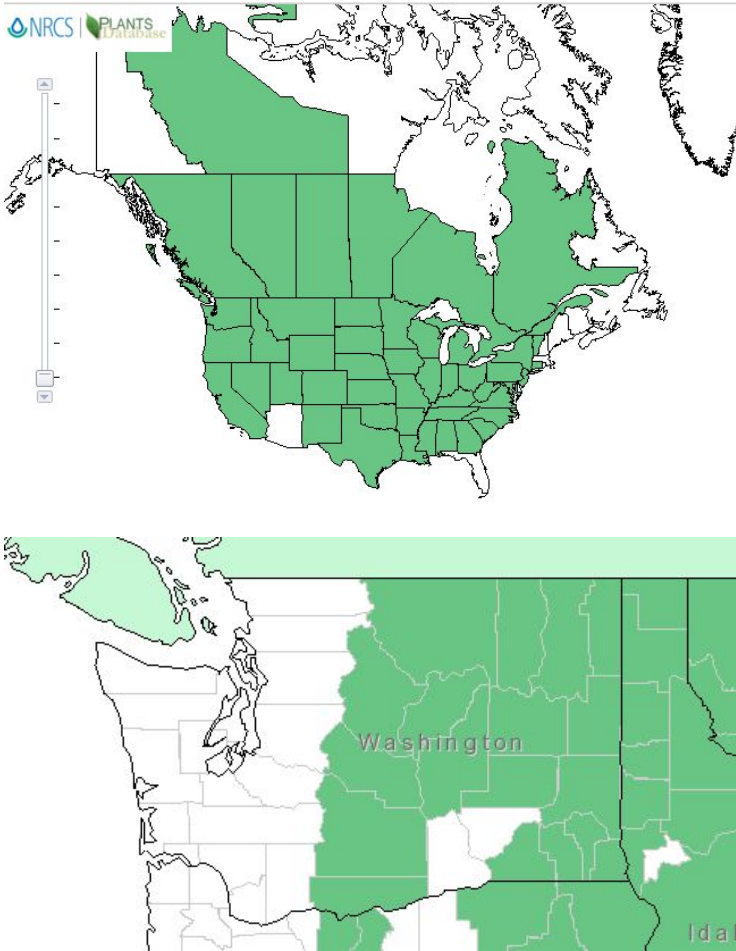


Plant Propagation Protocol for *Astragalus canadensis*

ESRM 412 – Native Plant Production

Protocol URL: <https://courses.washington.edu/esrm412/protocols/ASCA11.pdf>

TAXONOMY	
Plant Family	
Scientific Name	Fabaceae ¹⁰
Common Name	Legume Family
Species Scientific Name	
Scientific Name	<i>Astragalus canadensis</i> L. <i>Astragalus canadensis</i> L. var. <i>Canadensis</i> <i>Astragalus canadensis</i> L. var. <i>brevidens</i> (Gandog) Barneby <i>Astragalus canadensis</i> L. var. <i>mortonii</i> (Nutt.) S. Watson ¹⁰
Varieties	<i>Astragalus canadensis</i> var. <i>Brevidens</i> (Gandog) Barneby <i>Astragalus canadensis</i> L. var <i>canadensis</i> <i>Astragalus canadensis</i> var. <i>Mortonii</i> (Nutt.) S. Watson ¹⁰
Sub-species	N/A
Cultivar	N/A
Common Synonym(s)	<i>Astragalus canadensis</i> var. <i>brevidens</i> <i>Astragalus canadensis</i> var <i>canadensis</i> <i>Astragalus canadensis</i> var. <i>mortonii</i> ¹⁰
Common Name(s)	Canadian Milkvetch ¹⁰ Short-toothed Canadian Milkvetch Morton's Canadian Milkvetch ⁹ Little Rattlepod ⁵
Species Code (as per USDA Plants database)	ASCA11 ¹⁰
GENERAL INFORMATION	

<p>Geographical range</p>	<p>Distributed extensively across the United States and Canada becoming rare or non-existent in parts of the southeastern and southwestern United States.^{1,8}</p>  <p>The figure consists of two maps. The top map is a map of North America showing the distribution of a species, with green shading indicating its range across most of the United States and Canada. A scale bar and a small inset map of the Pacific Northwest are also shown. The bottom map is a detailed map of the Pacific Northwest region, showing the distribution of the species in Washington and Idaho, with green shading indicating its range.</p>
<p>Ecological distribution</p>	<p>Prefers moist conditions with wet mesic to mesic soils. Commonly seen in small colonies in prairie habitats or disturbed areas.⁵</p>
<p>Climate and elevation range</p>	<p>Full sun.⁵ Widely distributed.⁸</p>
<p>Local habitat and abundance</p>	<p>Most likely found on moist sites in or near woodlands, moist prairies, along stream corridors and near disturbed areas like roads.⁸ Species has the versatility to survive on many different soil types and conditions although will not do well on dry upland sites.⁸</p>

Plant strategy type / successional stage	Colonizer in suitable areas. ⁹ Plant fixes Nitrogen into the soil.
Plant characteristics	Forb. ¹⁰ Perennial legume with rhizomatous root structure. ⁸ Short-lived species, lives about 3-4 years. Leaves are odd-pinnately compound with medium green leaflets that are 1 to 4 cm long, and 5 to 15 mm wide, they are smooth or slightly hairy on upper surface with stiff short hairs on the underside. ⁹ Flowers are creamy, greenish white, 1/2 to 3/4 inch long, on a dense spike. ⁹
PROPAGATION DETAILS	
Ecotype	N/A
Propagation Goal	Plants, Seed
Propagation Method	Seed
Product Type	Propagules
Stock Type	Direct Seed
Time to Grow	N/A
Target Specifications	Mature plants able to produce seed.
Propagule Collection Instructions	Seed matures in mid August-early September. ⁵ Collect pods by hand or with a combine August-October before insects eat the seeds. Pods will split partially open at maturity causing seeds to fall out if passing animals or a strong wind disturbs the pods. ⁵
Propagule Processing/Propagule Characteristics	Fruit is a smooth, oval pod about a 1/2 inch long. ² Look for the remains of the flower style on the pod which forms a characteristic "tail" at the top. ² Inside the pod, seeds are small, smooth and brownish-yellow green turning brown at maturity. ⁵ The number of seeds/lb varies but averages 266,000 to 275,000 seeds/lb. ⁹
Pre-Planting Propagule Treatments	If available use Westrup Model LA-P Laboratory Clipper/De-awner to open pods mechanically and free the seed. ⁴ Clean seed with an air screen using an office Clipper, with a top screen: 1/2 round and a bottom screen: 1/23 round running at medium speed with high

	<p>air.⁴ Store seeds in refrigerated conditions (50°F, 30% RH).⁵ Also noted that if seed was air dried it is possible to pre-clean the material using a ½” and ¼” mesh to remove large chaffe.⁵ If pods were hand-harvested, break up pods with a brush machine.⁵ If they were combined, use an air screen to clean.⁵ Scarification and a brief period of moist stratification for 1 month are recommended.⁶ Inoculate with species appropriate <i>rhizobia</i> bacteria before planting.^{3,9}</p>
Growing Area Preparation / Annual Practices for Perennial Crops	Prepare weed free and firm seedbed ⁹ .
Establishment Phase Details	<p>Direct seeding at the site is recommended. Seed in spring before May 15 or sow after October 30 for dormant seeding.⁹ If appropriate, plant as part of Native Grass/Forb mix. Planting 1/10 to 1/4 PLS lb/ac as part of a mix should produce desirable densities.⁹ When higher densities are needed, such as along stream bank corridors, 1 to 2 PLS lb/ac is recommended.⁹ Plant seed at a depth of 1/2 to 3/4 inches into a firm seedbed using the legume setting on a grass seed drill.⁹ Another preferred method is to mix the <i>A. canadensis</i> seed with other native species to be broadcast in a seed drill. <i>A. canadensis</i> seed may settle to the bottom if added all at once therefore seed should be added at frequent intervals.⁹ If conditions are not compatible to seed with a drill, double the seeding rate and broadcast, then lightly cover by harrowing.⁹</p>
Length of Establishment Phase	4-9 weeks until germination occurs. ³ Allow one year for successful establishment. ⁵
Active Growth Phase	N/A
Length of Active Growth Phase	N/A
Hardening Phase	N/A
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	N/A

Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	Bloom and seed set more prolific at the end of the second year. ⁵
Other Comments	N/A
PROPAGATION DETAILS	
Ecotype	N/A
Propagation Goal	Plants, Seed
Propagation Method	Seed
Product Type	Propagules
Stock Type	Start in greenhouse.
Time to Grow	N/A
Target Specifications	Mature plants able to produce seed.
Propagule Collection Instructions	Seed matures in mid August-early September. ⁵ Collect pods by hand or with a combine August-October before insects eat the seeds. Pods will split partially open at maturity causing seeds to fall out if passing animals or a strong wind disturbs the pods. ⁵
Propagule Processing/Propagule Characteristics	Fruit is a smooth, oval pod about a ½ inch long. ^{2, 5} Look for the remains of the flower style on the pod which forms a characteristic “tail” at the top. ² Inside the pod, seeds are small, smooth and brownish-yellow green turning brown at maturity. ^{5, 8} The number of seeds/lb varies but averages 266,000 to 275,000 seeds/lb. ⁹
Pre-Planting Propagule Treatments	If available use Westrup Model LA-P Laboratory Clipper/De-awner to open pods mechanically and free the seed. ⁴ Clean seed with an air screen using an office Clipper, with a top screen: ½ round and a bottom screen: 1/23 round running at medium speed with high air. ⁴ Store seeds in refrigerated conditions (50°F, 30% RH). ⁵ Also noted that if seed was air dried it is possible to pre-clean the material using a ½” and ¼” mesh to remove large chaffe. ⁵ If pods were hand-harvested,

	break up pods with a brush machine. ⁵ If they were combined, use an air screen to clean. ⁵ Scarification and a brief period of moist stratification for 1 month are recommended. ⁶ Inoculate with species appropriate <i>rhizobia</i> bacteria before planting. ^{3,9}
Growing Area Preparation / Annual Practices for Perennial Crops	Prepare weed free and firm seedbed. ⁵ Consider installing temporary weed barrier that can be removed before the second growing growing season in order to accommodate plant spreading from stolons. ⁵
Establishment Phase Details	Sow seed in greenhouse 2 months before last frost. ⁵ After frost danger has passed, transplant mature seedlings outside into rows that can accommodate tillage equipment. ⁵ Combine at maturity. ⁵
Length of Establishment Phase	4-9 weeks until germination occurs. ³ Allow one year for successful establishment. ⁵
Active Growth Phase	N/A
Length of Active Growth Phase	N/A
Hardening Phase	N/A
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	N/A
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	Bloom and seed set is more prolific at the end of the second year. ⁵
Other Comments	N/A
INFORMATION SOURCES	
References	<ol style="list-style-type: none"> 1. "Astragalus Canadensis: Conservation Status." <i>Astragalus Canadensis</i>. NatureServ Explorer, n.d. Web 23 Apr. 2016 2. "Astragalus Canadensis (Canada Milkvetch): Minnesota Wildflowers." <i>Astragalus Canadensis</i>. Minnesota Wildflowers, n.d. Web 23 Apr 2016.

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Other Sources Consulted	<ol style="list-style-type: none"> 1. "Astragalus Canadensis (Canadian Milk Vetch) MNFI Rare Species Explorer." <i>Astragalus Canadensis (Canadian Milk Vetch) MNFI Rare Species Explorer</i>. Massachusetts State University, n.d. Web. 23 Apr. 2016. 2. "Canada Milkvetch (Astragalus Canadensis)." <i>Canada Milkvetch (Astragalus Canadensis)</i>. Illinois Wildflowers, n.d. Web. 23 Apr. 2016. 3. "Propagating Native Plants." Technical Guide #3. Tall Grass Prairie Center, n.d. Web. 23 Apr. 2016. 4. Turner, Mark, and Gustafson, Phyllis. <i>Wildflowers of the Pacific Northwest</i>. Portland, Or.: Timber, 2006. Print. Timber Press Field Guide
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Date Protocol Created or Updated	04/23/16