FERTILIZERguide
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Annual Ryegrass

(Western Oregon)

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Annual ryegrass varieties such as 'Gulf' are grown for seed on poorly drained soils of the south Willamette Valley, including Dayton, Concord, and Bashaw. Recommendations in this guide are based on research throughout this production area.

Management practices from seedbed preparation to harvest must be performed in an appropriate and timely manner for optimum annual ryegrass seed yield. Fertilizer is not a substitute for failure to control insects, diseases, or weeds. Excessive stand density, low soil pH, and/or poor drainage can be significant limiting factors in obtaining high seed yields. Increasing fertilizer rates or adding nutrients already in adequate supply will not correct these limiting factors.

Annual ryegrass can be established by planting in a prepared seedbed, by no-till methods, or with volunteer seedlings from the previous year's crop. Recommendations in this guide apply to all stand establishment methods. Volunteer stand establishment is recommended when soil pH is above 5.3 and soil test levels are adequate (see Tables 1 and 2). Do not use volunteer seedlings for stand establishment if soil pH is below 4.8.

Sample and analyze soil to estimate the need for lime, phosphorus, potassium, calcium, and magnesium. Annual soil tests are not necessary. Sampling and testing soil every second or third year is sufficient for fields continuously cropped with annual ryegrass. For more information, consult the publications about soil sampling and testing listed at the end of this publication. Or, contact your local office of the Oregon State University Extension Service.

Nitrogen (N)

Burning, plowing down, or chopping straw for a volunteer stand have little short-term effect on nitrogen supply to an annual ryegrass seed crop.

The use of nitrogen fertilizer beyond crop need has multiple costs and no benefit. The first cost is the additional expense of the nutrient without an increased seed yield. The second is the cost of lime needed to raise the pH of soil acidified by N fertilizer. (Urea and other ammoniacal N sources acidify soil approximately 0.1 pH unit/100 lb N/acre per year.)

Fall application

Apply 20 lb N/acre when seed is planted. Research has not shown fall N applications to increase seed yield. However, fall N can increase vigor and growth in grazed fields and might aid in stand establishment before winter.

Spring application

Apply nitrogen to annual ryegrass in the spring at a rate of 100 to 140 lb/acre. On poorly drained soils, use the lower rate (100 lb N/acre). Nitrogen rates higher than 150 lb/acre have not been shown to increase seed yield but have been shown to increase lime need.

Apply N in mid-March to mid-April in nongrazed fields. It can be applied in a single or split application. Application uniformity is one reason to use split spring N applications. However, no increase in seed yield was obtained from split applications in research trials.

Delay N application until no standing water remains. Annual ryegrass fields often remain wet late into spring and occasionally into summer. A single application after fields have dried is an option. Nitrogen applied to annual ryegrass where soils are saturated and plants show chlorosis will not "green up" the yellow plants. Adequate N is present, but waterlogged soils prevent its use.

In fields that are grazed, apply spring nitrogen as soon as sheep are removed from the field.

Phosphorus (P)

Phosphorus applications should be based on a soil test (see Table 1). Band phosphorus near the seed at planting. Since banding at planting is not possible with volunteer/row-spray establishment, do not use this method of establishment when the soil test for P is below 25 ppm.

Table 1.—Phosphorus application rates based on soil test.

If soil test for P is (ppm)	Apply this amount of P_2O_5 (lb/acre)
0–15	40–60
16–25	30–40
over 25	0

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Potassium (K)

Use a soil test to determine soil potassium status (see Table 2). Potassium can be applied either in the fall or spring. When potassium is placed with the seed at planting in the fall, rates should not exceed 30 to 40 lb K_2O/acre.

Table 2.—Potassium application rates based on soil test.

If soil test for K is (ppm)	Apply this amount of K_2O (lb/acre)
0–100	30–60
100–150	0–30
over 150	0

Sulfur (S)

Soil testing for sulfur is not recommended. Sulfur rates of 10 to 15 lb/acre are adequate for annual ryegrass production. Sulfur can be applied in the spring or fall. Spring applications are recommended.

Calcium and magnesium (Ca and Mg)

Calcium and magnesium are essential plant nutrients that usually exist in the soil in adequate quantities for annual ryegrass seed production when soil pH is above 5.5. For acidic soil with less than 0.5 meq/100 g soil (60 ppm) magnesium, apply 1 ton dolomite/acre. Dolomite and limestone have approximately the same capability to neutralize soil acidity and increase soil pH.

An alternative to dolomite is to broadcast 30 lb Mg/acre. The form or timing for Mg applications is not critical.

Soil test Ca below 5 meq/100 g (1,000 ppm), especially below 3 meq (600 ppm), can limit annual ryegrass growth. When the soil pH is above 5.5, soil test Ca will be greater than 5 meq/100 g—usually 10 to 15 meq/100 g for Bashaw soil and 8 to 12 meq for Dayton soil.

Micronutrients (B, Zn)

Seed yield increases from micronutrient applications have not been documented in Oregon. Although soil test boron (B) levels normally are very low (< 0.2 ppm) and yield increases are measured from B application to other crops, seed yield increases from B application to grass seed crops are inconsistent. Tissue and soil test B levels will increase with soil boron applications. A single application of 1 lb B/acre will increase tissue B for several years.

Soil test levels for zinc (0.6 ppm) usually are adequate.

Lime and pH

Proper soil pH is extremely critical during stand establishment. Stand failure can occur if soil pH is below 4.8. Avoid volunteer and no-till methods of establishment on fields with soil pH below 4.8.

If soil pH is less than 5.5, lime is recommended. Lime rate is based on an SMP buffer test (Table 3).

Table 3.—SMP lime requirement table.

	Amount of 100-score lime needed to raise pH of surface 6 inches of soil to the following pH* (ton/acre)	
SMP buffer	**5.6**	**6.0**
4.8–5.0	6–5 **	8–7**
5.1–5.3	5–4	7–6
5.4–5.6	4–3	6–4
5.7–5.9	3–2	4–3
6.0–6.2	2–1	3–2
6.3–6.5	0	2–1
6.6	0	1

*The combination of calcium carbonate equivalent, moisture, and fineness determines lime score. Lime application rates are adjusted for score. Rates in Table 3 are based on 100-score lime. Lime score is legally required for all materials marketed as "liming materials" in Oregon. For more information about lime score and liming materials, see FG 52, *Fertilizer and Lime Materials Fertilizer Guide*.

**The higher lime rate is required for the lower buffer test reading.

Incorporate lime several weeks before planting. If the application rate is greater than 3 ton/acre, thoroughly mix the lime into the soil. Do not exceed 5 ton/acre in a single lime application even if the SMP lime requirement table recommends a higher rate. Test soil for pH and SMP after the first application, and apply the additional lime before planting the next crop.

For more information

A List of Analytical Laboratories Serving Oregon, EM 8677 (revised 2001).

Soil Test Interpretation Guide, EC 1478 (1996).

Fertilizer and Lime Materials Fertilizer Guide, FG 52-E (revised 1990).

These publications may be viewed or downloaded from the Web. Visit the online Publications and Videos catalog (**http://eesc.oregonstate.edu**). Copies of EM 8677 and EC 1478 also are available from OSU Extension and Experiment Station Communications. For prices and ordering information, visit the online catalog or contact us by fax (541-737-0817), phone (541-737-2513), or e-mail (puborders@oregonstate.edu).