

Plant Propagation Protocol for *Wyethia amplexicaulis*
 ESRM 412 – Native Plant Production



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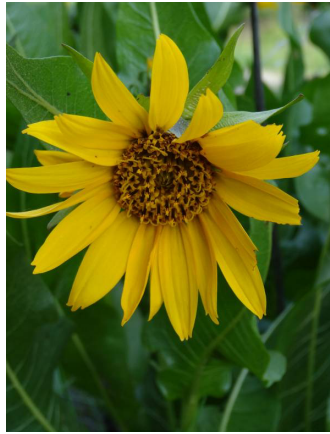


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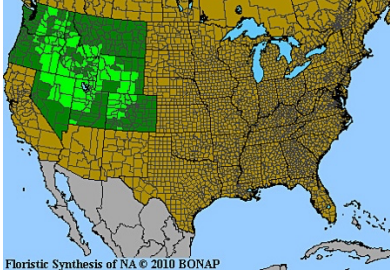
URL: [https://courses.washington.edu/esrm412/protocols/\[2021\]/\[WYAM.pdf\]](https://courses.washington.edu/esrm412/protocols/[2021]/[WYAM.pdf])

This propagation protocol template was modified by E.M Graham from that available at:
<http://courses.washington.edu/esrm412/protocols/2007/WYAM.pdf>

“*” – revisions to 2007 protocol

TAXONOMY	
Plant Family	ASTERACEAE
Scientific Name	<i>Wyethia amplexicaulis</i>
Common Name	Mule’s ears
Species Scientific Name	<i>Amplexicaulis Nutt.</i>
Scientific Name	<i>Wyethia amplexicaulis</i>
Varieties	N/A
Sub-species	N/A
Cultivar	N/A.
Common Synonym(s)	*black sunflower, wyethia, mule-ears, mule ear dock (Matthews.), smooth dwarf sunflower (Knoke.) * <i>Espeletia amplexicaulis</i>
Common Name(s)	Mule’s ears
Species Code (as per USDA Plants database)	WYAM

GENERAL INFORMATION

<p>Geographical range</p>	<p>*From Washington to Montana and south to Colorado and Nevada. East of the Cascade crest in Washington and east to the Rocky Mountains.</p> <div style="text-align: center;">  <p style="font-size: small;">Floristic Synthesis of NA © 2010 BONAP Light green- species native Dark green- species present</p> </div>
<p>Ecological distribution</p>	<p>*Requires mean annual precipitation ranges from 10-18 inches (Parker, 2014). In eastern Washington it occurs in dry to mesic open slopes and meadows from sagebrush to open Ponderosa pine forest. In the northwestern US its wetland status is classified as FAC- (US Fish and Wildlife Service, 1988). East of the Cascades from British Columbia to Oregon (Knoke)</p>
<p>Climate and elevation range</p>	<p>*Moderate elevations 4,500 to 11,000 ft. Grows well on gentle to moderately steep slopes (Matthews).</p>
<p>Local habitat and abundance</p>	<p>Open ponderosa pine forest, sagebrush forest, and other *seral coniferous forests within its range (Parker).</p>
<p>Plant strategy type / successional stage</p>	<p>*Mule-ears is highly competitive and an aggressive species. You will often find them in large, dense, close to pure stands (Matthews).</p> <p>*Because livestock do not eat it, it has been considered a range pest and attempts have been made to eradicate it from range (Craighead et al 1963).</p>
<p>Plant characteristics</p>	<p>*Mule-ears is a native, perennial forb with stems up to 32 inches tall. Large, shiny, round leaves. There are usually several “sun-flower like” heads surrounded by smaller yellow flowers. (USDA 2014). Flowers May-June.</p>
<h2 style="margin: 0;">PROPAGATION DETAILS</h2>	
<p>Ecotype</p>	<p>Paradise Creek drainage near Pullman, Washington</p> <p>Habitat: Slightly moist spots in the shrub-steppe, to open areas at mid-elevation. (Knoke)</p>

Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	N/A
Time to Grow	10 months
Target Specifications	Tight root plug in
Propagule Collection Instructions	*Fruit is an achene- compressed quadrangular (Knocke). Seed is collected in late July or early August when the inflorescence is dry and the seeds are dark brown in color. Seed heads are clipped from the plants and stored in paper bags at room temperature until cleaned.
Propagule Processing/Propagule Characteristics	Seed dormancy is physiological dormancy. Small amounts are crushed by hand to free the seed, then cleaned with an air column separator. Larger amounts are threshed with a hammermill, then cleaned with air screen equipment. Clean seed is stored in controlled conditions at 40 degrees Fahrenheit and 40% relative humidity. We determined 28,200 seeds/lb. for this ecotype.
Pre-Planting Propagule Treatments	Seed from northern Nevada and California requires 4 weeks of cool, moist stratification (Young and Evans, 1979). Mirov also reported that California seeds needed prechilling before germination (Mirov, 1936). Baskin and Baskin report that seeds possess physiological dormancy that is broken by cold stratification (Baskin and Baskin, 2002). Unpublished data from trials conducted at the Pullman Plant Materials Center revealed that low rates of germination occurred without stratification and with 45 days of cold, moist stratification. 90 or more days of cold, moist stratification resulted in 79% germination.
Growing Area Preparation / Annual Practices for Perennial Crops	In November seed is sown in 10 cu. in. Ray Leach Super cell conetainers filled with Sunshine #4 and covered lightly. A thin layer of pea gravel is applied to prevent seeds from floating. Conetainers are watered deeply and placed outside. Alternately, seed can be moist stratified in a refrigerator for 90 days before sowing in the greenhouse.
Establishment Phase Details	Containers are moved to the greenhouse in mid-February or early March. Germination usually begins in 7-10 days and is complete in 30 days.

Length of Establishment Phase	Two weeks
Active Growth Phase	Plants are watered deeply every other day and fertilized once per week with a complete, water soluble fertilizer containing micro-nutrients. Plants are moved to the lath house in June. They are watered every other day if the weather is cool, and every day during hot, dry spells. They are fertilized once per week with a water-soluble complete fertilizer containing micro-nutrients. Fertilizer and water are reduced as fall approaches. Plants may only develop 2-3 true leaves during this period and may become dormant during the late summer.
Length of Active Growth Phase	6-7 months
Hardening Phase	*Since the plants are grown outside, additional hardening is not needed (Skinner).
Length of Hardening Phase	*Plant is grown outside, so additional hardening is not needed (Skinner).
Harvesting, Storage and Shipping	If sufficient root growth has occurred, plants may be transplanted to the field in late fall. If the plants have not yet developed a tight root plug, they should be held over winter. Rapid root growth will occur with the arrival of early spring temperatures and the plants will be ready for out planting in early May. Those held over winter are left in the lath house with no protection except snow cover, but plants exposed to extreme low temperatures should be afforded some insulation. It may be possible to grow plants more quickly by using refrigerator stratified seed sown directly in the greenhouse at an earlier date, but we have not tried this approach.
Length of Storage	N/A
Guidelines for Out planting / Performance on Typical Sites	Transplanting is done in the late fall or in early May by using an electric drill and portable generator to drill 1.5-inch diameter holes at the planting site. Survival in seed increase plantings without competing vegetation averages 75%. Transplanting into sites with existing vegetation reduces survival and vigor depending on weather conditions following planting. Flowering and seed production occurs 4-5 years after transplanting
Other Comments	Some insect seed predation has been noted. A planting made in 1998 yielded its first good crop of seed in 2004.

	*“It may be possible to grow plants more quickly by using refrigerator stratified seed sown directly in the greenhouse at an earlier date, but we have not tried this approach” (Skinner).
INFORMATION SOURCES	
References	See Below
Other Sources Consulted	Marit Gustin (Master Gardener specializing in propagation).
Protocol Author	Dave M Skinner
Date Protocol Created or Updated	Created: 2007 Updated: 2008 Protocol revised by E.M Graham: May 2021

References

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