

Bringing native grasses into commercial production— the responsibilities of the seed producer

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The demand for native grass seed for revegetation and restoration projects in California has grown steadily in the last 10 years and shows no sign of letting up. Although naturally occurring stands of native grass continue to be an important source of seed, the volume of material needed in today's market requires commercial-scale production. This means that seed producers will play an increasingly important role, not only in the supply of plant materials, but in making sure that these materials meet the ecological, economic, and practical needs of restoration practitioners.

Growing native grass seed is a complex, labor- and time-intensive process that requires a level of interchange between producers and their customers that may be unparalleled in other agricultural crops. End users (including restoration practitioners, land managers, agencies, horticulturalists, and researchers) must communicate how much of which species (and which ecotypes) are needed in particular areas so that producers can grow these materials in a cost-effective manner. Producers must be responsible for insuring their product is as pure and weed-free as possible, accurately labeled, and meets the specifications of the buyer. This often entails growing seed for a particular geographic area from specially collected sources of local seed.

Today's native grass seed producers take these responsibilities very seriously. Even so, end users need to be familiar with what is involved in the production of commercial native grass seed so that they know what questions to ask when making decisions about ordering and purchasing plant materials.

FROM NATURE TO MARKET — GROWING NATIVE GRASS CROPS

Transforming a couple pounds of field-collected seed to hundreds or even thousands of pounds of commercial product entails a series of steps, each of which may differ depending on the species.

Seed collection from native sources

Seed producers and end users collect seed that will be put into production. Agency botanists are frequently called upon to orchestrate seed collection and they in turn may contract out with professional collectors. Seed is generally collected by hand stripping or hand held mechanical seed strippers. Knowing when seed is ripe and how to determine if it is

ripe is important. It is crucial to get to the site before seed has shattered. Collection data should include exact location, photo documentation, GPS if possible, soil characteristics, and other plant associations. Seed should be collected from a number of plants within the area to insure genetic diversity unless a very specific phenotype is being selected for.

Getting to commercial-scale production

If the goal is commercial-scale production of seed first collected in the wild, the first step is to grow transplants in a greenhouse that can then be planted out to produce a sufficient quantity of seed to direct seed larger acreage. This may require two years, especially with some of the slower-grow-



ing species such as *Nassella* spp., *Melica* spp., and *Poa* spp. Harvesting these original small plots is occasionally done by hand, but more often is done with mechanical seed strippers. This original first generation seed is subsequently direct-seeded into larger acreage, typically one to five acres. The first year crop from direct seeding is usually low-yielding and sometimes even non-yielding. It generally takes 2 to 3 years before a direct-seeded field reaches full-scale production.

Farming methods for seed production fields

At this stage, growing native grass seed is similar to growing turf grass seed, but often requires specialized equipment and timing. The horticultural techniques required on large fields include ground preparation and bedding, seeding with precision drills that can handle chaffey seed, fertilization, occasional fungicide application, irrigation, and, most importantly, weed control.



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The importance of weed control in seed production fields cannot be overestimated. Native grass seed growers spend more money on weed control than any other farming input. It is easy to understand why. Not only do state laws govern allowable levels of weed seed content, but a native grass seed producers' reputation hinges on whether or not his or her fields are "clean." Weed control techniques include cultivation with precision cultivators, a variety of timed herbicide applications, mowing, fire, and often thousands of hours of manual hoeing.

Harvesting

Determining the best time to harvest requires very close monitoring, often on a daily basis. Harvesting too early may result in poor germination of the seed. Waiting too late may result in shattering, especially if windy weather sets in. The type of harvesting equipment used depends on the grass species. We use brush strippers on grasses such as *Poa*, *Melica*, and *Deschampsia*, and some of the *Nassellas* that ripen over a period of time. Brush strippers harvest ripe seed and leave the seed that is not quite ready. We may go over a field with brush strippers 3 or 4 times over a 2-3 week period. Stripped seed is laid out on tarps to dry before final processing. We harvest other species such as *Elymus* spp., some *Nassellas*, and *Festuca* spp. with a swather and lay the cut plants in windrows to finish ripening. Once ripe, a combine picks up the windrows and threshes the seed leaving the stems and blades behind.

Processing and cleaning of seed

After harvest, we further process and clean our seed. Again, the equipment and techniques depend on the species. All seed goes through seed cleaners that separate seed from inert material and weeds. There are a number of different types of seed cleaners that use combinations of screens, air flow, and gravity to do the separation. Screen machines, gravity tables, indent machines, and air flow machines are some of the types. *Nassella* that is stripped must first be deawned in either a deawner or in another piece of equipment called a brush machine. It is then run through the cleaning machines. The final product often requires a number of runs through several different machines. Seed cleaning is frequently the most time consuming operation of getting seed to a marketable product. Small seed producers often rely on other companies to clean their seed because of the high capital investment required for seed cleaning equipment.

Once our seed is cleaned, we bag it and store it in bins. Labeling and tracking of the product through all the steps is of utmost importance especially when we grow several ecotypes of the same species. In a busy facility harvesting and processing over 20 species and frequently several ecotypes of the same species, the potential for error is high. Additionally important is cleaning of equipment between each ecotype to avoid genetic contamination.

records of where seed came from, where the production fields are located, and how the seed is labeled and identified from the field to the cleaning facility.

Seed testing and labeling

After cleaning, the seed is tested for purity, germ, and weed seed. Samples are taken from each lot, labeled, and sent to a certified laboratory. California seed law prohibits selling seed with a weed seed content of 1.5% or greater. Seed with State-listed noxious weeds such as medusahead, yellow star-thistle, and Johnson grass, cannot be sold.

While it is the responsibility of the producer to provide a product that is as weed free as possible (or at a minimum within the State guidelines), it is important to remember that it is almost impossible to have no weeds at all. End users should be aware of this and remember that, in most cases, a few weeds are not going to impact a project. There are, of course, exceptions. It would never be appropriate to introduce highly aggressive weeds such as annual ryegrass, soft chess, and zorro fescue to a new area. In fact, I believe producers should go beyond the minimum requirements of state law and, if there is some weed seed in the product, they should disclose to their customers which species of weed it is. Customers should ask for this information!

CONCLUSIONS

Producing native grass seed is a sophisticated farming operation that involves multiple species (each with specialized needs and requirements) and a market consisting of multiple end users (each of whom also has specialized needs and requirements). Perhaps that is why there are so few native grass seed producers in California! Nevertheless, the boom in interest in native grasses and grasslands is heartening to this burgeoning industry. In coming years, end users and producers will have to work even more closely together to insure that supply continues to meet demand and that the high costs of production are reduced. To date, seed producers have had to rely too much on their own experience and that of their associates in determining how much of which species to grow. With better information, we can begin to adopt more efficient methods of production that will ultimately bring down the price of native grass seed. Agencies and organizations with an interest in restoration, revegetation, and land or range management can play an important role in organizing their constituencies to work with the native grass seed industry to make this possible.

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