
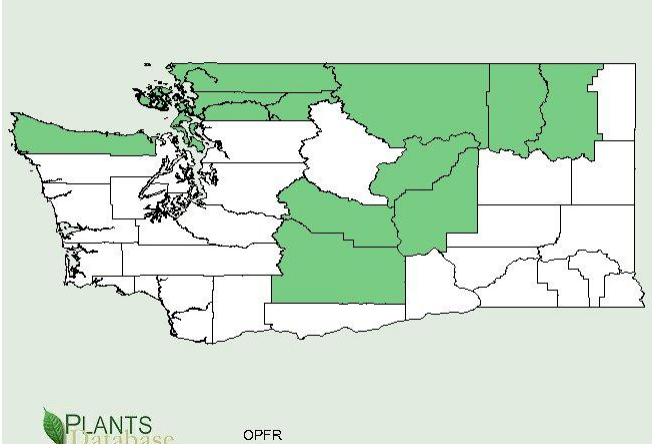


Plant Propagation Protocol for *Opuntia fragilis*
ESRM 412 – Native Plant Production

| TAXONOMY | |
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| Family Names | |
| Family Scientific Name: | Cactaceae |
| Family Common Name: | Cactus Family |
| Scientific Names | |
| Genus: | <i>Opuntia</i> |
| Species: | <i>fragilis</i> |
| Species Authority: | Nutt. |
| Varieties: | var. <i>fragilis</i> ¹ var. <i>brachyarthra</i> ¹ var. <i>denudate</i> ² var. <i>frutescens</i> ² var. <i>parviconspicua</i> ² |
| Sub-species: | |
| Cultivar: | |
| Authority for Variety/Sub-species: | |
| Common Synonym(s): | <i>Cactus fragilis</i> Nutt. <i>Opuntia brachyarthra</i> <i>Opuntia fragilis</i> (Nutt.) Haw. ssp. <i>brachyarthra</i> <i>Opuntia fragilis</i> (Nutt.) Haw. var. <i>brachyarthra</i> <i>Opuntia fragilis</i> (Nutt.) Haw. var. <i>Denúdate</i> <i>Opuntia fragilis</i> (Nutt.) Haw. var. <i>fragilis</i> |
| Common Name(s): | brittle pricklypear, little pricklypear ³ |
| Species Code: | OPFR |
| GENERAL INFORMATION | |
| Geographical range | Distribution map for North America ⁸ |

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| |  <p>Distribution map for Washington state⁸</p>  |
| Ecological distribution: | <p>Mainly occurs in Sagebrush Desert, Southern Juniper-Pinyon Woodland and Great Plains Grassland. Also occurs in Pacific Lowland Forest, Palouse Prairie, Rocky Mountain Montane Forest and Sagebrush Desert. Rarely will occur in a Prairie ecosystem.¹</p> |
| Climate and elevation range: | <p>Can be found growing from sea level to 2,000ft in its northernmost regions, and growing from 3,000-8,000ft as you move south.¹</p> <p>Grows in cold to warm, dry climates.⁸ Grows in USDA hardiness zones 4-5.⁹</p> |
| Local habitat and abundance; may include commonly associated species | <p><i>O. fragilis</i> grows on dry, well drained (sandy or gravelly) soils. Usually found in open sites.⁴</p> <p>Can often be found growing partially underneath other shrubs to protect it from animal.¹</p> |
| Plant strategy type / successional stage: | <p>Tolerates colder temperatures than any other prickly pear, which is why it can be found growing in the Olympic rain shadow and up into Canada.¹</p> |
| Plant characteristics | <p>Shrub. Low, mat-forming plant. Small or “miniature” version of a prickly</p> |

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| (life form (shrub, grass, forb), longevity, key characteristics, etc) | <p>pear. A key characteristic of the <i>O. fragilis</i> species is that it has much thicker joints than any other prickly pear.¹</p> <p>Succulent perennial with large spines and smaller bristles. Has large yellow flowers.⁴</p> |
| PROPAGATION DETAILS | |
| Ecotype: | |
| Propagation Goal: | Seeds and Cuttings. ⁵ |
| Propagation Method: | Seeds and Cuttings for entire <i>Opuntia</i> genus. ⁵ |
| Product Type | Container plants. ⁶ |
| Stock Type: | Container plants. ⁶ |
| Time to Grow: | Cuttings will root and grow very quickly; seedlings will take substantially longer to grow. ⁶ |
| Target Specifications: | 5-10cm high |
| Propagule Collection: | Seeds can be difficult to acquire. Cuttings can come from an existing plant. ⁶ Cutting should be planted in the spring to summer when the plant will receive high light. ⁷ |
| Propagule Processing/Propagule Characteristics: | Cuttings |
| Pre-Planting Propagule Treatments: | <p>For all species within the <i>Opuntia</i> genus:</p> <p>Treat seeds with fungicide before planting.⁶ Soak seeds for 24 hours before planting.⁹</p> <p>Allow cuttings to dry a few days to heal before planting, and then cut surface before planting.⁶</p> |
| Growing Area Preparation / Annual Practices for Perennial Crops: | Sow seeds and cuttings in a well drained sterile soil mixture. Water sparingly, but do not allow soil to dry out. For cuttings, high humidity is not necessary, but bottom heat can be beneficial. ⁶ |
| Establishment Phase: | Seed propagation can be used, but is often slow. Cuttings are much faster growing, and can become established soon after planting. ⁶ |
| Length of Establishment Phase: | Dependent upon if propagating from seeding or cutting. ⁶ |
| Active Growth Phase: | |
| Length of Active Growth Phase: | |
| Hardening Phase: | Plants need periods of short light and long dark days in the fall or the plant will not be able to form a blossom. ⁷ |

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| Length of Hardening Phase: | 4-6 weeks. ⁷ |
| Harvesting, Storage and Shipping: | |
| Length of Storage: | |
| Guidelines for Outplanting / Performance on Typical Sites: | |
| Other Comments: | When propagating in a greenhouse, if the summer temperatures reach 86-95°F or higher, room needs to be aerated and shading might even be necessary. ⁷ |

INFORMATION SOURCES

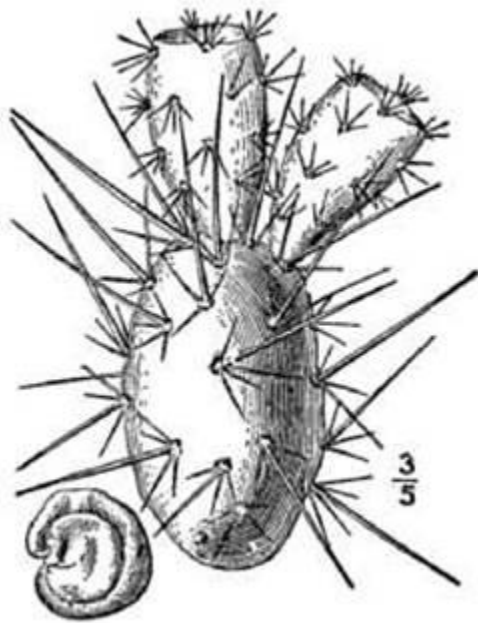
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| References: | <ol style="list-style-type: none"> 1. Benson, Lyman David. <i>The Cacti of the United States and Canada</i>. Stanford, CA: Stanford UP, 1982. Print. 2. "IPNI: Plant Name Search." <i>The International Plant Names Index</i>. Web. 14 Apr. 2012. <">http://www.ipni.org/ipni/advPlantNameSearch.do?find_authorAbbrev=>>. 3. "Opuntia Fragilis (Nuttall) Haworth, Suppl. Pl. Succ. 82. 1819." <i>Floras of North America</i>. Web. 14 Apr. 2012. <http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=242415221>. 4. MacKinnon, A., Jim Pojar, and Paul B. Alaback. <i>Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia & Alaska</i>. Vancouver: Lone Pine Pub., 2004. Print. 5. Quiros, Alice, Barbara L. Young, and Martha Baker. <i>The World of Cactus & Succulents</i>. San Francisco: Chevron Chemical, Ortho Division, 1977. Print. 6. Kester, Dale E., Fred T. Davies, and Robert L. Geneve. <i>Hartmann and Kester's Plant Propagation: Principles and Practices</i>. 7th ed. Upper Saddle River (New Jersey): Prentice Hall, 2002. Print. 7. Hecht, Hans. <i>Cacti & Succulents</i>. New York: Sterling Pub., 1994. Print. 8. "PLANTS Profile." <i>USDA</i>. Web. 14 Apr. 2012. <http://plants.usda.gov/java/profile?symbol=OPFR>. 9. "Opuntia Species." <i>Grow'Em Plant Propagation Database</i>. 2012. Web. 14 Apr. 2012. <http://grow.ars-informatica.ca/plant.php?L=554>. |
| Other Sources Consulted: | <p>Grantham, Keith, and Paul Klassen. <i>The Plantfinder's Guide to Cacti & Other Succulents</i>. Portland, Or.: Timber, 1999. Print.</p> <p>Gröner, Gerhard, and Erich Götz. <i>Beautiful Cacti: A Basic Grower's Guide</i>. New York: Sterling, 1992. Print.</p> <p>Hewitt, Terry. <i>The Complete Book of Cacti & Succulents</i>. New York: Dorling Kindersley, 1993. Print.</p> <p>Tropicos.org. Missouri Botanical Garden. 14 Apr. 2012.</p> |

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| | http://www.tropicos.org/Name/5100066 . Iannotti, Marie. "Prickly Pear - Growing the Hardy Cactus <i>Opuntia Compressa</i> - Eastern Prickly Pear." <i>About.com Gardening</i> . Web. 16 Apr. 2012. http://gardening.about.com/od/plantprofile1/p/Prickly_Pear.htm |
| Protocol Author: | Noel Daniel |
| Date Protocol Updated: | 04/18/12 |

Note: This template was modified by J.D. Bakker from that available at:
<http://www.nativeplantnetwork.org/network/SampleBlankForm.asp>

Appendix: Past Plant Protocol

Opuntia fragilis (brittle prickly-pear cactus)



Drawing on left from Britton, N.L., and A. Brown. 1913. *Illustrated flora of the northern states and Canada*. Vol. 2: 573. Photo taken in the San Juan Islands by Carson Sprenger, 2006.

Range

Opuntia fragilis makes its home from British Columbia

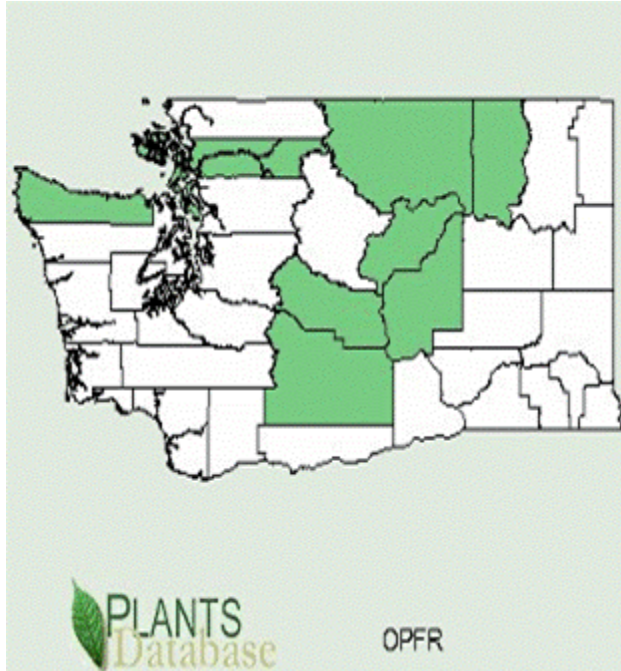
all the way east to Michigan, and as far south as Texas. ⁽¹⁾



Elevation in Washington State: 14 - 4500 ft (4 – 1372 m).

Local occurrence

According to the Washington Natural Heritage Program, there are only 10 known occurrences of *O. fragilis* in Washington. Despite this small number of sightings, it is recorded to have been seen in all of the following counties: Grant, Okanogan, Ferry, Clallam, San Juan, Skagit, Whatcom, Stevens, Douglas, Kittitas and Yakima. Some of these populations, however, may no longer be present. ⁽⁴⁾



Habitat preferences

This species does well in open, exposed locations and cannot persist in shady conditions. Much of its habitat has been lost due to tree encroachment (fire suppression & exclusion) and the introduction of invasive species.⁽⁴⁾

Plant strategy

Able to grow on south-facing rocky outcrops, like many cactus species, *O. fragilis* is a stress tolerator. Some studies have found that it reproduces almost exclusively asexually, by segments breaking off and rolling away, being carried by animals, or even floating and relocating via water. Its species name “fragilis” is a nod to the ease in which terminal segments break off from the main plant.⁽³⁾ This strategy can be a nuisance to humans and animals alike. It is perhaps for this reason that it is listed as a noxious weed in Nebraska.⁽²⁾ The yellow flowers bloom very briefly sometime between May and July depending on location.⁽³⁾

Associated species

Due to its wide range, *O. fragilis* is associated with a wide variety of species. In western Washington, it is usually found in open, grassland areas while on the east side it is commonly associated with ponderosa pine and bunchgrass communities.⁽⁴⁾

May be collected as:

O. fragilis may not be collected in Washington.

Seed germination

If you are so lucky as to 1) find a fruiting plant, 2) find fruit with viable seed, and 3) live in a state where you can collect *O. fragilis*, the following method has been suggested. Lightly sand the surface of the seed before stratification. Place in the fridge for 5 weeks and then set out in 68° F for germination. ⁽³⁾

Propagation recommendations

Make friends with someone from Nebraska. Have that friend send you a vegetative segment (also known as a cladode) of the plant; stick the cut-off portion in well-drained, sandy soil. Water sparingly and be patient.

Soil or medium requirements

Sandy, well-drained soil is a must.

Sources cited

(1) Burke Museum Herbarium Image Collection.

<http://biology.burke.washington.edu/herbarium/imagecollection.php> May 23, 2006.

(2) PLANT Database. <http://plants.usda.gov/java/profile?symbol=OPFR>. May 24, 2006.

(3) Ribbens, Eric M.D. *Opuntia fragilis* (Nuttall) Haworth (Cactaceae): Reproductive Ecology.

<http://www.wiu.edu/users/mfer1/pubs/OpFrInfo/reproduction.htm>. May 24, 2006

(4) Washington Natural Heritage Program

website: http://www.dnr.wa.gov/nhp/refdesk/fguide/htm/fsp_ascu.htm May 25, 2006

Data compiled by

Samantha Martin Sprenger

May 25, 2006