CIRCULAR 221 OCTOBER 1975

Sericea - Grass Mixtures

AGRICULTURAL EXPERIMENT STATION/AUBURN UNIVERSITY
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First Printing 5M, October 1975

SERICEA-GRASS MIXTURES

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SERICEA LESPEDEZA (*Lespedeza cuneata*) is well adapted over much of Alabama. The fine-stemmed Serala[1] and the short-growing Interstate[2] are improved varieties that are superior to the old coarse-stemmed common sericea.

Although sericea produces high yields of forage in late spring and summer, it is dormant and unproductive in late autumn, winter, and early spring. It is possible to produce late winter forage by overseeding sericea with a cool season grass. This publication summarizes research in Alabama on over-seeding sericea with cool season perennial or annual grasses.

TENNESSEE VALLEY SUBSTATION

Individual plots of Serala and Interstate sericea were planted in April and Kentucky 31 tall fescue or Boone orchardgrass was broadcast overseeded in October 1969. The 5- x 20-foot plots, replicated four times, were located on Decatur clay. In 1970 all sericea-grass mixture plots were fertilized with 40 pounds N per acre. During the experimental harvest years, 1971-73, the grasses were fertilized annually with 0, 80, or 160 pounds N per acre. One-half of the N was applied in late February and the remainder in early September. Forage harvesting began in April and ended in November each year.

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[1] Donnelly, E. D. 1963. Serala Sericea—A New Sericea Variety. Auburn Univ. (Ala.) Agr. Exp. Sta. Leaf. 70.

[2] Donnelly, E. D., R. Dickens, D. G. Sturkie, and J. D. Miller. 1970. Interstate Sericea Lespedeza—A Multi-Purpose Legume. Auburn Univ. (Ala.) Agr. Exp. Sta. Leaf. 80.

Forage Yields

Total forage yields of Serala were higher than Interstate, Table 1. Virtually all sericea forage production occurred from May to September from two to three hay cuts. Yields were similar during 1971-73.

Overseeding tall fescue or orchardgrass on Serala without applying N had little effect on total yield. Nitrogen increased the yield of all grass-sericea combinations. Total yields were highest on the Serala-grass mixtures, averaging about 5 tons per acre when 160 pounds N per acre was applied.

Seasonal distribution of forage was more important than total yield. Good production of tall fescue and orchardgrass was obtained in late March through April when sericea was unproductive, Figure 1. Although sericea greened up in April, there was little available forage on it until May. When grass was not fertilized with N, very little forage was obtained, Figure 2. This indicates that although sericea is a legume, it furnishes little N to associated grasses.

Both tall fescue and orchardgrass fertilized annually with 160 pounds N per acre furnished approximately 1¼ tons of dry forage during March and April, Table 1. Orchardgrass made somewhat more growth than tall fescue in March each year. Spring production of the grasses was similar on both of the two sericea varieties. Tall fescue produced more autumn forage than orchardgrass although production of both grasses was low.

Nitrogen-fertilized grass depressed late spring and early sum-

FIG. 1. Spring growth of tall fescue (left) and orchardgrass (right) overseeded on sericea extends the productive season without injuring the sericea stand.

FIG. 2. Nitrogen fertilizer is essential for good spring production (left) of tall fescue. Sericea does not furnish adequate N for good growth of tall fescue (right).

mer production of sericea but had no effect in late summer when grasses made little growth. The grasses made considerable growth during May but generally furnished little forage in June and July, Figure 3. To utilize forage from sericea-grass mixtures, the grass can be grazed from March until May. Rapid late spring and summer growth of sericea can be cut for hay. As sericea growth ceases in late summer, autumn growth of grass can be grazed until November or December.

Stands

Stands of both sericea varieties persisted well in association with grasses at all rates of N under the hay cutting system used.

TABLE 1. THREE-YEAR (1971-73) AVERAGE FORAGE YIELDS OF SERICEA-GRASS MIXTURES AS AFFECTED BY RATE OF NITROGEN, TENNESSEE VALLEY SUBSTATION

Sericea	Grass	Nitrogen per acre annually	Dry forage yield per acre			
			March-April	May-Sept.	Oct.-Nov.	Total
		Lb.	*Lb.*	*Lb.*	*Lb.*	*Lb.*
Serala	------	0	50	8,120	0	8,170
Interstate	------	0	40	6,960	0	7,000
Serala	Tall fescue	0	530	8,210	150	8,890
Serala	Tall fescue	80	1,370	8,180	350	9,900
Serala	Tall fescue	160	2,404	8,770	610	10,950
Serala	Orchardgrass	0	410	7,710	100	8,220
Serala	Orchardgrass	80	1,460	7,240	260	8,960
Serala	Orchardgrass	160	2,340	7,600	330	10,270
Interstate	Tall fescue	0	570	6,650	260	7,480
Interstate	Tall fescue	80	1,540	6,900	640	9,080
Interstate	Tall fescue	160	2,650	5,760	930	9,340
Interstate	Orchardgrass	0	390	6,360	120	6,870
Interstate	Orchardgrass	80	1,260	6,210	350	7,820
Interstate	Orchardgrass	160	2,330	6,120	520	8,970

Both tall fescue and orchardgrass maintained excellent stands in Interstate sericea, Table 2. In Serala sericea, tall fescue stands were less at 0 and 80 as compared to 160 pounds N per acre. Tall fescue stands generally increased during the 3 years. Orchardgrass stands remained constant unless N was not applied. Under continuous heavy grazing, orchardgrass stands can be expected to deteriorate.

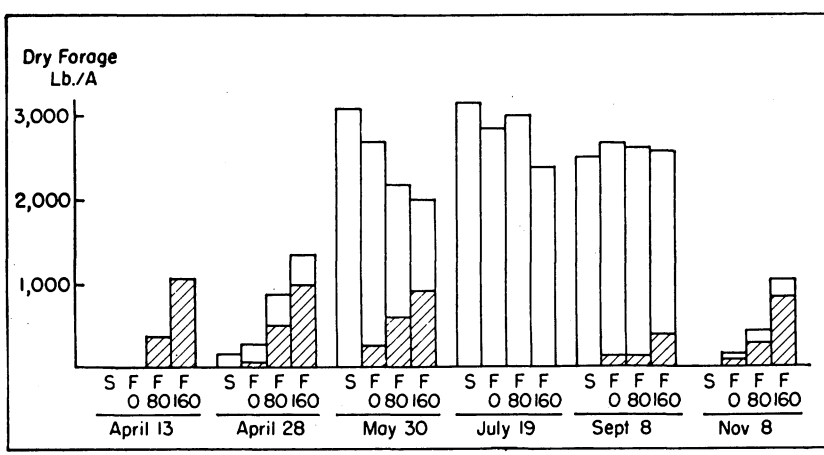

FIG. 3. Seasonal growth in 1972 of Serala sericea (S) and sericea-fescue (F) as affected by rates of nitrogen (0, 80, 160 lb. per acre). Fescue growth is shown in cross-hatched areas and sericea in plain areas.

Forage Quality

Forage quality as measured by digestible dry matter (DDM) was improved over the entire season by growing tall fescue in association with sericea and fertilizing with N, Figure 4. DDM of Serala sericea averaged 47 percent for the year as compared to 60 percent for non-nitrated tall fescue-sericea and 67 percent for tall fescue-sericea with 160 pounds N per acre. DDM of orchardgrass-sericea was similar to that for tall fescue-sericea. DDM of Serala sericea was similar to that determined in other tests for Coastal bermudagrass. The improved forage quality of the nitrogen fertilized grass-sericea sward as compared to sericea alone should result in improved animal performance. This is especially important when it is coupled with better distribution of forage in the sericea-grass mixture than with either grass or sericea alone.

BREWTON EXPERIMENT FIELD

An experimental nematode-resistant sericea, similar in growth habit to Serala, was broadcast planted on Benndale fine sandy loam in March 1969. In October, Kentucky 31 tall fescue was seeded at 20 pounds per acre broadcast or in 6-inch rows in the sericea, using 5- x 20-foot plots replicated four times. Additional plots had Wrens Abruzzi rye planted in 6-inch rows at 90 pounds per acre each October during the 4-year (1970-73) experiment. Nitrogen was applied to sericea-grass mixtures at 50 pounds per

TABLE 2. STANDS OF SERICEA-GRASS MIXTURES AS AFFECTED BY RATE OF NITROGEN, TENNESSEE VALLEY SUBSTATION, 1972-73

Sericea	Grass	Nitrogen per acre annually	Stand of tall fescue or orchardgrass	
			March, 2nd year	March, 3rd year
		Lb.	*Pct.*	*Pct.*
Serala	Tall fescue	0	42	50
Serala	Tall fescue	80	45	65
Serala	Tall fescue	160	68	80
Serala	Orchardgrass	0	62	52
Serala	Orchardgrass	80	72	70
Serala	Orchardgrass	160	62	68
Interstate	Tall fescue	0	92	95
Interstate	Tall fescue	80	89	96
Interstate	Tall fescue	160	89	95
Interstate	Orchardgrass	0	84	85
Interstate	Orchardgrass	80	81	86
Interstate	Orchardgrass	160	82	92

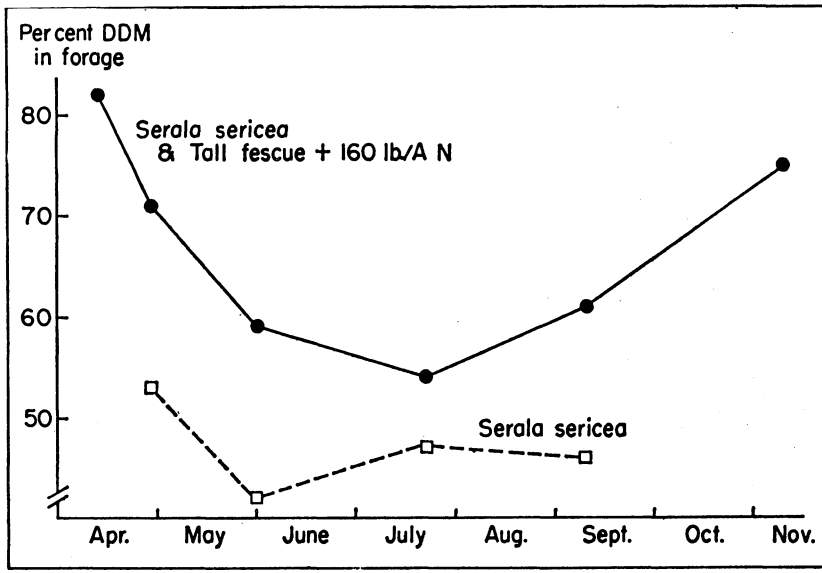

FIG. 4. Digestible dry matter (DDM) of forage over the growing season, 1972.

acre in November and again in February. Forage harvesting began in early March and continued until late October each year. One-half of each treatment was not harvested in May to determine the effect on forage production and stand persistence.

Forage Yields

Tall fescue made little forage growth in association with sericea at this location, Table 3. Of the small yield of tall fescue, none was available before April. In contrast, rye seeded on sericea furnished over 1 ton of dry forage during February-April. In 3 out of the 4 years, good rye grazing would have been possible in late February and early March. In 2 out of the 4 years, there was sufficient rye available for grazing in late January and early February. In 1 of the 4 years there was no rye forage in February and March. Harvesting in May reduced the production of both tall fescue in May and sericea during early summer.

Stands

Tall fescue stands declined sharply over the 4-year period, Table 4. Fescue stands persisted better when harvested in May but forage production was poor under both systems of manage-

TABLE 3. FOUR-YEAR (1970-73) AVERAGE FORAGE YIELDS OF SERICEA-GRASS MIXTURES, BREWTON EXPERIMENT FIELD

Management	Grass	Dry forage yield per acre	
		Feb.-April	Total
		Lb.	*Lb.*
Not harvested in May	None	240	6,400
	Tall fescue planted broadcast	350	6,530
	Tall fescue planted in rows	270	5,580
	Rye planted annually in rows	2,390	7,580
Harvested in May	None	190	5,120
	Tall fescue planted broadcast	300	3,730
	Tall fescue planted in rows	380	3,760
	Rye planted annually in rows	2,360	6,910

ment. The poor yield and persistence of tall fescue on this soil is probably caused by nematode damage to the root system, resulting in susceptibility to drought.

AGRONOMY FARM, AUBURN

An experiment was conducted for 3 years on Dothan sandy loam soil at Auburn to determine the forage production of several winter annual grasses on Serala sericea and the effect of these grasses on stands and productivity of sericea. Wren's Abruzzi rye and common rescuegrass were seeded in 12-inch drill rows and rescuegrass and Gulf ryegrass were broadcast on previously established sericea. Plantings were made on the same area late in October or early in November of 1966, 1967, and 1968. Plots were 5- x 20-feet, replicated three times. Nitrogen at 100 pounds per acre was split into two equal applications. Sericea and grasses were hand separated to determine the production of each species.

Rye was the only winter grass to produce appreciable forage by March 20, Figure 5. The 3-year average yield of 1,280 pounds per acre was not high but supplemented the productive season

TABLE 4. STANDS OF TALL FESCUE IN SERICEA-TALL FESCUE MIXTURES, BREWTON EXPERIMENT FIELD

Management	Grass	Tall fescue stand		
		1971	1972	1973
		Pct.	*Pct.*	*Pct.*
Not harvested in May	Tall fescue planted broadcast	68	52	25
	Tall fescue planted in rows	76	60	16
Harvested in May	Tall fescue planted broadcast	92	88	50
	Tall fescue planted in rows	100	91	55

of sericea. In only 1 year was there sufficient forage to harvest in January. Most of the winter production occurred late in February and in March. Average 3-year yields by March 20 for fescue and ryegrass were low with little or no production during 2 years. Rescuegrass gave low yields on both the broadcast and drilled plots.

Forage production from March 20 to April 20 was similar for all the winter grasses. During this period sericea alone yielded about 50 percent of what the plots with winter grasses overseeded

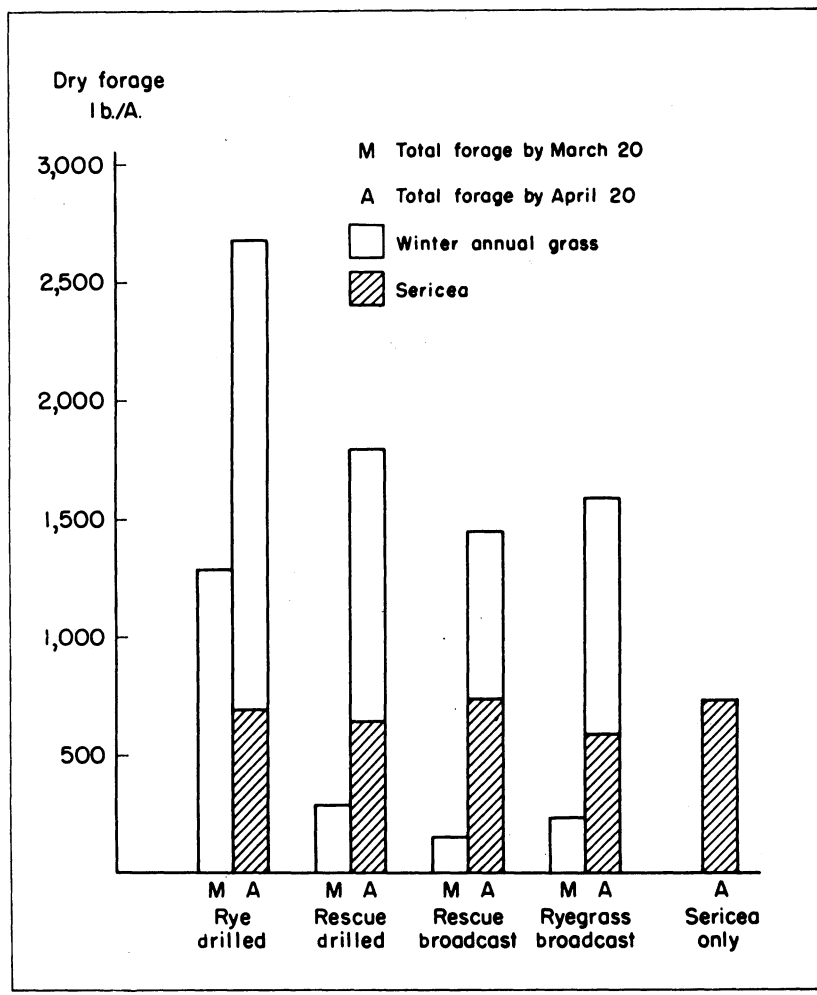

FIG. 5. Three-year average winter forage production by sericea-annual winter grass mixtures, Auburn.

on sericea produced. The mixtures contained little sericea by April 20, indicating that the winter grasses delayed spring growth of sericea.

Total annual production of sericea alone averaged 5,900 pounds per acre for the 3-year period, Figure 6. Rye increased the total production over that of sericea alone but rescue and ryegrass did not. Rescue and ryegrass competition delayed spring growth and reduced total annual production of sericea.

Seeding of annual grasses had no adverse effect on sericea stands. Live stem numbers were the same at the end of 3 years as at the beginning of the experiment.

Rye seeded on sericea increased total yields about 1 ton per acre. It is likely that higher yields would be obtained on a less droughty soil than was used in this experiment. Overseeding rye

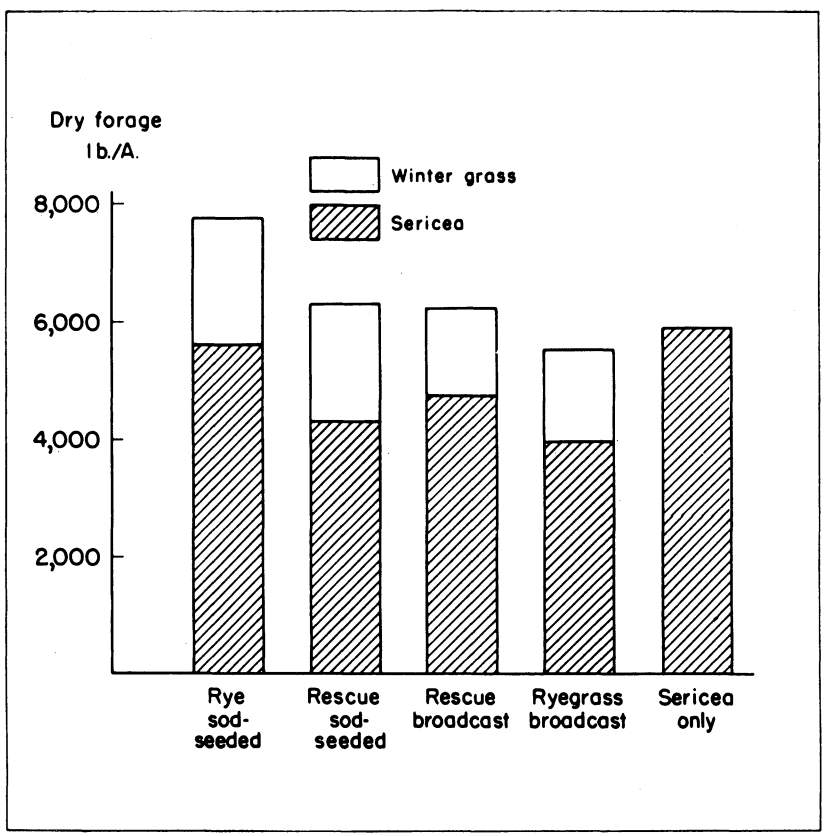

FIG. 6. Three-year average total forage production by sericea-annual winter grass mixtures, Auburn.

on sericea provided grazing potential 2 months earlier in the spring than the pure sericea sward.

CONCLUSIONS

1. Tall fescue or orchardgrass, overseeded on Serala sericea and fertilized with 160 pounds N per acre extended the productive season over 3 months in the Tennessee Valley of northern Alabama. Total annual yields of dry forage were increased from 4 tons per acre of Serala sericea alone to over 5 tons per acre when grass was grown with sericea and fertilized with 160 pounds N per acre. The productive season of sericea-grass mixtures extended from March until November.

2. Persistence of both grass and sericea in a mixture was good over a 4-year period at the Tennessee Valley Substation.

3. Forage quality, as measured by digestible dry matter, was increased over the year by growing nitrogen-fertilized tall fescue or orchardgrass in association with sericea.

4. At Brewton Experiment Field in southern Alabama, tall fescue was unproductive and did not persist in association with sericea.

5. Rye overseeded on sericea and fertilized with 100 pounds per acre N at Auburn and Brewton, extended the productive season 2 months and increased total yields about 1 ton per acre. Rescuegrass and ryegrass furnished much less winter production than rye. Most of the rye winter production occurred in late February and March.

6. Overseeding rye for 4 years had no adverse effect on sericea stands.

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