



WILD ONES FRONT RANGE CHAPTER

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## PROPAGATING COLORADO NATIVE PLANTS FROM SEEDS

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### SEEDS

#### I. COLLECTION, CLEANING & STORAGE

#### II. TREATMENTS

#### III. SOWING

#### IV. TRANSPLANTING

#### I. SEED COLLECTION

Permits (JCOS Research and Collection Permit Application)

10% Rule

When

How

#### COLLECTION “WET” SEEDS (with an elaiosome or aril) into reclosable plastic bag

7. *Trillium ovatum* ssp. *ovatum* (Pacific Trillium) moist spruce fir, 7200-11,000'

8. *Viola nuttallii* (Nuttall's Violet) open spaces, 3500-11,500'

9. *Erythronium grandiflorum* ssp. *grandiflorum* (Avalanche/Glacier Lily) moist, 7500-13,000'

#### COLLECTION DRY SEEDS - paper bag

**Timing** - all in one fell swoop or every few days (ripening influenced by weather and elevation)

**Method** - Whole inflorescence, Heads, Pinches

**ballistic dispersal** - Cut whole inflorescence or bag it before it explodes.

11-13. *Grindelia subalpina* (Subalpine Gumweed) - branch

14. *Rudbeckia hirta* (Black-Eyed Susan) - heads

15-16. *Liatris punctata* (Dotted Gayfeather) - pinches

17. *Cardamine cordifolia* (Heartleaf Bittercress) - fruit a silique with ballistic dispersal

18. drawstring cloth parts bag, 2x3

19. *Leucocrinum montanum* (Sand Lily) - seeds underground, ready 6w after bloom

## SEED CLEANING

20. Soil sieves - Sizes I have: #25, 35, 30, 18, 14, 10, 6 (or use kitchen strainers)
  21. Rolling pin to crush hard capsules: *Penstemon caespitosus* (Mat Penstemon)
  22. Hair dryer on low to remove chaff. Hold at a distance
  23. Immersion blender with metal blade which was dipped in rubberized plastic or plastic blade
  24. *Prunus americana* (Wild Plum) - dry to moist, 3500-8700' soak, quik prep or just manually remove the pulp, sow Sept, cold stratify outside; germinate April (7 months)
  25. Soak & Ferment
  26. *Rosa blanda* (syn. *Rosa woodsii*, Smooth Rose) dry or moist soil, 3500-11,700' clean seeds promptly to deter formation of germ inhibitors; ferment in water for many days; remove pulp; sow, cover to depth ; 70(2m) - 40(3m); can dry store 40°
  27. Fumigation or Freezing
- Put **dry** seeds into the freezer for 2 weeks. Some examples of species whose seeds often have parasitic insects and can benefit from a freezer treatment:
- Sphaeralcea coccinea* (Cowboy's Delight, Scarlet Globemallow)
  - Ceanothus fendleri* (Fendler's Buckbrush)
  - Helianthus pumilus* (Little Sunflower)

## SEED STORAGE

Wet Seeds briefly in sphagnum, ziplock, fridge

### 29. Dry Seed Storage

- 40-70° to afterripen 2-6 months, for seeds with immature embryos
- 40° for long term viability, Rule of 80 (temp + humidity = 80)

Examples of Dry Seeds

30. *Echinacea angustifolia* (Prairie Coneflower) - rocky, plains, 3800-5300'
  31. *Helianthus pumilus* (Little Sunflower) - dry, rocky, 5000-9500'; sow Jan 1, vlc, outside
  32. *Oenothera caespitosa* (Stemless Evening Primrose) - 28-38°(30-60d) or outside fall to early winter.
- Western Native Seed
33. *Oenothera caespitosa* var. *macroglottis* (Tufted Evening Primrose) - note color of capsule 34.
- Penstemon secundiflorus* (Sidebells Penstemon)

## 35. STORAGE CONTAINERS

36. Paper envelopes (2.5x4.25"), glass, plastic for dry seeds
37. Shoe boxes etc. in fridge

## II. SEED TREATMENTS

### SEED TYPES DETERMINE THE STORAGE TEMP AND THE SEED TREATMENT

**Non Dormant** - will germinate moist 70°

41. *Quercus arizonica* (Arizona White Oak), *Aesculus parviflora* (Bottlebrush Buckeye)

**Dormant** - won't germinate moist 70° without one or more seed treatments

43. **Internal** or Embryo Dormancy - The embryo needs to finish maturing and will do so under certain conditions of temperature and moisture. Some need to remain dry from 2 weeks to 6 months or even longer (Afterripen). (Ex. Asteraceae except *Vernonia* spp., Brassicaceae, Campanulaceae and Poaceae.) Others need to experience temperature changes while moist (stratification). They may need both an initial dry period and then stratification.

44. **External** or Seed Coat Dormancy - The hard seed coat blocks entry of water and oxygen and prevents expansion of the seeds.

#### **Afterripen** (dry for a period of time)

45. *Artemisia frigida* (Fringed Sagebrush) - common, dry, 4000-10,000'

46. *Artemisia ludoviciana* (Louisiana Sagewort) seeds - dry, open, 4000-9500+'

47. *Wyethia amplexicaulis* (Mule's Ears) - common, wet-dry open, 6500-10,500' afterripen, then 40(3m)

#### **Scarification**

##### **48. Sandpaper**

49. *Amorpha nana* (Dwarf Leadplant) - scarify, boiling water soak, cold stratify

50. *Astragalus agrestis* (Purple Milkvetch) com., hi plains to upper montane, 5000-10,500' *A. shortianus* (Short's Milkvetch) pod just forming - common, 4500-9800' *A. shortianus* seeds

51. "Green Seeds" of legumes, *Lupinus argenteus* (Silvery Lupine) 4800-10,500'

##### **52. Peroxide Soak**

add 1 ounce of 3% hydrogen peroxide to 1 pint of water; soak seeds for 18 to 24 hours, rinse; maybe peel; sow

53-5. *Berlandiera lyrata* (Chocolate Flower) - open prairie, 3400-6200'

peroxide soak, light cover, 60-70°, radicles 3-4d, leaves 1w vs 30-90d if no peroxide soak

##### **56. Sulphuric Acid 10%**

NO METAL, DO OUTSIDE, soak 5-15 min in sulfuric acid, rinse well, strat. or sow. Wear a coverall, old clothes, apron and very long thick rubber gloves, and goggles.

Watch videos online before using sulphuric acid. **It can burn tissues & damage lungs.**

57. Non metal strainers

58. *Rhus trilobata* (Skunkbush) - or boiling water soak; dioecious (2 "houses")

*Iris missouriensis* (Rocky Mountain Iris) - or boiling water soak

59. *Callirhoe involucrata* (Winecups) - acid (or scarify with another treatment), rinse, dry, sandpaper, remove "seed coat"; cover, 70-74°

##### **60. Tepid Water Soak**

61. *Mirabilis multiflora* (Colorado Four O'Clock) - so. & w. CO, common, 4500-9000' Can peroxide soak instead of water soak. Cold stratify 40(7w), cover with 1/8" medium. *Mirabilis nyctaginea* (Heartleaf Four O'Clock) - Jeffco, e. slope, 3400-7000'

##### **62. Boiling Water Soak**

63. *Amsonia eastwoodiana* (Eastwood's Bluestar) - regional, named for Alice Eastwood

##### **64. Soak & Peel** - Removal of pericarp from achene

Achene, Clematis fruit, *Clematis fremontii* (NE, KS, MO)

65. *Clematis ligusticifolia* (Western White Virgin's Bower) - common vine, 4500-8500'

66. *Clematis hirsutissima* (Sugarbowls) - erect peren; com., meadows & woodlands, 5-10,000'

67. Seeds of *Clematis scottii* - rocky slopes, oak thickets, pine forests, 5500-10,000' For all these Clematis, soak, peel, sow, L, outside over winter

**68. Stratification** (always moist, outdoors or in the refrigerator) “Activates enzymes which destroy the germination inhibitor.” Bob Nold, 2/12/21 CoNPS FB page

Start warm: 70°-40°-70°

Start cold: 40°-70°

Unless you have instructions for a specific time period, consider each temperature cycle to be 3 months (3m).

69. Outdoors

70-71. Refrigerator - If in fridge, use plain white (no color pictures) paper towel, or vermiculite, or some other sterile medium in a resealable bag or sterile glass jar and add about 15 drops of water. For 1/4 tsp seeds use 1 Tbsp of medium such as vermiculite. Write name, date instructions on baggie with a permanent marker and record date to remove from fridge on calendar. Check bag each week for germination and for moisture level.

72. **Smoke** (for fire adapted plants) - Liquid smoke is produced by passing wood smoke through water.

Wright’s brand contains just smoke and water.

(Prepare a dilute smoke solution by adding one part commercial smoke flavoring to nine parts water. Either soak the seeds in this solution overnight (or until they swell) or water the pot or flat once with this solution. JL Hudson)

73. **Inoculate** - Inoculant powder (rhizobium bacteria) for Fabaceae enables seeds to use “free” nitrogen from the air. (*Astragalus shortianus* seeds)

### **More than One Treatment**

**Sandpaper & Boiling Water Soak & Inoculate (opt.)** - legumes

74. *Thermopsis rhombifolia* (Goldenbanner) - common, 4300-8900’

### **Sandpaper & Stratify**

77. *Sphaeralcea coccinea* (Scarlet Globemallow) - Sandpaper scarify, 40(60-90d) or plant outside the fall.

Plant to 1/8” deep; common, 3500-9000’

### **Sandpaper, Boiling Water Soak and Stratify**

78. *Amorpha canescens* (Lead Plant) - scarify, boiling water soak, 40(30d), inoculate, sow, very light grit; e. plains but excellent plant for Denver gardens, 3500-6000’

### **Afterripen, Scarify, Liquid Smoke and Outdoor Stratification**

79. *Holodiscus dumosus* (Rockspirea) - [at Chatfield: acid, cold strat, smoke treatment, then sow.] Can have very low viability, 7%. Afterripen dry from Aug-Jan 15 at 40 or 70°. Smoke treatment, sow, very light cover, outside.

## **III. SOWING**

### **When to Start Seeds**

You must plan ahead re. start date. Keep a calendar.

Stratification requirements may determine the starting time.

### **Late summer, early fall (70-40-70°), ASAP because start warm moist**

82. *Caltha leptosepala* (Marsh Marigold) - embryo needs to finish maturing, 70D and moist 2-4(7)w - 25-40° (4-6w+) in non-draining container, charcoal, mucky soil, medium cover; “cool germinator” germ temp 41-54°; outdoor best; moist, 8000 -13,500’
83. *Streptopus amplexifolius* (Claspleaf Twisted Stalk) - remove red flesh; 70D (4m) - 40 (4m) -70D; 18 months or more to germinate; transplant 2nd year

### **Fall - Early Winter**

Annuals - in situ best but can be started later in cells or pots

85. *Peritoma serrulata* (syn. *Cleome serrulata*) (Rocky Mountain Beeplant); 3500-9000’
86. *Polanisia dodecandra* (Redwhisker Clammyweed) - sandy (tolerates heavier), 3500-6800’

### **Fall-Winter (one cycle of 40-70°)**

88. *Calochortus nuttallii* (Nuttall’s Sego Lily) common, dry, 4700-9200’; germinates cold (40-50°) so it is best to sow outside in situ or in cells; light to medium cover.
89. *Castilleja integra* (Wholeleaf Paintbrush) - Rub seeds, cold stratify, sow, transplant into a pot with a host (nonaggressive grass, *Artemisia frigida* or *Liatris punctata*) when it has 2 true leaves.
90. *Eriogonum umbellatum* (Sulfur Flower) either **sow soon after collection** or store dry 6m at 40° (Deno says 6m at 70° is fatal); then sow and put outside; If you want to cold stratify in fridge in a baggie, some radicles will emerge in 2 months, so don’t start until mid March.

### **Fall-Winter (two cycles 40-70-40-70°)**

- 92-94. *Actaea rubra* (Red Baneberry) common moist shade, 6400-12,000’ germinated during second cold cycle (44 days in), cold germinator

### **Spring**

Many can be sown in the fall. They just don’t require the cold treatment.

I find warm season grass seeds can rot over the winter and I prefer to sow them outside early to mid April for temperature fluctuations.

96. *Aquilegia chrysantha* (Golden Columbine) uncom. in CO but gd garden plant, sow May  
*Aquilegia elegantula* (Western Red Columbine) com, moist forests, 6500-11,800’, sow Feb  
*Aquilegia coerulea* (CO Blue Columbine) hi foothills, mts, w. slope 5500-13,500’, sow May
97. *Anaphalis margaritacea* (Pearly Everlasting) - dry 7800-11,500’, light cover *Heterotheca foliosa* - com, open, 4500-12,500’; light grit, 70, germ in 8d
98. *Coryphantha missouriensis* (Missouri Foxtail Cactus) - dry, open, 5200-7000’ 77°, cover with fine layer of grit, water from below, keep humidity high for about 2 wks when seeds should have germ’d; very prone to rot; need super drainage  
[www.llifl.com/Encyclopedia/CACTI/Family/Cactaceae/10274/Escobaria\\_missouriensis](http://www.llifl.com/Encyclopedia/CACTI/Family/Cactaceae/10274/Escobaria_missouriensis)
99. *Oxytropis* spp. (Locoweeds) When daytime temperatures hover consistently around 70 or after the last frost date, scarify seeds. Inoculate with rhizobium inoculant (opt.) and sow promptly. Cover to depth. Germinate in 3 days to 2 months
100. *Sedum lanceolatum* (Spearleaf Stonecrop) - rocky, dry, 5300-14,000’  
68°L ( L means light requirement), surface sow or very light cover, germ’s in 1 month
101. *Solidago multiradiata* var. *scopulorum* (Rocky Mountain Goldenrod) - common, meadows, forests, 6500-13,000’; 70L, out

## SOWING CONTINUED

### Equipment

103-104. cells or small pots, new or used, cleaned with 10% bleach water  
plastic labels and use a pencil

### Media

“Sterile” - weed & pathogen free; avoid compost

106. Germination Mix - fine grade peat moss, fine grade perlite, fine grade vermiculite, dolomitic and calcitic limestone, non-ionic wetting agent, standard seedling fertilizer starter charge

107. Potting Mix - coarse grade peat moss, coarse grade perlite, dolomitic and calcitic limestone, wetting agent, fertilizer starter charge

108. Perlite - small white irregular shaped, **volcanic rock** that was crushed and heated.

109 Vermiculite - very light, greyish puffy substance that forms when **mica chips** are heated.

110. Cover - varies with size and light requirement of seeds  
fine vermiculite, squeegee, ant gravel, starter chicken grit

### Light

111. Outside, full, part, filtered;

112. Artificial - 4-5 tube fixture of standard fluorescent 4 foot bulbs

113. Fence Panels - flats always on gravel, cement, weed barrier, wire panels, etc.

## IV. TRANSPLANTING (death from too hot, too wet, too late?)

114. When: two sets true leaves; before July 1 in Denver area

115. Tools: clam knives and/or large tweezers for removal from cells

116. Containers - 2.5” pots, 3.5”, pots, “quarts”, “gallons”

Fertilizers

117. liquid feed for cells (ex. water soluble 20-10-20)

118. slow release pellets with minor elements or liquid feed for pots

Avoid placing trays on cement in full sun

Judicious Watering

119. Backyard Prairie June 12- 8/15/20

120. Backyard Prairie Sept. 25, 2020

### Poaceae - Grasses

The following are all warm season grasses. They germinate best when daytime temperatures are 70° and above. Temperature fluctuations between 34-50° at night and 70-90° in the day result in rapid germination (5-20 days).

122. *Bouteloua curtipendula* (Blue Grama) - plains, foothills, etc., 3500-7000’

123. *Schizachyrium scoparium* var. *scoparium* (Little Bluestem) - 3400-9500’

124. *Andropogon gerardii* (Big Bluestem) - tall grass prairie, 3400-6800’