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Pasture Fertility Recommendations

After we receive soil tests back from the lab, the next step is developing a plan for pasture fertility. The main nutrients to consider are nitrogen, phosphorus, potassium, and sometimes sulfur.

Before we dive into fertility recommendations, we need to remember that fertilization differs depending on the pasture we are dealing with. Native pastures historically developed under limited fertility, where precipitation was the largest driver of production. For fields where precipitation isn't limited, through natural rainfall, irrigation, or species present, fertility can provide a much bigger boost to production. Before planning a fertility program, look at what is limiting your production, and plan accordingly. Precipitation limited pastures may not be worth the investment of fertility.

The first fertility factor we need to look at is pH. pH can play a big role plant health and nutrient availability. A majority of forage crops grow best with a pH around 6.0. Mixtures heavy in legumes tend to prefer a bit higher pH around 6.5. An application of lime is the tried and true route to decrease pH. As with fertility native plants can often handle pH ranges outside of recommendation, so evaluate before taking action.

While nitrogen is the nutrient that typically sees the greatest return on investment, right now we can't do much more than plan. Most nitrogen fertilizers are very mobile, so to ensure up take during the growing season, spring applications are preferred. We can dive more into that at a later time, but know that precipitation, yield potential, and percentage of the stand that is legumes all impact the amount of nitrogen we need to apply.

Phosphorus plays a critical role in many plant processes, including root development, N-fixing ability in legumes, plant strength, and a central role in the photosynthetic process. Research in Nebraska and other states has shown that the combined effect of nitrogen and phosphorus fertilization often produces higher yields than application of either nutrient alone, especially when phosphorus is low.

In addition to soil test results, phosphorus application will depend on whether or not the pasture is irrigated and how many legumes are present. If legumes make up 25% or more of the pasture's production, phosphate should be applied at 50% more than for grass alone.

Soil phosphorus can be tested in three ways, Bray, Mechlich, and Olson. All three tests give results in parts per million (ppm), but values for the Bray or Mechlich test will differ from those of the Olson. It is important to know what test you are using before making a fertilization plan. For the Bray and Mechlich tests, values over 25 ppm do not need any phosphate applied for both dryland and irrigated pastures.

- 0-5 ppm apply 60 lb. P_2O_5 /acre for irrigated or 40 lb. P_2O_5 /acre for dryland
- 6-15 ppm apply 40 lb. P_2O_5 /acre for irrigated or 20 lb. P_2O_5 /acre for dryland
- 16-25 ppm apply 20 lb. P_2O_5 /acre for irrigated or 10 lb. P_2O_5 /acre for dryland

For the Olson test:

- 0-3 ppm apply 60 lb. P_2O_5 /acre for irrigated or 40 lb. P_2O_5 /acre for dryland
- 4-10 ppm apply 40 lb. P_2O_5 /acre for irrigated or 20 lb. P_2O_5 /acre for dryland
- 11-17 ppm apply 20 lb. P_2O_5 /acre for irrigated or 10 lb. P_2O_5 /acre for dryland

Values over 17 ppm for the Olson test are considered high and do not need any additional phosphorus fertilization.

Phosphorus is fairly immobile, so fertilizing can be done yearly or every other year, as long as applications match recommendations for the length of time desired. The Nebguide G1977: Fertilizing Grass Pastures and Hayland is a great resource if you want more information, and as always, for additional help or information, contact your local extension office.

Typically soils in Nebraska have relatively high naturally occurring levels of potassium in the soil, but if soil tests show you are low, fertilization can boost yield and improve plant health, especially for legumes. For irrigated pastures,

- 4-40 ppm apply 90 lb. K/acre for grass pastures or 120 lb. K/acre for grass-legume
- 41-75 ppm apply 60 lb. K/acre for grass pastures or 80 lb. K/acre for grass-legume
- 76-125 ppm apply 30 lb. K/acre for grass pastures or 40 lb. K/acre for grass-legume
- Over 125 ppm tests don't require additional fertilization

The last nutrient to look at is sulfur. In irrigated, light textured soils with low organic matter, sulfur may be limiting. Irrigation water can actually be a good indicator of sulfur availability. Water under 6 ppm needs fertilization. Fertilization can then be done at a rate of 30-40 lbs. per year or 100 lb. before seeding once every three years.

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