

Plant Propagation Protocol for *Pediocactus nigrispinus*

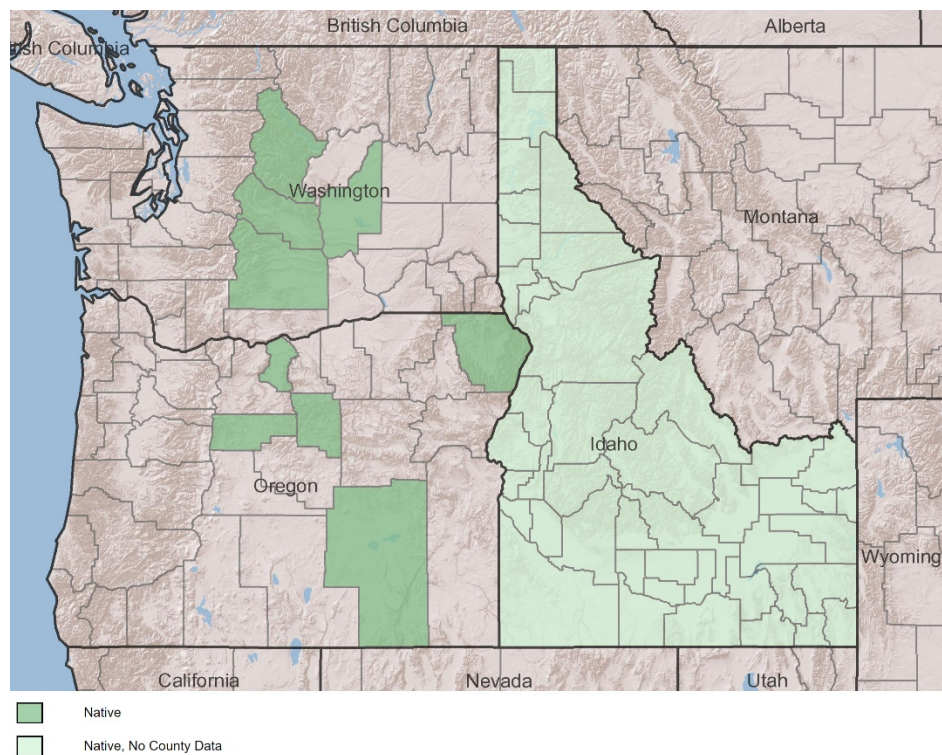
ESRM 412 – Native Plant Production

URL: <https://courses.washington.edu/esrm412/protocols/2021/PENI5.pdf>



Credit: Left – H. Tim Gladwin, Right – Robert L. Carr⁸

Pediocactus nigrispinus Distribution¹⁰



TAXONOMY	
Plant Family	
Scientific Name	Cactaceae
Common Name	Cactus Family
Species Scientific Name	
Scientific Name	<i>Pediocactus nigrispinus</i> (Hochstätter) Hochstätter
Varieties	No varieties in USDA Plants Database
Sub-species	No subspecies in USDA Plants Database
Cultivar	None since <i>Pediocactus nigrispinus</i> is rarely propagated
Common Synonym(s)	<i>Pediocactus nigrispinus</i> (Hochstätter) Hochstätter var. <i>beastonii</i> Hochstätter <i>Pediocactus nigrispinus</i> (Hochstätter) Hochstätter ssp. <i>beastonii</i> <i>Pediocactus nigrispinus</i> (Hochstätter) Hochstätter ssp. <i>puebloensis</i> Hochstätter <i>Pediocactus simpsonii</i> (Engelm.) Britton & Rose var. <i>nigrispinus</i> Hochstätter ¹⁰
Common Name(s)	Snowball cactus ¹⁰ , hedgehog cactus, dark spine-ball cactus ⁴
Species Code (as per USDA Plants database)	PENI5 ¹⁰
GENERAL INFORMATION	
Geographical range	See above. Only PNW distribution is shown because <i>Pediocactus nigrispinus</i> is not found outside of Washington, Oregon, and Idaho.
Ecological distribution	Shrub steppe
Climate and elevation range	300 – 1200 m elevation ⁴
Local habitat and abundance	Thin, rocky soil on ridge tops, desert valleys, and low mountains ¹¹ . Grows among scabland sagebrush (<i>Artemisia rigida</i>), thymeleaf buckwheat (<i>Eriogonum thymoides</i>), Sandberg bluegrass (<i>Poa secunda</i>), hairy balsamroot (<i>Balsamorhiza hookeri</i>), etc. Endemic to a small range ³ .
Plant strategy type / successional stage	<i>Pediocactus nigrispinus</i> ’ ability to survive in its specific harsh habitat may provide an advantage over competitive species ¹¹ .
Plant characteristics	Stem is a spherical form with many tubercles (conical protuberances with spines) ⁴ . Usually about the size of a baseball but may be twice as large or larger in ideal conditions. Stem stores water – size fluctuates with water storage. May have one or multiple stems ³ . Multiple pink,

	magenta, yellow, yellow-green, or white flowers ⁷ bloom atop stem ³ . Needle-like to hair-like ⁷ reddish-brown or white spines ⁴ . Rarely has a contorted form ² . It is a rare species endangered by collectors; S2 ranking – high risk of local extinction ³ .
PROPAGATION DETAILS*	
Germination testing of <i>Pediocactus nigrispinus</i> as Detailed by Shank**⁹	
Ecotype	Information not provided by Shank.
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	4" pot
Time to Grow	Grows at a rate of ~0.5"/year ⁵ .
Target Specifications	Plants outgrow 3.25" pots, transplanted to 4" pot
Propagule Collection Instructions	Harvest as fruits before release ¹ ; seed is released in late June or early July. Higher elevations and harsher winters may move timing by a week or more ⁴ . Bockelman harvested fruits on 17-19 of June at 1100 m elevation in Kittitas County, WA ¹ .
Propagule Processing/Propagule Characteristics	Information not provided by Shank.
Pre-Planting Propagule Treatments	Stratify for 12 weeks at 5° C/2° C day/night temperatures, then move to Spring temperatures (16° C day/8° C night). Shank found that stratification produced 100% germination rate in 4 weeks, while direct sowing into summer temperatures had a 90% germination rate in 3 weeks.
Growing Area Preparation / Annual Practices for Perennial Crops	Seeds are sown into 2.5" x 3.25" pots with a 1:1:1 mixture of Pro-Mix HP:pumice:coarse sand
Establishment Phase Details	Sow into Spring temperatures after stratification. Top-dress with a thin layer of pumice and fertilize lightly (Shank used Apex 14-14-14). Keep consistently moist.
Length of Establishment Phase	4 weeks
Active Growth Phase	Water thoroughly. Allow plants to dry out between waterings.
Length of Active Growth Phase	Unknown
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	Further study is needed to determine ideal conditions so that plants survive after outplanting ¹ .
Other Comments	Do not transplant – this rarely works and reduces populations ³ . Seeds of this plant should only be collected for research or to save it from imminent

	destruction. Work with the Washington Natural Heritage Program and other appropriate agencies ¹² . Permission is required for harvest from private landowners and permits may be required for harvest from BLM or State Park land ⁶ .
INFORMATION SOURCES	
References	See below.
Other Sources Consulted	See below.
Protocol Author	Miguel Orr
Date Protocol Created or Updated	5/22/2021

*The 'Propagation Details' section draws heavily from the work of another, as indicated at the top of the section. Information in each of these sections is edited slightly for cohesion. Information provided by others is indicated by a citation.

**Plants were grown for germination testing, not for sale or outplanting⁹. Therefore, some information is lacking and applicability to other contexts may be limited.

References:

- ¹ Bockelman, Ron. "Early Life History of *Pediocactus nigrispinus* from the Shrub-Steppe of Central Washington." *Douglasia* 45.2 (2021). Advance copy provided by author.
- ²—. "Fascinating Fasciated Ball Cacti." *Douglasia* 44.3 (2020): 17.
<https://www.wnps.org/index.php?preview=1&option=com_dropfiles&format=&task=frontfile.download&catid=188&id=913&Itemid=10000000000000>.
- ³—. "Pediocactus nigrispinus - Washington's Only Ball Cactus." *Douglasia* 44.1 (2020): 2.
<https://www.wnps.org/index.php?preview=1&option=com_dropfiles&format=&task=frontfile.download&catid=188&id=855&Itemid=10000000000000>.
- ⁴—. "Phenology of *Pediocactus Nigrispinus* in the Shrub Steppe of Central Washington." *Douglasia* 45.1 (2021): 13-17.
<https://www.wnps.org/index.php?preview=1&option=com_dropfiles&format=&task=frontfile.download&catid=188&id=921&Itemid=10000000000000>.
- ⁵Dringman, Dixie. *Cacti of Washington State - A History*. 31 July 2019. 22 May 2021.
<<https://wenatcheeoutdoors.org/2019/07/31/cacti-of-washington-state-a-history/>>.
- ⁶Fertig, Walter. *Collection of Rare Plants* Miguel Orr. 19-24 May 2021. Email.
- ⁷Hitchcock, C. Leo and Arthur Cronquist. *Flora of the Pacific Northwest: an illustrated manual*. 2nd. Seattle: University of Washington Press , 2018.
- ⁸Knoke, Don and David Giblin. *Pediocactus nigrispinus*. n.d. 21 May 2021.
<<https://biology.burke.washington.edu/herbarium/imagecollection/taxon.php?Taxon=Pediocactus%20nigrispinus>>.
- ⁹Shank, Susan. *Pediocactus propagation* Miguel Orr. 19 - 22 May 2021. Email.
- ¹⁰USDA PLANTS Database. *Pediocactus nigrispinus (Hochstätter) Hochstätter*. n.d. 21 May 2021. <<https://plants.usda.gov/home/plantProfile?symbol=PENI5>>.
- ¹¹Washington Department of Natural Resources, Washington Natural Heritage Program, and U. S. D. I. Bureau of Land Management. "*Pediocactus simpsonii* var. *robustior* ." n.d.

Washington State Department of Natural Resources. 21 May 2021.

<https://www.dnr.wa.gov/publications/amp_nh_pedsim.pdf>.

¹²Washington Native Plant Society. *Policy on Collection and Sale of Native Plants*. 19 August 2018. 22 May 2021. <<https://www.wnps.org/rare-native-plants/policy-on-plant-collection>>.

Other Sources Consulted:

Abbott, J. Anthony. "The Localized and Scaled Discourse of Conservation for Wind Power in Kittitas County, Washington." *Science & Natural Resources* 23.10 (2010): 969-985.

<<https://www.tandfonline.com/doi/full/10.1080/08941920802438634>>.

Crediford, Ernest. *Snowball Cactus Propagation* Miguel Orr. 2 -19 May 2021. Email.

Dringman, Dixie. "Dave Bishop and *Pediocactus nigrispinus* ." *Cactus and Succulent Journal* 86.1 (2014): 24-29. <<https://doi.org/10.2985/015.086.0106>>.

Kruckeberg, Arthur R. and Linda Chalker-Scott. *Gardening with Native Plants of the Pacific Northwest*. 3rd. Seattle: University of Washington Press, 2019. 121.