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There are currently about 2,200 acres of forage and turfgrass seeds being produced in southeast Wyoming and the Nebraska panhandle. Having grass as part of a rotation crop offers the opportunity to clean up troublesome broadleaf weeds, increase organic matter and water infiltration, and reduce nematode levels. Production experience in those areas has shown tall fescue (*Festuca arundinacea*) to be winter hardy and drought tolerant. Other turfgrass and forage species being produced include bluegrass (*Poa pratensis*) and orchardgrass (*Dactylis glomerata*). The seeds of reclamation species such as wheatgrasses (*Agropyron species*), Indian ricegrass (*Sorghastrum nutans*), and bromegrasses (*Bromus species*) have been successfully produced in Wyoming for many years, with the majority of the production in the north central part of the state.

Field selection and weed control

As with other perennial crops, **it is critical to start with a clean field.** It is recommended that a selected field have had a strong weed control program for two years prior to planting. A year of clean fallow can also be helpful.

- Grassy weeds will be the greatest challenge to the production of quality grass seed. Quackgrass, a prohibited noxious

weed, is common in parts of Wyoming and can have an impact on the ability to certify or even sell seeds since the Wyoming State Seed Law prohibits the sale of seeds containing prohibited noxious weeds.

- **Fields known or suspected of having quackgrass should not be considered for the production of grass seed. There are no non-selective chemical control options for removing quackgrass from other grass species.** Other weeds that can impact the certification of grass seed crops are **annual bluegrass, wild oats, downy brome, Japanese brome, foxtails, and curly dock.** It is very difficult to separate some grass crops from weedy grasses during conditioning, and failure to control these weeds will impact the profitability of a field. Significant contamination will result in a seed crop that cannot be sold.
- Grassy weeds are difficult to control in grass seed fields. Crop response to herbicides varies greatly from species to species. Herbicide applications can eliminate seed production for the following season based on the timing of the application, but herbicide choices are limited.



- Most grassy weeds are controlled by hand removal. Depending on the crop, these weeds can be easy or very difficult to recognize and remove.
- Many grassy weed seeds are carried in open irrigation lateral systems. Smooth brome and downy brome travel very effectively this way and are commonly found at the head of fields. Even a “clean” field will need attention to control encroaching by various methods of transportation.
- On the positive side, many difficult-to-control broadleaf weeds can be regulated in grass seed production, making such production a good rotation for fields with Canada thistle and other troublesome broadleaf weeds.
- 2,4-D and dicamba are effective on broadleaf weeds, and diuron and dicamba can help with downy brome infestations. Off-type grasses can be controlled by spot treatment with non-selective herbicides such as glyphosate or by removal through hand labor. Contact a local weed specialist for specific recommendations and rates.

Seed stock

- Another key to quality grass seed production is starting with quality seed stock. Ask to see the seed lab report when purchasing seed and check it for the weeds listed earlier. These weeds are problems for producers across the western U.S. and are commonly found as contaminants in seed. Planting a weed problem is a distinct possibility since the percentage of common weed seed allowed in foundation or registered seed still allows for a significant number of small weed seeds per pound of seed.
- Be aware that knowledgeable seed consumers will check seed lab reports as well. Quality grass seed, with minimal contaminants, will command top prices and may be the only seed that sells when seed availability exceeds demand.
- Seed stocks of reclamation grasses can be limited. Ordering seed a year in advance may be the only way to guarantee that one will be able to purchase the seeds of some species. Waiting until planting time to place an order will increase the likelihood that the seed will not be available.

Getting a crop started

Good stand establishment helps weed control.

- The use of correct seeding rates, which varies greatly depending on the seed size of the grass being planted and the percentage of pure live seed in a seed lot, is important.
- Grass seeds are small and will escape from voids and holes in planter units unless care is taken before planting to cover such areas.

- A firm seedbed and shallow planting depths are crucial to successful plant establishment since grass seedling vigor can be low. The rule of thumb is that a proper seedbed will show only a 1/4 inch-deep boot print when one walks across it. Double disc openers with depth bands and packer wheels will maintain a consistent planting depth and establish good seed-to-soil contact.
- Competition from weeds or volunteer crops during establishment can dramatically reduce stand establishment. Grass seedlings are not good competitors.
- The timing of planting is important. Late fall seedings are subject to winterkill if there is insufficient time for them to develop a root system that will support the plants during the winter. As a result, planting after mid-August is not recommended for most grasses. Dormant planting is recommended for the best establishment of a few select species.



- Spring plantings should be made between April 15 and May 15 for best results. Both spring and fall plantings will require frequent irrigation until seedlings are fully emerged.
- Most grass species do not produce seeds during the establishment year. Many producers take the opportunity to use a non-selective herbicide to control spring flushes of weeds and plant in late spring to reduce weed competition. Other producers report that waiting to plant until late in the spring or early summer results in the weeds growing as fast as the grass. By the time the grass plants are large enough to tolerate herbicides, the weeds are too large to be controlled.
- The Natural Resources Conservation Service in cooperation with Ducks Unlimited published a manual on native grass seed production that gives guidance on seeding rates, field management, harvest methods, expected yields, and seed cleaning. The manual is no longer in print, but the Wyoming Seed Certification Service office will make copies of production information from the manual upon request. The Wyoming Seed Certification Service can be reached at (307) 754-9815 or toll free at (800) 923-0080.
- A NebGuide is available from the University of Nebraska–Lincoln for Kentucky bluegrass seed production in the Nebraska panhandle and southeastern Wyoming. It can be found at www.ianr.unl.edu/pubs/horticulture.

Field management

- Irrigation management in grass seed production can be as variable as the different species. Crops such as creeping foxtail require significantly more water than wheatgrasses and prefer heavy soils with subsoil moisture. Wheatgrasses do well in lighter soils including sandy or gravel soils. Typically, grass seed fields are watered as soon as water is available in the delivery system. As the crop canopy becomes increasingly dense, consideration should be given to disease development. High humidity in a dense crop canopy makes an ideal environment for diseases that can reduce seed yield. Reclamation grass species are, in general, good competitors for soil moisture once established, and conservative watering can help reduce disease and weed pressure. It is important to maintain good soil moisture during flowering to maximize seed set.
- Insects have not been a problem in the species currently grown for grass seed in Wyoming.
- Diseases can be an issue in grass seed production. Mildew, rust, smut, and ergot can impact yield. Fungicides such as Tilt are effective on some of these pests, but there are two signifi-

cant considerations involving their use. They need to be applied as a preventative rather than a curative measure. They are also expensive. It will require some homework or experience to determine the cost/benefit relationship of producing a crop while using such fungicides.

Harvest and cleaning

- Harvest timing and methods will vary greatly by species. Growers producing certified seed will need to contact the Wyoming Seed Certification Service to allow for the scheduling of seed field inspections prior to swathing or combining.
- Swathing is normally done at the hard-dough stage. Seed heads mature from the top down, and a rule of thumb is that when the upper florets come free easily, the crop is ready to swath.
- Grasses can be prone to shattering, so it is important to monitor a field and to harvest it as soon as the moisture percentage is acceptable.
- Some grasses can be combined directly, but this is not normally done. It exposes the crop to a greater risk of seed loss due to shattering and may result in higher seed-moisture content.



- Windrowed crops combine faster, there is less shattering due to wind, and the seeds cure and store better. Windrows may result in higher weed-seed contamination since the weeds can be picked up by the header.
- Combine settings are a key to quality grass seed production. Grass seed is very light, making wind settings important to reduce the amount of seeds lost during threshing. Overly conservative settings can make seed conditioning difficult due to excessive chaffy material. It can be worthwhile to combine each windrow twice for difficult-to-thresh species.
- Grass seed handling can present challenges. A seed can be light and may have awns or pubescence that limits its ability to flow out of the grain tanks of combines or out of tote bags.
- Grass seed, being small and light, can present challenges to the cleaning of seed-handling equipment. Special attention should be given to assure that equipment is clean, especially if producing more than one variety or species. Seeds from other species or varieties can be as detrimental to the final certification or sale of the product as grassy weeds, especially if one of the grasses is a native species and one is an introduced species.

Post-harvest field management and fertility

Post-harvest field management also varies by species. Proper post-harvest field management is vital to maintaining productive seed fields. Residue should be removed as soon as possible by baling and/or burning. Some grasses do well with fall



burning; others can have the harvest aftermath baled and sold.

- Keep in mind that grazing animals can introduce weeds to a field.
- For species that tolerate fall burning, the burning can be an important tool in the reduction of blind seed disease, ergot, and seed gall nematode. It can also be used to control volunteer crops and certain weeds.
- The timing of seed-head initiation is one of the keys to determining a proper fall management program. Cool season grasses, in general, form seed-head primordia in the fall, making it important not to damage a plant with burning, grazing, or herbicides in the late fall. Common practice would be to burn or remove the post-harvest residue immediately after harvest and then fertilize and irrigate the crop. Allow the grass to grow until fall tem-



peratures cause it to become dormant and then consider the application of selective grassy weed herbicides.

- Poor soil moisture conditions in the fall can also limit seed production the following year.
- **Fertility** for grass seed crops is focused on fall applications of nutrients. Phosphorus and nitrogen are the most important, with potassium, sulfur, and micronutrients also playing a part in production systems.
- Most recommendations include putting 100 pounds per acre of phosphorus down when preparing a seedbed.
- A general rule for the annual fertilization of established stands would include a split fall/spring application with a total application to bring the field up to 150 pounds per acre of nitrogen and 100 pounds per acre of phosphorus for reclamation species.
- It is common for soil tests to show sufficient phosphorus, but most producers apply that nutrient annually regardless of soil test results and are getting a yield response.
- Turfgrasses normally receive 160 to 220 pounds per acre of nitrogen per year. Some producers use a split application in the fall, with 100 to 160 pounds per acre of nitrogen after burning and then 100 pounds per acre in October. A final application of 20 to 40 pounds per acre of nitrogen is then made in the spring.
- Fall fertilization with nitrogen is important because many grass species initiate seed heads in the fall, and poor fertility at this time greatly reduces seed production the following year.
- Overfertilization with nitrogen will result in vegetative production rather than seed production. A dense plant canopy can result in the development of molds and rusts, which can impact seed production and seed quality. Bayleton and Tilt are two effective treatments for fungal diseases.



Grass seed markets

- **Grass seed markets** are volatile, especially for reclamation species. Many reclamation grasses are produced and used over a wide area with changes in potential production or use. A relatively small increase in production acreage can have a significant impact on seed prices as can the use of grass seed in conservation reserve plantings, post-fire revegetation, and the revegetation of disturbed sites such as road and pipeline construction areas. Determining the species and the acreage to plant, given that one might need to order seed a year in advance of planting and that the first crop will be harvested as much as a year after planting, can be difficult. Market research is important, but the delay between the time of seeding and seed production for most species makes predicting the market difficult.
- **Contract grass seed production** is relatively new to the Big Horn Basin, but turfgrass seed companies have already been offering contracts in the Nebraska panhandle. Production under contract can take some of the risk out of determining what species or variety to grow, but at this time little is known about the performance of forage grasses for seed production in the Big Horn Basin.

Seed certification

While some markets prefer certified seed, other markets require it. Seed certification is a relatively simple process based on seed-stock documentation and field inspections for off-type varieties, other crops, weeds, and diseases. If interested in certification, contact the University of Wyoming Seed Certification Service for additional information. The certification process starts at the time a field is planted, and it can be beneficial to contact the certification agency prior to planting to discuss any potential problems while they can still be tackled. Failure to consider isolation from neighboring fields or pastures can result in all or part of a field being ineligible for certification. A field must be enrolled in certification within 60 days of planting to allow for a seedling field inspection, planting stock verification, and field history documentation.

