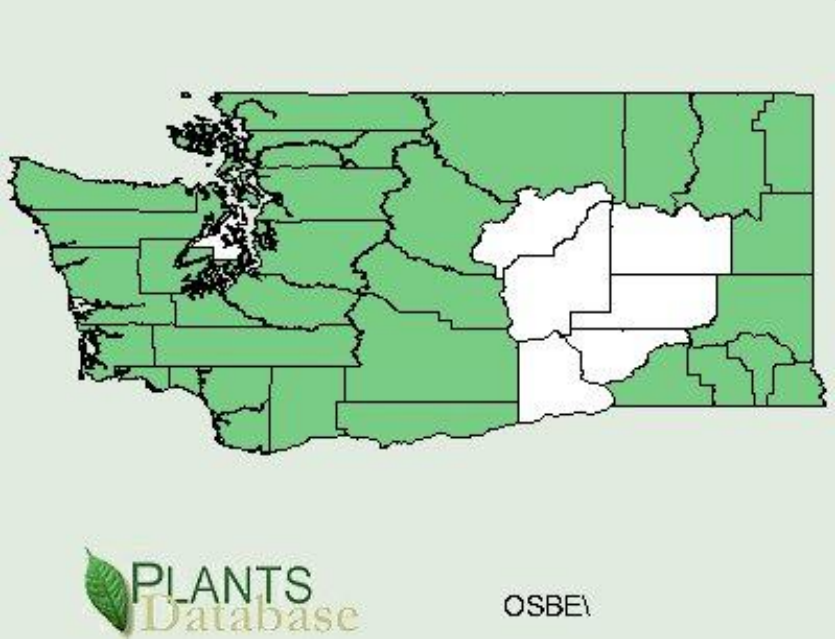
Plant Propagation Protocol for *[Osmorhiza Berteroi]*
ESRM 412 – Native Plant Production

TAXONOMY	
Family Names	
Family Scientific Name:	Apeaceae
Family Common Name:	Carrot
Scientific Names	
Genus:	Osmorhiza
Species:	Berteroi
Species Authority:	DC.
Variety:	
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	
Common Synonym(s)	*OSBR2 Osmorihza brevipes* (J.M. Coult. & Rose) Suksd. OSCH *Osmorihza chilensis* Hook.& Arn. OSDI *Osmohiza divaricata* (Britton) Suksd. OSNU *Osmorihza nuda* Torr. WADI *Washingtonia divaricata* Britton
Common Name(s):	Sweetcicely Mountain Sweet Cicely Mountain Sweetroot Sweet Cicely Western Sweet Cicely Western Sweetroot
Species:	OSBE
GENERAL INFORMATION	

Geographical range	 
Ecological distribution	Thickets, Woodlands, and woodland edges[1]
Climate and elevation range	Near sea level to moderate elevations in the mountains[2]
Local habitat and abundance; may include commonly associated species	Cedar/Hemlock Forests[3] Prefers moist areas to dry areas.
Plant strategy type / successional stage:	

Plant characteristics:	 Image by Ben Legler, 2004[2] Leaf blades biternate, the leaflets thin, narrow to broadly ovate, coarsely toothed to incised, 2-7 cm. long and 1-5.5 cm. wide; basal leaves several, long-petiolate; cauline leaves 1-3, sub-sessile; stem branched above and producing several small umbels. Inflorescence of loose, compound umbels, the long peduncles rising from leaf axils as well as terminal, the peduncles 5-25 cm. long; the 3-5 rays ascending-spreading, 2-12 cm. long; involucre and involucel wanting; calyx teeth obsolete; flowers usually greenish-white, occasionally yellowish.[2] Fruit linear-oblong, 12-22 mm. long, concavely narrowed toward the summit, densely covered with ascending hairs at least toward the base;

	stylopodium conic, about as high as wide.[2]
PROPAGATION DETAILS	
Ecotype:	Marin County, California,[3,4]
Propagation Goal:	Plants
Propagation Method:	Seed
Product Type:	Container (Plug)
Stock Type:	160 ml conetainers
Time to Grow:	11 Months[3]
Target Specifications:	Height: 7 CM, 4-6 leaves, firm rooting inside conetainer[3]
Propagule Collection:	Hand collect seeds in early August when black and fall readily off the plant. Keep seeds in paper bag in a ventilated drying shed before cleaning.[4]
Propagule Processing/Propagule Characteristics:	Seeds can last for around 5 years in sealed, 1C containers 16,000 seeds/kg, 100%, Purity, 47% Germination rate[3] Seeds kept dry and stored in refrigerator[4]
Pre-Planting Propagule Treatments:	140 day cold, moist outdoor stratification. Cone-tainers are sown late fall[3] Or Soak seeds for 24 hours. Stratify for 42 days.[3]
Growing Area Preparation / Annual Practices for Perennial Crops:	Direct Sowing: Species germinates well under light, sow seeds near the surface. Growing medium used is 50% milled sphagnum peat, perlite, and vermiculite with Osmocote controlled release fertilizer (13N:13P2O5:13K2O; 8 to 9 month release rate at 21C) and Micromax fertilizer (12%S, 0.1%B, 0.5%Cu, 12%Fe, 2.5%Mn, 0.05%Mo, 1%Zn) at the rate of 1 gram of Osmocite and 0.20 gram of Micromax per conetainer.[3] Transplanting: Sow seeds in germination flats with Sunshine Mix #4 and Aggregate Plus (peat moss, perlite, major and minor nutrients, gypsum, and dolomitic lime).[4]
Establishment Phase:	Direct Sowing**:** Medium kept moist during germination. Initial germination is complete after 2 weeks, occuring around mid May.[3] Transplanting: Seeds germinate after 10 days and are transplanted to individual cone-tainers.[4]
Length of Establishment Phase:	Direct Sowing: 28 days[3] Transplanting: 20 days[4]
Active Growth Phase:	Move plants to shadehouse and fertilized with Nutrcote NPK fertilizer[3,4]

Length of Active Growth Phase:	16 weeks[3]
Hardening Phase:	Irrigation is gradually reduced in September and October. Plants are leached with clear water and fertilized with NPK fertilizer once more before winterization.[3]
Length of Hardening Phase:	8 weeks[3]
Harvesting, Storage and Shipping:	Store overwinter in outdoor nursery under insulating foam cover.[3]
Length of Storage:	5 months[3]
Guidelines for Outplanting / Performance on Typical Sites:	Shade is necessary for this species during production and at the site where it is planted.[3]
Other Comments:	

INFORMATION SOURCES

References:	1)Johnson, Lady Bird. Osmorhiza berteroi DC. 17 05 2011 http://www.wildflower.org/plants/result.php?id_plant=OSBE. 2) Knoke, Don and David Giblin. Osmorhiza Chilensis. 2004. 16 05 2011 <http://biology.burke.washington.edu/herbarium/imagecollection.php?Page=nomatch.php?Genus=Osmorhiza&Species=berteroi>. 3) Wick, Dale; Evans, Jeff.; Luna, Tara. 2008. Propagation protocol for production of container *Osmorhiza chilensis* H. & A. plants (160 ml conetainers); USDI NPS - Glacier National Park, West Glacier, Montana. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 16 May 2011). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery. 4)) Young, Betty 2001. Propagation protocol for production of container *Osmorhiza chilensis* H. & A. plants (Deepot 16); , San Francisco, California. In: Native Plant Network. URL:
Other Sources Consulted:	Licher, Max. Osmorhiza bertorei. 16 05 2011 (http://swbiodiversity.org/seinet/taxa/index.php?taxon=2692). Osmorhiza Chilensis - Hook and Arn. 16 05 2011 (http://www.pfaf.org/user/Plant.aspx?LatinName=Osmorhiza%20chilensis). U.S. Forest Service. "Omorhiza Berteroi." Forest Plan. 2005.
Protocol Author:	Cory Burk
Date	5/18/2011

Protocol Created or Updated:	

Old Protocol:

Plant Data Sheet
Osmorhiza chilensis

Photo by Richard W. Wright

Photo Ó Lee Dittmann

Species (common name, Latin name)
Mountain sweet cicely, Sweet cicely (*Osmorhiza chilensis*) (4 and 6)
Also known as *Osmorhiza Berteroi* (2)
Range
Native to the United States, *Osmorhiza chilensis* occurs mostly in the west and north eastern states. (5)

Its range also goes down the west coast, all the way into some areas of South America. (2 and 6)

Climate, elevation
Osmorhiza chilensis is found from low to middle elevations in open coniferous and deciduous forests, forest edges and thickets. (4)

Local occurrence (where, how common)
Osmorhiza chilensis is common in the habitats it occurs in shady woods favoring well-drained soil. (2)

Habitat preferences
As noted above, *Osmorhiza chilensis* prefers shady woods and well-drained soils (2)

Plant strategy type/successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)

Osmorhiza chilensis does have the ability to self-fertilize if not pollinated from other plants (3)

Associated species
Grows in open mixed or coniferous forests, forests edges, including yellow pine forests, red fir forests, lodgepole Forest, and mixed evergreen forests. (1)

May be collected as: (seed, layered, divisions, etc.)
Seed (6)

Collection restrictions or guidelines
Seeds are hand collected in early August (or earlier depending on location) when seeds turn black and are easily hand stripped from the inflorescence. Seeds are kept in paper bags in a well ventilated drying shed prior to cleaning. (6)

Seed germination (needs dormancy breaking?)
For colder environments 5 months cold moist outdoor stratification, a minimum of 140 days, is recommended for germination. (6)
Other recommendations include soaking the seeds for 24 hours and then cold stratifying them for 42 days. (7)

Seed life (can be stored, short shelf-life, long shelf-life)
Seed longevity is estimated at 5 years in sealed containers at 1C. (6)

Recommended seed storage conditions
See 'Seed life'

Propagation recommendations (plant seeds, vegetative parts, cuttings, etc.)
Germination is reported to be higher in the presence of light for this genus.
Containers are filled and sown in late fall and irrigated thoroughly prior to winter stratification. (6)

Seeds should be surface sown along with a controlled release fertilizer. Media is kept slightly moist during germination (6)

Another recommendation is to sow seeds in flats and cover with media. Water flats with an automatic irrigation system. Seeds will germinate in 10 days after sowing. Seedlings can then be transplanted to individual containers of 2" x 7" tubes. After establishment, seedlings are moved to a shadehouse. (7)

Soil or medium requirements (inoculum necessary?)

Growing media used is 50% milled spaghnum peat, perlite, and vermiculite
with Osmocote controlled release fertilizer (13N:13P2O5:13K2O; 8 to 9 month release rate at 21C) and Micromax fertilizer (12%S, 0.1%B, 0.5%Cu, 12%Fe, 2.5%Mn, 0.05%Mo, 1%Zn) at the rate of 1 gram of Osmocite and 0.20 gram of Micromax per conetainer. (6)

Also flats can be used containing Sunshine Mix #4 Aggregate Plus (peat moss, perlite, major and minor nutrients, gypsum, and dolomitic lime). (7)

Installation form (form, potential for successful outcomes, cost)

From seed to transplanting in a container to site, total time is 11 months. (6)

Recommended planting density

Plants grow 30 to 100 cm tall (4), but can be planted approximately 30 cm apart.

Care requirements after installed (water weekly, water once etc.)

Water during first summer only if necessary

Normal rate of growth or spread; lifespan

n/a

Sources cited

1. California Native Plant Link Exchange
http://www.cnplx.info/nplx/nplx?page=detail&taxon=Osmorhiza+chilensis

2. Jacobson, Arthur Lee. 2001 "Wild Plants of Greater Seattle" Arthur Lee Jacobson. Seattle, WA.

3. Plants for a Future—Species Database:
http://www.scs.leeds.ac.uk/cgi-bin/pfaf/arr_html?Osmorhiza+chilensis&CAN=LATIND

4. Pojar, J. and MacKinnon, A. Plants of the Pacific Northwest Coast. Lone Pine Publishing, Redmond, WA. 1994.

5. University of Oregon 2002, "*Osmorhiza chilensis*, Sweet cicely". Environmental Studies Service Learning
Program, Hendricks Park Project. http://darkwing.uoregon.edu/~ecostudy/slp/hendricks/pdf_files/osmorhiza_chilensis.pdf

6. Wick, Dale; Evans, Jeff; Luna, Tara. 2001. Propagation protocol for production of container Osmorhiza chilensis H. & A. plants (160 ml conetainers); Glacier National Park, West Glacier, Montana. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 5 June 2004). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

7. Young, Betty. 2001. Propagation protocol for production of container Osmorhiza chilensis H. & A. plants (Deepot 16); Golden Gate National Parks, San Francisco, California. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 5 June

2004).Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

Data compiled by Wendy DesCamp 6/5/04