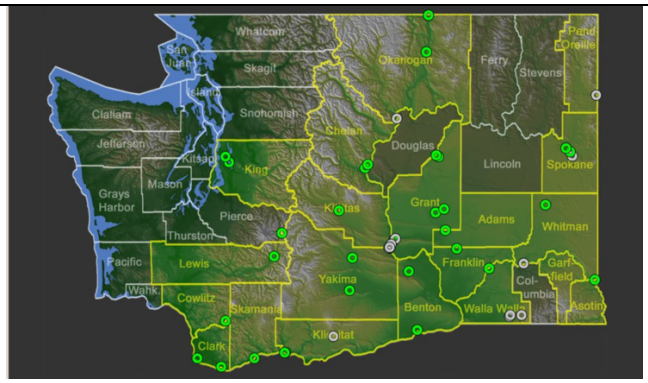
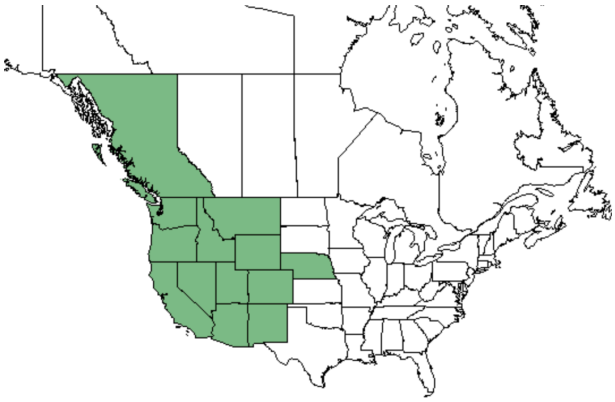
Plant Propagation Protocol for *Euthamia occidentalis Nutt.*
ESRM 412 – Native Plant Production
Protocol URL: https://courses.washington.edu/esrm412/protocols/*EUOC4.pdf*


(Photo by UC Irvine, 2002)

TAXONOMY	
Plant Family	
Scientific Name	Asteraceae
Common Name	Sunflower Family
Species Scientific Name	
Scientific Name	Euthamia occidentalis Nutt.
Varieties	N/A
Sub-species	N/A
Cultivar	N/A
Common Synonym(s)	Euthamia californica Gandog Euthamia linearifolia Gandog Solidago occidentalis (Nutt.) Torr. & A. Gray
Common Name(s)	Western goldenrod, western goldentop
Species Code (as per USDA Plants database)	EUOC4
GENERAL INFORMATION	
Geographical range	 Washington Distribution[8]

	 North America Distribution[2] Commonly found in western North America; British Columbia south to CA, AZ and NM, east to Nebraska.[4]
Ecological distribution	It is commonly found in riparian areas, coastal salt marshes, freshwater wetlands, and wet meadow habitats.[2]
Climate and elevation range	Usually below 2000ft, occasionally 5000 ft.[5]
Local habitat and abundance	Habitat is low, with usually moist ground in the valleys and plains.[8] It is often growing in association with cattail, rushes, and sedges.[2]
Plant strategy type / successional stage	Perennial from rhizome, ascending to erect, and branched above. It is a plant that once established, can often overrun, displace, and outcompete others.[1] It will spread under favorable conditions but does not pose any environmental concern to native plant communities under proper management.[2] It is tolerant of a variety of garden soils as long as sufficient moisture is available.[7]
Plant characteristics	Rhizomatous perennial herb, with erect stems.[3] The stems are white and less than 2m long. The leaves are less than 10 cm long, less than 6 mm wide. The lower leaves are deciduous while the middle leaves are the largest[1]. The inflorescence is a large, flat-topped corymb composed of multiple small yellow flower heads.[3] They are usually grown in a colony.[5]
PROPAGATION DETAILS	
Propagation by Derek Tilly, 2016 [4]	
Ecotype	Yosemite National Park
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	N/A
Time to Grow	N/A
Target Specifications	Healthy root development fulling the 10ci conetainer
Propagule Collection Instructions	N/A

Propagule Processing/Propagule Characteristics	Seed can be removed from plant material using a brush machine. Seeds run through an air-screen with 1.15mm top screen and solid bottom screen with light air
Pre-Planting Propagule Treatments	Seed is stored in cool-dry conditions with temperatures of approximately 10C (50F) and relative humidity of 20-30%. No stratification treatments are necessary
Growing Area Preparation / Annual Practices for Perennial Crops	N/A
Establishment Phase Details	Sunshine mix #4. No fertilizer. 5-10 seeds placed on soil surface and pressed for good seed to soil contact. Seed is lightly covered with pea gravel and the soil surface is kept moist with 20mins of daily irrigation from overhead sprinklers for first 30 days. After 30 days the irrigation schedule is changed to 40-60mins every other day to encourage root growth
Length of Establishment Phase	8 weeks
Active Growth Phase	Seed lot had very high viability and most cones had multiple plants in them and required significant thinning. Too many plants per cone significantly retarded growth. After full establishment, plants are fertilized once per week with Miracle Grow All Purpose Plant Food (15-30-15). After 30 days the irrigation schedule is changed to 40 to 60 minutes every other day to encourage root growth.
Length of Active Growth Phase	4 months
Hardening Phase	We backed off of water to 60mins every 4-5 days
Length of Hardening Phase	1 week
Harvesting, Storage and Shipping	Plants were deeply watered just prior to shipping. Plants were shipped in a 10° C (50° F) refrigerated truck for 2 days.
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	N/A
Other Comments	N/A
INFORMATION SOURCES	
References	[1] Boyd, I. (2007). A Resource to Identifying and Growing Native Vascular Plants of the Wilder Ranch State Park Coastal Communities. University of California Santa Cruz. Retrieved from http://spatial.cisr.ucsc.edu/envs/thesis/BoydI.pdf [2] Euthamia occidentalis Nutt. . (n.d.). Retrieved May 5, 2020, from https://plants.usda.gov/core/profile?symbol=EUOC4

	[3] Kraus, H. (n.d.). California's Native Plants™. Retrieved May 5, 2020, from http://www.moosacreeknursery.com/Native_Plants/536/Euthamia-occidentalis [4] Tilley, Derek. 2016. Propagation protocol for production of Container (plug) Euthamia occidentalis Nutt. Plants USDA NRCS - Aberdeen Plant Materials Center Aberdeen, Idaho. In: Native Plant Network. URL: http://NativePlantNetwork.org (accessed 2020/05/02). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. [5] UC Irvine. (2002, October 15). Euthamia occidentalis Nutt. Retrieved May 5, 2020, from http://nathistoc.bio.uci.edu/Plants of Upper Newport Bay (Robert De Ruff)/Asteraceae/Euthamia occidentalis.htm [6] WESTERN GOLDENTOP Plant Guide. (2017, December). Retrieved May 5, 2020, from https://plants.usda.gov/plantguide/pdf/pg_euoc4.pdf [7] Western Goldentop, Euthamia occidentalis. (n.d.). Retrieved May 5, 2020, from https://calscape.org/Euthamia-occidentalis-() [8] WTU Herbarium, Burke Museum, & University of Washington. (n.d.). Euthamia occidentalis. Retrieved May 5, 2020, from http://biology.burke.washington.edu/herbarium/imagecollection/taxon.php?Taxon=Euthamiaoccidentalis
Other Sources Consulted	efloras.org. (n.d.). 5. Euthamia occidentalis Nuttall, Trans. Amer. Philos. Soc., n. s. 7: 326. 1840. Retrieved May 5, 2020, from http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250066765 John C. Semple 2012, *Euthamia occidentalis*, in Jepson Flora Project (eds.) *Jepson eFlora*, /eflora/eflora_display.php?tid=2933, accessed on May 05, 2020. LADY BIRD JOHNSON WILDFLOWER CENTER. (2019, February 26). Plant Database. Retrieved May 5, 2020, from https://www.wildflower.org/plants/result.php?id_plant=EUOC4
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