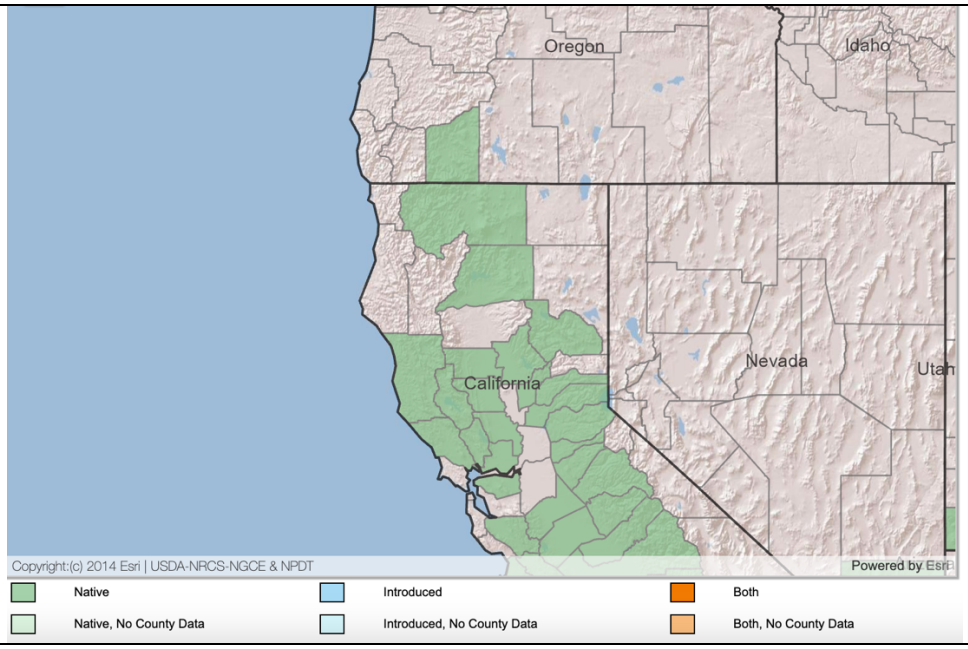
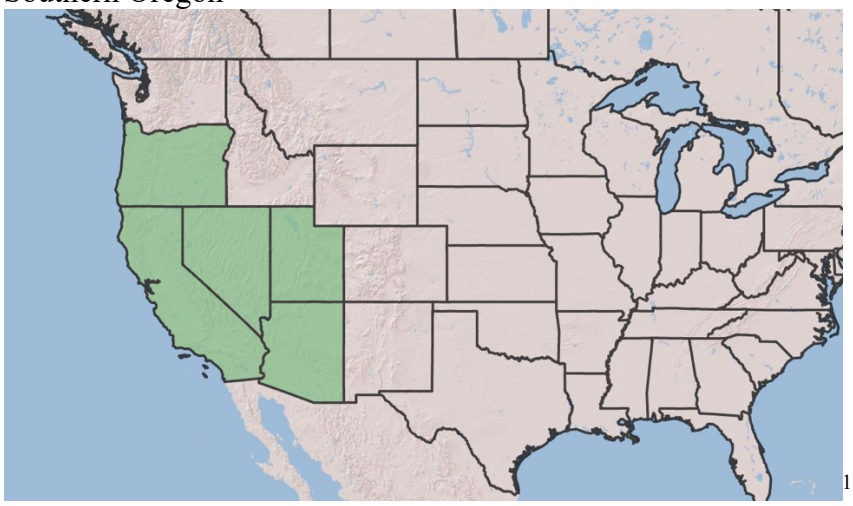
Plant Propagation Protocol for *FRDI2*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/*[2023]*/*[FRDI2.pdf]*

TAXONOMY	
Plant Family	
Scientific Name	*Fraxinus dipetala*
Common Name	California Ash
Species Scientific Name	
Scientific Name	*Fraxinus dipetala* Hook. & Arn.
Varieties	*Fraxinus dipetala* Hook. & Arn. var. *trifoliolata* Torr., orth. var.
Sub-species	
Cultivar	
Common Synonym(s)	
Common Name(s)	
Species Code (as per USDA Plants database)	FRDI2
GENERAL INFORMATION	
Geographical range	

	Southern Oregon  [1]
Ecological distribution	Slopes Grown mostly in central valley
Climate and elevation range	Full sun/Part Shade Very Low moisture Grows at lower elevations of around 300-4200 ft above sea level[2]
Local habitat and abundance	Tolerates a variety of soils including clay and decomposed granite. Tolerates Serpentine Soil. Soil PH: 5.9 - 8.2
Plant strategy type / successional stage	Stress-tolerator
Plant characteristics	Shrub Tree (1)
PROPAGATION DETAILS	
Ecotype	Cumberland Gap National Historical Park
Propagation Goal	plants
Propagation Method	seed
Product Type	Bareroot (field grown)
Stock Type	Bareroot seedling and specimen plants in 2 or 3-gallon containers
Time to Grow	2 years
Target Specifications	Time to Grow: Bareroot seedlings are harvested after growing for two years in outdoor nursery beds. Most go out to the park bareroot; selected specimens are potted up and moved to the NPMC's container nursery and grown to 1 or 2-gallon size for an additional one or two seasons.

[1] USDA plants database. (n.d.-a). https://plants.usda.gov/home/plantProfile?symbol=FRDI2

[2] *California ash, fraxinus dipetala*. California Native Plant Society. (n.d.). https://calscape.org/Fraxinus-dipetala-(California-Ash)

	Root systems: Bareroot seedlings: well-developed root system. Long roots are pruned as needed at harvest. Container: Firm root ball that fills a container treated with Spin Out, a copper hydroxide product that inhibits root girdling. Height: 2-0 bareroot seedlings are 22-40 inches. 2-2 plants in 2-gallon containers are up to 48"
Propagule Collection Instructions	Mature fruit heads were collected on October 4 and October 26 in Cumberland Gap National Historical Park in Virginia and Tennessee
Propagule Processing/Propagule Characteristics	Seed cleaning: samaras are dried; stems and debris are removed. Storage: if seeds are not sown the season of collection, they are stored dry in paper seed collection envelopes, cloth bags or plastic containers in a seed cooler at 40F, 35% relative humidity. Purity: estimated at 99-100% after cleaning. Seeds per Kg: approximately 17,700
Pre-Planting Propagule Treatments	Seeds have embryo and seedcoat dormancy. Best pretreatments are a combination of warm and cold stratification. (Bonner, 1974) Seeds are soaked in water for several hours or overnight, and treated with fungicide. Seeds are sown in woody nursery beds in the fall soon after collection to allow natural stratification of the seeds
Growing Area Preparation / Annual Practices for Perennial Crops	Propagation environment: bareroot seedlings are grown in outdoor woody nursery beds; container specimens are grown to finished size in a container nursery. Sowing date: fall Sowing/planting technique: Seeds are dusted with fungicide and hand-sown into rows. (Rows are 5-6 inches apart and seeds are sown close together within each row). Endomycorrhizae are sprinkled over the seed and the row is covered with about _ inch of soil. The beds are then mulched with aged sawdust, which is scraped back in the spring before seedling emergence
Establishment Phase Details	Seedlings generally emerge during the spring following fall sowing. Newly emerged seedlings are monitored closely for irrigation needs. Young seedlings are shaded as soon as they emerge with 30% poly screening. Shade cloth remains over seedlings until mid-August
Length of Establishment Phase	1-2 months after emergence in the spring
Active Growth Phase	Outdoor woody beds: Because NPMC soil is a nutrient poor, sandy loam, seedlings in the outdoor nursery beds are fertilized once weekly from mid-April through early June with a granular 10-10-10. From mid-June through late July, the 10-10-10 is alternated with a granular urea. Fertilization from late July through late August is bi-weekly with 10-10-10. Overhead irrigation is used after each fertilization. The rate of water applied is determined by soil moisture prior to irrigation Container nursery: Potted seedlings are put in a shade house until reaching outplanting size at 1 or 2 gallons. Plants are bumped up to the next container size in spring using a customized woody mix (3.8 cu. ft. bale Sunshine #1, 4 cu. ft. pine bark mulch, 4 cups 180 day controlled release Nutricote 18-6-8 with micros and about 4 cups of endomycorrhizae per batch). Plant roots

	usually need a season or more after each bump-up for roots to fill the containers. Daily irrigation is adjusted depending on natural precipitation and pot size. Larger (2 and 3-gallon) pots are moved to a drip section in full sun. If additional nutrients are needed, containers may be top-dressed with controlled release Nutricote at manufacturer-recommended rates. Prune as necessary to shape the plant
Length of Active Growth Phase	4-5 months
Hardening Phase	Outdoor woody nursery beds: During mid- to late summer, fertilization is cut back to twice monthly. Beginning in September, irrigation is only used in a severe droughty situation. Container nursery: frequency and duration of irrigation is reduced as plants go dormant, depending on natural rainfall.
Length of Hardening Phase	2-3 months
Harvesting, Storage and Shipping	Bareroot: Dormant bareroot plants are harvested in early to mid-December. A bareroot seedling harvester is used to lift plants in the woody bed. Seedlings are then hand-sorted by size and tied in manageable bundles. Roots are pruned as needed and kept moist until packing. Bundles are packed in plastic bins with drainage holes and roots are covered with moist sawdust. Bins are held in cold storage at 40F and watered as needed. Containers: dormant containerized stock is overwintered outdoors under a microfoam-insulating blanket. After leaves have fallen, the clean, well-watered containers are overlapped on their sides on weed barrier fabric and covered with microfoam. Rodenticide baits are placed at intervals under the blanket to discourage gnawing rodents. The microfoam is then secured with rope and rebar
Length of Storage	3-5 months [3]
Guidelines for Outplanting / Performance on Typical Sites	7% to 16% of seeds sown survived to harvest size
Other Comments	[4]**Davis, Kathy; King, Brandy. 2005. Propagation protocol for production of Bareroot (field grown) *Fraxinus americana* L. plants bareroot seedlings and specimen plants in 2 or 3-gallon containers; USDA NRCS - Norman A. Berg National Plant Materials Center Beltsville, Maryland. In: Native Plant Network. URL: https://NativePlantNetwork.org (accessed 2023/05/24). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources**

[3] Hoss, Gregory. 2005. Propagation protocol for production of Bareroot (field grown) *Fraxinus americana* L. plants 1+0; George O. White State Forest Nursery Licking, Missouri. In: Native Plant Network. URL: https://NativePlantNetwork.org (accessed 2023/05/24). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources

INFORMATION SOURCES	
References	See below
Other Sources Consulted	McMinn, H., Maino, E., & Shepherd, H. W. (1937). An illustrated manual of Pacific coast trees. University of California Press. Fraxinus latifolia benth. (n.d.). https://www.srs.fs.usda.gov/pubs/misc/ag_654/volume_2/fraxinus/latifolia.htm *California Ash (how to identify the common native trees of North America) · INATURALIST*. iNaturalist. (n.d.). https://www.inaturalist.org/guide_taxa/1148210 *Oregon Ash*. Fraxinus latifolia benth. (n.d.-b). https://www.srs.fs.usda.gov/pubs/misc/ag_654/volume_2/fraxinus/latifolia.htm Pojar J., McKinnon A.,1994 Plants of the Pacific Northwest: Washington, Oregon, British Columbia and Alaska, B.C. Ministry of Forests and Lone Publishing, Canada Benedict, L., & David, R. (2003). Propagation protocol for Black Ash. https://npj.uwpress.org/content/wpnpj/4/2/100.full.pdf Knight, K. S., Karrfalt, R. P., & Mason, M. E. (2010). *Methods for collecting ash (fraxinus spp.) seeds*. United States Department of Agriculture, Forest Service, Northern Research Station.
Protocol Author	Ellie Muscat
Date Protocol Created or Updated	05/24/23

References

1 USDA plants database. (n.d.-a). https://plants.usda.gov/home/plantProfile?symbol=FRDI2

2 *California ash, fraxinus dipetala*. California Native Plant Society. (n.d.).
https://calscape.org/Fraxinus-dipetala-(California-Ash)

3 Hoss, Gregory. 2005. Propagation protocol for production of Bareroot (field grown) *Fraxinus americana* L. plants 1+0; George O. White State Forest Nursery Licking, Missouri. In: Native Plant Network. URL: https://NativePlantNetwork.org (accessed 2023/05/24). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources

4 Davis, Kathy; King, Brandy. 2005. Propagation protocol for production of Bareroot (field grown) *Fraxinus americana* L. plants bareroot seedlings and specimen plants in 2 or 3-gallon containers; USDA NRCS - Norman A. Berg National Plant Materials Center Beltsville, Maryland. In: Native Plant Network. URL: https://NativePlantNetwork.org (accessed 2023/05/24). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources