



HERITAGE

seedlings, inc.

Unusual Deciduous Species

SEEDING RATES AND METHODS

PREPARED BY LYNDA BOYER
NATIVE PLANT MANAGER
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Timing

Willamette Valley native seed should be sown in the fall to allow for any possible stratification needs. However, many of our native grasses and forbs can be sown as late as early-March as long as there is sufficient rain. These species should be those that only need a very short period of moisture in conjunction with cold (two weeks). Our "Disturbed Ground / Late-Seeding" mixes are made up of these species.

What Seeding Rate Should I Use?

Seeding rates vary depending on seeds/lb (species with many seeds/lb should be sown at a lower rate) as well as the desired end condition. They also vary depending upon starting site conditions, seeding method, and precipitation.

In general, the lowest rates can be used for seed that is drilled. This is due to the fact the seed has very good contact with the soil and protection from predation. Many native species need light to germinate so never mulch over drilled seed and sow the seed no more than 1/4 inch deep.

You should estimate a desired target number of seeds/sq. ft depending on the site conditions and sowing method. Assume you need to almost double your sowing rate for seed that is broadcast. If you broadcast the seed, pressing the seed into the soil with a water drum or cement roller will ensure better soil contact and the rate can be lowered accordingly.

Calculating Seeding Rate for a Single Species (PLS = Pure Live Seed)

$$\frac{\text{Target \# of seeds}}{1 \text{ sq. ft.}} \times \frac{43,560 \text{ sq. ft.}}{1 \text{ acre}} \times \frac{1 \text{ lb}}{\text{Known \# of seeds per lb}} = \frac{\text{PLS lbs}}{\text{Acre}}$$

Actual Seeding Rate vs. Calculated Seeding Rate

Since seed that is sold in PLS pounds will weigh more than an actual pound (please see the definition and an example on our Natives Page), you will need to convert the seeding rate in PLS lbs/acre to the actual or bulk seeding rate to ensure the desired number of seeds/sq. ft. are applied. This can be calculated two different ways:

- 1) Divide the PLS rate by both the % Purity and the % Germination (TZ) expressed in a decimal fraction (these are found on the seed tag).

OR

- 2) Use the following formula:

$$\frac{\text{Bulk Wt delivered (lb)}}{1} \times \frac{\text{desired PLS lbs}}{\text{Acre}} \times \frac{1}{\text{PLS lbs purchased}} = \frac{\text{actual lb}}{\text{acre}}$$

Target sowing rate and seeding rate calculations

EX: *Sidalcea campestris* has 100, 000 seeds/lb and you want 3 seeds/ft = 1.3 PLS lb/ac

You have 7.5 acres to seed so you order 10 lbs of seed (rounded)

The seed lot has a PLS value of 84% so $1/84\% = 1.2$ bulk lbs = 1 lb PLS.

You get 12 bulk pounds delivered ($10 \times 1.2 = 12$)

To seed at the desired rate of 1.3 PLS/ac you would need to seed at 1.6 lbs/ac.

Target Seeding Rates

A common target seeding rate for the Willamette Valley is about **30 – 100 seeds/sq. ft.** On a very clean site (sprayed with herbicide two seasons) I achieved good establishment in some areas with a broadcast rate as low as 24 seeds/ft.

It is probably better to err on the side of more seeds / sq. ft. If the soil is poor and the sowing rate too low, the stand will not be full and make the space available for weeds to germinate. However, if the sowing rate is too high, you can create native “lawn” and the forbs will not flower due to high competition for resources.

My own experience and the data of others give the following ranges for seeding rates:

Drilled Seed: Larger seeded grass species 5 – 10 PLS lbs/acre (lower rates will leave room for forbs); smaller seeded grasses (such as *Deschampsia*, *Koeleria*, or *Poa*) can be sown at a very low rate of 0.5-2 lbs/acre, and forbs 0.5 – 8lb/acre. It is best not to mix grasses and forbs together. The early germinating grass species will take up space needed by later germinating species.

Note: If the site is going to be used to promote Streaked horned-lark habitat, the grasses should be sown at a very low rate to provide the needed bare patches used for nesting.

Broadcast Seed (see below for cutting agent suggestions): grasses 10 – 15 lb/acre; forbs 4 – 11 lbs/acre. To increase seed/soil contact, press seed firmly into soil.

Seed Mixes of both grasses and forbs: 6 – 12 lbs/acres drilled, doubled to tripled for broadcast depending on starting conditions.

How Much Seed Do I Need?

$$\frac{x \text{ ft. sq. to sow}}{1} \times \frac{1 \text{ acre}}{43,560 \text{ sq. ft}} = y \text{ acres} \times \frac{\text{PLS lbs}}{\text{Acre}} = z \text{ lbs of seed}$$

Seeding Sedges, Rushes and Saxifrage sp – A Special Case

Sedges and rushes need four things to germinate: 1) good soil contact; 2) high soil temperatures; 3) water; and 4) light. Given these criteria, sedges, rushes, and Saxifrage sp should *only* be broadcast sown. The West Eugene Wetlands Project Ecologist also notes that soil fertility is a factor. They sow in the fall due to the inaccessibility of the sites during the winter. They also recommend sowing at a very high rate and over a period of two years if possible. If there is still sufficient rain, and the site is accessible, a late winter seeding is also possible. This ensures the seed is on a wet soil surface when the daytime temperatures heat the soil but not buried. Pressing the seed into the soil will help improve seed/soil contact.

SUGGESTED BROADCAST SOWING METHODS FOR NATIVE SEED

(For drilling suggestions, please see the prairie and oak information document.)

Sowing Rates for Small Areas:

On clean site: 1 oz/250 sq. ft. (approximately 11 lb/acre). However, seed mixes vary and a mix with a lot of small seeded species can be sown at a lower rate than a mix with larger seeded species.

On site not clean of existing vegetation and/or weed seed: 1.5 – 2 oz/250 sq. ft.

Sowing Mantra:

Reduce weeds; ensure good soil contact; time the seeding to allow the appropriate amount of cold/moist treatment for germination (2 – 12 weeks depending on species, but a few only need heat); do not bury the seed too deeply (straw mulch or sawdust is ok if applied **very lightly**).

Cutting Agents:

Natural Corn Cob animal litter/bedding by PureLite™, Slightly moistened (not wet) medium or coarse-grade vermiculite; fertilizer; sawdust; low viability (old) native grasses such as Blue Wildrye, peat moss, or Floor Dry.

1) **Natural Corn Cobs** Bird and Small Animal Litter/Bedding 27 lb [some farm stores may carry it or can order it for you]

<http://www.amazon.com/Natural-Small-Animal-Litter-Bedding/dp/B001VIY7J0>

Rate: One user suggests ½ bag/acre mixed with the desired amount of seed mix. However, calibration is a must since the spreader opening determines how much cutting is applied.

2) **Medium-grade vermiculite (might be a coarse-grade for some brands)** 3.5 cu ft bag \$25 or so (Growers Nursery Supply or other Nursery Supply store);

3) Floor Dry 50 lb bag (D&W has this)

<http://www.cepsorbents.com/proddetail.asp?prod=FLAB50>
CEP-FLAB50 Floor Dry Clay Based Absorbent (50LB Bag)

4) Rice Hulls - <http://www.ricehull.com/>

"Welcome to the Rice Hull Specialty Products, Inc. web site. Rice Hull Specialty Products, Inc. is located in the rice and duck capital of the world; Stuttgart - Arkansas. We have been dedicated to producing high quality ground RICE HULLS for over 30 years. A supplier to companies all over North America, we are committed to our customers. Our loading hours and shipping abilities reflect our commitment to fulfilling customers' needs as soon as possible.

Rice hulls, a recycled resource, have many current and potential uses. Rice hulls are used as a FIBER SOURCE, PREMIX, and PELLET BINDER in the animal feed industry. Rice hulls are currently used in composite materials as fiber in INJECTION MOLDING and EXTRUSION processes. Rice hulls have been used as a CARRIER and EXTENDER for other products as well. Additionally, rice hulls are a great substitute for products containing WOOD FIBER, WOOD FLOUR, or WOOD SHAVINGS."

5) Cracked Wheat (chicken feed)

Winco bulk section – ask someone in the department for 50# bags (may want to try some first to see if it will work for your needs)

Sowing Methods: – the seed MUST BE CUT WITH A CUTTING AGENT!

- 1) Mechanical: A fertilizer (spinner) spreader can be rented at farm stores such as Wilco. Mix the seed with a cutting agent such as **medium-grade vermiculite** (Note: this is my favorite but all medium-grades are not created alike; look at a sample at the vendor of choice; the bag should weigh about 20 lbs for 3.5 cu ft; if it weighs more, then it will have too many fines and you should get their "course") or fertilizer (0,45,0 is good so you don't really fertilize the site and make more weeds). Always err on the side of more cutting agent, and then go over the area more times. For the vermiculite; **3 bags of 3.5 cu ft mixed with seed on a setting of 2 will cover 5-6 acres covering the area twice (about 1/2 bag/acre). The amount of seed depends on your desired sowing rate.** Make sure to seed in different direction the second time to ensure good coverage. The amount of cutting agent depends on the type of mix. Mixes with bulky, large seeds do not flow as fast as mixes with small seeds. Be sure to wear a dust mask when mixing the seed with the cutting agent. While seeding, make sure the mix is flowing regularly and not bridging. Adjust the opening to about 3/4. Press seed into soil with metal or water drum roller if possible (harrowing can dredge up weed seed).
- 2) Hand - : I like to use a five-gallon bucket. First, you should calibrate how many square feet you can go with a given amount of cutting agent. Calculate how much you will need for your seeding area and double that so you can do **2 passes**. Put the seed in large bin with medium or course grade vermiculite and **slightly moistened** before mixing – (do not breathe the dust and using a dust mask is a good idea). I use Therm-O-Rock brand and the "course" is more medium in size. A 3.5cu ft bag weighs 20#. I can do about 1800 ft² with 3/4 if a bucket (around 4-5 lbs) of vermiculite. So, I can apply 1 bag of vermiculite to about 0.1 acres with **two passes**. Again err on the side of cutting more, and then go over the area a few times in a different direction. Press seed into the soil if possible.

Note: for small areas, if you have the ability to apply the seed/vermiculite mix to top soil or mulch, that works really nicely especially if applying seed later in the winter. This ensures really good soil contact for germination and establishment.

Note: I have also used a hand-crank seeder but you have to fill it up too often and the seed usually does not flow easily.

Small Garden Areas:

It is OK to cover seed with a light dusting of soil. (I sift potting soil through a sieve to dust the seeded area with fine soil.) Cover only until you can barely see the cutting agent. This will quicken germination and help avoid predation.

Legumes:

Legumes have a hard seed coat. If planted in the fall most legumes will germinate by spring. However, if planting late-winter or early-spring legumes will benefit from a light scarification prior to sowing. Use fine sandpaper (150 grit.) Tape one piece of sandpaper into a bin with sides, and rub small amounts of seed on it with an additional piece of sandpaper. Thirty seconds should do it. The species with the hardest seed coat is *Lupinus polycarpus (micranthus)*. This species should be scarified no matter when sown.