Dryas drummondii Richards. *ex* Hook. yellow mountain-avens

Family: Rosaceae



Figure 100. Documented range of Dryas drummondii in northern British Columbia.



Figure 101. Growth habit of *Dryas drummondii* mats in cultivation; note sand rooting medium.



Figure 102. Close-up of cultivated Dryas drummondii in flower.

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Background Information

Dryas drummondii is found north to Alaska and the Northwest Territories, south to Oregon and east to Newfoundland. It is common throughout B.C. east of the Coast-Cascade Mountains but rare west of these mountains (Douglas et al. 1999). Three varieties are recognized (Douglas et al. 1999), which we do not distinguish, though most of our material appears to be *D.d.* var. *drummondii*. This species has been the subject of numerous studies in which its role as a colonizer and nitrogen fixer on recent glacial moraines has been documented (Crocker and Major 1955, Schoenike 1958, Lawrence et al. 1967, Chapin et al. 1994, Kohls et al. 1994).

<u>Growth Form</u>: Forms extensive continuous mats, roots forming symbiotic nodules with the nitrogen-fixing actinomycete, *Frankia* (Kohls et al. 1994); low dwarf shrub from long woody base, alternate evergreen leaves, woolly hairy underneath, solitary flower on leafless woolly-hairy stalks, yellow corollas, dandelion-like fluff of seeds; mature plant size is 15 - 25 cm tall (Hardy 1989, Kohls et al. 1994, Douglas et al. 1999). Tolerates a minimum of 355 mm and a maximum of 1016 mm annual precipitation; can tolerate minimum temperatures to -42°C (NRCS 2002).

<u>Site Preferences</u>: A pioneer species commonly found on gravel bars, glacial moraines, rocky slopes, streamside, roadside and alpines areas north of 54°N (MacKinnon et al. 1992). In Alberta it is reported to grow on coarse textured mesic to dry soils, and to be tolerant of drought and alkaline conditions (Gerling et al. 1996).

Seed Information

Seed Size: Length: 9.63 mm (5.44 - 16.42 mm) Width: 2.07 mm (1.25 - 3.39 mm) Seeds per gram: 1,940 (range: 1,837 – 2,244) Volume to Weight Conversion: 101.5 g/L at 45.0% purity Germination Capacity: At 30°/20° C untreated: 35.5% (9 - 65%)At 25°/15° C untreated: 70.3% (58 - 82%)stratified: 54.8% (22 - 88%)Germination Speed: To first germination: 16.6 days To 50% potential: 40.7 days Seed Longevity: three to five years (Wick et al. 2001)



Figure 66. Seeds of *Dryas drummondii*, with most plumes removed. Rule divisions are 1.0 mm.

Considerations for Growing

Techniques for Seed Production

Seed treatment: No apparent benefit to stratification; untreated seed germinates best in cooler soils. *Stand establishment*: Establishes best on very sandy or gravelly, loose moist soil; roots rotted and plants died in Symbios Research plots consisting of loamy soil and no provisions for drainage. Site should be free of all weeds, especially rhizomatous grasses, because selective herbicides cannot be used once plants are growing. We recommend establishing seedlings in a greenhouse first, and then transplanting them out to seed increase plots.

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(Techniques for Seed Production, continued)

Row spacing: Unknown; suggest 75-120 cm under dryland conditions, 30-90 cm under irrigation. *Seeding/planting density*: Unknown at present; suggest 60-100 PLS per linear metre (Smith and Smith 2000).

Seeding depth: Surface to shallow seeding; a light dusting of peat moss will help to keep the seeds in place; tends to slow to establish from seed outdoors, establishment from plugs will be faster.

Stand maintenance: Regularly cultivate rows and spot spray with herbicide to keep plot weed free. Annual fertilization with high P and K (very low N) formulations may extend the life of the plot, but mats tend to naturally die back at their center regardless. Maximum seed production may require stand renewal in 5-7 years.

Harvesting and Seed Processing:

Extensive, nearly pure wild stands of this species can be found on gravel bars and low terraces of river floodplains of northern B.C. Collecting seed from the wild may be more efficient than growing it in cultivation for seed production.

Dates of selective harvesting of cultivated stands in the Bulkley Valley of northwestern B.C. have ranged from July 10^{th} to August 2^{nd} . This species holds onto its seed well, unless it is windy.

Hand clipping: *Dryas drummondii* can be collected easily by hand, as the fluffy seeds pull easily from the plant; clipping of entire stalks while still slightly green appears to be acceptable, as seeds can mature somewhat if dried in the sun.

Vacuum: Uniformly ripe seeds can be efficiently harvested with a shop vacuum by placing hose cone directly over mature seed heads.

Seed stripper: Suitability untested, but expected to be good. Seed could possibly be collected with a seed stripper from wild populations, often found as relatively pure stands on river floodplains.

Combine/thresher settings: 1850 rpm with a 1-2 mm gap.

Seed cleaning: Run through rethresher 12 to 15 times, removing fluff each time. Then run through a fanning mill with the following configurations: prescreen 1.2×7.1 mm; top screen 1.8×12.7 mm; bottom screen blank.

Storage requirements: Cool dry conditions; Wick et al. (2001) suggest storing the seed at 0°C under low humidity in sealed containers.

Considerations for Use in Revegetation

- *Dryas drummondii* is a nitrogen fixer so grows well on poor soil and could provide ground cover at poor, gravelly or lithic sites (Chapin et al. 1994, Kohls et al. 1994).
- Well developed *Dryas* mats create seedbed conditions favourable to establishment of trees such as *Abies lasiocarpa*, *Picea engelmannii* and *Populus trichocarpa* (Schoenike 1958, Blundon et al. 1993).
- Mats of established Dryas help retain organic matter and moisture (Blundon et al. 1993).
- This species is a pioneer on recently deglaciated sites (Hardy 1989, Crocker and Major 1955, Kohls et al. 1994), so is well-adapted for revegetating gravel pits and lithic minespoils at low elevations throughout the north, so long as moisture is not limiting.
- *Dryas drummondii* has proven slow to establish in the field from seed, but once established will last 20 to 30 years until shaded out (Hardy 1989).

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(Considerations for Use in Revegetation, continued)

- This species is reported to have low tolerance to drought, medium tolerance to fire and medium fertility requirements (NRCS 2002).
- *Dryas drummondii* apparently has medium palatability to browsing animals and low palatability to grazing animals, with low protein potential (NRCS 2002).

Other considerations:

• *Dryas drummondii* is a pretty, mat-forming dwarf shrub so has possible ornamental and landscaping value, especially in rock gardens and as a ground cover on gravelly areas.



Notes