarf grouseberry (USDA NRCS, 2014) (Tirmenstein, 1990). |
| Species Code (as per USDA Plants database) | VACE (USDA NRCS, 2014). |
| **GENERAL INFORMATION** | |

| | |
|---|---|
| Geographical range |  <br>Distribution of *V. Cespitosum*, North America and Washington State (USDA NRCS, 2014). |
| Ecological distribution | *V. cespitosum* occurs in flat areas that receives yearly frost and have well drained sandy soils, at the edge of subalpine meadows, on riverbanks, in low elevation bogs, and in alpine tundra. It is an understory species that occurs in many different forest types across North America and can dominate the forest floor (Tirmenstein, 1990) (Pojar, MacKinnon and Alaback, 1994). |
| Climate and elevation range | *V. Cespitosum* likes cool areas from 1,2000 to 3,600 m (Tirmenstein, 1990) (Pojar et al, 1994). |
| Local habitat and abundance | *V. Cespitosum* in the western portion of North America occurs in Spruce (*Picea spp*)-Fir (*Abies spp*) forest at high elevations. It is also commonly found in Douglas-fir (*Pseudosunga menziesii*), quaking aspen (*Populus tremuloides*) and lodgepole pine (*Pinus contorta*) dominated stands. In the eastern portion of the continent it occurs in black spruce (*Picea mariana*), balsam fir (*A. balsamea*)-white spruce (*P. glauca*), paper birch (*Betula papyrifera*)-balsam fir, oak-maple (*Quercus-Acer spp.*), and eastern hemlock |

| | |
|---|---|
| | (*Tsuga canadensis*) forests. *V. Cespitosum* also occurs in heath communities in the alpine and subalpine (Tirmenstein, 1990).<br><br>This species is commonly associated with Labrador tea (*Ledum groenlandicum*), Queen cup beadlily (*Clintonia uniflora*), other huckleberries/ blueberries (Vaccinium spp.) elk sedge (*Carex geyeri*), kinnickinnick (*Arctostaphylos uva-ursi*), maples (*Acer spp*) and viburnum (*Viburnum spp*.) (Tirmenstein, 1990). |
| Plant strategy type / successional stage | *V. Cespitosum* is a seral shrub in much of western North America. It also occurs in Douglas-fir or spruce-fir climax forests. It has the ability to rejuvenate swiftly after moderate disturbance in these areas due to its network of rhizomes (Tirmenstein, 1990). |
| Plant characteristics | *Vaccinium cespitosum* is a dwarf deciduous shrub with angular branching that forms a mat. It can grow up to 50 cm tall. Its twigs are yellow-green, pubescent and rounded. The leaves of this shrub are alternate, variable in shape but often lanceolate with fine serration and bright green on both sides, but sometimes lighter on the underleaf where veins can be observed. (Trehane, 2004)<br><br>Flowers are small, bell or urn shaped, single in the axils of the leaves with 5 lobes. The flowers can be white, red or pink. The fruit are blue with a grey glaucous bloom (Pojar, MacKinnon and Alaback, 1994) (Tirmenstein, 1990). |
| **PROPAGATION DETAILS: Vegetative Propagation** | |
| Ecotype | Camas in Glacier National Park |
| Propagation Goal | Plants, Cuttings |
| Propagation Method | Vegetative |
| Product Type | Container Plug and Container Propagules |
| Stock Type | Wild Plant Cutting/Container Cutting |
| Time to Grow | 2 years (Evans, Wick and Luna, 2008). |
| Target Specifications | *V. cespitosum* propagules should be 6cm in height, with a crown/main stem diameter of 5cm and a firm root system before outplanting. |
| Propagule Collection Instructions | *Vaccinium cespitosum* collection type 1: pre-rooting cuttings should be taken from softwood stems in late June (Evans et al, 2008).<br><br>Type 2: Remove runners with uprights and roots. (Trehane, 2004). |
| Propagule Processing/Propagule Characteristics | *V. cespitosum* cutting should be kept moist and refrigerated. Cutting size should be 4 cm in length and 5 mm in diameter (Evans et al 2008). *Timeframe of survival of cutting in refrigeration not specified.* |
| Pre-Planting Propagule Treatments | *V. Cespitosum* cuttings should be recut before placed in media. The terminal buds should be removed. After bud removal, treat distal cut surface with a 2,000 ppm IBA liquid hormone solution. Make sure to place cutting proximal end up (Evans et al 2008). |
| Growing Area | *V. Cespitosum* cuttings should be placed in flats with 12cm of medium, |

| | |
|---|---|
| Preparation / Annual Practices for Perennial Crops | consisting of 1:1 perlite and peat. (Evans et al, 2008). *Depth of cutting placement not specified.* |
| Establishment Phase Details | The *V. Cespitosum* flats should be A mist bed with bottom heat. The mist intervals should be set at 6 second intervals every 6 minutes or less. The temperature of the medium should be kept around 21 °C. Shade cloth covering of the mist bed should be used while rooting is occurring (Evans, 2008). |
| Length of Establishment Phase | 15 Weeks (Evans et al, 2008). |
| Active Growth Phase | Rooted *V. cespitosum* propagules should be placed in 800ml (.25 gallon) plastic containers. Medium should consist of 6:1:1 peat, perlite and vermiculite, mixed at a 7/3 ratio with silica sand. Control release Osmocote (13N: 13P2O5:13K2O) should be used in conjunction with Micromax fertilizer for health growth of propogules. Each container should have 2g Osmocote to .5 g micromax. (Evans et al, 2008). |
| Length of Active Growth Phase | 4 Weeks first year, 16 weeks second year (Evans et al, 2008). |
| Hardening Phase | *Vaccinium cespitosum* should be given one good watering before overwintering them outdoors with a insulated foam cover. Evans et all suggest that this will then be covered in snow (Evans et al, 2008). |
| Length of Hardening Phase | 4 weeks (Evans et al, 2008). |
| Harvesting, Storage and Shipping | *Vaccinium cespitosum* harvesting should be done in September. Recommended storage is the same as preparation for hardening phase (Evans et al, 2008). |
| Length of Storage | 5 months. |
| Guidelines for Outplanting / Performance on Typical Sites | Out planting sites should have well drained acidic soils. *Vaccinium cespitosum* can grow in areas that are low in nutrients but soils need to have a pH of 7 or less (Tirmenstein, 1990). High amounts of organic matter in soils where out planting will occur is also desirable (Griffin and Blazich, 2008). |
| Other Comments | Inoculation of various mediums may increase rooting and plant vigor. For wild harvest please refer to the rules and regulation of the National Forest Service. |
| **PROPAGATION DETAILS: Seed** | |
| Ecotype | |
| Propagation Goal | Plants, Cuttings |
| Propagation | Direct Seeding |

| Method | |
|---|---|
| Product Type | Container Plug and Container Propagules |
| Stock Type | Wild Plants/Stock |
| Time to Grow | 3 months (Tirmenstein, 1990). |
| Target Specifications | *No Specification were made. Hearty rootstock and solid shoot performance since germination certainly preferable.* |
| Propagule Collection Instructions | *Vaccinium cespitosum* fruit should be collected in August – or when fruit are full mature. The seeds themselves are small and brown to tan at maturity. Seed is cleaned by a macerator and screened and air dried (Tirmenstein, 1990) (Evans et al, 2008). |
| Propagule Processing/Propagule Characteristics | *V. Cespitosum* seeds have a density of 5,300,000 per pound (Tirmenstein, 1990). Seeds can be stored for 12 years (Evans et al, 2008). Viable Seeds will sink when placed in water (Griffin and Blazich, 2008). |
| Pre-Planting Propagule Treatments | *V. Cespitosum* seeds are nondormant, though it should be noted that they are not harmed by acid scarification and that germination is more uniform if seeds have been stratified (Tirmenstein, 1990). Stratification should be at least 3 months long at around 7 °C. Soaking seeds in water for 3 to 5 days may also increase emergence speed (Griffin and Blazich, 2008). Storage of seeds should occur at at 3 °C in sealed containers (Evans et al, 2008). |
| Growing Area Preparation / Annual Practices for Perennial Crops | *V. cespitosum* seeds should be placed on/in finely milled peat. (Evans et al, 2008). Seeded area should be misted to prevent over drying of medium and seeds (Griffin and Blazich, 2008). |
| Establishment Phase Details | Seeds should be placed on top of medium as germination is light dependent seeding area should be kept in a temperature range of 17 to 21 °C (Evans et al, 2008). |
| Length of Establishment Phase | About 1 month; more variable without stratification (Tirmenstein, 1990). |
| Active Growth Phase | Seedlings of *V. cespitosum* propagules should be placed in small plastic containers (.25 gallon). Medium should consist of 6:1:1 peat, perlite and vermiculite, mixed at a 7/3 ratio with silica sand. Control release Osmocote (13N: 13P2O5:13K2O) should be used in conjunction with Micromax fertilizer for health growth of propagules. Each container should have 2g Osmocote to .5 g micromax. (Evans et al, 2008). |
| Length of Active Growth Phase | 6 to 7 weeks (Tirmenstein, 1990). |
| Hardening Phase | Though seedlings plants can be out planted in the same season, *Vaccinium cespitosum* can be hardened and kept over winter (Tirmenstein, 1990). Plants should be given one good watering before overwintering them outdoors with a insulated foam cover. Evans et all suggests that this will then be covered in snow (Evans et al, 2008). |

| | |
|---|---|
| Length of Hardening Phase | 4 weeks (Evans et al, 2008). |
| Harvesting, Storage and Shipping | *Information not available for unhardened seedlings, see vegetative propagation section for propagules which have been hardened.* |
| Length of Storage | *Not Available* |
| Guidelines for Outplanting / Performance on Typical Sites | Out planting sites should have well drained acidic soils. *Vaccinium cespitosum* can grow in areas that are low in nutrients but soils need to have a pH of 7 or less (Tirmenstein, 1990). High amounts of organic matter in soils where out planting will occur is also desirable (Griffin and Blazich, 2008). |
| Other Comments | For wild harvest, please refer to the rules and regulation of the National Forest Service. |
| **INFORMATION SOURCES** | |
| References | Evans, J; Wick, D.; Luna, T. 2008. *Propagation protocol for vegetative production of container Vaccinium caespitosum Michx. plants (800 ml containers);* USDI NPS - Glacier National Park, West Glacier, Montana. In: Native Plant Network. Accessed 5/15/2014- http://www.nativeplantnetwork.org Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.<br><br>Griffin, J and Blazich, F. *Vaccinium L. Blueberry*. In: Bonner, F. T., and Robert P. Karrfalt. 2008. *The woody plant seed manual*. [Washington, D.C.]: U.S. Dept. of Agriculture, Forest Service. (Pgs 1154-1157)<br><br>Hartmann, Hudson T., and Dale E. Kester. 1997. *Plant propagation: principles and practices*. New Delhi: Prentice-Hall.<br><br>Pojar, Jim, A. MacKinnon, and Paul B. Alaback. 1994. *Plants of the Pacific Northwest coast: Washington, Oregon, British Columbia & Alaska*. Redmond, Wash: Lone Pine Pub. (P 58).<br><br>Tirmenstein, D. 1990. Vaccinium caespitosum. In: Fire Effects Information System, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Accessed 5/14/14- http://www.fs.fed.us/database/feis/<br><br>Trehane, Jennifer. 2004. *Blueberries, cranberries, and other vacciniums*. Portland: Timber Press.<br><br>United States Department of Agriculture Natural Resource Conservation Service Website (USDA NRCS). Vaccinium myrtilloides (VAMY) - Velvetleaf huckleberry. Accessed 5/15/2014. |

| | |
|---|---|
| | http://plants.usda.gov/core/profile?symbol=VACE |
| Other Sources Consulted | Coville, F. V. 1910. *Experiments in blueberry culture*. Washington: G.P.O.<br><br>Gough, R. E., and Korcak, R. 1995. *Blueberries: a century of research*. Binghamton, NY, USA: Food Products Press.<br><br>Rose, R, Caryn E. C. Chachulski, and Haase, D. 1998. *Propagation of Pacific Northwest native plants*. Corvallis: Oregon State University Press. http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=26023.<br><br>EFloras.org. Floras of North America. Family : *Ericaceae* FNA Vol. 8. Accessed 5/15/14 -. http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=10316 |
| Protocol Author | Steven M Norton; with reference to Patrick Keegan |
| Date Protocol Created/Updated | Original: 5/1/06.<br>Updated: 5/15/14 |