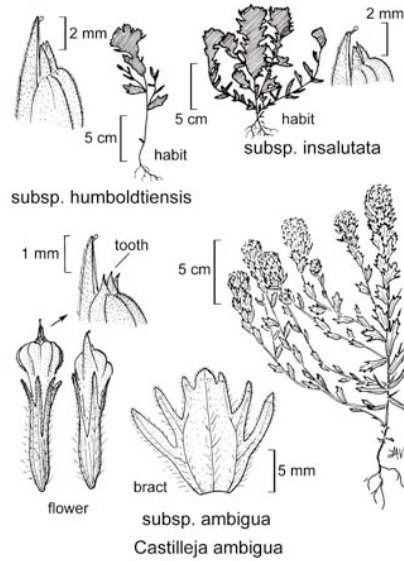


Plant Propagation Protocol for *Castilleja ambigua*

ESRM 412 – Native Plant Production

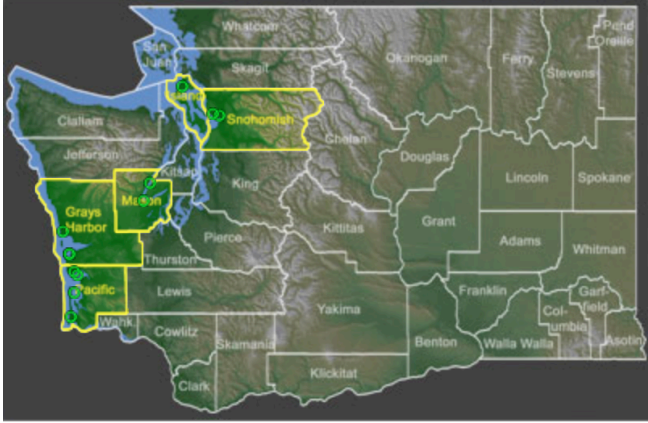
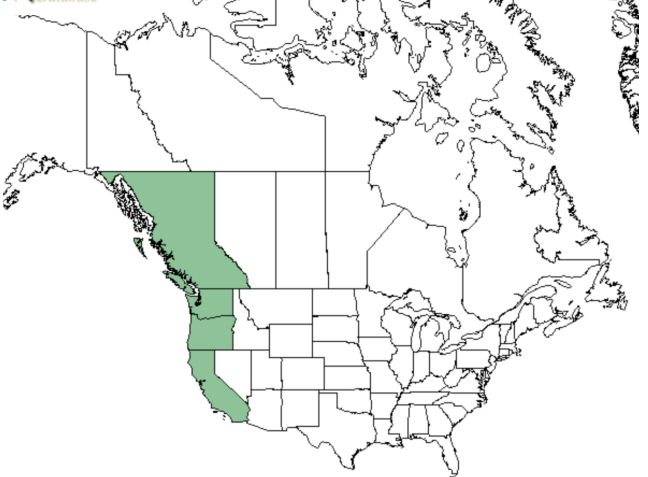
Protocol URL: <https://courses.washington.edu/esrm412/protocols/CAAM32.pdf>



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TAXONOMY

TAXONOMY	
Plant Family	
Scientific Name	Scrophulariaceae
Common Name	Figwort
Species Scientific Name	
Scientific	<i>Castilleja ambigua</i> Hook. & Arn.
Varieties	N/A
Sub-species	<i>Castilleja ambigua</i> Hook & Arn. ssp. <i>ambigua</i> <i>Castilleja ambigua</i> ssp. <i>humboldtiensis</i>
Cultivar	
Common Synonym(s)	<i>Orthocarpus castillejoides</i> Benth
Common Name(s)	Johnny Nip, Salt Marsh Owl Clover, Paintbrush owl's clover, Humboldt Bay owl clover (subspecies)
Species Code (as per USDA Plants database)	CAAM32
GENERAL INFORMATION	

<p>Geographical range</p>	 <p>(5)</p>  <p>(9)</p>
<p>Ecological distribution</p>	<p>Salt marshes and borders of brackish ponds (2).</p>
<p>Climate and elevation range</p>	<p>Grows at low elevations near the coast (2)</p>
<p>Local habitat and abundance</p>	<p>This is abundant species. It is found coastal paries, scrub, marshes, vernal pools, and foothill grass (2)</p>
<p>Plant strategy type / successional stage</p>	<p>This species is a hemiparasite. It is also a salt tolerant species.</p>
<p>Plant characteristics</p>	<p>This species is a hemi parasite; it produces a haustoria with its host roots (3). Being a hemi parasite the plant is able to survive without however it will not grow as well (4) . It is an annual herb with a maximum height of 30 cm, leaves of 1 to 5 cm, and inflorescence up 12 cm long. Inflorescence consists of purple to white ridged bracts. From these bracts comes flowers with yellow with purple markings (5,6)</p>
<p>PROPAGATION DETAILS</p>	

Ecotype	Based on the region the seeds are collect. Species can be collected from salt marshes (which are more salt tolerant populations) or coastal marshes with populations that are less salt tolerant. (7) Select host species from area the seeds were collected. Grass species are good host selection given that is an annual (8). These hosts should not be attractive to herbivores. (10)
Propagation Goal	Propagate <i>C. ambigua</i> along with host species in order to assure a parasite host relationship. This will improve the health of the plants.
Propagation Method	Propagate from seed.
Product Type	Container (plug or pots)
Stock Type	Seed
Time to Grow	~16 weeks
Target Specifications	The target is to propagate the <i>C. ambigua</i> so it is able to form a hemi parasitic relationship with its host (Stock). If growing an outplanting project plant host and parasite separately in plugs for ease of transport (11). Due to <i>C. ambigua</i> being a hemi parasite it will be able to grow without its host. If transportation is not a problem grow <i>C. ambigua</i> along side its host within a 1-gallon pot.
Propagule Collection Instructions	Collect seeds when they mature, collecting too early could result in the seeds being nonviable (7).
Propagule Processing/Propagule Characteristics	N/A
Pre-Planting Propagule Treatments	This species does not need stratification. However uniform emergence is achieved by stratifying seeds for 30 days at 3 C (7). Make sure no excess material is obtained when collecting the seeds.
Growing Area Preparation / Annual Practices for Perennial Crops	Plant seeds in shallow dirt and cover lightly with perlite, mulch, or chicken grit to hold them in place. Sow host plants separately (7) Greenhouse temperatures should range from 21 to 25 C in the day to 10 to 16 C at night. (7)
Establishment Phase Details	Keep germinants moist during establishment period. There is high risk of wilt during this stage (7). After four to six true leaves have formed, combine <i>C. ambigua</i> with the host species in a 1-gallon pot. Make sure roots are touching when introducing the <i>C. ambigua</i> to its host.
Length of Establishment Phase	4-6 weeks
Active Growth Phase	<i>C. ambigua</i> and the host species will form a parasitic relationship. Make sure the host plant is not shading out the <i>C. ambigua</i> . Add low concentration of fertilizer at one-quarter of the labeled recommendation (6). If in a plug, add
Length of Active	6-8 weeks

Growth Phase	
Hardening Phase	This plant is an annual; there is no hardening phase.
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	<p>Plants can be harvested from the individual plugs or as flat. When harvesting make sure to harvest both a <i>C. ambigua</i> and corresponding host.</p> <p>If storing plugs, make sure to apply regular fertilizer to provide enough nutrients for the <i>C. ambigua</i>.</p> <p>For <i>C. ambigua</i> stored in pots with a host, there is less need due to the parasitic relationship.</p> <p>For shipping to an out planting site, ship parasites in plugs along with the desired hosts species. Make sure the number of hosts shipped is equal to or greater then the number of <i>C. ambigua</i> shipped.</p> <p>If shipping for an extended period of time plant a <i>C. ambigua</i> and a host into a 1-gallon pot a few weeks before shipping. This will allow for the haustoria to be formed, allowing the <i>C. ambigua</i> to gain nutrients during its shipment. This will improve the health and survival rate of the plants during the journey.</p> <p>If the <i>C. ambigua</i> are grown in a 1-gallon pot with a host, it will be more difficult to transport and take up more space to store. However the plants will be hardier given they have already formed the parasitic connection.</p>
Length of Storage	Due its annual life cycle, these plants have only a few months in storage. Seed can be collected and stored to increase storage time.
Guidelines for Outplanting / Performance on Typical Sites	Plant host and <i>C. ambigua</i> in the same hole. Make sure that the roots of the two species are in contact. (11)
Other Comments	

INFORMATION SOURCES

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Protocol Author	Michael Kastama
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