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Performance of Legend Lespedeza in Mid-Missouri

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Abstract: *Lespedeza (*Kummerowia striata*) is a unique annual legume grown for pasture, hay and soil improvement due to its qualities as drought resistant, acid tolerant, non-bloating when fed to livestock, tolerant of low soil fertility and its adaptation as a warm-season plant. The objective of this study was to compare the field performance of 'Legend' lespedeza a new cultivar with other common cultivars in mid-Missouri. A three year seeding study was conducted near Warrensburg on a Macksburg silt loam soil. Soil phosphorous was amended to levels recommended for optimum lespedeza production in mid Missouri. 'Korean' and 'Summit' (both* kummerowia stipulacea*) 'Kobe' and 'Marion' were compared with Legend. Cultivars (all* Kummerowia striata*) were randomly assigned each year to five plots and replicated four times in a randomized block design. All plots were seeded using a Great Plains five foot grass seeder at recommended rate of 20 pounds/acre. Yields ranged from 0.68 tons/acre to 2.56 tons/acre during the three-year study. Yield of Legend was 30% greater than Marion ($p<0.05$), the newest cultivar during the three-year study. Overall, Legend yields were significantly higher ($p<0.05$) than that of the other cultivars.*

Introduction

Lespedeza (*Kummerowia striata*) is an annual legume that is grown for pasture, hay and soil improvement (Baldridge et al., 1974). It is drought resistant, acid-tolerant and non-bloating when fed to livestock. In addition, Lespedeza is known to tolerate low fertility (Baldridge et al., 1974). It is a warm-season plant that grows well during summer months (Heath et al., 1973). These qualities make lespedeza a unique legume for pasture and hay production. Annual lespedeza is adapted to a wide area extending from eastern Texas, Oklahoma, and Kansas into southern Iowa and eastward to the Atlantic Coast (McGraw and Hoveland, 1995). The two annual species grown in Missouri are Korean (*Kummerowia stipulacea)* from Korea and Kobe (*K. striata)* from Japan (Baldridge et al., 1974). These species were introduced into the USA in 1919. Korean was introduced into Missouri through the University of Missouri Agricultural Experiment Station in 1921. Summit was jointly released by Arkansas and Missouri in 1962 and Marion, a more recent cultivar, was released by Missouri in 1989 (Beuselinck and McGraw, 1990).

Korean types tend to be early in maturity, lower yielding and are grown primarily in the northern area of lespedeza adaptation. Striate types are grown in the southern areas. These types tend to be later in maturity and produce longer plants. Both types are adapted to Missouri. There is little current effort to develop new cultivars of either type by public breeders, so private companies such as Cutting-Edge Agri. Products have become established. Cutting-Edge has introduced a new lespedeza cultivar named Legend; a new selection from common or striate lespedeza. It has longer, narrower leaves than other annual types, and in some tests it has grown to be 6-8 inches taller than the popular Marion cultivar (Carmichael, 2001). In Arkansas, Legend yielded more than did lespedeza types and cultivars (Sandage, 1998). Legend also had superior drought tolerance and ability to reseed itself compared with other cultivars (Sandage, 1998).

The best lespedeza cultivar must be able to consistently reseed itself and be disease resistant (Heath et al., 1973). Preliminary findings on Legend's superior yield, higher leaf: stem ratio, prolific reseeding characteristic and drought tolerance in Arkansas (Sandage, 1998) suggests could be a valuable legume for Missouri farmers. The objective of this study was: To compare yields of new seeding of 'Legend' with other commonly grown cultivars in mid-Missouri.

Materials and Method

A study was initiated in spring 2002 at the University of Central Missouri research farm near Warrensburg, on a Macksburg silt loam soil. Marion, Korean, Kobe, Summit and Legend lespedeza cultivars were evaluated. The cultivars (treatments) were assigned randomly to plots that were replicated four times in a randomized complete block design. A soil sample was taken to 15 cm depth and analyzed for major nutrients. Soil P and K levels were amended in spring to those recommended for optimum lespedeza production in mid-Missouri seedbed preparation. Lespedeza seed inoculated with the proper strain of rhizobia and seeded at 220 pounds/acre recommended seeding rate using a Great Plains five foot grass seeder. Stand density and yield were measured. Since lespedeza has the ability to reseed itself, plants were cut after reproductive stage to determine yield. Because of this reseeding characteristic, the same plots were used every study year.

Table 1. Plant density and yield of lespedeza cultivars during the three study years.

Variety	2002	2003	2004	Mean	2002	2003	2004	Mean
	----------plants/sq. ft----------				----------tons/acre----------			
Korean	66 a	71 a	38.0ab	**58**	0.76c	2.48ab	1.92ab	**1.72**
Summit	62 a	67 a	48.0a	**59**	0.68c	1.96b	1.82ab	**1.48**
Legend	31 b	33 b	23.8bc	**29**	1.10a	2.56a	2.14a	**1.93**
Marion	29 b	29 b	30.3bc	**29**	0.83b	2.10ab	1.51b	**1.48**
Kobe	22 b	23 b	19.5c	**22**	0.94b	1.92b	1.42b	**1.42**

Means with the same letter are not significantly different at 0.05 probability level.

Data were analyzed by analysis of variance (ANOVA) procedures (SAS Inst., 1990) to determine significant treatment effects. Means were separated by Fisher's protected least significant difference (LSD) at the 0.05 probability level.

Results and Discussion

Lespedeza yields during the 2002–2004 growing periods ranged from 0.68 tons/acre to 2.56 tons/acre across cultivars (Table 1). Yields of Legend were significantly higher (0.05 level) than yields of other cultivars. Average yields during the 2002 growing season were lowest, due largely to severe drought that depressed all lespedeza yields. The highest average yield (2.56 tons/acre) was recorded in 2003, being associated with lespedeza's ability to reseed. Even though Legend yields were higher, stand density (population) was significantly lower in 2002 and 2004 when compared to Korean and Summit cultivars (Table 1).

The high plant densities for Korean and Summit were attributed to their seed type/texture. Both types average about 230,000 seeds per pound. But Marion, Kobe, and Legend have a fluffy seed type/texture while Korean and Summit have a smooth seed type/texture, a which may have resulted in more seed being deposited into the soil by the Great Plains grass seeder during planting. This reduced the ability to produce a live seedling and plant.

There was no relationship between plant density and yield (Table 1). Compared with Marion, yield of Legend averaged 26% higher across years (Table 1). This is consistent with earlier report in Arkansas (Larry Sandage, 1998). A severe drought during the 2002 growing period reduced growth and development of several crops in the area. However, yields of lespedeza were high compared to other cultivars. Yield during the 2002 growing period, especially for Legend, suggests it is more drought tolerant than other cultivars.

The 2002 study was left in the field to test reseeding characteristics of the cultivars during the 2003 growing season. The drought during the 2002 growing season did not affect the reproductive period of any of the lespedeza cultivars tested. This is evident in the high plant density (Table 1) during the 2003 growing period. Lespedeza yields during the 2003 growing period were significantly higher for all cultivars ranging from 1.92 tons/acre to 2.56 tons/acre (Table 1). Legend and Korean lespedeza had the highest yields, the lowest yielding cultivars were Kobe, Summit and Marion. When averaged across years, Legend yields were higher at 1.93 tons/acre followed by Korean at 1.72 tons/acre, then Summit and Marion at 1.48 tons/acre and Kobe at 1.42 tons/acre (Table 1). These high yields were associated with reseeding characteristics of lespedeza. Legend's higher yields show that the selection has an excellent reseeding characteristic that allows the cultivar to out-compete weeds and other plants and to out-yield other cultivars. Because of this, Legend was able to record higher yields during each year with an average yield of 1.93 tons/acre than Korean lespedeza a cultivar common in mid Missouri and Marion the most recent cultivar released by the University of Missouri.

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