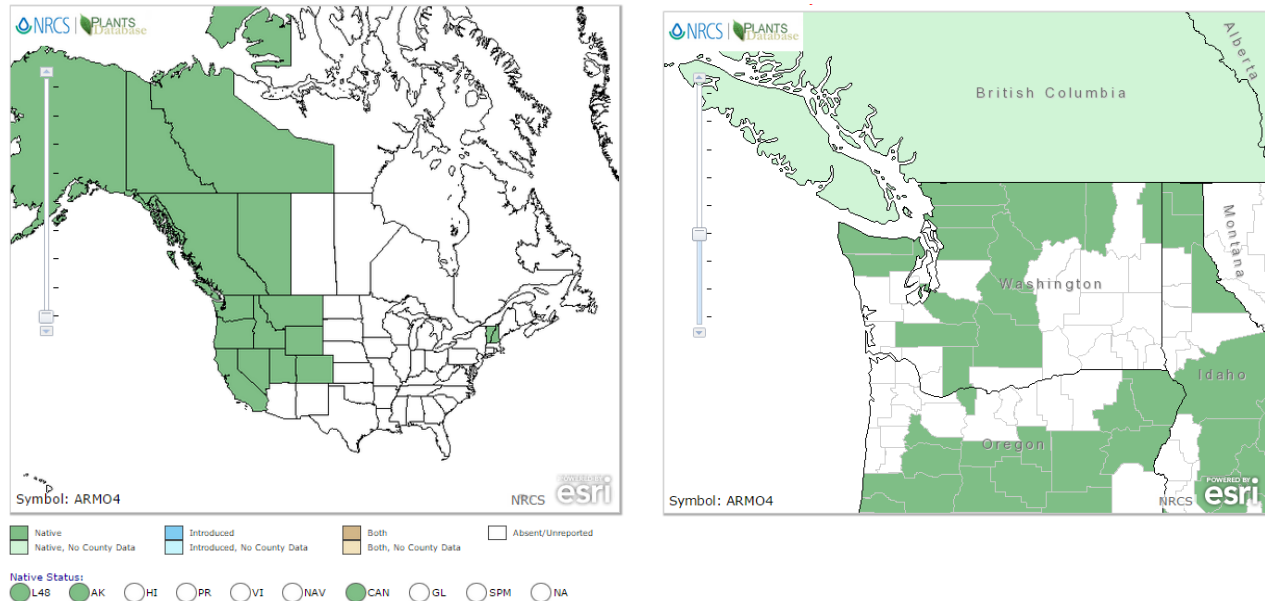


Plant Propagation Protocol for *Arnica mollis* Hook.

ESRM 412 – Native Plant Production

Protocol URL: <https://courses.washington.edu/esrm412/protocols/ARMO4.pdf>



Distribution Map in North America and Washington State¹

TAXONOMY	
Plant Family	
Scientific Name	Asteraceae ¹
Common Name	Aster ¹ Sunflower Family ³
Species Scientific Name	
Scientific Name	<i>Arnica mollis</i> Hook. ¹
Varieties	<i>Arnica mollis</i> Hook. var. <i>aspera</i> (Greene) B. Boivin ¹ <i>Arnica mollis</i> Hook. var. <i>petiolaris</i> Fernald ¹ <i>Arnica mollis</i> Hook. var. <i>silvatica</i> (Greene) Maguire ¹
Sub-species	
Cultivar	
Common Synonym(s)	<i>Arnica subplumosa</i> ^x ARMOS: <i>Arnica mollis</i> Hook. var. <i>silvatica</i> (Greene) Maguire ¹
Common Name(s)	Hairy Arnica ¹ Cordilleran Leopardbane ^x
Species Code (as per USDA Plants database)	ARMO4
GENERAL INFORMATION	
Geographical range	- Asia-China ⁴

	<ul style="list-style-type: none"> - In North America, it ranges from Alaska to California and south through the Rocky Mountain States to Colorado^{10?}. Maps above show distribution in North America and Washington State¹. - Native Status: Alaska, Canada, Lower 48 states¹
Ecological distribution	<p>It is most common in the Subalpine, Alpine, or Meadow classification. It is found in moist soil of meadows, open forest, and along streams³.</p> <p>Wetland indicator status: facultative (Hydrophyte. Occur in wetlands and non-wetlands)¹</p> <p>U.S. Distribution by Watershed¹⁰:</p> <ul style="list-style-type: none"> - Watershed Region 04: Winooski River (04150403)+*, Lamoille River (04150405)+* - Water Watershed Region 19: Mainland (19010201)+, Upper Susitna River (19020501)+
Climate and elevation range	<ul style="list-style-type: none"> - Elevation 1590 to 3620 meters - Annual Precipitation: 22 to 121 inches - Wet Season: 6 to 10 months - Temperature Range $\leq 61^{\circ}\text{F}$ - December Low 12°F, July High 82°F, July Low 38°F - Warm Season 0 to 3 months - Hardiness Zones 5b to 7b (-15 to 10°F) - Medium drought tolerance^{4?}
Local habitat and abundance	<ul style="list-style-type: none"> - Found In: Olympic NP, Mt. Rainier NP, N Cascades NP, Crater Lake NP, Wallowas, Steens^x
Plant strategy type / successional stage	<ul style="list-style-type: none"> - Life cycle habit: perennial^x - Shedability: Deciduous - Active growth period: spring and summer - Slow growth - Will not resprout - Seed period begins and ends in autumn - Seed is not persistent - Seeds spread slowly^x - Medium shade, high moisture, no salt^x
Plant characteristics	<ul style="list-style-type: none"> - Forb/herb¹ - Plant erect, covered with short to long hairs and glands⁵.

	<ul style="list-style-type: none"> - Stems are hairy and sticky, numerous, seldom branched⁵. - Flowers orange/yellow. Flower heads have 12–18 ray flowers 1/3–1 1/3 in. long⁵. - Leaves on stem, 2–4 pairs, mostly sessile, elliptical, to 8 in. long, entire or uneven and shallowly toothed; lowest leaf generally longest⁵. - Height: 8--24 inches⁵
PROPAGATION DETAILS 1	
Ecotype	Logan Pass, Glacier National Park, MT ³ .
Propagation Goal	Plants ³
Propagation Method	Seed ³
Product Type	Container (plug) ³
Stock Type	116 ml containers ³
Time to Grow	6 Months ³
Target Specifications	Stock Type: Container seedling Height: Multiple leaves Caliper: N/A Root System: Firm plug in containers ³ .
Propagule Collection Instructions	Seeds are collected in early September at high elevations when the pappus turns tan and is fully extended ³ . Seeds are grey at maturity ³ . Seeds are hand collected in paper bags and kept in a drying shed prior to cleaning ³ .
Propagule Processing/Propagule Characteristics	Seeds are cleaned using a hammermill at NRCS> Seeds/kg: 990,000/kg Seed dormancy is classified as physiological dormancy. Seed Longevity: 5 to 7 years in sealed containers at 3C. % Germination: 82% ³
Pre-Planting Propagule Treatments	Seeds are placed into a 60 day cold moist stratification in the refrigerator at 3C ³ . Seeds are moistened with distilled water and wrapped in paper towels and placed in an open plastic bag ³ . Check seeds weekly for moisture ³ .
Growing Area Preparation / Annual Practices for Perennial Crops	Greenhouse. Sowing Method: Direct Seeding. Seeds are lightly covered with perlite. Plants are sown in early March in the greenhouse and later moved to the outdoor nursery

	<p>in late May.</p> <p>Container Type and Volume: Seedlings are grown in 160 ml containers.</p> <p>Growing Media used is 6:1:1 milled sphagnum peat: perlite : vermiculite³.</p>
Establishment Phase Details	Cotyledons emerge 10 days after sowing. True leaves emerge 14 days after sowing ³ .
Length of Establishment Phase	4 weeks ³
Active Growth Phase	Once, established, seedlings develop rapid shoot and root growth. Seedlings are fertilized with 20-10-20 liquid NPK fertilizer at 100 ppm weekly during the active growth phase ³ .
Length of Active Growth Phase	8 weeks ³
Hardening Phase	Seedlings are fertilized with 10-20-20 liquid NPK fertilizer 2 to 4 weeks before outplanting ³ .
Length of Hardening Phase	4 weeks ³
Harvesting, Storage and Shipping	Seedlings were outplanted the first year in July and August ³ .
Length of Storage	
Guidelines for Outplanting / Performance on Typical Sites	<p>Outplanting Site: Logan Pass, Glacier National Park, MT</p> <p>Outplanting Date: July and August³.</p>
Other Comments	

INFORMATION SOURCES

References	See Below
Other Sources Consulted	See Below
Protocol Author	Mahshid Gharibimarzancola
Date Protocol Created or Updated	05/20/15

References

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