

Kentucky Bluegrass Seed Production in Central Oregon

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Kentucky bluegrass (*Poa pratensis* L.) is a widely used turfgrass in many temperate-climate areas of the United States and around the world. It is popular because it is an adaptable, long-lived perennial that forms a medium-textured, dark green turf with good leaf density and aggressive sod-forming rhizomes.

Kentucky bluegrass also is included in pasture mixes, particularly in the eastern United States. However, its low midseason forage yield, aggressiveness in mixtures, and high nitrogen requirements limit its use as a forage grass.

Jefferson County, north of Bend and Redmond in central Oregon, is an important Kentucky bluegrass seed production area. 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. Other Kentucky bluegrass seed production areas in Oregon are the Grande Ronde Valley near La Grande in northeast Oregon and near Hermiston in the southern portion of the Columbia Basin.

Climate and soils

Central Oregon is noted for its dry climate, characterized by warm, dry summers and cold, dry winters. Elevation of the Kentucky 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.

Stand establishment

Stand establishment and first-year management are critical for bluegrass seed production. With good crop rotation and proper nutrient, water, and pest management, a field can remain productive for 4 to 6 years.

Field selection

Choose ground for grass seed production 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



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the soil pH is between 6.2 and 6.8, but the crop can tolerate a pH from 5.4 to 7.3.

Growers prefer to plant Kentucky bluegrass into a fallow field or following wheat. Most other crops in the area are harvested too late in the season to provide proper timing for ground preparation and planting.

When planting after wheat, the stubble usually is burned because of the short time between harvest and planting. You then can plant the grass without additional working of the ground. Bluegrass also can be planted directly into stubble following peppermint. However, if planting after garlic, chisel and work the ground to form a firmly packed, smooth seedbed before planting.

Seed selection

Because postharvest dormancy can occur, do not use current-year seed of varieties known to have a dormancy problem.

Most of the Kentucky bluegrass varieties grown in central Oregon are proprietary. Seed is grown under contract for one of 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.

A small percentage of “common” Kentucky bluegrass seed grown in central Oregon is for sale on the open market. In this case, the grower takes all of the risk associated with fluctuating seed prices and finding a buyer for the seed.

Preplant nutrient and lime considerations

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

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. For the life of a Kentucky

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 at planting. Apply 40 lb nitrogen (N)/acre at planting.

Planting

In central Oregon, plant Kentucky bluegrass between August 1 and September 1, with August 20 as the target cutoff date. This timing provides adequate soil temperature for rapid germination, which generally takes 12 to 21 days. Germination is slowed when soil temperatures drop below 42°F. If planting is delayed until after September 10, 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 Kentucky bluegrass based on Olsen or bicarbonate soil test.

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

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

Potassium soil test value (ppm)	Potassium fertilizer to apply as K ₂ O (lb/a)
0 to 100	50 to 150
Above 100	0

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 for sprinkler irrigation or as double rows on 30-inch beds for 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 15 inches generally are applied in six irrigations 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 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. Weeds that germinate following planting, but before the crop emerges, can be controlled 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 the beds to maintain good contact between soil and roots.

Irrigation

All Kentucky bluegrass seed in central Oregon is produced on irrigated ground. The

crop is grown under either sprinkler or furrow irrigation. 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 24 to 30 inches of water. This amount generally is applied as four or five irrigations during spring and early summer prior to harvest, followed by four or five irrigations after harvest.

Fertilizer requirements

Apply phosphorus, potassium, and amendments based on a soil test. If a soil test indicates the need for lime, potassium, or phosphorus, apply these materials in the fall.

For established stands, apply nitrogen in the fall to stimulate fertile tiller production. Apply a small amount of nitrogen, 15 to 30 lb/acre, after burning. Apply the remainder of the annual application, approximately 160 lb/acre, in late October or early November.

Annual fall applications of 10 to 15 lb sulfur/acre should be sufficient except where soil is less than 1 foot deep and very sandy. Sulfur can be leached below the rooting zone by irrigation water. In these situations, 30 to 45 lb sulfur/acre may be needed.

Approximately 100 lb potassium/acre is removed annually from a Kentucky bluegrass field in the straw and seed. Monitor soil test potassium. Soil test K should remain above 100 ppm. Apply 50 to 150 lb K_2O /acre if soil test potassium is below 100 ppm.

Apply phosphorus using Table 3.

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

Bicarbonate or Olsen soil test (ppm)	Phosphorus fertilizer to apply (lb 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

Weed control

Apply a broad-spectrum herbicide in the fall with 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 three important diseases that affect Kentucky bluegrass seed production in central Oregon are powdery mildew (*Erysiphe graminis*), stripe rust (*Puccinia striiformis*), and ergot (*Claviceps purpurea*). Fungicides can be applied for control of these diseases. (See the current edition of the *Pacific Northwest Plant Disease Management Handbook* for current recommendations.)

Powdery mildew often appears during early spring and is favored by cool, humid, cloudy conditions with temperatures between 59° and 70°F. 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.

Stripe rust usually appears later in the spring and reaches treatable levels less frequently. However, the disease can develop rapidly when free moisture (rain or dew) occurs and temperatures are between 70° and 75°F. Pustules containing yellow to orange-yellow spores form oblong stripes on the leaves' upper surface or on stems and leaf sheaths.

Ergot infects flowers during blossom and replaces the seed with hard, elongated, black sclerotia. The sclerotia contaminate the seed crop or drop to the ground to reinfect the crop the following spring. Infected flowers exude a sticky combination of plant sap and ergot spores referred to as “honeydew,” which makes harvest more difficult. The degree of infection depends on the presence of free moisture during flowering as well as on crop susceptibility. Varieties that flower for a longer period tend to be more susceptible than those with a shorter flowering period.

Insect control

The major insect pest in Kentucky bluegrass is the winter grain mite (*Penthaleus major*). About half of central Oregon Kentucky bluegrass fields are treated each year during the winter. Sod webworm (*Chrysoteuchia topiaria*), thrips (*Thripidae*), and aphids (*Aphididae*) occasionally reach treatable levels. Apply insecticides as needed to control these pests. (See the current edition of the *Pacific Northwest Insect Management Handbook* for current recommendations.)

Adult winter grain mites are dark blue to black, with distinctive red legs and mouthparts. They are different from most other pest mites in that the largest populations occur during winter and early spring. Infested fields have a grayish to silvery appearance caused by removal of plant sap and chlorophyll from leaves by the feeding mites. Populations tend to increase with the age of the stand, so older fields are more likely to be affected.

Sod webworm larvae feed on plant crowns, reducing plant populations. If infestations are left untreated, sod webworms can completely destroy areas of the stand. Targeting the small, slender adult moths when they begin their flight during late June is the best method of controlling this pest.

Thrips feeding on seed heads can cause them to turn white, a condition often referred to as “silver top.” However, other factors also may cause silver top conditions.

The most common aphid found in grass fields is the English grain aphid. It usually is not considered an economic pest on grass seed.

Harvest

The dry, warm summers of central Oregon provide excellent conditions for maturation and harvest of Kentucky bluegrass seed. Swathing usually begins about the first of July, when seed moisture reaches 28 percent. Swathing too late may result in seed shatter, reducing the quantity of harvestable seed. Cutting too early stops growth before many of the seeds are fully mature.

The grass is allowed to dry in windrows before combining to ensure 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 seed yields for Kentucky bluegrass grown in central Oregon are about 1,000 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. Kentucky bluegrass is somewhat unusual in that it has “cotton” or lint on the seed, which needs to 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. The large majority of Kentucky 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 field 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. If open field burning is not totally successful, growers complete the job with a large propane flamer pulled behind a tractor.

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.

Several residue management approaches have been evaluated in large multiacre plots in commercial fields. 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 Kentucky 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

Rough Bluegrass Seed Production in Central Oregon, EM 8806 (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).

To order copies of the following publications, send the complete title and series number, along with a check or money order for the amount listed (payable to Oregon State University), to:

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

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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