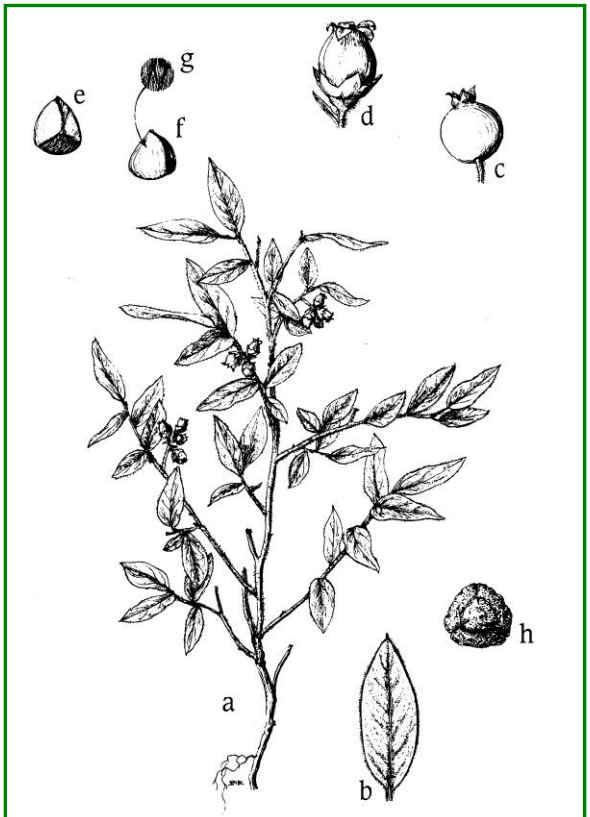
Scientific Name: *Vaccinium myrtilloides* Michx. **Family:** *Ericaceae*

Common Names: blueberry, velvet-leaf blueberry, Canada blueberry, velvet-leaf huckleberry



***Vaccinium myrtilloides* - a. branch with inflorescence and leaves, b. leaf, c. fruit, d. flower, e-f. seed, g. seed surface, h. pollen.**

Plant Description

Low evergreen shrub, perennial, 10 to 50 cm high; pubescent twigs; leaves entire alternate thin velvet elliptic, 1 to 4 cm long; small and short clusters at branch tips of greenish white to pink flowers, cylindrical bells 3 to 5 mm long.

Radical develops into taproot finely divided at extremities devoid of root hairs (Vander Kloet and Hall 1981), long tapering structure typical of a root (as deep as 1 m) and rhizomes have a stem-like structure (Hall 1957). Rhizomes 3 to 11 cm deep (Flinn and Wein 1977, Smith 1962). Branching, deeper roots were found by Smith (1962) but no taproots.

Fruit: Blue with whitish bloom, 4 to 8 mm wide, spherical, edible berry, and approximately 37 seeds per berry.

Seed: 1 mm ovoid to obconical, umber brown, rugose seeds.

Habitat and Distribution

Lowbush blueberry is common on acidic soil (pH from 3.0 to 5.9) in peat bogs, muskegs, peatlands, alpine and mountain meadows, sandy soils in open forests and clearings. Grows well on dry acidic soils of coniferous woods and on open or thinly wooded hillsides throughout Alberta, especially in sandy areas (Inkpen and Van Eyk n.d.)

Relatively intolerant to shade (Rogers 1974).

Soil: Optimum pH range of 4.0 to 5.5. Requires acidic soils, grows well on sandy loam soils (Carter and St-Pierre 1996). Most productive in light, well drained acidic soils high in organic matter. Common on stony, silt, and clay loam soils (Rogers 1974).

Seral Stage: Early secondary successional. Highest abundance in young post-disturbance communities (Tirmenstein 1990).

***Vaccinium myrtilloides* in flower.**

Distribution: Common in the boreal forest. Southern District of Mackenzie to southern Hudson Bay, Newfoundland south to western Montana, Alberta, southern Saskatchewan, southern Manitoba, Iowa, Great Lakes and Virginia (Moss 1983).

***Vaccinium myrtilloides* plant in fruit.**

Phenology

Flowers in April through July (Banerjee et al. 2001). Fruit ripens in July through August (Dirr and Hauser 1987).

Pollination

Andrenids, some *Bombus sp.* (Reader 1977, Vander Kloet 1981), and *Apis mellifera* L. (Whidden 1996). *Andrenids* and *Apis* are the most common, however *Bombus* is the most effective (Whidden 1996).

Seed Dispersal

Animal dispersal.

Genetics

2n=24 (Moss 1983).

Symbiosis

Blueberry associates with the ericoid mycorrhiza fungi and a diverse assemblage of fungal endophytes (e.g., *Hymenoscyphus ericae*) (Hambleton et al. 1999, Massicotte et al. 2005) that increase effectiveness of nitrogen uptake in high acidic soils (Jansa and Vosátka 2000). Young plants/seedlings are less likely to form mycorrhizal associations (McKechnie 2009).

Seed Processing

Harvest Dates: Late July, when the fruit is bluish black and bloomy.

Collection: Although time consuming, berries borne in clumps on these low shrubs are not difficult to collect. Handpick or hand-strip directly into buckets, picking bags or onto ground sheets.

Seed Weight: 0.060 to 0.214 g/1,000 seeds (0.147 average).

0.2 g/1,000 seeds (Royal Botanic Gardens Kew 2008).

Fruit Volume: 1,870 to 3,380 fruit/L (2,540 average), 93,800 seeds/L fruit.

***Vaccinium myrtilloides* seed.**

Fruit Weight: 3,740 to 7,070fruit/kg (5,240 average), 194,000 seeds/kg fruit.
Average Seeds/Fruit: 37 seeds/fruit.
Cleaning: Macerate in blender for 20 to 30 seconds on stir with equal amount of water, decant water and chaff. Repeat suspension and decanting until only seeds remain. Allow seeds to dry at room temperature over a moving air stream.
Storage Behaviour: Orthodox (Royal Botanic Gardens Kew 2008).
Storage: Store at cool temperatures (Young and Young 1992).
Store with moisture contents equivalent to 15% RH or lower (Royal Botanic Gardens Kew 2008).
Longevity: Seeds up to 5 years old have been found to be viable (Granström 1987).

Propagation

Natural Regeneration: Both by seed and vegetatively (Tirmenstein 1990). Vegetative spread is mainly via laterally branched woody rhizomes that can establish dense mats (Carter and St-Pierre1996). Reproduces from sprouts and suckers (Rogers 1974).
Germination: 10% germination in 90 days with fresh, 1 to 2 year old seeds.
Most successful in 1:1 sand-peat mixtures at a pH of 4.5 (Tirmenstein 1990).
Bimodal germination at 18 and ~80 days up to 30% (Vander Kloet 1994).
Young and Young (1992) report that light can increase the success of seed germination.
Dormancy may be induced by drying seed, but it is broken with cold storage (McKechnie 2009).
Germination is more favourable under warm conditions (15/25°C diurnal) in the presence of light (McKechnie 2009).
Pre-treatment: Often not required as many seeds are mostly non-dormant. However 1 to 2 months of stratification is used by Smoky Lake Forest Nursery (Darago pers. comm.).
Direct Seeding: No significant emergence observed by sowing seeds, only small seedlings were observed in later years on oil sands reclamation sites in northeastern Alberta. Emerged from fruit; fall sowing did slightly better than spring sowing when frozen seeds were used. Direct fruit sowing produced slightly greater emergence than direct seed sowing (Smreciu, et al. 2008).
Seedling Development: Radicals 20 days after seeding, cotyledons 31 days, first true leaves 48 days (Vander Kloet 1981) and can be transplanted 6 to 7 weeks after emergence (Rook 2002).
Vegetative Propagation: Can be propagated from 10 to 13 cm long hardwood cuttings (Rook 2002), however McKechnie (2009) does not recommend this method. Harvest rhizome cuttings in early spring or late summer and autumn (Dirr and Hauser 1987). Gibberellic acid and IBA can decrease rooting of rhizome cuttings and should be avoided; bottom heat has no effect (McKechnie 2009). Generally propagated from softwood cuttings 7 to 8 cm in length (Carter and St-Pierre 1996). Babb (1959) suggests using division.
Micro-propagation: Nickerson (1978) reports successful propagation through cultured seedling explants (excision and culture of cotyledons and hypocotyls).
Greenhouse Timeline: 60 days cold stratification before sowing.
26 weeks in the greenhouse prior to out-planting.
Dormant seedlings can be stored frozen over winter for spring or early fall planting (Wood pers. comm.).

Aboriginal/Food Uses

Food: *V. myrtilloides* is one of the most important fruits for local native people. Eaten fresh, cooked with sugar or lard, canned, or sun dried. Dried fruit can be mixed to pemmican. Beverages can be made by boiling the dried leaves (Marles et al. 2000).
Medicinal: Eating the fruits relieves acne; blueberry syrup can treat vomiting and diseases of the lung (Wilkinson 1990) and stems can be boiled to make a tea to prevent pregnancy. When combined with other plants, can prevent miscarriage, increase bleeding after childbirth, regulate menstruation, and stimulate sweating. The whole plant can be used as medicine to treat cancer. A decoction made from boiling the roots can be taken to relieve headaches (Marles et al.

2000). A diuretic tea can be made from the berries and is said to be a blood tonic (Royer and Dickinson 1996).
Other: Berries used to dye porcupine quills (Royer and Dickinson 1996).

Wildlife/Forage Uses

Wildlife: Berries are an extremely important food source for black bear and grizzly bear. White-tailed deer and eastern cottontail browse the leaves and twigs. Many mammals feed on the berries (white-tailed deer, red fox, porcupine, raccoon, mice, chipmunks, pika, white-footed mouse, grey fox, ground squirrel, deer mice, and skunks). Many birds, such as wild turkey, grey catbird, band-tailed pigeon, ring-necked pheasant, and quails, ptarmigans, towhees, spruce, ruffed, blue, and sharp-tailed grouse, American robin, American crow, bluebirds, and various other small birds, also feed on the fruit (Tirmenstein 1990).
Livestock: Browse is of relatively low palatability to most domestic livestock (Tannas 1997).

Reclamation Potential

Valuable ground cover species in areas of low vegetation cover (Tannas 1997).
Requires minimum site preparation.
Popular edible berry for both humans and animals.
Carter and St-Pierre (1996) report that blueberries are excellent colonizers of disturbed areas.
Haeussler et al. (1999) found that they are sensitive to high severity disturbances (natural and mechanical) and exhibit a slow recovery. However, moderate disturbances such as partial cutting can significantly improve berry production. This is possibly due to increased light availability and its vegetative habit. Although slow to recover after soil disturbances, moderate disturbance (fire or surficial damage) can encourage regrowth (McKechnie 2009).
For *V. myrtilloides* to expand and dominate an understory area, the faster growing hardwood species, which are aggressive competitors and invaders, must be suppressed and controlled (Moola and Mallik 1998). Moderate shade however is necessary because it aids in moisture conservation and foliage sunburn prevention (Smith 1962).
V. myrtilloides is relatively tolerant of drought (McKechnie 2009).

Commercial Resources

Harvest Methods: Handpicking, rakes and mechanical harvesters are all harvesting options. Mechanical harvesters range from over-the-row to hand-held vibrators with catch frames. Some berry loss is inevitable with this method.
Availability: Although commercially available, local stock may be difficult to purchase.
Cultivars: Many different clones (over 1,000) are available from Nova Scotia (Carter and St-Pierre 1996) but are not suitable for reclamation purposes.
Uses: Fresh fruit, jams, syrups. Potential for value-added food and beverage products (Marles et al. 2000).

Notes

Vaccinium myrtilloides is listed as 97% intact (less occurrences than expected) in the Alberta oil sands region (Alberta Biodiversity Monitoring Institute 2014).
Compared to other fruit crop species, *V. myrtilloides* has low nutrient requirements (Carter and St-Pierre 1996).
Because of their deep subterranean reproductive plant parts (4 cm below the mineral soil), blueberries have a high survival rate during fire (Flynn and Wein 1977).
Studies have shown that to maximize yield, significant stands of *V. myrtilloides* should be burnt every third year (Vander Kloet 1994).

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Photo 1, 3: Wild Rose Consulting, Inc.
Photo 2: Glen Lee, Regina, Saskatchewan.
Line Diagram: John Maywood, used with permission of Bruce Peel Special Collections, University of Alberta.

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