

# Rough Bluegrass Seed Production in Central Oregon

M.D. Butler, J.M. Hart, and W.C. Young, III

Rough bluegrass (*Poa trivialis* L.), also known as roughstalk bluegrass, is commonly used in the southern United States to overseed golf course greens, fairways, and landscape areas in the winter. Warm-season grasses go dormant and turn brown during the cool season, and rough bluegrass generally is mixed with ryegrass to maintain a lush, green color through the winter. As temperatures rise in the spring, the rough bluegrass mix dies, and the warm-season grasses come out of dormancy and become green again.

Compared to Kentucky bluegrass, rough bluegrass is slightly lighter green, has a shallower root structure, and requires more water. Like Kentucky bluegrass, rough bluegrass spreads by stolons ("runners"). It is a fine-textured turfgrass with soft leaf blades, which are glossy on the underside. The blades' narrow, boat-shaped tip is characteristic of bluegrasses. At first, the plant tends to have an upright growth pattern, but it develops a more prostrate stance over time.

Rough bluegrass is shade-tolerant and thrives in damp conditions. It is one of the most winter-hardy turfgrasses. However, it has poor wearability in high-use areas and poor drought and heat tolerance.

Jefferson County, north of Bend and Redmond in central Oregon, produces nearly 20% of the rough bluegrass seed in the United States. In this high desert region on the east side of the Cascade mountain range, the seed is grown under irrigation in the Madras and Culver areas.

## Climate and soils

Central Oregon is noted for its dry climate, characterized by warm, dry summers and cold, dry winters. Elevation of the rough bluegrass seed production area is approximately 2,200 feet. Average temperatures in July and August range from the mid- to upper 80s, with about 30 days per year reaching 90°F or above. Average low temperatures from December through February are in the mid- to low 20s, with occasional brief periods of nighttime temperatures reaching 0°F or below.

Precipitation is highest during the winter and lowest during midsummer, with a total of 11 inches per year. Snowfall averages 12 inches, which provides about 1.25 inches of water.

Soils in the area typically are shallow (36 inches or less to bedrock) and consist of moderately well-drained to well-drained Madras loam over basalt or sandstone. Fields vary from nearly level to low rolling terrain.



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Marvin D. Butler, Extension crops agent, Jefferson County; John Hart, Extension soil scientist; and William C. Young, III, Extension agronomist; all of Oregon State University.

## Stand establishment

Stand establishment and first-year management are critical for production of bluegrass seed. With good crop rotation and proper nutrient, water, and pest management, a field can remain productive for as long as 3 years.

## Field selection

Choose ground that has few weeds to minimize the cost of weeding and roguing in the establishment year. Soils should be moderately drained to well drained and medium textured. Growth is optimal when the pH is between 6.2 and 6.8, but the crop can tolerate a soil pH from 5.4 to 7.3.

Growers prefer to plant rough bluegrass into a fallow field, but some also grow it following garlic or mint. If planting after garlic, chisel and work the ground to form a firmly packed, smooth seedbed before planting.

## Seed selection

All of the rough bluegrass seed varieties grown in central Oregon are proprietary. Seed is grown under contract for one or several local seed contractors. Each contractor has a specific number of acres to place for each variety and works with growers to determine the variety and acreage to be grown at a specific price.

## Preplant nutrient and lime considerations

Test soil before planting to determine lime, phosphorus, and potassium needs.

**Lime:** Apply lime if the soil pH is below 5.8. Incorporation of lime before planting is much more effective in changing soil pH than a topdress application to an established stand. A lime application of 1.5 to 2.5 tons/acre usually is sufficient to raise the soil pH to an acceptable level. Use the lower rates on sandy soils. Clayey soils require the higher rates.

Soil pH can decline rapidly in the sandy soils of central Oregon, between 0.1 and 0.2 unit per year. During the life of a rough bluegrass stand, soil pH could decline between 0.3 to 0.6 pH

unit. Plan for this amount of soil pH decline before planting.

**Nutrients:** Soil test to determine the need for phosphorus (P) and potassium (K). Apply the amount recommended in Tables 1 and 2 before planting. Sulfur (S), at the rate of 10 to 15 lb/acre, also is recommended before planting. Apply 40 lb nitrogen (N)/acre at planting.

## Planting

Planting usually occurs between September 1 and September 15. This timing provides adequate soil temperature for rapid germination, which generally takes 7 to 14 days. Germination is slowed when soil temperatures drop below 42°F. If planting is delayed until after September 15, seed yields are reduced because of inadequate plant growth for tiller establishment and floral induction, which determines the number of seed heads and potential yield the following year.

Table 1.—Preplant amount of phosphorus fertilizer for rough bluegrass based on Olsen or bicarbonate soil test.

Phosphorus soil test value (ppm)	Phosphorus fertilizer to apply as P <sub>2</sub> O <sub>5</sub> (lb/a)
0 to 15	40 to 60
Above 15	0

Table 2.—Preplant amount of potassium fertilizer for rough bluegrass based on extraction with ammonium acetate.

Potassium soil test value (ppm)	Potassium fertilizer to apply as K <sub>2</sub> O (lb/a)
0 to 100	100 to 200
Above 100	0

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Once an adequate seedbed is prepared, plant seed 0.25 inch deep using 4 to 6 pounds of seed per acre. Space rows 12 to 14 inches apart, whether planted on the flat with sprinkler irrigation or as double rows on 30-inch beds with furrow irrigation. Some growers use Milton planters, but most use planters manufactured specifically for small seed specialty crops by a local equipment fabricator.

Frequent, short irrigations are required to keep the seed moist until it germinates and the plants are established. The amount and timing of irrigations vary depending on soil infiltration rates and water-holding capacity. A total of 9 inches generally are applied from planting to mid-October, when irrigation water no longer is available.

### Establishment weed control

Weed control is particularly important during crop establishment. Weed seeds germinate faster and establish more quickly than grass seed. Because the crop is young and tender, there are fewer herbicide choices the first year than during the following production years.

It is especially important to control weeds of grass species before planting because selective weed control in the grass crop is difficult. If grasses are controlled in the previous crop or during fallow, labor for maintaining a clean field is greatly reduced.

Growers often preirrigate to germinate weed seeds prior to planting. Weeds then are killed with a broad-spectrum contact or systemic herbicide. Control weeds that germinate following planting, but before the crop emerges, in the same manner.

### Crop maintenance

During the first winter, freezing and thawing can cause cracks to appear in the beds, and rocks may push their way to the surface. Use a roller to firm up the beds to maintain good contact between soil and roots.

### Irrigation

All rough bluegrass seed in central Oregon is produced on irrigated ground. The crop generally is grown under furrow irrigation with some production under sprinklers. Rough bluegrass has a high water requirement. Growers typically apply 6 inches of water to fill the soil profile in early to mid-April, when irrigation water becomes available. Production years require a total of 36 to 40 inches of water. This amount typically is applied as nine weekly irrigations of 3 inches each during spring and early summer prior to harvest, followed by two or three irrigations after harvest.

### Fertilizer requirements

Little information is available regarding the nutrient requirements or soil test values needed for rough bluegrass production. However, the following locally generated information comes from monitoring nutrient accumulation in rough bluegrass for three growing seasons in central Oregon.

The straw and seed in established stands of rough bluegrass typically contain between 160 and 200 lb N/acre. Therefore, the application of 100 to 180 lb N/acre is recommended. Apply some, if not all, of the N early in the growing season, as maximum N uptake occurs from mid-April to the first of May. The maximum N uptake rate precedes the period of maximum growth, which occurs during the last half of May.

In addition to nitrogen, sulfur (S) probably is the nutrient that routinely is lacking for seed production in rough bluegrass fields. At harvest, the seed and straw contain 15 to 20 lb S/acre. Annual application of 15 to 20 lb S/acre should be adequate for crop growth if S is not leached below the rooting zone.

The large amount of irrigation water used in rough bluegrass production leaches some sulfur. Application of sulfur close to peak use will reduce the loss from leaching. Peak sulfur demand occurs during late April and early May—the same time as peak N, P, and K use. An additional 10 to 15 lb S/acre may be necessary if sulfur is applied in the fall or very early in the growing season.

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Approximately 200 lb potassium/acre is removed annually in rough bluegrass straw and seed. Monitor soil test potassium. The soil test value should remain above 100 ppm. Apply 100 to 200 lb  $K_2O$ /acre in the fall if soil test potassium is below 100 ppm.

Apply phosphorus using Table 3.

## Weed control

Apply a broad-spectrum herbicide in the fall, using shielded spray equipment to prevent the herbicide from contacting crop plants. Fall-applied herbicides control fall weeds such as cheatgrass (*Bromus tectorum*), rattail fescue (*Vulpia myuros*), common groundsel (*Senecio vulgaris*), prickly lettuce (*Lactuca serriola*), common mallow (*Malva neglecta*), and dog fennel (*Anthemis cotula*).

In the spring, apply herbicides to control broadleaf weeds such as redstem filaree (*Erodium cicutarium*), curly dock (*Rumex crispus*), shepherdspurse (*Capsella bursa-pastoris*), other mustards, and quackgrass (*Elytrigia repens*). For grass weeds and “off types” (plants whose growth characteristics differ from the intended crop), use spot spraying, hand hoeing, or hand pulling in order to meet seed certification standards for crop purity.

See the current edition of the *Pacific Northwest Weed Management Handbook* for current herbicide recommendations.

## Disease control

The only major disease that affects rough bluegrass seed production in central Oregon is powdery mildew (*Erysiphe graminis*). Although it generally is not as severe in rough bluegrass as in Kentucky bluegrass, fungicides can be applied for control of this disease. (See the current edition of the *Pacific Northwest Plant Disease Management Handbook* for current recommendations.)

The fungus overwinters on infected plants and debris. Powdery mildew often appears during early spring and is favored by cool, humid, cloudy conditions with temperatures between 59° and 70°F. Spores are easily dislodged and spread by wind.

Table 3.—Phosphorus recommendations for fall application on established rough bluegrass in central Oregon.

Bicarbonate or Olsen soil test (ppm)	Phosphorus fertilizer to apply ( $P_2O_5/a$ )
0 to 5	50 to 60
5 to 10	40 to 50
10 to 20	30 to 40
Above 20	0

The disease produces characteristic white, powdery spots on both the tops and bottoms of leaves. Older leaves tend to be more heavily infected than younger ones. Eventually, heavily infected leaves turn brown or light brown as they die.

## Insect control

The major insect pest in rough bluegrass is the winter grain mite (*Penthaleus major*). Apply insecticides as needed to control this pest. (See the current edition of the *Pacific Northwest Insect Management Handbook* for current recommendations.) Nearly all rough bluegrass fields are treated each winter.

Adult winter grain mites are dark blue to black, with distinctive red legs and mouthparts. Winter grain mites are different from most other pest mites in that the largest populations occur during winter and early spring. They generally are more prevalent in rough bluegrass than in Kentucky bluegrass. Populations tend to increase with the age of the stand, so older fields are more likely to be affected.

Infested fields have a grayish to silvery appearance caused by removal of plant sap and chlorophyll from leaves by feeding mites. Damage occurs when large populations of mites are present from fall through spring. Seedling fields can be stunted or totally destroyed if control is not adequate.

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## Harvest

The dry, warm summers of central Oregon provide excellent conditions for maturation and harvest of rough bluegrass seed. Swathing usually begins during the last week of June. Determine seed maturity by seed color rather than moisture level. When the seed turns from bright green to a yellow-green to brown color, the field is ready for swathing.

Seed shatter is a major concern with rough bluegrass. Maintain high soil moisture levels as close to harvest as possible and allow the plants to lodge (fall over and lie on the ground) prior to maturity to prevent seed loss. Swathing too late can result in severe seed shatter, reducing the quantity of harvestable seed. Cutting too early stops growth before an adequate number of seeds are fully mature.

The grass is allowed to dry in windrows before combining to ensure that seed moisture is low enough for safe storage. Humidity and ambient temperatures determine the rate at which seed dries down in the windrow. In central Oregon, 7 to 10 days usually are adequate for the drying process. When combining, the relative humidity should be 40 percent or less.

Average yields for rough bluegrass seed in central Oregon are 500 to 950 lb/acre. However, yields can vary widely and are influenced by variety, grower cultural practices, and growing conditions.

## Seed conditioning

The combined seed is referred to as “in the dirt” and is brought to local seed contractors for additional seed cleaning. Seed conditioning equipment with various sizes and shapes of screens is used, along with air and gravity tables, to clean the seed to the specification outlined in the contract. Rough bluegrass is similar to Kentucky bluegrass in that it has “cotton” or lint on the seed, which must be removed as part of the cleaning process.

## Seed certification

Oregon State University administers a seed certification program that monitors the seed production and cleaning process. Through field inspections in the spring and seed sampling after cleaning, the program verifies that production methods have met the criteria necessary to protect the genetic identity of the specific grass variety. To ensure seed quality, only registered or foundation seed can be used when planting certified fields. Nearly all rough bluegrass seed produced in central Oregon is grown under the seed certification program.

## Postharvest residue management

Residue and stubble management following harvest and prior to regrowth have a significant effect on the following year's seed yield. In the late 1940s, postharvest field burning was adopted for disease and insect control. Burning also returns ash to the soil, eliminates crop residue, and increases seed production the following year by producing a clean crown that promotes better fall tiller development.

Grass seed growers in central Oregon established a smoke management district in 1981. Self-imposed guidelines restrict burning to times when conditions not only meet fire safety standards but also provide for adequate smoke dispersal away from populated areas. In addition, the program coordinates burning along major roads and highways to ensure public safety.

Straw generally is baled and removed from the fields prior to open field burning and propane flaming. On first-year fields where the straw load is light, you may need to leave the straw in place to provide enough dry material for an adequate fire. Rough bluegrass fields generally do not dry well enough for a good burn with open field burning alone. As a result, growers often use a large propane flamer pulled behind a tractor following open field burning.

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Research conducted at the Central Oregon Agricultural Research Center indicates that Kentucky bluegrass requires a cleaner crown than many other species (e.g., perennial ryegrass, tall fescue) to maintain an economic level of seed production. Although no research has been conducted specifically on rough bluegrass, indications are that it is similar to Kentucky bluegrass in this respect.

Several residue management approaches have been evaluated in large multiacre plots in commercial fields of Kentucky bluegrass. Where postharvest straw removal was the only residue management practice, yields were reduced by 50 percent compared to open field burning and flaming. With the addition of a flail chopper to open up the crowns after straw removal, yields were reduced by 25 percent compared to burning and flaming.

## For more information

Contact your county office of the OSU Extension Service for additional information on production of rough bluegrass seed.

## OSU Extension publications

The following publications are available from central Oregon county offices of the OSU Extension Service. Check the county government section of your telephone book. These publications also are available on the Web at [eesc.oregonstate.edu](http://eesc.oregonstate.edu).

*Kentucky Bluegrass Seed Production in Central Oregon*, EM 8807 (2002).

*Enterprise Budget: Kentucky Bluegrass Establishment, Central Oregon Region*, EM 8810 (2002).

*Enterprise Budget: Kentucky Bluegrass Production, Central Oregon Region*, EM 8811 (2002).

*Enterprise Budget: Rough Bluegrass Establishment, Central Oregon Region*, EM 8808 (2002).

*Enterprise Budget: Rough Bluegrass Production, Central Oregon Region*, EM 8809 (2002).

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*Pacific Northwest Plant Disease Management Handbook* (revised annually). \$35.00

*Pacific Northwest Weed Management Handbook* (revised annually). \$35.00

*Weed Management in Grass Seed Production*, EM 8788 (published 2001, reprinted 2002). \$5.50

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