



Interstate Sericea Lespedeza— A Multi-Purpose Legume

INTERSTATE SERICEA—a special variety for highway plantings—has just appeared on the scene. Developed specifically to meet growth requirements on highway rights of way, the new Auburn University Agricultural Experiment Station variety was released in December 1969.

Qualities needed for a roadside crop are combined in Interstate sericea. It has an attractive appearance, effectively prevents erosion on steep slopes, and grows well under unfavorable circumstances encountered along highways. It is widely adapted in the Southeastern States and shows promise for several states north of the region.

The new sericea is shorter growing, branches more profusely, has finer stems, and grows more uniformly than other varieties tested in Alabama. Its texture and appearance also proved superior in the tests. Stands of Interstate were equal to or better than other varieties in northern, central, and southern Alabama test

plantings. On the basis of desirability as roadside vegetation and for erosion control, Interstate was the most promising of the five varieties in the State comparisons.

Although developed for and evaluated primarily on roadsides and other areas where even appearance and short growth habit are desired, Interstate also has promise as a grazing and hay crop in many areas.

Origin of Interstate goes back to a breeding line that resulted from irradiation of seed in 1957. The mutant that became Interstate was identified in the fourth generation after seed were treated by radiation.

Details about the new sericea are presented on the following pages.

TITLE PHOTO. Interstate sericea (right) is contrasted with common (left) on I-59 near Fort Payne, Alabama. Photo was made on September 16, 1967.

Interstate *Sericea Lespedeza*— A Multi-Purpose Legume¹

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SERICEA, *Lespedeza cuneata* (Dumont) G. Don, has been used for many years as a forage, soil conserving, soil improving, and seed crop in the Southeast. It protects sloping land, waterways, and gullies, and is used in field borders and longtime rotations.² Sericea has also been used extensively for the protection of roadbanks as highway systems have been expanded in recent years.

Like most plants used for vegetation on road cuts, fills, and medians, current sericea varieties were developed for other uses. However, the new Auburn University Agricultural Experiment Station variety, Interstate, was developed primarily for roadside vegetation and other conservation uses where an attractive, shorter growing plant is desirable.

VARIETY DEVELOPMENT

Development of the new variety dates back to 1950 when a breeding program was begun at Auburn to improve sericea. Early in this project it was found that steers preferred grazing plants with fine, soft textured stems to those with medium or coarse textured stems.³

¹ Opinions, findings, and conclusions expressed are those of the authors and not necessarily those of Alabama Highway Department or the U.S. Bureau of Public Roads that supported portions of this research.

² BAILEY, R. Y. 1951. Sericea in Conservation Farming. USDA Farmers' Bull. No. 2033.

³ DONNELLY, E. D. 1954. Some Factors that Affect Palatability in *Sericea Lespedeza*, *L. cuneata*. Agron. J. 46:96-97.

A vigorous variety with soft stems was developed in this program and released as Serala.⁴ This synthetic variety is composed of six lines, one of which (Alabama 1373) is soft textured, branches well, and has uniform plant type. The Alabama 1373 line was used in an irradiation breeding program begun in 1957 in efforts to increase the rate of mutation and thereby to increase variability in the population. Self pollinated dormant seed of this line were treated with ionizing radiation⁵, in cooperation with University of Tennessee-Atomic Energy Commission Agricultural Research Program at Oak Ridge, Tennessee.

Pure line breeding was followed after irradiation. In X₄ (fourth generation following irradiation) a mutant was identified that appeared to have traits needed in sericea for highway vegetation and similar conservation uses, Figure 1. This mutation resulted from exposing seed to neutrons for 2 hours. Selections were made within this plant type in the X₄, X₅, and X₆ generations and progeny were grown in spaced plant nurseries at the Plant Breeding Unit, Tallassee. In 1967, X₅ plants of the mutant type that varied in total vigor or size were progeny tested in replicated

⁴ DONNELLY, E. D. 1963. Serala—A New Sericea Variety. Auburn Univ. (Ala.) Agr. Exp. Sta. Leaf. 70.

⁵ E. M. CLARK, Department of Botany and Plant Pathology, cooperated on the initial phases (X₁ and X₂ generations) of this work.

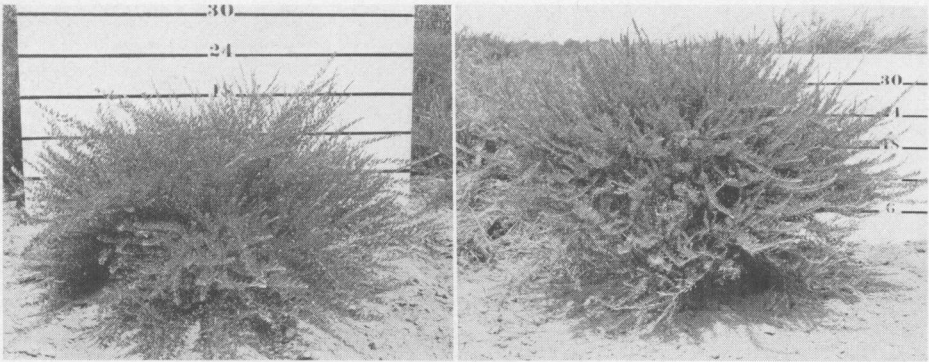


FIG. 1. Left—an X_5 mutant type plant from which Interstate variety was developed; right—plant of the variety *Serala*. Photos were made August 2, 1966.

single-row plots. All X_6 progenies were similar in appearance, growth pattern, and size in 1967, 1968, and 1969 regardless of whether the X_5 parent was rated low or high in vigor. Thus, it was concluded that plant type had been stabilized, and seed increase was begun in 1968 in anticipation of variety release. First certified seed became available in January 1970.

HOW VARIETY WAS TESTED

First testing of the variety (then unnamed) was done in 1966 when bulked

X_6 seed from spaced plants were seeded in small broadcast plantings on highway backslopes and other sites, Figure 2. During 1966-69, bulk X_6 seed from spaced plants formed an experimental variety that was tested under the name "Hiway" by SCS, TVA, state highway, and state agricultural experiment station personnel. The variety was evaluated critically on highway backslopes and other sites in northern, central, and southern Alabama. It was also tested in about 18 states from the Carolinas to Southern Illinois and westward to Oklahoma, including most of the Southeastern States.



FIG. 2. Highway backslope on I-59 shown ready for planting on May 25, 1966.



FIG. 3. Differences in texture and height of dormant plants between Interstate sericea (left) and common variety (right) are shown by this comparison on I-59 backslope near Fort Payne, Alabama. Photos were made January 1, 1968.

It was also established in Canada in 1969.

In Alabama, the experimental variety was compared at three locations with four other sericea varieties for use in vegetating roadsides. In all tests, the sericeas were broadcast at a rate of 50 pounds of seed per acre and these mulches were used: northern Alabama — low grade hay; central area — wheat straw and low grade hay; and southern Alabama — pine needles and low quality hay.

PERFORMANCE OF VARIETY

Detailed results from the tests in northern, central, and southern Alabama are reported in Tables 1-7, which are grouped at the end of the discussion of findings.

Northern Alabama

Test varieties were seeded May 25, 1966, on backslopes of I-59 north of Fort Payne, near the Georgia line, on Hartsells and Tilsit soils. Stands on both banks were adequate and showed no practical differences, Table 1. On the east side, Interstate and N.C. Prostrate plants were considerably shorter than other varieties, Table 2. Although height

differences were less on the west side, Interstate was 5 to 10 inches shorter than other varieties in 1968. Common was tallest.

Since appearance is the important factor, apparent height of varieties is more important than actual stem length, and the softer stemmed Interstate appears even shorter than comparable height of varieties that produce rigid stems. On the east bank of I-59, Interstate averaged 13 inches shorter in apparent height than common sericea, Table 3.

Differences in final height were not reflected in rate of growth, because all grew off about the same in spring. Thus, the shorter Interstate covers its previous year's stems quicker than other varieties.

Interstate had finer texture and more even height than other varieties, giving it a smoother, more even appearance. N.C. Prostrate had many upright stems that detracted from its appearance. These same characteristics make Interstate superior in appearance to the other varieties even when dormant, Figure 3, which is important on areas that are not mowed.

Central Alabama

Sites seeded June 6, 1966, on I-85 backslopes near Tuskegee on Norfolk

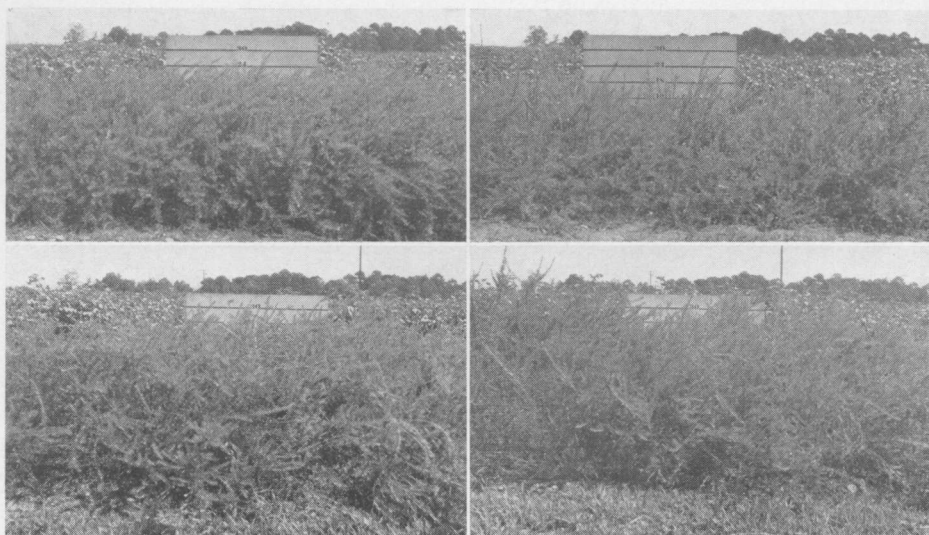


FIG. 4. Typical heights of the sericea varieties tested are illustrated by these photos, made August 15, 1967, at Auburn, Alabama. Top left—Interstate, top right—N. C. Prostrate, bottom left—Serala, and bottom right—common.

and Luverne soil types had poor, non-uniform stands of all varieties in the test. Interstate was shortest and common the tallest variety, with the other three being intermediate in height. Typical heights of the varieties in central Alabama are

illustrated by the Figure 4 comparison at Auburn.

Southern Alabama

Tests in this area were planted June 7, 1966, on Alabama 225 backslopes near

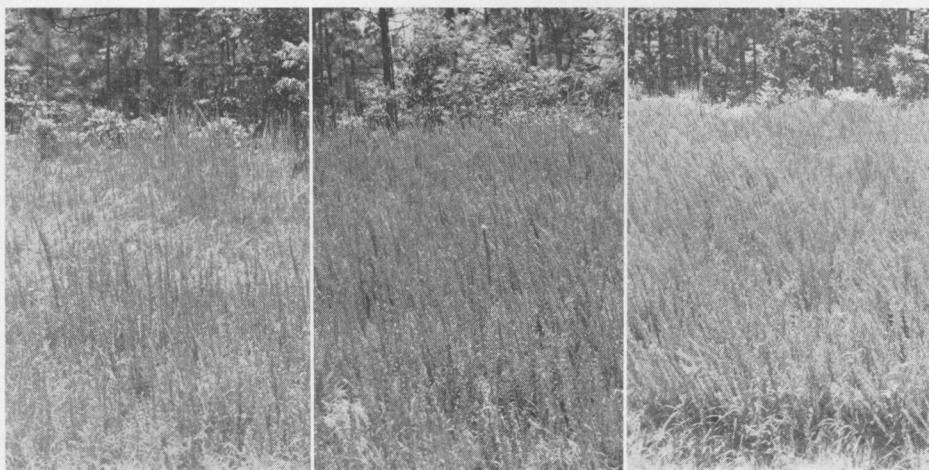


FIG. 5. Density and texture differences of common (left), Serala (center), and Interstate (right) varieties of sericea are apparent in these plots on Alabama 225 near Spanish Fort, Alabama. Photos were made May 21, 1968.

Spanish Fort on Luverne soil type, with bahiagrass seeded as a companion crop just before planting sericea. Good initial stands of all varieties except common were obtained on the east side of the highway, Table 4. Common had thinned considerably more than other entries by 1968 in the east side plantings, when all other varieties had good stands. On the west side, initial stands of Gasyn and N.C. Prostrate were poorer than other entries, and by 1968 these two varieties had relatively thinner stands. Interstate produced more stems per crown than other varieties, Figure 5.

There was no height difference among varieties in 1966 and 1967, Table 5. In 1968, however, Interstate had the shortest true height (stem length) and, along with N.C. Prostrate, had the shortest apparent height when both sides of the highway were considered, Table 6. Interstate was rated best in overall appearance when all dates were considered, followed by Serala and N.C. Prostrate, Table 7. It was concluded that sericea is suitable for roadside vegetation in southern Alabama, and that Interstate is the best of the varieties tested.

Evaluation from Other States

Cooperators in other states tested Interstate for 1 to 4 years, and 33 from 12 states replied to a questionnaire. Twenty-

three reported stands of Interstate equal to other sericeas, but 7 got poorer stands.

Interstate generally was judged to be one-half to three-fourths as tall as common and Serala. In texture, 19 rated it superior to other varieties and 7 said it was about the same. Summer appearance of Interstate was judged superior to other sericeas by 14, with 12 rating it about the same. Interstate's winter appearance was judged superior by 8 and about the same as other varieties by 12 respondents.

In general, seedling vigor and ability to compete with weeds were rated about the same for Interstate as for other sericea varieties (3 superior, 19 about the same, and 5 inferior). Second- and third-year early spring growth and ground coverage of Interstate were rated superior by 5 respondents and about like other varieties by 12. Seventeen saw Interstate as having potential for grazing and 19 as a possible hay crop in their areas. Three thought it had no potential for either use.

Twenty-five of 27 responding thought Interstate to be different enough in appearance and performance for release as a variety. Of 25 replying, 24 believed the variety would be recommended in their areas for highway vegetation and other conservation uses.

TABLE 1. STANDS OF SERICEA AT I-59 LOCATION NORTH OF FORT PAYNE, ALABAMA

Sericea variety	Plants per square foot, ¹ by dates					
	8-11-66	10-15-66	5-12-67	8-1-67	5-30-68	10-5-68
	No.	No.	No.	No.	No.	No.
East side						
Interstate.....	12	13	17	15	28	24
Serala.....	14	18	21	18	34	21
Common.....	24	25	23	24	32	22
Gasyn.....	14	25	20	22	33	20
N.C. Prostrate.....	29	25	21	23	31	24
West side						
Interstate.....	9	8	12	10	31	17
Serala.....	10	11	16	9	29	21
Common.....	3	8	8	11	20	18
Gasyn.....	4	9	6	7	21	18
N.C. Prostrate.....	7	12	9	4	19	14

¹ Averages of counts made in five 2-foot-square areas per plot, and reported as number per square foot.

TABLE 2. TRUE HEIGHT OF SERICEA AT I-59 LOCATION NORTH OF FORT PAYNE, ALABAMA

Sericea variety	True plant height ¹ on each side of highway					
	East side			West side		
	10-15-66	8-1-67	1-25-68	10-15-66	8-1-67	1-25-68
	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>
Interstate.....	8	26	33	8	25	30
Serala.....	9	37	49	9	31	42
Common.....	11	40	52	8	35	41
Gasyn.....	8	35	45	5	27	44
N.C. Prostrate.....	8	27	38	6	27	42

¹ Average height measured from the ground to the tips of extended plant stems.

TABLE 3. APPARENT HEIGHT OF SERICEA ON I-59 NORTH OF FORT PAYNE, ALABAMA

Sericea variety	Apparent plant height ¹ on each side of highway							
	East side				West side			
	8-1-67	1-25-68	5-30-68	10-5-68	8-1-67	1-25-68	5-30-68	10-5-68
	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>
Interstate.....	19	22	20	33	17	20	20	27
Serala.....	34	31	27	44	26	28	25	40
Common.....	35	34	25	47	29	34	29	42
Gasyn.....	30	33	23	36	24	30	24	37
N.C. Prostrate.....	21	24	22	38	12	23	24	29

¹ Average of five random measurements of the standing plant material.

TABLE 4. STANDS OF SERICEA ON ALA. 225 NORTH OF SPANISH FORT, ALABAMA

Sericea variety	Plants per square foot, ¹ by dates						
	7-19-66	8-10-66	11-5-66	3-23-67	7-29-67	5-7-68	
	<i>No.</i>	<i>No.</i>	<i>No.</i>	<i>No.</i>	<i>No.</i>	<i>No.</i>	
East side							
Interstate.....	40	20	18	21	20	30	
Common.....	20	11	12	16	8	6	
Serala.....	40	27	25	25	13	23	
Gasyn.....	45	30	32	32	30	22	
N.C. Prostrate.....	45	35	33	22	26	25	
West side							
Interstate.....	45	30	16	21	26	24	
Common.....	55	42	25	22	21	20	
Serala.....	55	42	30	26	18	24	
Gasyn.....	25	11	5	17	13	11	
N.C. Prostrate.....	35	25	14	4	12	13	

¹ Averages of counts made in five 2-foot-square areas per plot, and reported as number per square foot.

TABLE 5. TRUE HEIGHT OF SERICEA ON ALA. 225 NORTH OF SPANISH FORT, ALABAMA

Sericea variety	True plant height ¹ on each side of highway					
	East side			West side		
	11-5-66	5-7-67	7-29-67	11-5-66	5-7-67	7-29-67
	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>
Interstate.....	7	12	16	7	12	19
Common.....	7	15	22	5	10	18
Serala.....	8	10	21	7	16	22
Gasyn.....	6	10	18	5	15	24
N.C. Prostrate.....	5	8	17	6	12	20

¹ Average height measured from the ground to the tips of extended plant stems.

TABLE 6. HEIGHT OF SERICEA ON ALA. 225 NORTH OF SPANISH FORT, ALABAMA, 1968

Sericea variety	East side			West side		
	5-7-68	9-12-68		5-7-68	9-12-68	
	Apparent ¹ height	Apparent height	True ² height	Apparent height	Apparent height	True height
	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>
Interstate.....	15	13	22	17	11	23
Common.....	16	21	38	12	18	30
Serala.....	17	18	29	14	18	27
Gasyn.....	13	13	25	19	22	34
N.C. Prostrate.....	11	11	28	14	12	28

¹ Average of five random measurements of the standing plant material.

² Average height measured from the ground to the tips of extended plant stems.

TABLE 7. APPEARANCE OF SERICEA ON ALA. 225 NORTH OF SPANISH FORT, ALABAMA, 1968

Sericea variety	Appearance rating ¹ on each side of highway					
	East side			West side		
	4-24-68	7-30-68	9-12-68	4-24-68	7-30-68	9-12-68
	<i>Av.</i>	<i>Av.</i>	<i>Av.</i>	<i>Av.</i>	<i>Av.</i>	<i>Av.</i>
Interstate.....	5	4	5	5	5	5
Common.....	1	1	1	3	2	2
Serala.....	3	4	3	4	4	3
Gasyn.....	3	2	2	2	1	1
N.C. Prostrate.....	2	2	5	3	2	5

¹ Visual ratings by trained observers (two in most cases) on basis of color, fineness of stems, and uniformity: 5 = best appearance, 1 = poorest appearance.