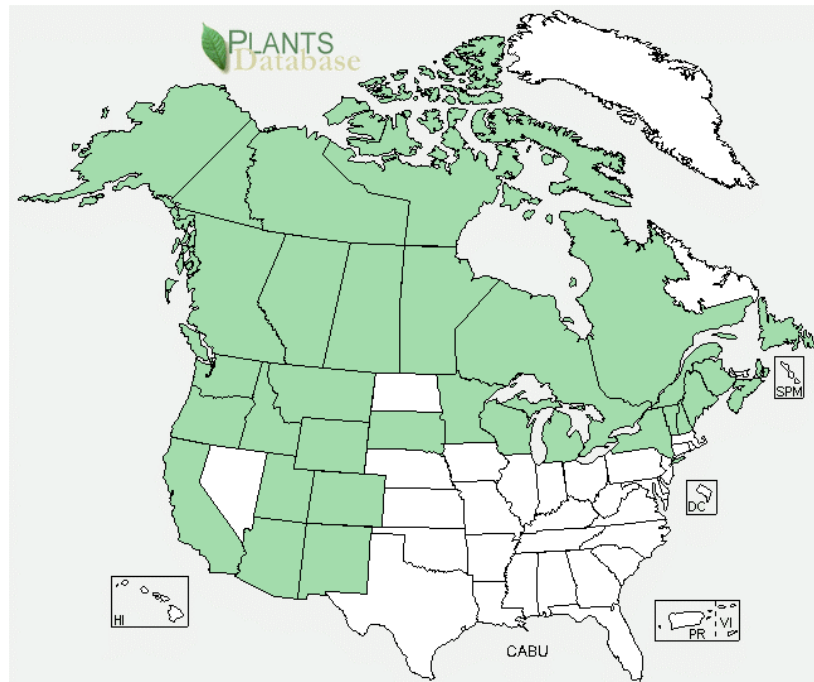
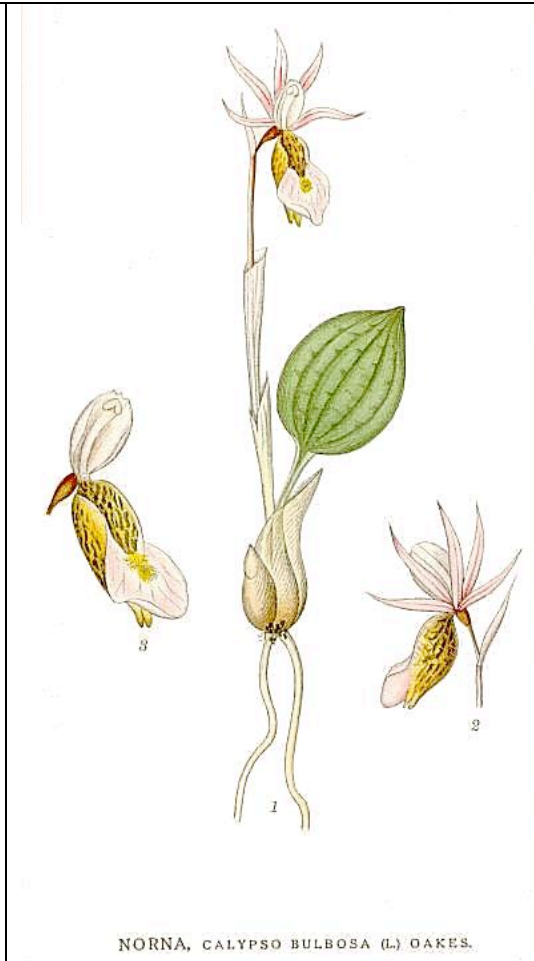


Plant Propagation Protocol for *Calypso bulbosa* (L) Oaks
 ESRM 412 – Native Plant Production



TAXONOMY	
Family Names	
Family Scientific Name:	Orchidaceae
Family Common Name:	Fairy slipper
Scientific Names	
Genus:	<i>Calypso</i>
Species:	<i>bulbosa</i>
Species Authority:	(L) Oaks
Variety:	<i>Calypso bulbosa</i> (L.) Oaks var. <i>Americana</i> (R. Br. Ex Ait f.) Luer- fairy slipper
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	
Common Synonym(s) (include full scientific names (e.g., <i>Elymus glaucus</i> Buckley), including variety or subspecies information)	
Common Name(s):	Calypso Orchid, Fairy slipper, Venus's slipper, Angel slipper
Species Code (as per USDA)	CABU

Plants database):	
GENERAL INFORMATION	
Geographical range (distribution maps for North America and Washington state)	Fairy slipper has a circumboreal distribution. In North America, it occurs extensively across the United States and Canada, ranging from Alaska east to Newfoundland and south to California, New Mexico, and Michigan.
Ecological distribution (ecosystems it occurs in, etc):	Fairy slipper is found in undisturbed northern and montane forests beneath moist soils rich with decaying leaves and wood.
Climate and elevation range	It typically grows in cool, shady areas, from sea level to mid-montane elevations, and tolerates boreal climates north of the great lakes region.
Local habitat and abundance; may include commonly associated species	Calypso bulbosa is principally associated with northern white cedar - growing in the shaded duff with little or no herbaceous competition over a metamorphic and igneous Bedrock parent material, with calcium accumulated from ground springs. In bogs, it can occur on stumps, logs, hummocks of drier soil, or slopes, but does not occur in soggy soils.
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	To date (2006), published information on fairy slipper response to fire is lacking. Given that the perennating part of the fairy slipper is a corm and that corms are generally well protected, fairy slipper is probably well adapted to survive most fires.
Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc)	<i>C.bulbosa</i> is a native perennial forb. It has a single, basal green leaf that is 1 to 2 inches (3-6 cm) long. The flower is usually solitary (rarely with 2 flowers), with a long, scoop-shaped lip tufted, 3 erect-spreading sepals, and 2 petals that are narrow, pointed and twisted. The fruits are erect capsules. The erect stem stands between 2 to 8 inches (5-20 cm) tall, extending from a bulb-like corm. Fibrous roots are typically produced at the base of a single corm.



PROPAGATION DETAILS

<p>Ecotype (this is meant primarily for experimentally derived protocols, and is a description of where the seed that was tested came from):</p>	
<p>Propagation Goal (Options: Plants, Cuttings, Seeds, Bulbs, Somatic Embryos, and/or Other Propagules):</p>	<p>seeds</p>
<p>Propagation Method (Options: Seed or Vegetative):</p>	<p>seed</p>
<p>Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown hybrids, and/or Propagules</p>	<p>Propagules (seeds)</p>

(seeds, cuttings, poles, etc.)	
Stock Type:	
Time to Grow (from seeding until plants are ready to be outplanted):	If the seed successfully completes the required minimum 70 to 75 weeks to two years of underground development, you may see your first tiny leaf in the winter of the following year after sowing in the fall. You will see nothing happening for at least a year and 5 months after you sow the seed.
Target Specifications (size or characteristics of target plants to be produced):	Calypso bulbosa is a perennial orchid that is 5-20 cm tall with a yellowish-purple stem originating from a rounded or oval solid bulb. A single basal leaf at the base of the stem grows in late summer and over winters until the next flowering season in May. The solitary flower has five purple petals, 1-2 cm long and a sac-like lip about 2 cm long. The back of the lip is translucent white and spotted with purple, the front is crested with three rows of yellow hairs.
Propagule Collection (how, when, etc):	Calypso bulbosa does not transplant well due to a delicate root system.
Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed longevity, etc):	Extremely small seeds. 416992 seeds per pound
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	
Establishment Phase (from seeding to germination):	
Length of Establishment Phase:	70-75 weeks to two years after germination
Active Growth Phase (from germination until plants are no longer actively growing):	
Length of Active Growth Phase:	
Hardening Phase (from end of active growth phase to end of growing season; primarily related to the development of cold-hardiness and preparation	Grows primarily in the fall and early spring, blooming from late May to late June

for winter):	
Length of Hardening Phase:	
Harvesting, Storage and Shipping (of seedlings):	
Length of Storage (of seedlings, between nursery and outplanting):	
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter growth, elapsed time before flowering):	60% cover and cool soils, intolerant of soil temperatures higher than 15 degrees C. very low salt-levels, and a light alkaline soil.
Other Comments (including collection restrictions or guidelines, if available):	Relatively little is known of the natural history of this diminutive orchid, and thus virtually any life history study would aid greatly in management and conservation. Of primary interest would be investigations of this species breeding system, especially pollination biology and studies leading to a better understanding of the requirements of germination and establishment.
INFORMATION SOURCES	
References:	<p>"Calypso Orchid ." <i>Blogger</i>. N.p., 17/6/2007. Web. 20 Apr 2010<http://calypsobulbosaorchid.blogspot.com/2007/09/lilium-rubescens-and-calypso-bulbosa.html>.</p> <p>Higman, P.J. and M.R. Penskar. 1996. Special plant abstract for <i>Calypso bulbosa</i> (calypso orchid). Michigan Natural Features Inventory, Lansing, MI. 2 pp</p> <p>NatureServe Explorer: An online encyclopedia of life [web application]. 2002. Version 1.6 . Arlington, Virginia, USA: NatureServe. Available: http://www.natureserve.org/explorer.</p> <p>USDA, NRCS. 2002. The PLANTS Database, Version 3.5 (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.</p>
Protocol Author (First and last name):	Keenan Lee-Peters
Date Protocol Created or Updated (4/20/10):	

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