



Crop Science Report

RESEARCH/EXTENSION

PERENNIAL RYEGRASS SEED PRODUCTION

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Adaptation and Use

Perennial ryegrass is the most extensively grown perennial grass seed crop grown in Oregon. It originated in Asia Minor and Northern Africa and is now widely grown in Europe and North America as a very desirable forage crop. It is adapted to cool, moist regions with mild winters and heavy soils of medium to high fertility. It is very palatable and nutritious as hay and is tolerant of heavy grazing as a pasture crop. It is normally considered to be a short-lived perennial, but will survive for many years when not subjected to extremes of temperature or to disease.

In addition to forage uses, perennial ryegrass varieties have been developed for use in lawn seed mixtures and for conservation and beautification plantings. Fine-leaf varieties have been developed that are extremely well adapted. Oregon acreage has increased during the past several years, reaching a maximum of 68,000 in 1980. (See Table 1.)

TABLE 1

OREGON PERENNIAL RYEGRASS ACREAGE AND PRODUCTION

<u>Year</u>	<u>Acres</u>	<u>Production</u>
1971	37,150	40,300,000
1972	41,600	33,680,000
1973	48,200	33,500,000
1974	53,000	42,400,000
1975	48,000	43,200,000
1976	44,000	35,200,000
1977	44,000	39,600,000
1978	60,000	45,000,000
1979	60,000	49,600,000
1980	68,000	63,200,000

1/ OSU Extension Agronomist and Linn County Extension Agent, respectively.

Varieties

Many improved varieties of perennial ryegrass have been developed in the U.S. and Europe for specific uses and markets. Varieties can generally be divided into categories such as diploids (Linn, Barenzna), tetraploids (Massa, Reveille, Taptoe), and fine leaf (Manhattan, Pennfine, Pelo). More than 38 public and private varieties are listed on the Oregon certification list with many others eligible for certification under the OECD certification program.

Perennial ryegrass seed yields vary considerably according to growing conditions, harvest conditions, and variety. Commercial grower yields average from 400 to 1500 pounds of seed per acre depending on variety. As a rule, the early and mid-season varieties are the heavier seed producers. Examples of seed yields expected under the Oregon conditions are shown in Table 2.

TABLE 2
PERENNIAL RYEGRASS SEED YIELDS 2/

<u>Variety</u>	<u>Average Seed Yield ^{3/}</u> lbs/acre	<u>Relative Maturity</u>
Linn	1200	early
RVP hay type	1179	early
NK100	859	mid
Viris	1033	mid
Norlea	733	late
RVP pasture type	423	late

Fields to be planted to perennial ryegrass for seed production should be selected to protect varietal identity and be free of weed contamination. Cultivation standards state that a field must not have grown a perennial ryegrass variety for 2 years and must be isolated from another perennial ryegrass variety by 165 feet if the field is more than 5 acres or 330 feet if less than 5 acres.

Soil should be of adequate depth to permit root development. The soil should be moderately to well drained, although much of the perennial ryegrass grown in the Willamette Valley is on poorly drained soils. If soil pH is below 5.5, lime should be applied and incorporated into the soil before planting.

Planting and Fertilization

It is important to prepare a fine, firm seedbed that will allow close contact between the ryegrass seed and surrounding soil particles. Planting is frequently in May or June following a period of tillage or fallow to destroy weeds. Late-August to early-October seedings are also used for seed and forage plantings. Particularly troublesome perennial weeds such as bentgrass and meadow foxtail should be controlled before plantings are made.

2/ OSU trials reported EXT/ACS 2

3/ 1966-68, 3-year average seed yields

A fall planting using a one-inch-wide band of activated charcoal layered directly over the seeded row at planting time has proven to be quite successful for weed control. After seeding and applying the activated charcoal, Diuron (or similar herbicide) at a rate of 3 pounds per acre is sprayed over the entire field. The herbicide is absorbed by the charcoal directly over the seeded row and the grass seed emerges unharmed while seeds germinating between the rows are controlled.

The use of a chemical seedbed is another technique of establishing a weed-free crop. A seedbed is prepared in the fall before the heavy rains. Seeds on the soil surface germinate in November and early December. Herbicides such as IPC + 2,4-D and/or Paraquat are used to eliminate these plants. The crop is then planted in late February or March without additional soil tillage.

Minimum Tillage

Perennial ryegrass seed fields are often established using minimum tillage practices. Following the harvest of a winter cereal, the straw is burned and the grass seed crop is seeded in the ash using the charcoal band planting method. Volunteer cereal plants can be selectively controlled with Nortron.

Perennial ryegrass fields are frequently limited to 4 or 5 harvest years by the terms of the production contract. During the production years, weeds have been controlled. Often the same variety of perennial ryegrass is re-established by burning the harvest residue followed by spraying the existing crop with Roundup after regrowth is large enough to insure control. The seed is then planted with a heavy no-till drill or power drill.

Seeding Rate

Linn perennial ryegrass has been occasionally seeded at rates of 20-25 lbs per acre in 6" drill rows to provide a highly competitive seedling stand. However, most perennial ryegrass crops are seeded at 3-5 lbs per acre in 12" rows. This planting rate with vigorous high viability seed will provide ample seedlings for a good seed crop (Table 3).

TABLE 3

NUMBER OF PERENNIAL RYEGRASS SEEDS PER FOOT OF DRILL ROW

<u>Seeding Rate</u> lbs/acre	<u>Seeds per Foot 4/</u>	
	6" row	12" row
3	8	17
5	14	28
10	28	57
15	43	85
20	57	113
25	71	142

4/ Based on 247,000 seeds per pound.

Nitrogen is essential to good growth and seed production. 20-40 pounds of nitrogen banded just below the seed at planting will increase seedling vigor and capability of crop to compete with weeds. On established stands an autumn application of 30-40 pounds of nitrogen per acre (higher rates if fields are grazed during winter months) with an additional application of 40-50 pounds applied in March and again in April are adequate for seed production. The use of higher rates of spring nitrogen on fertile soils will cause early lodging and reduce seed yields.

Soil tests have shown that in many Willamette Valley soils phosphorus is a limiting factor. On a new seeding, 30-40 pounds of P₂O₅ should be included in the fertilizer band under the seedling and 30-60 pounds broadcast in the fall on established fields, depending on the soil test value for phosphorus.

Soils in western Oregon require an application of 7 to 15 pounds of sulfur per year for ryegrass seed production.

Soil levels of phosphorus and potassium will vary. Applications should be based on a soil test. (See Table 4.)

TABLE 4
PHOSPHORUS AND
POTASSIUM APPLICATIONS

<u>Soil Test</u> (ppm)	<u>Applications</u> (lbs/acre)
<u>Phosphorus</u>	<u>P₂O₅</u>
0-15	40-60
15-30	30-40
Over 30	None
<u>Potassium</u>	<u>K₂O</u>
0-100	60
Over 100	None

Weed Control

High quality, weed-free seed crops require extra effort in herbicide application and spot treatment. Common weed problems in perennial ryegrass are annual ryegrass, rattail fescue, annual bluegrass, meadow foxtail, Canada thistle, sheep sorrel, buckhorn, St. Johnswort, quackgrass, rough stalk bluegrass and mannagrass.

Broadleaf weed control. Apply in March or early April. Use 0.5 to 0.75 pound per acre. Where sheep sorrel is a problem, add 1/8 to 1/4 pound Banvel D. New seedlings should have 4-5 leaves before spraying.

Annual ryegrass and annual bluegrass control. Apply in early fall, usually in October. Atrazine at 1 1/2 to 2 pounds per acre before annual ryegrass emergence. Atrazine should not be used on new seedlings or for more than

two successive years on the same field. On established fields at least 18 months old, you may apply IPC or CIPC after the fall rains have started germination of annual grass seed and prior to November 1. CIPC at 1½ to 2 pounds per acre provides control over a longer time and will control later germinating plants than IPC. IPC at 3 pounds per acre is quite effective on emerging annual bluegrass seedlings.

Pasturing Seed Fields

Perennial ryegrass is frequently pastured by sheep in the late fall until late March without reducing seed yield. Later pasturing is hazardous because the animals may damage the growing point of the developing seed stalk, causing a loss of seed production. Because of the possibility of spread of weed seed to the grass seed field, the sheep must not have come from weedy fields before turning them out into the seed fields. Sheep numbers should be managed to minimize trampling.

Harvesting

The proper method and timing of the harvest operation is essential to the production of the maximum quantity of high quality seed. The seed is cut and placed in windrows when the seed moisture in the standing crop is 25-40% (Klein and Harmond 1971). Under normal weather conditions, the seed will dry in the windrow to a 12% moisture level in 7-10 days. The seed can be safely threshed and stored in bulk.

Moisture determinations should be made by the oven dry method. Electrical resistance meters must be specially designed for chaffy seeds to be accurate.

References

- Gardner, Hugh E. et al. 1969. Oregon State University fertilizer guide for perennial ryegrass seed. FG 46. Oregon State University Extension Service.
- Klein, Leonard, and Jesse Harmond. 1971. Seed moisture--a harvest timing index for maximum yields. Trans. ASAE 14:124-126.
- Whitesides, Ralph E. 1981. Oregon Weed Control Handbook. Crop Science Department. Oregon State University.