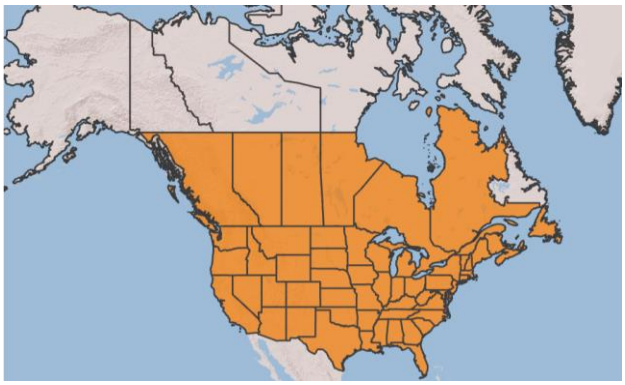
Plant Propagation Protocol for *Portulaca oleracea*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/2022/POOL.pdf



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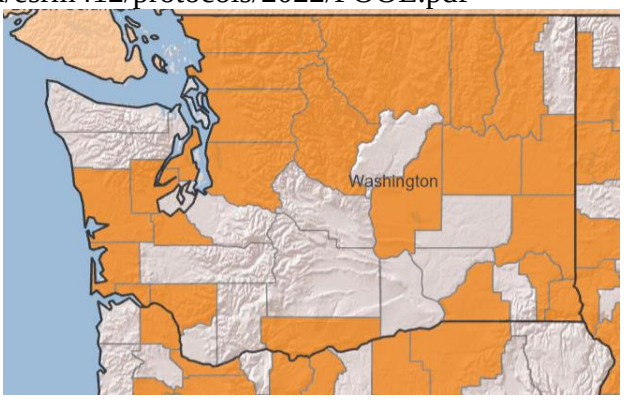

(2014)

TAXONOMY	
Plant Family	
Scientific Name	*Portulacaceae*
Common Name	Purslane family
Species Scientific Name	
Scientific Name	*Portulaca oleracea* L.
Varieties	
Sub-species	
Cultivar	
Common Synonym(s)	*Portulaca neglecta* Mack. & Bush *Portulaca oleracea* L. ssp. *granulatostellulata* (Poelln.) Danin & Baker *Portulaca oleracea* L. ssp. *impolita* Danin & Baker *Portulaca oleracea* L. ssp. *nicaraguensis* Danin & Baker *Portulaca oleracea* L. ssp. *nitida* Danin & Baker *Portulaca oleracea* L. var. *oleracea* *Portulaca oleracea* L. ssp. *papillatostellulata* Danin & Baker *Portulaca oleracea* L. var. *parvifolia* (Haw.) Griseb. *Portulaca oleracea* L. ssp. *stellata* Danin & Baker *Portulaca retusa* Engelm.
Common Name(s)	Little hogweed, common purslane, pigweed, akulikuli kula, Garden purslane, Wild portulaca,Verdolaga, Lunia
Species Code (as per USDA Plants database)	POOL
GENERAL INFORMATION	
Geographical range	Common latitudes are between 45°N and 40°S, with extension to 58°N in North America and 54°N in Europe (2021) Northeastern states in the U.S have the most abundance with the Pacific Northwest as the region with the least abundance, it is not found north of latitude 60°N. (U.S. Department of Agriculture 1970).

Ecological distribution	Can grow nearly in nearly any soil type but prefers highly disturbed soils and is drought resistant so can grow in a variety of conditions
Climate and elevation range	Commonly grows up to about 3000m above sea level (2021)
Local habitat and abundance	It is a common weed among vegetable crops, annual flowers and nursery trees, field and sweet corn, strawberries, tobacco, spring wheat, and newly planted orchards. There are indications that the weed is spreading (Danielson, 1968).
Plant strategy type / successional stage	Weedy/colonizer
Plant characteristics	Life form: forb/herb Longevity: Complete life cycle is no more than 2-4 months whether in tropical or temperate regions. In conjunction the plants will bloom and release seeds rapidly with some germinating immediately resulting in multiple generations occurring within one growing season. Typically the low temperatures of autumn and first frost are what kills the plant. (MIYANISHI & CAVERS, 1980). Seed can survive up to 19 yr in dry storage and up to 40 yr if buried in soil (Darlington & Steinbauer, 1961) Key characteristics: "Common purslane is a prostrate, succulent annual that often forms a dense mat. The reddish stems originate from a central rooting point, radiating out like spokes of a wheel. The stems vary in length, commonly up to 12 inches. Leaves are stalkless (sessile), oval, smooth, succulent, and shiny, and vary from 1/2 to 2 inches in length. The leaves, although generally arranged opposite, may also occur alternately along the stem, particularly near the base. Small (3/8 inch), five-petaled, yellow flowers are borne singly in leaf axils and open only in sunshine. Seeds are borne in a small pod with a top that comes off like the lid on a cookie jar. Seeds are reddish brown to black, oval, and tiny (about 1/64 to 1/32 inch in diameter). Common purslane is a prolific seeder. A single plant may produce 240,000 seeds, which may germinate even after 5 to 40 years. In late summer, flat mats of mature purslane can be turned over to reveal thousands of seeds on the soil surface." (Cudney & Molinar, 2007)
PROPAGATION DETAILS **https://pdfs.semanticscholar.org/416b/b33cb80680b018008e99f6855114625b45ae.pdf**	
Ecotype	The seeds of the species were obtained in commercial vegetable garden, located in the city of Goianésia, Goiás, where there was great infestation of the same in the beds. (Chagas et al., 2019)
Propagation Goal	Plants
Propagation Method	Seed
Product Type	The sowing of the pedigree was carried out in August 2017 on a polyethylene tray with 200 cells. In each cell three bare seeds were added, where it was then thinned one week after emergence, leaving one plant per cell. (Chagas et al., 2019)
Stock Type	
Time to Grow	About 100 days
Target Specifications	The purpose of the studies was not to plant the produced material

Propagule Collection Instructions	Seeds should be collected from open flowers approximately 7 days after the flower has opened allowing time for the seeds to mature in early summer around June or July
Propagule Processing/Propagule Characteristics	Seeds can last for many years in storage, about 1,454,000 seeds per pound (Sheffields.com, 2021) see plant characteristics
Pre-Planting Propagule Treatments	Seeds should be stored in cool dry storage but do not need any dormancy treatments. (Sheffields.com, 2021)
Growing Area Preparation / Annual Practices for Perennial Crops	Purslane is annual not perennial, sowing seeds on surface and keeping them moist is all that is needed for germination
Establishment Phase Details	Requires high temperatures for germination and the optimal is above 30°C (86°F). (Ampim & Rivera-Ocasio). Plant seeds in moist soil any time after the last frost of spring extending into late summer
Length of Establishment Phase	Seeds germinates 10 days after planting. (Ampim & Rivera-Ocasio)
Active Growth Phase	Drought resistant *Portulaca oleracea* requires little water and will spread densely and quickly without interference or assistance from the grower but will establish better in nutrient rich soil particularly with adequate phosphorus so if soil is lacking nutrients consider adding a fertilizer. (Ampim & Rivera-Ocasio)
Length of Active Growth Phases	It takes 3-4 weeks after germination for seeds to reach maturity. (Ampim & Rivera-Ocasio)
Hardening Phase	Purslane will continue to develop and actively grow for the duration of its season, the summer months, even while actively producing seeds before it dies with the onset of colder temperatures leaving behind vast numbers of seeds that can potentially continue to germinate years after the original plant has died meaning that it does not experience hardening as it does not prep for winter. (Cudney & Molinar, 2007)
Harvesting, Storage and Shipping	N/A
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	Most experiments are carried out in lab and not for the purpose of out planting so the data does not reflect performance of propagated plants in this area
Other Comments	While it is possible to reproduce *Portulaca oleracea* vegetatively as outlined in the next section for common growing purposes seed is abundantly available and relatively cheap making vegetative propagation unlikely and, beyond experimentally, rather unnecessary. Additionally, while it can be propagated from cutting evidence indicates that *Portulaca oleracea* does not reproduce or spread vegetatively traditionally. (Vengris, 1972)
PROPAGATION DETAILS http://www.jmbfs.org/wp-content/uploads/2015/02/jmbfs-0573-shekhawat.pdf	

Propagation Goal	Plants
Propagation Method	vegetative
Product Type	Propagules: cuttings
Stock Type	
Time to Grow	Four weeks
Target Specifications	Plants were not used for outplanting and were instead evaluated on their success rooting, so no target specifications were given.
Propagule Collection Instructions	"Healthy plants were identified and collected during January - April, 2012 from the coastal areas of Pondicherry, India. Fresh sprouts with axillary buds were collected from six-week-old plant. Two-to three-cm long fresh shoots each with 1-2 nodes were harvested and used." (Shekhawat et al., 2015)
Pre-Planting Propagule Treatments	"The explants collected were surface sterilized with 0.1% Bavistin® (systemic fungicide, BASF, India Ltd.) and HgCl2 solution for 4-6 minutes. These were washed thoroughly with autoclaved distilled water 6-8 times. Explants were finally dipped in ethanol and inoculated on the medium." (Shekhawat et al., 2015)
Establishment Phase Details	Rooting compounds may be used to assist in the rooting process. The end of the cutting where the cut was made is the only place from which the roots will develop from so placing that end in a liquid medium or soil and keep submerged or watered respectively.
Length of Establishment Phase	It took about one week from placement in the medium for cuttings to produce roots
Active Growth Phase	Once in the active growth phase there isn't any difference from the protocols for seed grown plants as with such a short life where the plant continues actively growing until death the cutting should already be planted in its final destination at this stage and all that is needed is occasional watering and pest management if it becomes an issue.
Length of Active Growth Phase	Ranges from 5-6 weeks
Harvesting, Storage and Shipping	N/A
Length of Storage	N/A
INFORMATION SOURCES	
References	See below
Other Sources Consulted	See below
Protocol Author	Jackie Snowden
Date Protocol Created or Updated	05/04/22

References:

Chagas, J. F. R., da Paz, S. A., Ventura, M. V. A., Costa, E. M., Mortate, R. K., Nunes, B. de M., Lima, A. P. A., Vilarinho, M. S., Nomura, M., Bessa, M. M., de Oliveira, M. H. R., & Santana, A. J. de O. (2019). Propagation and Vegetative Development of Portulaca oleracea Linn. in Different Substrates. *Journal of Agricultural Science*, *11*(7). https://doi.org/10.5539/jas.v11n7p22

Ampim, P. A. Y., & Rivera-Ocasio, D. (n.d.). *Fact Sheet*. Purslane. Retrieved 2022, from https://www.pvamu.edu/cahs/wp-content/uploads/sites/27/Fact-Sheets-Purslane.pdf

Cudney, D. W., & Molinar, R. H. (2007). *Common Purslane*. How to manage pests. Retrieved May 1, 2022, from http://ipm.ucanr.edu/PMG/PESTNOTES/pn7461.html

Danielson, L. L. (1968). Extent and cost of weed control with herbicides and an evaluation of important weeds, 1965. https://doi.org/10.5962/bhl.title.70191

Darlington, H. T., & Steinbauer, G. P. (1961). The Eighty-year period for dr. Beal's seed viability experiment. *American Journal of Botany*, *48*(4), 321–325. https://doi.org/10.1002/j.1537-2197.1961.tb11645.x

MIYANISHI, K. I. Y. O. K. O., & CAVERS, P. A. U. L. B. (1980). The Biology of Canadian Weeds.: 40. *portulaca oleracea* L. *Canadian Journal of Plant Science*, *60*(3), 953–963. https://doi.org/10.4141/cjps80-139

National scale map of Portulaca oleracea L. and map zoomed in to Washington state. (2014). Portulaca oleracea L. Retrieved 2022, from https://plants.usda.gov/home/plantProfile?symbol=POOL.

Portulaca oleracea (purslane) - cabi.org. Portulaca oleracea (purslane). (2021, December 18). Retrieved May 4, 2022, from https://www.cabi.org/isc/datasheet/43609

Portulaca oleracea L. USDA plants database. (2014). Retrieved May 1, 2022, from https://plants.usda.gov/home/plantProfile?symbol=POOL

Proctor, C. A., Gaussoin, R. E., & Reicher, Z. J. (2011). Vegetative reproduction potential of common purslane (*portulaca oleracea*). *Weed Technology*, *25*(4), 694–697. https://doi.org/10.1614/wt-d-11-00045.1

Sheffields.com. (2021). *Portulaca oleracea - tree - little hogweed, common purslane - price per 1 packet*. Sheffields Seeds Online Ltd. Retrieved May 1, 2022, from https://sheffields.com/seeds/Portulaca/oleracea

Shekhawat, M. S., Kannan, N., & Manokari, M. (2015). Propagation of portulaca oleracea L. in liquid medium: Implications of plant growth regulators in culture. *Journal of Microbiology, Biotechnology and Food Sciences*, *04*(04), 332–335. https://doi.org/10.15414/jmbfs.2015.4.4.332-335

United States Department of Agriculture, Agricultural Research Service. (1970). *Selected weeds of the United States*.

Vengris, J. (1972). *Life history studies as related to weed control in the Northeast*. Agricultural Experiment Station, University of Massachusetts.

Other sources consulted

Alam, M. A., Juraimi, A. S., Rafii, M. Y., Abdul Hamid, A., Aslani, F., & Mohsin, G. M. (2014). A Comparison of Yield Potential and Cultivar Performance of 20 Collected Purslane (Portulaca oleracea L.) Accessions Employing Seeds vs. Stem Cuttings. *J. Agr. Sci. Tech*, *16*.

Schat, M., & Van Voast., J. (2016, March 28). *Common purslane*. Common purslane - Bugwoodwiki. Retrieved May 3, 2022, from https://wiki.bugwood.org/HPIPM:Common_purslane

WTU Herbarium, B. M. (n.d.). *Portulaca oleracea*. Burke Herbarium Image Collection. Retrieved May 1, 2022, from http://biology.burke.washington.edu/herbarium/imagecollection/taxon.php?Taxon=Portulaca+oleracea