


Plant Propagation Protocol for *Castilleja parviflora*

ESRM 412 – Native Plant Production

URL: <https://courses.washington.edu/esrm412/protocols/2023/CAPA26.pdf>

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

TAXONOMY	
Plant Family	
Scientific Name	Scrophulariaceae
Common Name	Figworts
Species Scientific Name	
Scientific Name	<i>Castilleja parviflora</i> Bong.
Varieties	<i>Castilleja parviflora</i> Bong. var. <i>albida</i> (Pennell) Ownbey <i>Castilleja parviflora</i> Bong. var. <i>olympica</i> (G.N. Jones) Ownbey <i>Castilleja parviflora</i> Bong. var. <i>oreopola</i> (Greenm) Ownbey <i>Castilleja parviflora</i> Bong. var. <i>parviflora</i>
Sub-species	none
Cultivar	
Common Synonym(s)	<i>Castilleja oreopola</i> Greenm. ssp. <i>albida</i> Pennell
Common Name(s)	Common names for <i>Castilleja parviflora</i> include mountain paintbrush, rosy paintbrush, small flower paintbrush, Olympic paintbrush, Henry Indian paintbrush and magenta paintbrush (USDA PLANTS) (Burke Herbarium)
Species Code (as per USDA Plants database)	CAPA26
GENERAL INFORMATION	

Geographical range	 <p>Near streams and in meadows at mid to high elevation from Southern Alaska to California and extends east to the Rocky Mountains. (Robson)</p>
Ecological distribution	<i>Castilleja parviflora</i> can be found in moist to mesic meadows at high elevations. It is found along stream banks and rocky slopes in the subalpine to alpine zones. (E-Flora BC)
Climate and elevation range	<i>Castilleja parviflora</i> is found in alpine tundra and boreal. (Meidinger et. al.)
Local habitat and abundance	<i>Castilleja parviflora</i> is a semi parasitic plant in the root network and is typically found near other plants. Roots grow into the roots of other plants, commonly grasses, and penetrate the roots of other plants to absorb the host plants nutrients. (Lady Bird Johnson Wildflower Center)
Plant strategy type / successional stage	<i>Castilleja parviflora</i> is an herbaceous perennial which flowers through early spring to early fall.
Plant characteristics	Flowers are leafy bracts surrounding flowers and vary in color from a light salmon to crimson in color. Flowers can typically be seen from April to September. <i>Castilleja parviflora</i> is classified as a forb/herb and subshrub.



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PROPAGATION DETAILS

No information on specific species. Propagation details adapted from *Castilleja rhexiifolia* which grows in subalpine to alpine meadows and can co-occur with *Castilleja parviflora*.

Ecotype	Moist forest meadows, Camas, Glacier National Park, Flathead Co., Mt., 1100m elevation.
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (Plug)
Stock Type	172mL conetainers
Time to Grow	Five months
Target Specifications	5 cm with firm root plug
Propagule Collection Instructions	Seeds are hand collected in late August when capsules begin to split and seed is easily shaken out of the seed capsule. Mature seeds are dark gray and kept in paper bags in well ventilated drying shed prior to cleaning.
Propagule Processing/ Propagule Characteristics	Seed longevity is at least three years when kept at 3-5 degrees Celsius in sealed containers. Seeds/Kg: 10,780,000/kg % purity: 100% % germination: 98%
Pre-Planting	Seeds are hand cleaned at the nursery. Seed dormancy is classified as

Propagule Treatments	physiological dormancy. Seeds are placed into a 150 day cold, moist stratification using moistened paper towels in an unsealed plastic back in an environment at 2 degrees Celsius. Seeds may also be sown outdoors in fall.
Growing Area Preparation / Annual Practices for Perennial Crops	Greenhouse and outdoor nursey growing facility. Direct seeding, lightly covered with medium (6:1:1 milled sphagnum peat, perlite, and vermiculite with Osmocote). A controlled rate release fertilizer with an 8-9 month release rate at 21C at the rate of 1g of Osmocote and .20 gram of Micromax per 172 mL conetainer. Greenhouse temperatures should be maintained from 21 to 25C during the day and 16 to 18C at night. Seedlings are hand watered and remain in greenhouse until mid May.
Establishment Phase Details	Medium is kept slightly moist during germination. Initial germination was uniform and appeared complete in 3 weeks. Host root exudates are not required for germination but at 3-4 weeks after germination it is necessary to companion plant a host seedling to further growth and development. The roots are then induced by the presence of the exudates of the host roots and the hemi-parasitic relationship is then established.
Length of Establishment Phase	4 weeks.
Active Growth Phase	Root and shoot development occur at a rapid rate after the haustoria are formed. Plants form 15 to 25 true leaves and grow to 3cm in height in 8 weeks. It is necessary to keep the growth of the companion plant in check so it does not out compete the <i>Castilleja parviflora</i> seedling in the container.
Length of Active Growth Phase	8 weeks.
Hardening Phase	Irrigation is gradually reduced in September and October. Plants are leached with clear water once before winterization. Total time to harvest is 5 months and harvesting is done in September.
Length of Hardening Phase	4 weeks.
Harvesting, Storage and Shipping	Harvesting is completed in September. Plants should be stored over winter in outdoor nursery and under insulating foam cover and snow.
Length of Storage	5 months.
Guidelines for Outplanting / Performance on Typical	As <i>Castilleja</i> are hemiparasitic, seedlings must be companion planted or will begin to decline in vigor about 8 weeks after germination. The larger seed size of member of the Scrophulariaceae allows for the establishment of the seedling without the radicle having to make contact with a host root immediately, but a host is necessary for continued growth and development and success in out planting.

Sites	
Other Comments	
INFORMATION SOURCES	
References	<p>Bongard, Egger, J. M., Zika, P. F., Wilson, B. L., Brainerd, R. E., & Otting, N. (n.d.). <i>Castilleja parviflora</i>. Castilleja parviflora - FNA. Retrieved May 7, 2023, from http://floranorthamerica.org/Castilleja_parviflora</p> <p><i>Castilleja parviflora</i> Bong. USDA plants database. (n.d.). Retrieved May 7, 2023, from https://plants.usda.gov/home/plantProfile?symbol=CAPA26</p> <p><i>Castilleja parviflora</i> bong., <i>smallflower Indian Paintbrush (world flora)</i>. (n.d.). Retrieved May 8, 2023, from https://identify.plantnet.org/the-plant-list/species/Castilleja%20parviflora%20Bong./data</p> <p><i>Castilleja parviflora</i>. California Native Plant Link Exchange. (n.d.). Retrieved May 7, 2023, from http://www.cnplx.info/nplx/nplx?page=mdetail&taxon=Castilleja%2Bparviflora</p> <p><i>Flora BC: Electronic atlas of the flora of british columbia</i>. E Flora BC: Electronic Atlas of the Flora of British Columbia. (n.d.). Retrieved May 7, 2023, from http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Castilleja+parviflora</p> <p>Lab, B. T. and R. (2020, June 8). <i>Castilleja parviflora bong</i>. Biogeography Teaching and Research Lab. Retrieved May 7, 2023, from https://blogs.ubc.ca/alpineplants/2020/06/08/castilleja-parviflora-bong/</p> <p>Luna, Tara; Wick, Dale. 2008. Propagation protocol for production of Container (plug) <i>Castilleja rhexiifolia</i> Rydb. plants 172 ml conetainers; USDI NPS - Glacier National Park West Glacier, Montana. In: Native Plant Network. URL: https://NativePlantNetwork.org (accessed 2023/05/02). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources</p> <p>TWC Staff. (n.d.). <i>Plant database</i>. Lady Bird Johnson Wildflower Center - The University of Texas at Austin. Retrieved May 7, 2023, from https://www.wildflower.org/plants/result.php?id_plant=CAPA26</p> <p>WTU Herbarium, B. M. (n.d.). WTU111485 (<i>Castilleja parviflora</i> var. <i>Oreopola</i>) - burke herbarium image collection. Retrieved May 7, 2023, from https://burkeherbarium.org/imagecollection/photo.php?Photo=wtu111485&Taxon=Castilleja+parviflora&SourcePage=taxon</p>

Other Sources Consulted	
Protocol Author	Caroline Kelly
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