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Seed Propagation of Several High-Elevation California Natives[©]

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INTRODUCTION

Cornflower Farms propagates a wide array of California native plants ranging from desert to wetland and coastal to alpine species. Propagation is done from cuttings, seed, and division. Here, we'll address seed propagation of several high-elevation California natives including: *Artemisia tridentata*, *Ceanothus cordulatus*, *C. integerrimus*, *C. prostratus*, *C. velutinus*, *Eriogonum umbellatum*, *Linum lewisii*, *Lupinus grayi*, *Penstemon newberryi*, *Potentilla glandulosa*, *Prunus andersonii*, *P. emarginata*, *P. virginiana*, *Purshia tridentata*, *Ribes nevadense*, *Rosa woodsii*, *Sambucus nigra* subsp. *caerulea*, and *S. racemosa*.

SEED PROPAGATION PROTOCOL

Typical Seed Treatments. Many California native plants produce seeds that have complicated and sometimes not-so-complicated dormancy issues. We employ different seed treatments to break dormancy and encourage germination:

- 1) Hot water treatment: Hot (180–212 °F) water is poured over the seeds and allowed to soak for 24 h. Seeds are then drained.
- 2) Warm water treatment: Warm (120–140 °F) water is poured over the seeds and allowed to soak for 24 h. Seeds are then drained.
- 3) Cold Stratification: Seeds are kept in moist media at 40–45 °F, and either removed when germination starts or after a predetermined length of time.
- 4) Leach: Seeds are leached in running water for a predetermined length of time.
- 5) No treatment: Dry seed is sown without a pretreatment.
- 6) Hydrogen peroxide: Seeds are soaked in a solution of hydrogen peroxide for a predetermined length of time.

Seed Sowing Techniques. After the appropriate pretreatment, seeds are either sown individually into the liner or are sown into a seed flat. Seed flats may be covered with sand or vermiculite or may be left uncovered. Generally, size of the seed and sensitivity to transplant determine how they will be sown.

Protocol by Species.

- 1) *Artemisia tridentata* (big sagebrush): Cold stratify for 90 days in perlite. Flat sow. No cover. Seed flats need to be kept moist until germination. Transplant when first set of true leaves emerges.
- 2) *Ceanothus cordulatus* (whitethorn), *C. integerrimus* (deerbrush), *C. lemmonii* (Lemmon's ceanothus), *C. prostratus* (mahala mat), *C. velutinus* (snowbush): Hot water treatment. Cold stratify in perlite until germination occurs. Direct-sow seeds that have germinated into liners.

- 3) *Eriogonum umbellatum* (sulfur buckwheat): No treatment. Sow fresh seed into seed flat. Cover with sand. Transplant when first set of true leaves emerges.
- 4) *Linum lewisii* (western blue flax): No treatment. Sow seed into seed flat. Cover with sand. Transplant when first set of true leaves emerges.
- 5) *Lupinus grayi* (Sierra lupine): Warm water treatment. Direct sow seeds that have imbibed water into liners. Treatment can be repeated on seeds that have not been imbibed.
- 6) *Penstemon newberryi* (mountain pride): Warm water treatment. Cold stratify for 60 days in perlite. Flat sow. Cover with sand. Transplant when first set of true leaves emerges.
- 7) *Potentilla glandulosa* (sticky cinquefoil): No treatment. Sow seed into seed flat. Cover with sand. Transplant when first set of true leaves emerges.
- 8) *Prunus andersonii* (desert peach): Soak in water for 8 days. Cold stratify for 150+ days in perlite. Direct sow seeds that have germinated in liners.
- 9) *Prunus emarginata* (bitter cherry): Leach in running water for 8 days. Cold stratify in perlite until germination starts. Flat sow. Cover with sand. Transplant when first set of true leaves emerges.
- 10) *Prunus virginiana* (chokecherry): Warm water treatment. Cold stratify in perlite until germination occurs. Direct sow germinated seeds into liners.
- 11) *Purshia tridentata* (bitterbrush): Soak in 3% hydrogen peroxide for 5 h. Flat sow. Cover with sand. Transplant when first set of true leaves emerges.
- 12) *Quercus vaccinifolia* (huckleberry oak): Warm water treatment. Cold stratify in peat moss until germination occurs. Direct sow germinated acorns into liners.
- 13) *Ribes nevadense* (Sierra currant): Warm water treatment. Cold stratify for 90 days in perlite. Flat sow. Cover with sand. Transplant when first set of true leaves emerges.
- 14) *Rosa woodsii* (interior wild rose): Warm water treatment. Cold stratify in perlite until germination occurs. Flat sow. Cover with sand. Transplant when first set of true leaves emerges.
- 15) *Sambucus nigra* subsp. *caerulea* (blue elderberry), *S. racemosa* (red elderberry): Warm water treatment. Cold stratify in perlite until germination occurs. Flat sow. Cover with sand. Transplant when first set of true leaves emerges. Very susceptible to fungi at all stages of propagation!

QUESTIONS AND ANSWERS

Todd Jones: Are you collecting your own seed or do you purchase them from others?

Neal Funston: We collect many of our own seeds from the American River Parkway near Sacramento or we may collect seeds from the site on which we're going to plant. We buy some seeds from local seed collectors and also a few collectors in the Sierras.

Mike Bone: More of a comment than a question. I've read there seems to be some allelopathy with *Ribes* where seed germination is higher if seeds are sown in individual plugs versus in a seed flat.

Steve McCulloch: I have two questions. First, in your overnight soak using hot water, what is the temperature of the hot water?

Neal Funston: About 160–180 °F.

Steve McCulloch: Second, on what plants do you use hydrogen peroxide?

Neal Funston: I believe only on *Purshia*.

Kathy Echols: What is the reason for the gravel on top of the seed flats?

Neal Funston: It's used to prevent seeds from flushing out with heavy rains.

Kathy Echols: How do you perform your leaching?

Neal Funston: Seeds, wrapped in burlap or similar material, are placed in a bucket in a bath tub and water is slowly applied by a hose.

Douglas Justice: Do you direct-sow any of your seeds into plug trays?

Neal Funston: Yes, we direct-seed *Ceanothus* into plugs. We prefer to only direct-sow seeds that are going to germinate quickly and in high percentages.