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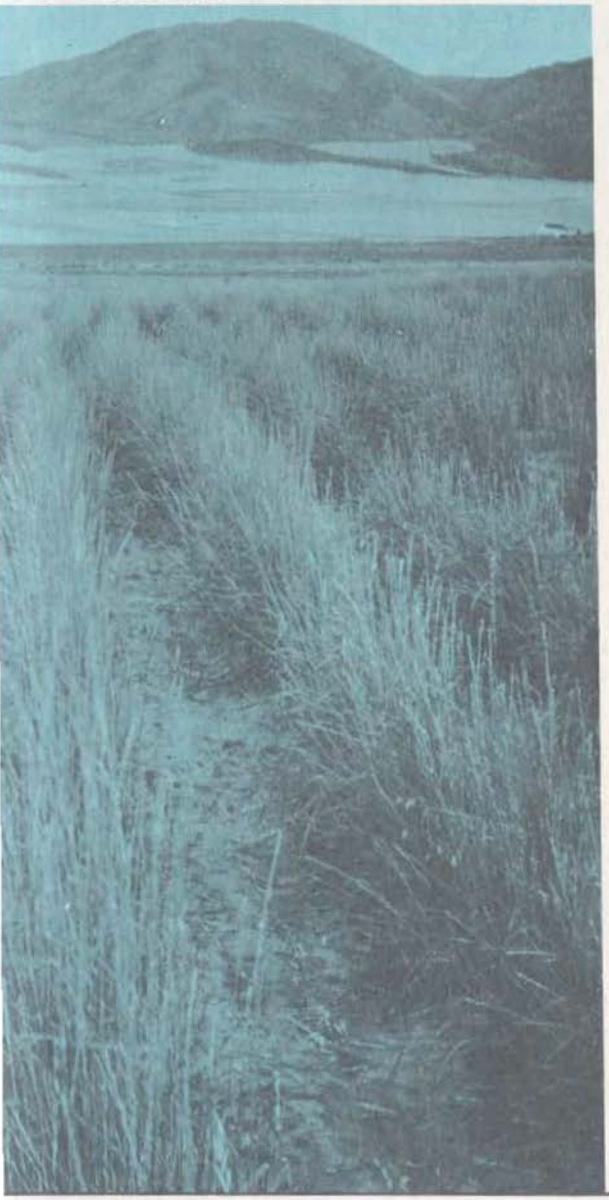

GRASS SEED PRODUCTION

on Southern Idaho Dryland Farms

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SUMMARY

An adequate supply of high-quality seed at reasonable prices is essential if new and improved grass varieties are to receive widespread use. Grass seed production can fit nicely into some dryland farm operations. Equipment and management needs are different from those for small grains, however.

Some grasses have produced more than 700 pounds of cleaned seed per acre the first harvest year under dryland conditions in southern Idaho. Seed yields usually decline each year after the first seed harvest. Climatic factors such as drought, unseasonal frost and wind can reduce seed yields.

A new grower should plant only one variety until he has gained experience in all phases of grass seed production. Foundation or registered class seed must be used to establish all certified grass seed production fields.

Proper seedbed preparation is essential for obtaining good stands. An ordinary grain drill or tool-bar planter can be used for seeding grass. Row spacing should be about 3 feet and the seeding rate about 25 seeds per linear foot of row. Seed no deeper than one-half inch in most soils. Seed the grass alone, generally in the spring. An annual application of nitrogen may be profitable after the first crop year.

Chemicals and cultivations will control most weeds. Roguing or hand weeding is necessary to control off-type plants and annual grassy weeds. Insects and diseases are not critical problems in southern Idaho.

Seed harvest for most grass species will be in late July or during August. Any one of several harvesting methods may be used. Straw left in the field after the harvesting operation must be removed or destroyed to facilitate cultivation.

Marketing the seed is the final phase of a successful grass seed production program. The importance of this phase cannot be overstressed.

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GRASS SEED PRODUCTION

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Leaford C. Windle, Hugh C. McKay, Ronald B. Foster

Producing grass seed on dryland farms as an alternative to other crops can be profitable. The normal production life of grass seed fields provides 3 crops in 4 years compared with 2 crops in 4 years for small grains. Labor requirements for producing grass seed usually come during slack periods. This helps increase the over-all efficiency of the farming system. In addition. a grass crop will maintain or increase the organic matter in the soil.

The grass variety produced will partially control equipment needs. Cultivating equipment, a swather or binder, a combine with pickup attachment and a sprayer may be needed.

Grass seed production on dryland farms is seldom profitable in areas receiving less than 12 inches of rainfall annually. More is needed at elevations below 5,000 feet. Other climatic factors including wind, drought and unseasonal frost must be considered because they can reduce seed yields.

SELECTION OF SPECIES AND VARIETY

This bulletin will help you choose the grass species and variety that has the best chance of success in your operation. If you are a new grower, limit yourself to a small acreage of one variety until you have become acquainted with all phases of grass seed production. Producing seed of only one variety at a time will largely eliminate natural crossing and the danger of mechanical mixing during harvesting or cleaning operations.

Producing grass seed under dryland conditions is generally limited to varieties that can be used in the region where the seed is grown. Occasionally, seed of a variety can be produced that will be used primarily in another section of the country. Local seed companies will be the main market for the seed; contact them to determine varieties they can use.

Local county extension agents and USDA Soil Conservation Service technicians can help you decide which grass varieties to include in your seed production program.

YIELDS

Climate, soil and management play major roles in controlling grass seed yields. The clean seed yields given in Table 1 are approximately what can be expected on silt loam soils under dryland conditions with more than 12 inches annual precipitation at elevations between 5,000 and 6,500 feet. These grasses were seeded in mid-May and had a row spacing of 36 inches. Simulated binding was used to harvest all species.

Siberian wheatgrass had the highest average yield with 401 pounds per acre followed by Nordan crested wheatgrass with 350 pounds. The seed yield of Manchar smooth bromegrass was high the first year, but it fell off rapidly the following years.

One growing season is required for the plants to become fully established. The first seed is harvested the second growing season and this is when the highest seed yields ordinarily occur. Yields then decrease each year, but climatic conditions have some influence on the size of the decreases. An above-average amount of precipitation will not by itself greatly increase grass seed yields as the plants grow older. This is evident in Table 1 during the fourth and fifth harvest years. Three to four years is as long as most grasses will produce profitable seed yields under dryland conditions.

Soil moisture often becomes depleted before the seed ripens on late-maturing grasses such as intermediate and pubescent wheatgrasses. Frost occurring when the grasses are blooming will reduce seed yields. This type of damage is normally limited to the early-maturing grasses such as smooth bromegrass. Late-summer frost may freeze the seed of late-maturing grasses before

Table 1. Pounds of clean grass seed per acre and precipitation (inches) by crop years[a] at the Tetonia Branch Experiment Station (elevation 6000 feet) in southeastern Idaho.

Species[b]	Harvest Years 1	2	3	4	5	5-year average
Bromegrass, Lincoln smooth	397	145	170	107	73	178
Bromegrass, Manchar smooth	480	171	130	97	130	202
Wheatgrass, Fairway crested	630	361	133	80	73	255
Wheatgrass, Nordan crested	740	439	247	200	123	350
Wheatgrass, Siberian (p-27)	687	503	277	327	210	401
Wheatgrass, Sodar streambank	200	151	117	33	37	108
Wheatgrass, Whitmar beardless	240	51	203	27	110	126
Wheatgrass, Greenar intermediate	250	61	63	43	107	105
Wheatgrass, Topar pubescent	127	103	143	97	190	132

	Establishment year	1	2	3	4	5	6-year average
Precipitation[a]	11.32	12.89	12.20	11.53	18.63	17.04	13.94

[a] September 1 through August 31 of following year.

[b] See appendix for the scientific names and authorities of grass species mentioned in this bulletin.

it is fully developed. Hot, dry winds during bloom stage may damage floral parts and thereby reduce yields. Strong winds when the seed is nearly mature cause considerable seed shatter.

SELECTION OF SEED

Foundation or registered class seed must be used to establish grass seed production fields if the seed is to be certified by the Idaho Crop Improvement Association. Foundation seed of most improved grass varieties adapted to southern Idaho is available through the University of Idaho Agricultural Experiment Station or through seed increase programs of soil conservation districts. Grass seed for establishing seed production fields should not be purchased unless each sack contains a tag showing class, purity, current germination and weed seed content.

SEEDBED PREPARATION

Choose relatively level, fertile fields free of noxious weeds for grass seed production. Fields with excessive slope are not suitable.

For best results, seed in a summer-fallowed or fall-plowed stubble field. The seedbed needs to be firm, moist and weed-free at seeding time. If the heel of a man's shoe sinks in more than an inch, the seedbed is too loose. A cultipacker is an excellent tool for firming a seedbed, but going over the field two or three times with a spiketooth harrow is satisfactory. The soil must be moist for effective packing.

SEEDING

Spring is the best time to seed. At the lower elevations this usually means during April, but at higher elevations (above 5,500 feet) it means early to mid-May. Late summer seeding is satisfactory in a few instances, but the seedlings will winterkill if they do not become well established before freeze-up. Seed which germinates the following spring may have difficulty emerging because of soil crusting.

Do not seed a companion or nurse crop, such as wheat, barley or oats, with grass intended for seed production. A fair grass stand can be obtained by this practice, but the grass seed yield the first crop year will be seriously reduced. The grain stubble and crowns will interfere with cultivations the first year. Perennial grass seedlings are not as competitive as weeds and small grains.

Treating the seed with a fungicide helps to insure good stands but it is not usually necessary under dryland conditions. Seed of a few grasses, such as Bromar mountain bromegrass and Regar bromegrass should be treated to control head smut.

An ordinary grain drill is satisfactory for seeding grass seed production fields. The disk-type drill is better than the shoe-type for this purpose. Adjust row spacing by plugging some of the

Table 2. Percent reduction in grass seed yields from rows 6 inches apart compared with yields from rows 36 inches apart at the Tetonia Branch Experiment Station.[a]

Species	Harvest Years 1	2	3	4	5	6	Average
Crested wheatgrass	16	35	38	[b]	41	43	35
Smooth bromegrass	64	54	56	[b]	66	64	61
Big bluegrass	58	52	50	[b]	54	51	53

[a] Calculated on accumulated average yields.
[b] Few heads produced so yields were not determined

holes in the grain drill. Great care should be used in seeding the "guess" rows. If spacing is not uniform, some rows may be destroyed when the field is cultivated.

Grass seeded in closely spaced rows is excellent for erosion control, but in seed production, a row spacing of about 36 inches is needed to allow for cultivation. Table 2 shows results at the Tetonia Branch Experiment Station in a trial comparing grass seed production in rows 6 inches and 36 inches apart. These results indicate that for the normal life of a grass seed production field, the yields for many grasses will be reduced a third to a half or more if the rows are changed from 36 inches to 6 inches apart.

Acceptable seeding rates are given in Table 3 for most grass species likely to be grown for seed production under dryland conditions in southern Idaho. Most species should be seeded at a rate of 25 to 30 seeds per linear foot in rows spaced approximately 36 inches apart. Rice hulls may be used to aid in seed distribution and to reduce the tendency of some seeds to bridge-over in the drill. Equal proportions by volume or weight of rice hulls and grass seed will give satisfactory results.

Seeding depth must be carefully controlled. A poor stand will usually result if the seeding depth is greater than one-half inch in most soils.

WEED CONTROL

Weed control is most critical during the establishment year. Two or three shallow cultivations—about 2 inches deep—will control weeds during this period. A rotary cultivator in combination with sweeps is excellent for this purpose. Half sweeps (beet knives) on the front and wide sweeps on the back tool bar can be adjusted to do a satisfactory job. Take care not to cover the grass seedlings with clods or soil because of improper adjustment of the cultivating equipment or tractor speed. After the grass seedlings are past the 3-leaf stage and about 6 inches tall or 6 weeks old, you can spray the field with an application of 2,4-D at the rate of 1 pound of active ingredient per acre to control broadleaf weeds.

After the establishment year, you may need to cultivate 5 inches deep in late fall to cut the grass plants back and keep them confined to the rows. Additional cultivations are needed only to control weeds or volunteer plants. Spraying with 1 pound of 2,4-D after the heads have begun to emerge will damage the seed.

Roguing or hand weeding is necessary every year to control off-type plants and annual grassy weeds.

INSECTS AND DISEASE

Intermediate and pubescent wheatgrasses are susceptible to damage by Banks grass mites in late spring and early summer. Seed growers should keep current on recommendations for insecticides to use for controlling mites.

Stripe rust has been found occasionally on some grasses in southern Idaho, but this disease has apparently had little influence on seed yields.

As mentioned previously, head smut can be a problem with a few grasses.

FERTILIZATION

Present evidence indicates that nitrogen or other commercial fertilizers do not give economical responses the first seed production year. In later production years it may be profitable to apply nitrogen in areas receiving more than 13 inches of annual precipitation. In such cases apply about 40 pounds of actual nitrogen per acre annually.

CERTIFICATION

Current rules and requirements for producing certified grass seed should be obtained from the Idaho Crop Improvement Association. These vary somewhat with the species grown. This information in booklet form is available from county extension agents and local soil conservation district representatives.

Table 3. Seeding rates of common grass species for seed production on dry land in rows spaced 30 to 40 inches apart.

Species	Variety or Accession	Pounds per acre	Seeds per linear foot
Bromegrass, mountain (de-awned)	Bromar	4	25
Bromegrass, smooth	Manchar	3	26
Bromegrass	Regar	3	26
Fescue, tall	Alta	2	31
Wheatgrass, bearded	P-9115	3	33
Wheatgrass, beardless	Whitmar	4	36
Wheatgrass, bluebunch	P-739	4	36
Wheatgrass, crested	Nordan & Fairway	2	24
Wheatgrass, intermediate	Greenar & Oahe	3	27
Wheatgrass, pubescent	Topar & Luna	3	25
Wheatgrass, Siberian	P-27	2	24
Wheatgrass, slender	Primar	3	33
Wheatgrass, streambank	Sodar	2	24

HARVESTING

Most grass species suitable for producing seed under dryland conditions in southern Idaho will be ready to harvest in late July or during August. Proper timing of harvest is essential.

Several methods are suitable for harvesting grass seed. Swathing or binding is especially useful for those grass varieties that shatter readily. The direct cost per acre is higher for binding than for swathing or direct combining, but the higher cost may be more than offset by additional seed saved.

Equipment used for harvesting must be completely free of other seeds. When more than one grass variety or species is grown, clean all equipment thoroughly prior to harvesting the various lots in order to prevent mechanical mixtures. It is usually impossible to separate mixed seed during the cleaning operation. Contaminated seed often cannot be marketed at any price.

THRESHING

Grass seed is not as easy to thresh as most grains. Machines with rubber cylinder bars do the best threshing lob. When threshing the bundles or the windrows with a combine, feed the material into the machine uniformly. If the grass is fed too rapidly, a poor threshing job will result and much seed will be carried through the combine with the straw.

SEED CLEANING

It is not practical for a farmer to acquire his own seed cleaning equipment unless he has grass seed production as a major enterprise. Most commercial seed companies have the necessary experience and equipment to clean grass seed properly. Determine if seed cleaning equipment is available before getting into the production of grass seed.

Table 4. Influence of age on percent germination of untreated grass seed stored at Aberdeen, Idaho.

Species	Original germination	Years After Harvest 1	2	3	4	5	10
Bluegrass, big	82	76	77	76	54	91	65
Bromegrass, mountain	94	88	90	80	34	6	1
Bromegrass, smooth	95	87	89	94	86	83	35
Fescue, tall	97	96	96	94	96	97	72
Wheatgrass, beardless	93	93	92	92	84	79	10
Wheatgrass, bluebunch	89	88	88	84	55	68	3
Wheatgrass, crested	98	96	94	93	95	98	84
Wheatgrass, intermediate	98	98	91	97	94	95	77
Wheatgrass, slender	94	95	96	83	92	92	2

SEED STORAGE

Natural climatic conditions in most of southern Idaho are ideal for seed storage. However, the seed must be dry and in good condition when placed in storage. It then must be protected from insects, rodents and moisture. Most grass seed stored in southern Idaho will maintain high germination for several years (Table 4). Mountain bromegrass, beardless wheatgrass and bluebunch wheatgrass were the only species whose seed deteriorated rapidly after three years of storage.

MARKETING

Before going into grass seed production, consider the available markets, the expected demand and the selling price for the variety you plan to grow. Naturally, the best prices are obtained for seed from grasses that are difficult to raise or that are normally low seed yielding. Marketing the seed is one of the most important steps in a successful grass seed production enterprise. Commercial seedsmen, who are the likely outlets for the seed, can offer valuable advice.

As with any crop, an oversupply of grass seed depresses prices. This has been demonstrated several times with crested wheatgrass during above average moisture years when large acreages of rangeland seedings were harvested for seed. This seed is seldom certified quality, but such large supplies affect the demand for and price of certified seed. Storage for a few years (see Table 4) may be one method of obtaining a more suitable price for grass seed harvested during years when there is an oversupply.

RESIDUE MANAGEMENT

The method of handling residue after seed harvest will depend upon the harvesting method used. Tall stubble or piles of stubble left in the field after threshing must be baled, burned or otherwise removed to prevent interference with cultivation. If you burn the residue, do it immediately following threshing or in late winter. This practice helps to control diseases and insects in some grasses. Most grasses are seldom injured if burned when the plants are dormant and if the fire moves rapidly across the field.

Fall burning exposes the field to wind and water erosion until spring growth begins. Fall cultivation minimizes this hazard.

PLOWING OUT GRASS FIELDS

Grass fields can be plowed either in the fall or spring, but fall plowing is advantageous because freezing and thawing hasten breakdown of the sod. Leave the field rough during the winter. Heavy disking before plowing helps to cut up the sod. After plowing, disk the field once or twice to aid in breaking up the clumps. Summer-fallow the field before it is planted with another crop. Do not replant to a different variety of the same species for several years because of the potential problem created by volunteer plants.

APPENDIX

Following are scientific and common names of grass species mentioned in this bulletin:

Scientific names	Common names
Agropyron cristatum (L.) Gaertn.	Fairway wheatgrass
Agropyron riparium Scribn. & Smith	Nordan crested wheatgrass
Agropyron inerme (Scribn. & Smith) Rydb.	Whitmar beardless wheatgrass
Agropyron intermedium (Host) Beauv.	Greenar & Oahe intermediate wheatgrass
Agropyron riparium Scribn. & Smith	Sodar streambank wheatgrass
Agropyron sibiricum (Willd.) Beauv.	Siberian wheatgrass
Agropyron spicatum (Pursh) Scribn. & Smith	Bluebunch wheatgrass
Agropyron subsecundum (Link) Hitchc.	Bearded wheatgrass
Agropyron trachycaulum (Link) Malte	Primar slender wheatgrass
Agropyron trichophorum (Link) Richt.	Luna & Topar pubescent wheatgrass
Bromus biebersteinii Roem. & Schult.	Regar bromegrass
Bromus inermis Leyss.	Manchar smooth bromegrass
Bromus marginatus Nees	Bromar mountain bromegrass
Festuca arundinacea Schreb.	Alta tall fescue
Poa ampla Merr.	Sherman big bluegrass

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