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## G78-406 Fertilizing Grass Pastures and Haylands

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## Fertilizing Grass Pastures and Haylands

This article discusses managing nitrogen and using phosphorus and other nutrients for grass pastures and hay-lands.

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Pastures are important to many livestock producers in Nebraska, but production from many pastures is low. Research shows that fertilizing, weed control and rotational grazing increases grass production from pastures, resulting in greater livestock production.

Fertilizing and controlling weeds on haylands also increases production. Since more plant material is removed when land is managed as hayland, more attention needs to be paid to fertilization.

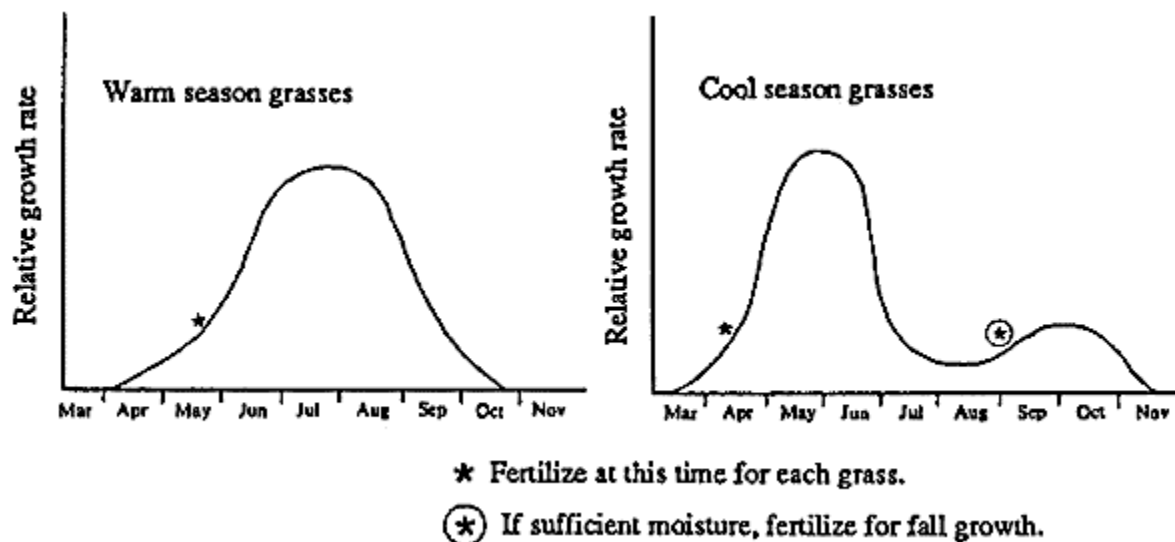
In addition to increasing grass production, fertilizing can improve forage quality. On-the-farm demonstrations show that fertilizing increases the amount of beef produced per acre, even in a dry year. This increased production is primarily a result of added carrying capacity, rather than an increase in average daily gain.

### Nitrogen Management

Apply nitrogen (N) fertilizer yearly to grass pastures and haylands for profitable livestock production. Nitrogen improves both grass yield and protein content. It also improves the vigor of grass plants, which can thicken stands and reduce weed invasion. When adequate soil moisture is present, economical rates of nitrogen more than double forage production.

Note that fertilization with nitrogen is most economical where weeds have been controlled and additional grass growth is needed for livestock. If additional forage can be purchased or pasture rented at a lower cost than fertilizer, these alternatives may be better choices.

Nitrogen fertilizer applied just prior to the period of most rapid grass growth assures that the applied nitrogen is available to the plants. For cool season grasses, such as smooth brome and wheatgrasses, maximum growth occurs in mid to late spring (*Figure 1*). These grasses grow very little in July and August. A small amount of growth takes place in late August and September if soil moisture is adequate and temperatures are favorable. Fall growth, however, is only a small portion of the total growth for the entire growing season.



**Figure 1. Seasonal distribution of forage production.**

Nitrogen can be applied in either fall or spring on cool season grasses. The risk of losing applied nitrogen by either leaching or run-off is reduced if it is applied in early spring. Therefore, spring applications are preferred.

Split applications of nitrogen for production of cool season grasses under dryland conditions are useful only when more than 100 lbs of nitrogen per acre are to be applied during the growing season, and good growing conditions are anticipated during September and October.

Apply fertilizer in mid to late May to pastures and haylands containing warm season grasses, such as switchgrass and the bluestems. Do not fertilize warm season grasses in early spring in order to reduce fertilizer losses and to avoid stimulating growth of cool season weeds. Begin application in mid-May in southern Nebraska and delay until late May in the northern portion of the state.

Some pastures and haylands contain a mixture of both cool and warm season grasses. Fertilizing these pastures with nitrogen in early spring often stimulates the cool season grasses which crowd out any warm season grasses present. To maintain warm season grasses in such a mixture, fertilize in late May. It also may be necessary to apply herbicides to suppress the cool season grasses.

Liquid and dry forms of nitrogen fertilizer are equally effective for increasing pasture production when certain precautions are taken. Do not apply urea nitrogen to pasture or haylands on calcareous soils when air temperatures are above 85 °F. Nitrogen losses due to ammonia volatilization can be high under these conditions. Since urea supplies more than half the nitrogen in solution nitrogen fertilizers, use similar care with their use.

Pasture production is highly dependent on rainfall, so nitrogen recommendations are adjusted

accordingly. Suggested application rates for nitrogen in four large regions of Nebraska are shown in *Figure 2*. The lower rates listed for each region are the minimum amounts recommended for average conditions and management situations. Even in years when summer rainfall is below normal, the use of 80 lb of nitrogen per acre usually will increase production economically on pastures and haylands in eastern and northeastern Nebraska. Use the higher rates listed for each zone when there is a full profile of subsoil moisture at the start of the growing season.



**Figure 2. The zones used in making nitrogen recommendations for pastures in Nebraska.**

Fertilizing upland, native range in Zones III and IV generally is not economical, especially where soils are sandy. Apply the suggested rates of nitrogen to subirrigation sites in these zones.

Table I. Nitrogen recommendations for pastures and haylands in Nebraska				
	Pounds of nitrogen to apply per acre*			
	Cool-season grasses		Warm-season grasses	
Zone	Pasture	Hayland	Pasture	Hayland
I	80-120	100-150	60-90	75-100
II	50-80	60-90	40-75	50-80
III	40-60	50-75	25-50	40-60
IV	20-40	30-60	20-40	30-50
*Use the higher rate when a full profile of subsoil moisture is present.				

## Phosphorus Use

In addition to nitrogen, phosphorus fertilizer also is needed on many pastures in Nebraska. Research in eastern and northeastern Nebraska shows that the combination of nitrogen and phosphorus frequently produces higher yields than the application of either nutrient alone.

Phosphorus recommendations are based on the availability of phosphorus in the soil as measured by a soil test. Phosphorus recommendations for grasslands are listed in *Table II*. If legumes make up one-fourth or more of the stand, apply 50 percent more phosphate than for grass alone. Phosphate fertilizers can be applied with the nitrogen in either spring or fall.

**Table II. Phosphorus recommendations for grasslands in Nebraska**

Relative Index Value	Soil Test Levels		Phosphorus Rate
	Bray & Kurtz #1	Olsen P (Na HCO <sub>3</sub> )	
	-----ppm-----		lbs P <sub>2</sub> O <sub>5</sub> /A
Very Low	0-5	0-3	40
Low	6-15	4-7	20
Medium	16-25	8-14	10
High	25+	15+	0

Repeated applications of phosphate fertilizers may increase the level of available phosphorus in the soil. When soil phosphorus levels are in the high range, phosphate application can be eliminated until soil test levels fall below the high range. When grasslands are used as haylands, soil sample more frequently. Phosphorus may need to be applied more often, since removal of nutrients will be greater than on grazed land.

### Other Nutrients

Results of studies conducted throughout eastern and northeastern Nebraska indicate that applying potash, sulfur and zinc does not improve pasture production. There is a small possibility that some pastures and grasslands on sandy soils may require sulfur. This need for sulfur, however, has not yet been demonstrated in research trials.

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***B-2, Pasture Management***

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