

Grass Pastures

These fertilizer guidelines have been developed by the University of Idaho and Washington State University based on relationships obtained from soil tests and crop yield response. The suggested fertilizer rates are designed to produce above average yields if other factors are not limiting production. Thus, these fertilizer guidelines assume good management.

The suggested fertilizer rates will be accurate for your field provided that (1) the soil samples are properly taken and are representative of the field to be fertilized, and (2) the crop and fertilizer history supplied is complete and accurate. (For help in obtaining a proper soil sample, see BUL 704, *Soil Sampling*, or consult your county extension educator.)

Harvested grasses remove large quantities of nutrients from the soil. Incorporate fertilizer into the soil as the seedbed is prepared, and apply additional amounts periodically over the life of the stand to maintain optimum nutrient levels.

Established Grass Pastures

Nitrogen (N), phosphorus (P), potassium (K), and sulfur (S) are nutrients essential for plant growth, but are often deficient in northern Idaho grass pastures. Conversely, calcium (Ca), boron (B), copper (Cu), chlorine (Cl), iron (Fe), manganese (Mn), molybdenum (Mo), and zinc (Zn) deficiencies are rare in northern Idaho grass pastures.

Animals foraging for grass in the spring may suffer grass tetany caused by low levels of soil magnesium (Mg).

Nitrogen – Soil sampling for N fertilizer recommendations is generally not practical; available N is mobile in soils and can be leached beyond the root zone with spring precipitation or irrigation.

Grass pastures will usually respond to N applications in northern Idaho. Table 1 lists suggested N application rates based on annual precipitation. Highest recommended N application rates are on irrigated grass pastures. These suggested rates are yearly requirements and should be split into at least two applications for nonirrigated and three to five applications for irrigated grass pastures.

Table 1. Nitrogen fertilizer rates for grass pastures based on annual precipitation.

| Annual precipitation (inches) | N application (lb/acre) |
|-------------------------------|-------------------------|
| Less than 20 | 80 to 110 |
| 20 to 22 | 100 to 125 |
| 22 to 25 | 120 to 140 |
| More than 25 | 135 to 150 |
| Irrigated pastures | 140 to 170 |

On nonirrigated land, make one of the two recommended applications as early in the spring as possible (February to April) and the second application in early June. On irrigated grass pastures, apply the first of the three to five applications as early in spring as possible and make subsequent applications every 5 to 7 weeks.

Phosphorus – Conduct a soil test to assess the P status of grass pastures. Table 2 lists P application rates required for optimum forage production, as determined by a soil test. On established stands, fall broadcast applications of P fertilizers are more effective than spring applications. On established stands, you may apply enough P to last for 2 or 3 years.

Potassium – Grass pastures remove large quantities of K from the soil. On established stands, applying K as a fall topdress application is most beneficial. Most northern Idaho soils contain enough K for optimum forage production, but deficiencies can occur in localized areas. Use a soil test to determine K needs (Table 3).

Sulfur – Northern Idaho soils are often S deficient, causing yield and quality reductions. When an S deficiency occurs, the entire plant yellows early in the growing season. This symptom is indistinguishable from an N deficiency.

Sulfur can be applied as gypsum or with liquid or dry fertilizer materials containing S. Use materials containing SO₄. Since S is mobile and subject to leaching in soils, apply S early in the spring. Do not apply S in the fall. Sulfur needs of grass pastures based on a soil test are shown in Table 4.

Magnesium (Grass Tetany) – Grass tetany is a cattle and sheep disorder caused by low levels of Mg often resulting from low Mg in their forage. Grass tetany occurs when lush grass pastures grow rapidly in areas with cool, wet springs.

Low Mg levels are found in cool season grasses, such as bluegrass, brome, fescue, orchardgrass, and timothy. Under cool, wet spring conditions, these grasses contain such low Mg levels that grazing animals may not obtain enough Mg to meet their nutritional requirements.

Supplement or improved grass pastures are prone to developing low Mg levels in the spring by using one or more of the following practices:

- Add legumes, such as ladino and alsike clovers or alfalfa.
- Fertilize pastures with Mg (e.g., dolomitic limestone or potassium-magnesium sulfate).
- Avoid heavy N and K applications.
- Supplement animal rations or water with Mg.

Micronutrients – Grass pastures have never been observed to respond to micronutrient applications in northern Idaho. If you are in doubt, test the soil and consult the extension educator in your county.

Lime – Test lime applications on highly acid soils (soil pH less than 5.1) to determine if there's an economical response. When needed, apply lime at a rate of 1 to 2 tons per acre, and where possible, mix it well into the soil. Surface applications will work but will be slow to react. Fewer than 5 percent of the grass pastures in northern Idaho have soil pH values less than 5.1

New Grass Seedings

Consider soil fertility needs before establishing new pastures. Both P and K are particularly important as these nutrients are immobile in the soil and are more available when worked into the seedbed before seeding.

At establishment, work 60 pounds of P₂O₅ per acre and appropriate amounts of K (see Table 3) into the seedbed. Add S when a soil test indicates a need (see Table 4). Sulfur does not need to be incorporated into the seedbed because it is mobile in soils and will reach plant root zones with normal precipitation or irrigation.

Adding 20 to 30 pounds of N per acre at seeding will help establish a pasture. Add 50 percent of the recommended N rate listed in Table 1 during the first season.

General Comments

1. P, S, and N are elements most often needed for grass pasture production in

northern Idaho. In some situations, applying K and lime will also improve plant growth.

2. Since N (nitrate) and S (sulfate) are mobile in soils, make fertilizer applications of these two nutrients in the spring. Never apply N or S in the fall.
3. Since P and K are relatively immobile in soils, work these nutrients into the seedbed before seeding.
4. Grass tetany can occur in pure grass pastures during cool, wet springs in northern Idaho counties because of low Mg forage levels.
5. Grasses grow poorly in soils with pH values less than 5.1. In such situations, you may need to apply lime to correct soil acidity. Apply and incorporate lime into the soil before the pasture is established.
6. When seeding, select the best adapted grass and grass varieties for your area.
7. S and N fertilization increase forage protein content, greatly improving its quality.



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