Jamie L. Whitten Plant Materials Center

Coffeeville, MS

Vol. 16 No. 9 Technical Report January 2002

Perennial Lespedeza Evaluations

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ABSTRACT

Lespedezas (*Lespedeza* sp.) are used throughout the southeastern states for erosion control, wildlife habitat development, and forage production. Native lespedezas may have potential for inclusion with native grasses to provide diversity in conservation cover seed mixes. This study was conducted to evaluate various types of lespedezas for potential use in conservation plantings. Seeds of native ecotypes of lespedeza were field collected from stands across the southeastern states and were compared to introduced lespedezas for adaptation, seed production, and plant performance from 1985-1989. Many of the native lespedezas failed to germinate and were replanted with limited success. Introduced lespedezas were larger and more robust than the native plants. Two native species, *L. capitata* and *L virginica*, were found to be good seed producers with potential for conservation use. Accessions 9021710 (*L. virginica*), 9045268 (*L. virginica*), 9045294 (*L. capitata*), and 9045296 (*L. capitata*), were selected for seed increase and further evaluations.

INTRODUCTION

Lespedezas are useful for wildlife, forage, and soil stabilization in the southeastern United States (Ball et al., 2002; Martin et al., 1976; Crawford et al., 1969). Of the approximately 140 species of *Lespedeza* that have been identified, only twenty are native to the Unites States (Offutt and Baldridge, 1973). Three introduced species are in widespread use: common lespedeza, *Kummerowia striata* (formerly *L. striata*) and Korean lespedeza, *K. stipulacea* (formerly *L. stipulacea*), which are both annuals, and sericea lespedeza, *L. cuneata*, which is perennial (Graham, 1941). Most lespedezas have deep tap roots with extensive lateral root development and are drought tolerant (Wheeler, 1950; Graham, 1941). Cultivars of sericea lespedeza have been used extensively for erosion control on severely eroded sites and steep slopes (Donnelly et al., 1970). The native lespedezas have a perennial growth habit and usually occur in abandoned fields and semi-open woods, particularly on well drained, upland sites (Grelen and Hughes, 1984). Many native lespedeza species are erect, wand-like or branching, while others have a trailing growth habit (Graham, 1941). Crude protein and phosphorus concentrations are high in native lespedezas (Crawford et al., 1969). Often, perennial lespedezas are slow to establish from seed and seedlings may not compete well with larger grasses and weeds. Once established, the plants are highly competitive and long-lived. The objectives of this study were to evaluate the performance of native and introduced lespedezas for conservation use in the southeastern states.

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MATERIALS AND METHODS

Seventy six accessions of perennial lespedezas were evaluated at the USDA-Natural Resources Conservation Service, Jamie L. Whitten Plant Materials Center, Coffeeville, MS from 1985 to 1989. Species observed included round head lespedeza (*L. capitata*); sericea lespedeza (*L. cuneata*); hairy lespedeza (*L. hirta*); slender lespedeza (*L. virginica*); juncea lespedeza (*L. juncea*); trailing lespedeza (*L. procumbens*); and violet lespedeza (*L. violacea*). The assembly was initially planted in May of 1985. A smooth, firm seedbed was prepared prior to planting. Fertilizer was applied at a rate of 300 lb/acre (8-24-24) and incorporated. Seed were scarified before being planted on non-replicated rows. Soil type was an Oaklimeter silt loam. Weeds were controlled by hand weeding and cultivation. Fertilizer was applied in April of subsequent years at a rate of 400 lb/acre (8-24-24). Accessions were rated annually for vigor, foliage, flower, and seed production characteristics (1 = best, 9 = worst); anatomical characteristics were measured in cm.

RESULTS AND DISCUSSION

Many accessions failed to germinate the initial year of planting and were replanted in 1986. Of the seventy six accessions planted in 1985 and 1986, only 29 accessions established. Several factors could have contributed to poor germination (i.e. collection of immature seed; damage to the seed during cleaning and scarification; or delayed interval between scarification and planting). Accessions that germinated and survived were consolidated and replanted into a new evaluation block in 1987. Table 1 is a summary of the evaluations from 1985 through 1989. Many of the introduced lespedezas were vigorous and suitable for conservation work. Several introduced sericea lespedeza cultivars that performed well in this study are commercially available. Conversely, none of the native species are commercially available. With the present strong emphasis on the use of native plants for revegetation and restoration projects, a native lespedeza may be a useful addition to the planting list. Slender lespedeza, an upright and slightly branching plant with light purple colored flowers, is partially shade tolerant and has good potential for wildlife use, soil improvement, erosion control, and serves as a host for beneficial insects. This plant is often found along the wood's edge, generally on drier sites. Seed are utilized by upland game birds and plants are browsed by deer (Graham, 1941).

CONCLUSION

Accessions 9021710 (*L. virginica*), 9045268 (*L. virginica*), 9045294 (*L. capitata*), and 9045296 (*L. capitata*), were selected for seed increase and further evaluation.

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Table 1. Summary of Lespedeza Evaluations at the USDA-NRCS Jamie L. Whitten Plant Materials Center, Coffeeville, MS. 1985-1989.

Species	Accession	Eval. year	Foliage			Flower color	Seed		Vigor	Remarks
			abu.	ht.	width		abu.	mature		
Lespedeza virginica	9006866	1985	3	40	70	purple	2	10/04	3	
		1986	2	75	90	purple	3	10/15	3	
		1987	4	40	90	purple	3	10/15	4	
		1988	3	100	110	purple	3	10/20	2	
		1989	3	45	45	lavender	3	10/20	4	
Lespedeza cuneata	286452	1985	4	20	70	white	3	10/10	4	
		1986	3	60	150	white	1	10/10	3	
		1987	3	35	140	white	3	10/15	2	prostrate growth form
		1988	3	40	100	white	2	10/20	2	
		1989	5	30	60	white	5	11/04	3	
Lespdeza capitata	468118	1985								no germination in 1985
		1986	3	120	50	white	1	10/15	3	replanted – no germ. in 1986
		1987	4	100	30	white	3	09/22	3	
		1988	4	60	20		3	11/10	3	
		1989					0		6	died, herbicide damage
Lespedeza cuneata	9006867	1985	5	60	40		3	10/04	3	
		1986	5	100	150	white	5	09/30	3	
		1987	3	80	150	white	2	09/18	3	
		1988	3	150	170	white	3	10/20	2	
		1989	2	40	55	white	4	09/18	4	
Lespedeza cuneata	9006885	1985	5	20	50	white	4	10/04	4	
		1986	5	40	120	white	2	10/30	5	
		1987	6	20	70	white	3	10/20	4	
		1988	5	40	80		4	10/20	5	
		1989								weak plants, died

Abundance and Vigor Rated on Scale 1-9 (1 Best, 9 Poor); Foliage Height and Width measurements (cm); Seed Maturity Date Format (Month/Day)

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Species	Accession	Eval.	Foliage			Flower	Seed		Vigor	Remarks
		year	abu.	ht.	width	color	abu.	mature		
Lespedeza	421873	1985	1	90	95		3	10/04	1	
cuneata		1986	1	150	200	white	1	11/05	1	
		1987	3	80	140	white	2	10/20	1	
		1988	1	100	150	white	2	10/30	1	
		1989	2	75	55	white	2	11/04	1	
Lespedeza	90356	1985	3	40	70		4	10/18	3	no germination in 1985
cuneata		1986	3	80	120	white	4	10/15	3	replanted/germinated 1986
		1987	3	40	110	white	3	10/20	3	
		1988	2	80	100	white	3	10/20	1	
		1989								not evaluated
Lespedeza	9009480	1987	1	60	110	white	1	10/20	1	
cuneata		1988	1	95	110		2	10/20	1	
		1989	1	70	70	white	2	10/20	1	
Lespedeza	9045232	1985	3	70	80		3	11/06	3	
cuneata		1986	1	130	200	yellow	3	10/15	1	
		1987	3	90	120	yellow	3	10/20	3	
		1988	1	130	110		3	10/20	1	
		1989	3	65	50	white	3	10/20	3	
Lespedeza	9045270	1985	3	55	80	white	3	10/04	3	
cuneata		1986	2	115	200	mixed	1	10/15	2	
		1987	2	110	150	white	3	10/20	2	
		1988	1	120	130	white	3	10/20	1	
		1989	3	65	65	white	3	10/20	2	

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Species	Accession	Eval. year	Foliage			Flower color	Seed		Vigor	Remarks
			abu.	ht.	width		abu.	mature		
Lespedeza cuneata	9009481	1985	3	60	85	white	3	11/06	3	mixed species on row
		1986	5	90	170	white	3	10/15	2	
		1987	3	85	110	white	2	10/20	2	
		1988	1	85	130		3	11/10	3	
		1989	2	75	75	purple	2	10/20	2	
Lespedeza virginica	9045278	1985	3	70	95	yellow	3	10/15	3	misidentified -- actually Lespedeza cuneata
		1986	1	125	220	yellow	1	10/15	1	
		1987	2	80	160	white	1	10/20	1	
		1988	1	140	180	white	3	10/20	1	
		1989	2	85	60		3	10/20	1	
Lespedeza cuneata	9003297	1985	3	60	80	white	3	11/06	3	
		1986	1	100	190	white	4	10/15	1	
		1987	3	60	100	white	3	10/20	3	
		1988	3	100	120		3	11/01	3	
		1989	3	70	70	white	4	10/20	2	
Lespedeza cuneata	9045280	1985	2	50	50		2	11/06	2	mixed species on row
		1986	1	90	70	white	3	10/15	1	
		1987	2	110	140	white	3	10/20	2	
		1988	1	130	120	white	3	10/20	1	
		1989	3	55	65	lavender	2	10/01	2	
Lespedeza virginica	9003504	1985	4	50	55	lavender	3	11/06	4	
		1986	3	90	120	purple	4	10/15	3	
		1987	3	40	130	lavender	3	10/20	2	
		1988	2	90	120	lavender	3	11/05	1	
		1989	5	50	40	purple	3	10/20	3	

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Species	Accession	Eval. year	Foliage			Flower color	Seed		Vigor	Remarks
			abu.	ht.	width		abu.	mature		
Lespedeza virginica	9045268	1985	5	40	30		3	10/04	4	
		1986	3	125	50	purple	1	10/15	3	
		1987	3	110	35	purple	2	09/18	3	
		1988	2	100	61	purple	3	10/20	2	
		1989								no survival after transplant
Lespedeza virginica	9045296	1985	4	40	30	purple	2	10/15	3	
		1986	3	90	80	purple	2	10/15	3	
		1987	4	75	60	purple	2	09/01	5	
		1988	2	61	126		3	10/20	2	
		1989	4	45	25	pink	3	10/20	5	misidentified – L. capitata
Lespedeza cuneata	9028261	1985								no germination in 1985
		1986	5	40	30	white	6	10/15	5	replanted in 1986
		1987	3	90	110	white	2	09/18	2	
		1988	1	120	140		2	10/20	1	
		1989	4	65	40	white	5	11/04	3	
Lespedeza virginica	9045294	1985	4	50	40		2	10/15	2	
		1986	3	90	90	purple	2	10/15	2	
		1987	3	45	50	purple	3	09/18	3	
		1988	3	80	100			10/20	2	
		1989	5	50	40	pink	2	09/01	4	misidentified -- is L. capitata
Lespedeza hirta	9045295	1985								no germination in 1985
		1986	4	40	60	purple	6	10/30	4	replanted 1986
		1987	3	60	35	lavender	3	09/18	3	
		1988	3	60	70		5	10/20	3	
		1989	5	20	25				6	died – herbicide damage

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Species	Accession	Eval. year	Foliage			Flower color	Seed		Vigor	Remarks
			abu.	ht.	width		abu.	mature		
Lespedeza virginica	9021710	1985								
		1986	3	36	31	lavender	3	10/31	5	planted 1986 – misidentified
		1987	3	60	65	purple	2	10/20	3	actually Lespedeza virginica
		1988								died 1988 – herbicide damage
		1989								
Lespedeza sp.	9028262	1985								planted 1986 – misidentified
		1986	4	31	25	lavender	5	10/28	5	actually Lespedeza virginica
		1987	4	40	65	purple	4	10/20	4	
		1988	4	100	100	purple	4	10/30	3	
		1989								died – herbicide damage
Lespedeza cuneata	9045286	1985								planted 1986
		1986	3	76	100	white	3	11/05	4	identified as Lespedeza cuneata
		1987	4	110	140	white	3	10/20	3	
Lespedeza cuneata	9045287	1985								planted in 1986 – identified as
		1986	3	61	90	white	4	10/28	3	Lespedeza cuneata
		1987	3	45	120	white	3	10/20	3	
		1988	1	90	120		4	10/20	3	good reseeding ability
		1989	3	80	75	white	4	10/20	3	
Lespedeza sp.	9045276	1985	4	20	10		5	10/28	3	
		1986	3	31	18		7	11/13	3	
		1987								
		1988								
		1989	5	25	25	white	8	11/04	5	

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Species	Accession	Eval. year	Foliage			Flower color	Seed		Vigor	Remarks
			abu.	ht.	width		abu.	mature		
Lespedeza sp.	9045288	1985								
		1986	3	41	61	white	4	11/05	4	
		1987	2	70	130	white	3	10/20	2	
		1988	3	70	120		2	11/01	3	
		1989	4	45	45	white	3	11/04	4	
Lespedeza procumbens	9053760	1985								
		1986	5	10	38	purple	5	10/28	3	
		1987	5	10	65	purple	3	10/20	4	
		1988	3	20	80	purple	5	10/15	3	
		1989	4	20	55	purple	4	09/30	4	
Lespedeza cuneata	173989	1985								no germination in 1985
		1986								replanted – no germ. in 1986
Lespedeza cuneata	207719	1985								no germination in 1985
		1986								replanted – no germ. in 1986
Lespedeza cuneata	246769	1985								no germination in 1985
		1986								replanted – no germ. in 1986
Lespedeza cuneata	259459	1985								no germination in 1985
		1986								replanted – no germ. in 1986
Lespedeza cuneata	259460	1985								no germination in 1985
		1986								replanted – no germ. in 1986
Lespedeza cuneata	9006876	1985								no germination in 1985
		1986								replanted – no germ. in 1986

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			abu.	ht.	width		abu.	mature		
Lespedeza cuneata	9006879	1985 1986								no germination in 1985 replanted – no germ. in 1986
Lespedeza cuneata	9006880	1985 1986								no germination in 1985 replanted – no germ. in 1986
Lespedeza hirta	9021703	1985 1986								no germination in 1985 replanted – no germ. in 1986
Lespedeza hirta	9021704	1985 1986								no germination in 1985 replanted – no germ. in 1986
Lespedeza cuneata	9028976	1985 1986								no germination in 1985 replanted – no germ. in 1986
Lespedeza hirta	9028234	1985 1986								no germination in 1985 replanted – no germ. in 1986
Lespedeza hirta	9028254	1985 1986								no germination in 1985 replanted – no germ. in 1986
Lespedeza hirta	9028265	1985 1986								no germination in 1985 replanted – no germ. in 1986
Lespedeza hirta	9028272	1985 1986								no germination in 1985 did not replant in 1986

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Species	Accession	Eval. year	Foliage			Flower color	Seed		Vigor	Remarks
			abu.	ht.	width		abu.	mature		
Lespedeza hirta	9045283	1985 1986								no germination in 1985 did not replant in 1986
Lespedeza violacea	9045292	1985 1986	2 3	30 35	90 110	purple	3 7	10/15 10/15	1 2	
Lespedeza virginica	9021707	1985 1986								no germination 1985 replanted – no germ. 1986
Lespedeza virginica	9021709	1985 1986								no germination 1985 replanted – no germ. 1986
Lespedeza virginica	9028980	1985 1986								no germination 1985 replanted – no germ. 1986
Lespedeza virginica	9028981	1985 1986								no germination 1985 replanted – no germ. 1986
Lespedeza virginica	9028982	1985 1986								no germination 1985 replanted – no germ. 1986
Lespedeza virginica	9028983	1985 1986								no germination in 1985 did not replanted in 1986
Lespedeza virginica	9028255	1985 1986								no germination in 1985 did not replant in 1986

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Species	Accession	Eval. year	Foliage			Flower color	Seed		Vigor	Remarks
			abu.	ht.	width		abu.	mature		
Lespedeza virginica	9028279	1985 1986								no germination 1985 replanted – no germ. in 1986
Lespedeza virginica	9028335	1985 1986								no germination 1985 replanted – no germ. in 1986
Lespedeza virginica	9006919	1985 1986								no germination 1985 replanted – no germ. in 1986
Lespedeza virginica	9045324	1985 1986	4	15	70	purple	7	10/15	3	misidentified – actually Kummerowia striata
Lespedeza violacea	9028250	1986								planted 1986 – no germination
Lespedeza stuevi	9021705	1986								planted 1986 – no germination
Lespedeza juncea	318638	1986								planted 1986 – no germination
Lespedeza sp.	9028595	1986								planted 1986 – no germination
Lespedeza sp.	9045265	1986								planted 1986 – no germination

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Species	Accession	Eval. year	Foliage			Flower color	Seed		Vigor	Remarks
			abu.	ht.	width		abu.	mature		
Lespedeza sp.	9028579	1986								planted 1986 – no germination
Lespedeza capitata	9021701	1985 1986								no germination 1985 replanted – no germ. in 1986
Lespedeza capitata	9021702	1985 1986								no germination 1985 replanted – no germ. in 1986
Lespedeza capitata	217118	1985 1986								no germination in 1985 replanted – no germ. in 1986
Lespedeza capitata	9017582	1985 1986								no germination in 1985 replanted – no germ. in 1986
Lespedeza cuneata	9002944	1985 1986								germinated then died in 1985 seed unavailable to replant
Lespedeza cuneata	9002945	1985 1986								no germination in 1985 seed unavailable to replant
Lespedeza cuneata	9003504	1985 1986								germinated then died in 1985 replanted – no germ. in 1986
Lespedeza cuneata	9006869	1985 1986								no germination in 1985 replanted – no germ. in 1986

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Species	Accession	Eval. year	Foliage			Flower color	Seed		Vigor	Remarks
			abu.	ht.	width		abu.	mature		
Lespedeza cuneata	9005296	1985 1986								no germination in 1985 replanted – no germ. in 1986
Lespedeza cuneata	9006881	1985 1986								no germination in 1985 replanted – no germ. in 1986
Lespedeza cuneata	9006882	1985 1986								no germination in 1985 replanted – no germ. in 1986
Lespedeza cuneata	9006883	1985 1986								no germination in 1985 replanted – no germ. in 1986
Lespedeza cuneata	9006886	1985 1986								no germination in 1985 replanted – no germ. in 1986
Lespedeza cuneata	9006887	1985 1986								no germination in 1985 replanted – no germ. in 1986
Lespedeza cuneata	476979	1985 1986			36					no germination in 1985 replanted – no germ. in 1986
Lespedeza cuneata	9028207	1985 1986								no germination in 1985 replanted – no germ. in 1986

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