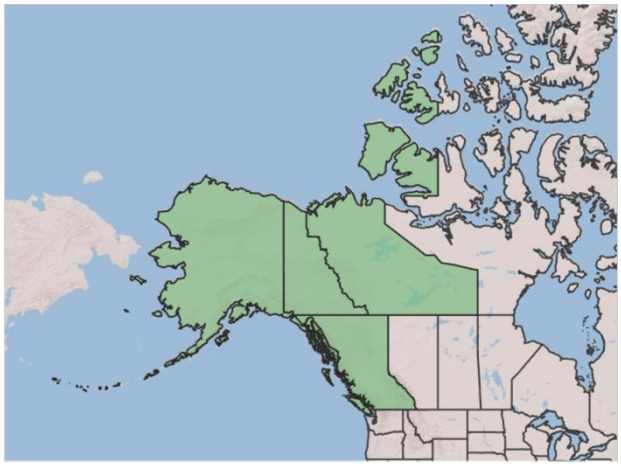
Ica frigida
Plant Propagation Protocol for *Arnica Frigida*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/*2024/ARFR2.pdf*

Arnica frigida
Snow Arnica
(Credit: Allen Charlier)

TAXONOMY	
Plant Family	
Scientific Name	Asteraceae (1)
Common Name	Sunflowers
Species Scientific Name	
Scientific Name	*Arnica frigida* C.A. Mey. Ex. Iljin Snow Arnica

Varieties	Arnica × diversifolia Greene (pro sp.) [amplexicaulis or mollis × cordifolia or latifolia] - rayless arnica Arnica acaulis (Walter) Britton, Sterns & Poggenb. - common leopardbane Arnica alpina (L.) Olin [excluded] Arnica amplexicaulis Nutt. - clasping arnica Arnica angustifolia Vahl - narrowleaf arnica Arnica cernua Howell - serpentine arnica Arnica chamissonis Less. - Chamisso arnica Arnica cordifolia Hook. - heartleaf arnica Arnica dealbata (A. Gray) B.G. Baldw. - mock leopardbane Arnica discoidea Benth. - rayless arnica Arnica fulgens Pursh - foothill arnica Arnica gracilis Rydb. - smallhead arnica Arnica lanceolata Nutt. - lanceleaf arnica Arnica latifolia Bong. - broadleaf arnica Arnica lessingii Greene - nodding arnica Arnica lonchophylla Greene - longleaf arnica Arnica longifolia D.C. Eaton - spearleaf arnica Arnica louiseana Farr - Lake Louise arnica Arnica mollis Hook. - hairy arnica Arnica montana L. - mountain arnica Arnica nevadensis A. Gray - Nevada arnica Arnica ovata Greene - sticky leaf arnica Arnica parryi A. Gray - Parry's arnica Arnica rydbergii Greene - Rydberg's arnica Arnica sororia Greene - twin arnica Arnica spathulata Greene - Klamath arnica Arnica unalaschcensis Less. - Alaska arnica Arnica venosa H.M. Hall - Shasta County arnica Arnica viscosa A. Gray - Mt. Shasta arnica (3)
Sub-species	*Arnica frigida* has no subspecies. It is the subspecies of *Arnica griscomii* (6)
Cultivar	None. Plant is mostly found in its natural habitat.
Common Synonym(s)	*Arnica frigia ssp.griscomii* *Arnica louiseana ssp.griscomii* *Arnica louiseana var. griscomii* (7)
Common Name(s)	Frigid arnica Snow arnica Snow Leopardbane Lake Louise Arnica (5)

Species Code (as per USDA Plants database)	ARFR2
GENERAL INFORMATION	
Geographical range	 (9)
Ecological distribution	Extreme northern British Columbia and western Northwest Territories east through the Yukon Territory and most of Alaska except Alaskan Peninsula, Aleutians, and the SE Panhandle (4)
Climate and elevation range	Climate: Cold, alpine climates; cool temperatures, well-drained soils, and sunlight. Tolerates *some* shade but grows best in sunny areas. Well-suited to alpine and subarctic environments (3) Elevation: 0 – 4900+ ft (8)
Local habitat and abundance	Alpine, dry, gravelly and rocky areas, gravelly roadsides and slopes (4)
Plant strategy type / successional stage	Stress-tolerator
Plant characteristics	Group: Dicot Duration: Perennial Habit: Forb/herb Root Type: Tap Size: 2-16 inches Fruit: Fruit is a cypsela Bloom Color: Yellow Bloom Time: Jul, Aug (5)
PROPAGATION DETAILS	
Ecotype	Dry rocky slope in foothills of Alaska. Range near Healy, AK (4)
Propagation Goal	Plants (4)
Propagation Method	Seed (4)
Product Type	Container (plug) (4)

Stock Type*	116 mL conetainers (10)
Time to Grow*	7 months (10)
Target Specifications	Multiple leaves, firm root plug (4)
Propagule Collection Instructions	Hand-picked when seeds ripen in early to mid-July in interior Alaska (4)
Propagule Processing/Propagule Characteristics	Pappus hairs removed with Westrup LA-H, screened, and air-blown Seed per Pound: 340200 (4)
Pre-Planting Propagule Treatments	Needs approximately 5 months of cold moist stratification. In Alaska, seed is sown in the Fall and overwintered where it's exposed to outside ambient temperatures. Soil: Upland, well-drained, calcium-rich preferred (but not necessary) (2, 4)
Growing Area Preparation / Annual Practices for Perennial Crops	Seed containers are moved into the greenhouse in Spring for germination; then moved to the lathhouse after several true leaves appear (4)
Establishment Phase Details	Requires cold stratification. Sow in Fall for germination in following Spring (4)
Length of Establishment Phase*	4 weeks (10)
Active Growth Phase*	After seedlings have been established, plants develop rapid shoot and root growth 2-4 weeks after germination. Plants are fertilized with 20-20-20 liquid NPK at 100 ppm weekly during growing season. (10)
Length of Active Growth Phase*	12 weeks (10)
Hardening Phase*	Plants are fertilized with 10-20-20 liquid NPK at 200 ppm in early fall. Containers are leached with water. Irrigation is gradually reduced through Sep-Oct (10)
Length of Hardening Phase*	4 weeks
Harvesting, Storage and Shipping*	Seeds are collected into paper or cloth bags (no plastic). After seed has been harvested, it is dried, cleaned, and stored (2) Overwinter in outdoor nursery under insulating foam cover and snow (10)
Length of Storage*	5 months
Guidelines for Outplanting / Performance on Typical Sites*	Seedlings outplanted first year in July and August (10)
Other Comments	None
INFORMATION SOURCES	

References	1. "Classification for Kingdom Plantae Down to Genus Arnica L." USDA Plants Database. https://plants.usda.gov/home/classification/32098. Accessed 23 Apr. 2024. 2. "Guidelines for Planting Seeds of Alaska Native Plants from the Native Plant Nursery 2004." Alaska Department of Natural Resources, 2004. https://dnr.alaska.gov/ag. Accessed 23 Apr. 2024. 3. Petersen, Lee. "Snow Arnica - Arnica Griscomii - Alaska Wildflowers." Lee Petersen. 19 Mar 2021. www.lwpetersen.com/alaska-wildflowers/snow-arnica-arnica-griscomii/. Accessed 23 Apr 2024. 4. Moore, Nancy. Ross, Donald. "Propagation Information for: Arnica (frigida)." U.S. Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. 2004. https://npn.rngr.net. Accessed 23 Apr 2024. 5. TWC Staff. "Plant Database." Lady Bird Johnson Wildflower Center - The University of Texas at Austin. 2 Mar 2023. www.wildflower.org/plants/result.php?id_plant=ARFR2. Accessed 23 Apr 2024. 6. "Snow Arnica." U.S. Fish & Wildlife Service. https://www.fws.gov/species/snow-arnica-arnica-griscomii-ssp-frigida. Accessed 14 May 2024. 7. Haber, E. "Arnica frigida ssp. griscomii." Government of Northwest Territories. 2015. https://www.gov.nt.ca/species-search/arnica-griscomii-arnica-frigida-ssp-griscomii. Accessed 14 May 2024. 8. Wolf, Steven J. "Arnica griscomii subsp. frigida." Flora of North America. 5 Nov 2020. http://beta.semanticfna.org/Arnica_griscomii_subsp._frigida. Accessed 14 May 2024. 9. USDA NRCS National Plant Data Team. "Arnica frigida C.A. Mey. Ex Iljin." U.S. Department of Agriculture. https://plants.usda.gov/home/plantProfile?symbol=ARFR2. Accessed 23 Apr 2024. 10. Luna, Tara. Corey, Susan. Evans, Jeff. Wick, Dale. Hosokawa, Joy. "Protocol Information for: Arnica (cordifolia)." U.S. Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. 2008. https://npn.rngr.net. Accessed 14 May 2024.
Other Sources Consulted	N/A
Protocol Author	Julia Jensen

Date Protocol Created or Updated	05/14/2024
*Indicates a reference plant and protocol were used. For my reference, I chose *Arnica cordifolia* due to its similarity in characteristics to *Arnica frigida*. Not only do these species shares similar morphological traits but they also have comparable growth patterns, and they grow in similar environments (both species tolerate foothills – subalpine climates).	