

Restoring Seed Relatives: Collection and Storage Techniques

October 7, 2020 • 12 – 1:15pm



Speaker 2: Bridget McNassar, MS

Native Plants and Conservation Manager, Oxbow Farm and Conservation Center

Title: Seed Collecting and Cleaning: Low-tech Methods and Tips

Bridget McNassar works at Oxbow Farm & Conservation Center, managing their Native Plant Program. Alongside a nursery operation growing thousands of seed-grown native plants each year for restoration, landscaping, and retail sellers, Bridget works to create outreach and education opportunities aimed at promoting use of natives in various landscapes and facilitating meaningful connections between people and native plants. Her formal education includes a B.S. in Biology from the University of Notre Dame and a M.S. in Natural Resources from University of Idaho.





Seed Collection and Cleaning: Low Tech Methods and Tips

Bridget McNassar, M.S., Native Plant Program Manager

Oxbow Farm & Conservation Center, Carnation, WA

Restoring Tribal Culture, Ecology, and Food Systems Webinar: Oct 2020

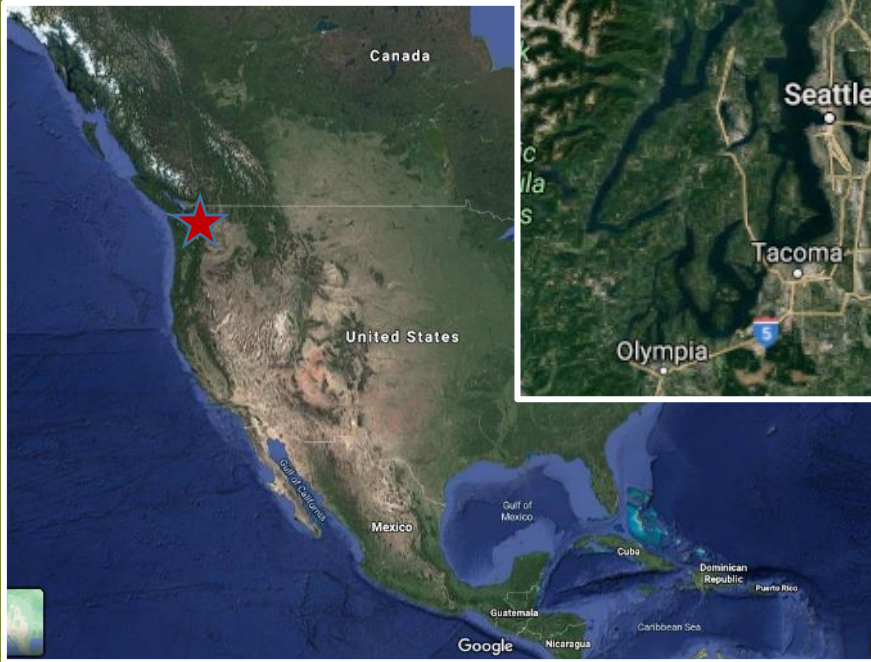
Slide content credits: Tara Luna, Tribal Nursery Manual



Oxbow is located on the Indigenous Land of Coast Salish peoples who have reserved treaty rights to the land, specifically the Snoqualmie Indian Tribe (sduk^walbix^w). We thank the caretakers of the land who have lived, and continue to live, here since time immemorial.

Oxbow

Farm & Conservation Center



Oxbow is a nonprofit organization located on 240 acres of forest and farmland bordering the Snoqualmie River, approximately 25 miles east of Seattle.

Oxbow's mission is to inspire people to eat healthy, sustainably grown food and to steward our natural resources for future generations.



Oxbow researches and practices regenerative farming methods, grows food and native plants, and educates people of all ages about agriculture and the environment. Collectively, Oxbow's work takes real-time action to combat climate change, promote biodiversity, and encourage healthy food systems.

Oxbow inspires and connects to the public through workshops & tours, field trips & in-class lessons, special events, and a Community Supported Agriculture (CSA) program.



Native Plant Nursery (2013)

- 1 greenhouse 6400 ft²
- Outdoor space 7000 ft²
- ~160 species, mostly seed propagated
- ~70,000 plants sold/year



Overview

- **Seed Collection**

- Planning/scouting/timing collections
- Techniques for different seed types
- Tools and records



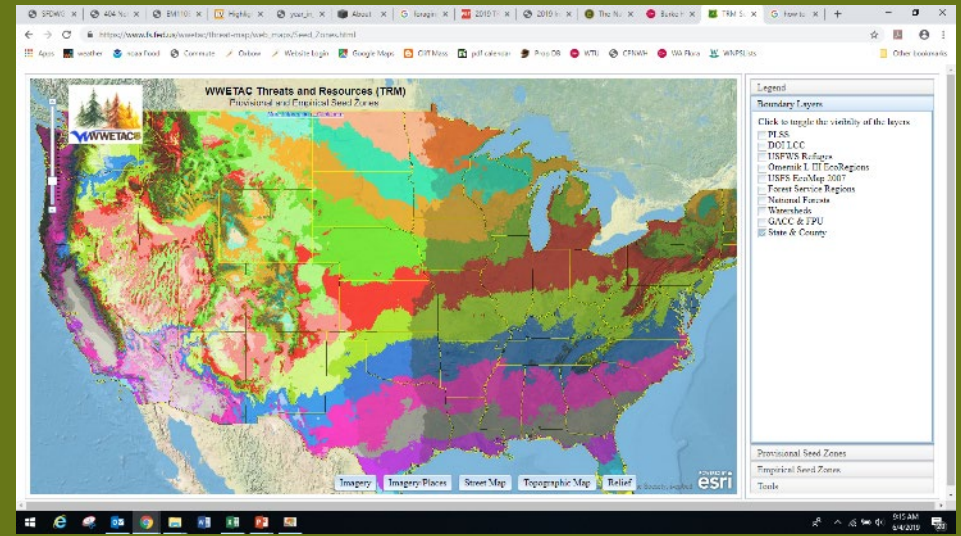
- **Seed Cleaning**

- Handling after collection
- Fleshy seeds
- Dry seeds
- Storage



Seed Collection: Planning

- Planning
 - Develop your target species list
 - Finding locations
 - Consider proximity, accessibility, and convenience
- Permission and permits
 - Landowner permission
 - Public land permits
- Genetic considerations
 - Elevation, ecoregion
 - Align with goals for plants



<https://www.fs.fed.us/wwetac/threat-map/TRMSeedZoneMapper.php>



<https://www.epa.gov/eco-research/ecoregions-north-america>

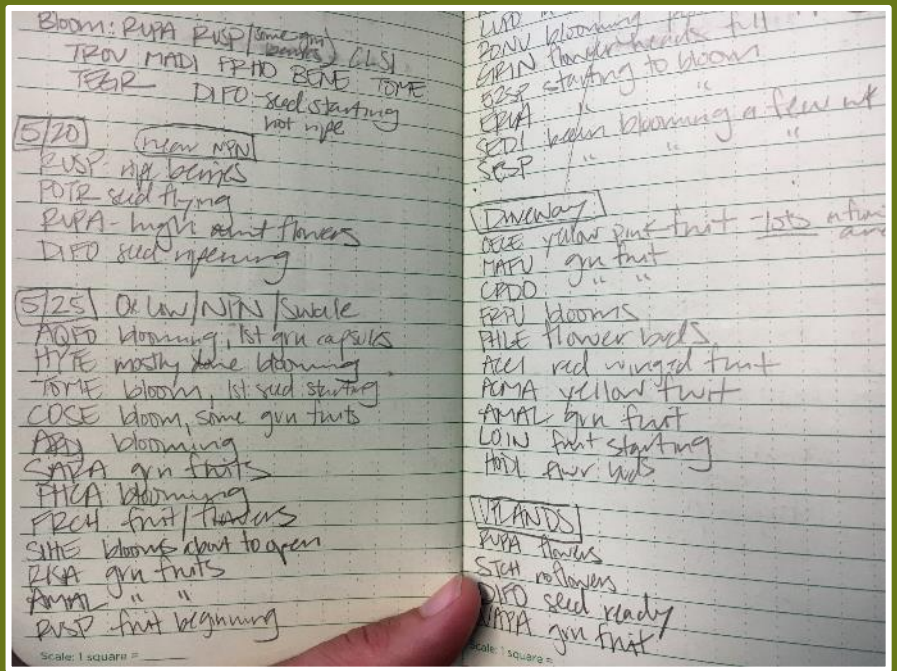
Seed Collection: Scouting

- Begin early in the season or even the year prior-can be the most time consuming activity
- Ensure accurate species ID
- Identify/flag female plants for dioecious species
- Assess population genetics and health
 - Look for 30+ individuals
 - Look for multiple patches at a site
 - Think about what else needs/uses the seed and fruit



Seed Collection: Scouting

- Phenology
 - Visit site multiple times over season, especially new sites
 - Keep records of flowering and early seed development



Seed Collection: Timing

- General starting point: seed often ripe about 1 month after flowering
 - Records each year will help save time
- Some species will have different fruit crops from population to population
 - Elevation, microsite
 - genetics



June 6



July 20



Aug 17

Seed Collection: Timing

- Flower morphology/ physiology traits can give you a longer collection window
 - Inflorescence with multiple flowers
 - continuous blooming and seed ripening over a longer period of time



Seed Collection: determining readiness

- Fleshy fruits
 - Color change
 - Fruit is edible, softening
- Cones
 - Scales change color and may begin to open



Seed Collection: determining readiness

- Dry fruits

- Seed pods and/or stem turn dry and brittle
- Seeds often turn from green/white/tan to brown/black
- Cut test to look for filled/eaten seed



Seed Collection: determining ripeness

- Dry fruits
 - Dehiscent=splits open at maturity
 - Collect as you see them start to split
 - Ex: legumes, milkweeds, camas, columbine
 - Indehiscent=do not split open
 - Ex: Asteraceae, Apiaceae, nuts



- Tips for dehiscent seeds
 - Net earlier in season
 - Collect inflorescence when a few have already popped
 - Grow a patch at the nursery to collect from



Tara Luna/Tribal Nursery Manual

Seed Collection: storage behavior types

Recalcitrant seeds =
Won't survive being
dried too much, or
stored at low
temps/humidities



Ex: maples, nuts
(many tropical
species)

Intermediate seeds =
More tolerant than
recalcitrant, but best not
to dry these



Ex: trillium, wild ginger,
vanilla leaf

Orthodox seeds =
Can be dried more,
stored at low
temps/humidities



Many temperate
species

Seed Collection: guidelines

- Be ready to process/deal with all you collect
- Collect from multiple individuals, populations
 - Only 5-10%
 - Rest between collection years
- Collection ideal during dry weather
- Early collections can sometimes help get a difficult-to-collect species



Seed Collection: guidelines

- Labeling and record keeping
 - Detailed site description/ directions
 - Date, species, location
 - Notes for next season
 - photos

	A	B	C	D	E	F	G	H
1	7/27/18, 7:45-2:15							
2	cloudy skies and light mist in am, clearing to sun by late morning, temps ranged 49-61 F							
3								
4	date	species	location-rd	location-coordinates	location-notes	phenology	collection	notes
14	7/27/18	<i>Trillium ovatum</i>	200 Rd-81 culvert	47.37219, -121.69700	both sides of 200 rd, moving south from parking spot	seed mostly released		
15	7/27/18	<i>Viola sempervirens</i>	200 Rd-81 culvert	47.37219, -121.69700	both sides of 200 rd, moving south from parking spot	seed pods still opening		
16	7/27/18	<i>Goodyera oblongifolia</i>	200 Rd-93-1 culvert	47.36074, -121.68926	park at hairpin turn just above culvert; walk into forest east of road, going both up and down slope	flowers just starting to open		
17	7/27/18	<i>Asarum caudatum</i>	200 Rd-93-1 culvert	47.36074, -121.68926	park at hairpin turn just above culvert; walk into forest east of road, going both up and down slope	fruit opening, seed ripe, still a small amount of flowering	throughout area	lots of patches, open seed pods throughout area; ripe fruit at terminal bud of plant, often facing down
18	7/27/18	<i>Streptopus amplexifolius</i>	200 Rd-93-1 culvert	47.36074, -121.68926	park at hairpin turn just above culvert; walk into forest east of road, going both up and down slope	fruit ripening		
19	7/27/18	<i>Streptopus lanceolatus</i>	200 Rd-93-1 culvert	47.36074, -121.68926	park at hairpin turn just above culvert; walk into forest east of road, going both up and down slope	fruit ripening		large patch down by flagging/black plastic
					park at hairpin turn just above culvert; walk into forest east of road, going both up and down			

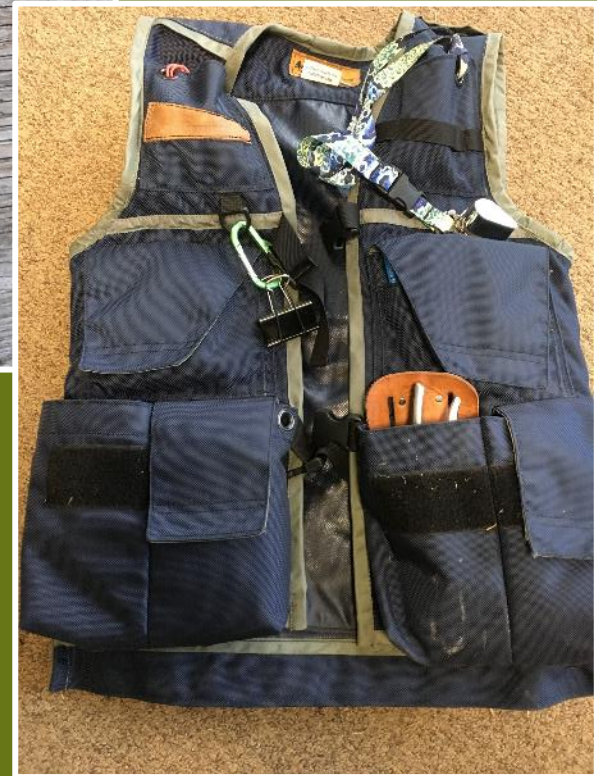
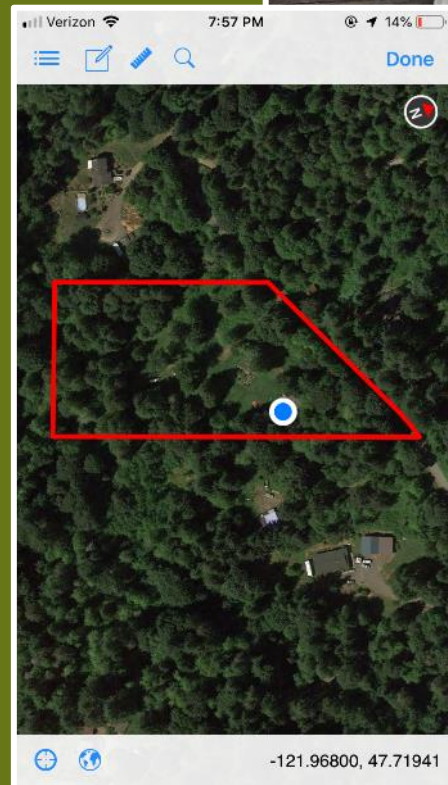
Seed Collection: tools and techniques

- Pruners
 - Cut-n-hold
 - Telescoping
- Long stick or hook
- Hand lens
- Gloves
 - For irritating seeds or cones
- Fleshy Fruits
 - Plastic bags or buckets
 - Keep cool



Seed collecting: tools and techniques

- Dry seed/fruits
 - Paper or cloth bags
 - Pruners
- GIS/Mapping app
- Cruiser vest



Seed Collection: returning to the nursery

- Fleshy fruits
 - Store in fridge
 - Molding, overheating
 - Plastic bags, need oxygen
- Recalcitrant seeds
 - Keep moist
- Dry seeds
 - Continue drying in warm, dry, protected space



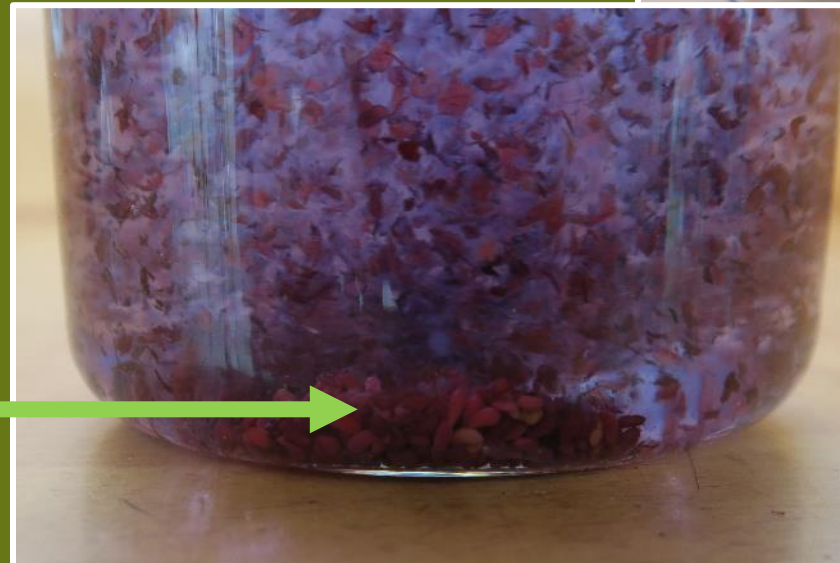
Seed Cleaning: why clean?

- Fruit may contain germination inhibitors
- Helps reduce molding, damage to seed
- Cleaned seed may have higher/faster germination
- Can determine quantity of seed collected-which can help with future collections
 - i.e., how many seeds per fruit?



Seed Cleaning: Fleshy Fruits

- Separate pulp from seed
- Generally good seed sinks
- Food processor or blender with dulled blades
- Float pulp off



Seed Cleaning: Dry Fruits

- Storing collected inflorescence upside down, seed drops into container
- If not easily “poured out”, crush up seed and chaff
- seed is heavier than chaff



Seed Cleaning: Dry Fruits

- Using screens



- Helpful to have a screen that your seed will fall through, and a screen that it won't fall through

Seed Cleaning: Dry Fruits

- Using fans/air separation
- Shaking
- With new species, work with a small sample first to determine the best method



Seed Cleaning: Drying Seed

- Ideal drying conditions
 - Warm, not hot
 - Protected from direct sun, strong wind, rain, animals
- Simple seed dryer
- Remember, recalcitrant seeds should not be dried

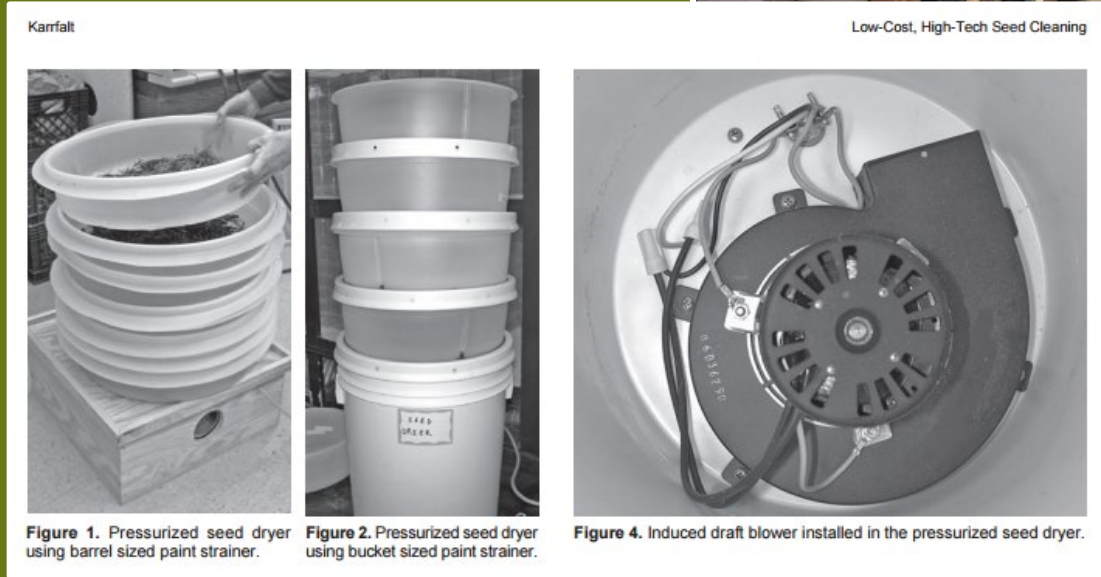


Figure 1. Pressurized seed dryer using barrel sized paint strainer.

Figure 2. Pressurized seed dryer using bucket sized paint strainer.

Figure 4. Induced draft blower installed in the pressurized seed dryer.

Seed Cleaning: helpful data to collect

- Methods that worked well/screen sizes used
- Photos of ripe fruit, uncleaned, cleaned seed
- Weight of seed (seeds per gram)
- Amount of dried seed yielded from amount of collected fruit
 - Weight, volume, number of seed heads, etc



Seed Cleaning: Seed Storage

- Short term (2-5 years) storage at 40° F
- Air-tight containers
 - Envelopes in a sealed box
 - Thicker plastic bags
 - Jars
- desiccant packets
- Labeling:
 - Species, date, location
 - Amount
- Keep a maintained inventory document



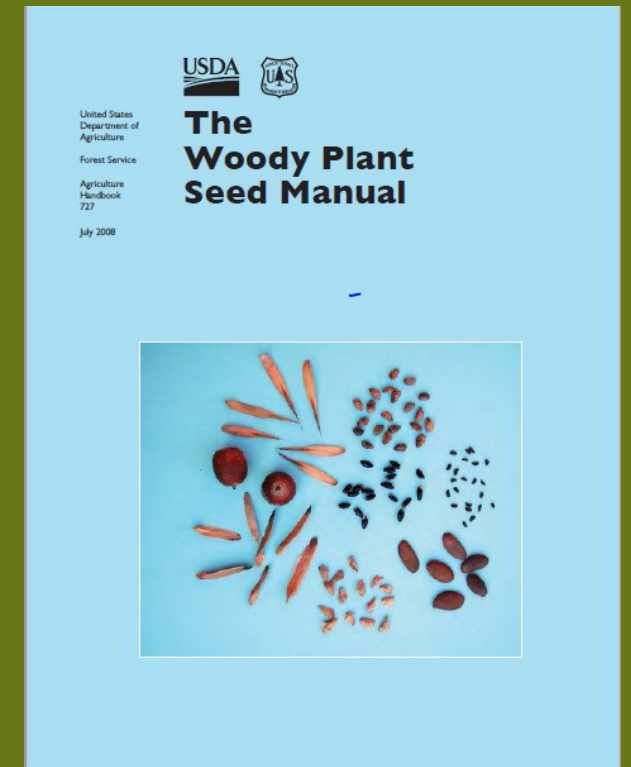
Helpful Resources

- **Native Plant Propagation Protocol Database:**
<https://npn.rngr.net/propagation/protocols>

Many of the protocols will include information on **seed collection and cleaning**, such as signs of seed ripeness and cleaning methods.

- **Woody Plant Seed Manual:**
<https://rngnr.net/publications/wpsm>

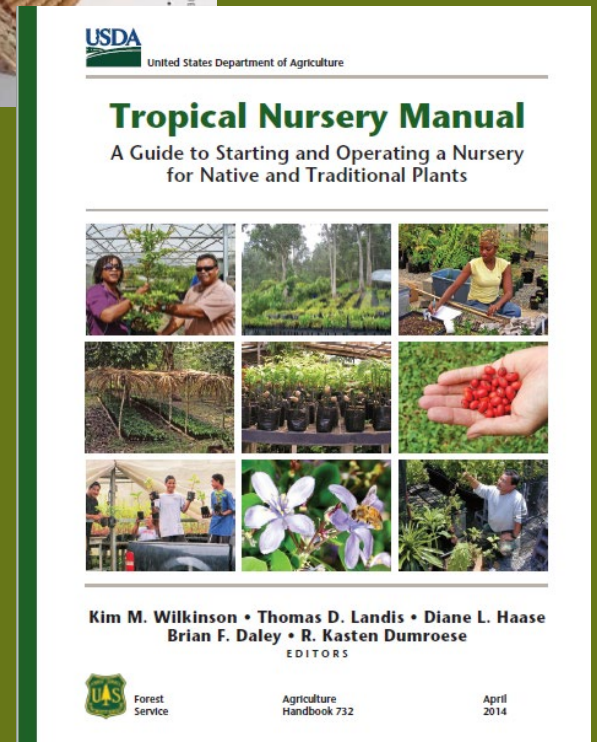
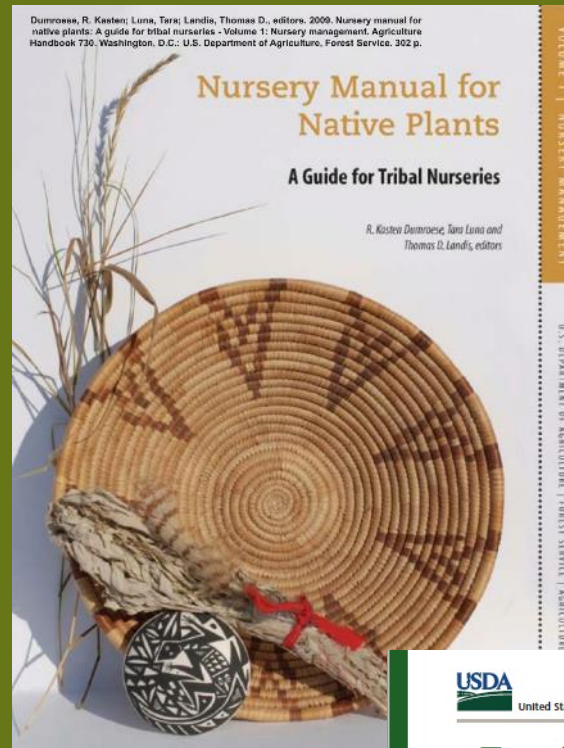
Very comprehensive collection, cleaning, storage, and propagation information for woody plants in US



- **Tribal Nursery Manual, Chapter 7: Collecting, processing, and storing seeds:** <https://rngr.net/publications/tribal-nursery-manual>

lots of great information on techniques ranging from low to high tech

- **Tropical Nursery Manual, Chapter 8: Collecting, processing, and storing seeds:** <https://rngr.net/publications/tropical-nursery-manual>



Questions?



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