

**Plant Propagation Protocol for *Castilleja affinis***

ESRM 412 – Native Plant Production

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

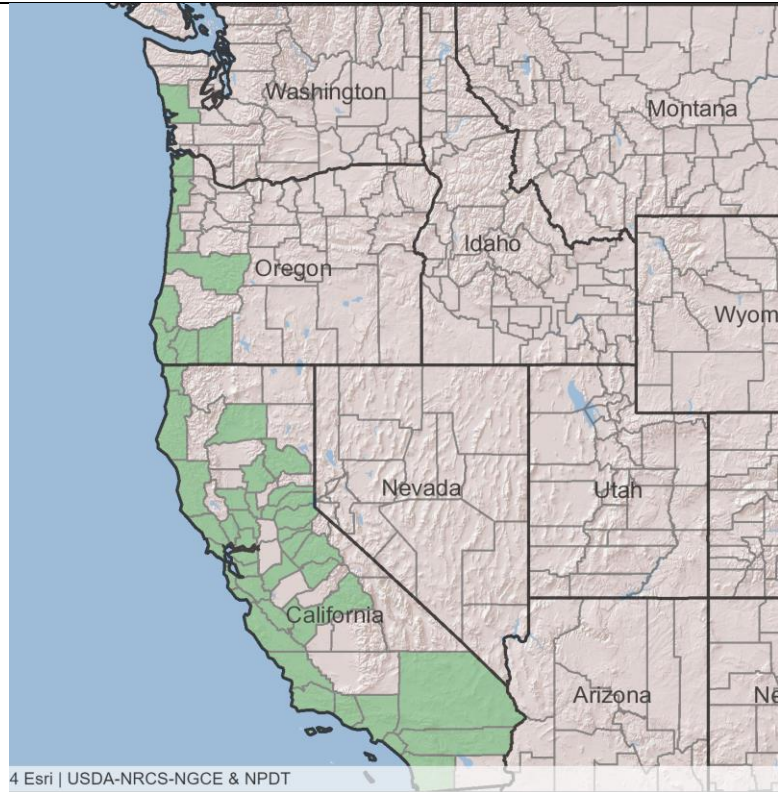


(Calflora, 2019)

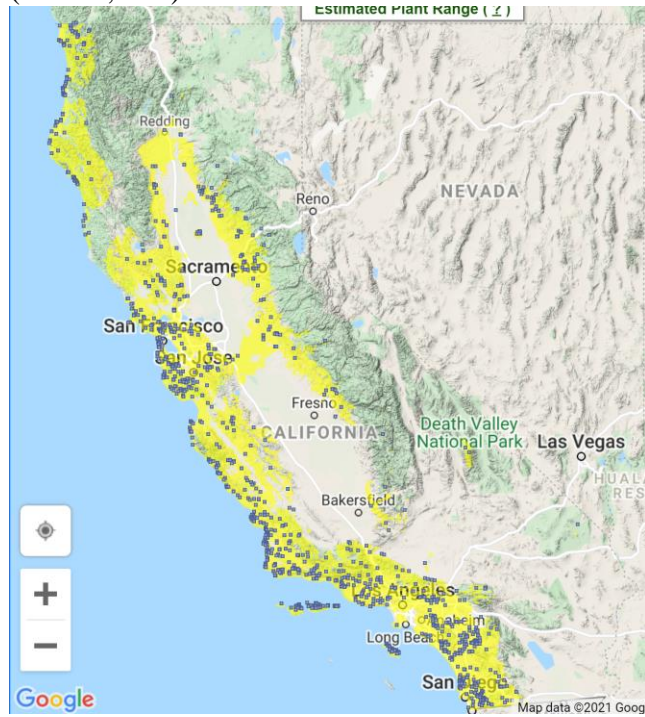
<b>TAXONOMY</b>	
<b>Plant Family</b>	
Scientific Name	<i>Scrophulariaceae</i> (USDA, n.d.)
Common Name	Figwort (USDA, n.d.)
<b>Species Scientific Name</b>	
Scientific Name	<i>Castilleja affinis</i> Hook. & Arn.
Varieties	<i>Castilleja affinis</i> var. <i>neglecta</i> (USDA, n.d.)
Sub-species	<i>Castilleja affinis</i> Hook. & Arn. ssp. <i>affinis</i> , <i>Castilleja affinis</i> Hook. & Arn. ssp. <i>litoralis</i> (Pennell) T.I. Chuang & Heckard, <i>Castilleja affinis</i> Hook. & Arn. ssp. <i>neglecta</i> (Zeile) T.I. Chuang & Heckard (USDA, n.d.)
Cultivar	No information available.
Common Synonym(s)	<i>Castilleja affinis</i> ssp. <i>insularis</i> , <i>Castilleja affinis</i> var. <i>contentiosa</i> , <i>Castilleja californica</i> , <i>Castilleja douglasii</i> , <i>Castilleja douglasii</i> ssp. <i>insularis</i> , <i>Castilleja inflata</i> , <i>Castilleja wightii</i> , <i>Castilleja wightii</i> ssp. <i>anacapsensis</i> , <i>Castilleja wightii</i> ssp. <i>inflata</i> , <i>Castilleja wightii</i> ssp. <i>rubra</i> (Lady Bird Johnson Wildflower Center, 2007)
Common Name(s)	coast Indian paintbrush (USDA, n.d.)
Species Code (as per USDA Plants database)	CAAF

## GENERAL INFORMATION

Geographical range



(USDA, n.d.)



The yellow highlight represents the range of *Castilleja affinis* and the blue squares represent a specimen in the field.  
(California Native Plant Society, 2021)

Ecological distribution	Both coastal and inland hills/mountain slopes, dry areas, and sea bluffs (California Native Plant Society, 2021)
Climate and elevation range	0- 1890m (Calflora, 2019), 6.5"-113.4" precipitation annually, full sun (California Native Plant Society, 2021)
Local habitat and abundance	Native to dry woods/brushy slopes throughout western Washington, Oregon, and California (De Ruff, 2004). Associates with <i>Bacharris Pilularis</i> , <i>Eriogonum latifolium</i> , <i>Sidalcea malviflora</i> (Plants from the coastal shrub community). Abundance of ssp. <i>affinis</i> is common, while ssp. <i>litoris</i> and ssp. <i>neglecta</i> are rare (California Native Plant Society, 2021).
Plant strategy type / successional stage	Hemi-parasite, meaning that <i>Castilleja affinis</i> acquires some nutrients from a host plant (California Native Plant Society, 2021).
Plant characteristics	Perennial herb, stem grows to 60cm. Stem is purpleish-green and could be completely hairless-hairy, flower cluster is a group of leaves ranging from shades of bright red to yellow. Some flowers grow between the leaves and are longer and covered in hairs. These flowers are green to purple and are lined with red or yellow. Fruit is a 1cm long capsule (California Native Plant Society, 2021). Stems become woody with age (The American Southwest, n.d.)
<b>PROPAGATION DETAILS</b>	
Ecotype	No information available.
Propagation Goal	Plants (Lady Bird Johnson Wildflower Center, 2009)
Propagation Method	Seed (Lady Bird Johnson Wildflower Center, 2009)
Product Type	Propagules (seeds) (Lady Bird Johnson Wildflower Center, 2008)
Stock Type	Container (Flats, Plugs, Cells) (Lady Bird Johnson Wildflower Center, 2008)
Time to Grow	16 weeks (Lady Bird Johnson Wildflower Center, 2008)
Target Specifications	Established root system, 4-6 sets of true leaves, must be planted with host plant seedlings (suggested host plants: <i>Eriophyllum stachaedifolium</i> , <i>Eriogonum parvifolium</i> , <i>Erigeron glaucus</i> ) (Lady Bird Johnson Wildflower Center, 2008)
Propagule Collection Instructions	Collect seeds from coast Indian paintbrush as soon as they are mature. Make sure to collect seeds from a host plant as well since <i>Castilleja affinis</i> is hemi-parasitic and will do better if planted with a host (Lady Bird Johnson Wildflower Center, 2008).
Propagule Processing/Propagule Characteristics	No information available.
Pre-Planting Propagule Treatments	Seeds are dormant and begin germination in winter after cold-moist stratification (Corvallis PMC, n.d.). Seeds should be subjected to cold stratification for 30-150 days. Begin by soaking <i>Castilleja</i> seeds in water for 4-6 hours and then pour off water and debris. Put seeds on a moistened piece of blotter paper and store in an open plastic bag in the fridge at 33-36 degrees F. Check on the seeds each week to make sure that the moisture is distributed evenly (Lady Bird Johnson

	Wildflower Center, 2008). Stratify host seeds at the same time so that both are ready for sowing (Luna, 2005).
Growing Area Preparation / Annual Practices for Perennial Crops	Use a well-draining soil medium such as perlite mulch. Do not compact soil too much or plant seeds too deep. Put seeds in flats separate from host plant seeds (Luna, 2005).
Establishment Phase Details	It is critical to ensure the plant is well-hydrated. Fully saturate the soil. Heavy fertilizing during this phase is crucial. High establishment rates have resulted from the use of Osmocote (13-13-13) slow-release macronutrients in conjunction with Micromax micronutrients (General information for <i>Castilleja</i> species) (Lawrence, 2005).
Length of Establishment Phase	4-6 weeks (Luna, 2005).
Active Growth Phase	After seedlings have an established root system and leaves, they can be combined with the host plant seedlings and transplanted into larger 4-inch or 1-gallon containers (Lawrence, 2005). Fertilize with a low concentration of complete fertilizer at 25% of the recommended rate on the label. Check that the host plant is not shading the seedlings regularly (Luna, 2005).
Length of Active Growth Phase	6-8 weeks (Luna, 2005)
Hardening Phase	Occurs during the middle of summer, seedlings should be moved from nursery to the outdoors before being planted (Luna, 2005).
Length of Hardening Phase	4 weeks (Luna, 2005)
Harvesting, Storage and Shipping	No information available.
Length of Storage	16 weeks (Lady Bird Johnson Wildflower Center, 2008)
Guidelines for Outplanting / Performance on Typical Sites	Be careful not to break stems during the outplanting process since they are fragile. Most <i>Castilleja</i> species bloom the second year after germination (Luna, 2005).
Other Comments	Cold-moist stratification greatly increases germination rates. The host plant seedling should be planted a few inches away from the <i>Castilleja affinis</i> seedling's root crown. Misting of the <i>Castilleja</i> seedlings is also recommended during their first month since they have high transpiration rates (Lawrence, 2005).
<b>INFORMATION SOURCES</b>	
References	The American Southwest. (n.d.). <i>Castilleja affinis</i> , coast Indian paintbrush. The American Southwest. <a href="https://www.americansouthwest.net/plants/wildflowers/castilleja-affinis.html">https://www.americansouthwest.net/plants/wildflowers/castilleja-affinis.html</a>  Calflora. (2019). <i>Castilleja affinis</i> . Calflora. <a href="https://www.calflora.org/entry/plantchar.html?crn=1668">https://www.calflora.org/entry/plantchar.html?crn=1668</a>

	<p>California Native Plant Society. (2021). <i>Indian Paintbrush: Castilleja affinis</i>. California Native Plant Society. <a href="https://calscape.org/Castilleja-affinis-()"><u>https://calscape.org/Castilleja-affinis-()</u></a></p> <p>De Ruff, R. (2004). <i>Castilleja affinis</i> H. &amp; A. ssp. <i>affinis</i>. <a href="http://nathistoc.bio.uci.edu/Plants%20of%20Upper%20Newport%20Bay%20(Robert%20De%20Ruff)/Scrophulariaceae/Castilleja%20affinis.htm"><u>http://nathistoc.bio.uci.edu/Plants%20of%20Upper%20Newport%20Bay%20(Robert%20De%20Ruff)/Scrophulariaceae/Castilleja%20affinis.htm</u></a></p> <p>Lady Bird Johnson Wildflower Center. (2007). <i>Castilleja affinis</i> spp. <i>affinis</i>. The University of Texas at Austin. <a href="https://www.wildflower.org/plants/result.php?id_plant=CAAFA2"><u>https://www.wildflower.org/plants/result.php?id_plant=CAAFA2</u></a></p> <p>Lady Bird Johnson Wildflower Center. (2008). <i>Ask Mr. Smarty Plants</i>. The University of Texas at Austin. <a href="https://www.wildflower.org/expert/show.php?id=2785"><u>https://www.wildflower.org/expert/show.php?id=2785</u></a></p> <p>Lady Bird Johnson Wildflower Center. (2009). <i>Ask Mr. Smarty Plants</i>. The University of Texas at Austin. <a href="https://www.wildflower.org/expert/show.php?id=4395"><u>https://www.wildflower.org/expert/show.php?id=4395</u></a></p> <p>Lawrence, B. (2005). <i>Growing Castilleja for Restoration and the Garden</i>. Oregon State University. <a href="https://appliedeco.org/wp-content/uploads/Lawrence_Thesis_CHAPTER-5-Growing-Castilleja.pdf?06f189"><u>https://appliedeco.org/wp-content/uploads/Lawrence_Thesis_CHAPTER-5-Growing-Castilleja.pdf?06f189</u></a></p> <p>Luna, T. (2005). <i>Propagation Protocol for Indian Paintbrush Castilleja Species</i>. Native Plants Journal. Vol. 6. No. 1. pp. 62-68. <a href="https://www-jstor.org.offcampus.lib.washington.edu/stable/pdf/43320513.pdf?refreqid=excelsior%3Af591ca3696e58f9b059ba4e728b89bb2"><u>https://www-jstor.org.offcampus.lib.washington.edu/stable/pdf/43320513.pdf?refreqid=excelsior%3Af591ca3696e58f9b059ba4e728b89bb2</u></a></p> <p>United States Department of Agriculture (USDA). (n.d.) <i>Castilleja affinis</i> Hook. &amp; Arn.: coast Indian paintbrush. USDA. <a href="https://plants.sc.egov.usda.gov/home/plantProfile?symbol=CAAF"><u>https://plants.sc.egov.usda.gov/home/plantProfile?symbol=CAAF</u></a></p>
Other Sources Consulted	<p>Native Here Nursery. <i>Castilleja affinis</i> subsp. <i>affinis</i>. Native Here Nursery. <a href="https://nativeherenursery.org/product/castilleja-affinis-subsp-affinis/"><u>https://nativeherenursery.org/product/castilleja-affinis-subsp-affinis/</u></a></p> <p>Reforestation, Nurseries, &amp; Genetic Resources (RNGR). <i>Scrophulariaceae (Castilleja)</i>. RNGR <a href="https://npr.rngr.net/npr/propagation/protocols/scrophulariaceae-castilleja-3995/?searchterm=castilleja"><u>https://npr.rngr.net/npr/propagation/protocols/scrophulariaceae-castilleja-3995/?searchterm=castilleja</u></a></p>
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Date Protocol Created or Updated	05/25/2021
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