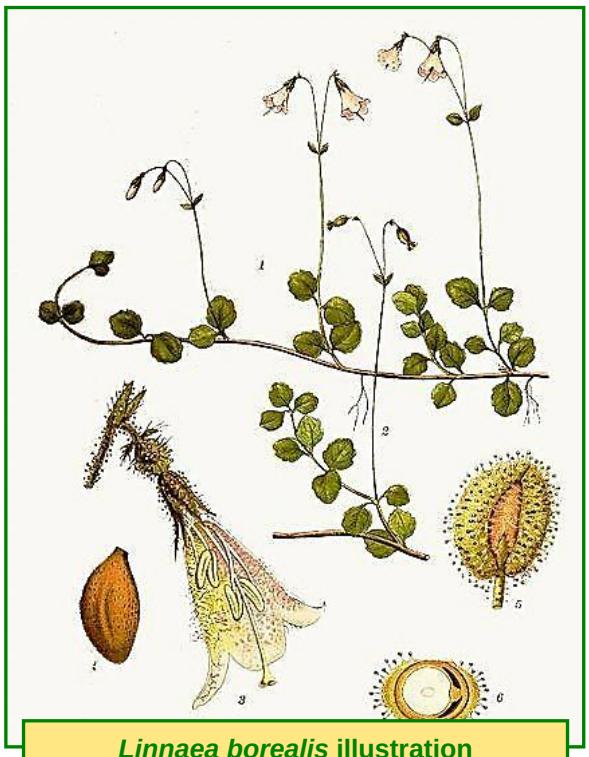
Scientific Name: *Linnaea borealis* L. ssp. americanum (Forbes) Hult.
Family: *Caprifoliaceae*

Common Names: northern twinflower



***Linnaea borealis* illustration**

Plant Description

Creeping woodland plant, stems slender, semi-woody, often 1 m long, forming loose mats, 3 to 10 cm tall; leaves opposite, evergreen, oblong to oval, 8 to 20 mm long, 3 to 15 mm wide; short stalked; margin with 2 pairs of notches near the leaf tip; flower cluster, 2 flowers borne on top of a Y-shaped stem; flowers pinkish-white, funnel-shaped, pendent, 8 to 15 mm, fragrant (Moss 1983, Royer and Dickinson 2007).

Fruit: Capsule 4 to 5 mm long; single seeded (Royer and Dickinson 2007).

Seed: One seed per fruit (Barrett and Helenurm 1987).

Habitat and Distribution

Common understory species in boreal and mixedwood forests in Alberta (Tannas 1997).

Seral Stage: Facultative seral species; *Linnaea borealis* has been found in disturbed areas such as cut blocks as well as climax communities (Howard 1993).

Soil: Soil parent material, textures and nutrient levels vary. Soil moisture ranges from hydric to xeric and soil pH can range from 4 to 7 (Howard 1993).

Distribution: Circumpolar. Alaska, Yukon, District of Mackenzie to Hudson Bay, northern Quebec, Newfoundland south to California, Arizona, New Mexico, South Dakota, Indiana, West Virginia (Moss 1983).

Phenology

L. borealis blooms from June to July through most of its range; the flowers last for 7 days (Howard 1993). Seeds mature in 36 days (Rook 2002).

Pollination

Pollinated by insects as well as self-fertile in rare occasions (Howard 1993).

Seed Dispersal

Barbed seed catches on fur of animals (CYSIP: Botany n.d., Royal Botanic Gardens Kew 2008).

Genetics

2n=32 (Moss 1983).

Symbiosis

Form arbuscular mycorrhizal associations (Kranabetter and MacKenzie 2010).

Seed Processing

Collection: Allow seed pods to dry on plant, break off and put in paper bags (Dave's Garden 2011).

Seeds stick to cloth due to a barbed outer coating. This makes them easy to collect but difficult to clean.
Seed Weight: 2 g/1,000 seeds Royal Botanic Gardens Kew 2008).
Harvest Dates: August (Luna et al. 2008).
Cleaning: Seeds are hand cleaned by rubbing capsules against screens (Luna et al. 2008).
Storage Behaviour: Most likely orthodox; dry seed to low relative humidity and store cold but this is unproven (Royal Botanic Gardens Kew 2008).
Storage: Store cool and dry (Luna et al. 2008).
Longevity: Unknown but does not remain viable in soil seed banks for long periods of time (Howard 1993); shown to form a short-term persistent soil seed bank, with seeds surviving in the soil for 1 to 5 years (Royal Botanic Gardens Kew 2008).

***Linnaea borealis* in flower**

Propagation

Natural Regeneration: Vegetative reproduction by stolons is the primary method of reproduction despite prolific seed production (Howard 1993).
Germination: Germination occurred following several days at 22°C or higher. Germination continued for over 1 month (Luna et al. 2008).
Pre-treatment: 5 month outdoor stratification with a minimum of a 60 day cold, moist stratification is recommended (Luna et al. 2008).
Direct Seeding: Sow seed in the fall (Dave's Garden 2011).
Vegetative Propagation: Root balls may be divided as well as propagation from stem cuttings (Dave's Garden 2011).

Aboriginal/Food Uses

Food: It was reported that Carrier Indians used them as food (Montana Plant Life n.d.).
Medicinal: Was used as a tonic in pregnancy, treatment of painful menstruation, cramps, fever or for crying. A decoction of leaves was taken for coughs and colds. The mashed plant was used as a poultice on inflamed limbs and applied to the head to treat headaches (Gray 2011, Montana Plant Life n.d.).
Other: Can be used as a horticultural plant (Montana Plant Life n.d.).

Wildlife/Forage Usage

Wildlife: Used by ruffed grouse and as winter forage for elk (Howard 1993).
Livestock: Poor forage but will be used if better alternatives are not present (Tannas 1997).
Grazing Response: Increaser, but not aggressive (Tannas 1997).

Reclamation Potential

Can tolerate acidic soils. Is an important species in providing ground cover in forests (Tannas 1997).

Commercial Resources

Availability: Not currently grown commercially in Alberta (ANPC 2010).
Seeds have been collected by the Oil Sands Vegetation Cooperative for use in the Athabasca oil sands region.
Use: Used to treat shingles, rashes and rheumatism in Norway (Alm 2006).

Notes

L. borealis is listed as 86% intact (less occurrences than expected) in the Alberta oil sands region (Alberta Biodiversity Monitoring Institute 2014).
Kohn and Lusby (2004) found that transplanting this species was not successful; 90% of the transplants died.

The flower's incredibly sweet scent is strongest near evening (CYSIP: Botany n.d.).

Photo Credits

Photo: Ghislain118, wikimedia commons 2009.
Line Diagram: Illustration by Carl Axel Magnus Lindman (1928), scanned from the book "Bilder ur Nordens Flora".

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