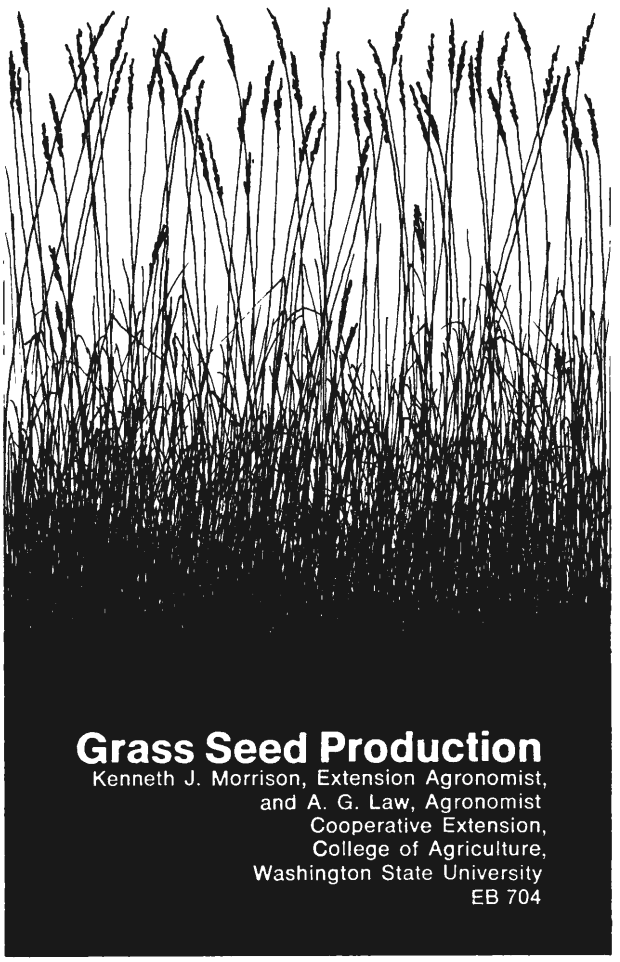


Grass Seed Production

Kenneth J. Morrison, Extension Agronomist,
and A. G. Law, Agronomist
Cooperative Extension,
College of Agriculture,
Washington State University

EB 704

Grass seed is a specialty crop in Washington. Many varieties and species can be grown because of the variation in climate, soil, and farm conditions. Eastern Washington's climate, with its winter precipitation but dry summers during the harvest season, is favorable for the production of high-quality seed.

Though grass seed production is an exacting enterprise that requires careful management and correct timing, it offers many advantages. In considering seed production, growers will want to weigh the following factors: 1) fits into rotation with other crops, 2) is an important cash crop with high value per unit weight, 3) may bring more income than other crops on submarginal land, 4) improves soil condition, 5) provides good erosion control, 6) acreage is not restricted or controlled, and 7) can easily allow effective weed control practices.

Select the Right Species

Different species have specific moisture requirements. Wheatgrasses are better adapted to the lower rainfall areas or to soils with low moisture-holding capacity. Bluegrass, orchardgrass, timothy, and bentgrass are high moisture-requiring grasses that should be grown under irrigation or on soils that have good moisture-holding capacities.

Table 1 gives the general characteristics of grasses adaptable to seed production in the state.

Table 1. General Characteristics of Several Grass Species Commonly Grown in Washington.

Maturity group*	Grass species	Requirement for		Tendency to		Row spacing (inches)	Additional remarks
		moisture†	nitrate‡	shatter§	lodge		
I	Kentucky bluegrass	high	high	low	med.	6 to 12	Slow to establish
II	Orchardgrass	high	high	high	low	36	Subject to winterkill
	Tall fescue	high	low	high	high	36	
	Red fescue	high	med.	high	med.	24	
	Bluebunch wheatgrass	low	low	high	med.	24	Limited market demand
	Hard fescue	low	low	high	med.	24	Difficult to establish
III	Smooth bromegrass	high	low	med.	high	24	
	Bentgrass	high	high	med.	med.	6 to 12	Maturity not uniform
	Crested wheatgrass	low	med.	med.	low	24	
IV	Intermediate wheatgrass	med.	low	med.	high	36	Moisture required late in season
	Timothy	high	low	low	low	36	Moisture required late in season
V	Tall wheatgrass	med.	low	med.	med.	36	Alkali tolerance

* I = early maturity; V = late maturity. See Washington Exp. Sta. Bull. 647 for additional information.

† *High* moisture = irrigation or more than 18 inches annual rainfall. Bent and timothy are better adapted to irrigation or to the high rainfall areas west of the Cascade Mountains because of high moisture requirement and late maturity.
Med. moisture = more than 15 inches annual rainfall or irrigation. Intermediate and tall wheatgrasses have considerable drought resistance but require moisture late in the season because of maturity.
Low moisture = more than 13 inches annual rainfall or irrigation.

‡ Use high, medium, and low nitrate rates suggested in Table 5 as indicated by requirement of the species.

§ All grass seeds have a tendency to shatter before they reach a moisture content safe for storage.

Gain Experience First

If a new grower, start with the large-seeded field grasses that are easy to establish and harvest before you try to produce seed of the smaller seeded turfgrasses. It is well for inexperienced growers to limit their grass seed production to one variety, then add other varieties and species as they gain experience.

Check Market Demand

Excellent seed plants are available in Washington for processing and marketing grass seed. It is good insurance to consult with the processors on the demands of particular varieties or species before the field is planted.

High-quality certified seed of recommended varieties has a price advantage to growers over uncertified seed.

Seed Yield and Price Are Related

Seed yield and price per pound are closely associated. Varieties that have high seed yield and are relatively easy to produce usually sell at a lower price. Varieties that have a low seed yield and are difficult to produce usually sell at a higher price.

New varieties usually sell at a higher price until the supply of the new variety meets the demand. However, there is the disadvantage that the new variety market potential is seldom known, which may result in good seed price initially but lower prices later.

Table 2. Varieties of Various Species of Grass Recommended for Seed production in Washington.

Species	Varieties recommended for seed production
Smooth bromegrass	Manchar,* Lincoln, Saratoga,
Orchardgrass	Latar,* Pennlate, Sterling, Chinook,
Bluegrass	Merion, Delta, Cougar, Newport, Proprietary varieties†
Bentgrass	Highland, Astoria, Penncross
Tall fescue	Alta,* Fawn*
Red fescue	Olds, Pennlawn, Chewings
Hard fescue	Durar,* Covar
Timothy	Climax
Wheatgrasses	
Crested	Nordan*
Intermediate	Greenar,* Oahe, Amur
Pubescent	Topar*
Tall	Alkar*
Bluebunch	Whitmar*
Grasses of minor importance in seed production	
Big bluegrass	Sherman*
Mountain bromegrass	Bromar*
Slender wheatgrass	Primar*

* Grown mostly for local market.
† Proprietary varieties are the property of seed companies and grown under contract for the company only.

Select Varieties with Care

Harvest season may be extended by selecting grasses that mature at different times. Grasses should be selected that do not conflict with other crop harvests. A list of varieties that are recom-

Table 3. Average Seed Yields for Some Selected Species and Varieties of Grass at Two Locations in Washington (3-year average seed yield lb/A).

Type of grass & variety	Pullman nonirrigated	Prosser* irrigated
Orchard		
Potomac	609	753
S-143	375	825
Latar	403	569
Pennlate	572	—
Smooth bromegrass		
Manchar	905	1066
Lincoln	544	689
Southland	618	—
Saratoga	495	—
Timothy		
Climax	282	1087
Drummond	185	—
Bentgrass		
Astoria	195	411
Penncross	—	365
Tall fescue		
Alta	916	999
Red fescue		
Olds	784	1033
Pennlawn	651	1418
Kentucky bluegrass		
Merion	422	465
Delta	543	873
Cougar	360	801
Newport	—	1034
Crested wheatgrass		
Nordan	689	762
Siberian	793	834
Intermediate wheatgrass		
Greenar	349	374
Amur	815	—
Pubescent wheatgrass		
Topar	610	622
Tall wheatgrass		
Alkar	455	—
Bluebunch wheatgrass		
Whitmar	561	—

* Prosser yields are higher than would normally be expected. The first productive year was cool and moist.

mended for seed production in Washington is shown in Table 2.

The average seed yield and the recommended varieties are shown in Table 3.

Grow Certified Seed

Certified seed or seed of proprietary varieties usually brings a higher price than common seed. Before you buy seed planting stocks, become familiar with the certification standards.

Seed certification standards are available from County Extension agents and from the Seed Branch, State Department of Agriculture, 2015 South First Street, Yakima, WA 98901.

It is desirable that growers plant seed that will produce certified seed. Seed planting stocks are foundation, registered, or certified seed as authorized by the state certification agencies. The tag on certified seed will indicate other perennial grasses or weed seed if present. Perennial grass seed of other species is a serious problem to the grass seed producer.

Do not plant seed of unknown or noncertified varieties. Common seed may contaminate the fields for future grass seed production.

Some growers may wish to grow "Sod Quality Seed," which must meet higher standards than classes of certified seed. Sod Quality standards are available from the Seed Branch listed above.

Plant at Proper Time

Plant grass seed as early as a proper seedbed can be prepared in the spring. Late spring plantings are hazardous with the bluegrasses. Large-seeded field grasses, such as smooth brome, orchardgrass, and wheatgrass, may be planted later in the spring.

Properly firmed seedbed (left) for grass seeding.

Late summer plantings are not recommended because fall moisture usually is not adequate, competition from winter annual weeds is severe, and there may be too short a time for seedling development before cold weather. Later summer plantings of grasses may be made in the irrigated areas of the Columbia Basin after an early crop has been harvested.

Wheatgrasses produced the same yield the following year from spring and fall plantings under irrigation at the Prosser Experiment Station. Other grass seed yields were lower following later summer seedings and the total average 3-year yields were reduced.

Potatoes and peas are good crops preceding late summer seedings of grass in the Columbia Basin. It is difficult to prepare a firm seedbed following wheat and barley for a late summer seeding.

Seeding Depth Is Shallow

Grass seed should be planted shallow in firm soil. Small-seeded grasses, such as Kentucky bluegrass and timothy, should be planted ¼ to½ inch deep. Large-seeded grasses may be planted ½ to 1 inch deep. The deeper seeding depths are recommended for lighter sandy soils or where moisture may not be adequate near the soil surface.

Follow Recommended Seeding Rate

The best grass seed-producing stands are thin but uniform in the first year of production (see Table 4 for recommended seeding rates). Increas-

Table 4. Suggested Seeding Rates for Grasses Commonly Grown in Washington for Seed Production.

Species	No. of seeds /ft of row*	Approx lb/A for rows 12 inches apart†
Kentucky bluegrass	10 to 20	1 to 2
Bentgrass	10 to 20	¾ to 1½
Timothy	10 to 20	1 to 1½
Orchardgrass	7 to 14	1 to 2
Tall fescue	4 to 6	2 to 3
Red fescue	4 to 6	2 to 3
Smooth brome	4 to 6	2 to 3
Crested wheatgrass	4 to 6	2 to 3
Intermediate wheatgrass	4 to 6	3 to 6
Bluebunch wheatgrass	4 to 6	2 to 3
Tall wheatgrass	4 to 6	4 to 6

* Suggested rate per foot for row spacings from 12 to 36 inches apart, based on a good seedbed adequately supplied with moisture.

† Seed required to plant the suggested rate per foot for 12-inch rows. Rows 24 to 36 inches apart would require ½ and ⅓ as much seed per acre.

ing the seeding rates will not compensate for a poorly prepared seedbed or severe competition from weeds.

Use Proper Seeding Equipment

Grass seedings can best be made with Planet Jr. seeding units or with grain drills. When grain drills are used it is desirable to use a dilutent, such as vermiculite, stained cracked grain, or rice hulls, to reduce the seeding rate. Rice hulls make a good dilutent but may contain weedy grass seed, especially watergrass, which will contaminate the fields and seed crop. Steam-treated rice hulls are safe.

Grow Most Species in Rows

Grass for seed production of all species, except bluegrass and bentgrass, should be seeded in rows varying from 12 to 36 inches apart. Row seedings require less seed, make weed control and roguing easier, and prolong the productivity of the stand. The bluegrass and bentgrass varieties are grown in solid stands except under irrigation.

On steep land subject to severe erosion, grass planted on the contour in 12-inch rows usually gives good erosion control. Solid seeding should be used on steep land where grass cannot be seeded on the contour. Row seedings under irrigation should be 24 to 36 inches apart, depending on the cultivation equipment available.

A companion or nurse crop is not generally recommended. These crops compete with the grass seedlings on nonirrigated land, restrict herbicide use for weed control, and usually end up in failure of the stand.

With irrigation it is possible to grow a companion crop with some of the field grasses without great loss in seed yield. Peas are best as a companion crop but the cereal grains may be used. It is advisable to reduce normal seeding rates of the nurse crop by 50% from that used for a regular production seeding.

Do not grow grasses with weak seedlings, such as Kentucky bluegrass, with companion crops under irrigation.

Cultivate with Care

Seed heads are initiated in the late winter from vegetative buds formed the preceding fall. Any removal of vegetative buds in the fall or spring will reduce the seed crop. Cultivation during the growing season should not remove any of the vegetative growth from the grass rows.

Cultivation after harvest but before regrowth starts in the fall may be made for weed control and to maintain the rows without serious seed production loss.

Apply Nitrogen

Nitrogen is the only fertilizer that can be expected to give consistent economical increases in grass seed production in Washington. The amount of nitrogen needed to produce the most economical seed yields depends on 1) residual nitrogen from past cropping practices, 2) kind of grass being grown—for example, bluegrass and orchardgrass are better adapted to higher nitrogen levels, 3) age of the stand, 4) amount of moisture available during the growing season, and 5) lodging characteristics of the grass.

Table 5 gives the amount of nitrogen for the most economical production of grass seed. Because sulfur may give a positive response in grasses, it may be advisable to consider ammonium sulfate as the most desirable source of both nitrogen and sulfur.

Table 5. Suggested Rates of Nitrogen for Grass Seed Production in Washington.

Nitrogen lb/A*	Washington area	Rainfall
20 to 40	Eastern	12 to 15 inches
40 to 60	Eastern	15 to 18 inches
60 to 80	Eastern	More than 18 inches
80 to 100	Eastern	Irrigated
80 to 120	Central	Irrigated

* Use the highest rate for species with high nitrate requirements and for old stands of all grasses. The low rates are for the first or second year of production and for grasses with low nitrate requirements (see Table 1 for requirements).

Apply all nitrogen in September or early October, after field burning, for grass seed production in eastern Washington. Spring and split applications increase the vegetative growth and lodging.

Twenty to 40 pounds of sulfur per acre is needed on most nonirrigated fields in eastern Washington; hence, ammonium sulfate is the preferred nitrogen fertilizer. Determine phosphate and potash requirements through a soil test (see Fertilizer Guide 38).

Control Weeds

Removing weeds from fields before harvest is cheaper than removing weed seed from the grass seed in the cleaning plant. Manage seed fields to eliminate as many annual weeds as possible and all perennial weeds before grass is seeded. Select seed that is free of weeds and other grass species to avoid contaminating seed fields. Rogue fields to

remove weeds that cannot be controlled with a selective herbicide.

Harvest at Medium Dough to First Shatter

The most important decision the grass seed grower makes is determining the proper time of harvest to secure the highest yield of good quality seed. Harvesting immature seed with high moisture content may result in low-quality and cause problems in drying the seed. If harvest is delayed, the grower may lose part of the crop by shatter.

The best time for harvesting is from medium dough to first shatter, which is usually only 3 to 4 days and may be less if the temperatures are high. Seed shatter occurs between 25 and 47% moisture. The change from green to pale green to yellow and finally to straw color indicates harvest time is approaching.

If seed shatters from a light blow struck against the hand, handle the crop quickly to avoid shatter loss. If a heavy blow is necessary to knock out seeds from the head, it is ready for windrowing but the moisture is too high for direct combining.

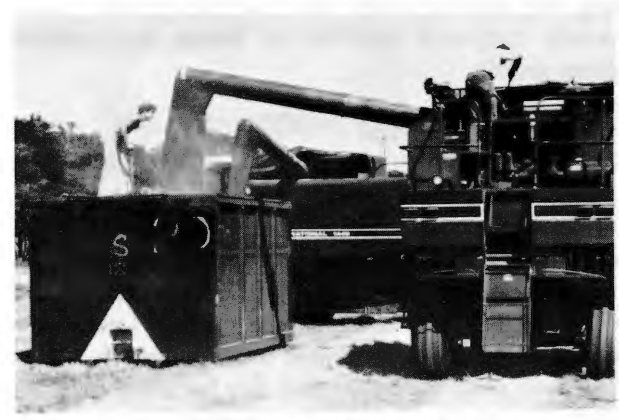
As another method, seed can be examined to determine when it is in the dough stage. For direct combining, seed should be in the firm to hard dough stage. If the crop is windrowed, the seed should be in the soft dough to firm dough stage.

Observing seed shatter is one of the best methods for determining maturity of the crop. When there are a few shattered seeds on the ground, harvest immediately.

Windrowing is the best method to harvest grass seed. It can be done before seed shatters and even continued during adverse weather. Windrowing eliminates the need for artificial drying.

Where possible, leave a stubble of 12 to 18 inches. This allows air circulation around windrows and keeps the grass from contacting the soil. Leaving a tall stubble also reduces the amount of straw that goes through the combine when the seed is threshed.

Direct combining can be used if a windrower is not available. Grass seed that is direct-combined usually must be subsequently dried. Immediately running seed through a scalping machine to remove stems and leaves will aid in drying the crop. The greatest danger in direct combining is severe loss from seed shattering due to wind and loss from overheating in storing seed with too high a moisture content.



Unloading seed into bulk container.

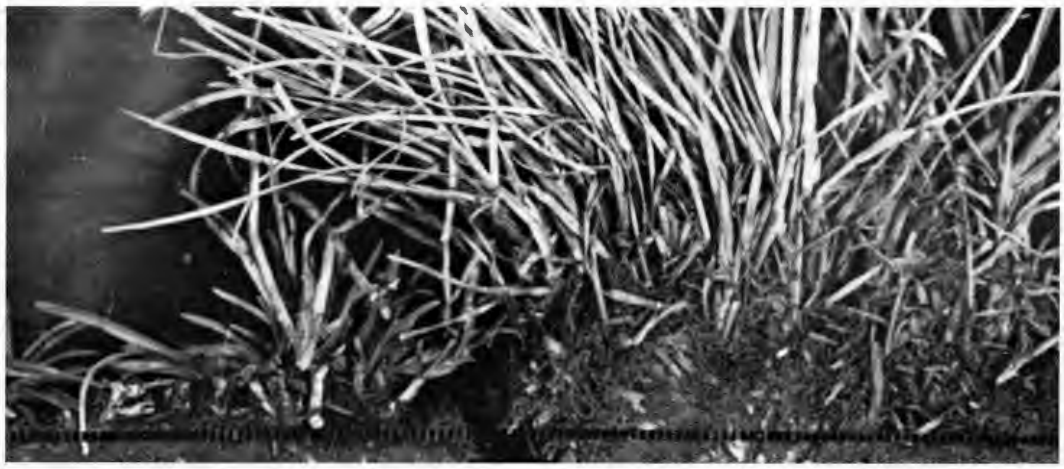
Loading bulk container to take to processing plant.

Burn to Remove Residue and Thatch

Burn seed fields after harvest and before regrowth starts in the fall. Burning is an essential method of removing residue and thatch and provides some control of insects and diseases; it also helps thin the stand. "Economics of Alternatives to Open Burning of Kentucky Bluegrass Residue," WSU College of Agriculture Research Center Bulletin 852, reports the economics of burning versus other management practices to remove crop residue. Use burning with special caution on bunchgrasses, such as orchardgrass and tall fescue.

To burn with a minimum loss of stand, take the following precautions: 1) burn before regrowth has started, 2) use a straw spreader on the combine, 3) spread straw which may accumulate, 4) burn on a dry day when there is a slight wind, and 5) do not chop straw.

In areas where it is impossible to burn, remove the straw and stubble from the field. Baling is the best method.



Thatch accumulation in burned (left) and unburned Kentucky bluegrass seed fields.

Burning bluegrass stubble to reduce thatch and increase seed yields.

Experimental burner to study effect of burning on grass seed stubble.

Experimental burner in operation.

Do not feed baled straw and stubble that has been sprayed with restrictive chemicals to livestock. Washington State University Bulletin 850, "Postharvest Residue Management in Kentucky Bluegrass Seed Production," gives valuable information on research results of open field burning and mechanical removal of residue.

Avoid Pasturing Seed Fields

Pasturing seed fields is objectionable because the livestock will pack the soil and introduce wheat and other seed crops in the field. Many restrictive chemicals are used for pest control, and fields that have been treated should not be grazed.

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