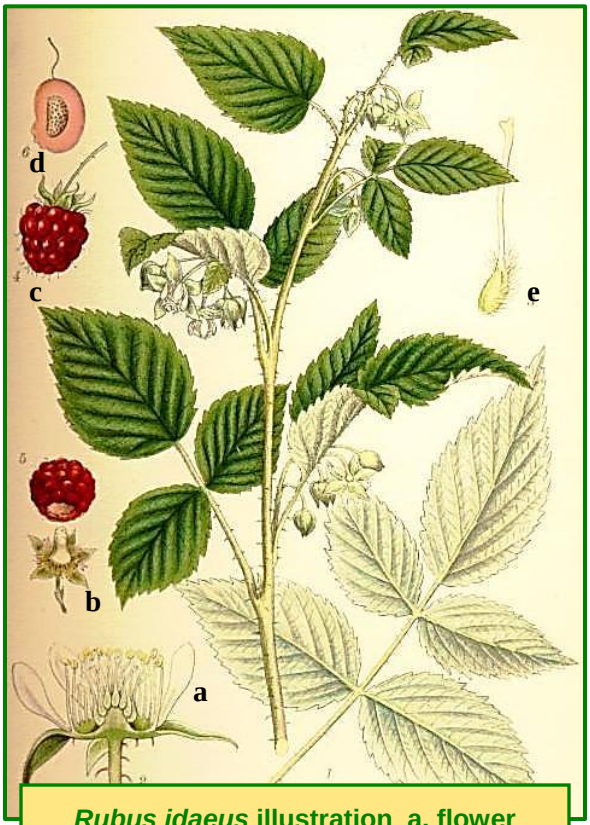
Scientific Name: *Rubus idaeus* L. **Family:** *Rosaceae*

Common Names: red raspberry



***Rubus idaeus* illustration a. flower b. receptacle c. fruit d. druplet e. pistil**

Plant Description

Erect perennial shrub 1 to 2 m high, biennial upright stems (canes), spiny and bristly, often glandular-hairy; bark shredding; leaves of first year stems are pinnately divided into 3 to 5 leaflets ovate to lanceolate, double-serrate margins; leaves of second-year flowering branches are tri-foliate; single or small clusters of drooping white flowers 8 to 12 mm across in a compound cyme (Moss 1983).

Fruit: Red, ovoid, aggregate, 1 cm across, fall intact from dry receptacle (Moss 1983).

Seed: Light brown to pinkish, reniform, with a reticulate surface, 1.5 to 3 mm long (Moss 1983).

Habitat and Distribution

Common in open woods, thickets, clearings, burned-over areas and riverbanks along borders of woodlands, roads and trails.

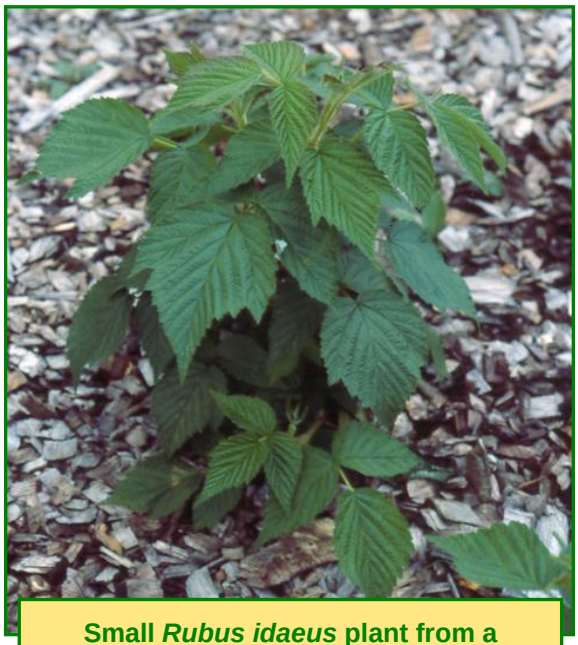
Low shade tolerance (Johnson et al. 1995); tolerant of some shade (Inkpen and Van Eyk n.d.).

Seral Stage: Early seral species that completes its life cycle during the first years following disturbance and becomes a dominant species, but decreases as tree cover increases (Tirmenstein 1990).

Soils: Drought tolerant. Found on fine to coarse soil texture (Gerling et al. 1996).

Grows best on moderately well drained soils and is most abundant on nutrient-rich soils (Tirmenstein 1990).

Tolerates wide range of soil pH (USDA NRCS n.d.). Moderately acid tolerant (Hardy BBT 1989).



Small *Rubus idaeus* plant from a rhizome sprout.

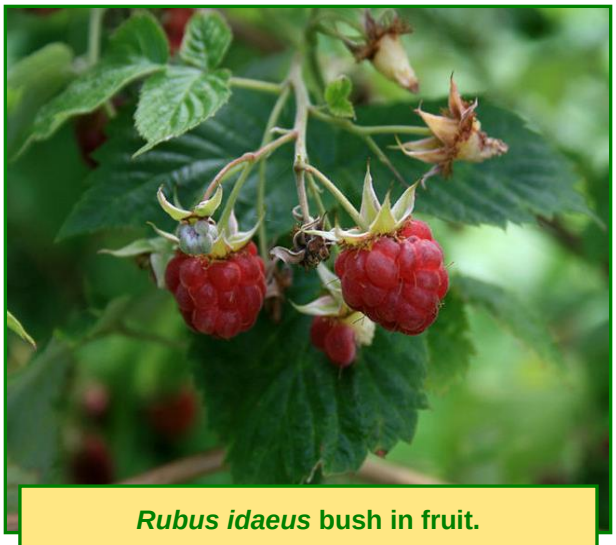
Distribution: Widespread across Alberta. Circumpolar: across Canada, throughout the continental USA (except the southeast), in northern Mexico and in Eurasia (Johnson et al. 1995). Alaska, Yukon, southwestern District of Mackenzie to Hudson Bay, northern Quebec, Newfoundland south to California, Arizona, New Mexico, South Dakota, Missouri (Moss 1983).

Phenology

Flowers late May to July. Fruit matures July through September (USDA NRCS n.d.). Seeds disperse July to October (Brinkman 1964).

Pollination

Pollinated by *Apis*, *Halictidae*, *Syrphidae*, and a variety of other insects (Hansen and Osgood 1983).



***Rubus idaeus* bush in fruit.**

Seed Dispersal

Animal dispersed by numerous predators (USDA NRCS n.d.).

Genetics

2n=14, 21, 28, 35, 42 (Moss 1983).

Symbiosis

Forms vesicular arbuscular mycorrhiza (Currah and Van Dyk 1986).

Seed Processing

Collection: Collection from low branches is more difficult than for some species.
Seed Weight: 14,706 g/1,000 seeds average.
Fruit/Seed Volume: 808 fruit/L average (29,878 seeds/L fruit).
Fruit/Seed Weight: 966 to 1,270 fruit/kg, 1,155 fruit/kg average (42,700 seeds/kg fruit).
Average Seeds/Fruit: 37 seeds/fruit.
Harvest Dates: Late July. July 1 to August 30 (Formaniuk 2013).
Cleaning: Place pulpy fruits in water (use about 3:1 water with fruit) and place in a blender on low speed until fruit is fully macerated. Pour through sieve(s) to remove chaff smaller than seeds. Re-suspend residue in water and mix; allow seeds to settle and decant water with floating and suspended larger chaff. Repeat re-suspension step until seeds are clean; sieve and place seeds on paper towel or cloth to dry. Dry at room temperature or up to 25°C over a moving air stream.
Storage Behaviour: Is thought to be Orthodox; seeds can be dried, without damage, to low moisture contents, their longevity increases with reductions in both moisture content and temperature (Royal Botanic Gardens Kew 2008).
Storage: Store at low temperatures (Young and Young 1992).
Viability maintained for several years in hermetic air-dry storage at 5°C (Royal Botanic Gardens Kew 2008).
Longevity: Seeds can remain viable for 60 to 100 years or more when buried in the soil (Tirmenstein 1990).
According to a one year study, once dried seeds can remain viable for at least one year when stored at 5°C (Hardy BBT 1989).

Propagation

Natural Regeneration: By seed and vegetative reproduction. Reproduces by seeds, root sprouts and stolons (Hardy BBT 1989).

Seedling establishment initiates a stand followed by suckering (Whitney 1982).

Capable of sprouting from axillary buds located above ground level, from aboveground stems, from root crown or stem base (Inkpen and Van Eyk n.d., Tirmenstein 1990).

Germination: >65% germination of fresh and one year old seeds after 60 minutes scarification regardless of stratification.

Brinkman (1964) obtained germination in 30 to 60 days.

Fresh seeds are less likely to germinate (Tirmenstein 1990).

Pre-treatment: 1 hour in 5% sulphuric acid and then a 30 day cold stratification before seeding (Wood pers. comm.).

90 days stratification (Formaniuk 2013).

Young and Young (1992) recommend 120 days cold stratification.

Germination can be improved by treatment with gibberelic acid (Jennings and Tulloch 1964).

Brinkman (1964) suggests 20 to 60 minutes of sulphuric acid scarification followed by 120 days of cold stratification. A combination of warm and cold stratification may be necessary (Brinkman 1964, Dale and Jarvis 1983, Young and Young 1992).

Wild Rose Consulting found seeds from northeastern Alberta did best with a short (<1 hour) acid scarification.

Direct Fruit Seeding: 0.04% emergence of seedlings the first growing season during the spring in the oil sands reclamation area in Fort McMurray.

Late summer or early fall sowing of scarified seeds usually produces the best emergence (Young and Young 1992).

Fruit-Sowing Rate: 25 fruit/m².

Planting Density: 790 to 3,190 plants/hectare (USDA NRCS n.d.).

Vegetative Propagation: Before transplanting, the hardwood cuttings should have a slow release fertilizer added to the rooting medium (USDA NRCS n.d.).

Red raspberry grown from root cuttings in Styroblock containers had a 60% to 80% survival rate and was spreading the first growing season in the landfill revegetation study carried out by Smreciu and Barron (1997).

It has great potential for increased ground cover with its long stolons, tailing stems, or root sprouts.

New plants formed by adventitious shoots can be dug up, when dormant, and transplanted or placed in cold storage until out-planting (Rose et al. 1998).

Micro-propagation: Cultivars of this species can be propagated effectively by tissue culture (Welander 1985).

Greenhouse Timeline: 14 weeks in greenhouse before out planting. Plants can be over wintered for a spring or summer planting (Wood pers. comm.). Grow for 100 days before harvest (Formaniuk 2013).

***Rubus idaeus* seeds; 1.5 to 3 mm long.**

Aboriginal/Food Uses

Food: Fresh and canned fruit eaten or made into syrups (Johnson et al. 1995). Young stems can be peeled and eaten (Wilkinson 1990); older stems and roots are boiled to make a beverage (Marles et al. 2000). Constant food of Aboriginals, settlers, explorers and trappers (Droppo 1987, Turner 1997).
Medicinal: Stems can relieve fevers, childhood diarrhoea, stomach aches, dysentery and cholera, teething, help with recovery from childbirth and be used in eye drop solutions; roots and stems can be used as a wash for infections; and roots can be used in asthma treatment (Johnson et al. 1995). A tea made from the berries and leaves was said to reduce morning sickness; a poultice from leaves and fruit was used to soothe wounds, burns and insect bites (Royer and Dickinson 1996). Leaves can be used to create a women's tonic for all stages of reproduction (Gray 2011).
Other: Fruit used as a dye for clothing and arrow quivers (Wilkinson 1990). Leaves can be used as a facial tonic and to unclog facial pores (Gray 2011).

Wildlife/Forage Usage

Wildlife: Good forage value. Fruits are eaten by grouse, birds, raccoons, coyotes, squirrels, skunks, and chipmunks. Thickets provide shelter for rabbits and squirrels and nesting spots for many birds (USDA NRCS n.d.). New growth, leaves and fruit are readily eaten by game.
Livestock: Poor to fair forage value (Gerling et al. 1996). Wilted leaves have caused livestock fatalities (Wilkinson 1990). Some BC Aboriginal peoples say over-grazing has depleted wild raspberries (Turner 1997).
Grazing Response: Increaser, resistant to moderate browsing pressure. Decreaser when heavy browsed (Gerling et al. 1996).

Reclamation Potential

In a review of Syncrude and Suncor plot data, Geographic Dynamics Corp. (2006) found that *R. idaeus* invaded plots rapidly but showed a consistent decline in cover and presence over time. Red raspberry forms thickets and has a rapid cover rate giving it erosion control and soil stability properties.
It is a common invader of disturbed sites such as amended tailings sands and roadsides in northern Alberta. Somewhat drought tolerant and can grow on infertile, bare mineral soil (Hardy BBT 1989). Adapted to a wide range of soil and moisture conditions (Tannas 1997).
Rubus is highly susceptible to damage caused by sodium- and sulphate-enriched consolidated tailings water (Renault et al. 1998). Redfield et al. (2004) found that raspberry exposed to CT had low levels of Na and Cl in roots but elevated levels in shoots causing injury; they recommended planting raspberry in less saline substrates.

Commercial Resources

Availability: Seeds and plants are commercially available in Alberta (ANPC 2010).
Cultivars: Several cultivars are commercially available, but these should be avoided in reclamation situations.
Uses: Red dye (M10), syrups and jams as well as fresh fruit (Marles et al. 2000).

Notes

R. ideaus is listed as 94% intact (less occurrences than expected) in the Alberta oil sands region (Alberta Biodiversity Monitoring Institute 2014). After timber harvest or fire, red raspberry usually increases dramatically. It competes vigorously with conifer seedlings (Tirmenstein 1990).

Photo Credits

Photo 1: Mary Hopson, Alaska.
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Photos 3 and 4: Wild Rose Consulting, Inc.
Line drawing: Carl Lindman (1856 to 1928) @ wikimedia commons 2013.

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