

# NEWS & VIEWS

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## Optimize Fescue Yield and Quality with Complete and Balanced Fertilization

**TALL FESCUE** is adapted to a wide region of North America. The area of adaptation includes most of the eastern U.S. and extends from east Texas north to Minnesota and east to the Atlantic Ocean. Fescue is considered the foundation forage in eastern Kansas, Missouri, Kentucky and surrounding states. The typical production of this cool-season grass ranges from about 2 tons/A to more than 4 tons/A of forage. However, growers can produce more than 6 tons/A with favorable growing conditions and good fertility and other management. Soil fertility can be quickly depleted under fescue without fertilization. One ton of fescue removes about 38 lb of nitrogen (N), 18 lb of  $P_2O_5$ , 52 lb of  $K_2O$ , 4 lb of sulfur (S) and 4 lb of magnesium (Mg).

Tall fescue commonly has digestibility ratings between 50 and 70 percent. Dry pregnant cows can be supported in good condition at the lower end of this range. At the higher end, 450 lb steers can be supported with an average daily gain of about 1.5 lb/A. Stage of growth and fertilization are important factors determining forage quality. Nitrogen fertilization is especially important in maximizing forage protein content. A Texas study investigated the influence of harvest date and N fertilizer rate on fescue protein content (**Figure 1**). The earlier-harvested forage was higher in protein, and higher N rates produced forage with more protein regardless of harvest date. Forage protein content in the April harvest increased from 16 to 20 percent with the addition of 180 lb N/A. Split applications of N will generally result in greater N use efficiency and higher yield than a single fall or spring application.

A 4-year Arkansas study investigated the effect of N, phosphorus (P) and potassium (K) fertilization on both irrigated and nonirrigated fescue yields. Yields of over 7

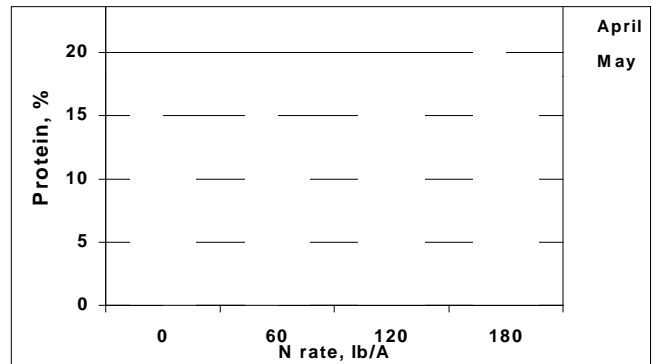


Figure 1. Effect of N fertilization and harvest date on tall fescue protein content (Texas).

tons/A were observed when 600 lb N/A were applied with adequate P and K (**Figure 2**). Nonirrigated yields were highest at 4.3 tons/A with a 400 lb/A N rate.

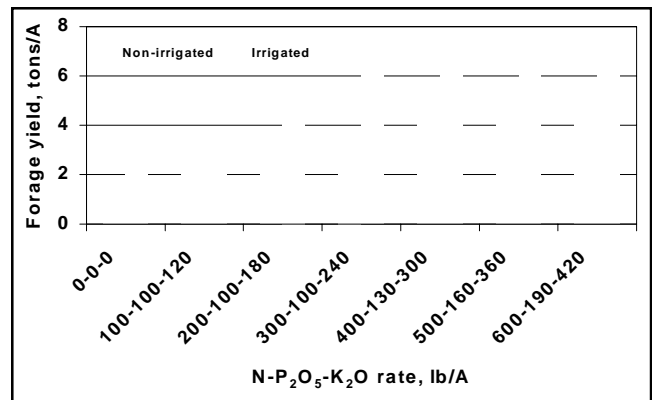


Figure 2. Fescue dry matter yield response to fertilization and irrigation in Arkansas (4-year average).



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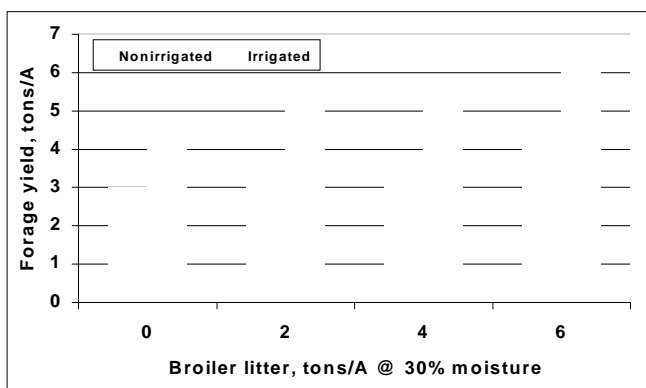
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Broiler litter rates were compared in a separate experiment (**Figure 3**). Six tons/A of broiler litter resulted in nonirrigated yields of 4.6 tons/A, while irrigated yields were 6.1 tons/A. Yields with 6 tons/A of broiler litter were equivalent to those where 300 to 400 lb/A of fertilizer N were applied with adequate P and K. Forage digestibility rose with improved fertility from 58 percent to 62 percent. Crude protein was increased from 10 percent to 15 percent with increased fertilizer rates, while the highest broiler litter rate (6 tons/A) resulted in 12 percent crude protein. Balanced fertilization also increases forage recovery and utilization of applied N. In Missouri, on a soil low in P and K, an increase in the N rate from 100 lb/A to 200 lb/A increased forage yield only 0.2 tons/A. With adequate P, yield was increased 1.4 tons/A.



**Figure 3. Fescue dry matter response to broiler litter in Arkansas (4-year average).**

Missouri research on soils low in P and Mg showed that fescue yields and Mg concentrations can be increased and grass tetany risk can be reduced by fertilizing with both P and Mg (**Table 1**). When N and K fertilization rates are high, the grass tetany potential of fescue may increase. Tetany is often associated with forage that has less than 0.20 percent Mg or has a K: (Ca+Mg) equivalent ratio of greater than 2.2. Addition of Mg alone did not increase yields or forage quality. Phosphorus tends to increase total uptake of Mg and results in greater translocation of Mg from roots to above-ground parts. Phosphorus and Mg should be applied in balance with the K needs. Sufficient nutrient concentrations for yield, nutrition and quality of tall fescue are 3.2 to 3.6 percent N, 0.34 to 0.45 percent P, 2.8 to 4.0 percent K, 0.18 to 0.40 percent S, and 0.20 to

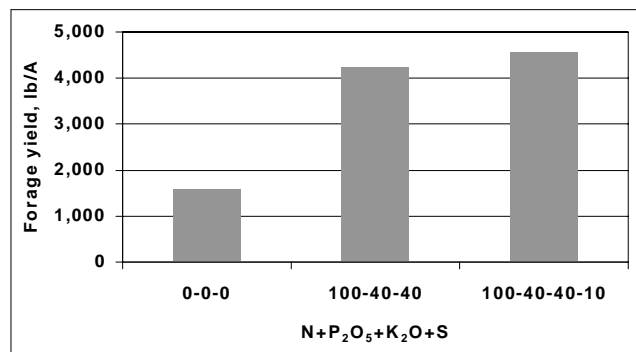
**Table 1. Influence of P and Mg fertilization on tall fescue tissue concentrations of Mg, Ca, K, and P (Missouri).**

P <sub>2</sub> O <sub>5</sub> lb/A	Mg (+ or -)	Tissue concentration, %				Equivalent ratio K: (Ca+Mg)
		Mg	Ca	K	P	
0	-	0.22	0.40	2.6	0.20	1.52
50	-	0.23	0.52	2.2	0.41	1.23
0	+	0.18	0.44	2.4	0.19	1.61
50	+	0.26	0.53	2.2	0.40	1.20

Nitrogen and potassium applied at 50 lb/A each (N, K<sub>2</sub>O).

0.32 percent Mg. Phosphorus and Mg levels should be kept in balance with K levels to avoid grass tetany.

Sulfur is also an important component of an effective fescue fertility program. Kansas research has shown that 10 lb S/A resulted in a forage yield increase of over 7 percent (**Figure 4**). Sulfur is taken up by plants as an anion and is therefore mobile in soils. Hence, S deficiency is most likely to occur in sandy, well drained soils.



**Figure 4. Effect of N-P-K-S fertilization on tall fescue forage yield (Kansas).**

Good management that includes adequate, complete and balanced fertilization results in optimum fescue yield and quality. Soil levels of P, K and Mg should be built and maintained at high levels. Realistic yield goals should be established and the appropriate N rates applied. Application of 50 to 60 lb/A of N in late summer to early fall will help stimulate growth. Higher N rates may be used to stockpile growth for late fall and winter grazing. Nitrogen should be applied in early spring before initiation of rapid growth at rates from 50 to 100 lb/A, depending on forage needs. Additional N should be applied at 50 to 100 lb/A every 4 to 6 weeks afterward, depending on grazing needs and haying objectives. The higher N rates will be required for high grazing pressures and for grazing-plus-hay programs.

In grazed systems it has been estimated that 75 percent of N, 80 percent of P, and 85 percent of K ingested by cattle pass through the digestive tract and are excreted in feces and urine. This “recycling” should be considered in nutrient management plans. Areas where animals have congregated and manure deposition is concentrated should be soil sampled separately from other portions of pastures

and hay meadows. Lime and fertilizer needs can be established by soil sampling at least once every three years. Maximum efficiency of all inputs will only be achieved when balanced fertility management is practiced. ■