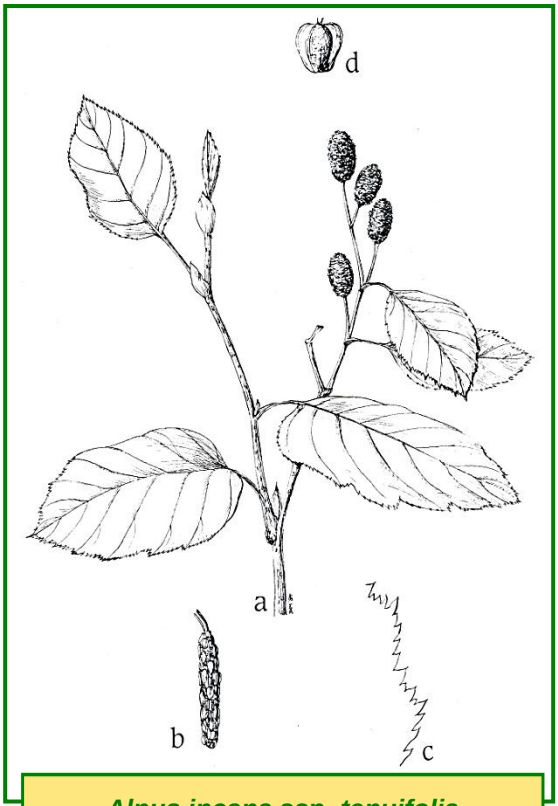
Scientific Name: *Alnus incana* ssp. *tenuifolia* Nutt. Breitung

Family: *Betulaceae*

Common Names: river alder, thin leaf alder, speckled alder, gray alder



Alnus incana* ssp. *tenuifolia
a. branchlet bearing seed cones.
b. pollen cone.c. leaf serations.
d. seed.

Plant Description

Large shrub or small tree 2 to 8 m tall; bark thin and smooth marked with orange lenticels; leaves oval to broadly ovate, doubly serrate 4 to 10 cm long and slightly pubescent beneath; flowers in catkins (Moss 1983).

Fruit: Short-stalked seed cones (catkins), 1 to 2 cm long.

Seed: Samaras, 2 to 3.5 mm, flat, ovoid, wingless, brown, rough.

Habitat and Distribution

Found in riparian, bog, and nutrient-rich swamp communities, on riverbanks and lakeshores. Low shade tolerance, tolerant of flooding (Hardy BBT 1989).

Soil: The pH range is 5.5 to 7. Adapted to a wide range of soil textures, however is most common in poorly drained soils (Healy and Gill 1974).

Distribution: Widespread across Alberta, frequent in all regions except the mixed grass prairie (Tannas 1997). Alaska, Yukon, western District of Mackenzie south to California, Colorado, western Saskatchewan (Moss 1983).

Phenology

Female plants mature in 5 to 10 years (Government of the Northwest Territories n.d.). Flowering from April to June. Fruits ripen late August through September. Seeds dispersed by wind during fall and winter (Healy and Gill 1974). Abundant seed crop every four years (Government of the Northwest Territories n.d.).

Pollination

Pollen (0.03 mm) spread by wind (CYSIP: Botany n.d., Healy and Gill 1974).

Genetics

2n=28 (Moss 1983).

Symbiosis

Arbuscular mycorrhizal symbiosis is critical for successful establishment of *A. incana* (Monzón and Azcón 2001). *Frankia* (nitrogen fixing soil bacteria) inoculation significantly increases biomass production (Hendrickson *et al.* 1993). Markham (2005) found inoculation with both *Frankia* and *Pacillus involutus* (a fungi forming ectomycorrhizal

systems) synergistically improved plant performance when grown on mine tailings.

***Alnus incana* developing male (bottom) and female catkins (top)**

Seed Processing

Collection: Catkins are easily stripped from branches, just prior to opening, and left to air dry.

Seed Weight: 0.382 to 0.627 g/1,000 seeds (0.490 average).

Harvest Dates: Harvest when the bracts start to separate on the earliest cones, generally in late August.

Cleaning: Air dry at ambient air temperature for several weeks. Crush material or remove large chaff and crush remaining material. Sieve to remove seeds from chaff using appropriate size screens (1.20 or 1.40 mm). Small chaff and dust can be removed by winnowing.

Storage: Store hermetically in sealed containers at 2 to 5°C (Young and Young 1992). Orthodox (Hong et al. 2004), seed can be stored at freezing temperatures (-18ºC) provided seed is sufficiently dry (3% to 7% moisture content).

Longevity: When refrigerated in sealed containers (1 to 3°C), seeds can be stored and viable for up to 10 years (Healy and Gill 1974).

***Alnus incana* seed.**

Propagation

Natural Regeneration: Reproduction occurs mainly through sprouting from root crown but also through layers, suckers and underground stems (Fryer 2011) as well as from seed (Healy and Gill 1974).

Germination: 30% in 30 days from fresh or 1 year old seed from northeastern Alberta. *Alnus incana* seed development is variable with up to 95% of the seeds being empty (Fryer 2011).

100% germination was achieved by Kew on 1% agar media at temperatures of 25/15°C (8 hours day/16 hours night) (Royal Botanic Gardens Kew 2008).

Pre-treatment: Cold stratification of 30 to 90 days (Nichols 1934). King (1980) reported that fresh seeds may not need stratification, however, stored seeds with less than 10% moisture content may need cold stratification.

A. incana exhibits increased growth and vigour in full sunlight and better seed germination in saturated soil (Healy and Gill 1974).
Direct Seeding: No emergence within 5 years when seeded in reclaimed sites in northeastern Alberta. Successful in Pennsylvania: fall-collected seed was sown the following February and March in cool, moist sites close to a stream (Healy and Gill 1974).
Seeding Rate: 60 kg of seed/ha (Healy and Gill 1974).
Vegetative Propagation: By 30 cm hardwood cuttings (Babb 1959).
Micro-propagation: Can be micro-propagated (Perinet and Tremblay 1987).

Aboriginal/Food Uses

Food: Buds can be eaten. Inner-bark can be dried and ground into flour, or chewed as a survival food (CYSIP: Botany n.d.).
Medicinal: Inner bark used to wash sore eyes, bark used as laxative (Marles et al. 2000). Leaves used to treat blisters, inflammation and other foot ailments (CYSIP: Botany n.d.).
Other: Boiled bark and stem pieces are used to make red-brown dye for hides (CYSIP: Botany n.d.), and alder wood is used to make carved tools and implements (Marles et al. 2000).

Wildlife/Forage Uses

Wildlife: Moose, muskrats, beavers, cottontail rabbits and snowshoe hares feed on branches and foliage. Songbirds feed on seeds; grouse eat buds and catkins and use alder for cover. Commonly used by beavers for dam construction (Healy and Gill 1974).
The pollen is used by bees in spring for brood rearing (CYSIP: Botany n.d.).

Commercial Resources

Availability: Available as seed and/or plants at Alberta nurseries.
Seeds have been collected by the Oil Sands Vegetation Cooperative for use in the Athabasca oil sands region.
Cultivars: There are cultivars but they are not suitable for reclamation (Dave's Garden n.d.).
Uses: Tree tops are used for interior decorating and branches are used for baskets, wreaths, birdcages, and decorative furniture (Marles et al. 2000). Trees have been cut for poles (Hardy BBT 1989).

Reclamation Potential

Exposure of mineral soil creates optimal seedbeds and accelerates alder's invasion of a site (Fryer 2011). River alder fixes atmospheric nitrogen, which in turn improves fertility and physical properties of soil (Hardy BBT 1989).

Notes

Alnus incana is listed as 90% intact (less occurrences than expected) in the Alberta oil sands region (Alberta Biodiversity Monitoring Institute 2014). River alder sprouts rapidly from persistent root crowns following mild fires. Severe fires delay regeneration (Fryer 2011).
Alnus pollen may cause hay fever, or bronchial asthma, in some sensitive people (CYSIP: Botany n.d.).

Photo Credits

Line Diagram: John Maywood, used by permission of Bruce Peel Special Collections, University of Alberta.
Photo 1: Simon Eugster. http://commons.wikimedia.org/wiki/File:Alnus_fruits.jpg
Photo 2: Wild Rose Consulting, Inc.

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