

***Arnica cordifolia* Hook.**
heart-leaved arnica

Family: Asteraceae

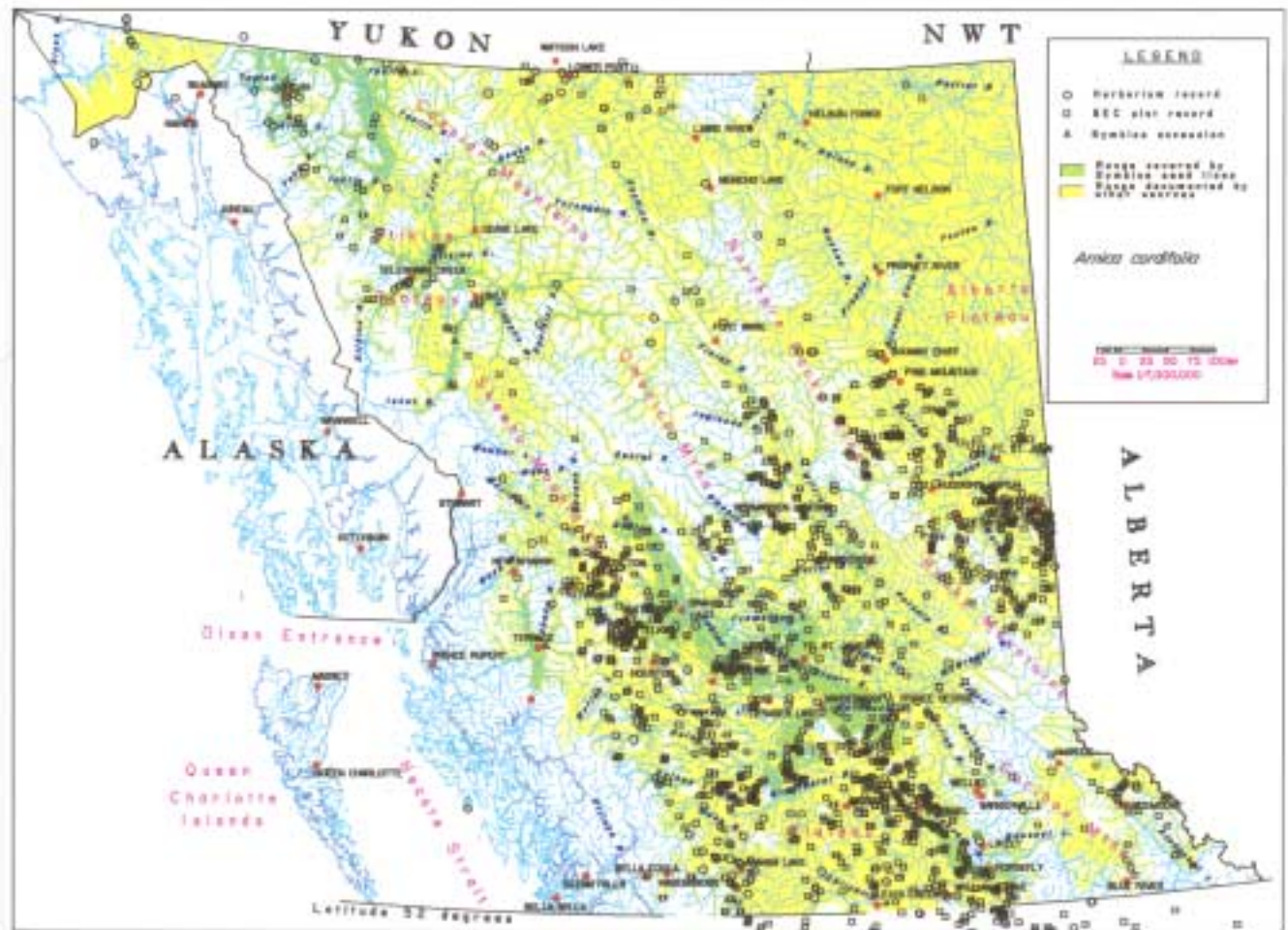


Figure 85. Documented range of *Arnica cordifolia* in northern British Columbia.



Figure 86. Growth habit of wild *Arnica cordifolia*.



Figure 87. *Arnica cordifolia* grown in cultivation, with individual plants inserted in weed cloth holes.

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(continued)

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Background Information

Arnica cordifolia occurs in boreal and cool temperate climates and is found north to Alaska, the Yukon and Northwest Territories, east to Saskatchewan and south to South Dakota, New Mexico, Arizona and California (Douglas et al. 1998).

Growth Form: Rhizomatous perennial herb; heart-shaped basal leaves, coarsely toothed to entire, 2-3 pairs of opposite stem leaves; yellow ray and disc flowers; mature plant size is 10–60 cm tall (MacKinnon et al. 1992, Douglas et al. 1998). Rhizomes grow laterally 1–2 cm below the soil surface. Shorter stature, slower growing and not as vigorously rhizomatous as *A. chamissonis*.

Site Preferences: Mesic to dry forest and meadows at low to moderate elevations throughout the northern Interior. Reported to be shade tolerant to shade intolerant (*Stickney 1993, *Steele and Geier-Hayes 1987, MacKinnon et al. 1992, Douglas et al. 1998). It inhabits exposed, moderately dry mineral soils but can occur on a variety of soil types; commonly found in open-canopy coniferous forests on high elevation water-shedding sites, so tends to co-occur with lodgepole pine (*Pinus contorta*) and soapberry (*Shepherdia canadensis*). Occurrence increases with elevation (Klinka 1989). Widely distributed in the ESSF (SNR >A), moderately abundant in the SBS and SBPS (SMR 2-5), on mesic and poorer sites in the BWBS (Beaudry et al. 1999). Recognized as diagnostic of the mv, dk and mc subzones of the ESSF (Coupé et al. 1991).

Seed Information

Seed Size: Length: 6.35 mm (4.34 - 8.60 mm).

Width: 0.71 mm (0.49 - 0.95 mm).

Seeds per gram: 1,991 (range: 1,657 – 3,030).

Volume to Weight Conversion: Unknown.

Germination Capacity: At 30°/20° C untreated: 10.7%
(2 - 19%).
At 25°/15° C untreated: 17.4%
(12 - 23%).
stratified: 22.7%
(22 - 23%).

Symbios results of 2 to 23% germination contrast with those of Romme et al. (1995), who found that nearly all *Arnica cordifolia* seeds were non-viable, with only one seed germinating Out of 650 seeds tested.

Germination Speed: To first germination: 13.1 days.
To 50% potential: 21.9 days.

Seed Longevity: Unknown at present; however, *Kramer and Johnson (1987) report that seeds of *Arnica cordifolia* have been found in mature forest seed banks. Link (1993) reports that seeds of *Arnica sororia* Greene, a similar species, are viable for about five years. In our research, seeds were still viable after three years of storage under cool, dry conditions.



Figure 88. Seeds of *Arnica cordifolia*.
Rule divisions are 0.5 mm.

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(continued)**

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Considerations for Growing

Techniques for Seed Production

Seed treatment: Germination tests suggest that seed stratification is slightly beneficial, and that emergence will be more successful under cool conditions (Burton and Burton 2001b).

Soil considerations: Requires loamy, well prepared soils, firm seedbed.

Stand establishment: Site should be free of all weeds, especially rhizomatous grasses, because there are currently no selective herbicides that can be used once plants are growing. Stands can either be established from rhizomes (Reed 1993), from seedlings started in the greenhouse, or from seed; appears to establish more successfully from seedlings started in a greenhouse.

Row spacing: Unknown; suggest 75-120 cm under dry land conditions, 30-90 cm under irrigation.

Seeding 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.

Stand maintenance: Regularly cultivate rows and spot spray with herbicide to keep plot weed free; annual fertilization with low N formulations may extend life of the plot.

Harvesting and Seed Processing

Dates of selective harvesting in the Bulkley Valley of northwestern B.C. have ranged from June 28th to September 26th. Watch the plants carefully and harvest seeds as soon as they are ripe because they easily dislodge and blow away.

Hand clipping: May or may not be a suitable harvesting method, as the ability for immature seeds to ripen after clipping is unknown. Hold the seed heads over bins placed alongside the plants being clipped or place a bag over the seed heads before clipping to minimize seed loss.

Vacuum: Vacuum ripe seed heads selectively as they ripen by placing vacuum cleaner intake completely over seed head.

Seed stripper: Not recommended for harvesting this species, though presumably could be done with a fine-threaded harvesting head on a uniformly ripened crop.

Combine/thresher settings: Repeated runs at 1241 rpm with 4 mm gap; remove fluff between runs by hand or using a vacuum.

Seed cleaning: Run threshed material through fanning mill screens: prescreen 1.2 x 7.1 mm; top screen 1.8 x 12.7 mm; bottom blank.

Storage requirements: Cool dry storage.

Considerations for Use in Revegetation

- *Arnica cordifolia* is reported to grow on wet to mesic soils in Alberta (Gerling et al. 1996).
- Reported to have poor forage value for livestock and to be potentially toxic (Gerling et al. 1996) but *Collins and Urness (1983) report that it is an important constituent of summer diets of mule deer and elk.
- Germination in the field has been poor, though, so revegetation from seedlings is recommended if ground cover is required quickly (Burton and Burton 2001b).
- *Arnica cordifolia* is moderately fire resistant, sprouting from surviving rhizomes after fire; also regenerates from wind-dispersed seeds (Reed 1993).

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(Considerations for Use in Revegetation, continued)

- *Arnica cordifolia* has low resistance to repeated human trampling (*Cole 1988, *Powell 1988).
*fide Reed 1993a.

Other considerations

- *Arnica cordifolia* has good potential for cultivation in woodland gardens (Douglas 1982).
- Both wild and cultivated *Arnica* species are used in as many as 300 hundred drug preparations in Europe and about 20 products in Canada (Small and Catling 2000). Medicinal and nutraceutical properties of *Arnica cordifolia* have yet to be fully explored.

Notes

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.