

## Phosphorus Fertilization Increases Annual Lespedeza Forage and Seed Yields

By Robert L. McGraw and Richard E. Joost

*Field research in southwest Missouri on soils with low phosphorus (P) and medium potassium (K) fertility recorded annual lespedeza response to applied P but not K.*

**TWO SPECIES** of annual lespedeza (Korean and striate) are grown in Missouri and throughout the southeastern U.S. for hay and in association with grasses for pasture. Annual lespedeza produces excellent quality, non-bloating forages during mid-summer . . . a time when forage supplies are often short.

The Missouri Fertilizer and Ag Lime Council funded research to determine the response of annual lespedeza to applied P and K at two sites at the Southwest Missouri Research Center near Mount Vernon. The soil at site 1 had an initial soil test level of 7 lb/A of available P and 248 lb/A of available K; site 2, 11 lb/A of P and 185 lb/A of K. These soil test values are typical for the region. The plots were limed to soil test recommendations prior to seeding. 'Marion' striate lespedeza and 'Summit' Korean les-

pedeza were spring seeded at 25 lb/A at both sites. Phosphorus at rates of 0, 40, 80, 120, and 160 lb/A  $P_2O_5$  and K at rates of 0, 60, and 120 lb/A  $K_2O$  were applied in all possible combinations before seeding. Each plot was split. Forage yields were taken on one half in August and seed yields on the other half in October. Plots were allowed to reseed and no additional P or K was added the second year.

### Results

Responses were similar for the two species at both sites both years so we combined data for discussion. Annual lespedeza did not respond to applied K. Plots fertilized with 60 or 120 lb/A  $K_2O$  produced forage and seed yields comparable to the controls with no added K. No interactions with applied P were noted. Applied P increased both lespedeza forage and seed yields. Without added P,

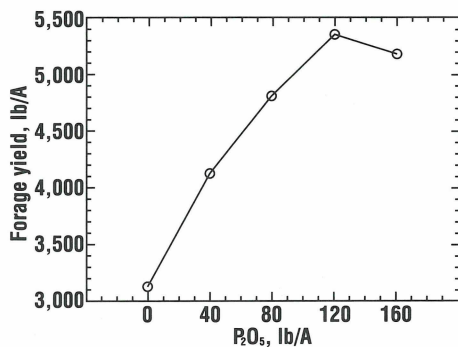


Figure 1. Applied P fertilizer increased herbage yield of annual lespedeza.

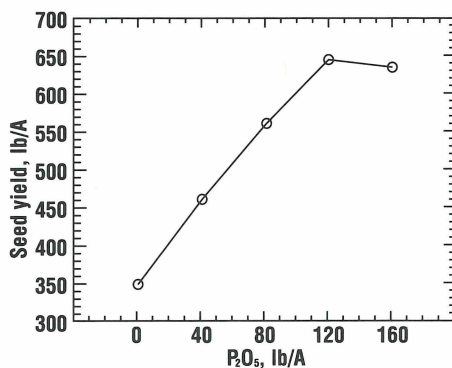


Figure 2. Applied P fertilizer increased seed yield of annual lespedeza.

Dr. McGraw is Associate Professor and Dr. Joost is Assistant Professor, Agronomy Department, University of Missouri, Columbia, MO 65211.



**PHOSPHORUS** fertility may be a key to establishing and maintaining annual lespedeza.

forage yields averaged 3,125 lb/A, shown in **Figure 1**. Yields increased 1,000 lb/A by application of 40 lb/A  $P_2O_5$  and reached a maximum of 5,355 lb/A with application of 120 lb/A  $P_2O_5$ . Seed yields showed similar increases in response to applied P, indicated in **Figure 2**. Seed yields increased 110 lb/A with 40 lb/A  $P_2O_5$  and reached a maximum of 635 lb/A at 120 lb/A  $P_2O_5$ .

### Summary

Annual lespedeza did not respond to K fertilizer in this study, probably due

to adequate (medium level) initial K fertility. Annual lespedeza responded to P up to 120 lb/A  $P_2O_5$ . Forage yields were increased by 1.1 ton/A and seed yields by 290 lb/A at the highest response rate.

The strong response to applied P indicates that adequate P is very important for successful production of annual lespedeza. Many soils in southwest Missouri and other areas where annual lespedeza is grown are known to have low P supplying capability. Problems associated with establishing and maintaining annual lespedeza may be due in part to poor P fertility.

Increased forage and seed yields from applied P were highly profitable. Figuring lespedeza hay at \$65/ton, seed at \$1.00/lb and  $P_2O_5$  at 25 cents/lb, returns from increased forage yields would be more than double the investment in P and return from seed would increase by a net of \$260. High rates of applied P would also have carry-over effects on following forage crops. ■

---

## North Central Soil Fertility Conference Proceedings Available

**PRESENTATIONS** at the 1994 North Central Extension-Industry Soil Fertility Conference, held in St. Louis, MO, October 26-27, are available for interested individuals. The conference is an annual opportunity for agriculturalists from the North Central region of the U.S. and Canada to be updated on the latest developments in soil fertility research and education. The North Central region includes the states of North Dakota, South Dakota, Nebraska, Kansas, Missouri, Iowa, Minnesota, Wisconsin, Illinois, Kentucky, Indiana, Michigan, Ohio and the province of Ontario.

Proceedings of the Conference include presentations on spatial variability of soil test phosphorus (P); using chlorophyll meters to improve nitrogen (N) use efficiency in corn and wheat; influence of seed-placed fertilizer on corn, soybean and sunflower emergence; soil nitrate test

performance on medium and high yield potential soils; starter fertilizer effects on corn grown on previously flooded soils; flooded soil syndrome and P deficiencies; N management for no-till production systems; the role of soil fertility in reducing plant stress from root-feeding insects; survival of plant growth-enhancing root fungi after flooding and extended fallow; chemical and biological changes resulting from soil submergence; using grid soil sampling for precision and profit; the role of combine yield monitors in nutrient management, and other topics.

Copies of the 1994 Conference proceedings are available at a price of \$15 from the Potash & Phosphate Institute, 2805 Claflin Road, Suite 200, Manhattan, KS 66502; phone 913-776-0273, fax 913-776-8347. A limited number of copies of proceedings of the 1993 Conference are also available at a price of \$15. ■