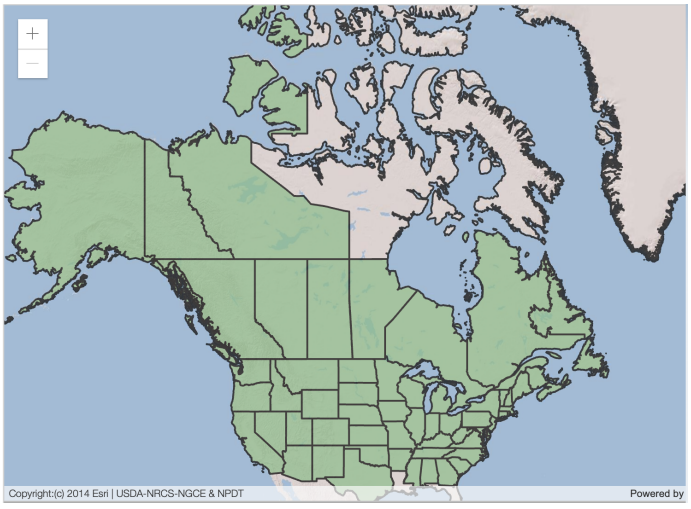
Plant Propagation Protocol for *Comandra umbellata*

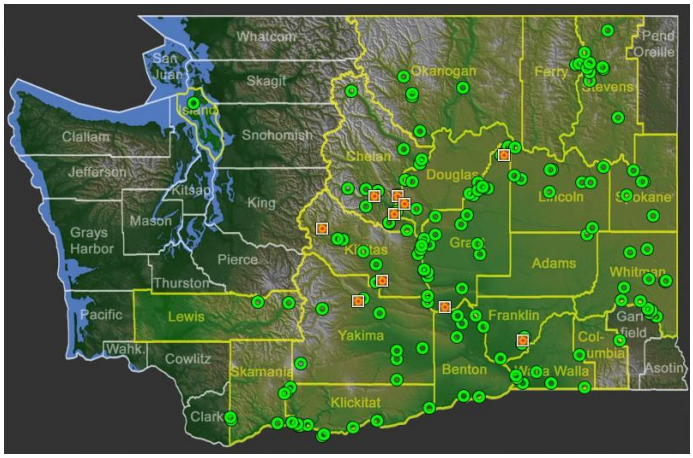
ESRM 412 – Native Plant Production

URL: https://courses.washington.edu/esrm412/protocols/*2022/COUM.pdf*

Photo credit: 2004 Ben Legler, https://biology.burke.washington.edu/herbarium/imagecollection/taxon.php?Taxon=Comandra%20umbellata

TAXONOMY	
Plant Family	
Scientific Name	Santalaceae
Common Name	Sandalwood family
Species Scientific Name	
Genus	*Comandra*
Species	*Comandra umbellata*
Scientific Name	*Comandra umbellata* (L) Nutt.
Varieties	NA

Sub-species	*Comandra umbellata* (L.) Nutt. Ssp. *californica* (Eastw. Ex Rydb.) *Comandra umbellata* (L.) Nutt. Ssp. *pallida* (A. DC) Piehl *Comandra umbellata* (L.) Nutt. Ssp. *umbellata*
Cultivar	NA
Common Synonym(s)	*Comandra pallida* A. DC *Comandra umbellata* (L.) Nutt. var. *Angustifolia* (A. DC.) Torr. *Comandra umbellata* (L.) Nutt. var. *pallida* (A. DC.) M.E. Jones
Common Name(s)	Pale bastard toadflax False toadflax Common comandra
Species Code (as per USDA Plants database)	COUM
GENERAL INFORMATION	
Geographical range	 Photo Source: USDA Plant Profile COUMP https://plants.usda.gov/home/plantProfile?symbol=COUM Pale bastard toadflax range

	 Photo source: Burke Herbarium Image Collection, https://biology.burke.washington.edu/herbarium/imagecollection/taxon.php?Taxon=Comandra%20umbellata
Ecological distribution	Forb/herb Subshrub Different subspecies have different ranges across the USA and Canada[7]
Climate and elevation range	Prairies including black soil, sand, and hill [10] Rocky open woodlands, thinly wooded ridges, sandy savannas, barren areas with scrubby vegetation [10]
Local habitat and abundance	Dry sandy or rocky slopes Shrublands in lowlands, mountains, steppes
Plant strategy type / successional stage	Hemi-Parasitic herb rhizomes
Plant characteristics	Shrub, inflorescence white to purple flowers on terminal. Flowers do not have petals, but rather colored sepals [1]. Alternate linear to lanceolate leaves, short stalked. Green to Bluish-purple fleshy drupes. Grows through both vegetative reproduction (rhizomes) and sexual reproduction. Rhizomes grow approximately 1 foot per year [2]. Hard to differentiate between three subspecies (very subtle differences). 8 to 34 cm tall [1].

	Mycorrhizal association as well as relationship with large host range. Hemi-parasitic of over 200 species of plants [3]. Comandra umbellata is an alternate host to comandra blister rust which affects pine trees[1]
PROPAGATION DETAILS	
Ecotype	Nachusa Grasslands, Franklin Grove IL [4]
Propagation Goal	Plants
Propagation Method	Seed
Product Type	No Literature
Stock Type	No Literature
Time to Grow	No Literature
Target Specifications	No Literature
Propagule Collection Instructions	No Literature
Propagule Processing/Propagule Characteristics	No Literature
Pre-Planting Propagule Treatments	Inoculating fruits with pollen from one population to another population over a mile away for germination [4]. 2 year dormancy of planted seeds before sprouting [5]. Seeds in state of dormancy, so require stratification to break dormancy [3]. Stratify seeds for 3 months at 5 degrees C, then plant with suitable host [6]

Growing Area Preparation / Annual Practices for Perennial Crops	No Literature
Establishment Phase Details	No Literature
Length of Establishment Phase	No Literature
Active Growth Phase	No Literature
Length of Active Growth Phase	No Literature
Hardening Phase	No Literature
Length of Hardening Phase	No Literature
Harvesting, Storage and Shipping	Transferred seedlings Harvest in July [3].
Length of Storage	No Literature
Guidelines for Outplanting / Performance on Typical Sites	1/25 treated plants survived and produced fruit [4] Plant near suitable host [6].
Other Comments	Very low success rates for propagation. Trials of scarifying, stratifying, planting seeds at different depths, and adding soil from areas with existing plants [4] Of the unknown lot of seeds sown only three germinated two years after being planted [5]. The germination and growth of these seedlings proved the plant was hemi-parasitic and was able to grow without a host plant for nutrients [5]. Seeds have different germination rates depending on their age. Typically the older seeds (darker colored) germinate less than the green and yellow seeds of the

	plant [2]. Seeds are prone to molding quickly. Seeds are slow starters so take a while to germinate and reproduce [2]. Parasitizes over 200 different species of plants [6].

INFORMATION SOURCES

References	[1]"Bastard Toadflax, Comandra Umbellata." *California Native Plant Society*, https://calscape.org/Comandra-umbellata-(). [2]Packard, Stephen. "Rotten Bastard Toadflax: And Related Quandaries." *Rotten Bastard Toadflax: and Related Quandaries*, 19 June 2019, https://woodsandprairie.blogspot.com/2019/06/rotten-bastard-toadflax-and-related.html. [3]"Comandra Umbellata L. Nutt." *University of Alberta*, University of Alberta, https://acrre.ualberta.ca/acrre/wp-content/uploads/sites/45/2018/04//Comandra_umbellata.pdf. [4] Buchholz, Bernie. "Propagating False Toadflax, Comandra Umbellata." *Grassland Restoration Network*, 15 Nov. 2019, https://grasslandrestorationnetwork.org/2019/11/21/propagating-false-toadflax-comandra-umbellata/. [5] Hedgecock, George G. "Parasitism of Comandra Umbellata." *Journal of Agricultural Research*, vol. 5, no. 3, 18 Oct. 1915, https://www.google.com/books/edition/Parasitism_of_Comandra_Umbellata/1qtAAQAAMAAJ?hl=en&gbpv=0&kptab=overview.

	[6] “Comandra Umbellata- (L.) Nutt.” *Plants for a Future*, Plants for a Future, https://pfaf.org/user/Plant.aspx?LatinName=Comandra%2Bumbellata. General information about plant sources: [7]“Classification for Kingdom Plantae Down to Species Comandra Umbellata (L.) Nutt.” *USDA Plants Database*, https://plants.usda.gov/home/classification/92593. [8]“Comandra Umbellata (L.) Nutt.” *E-Flora BC: Electronic Atlas of the Flora of British Columbia*, Department of Geography UBC, https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Comandra%2Bumbellata. [9]“Comandra Umbellata.” *Burke Herbarium Image Collection*, Burke Museum, https://biology.burke.washington.edu/herbarium/imagecollection/taxon.php?Taxon=Comandra+umbellata. [10]“Bastard Toadflax.” *Prairie Wildflowers of Illinois*, https://www.illinoiswildflowers.info/prairie/plantx/toadflaxx.htm.
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