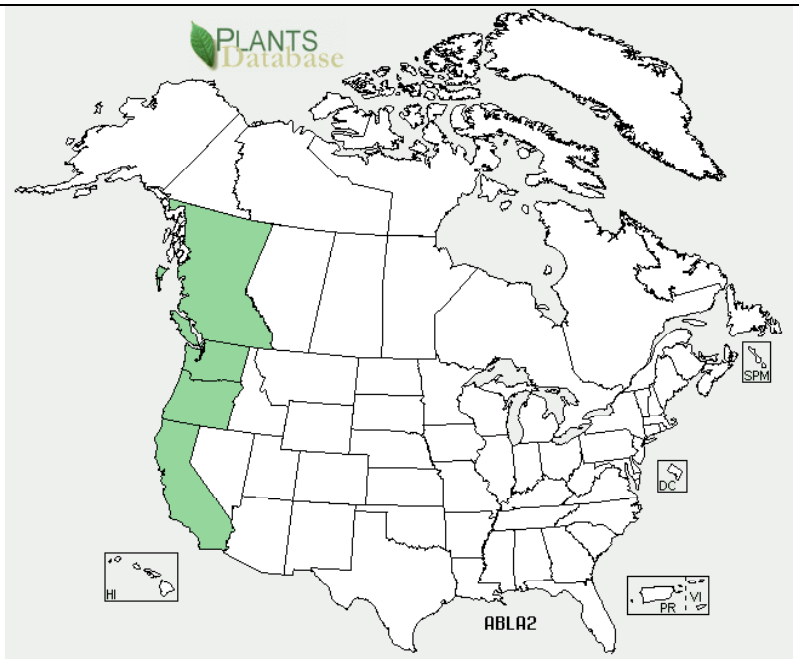
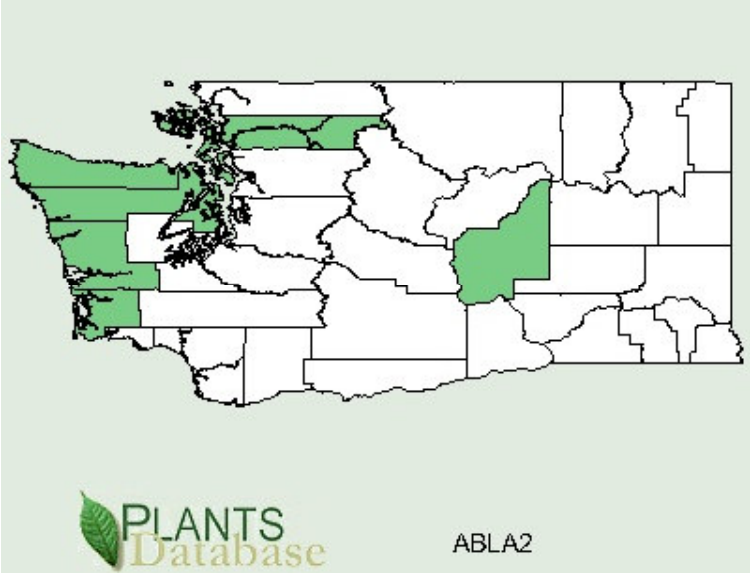
Plant Propagation Protocol for *Abronia latifolia*
ESRM 412 – Native Plant Production
Spring 2008

TAXONOMY	
Family Names	
Family Scientific Name:	Nyctaginaceae
Family Common Name:	Four o' Clock Family
Scientific Names	
Genus:	Abronia
Species:	latifolia
Species Authority:	Eschsch.
Common Name:	Yellow Sand Verbena
Species Code:	ABLA2
GENERAL INFORMATION	
Geographical range:	 (USDA, 2008) http://plants.usda.gov/java/profile?symbol=ABLA2&photoID=abla2_007_ahp.tif

	 (USDA, 2008) http://plants.usda.gov/java/county?state_name=Washington&statefips=53&symbol=ABLA2
Ecological distribution:	Occurs on sandy sea beaches and dunes (Pojar & MacKinnon, 2004).
Climate and elevation range	Occurs in very low elevation in maritime climates (Pojar & MacKinnon) that are from British Colombia to California (USDA, 2008).
Local habitat and abundance:	Yellow sand verbena is usually scattered, but sometimes it is locally common. Commonly associated species include *Carex stipata*, *Poa macrantha*, *Glehnia littoralis* ssp. *leiocarpa*, and *Calystegia soldanella* (Pojar & MacKinnon, 2004).
Plant strategy type / successional stage:	Since the plant occurs on dunes and beaches, it could be classified as a colonizer.
Plant characteristics:	Yellow sand verbena is a perennial with a thick taproot and trailing habit. It has fleshy, opposite leaves and yellow flowers in rounded heads (Pojar & MacKinnon, 2004). It's stems may grow as long as 1 m (Robson et al, 2007).
PROPAGATION DETAILS	
Ecotype:	For Young, 2001 the ecotype is Marin County, California. For the other sources, it is not given.
Propagation Goal:	The goal for Deno is germination. The goal for Thompson and Schmidt is plants. The goal for Young, 2001 is plants. For the other sources, no information is given.
Propagation Method:	Thompson recommends both seed and vegetative methods (Thompson, 2005). Schmidt uses seed propagation (Schmidt, 1980). Young used seeds (Young, 2001). The other sources do not specify a method.

Product Type:	The product for Schmidt is field grown plants (Schmidt, 1980). The product type for Young, 2001 was a container (plug). No information in other sources.
Stock Type:	Young's stock type was Deepot 16. Container is a 2" x 7" tube (Young, 2001). No information in other sources.
Time to Grow:	No information found.
Target Specifications:	The container plant should have compact growth, a firm root plug, and a tuber that is well developed (Young, 2001). No information in other sources.
Propagule Collection:	Cuttings should be taken in spring (Thompson, 2005). Rice-shaped seeds should be collected from June 1 through September 1 and are in sand colored pod fruits that are 5 mm – 10 mm. When ripe, seeds are light or dark brown and hard (Young, 2001). No information in other sources.
Propagule Processing/Propagule Characteristics:	Soak pods for 1 or 2 days and then place in a processor with taped blades. Add water and process on high for 10 minutes. Strain before dry storage in a refrigerator. Pods are often empty, and can have as low as 10% fill (Young, 2001). No information in other sources.
Pre-Planting Propagule Treatments:	Deno treated some seeds of *A. fragrans* and *A. villosa* with different experimental dormany breaking treatments. For *A. fragrans,* he obtained 2% germination after 8 to 10 days at 70°F and determined that light or a prior at a distance of 3 m did not affect germination. Percent germination for *A. fragrans* was determined to be inaccurate due to chaff. For *A. villosa* he obtained 40% germination after 4 to 6 days at 70°F and 40% germination in the third week at 40°F. (Deno, 1993) Thompson recommends peeling off the outer covering on the seed before planting for species of *Abronia* in general (Thompson, 2005). Moist, cleaned seeds require 2 weeks of cold stratification in a plastic bag (Young, 2001). No information in other sources.
Growing Area Preparation / Annual Practices for Perennial Crops:	Containers are not recommended because the seedlings suffer from disturbance and because rot is more common. Sandy, friable soil is recommended, and clay soil is probably harmful. Moderate water is suggested (Schmidt, 1980). Young used 10 grams of seed per flat sown on July 1st into Sunshine

	Mix #4 Plug Aggregate Mix. This mix contains peat moss, perlite, major and minor nutrients, as well as gypsum and dolomitic lime. The seeds were covered and watered with automatic irrigation until leached thoroughly (Young, 2001). No information in other sources.
Establishment Phase:	*Abronia* species seeds should be sown in autumn (Thompson, 2005). Schmidt recommends autumn sowing because the rain may aid germination. Germination is described as slow and irregular. (Schmidt, 2005). Average germination for Young was 60% (Young, 2001). No information in other sources.
Length of Establishment Phase:	The length is 14 days (Young, 2001). No information in other sources.
Active Growth Phase:	Young transplanted the seedlings 1 month after germination into Deepot 16 with a one-to-one mix of perlite and standard potting mix, which contains fir bark, peat, and sand perlite. After transplanting, seedling survival averaged 60%. A low water regime with soluble fertilizer started 2 months after transplanting was used with positive results. Also two months after transplanting, seedlings are moved to the shade house and plants are pruned vigorously. Plants should develop a large tuber at this time (Young, 2001). No information in other sources.
Length of Active Growth Phase:	No information found.
Hardening Phase:	No information found.
Length of Hardening Phase:	No information found.
Harvesting, Storage and Shipping:	Prune plants into a compact shape and remove trailers (Young, 2001). No information in other sources.
Length of Storage (of seedlings, between nursery and outplanting):	No information found.
Guidelines for Outplanting / Performance on Typical Sites:	Plant in sun in sandy, friable soil where it will receive moderate water (Schmidt, 2005). Drainage must be very sharp for the plant to tolerate moderate water (Robson et al, 2007). Plants should be pruned and have trailers removed before outplanting (Young, 2001).

	No information in other sources.
Other Comments (including collection restrictions or guidelines, if available):	 (Public domain image from the National Park Service accessed at http://en.wikipedia.org/wiki/Image:Abronia_latifolia.jpg) The genus *Abronia* has a peripheral and linear embryo that grows more germination and encloses either perisperm or endosperm (Hartman et al, 2002). The plant was reportedly used as food by the Clallam and Makah peoples. They dug the plant in fall and cooked it (Kuhlein and Turner, 1991).
INFORMATION SOURCES	
References:	Deno, Norman C. Seed Germination Theory and Practice. Pennsylvania State University, 1993. Hartman, Hudson T., Dale E. Kester, Fred T. Davies Jr., and Robert L. Geneve. Plant Propagation: Principles and Practices. Upper Saddle River, NJ: Prentice Hall, 2002. Kuhlein, Harriet V., and Nancy J. Turner. Traditional Plant Foods of Canadian Indigenous Peoples: Nutrition, Botany, and Use. Philadelphia: Gordon and Breach Science Publishers, 1991 Pojar, Jim, and Andy MacKinnon. Plants of the Pacific Northwest Coast. Vancouver, BC: Lone Pine Publishing, 2004. Robson, Kathleen, Alice Richter, and Marianne Filbert. Encyclopedia of Northwest Native Plants for Gardens and Landscapes. Portland, OR: Timber Press, 2007. Schmidt, Marjorie G. Growing California Native Plants. Berkeley, CA:

	University of California Press, 1980. Thompson, Peter. Creative Propagation. Portland, OR: Timber Press, 2005. USDA, NRCS. 2008. The PLANTS Database (http://plants.usda.gov, 1 June 2008). National Plant Data Center, Baton Rouge, LA 70874-4490 USA. Young, Betty. 2001. Propagation protocol for production of container Abronia latifolia Eschsch. plants (Deepot 16); USDI NPS - Golden Gate National Parks, San Francisco, California. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 2 June 2008). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.
Other Sources Consulted:	The American Horticultural Society. Toogood, Alan, ed. Plant Propagation. New York, NY: DK Publishing, Inc., 1999. Baskin, Carol C., and Jerry M. Baskin. Seeds: Ecology Biogeography, and Evolution of Dormancy and Germination. San Diego, CA: Academic Press, 1998. Klinka, K., V.J Krajina, A. Ceska, and A.M Scagel. Indicator Plants of Coastal British Columbia. Vancouver, BC: UBC Press Vancouver B.C., 1995. Young, James A., and Cheryl G. Young. Collecting, Processing, and Germinating Seeds of Wildland Plants. Portland, OR: Timber Press, 1986.
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