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PERFORMANCE of SILAGE VARIETIES

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SILAGE IS INCREASING in importance as part of the roughage feeding program for Alabama livestock production. There are two major reasons for the increased interest in silage crops: (1) recognition by producers of the importance of harvested roughages; and (2) the trend toward intensification of production, particularly in the dairy industry.

Corn is considered the ideal silage crop for productive soils. Silage made from corn with high grain content is easy to preserve and is a high quality roughage. However, many soils in Alabama are too droughty for corn to consistently make satisfactory yields. With such soils and uncertain rainfall, sorghum may be more productive than corn because it is more drought tolerant.

In recent years a large number of forage sorghum varieties have been released. Many of these varieties are leafier and produce much more grain than the older varieties. In the tests reported here, some of the newer sorghum varieties were compared with corn varieties commonly grown for silage. Sorghum almum, pearlmillet, and Sudax 11 were each included at one location.

Silage variety trials were conducted at five locations in Alabama during 1960 and 1961. The test entries were planted in 3-row plots 20 feet long with four replications. Row spacings varied with location to accommodate available cultivating equipment. A width of 36 inches was used at Marion Junction, 38 inches at Fairhope, 40 inches at Tallassee, and 42 inches at Belle Mina and Camp Hill. The tests were planted in late April or early May and fertilized at planting with 20 to 30 pounds per acre of nitrogen and adequate rates of phosphorus and potassium. All tests were sidedressed with 40 to 80 pounds of nitrogen per acre each year. The sorghum varieties were harvested when they reached the dough stage and corn when well dented. The center row of each plot was harvested and a sample of green forage was oven dried for determination of dry forage yields.

RESULTS

Reported in Tables 1-6 are maturity, height, grain production, disease resistance, sugar content, and forage yield of the varieties tested.

Maturity. The average time required from planting to the proper maturity for harvest varied from 80 days for the very early varieties to 135 days for the latest maturing entry, Table 1. These data are 2-year averages of the five locations and are presented as a guide for farm planning. Some variation in maturity should be expected because of location, time of planting, and rainfall distribution.

Varieties requiring an average of 80 to 100 days from planting to harvest are classified as very early; those requiring 100 to 115 days are early; those requiring 115 to 120 days are medium; and

* The tests were conducted in cooperation with John Boseck, Tennessee Valley Substation; Jordan Langford, Plant Breeding Unit; E. L. Mayton, Piedmont Substation; L. A. Smith and H. W. Grimes, Black Belt Substation; and Harold Yates and J. E. Barrett, Gulf Coast Substation.

TABLE 1. SOME CHARACTERISTICS AT FIRST HARVEST OF SILAGE VARIETIES TESTED IN ALABAMA, 1960-61

Entry	Time to silage maturity	Height	Proportion of head or ear in dry matter	Sugar content (brix) of juice
	Days	*Feet*	*Pct.*	*Pct.*
VERY EARLY				
DeKalb Sudax-11	80	8	16	12
Sorghum almum	80	9	----	10
Gahi-1 millet	90	9	6	----
Starr millet	90	6	6	----
EARLY				
Corn				
Pioneer 309A	100	8	65	----
Dixie 18	105	9	44	----
Dixie 29	105	9	----	----
Pfister 488	105	8	61	----
Sorghum				
DeKalb FS-1A	100	6	36	10
Combine Sagrain	100	5	----	----
NK-300	105	6	49	7
NK-320	105	9	38	7
Frontier S-212	105	7	----	----
DeKalb FS-22	110	10	9	14
NK-315	110	8	24	14
Lindsey 101F	110	7	23	12
MEDIUM				
Sorghum				
Silo King	115	9	26	11
Taylor-Evans Yieldmaker	115	10	29	11
NK-330	115	5	36	13
Lindsey 115F	120	12	21	14
Asgrow Beefbuilder	120	12	23	14
Tracy	120	9	7	16
LATE				
Sorghum				
Orange	125	8	24	11
Brawley	125	9	10	20
Sart	135	14	4	18

those requiring 125 or more days are classified as late maturing varieties. The early maturing sorghum varieties produced a second cutting in southern Alabama and at lower elevations in central Alabama. Regrowth from the stubble required less time for maturity than did the first crop.

Height. Height of the varieties varied from 5 to 14 feet, Table 1. The taller varieties generally produced the most forage, but were more susceptible to lodging, particularly when they produced heavy heads. Lodging was not a serious problem in these tests, except for 1 year at Camp Hill, Fairhope, and Tallassee.

Grain Production. The proportion of forage yield that was head or ear varied from 4 per cent for Sart sorghum to 65 per cent for Pioneer 309A corn, Table 1. Four of the forage sorghums, DeKalb FS-1A, NK-300, NK-320, and NK-330, were more than 30 per cent head at harvest.

Grain yield of all the sorghums may be reduced by the midge insect. There was a great difference among varieties in the amount of damage observed. DeKalb FS-1A was often severely damaged by midge, whereas NK-300 generally had high grain production. Bird damage may also severely reduce grain yields.

TABLE 2. YIELDS OF SILAGE VARIETIES AT TENNESSEE VALLEY SUBSTATION, BELLE MINA, 1960-61

Entry	Oven dry forage yields per acre				
	1960 harvests			1961 total	2-year av. total
	First	Second	Total		
	Tons	*Tons*	*Tons*	*Tons*	*Tons*
Sart	10.70	----	10.70	----	----
Asgrow Beefbuilder	10.47	----	10.47	6.12	8.30
Lindsey 115F	9.04	----	9.04	5.01	7.02
Taylor-Evans Yieldmaker	7.92	----	7.92	5.54	6.73
Silo King	6.55	----	6.55	6.02	6.28
DeKalb FS-22	----	----	----	5.94	----
NK-300	6.21	----	6.21	5.45	5.83
NK-320	----	----	----	5.70	----
Lindsey 101F	----	----	----	5.34	----
NK-330	----	----	----	4.96	----
DeKalb FS-1A	5.17	----	5.17	3.27	4.22
Sorghum almum	4.95	2.05	7.00	----	----
DeKalb Sudax-11	5.17	1.65	6.72	6.12	6.42
Dixie 18 corn	6.78	----	6.78	----	----
Dixie 29 corn	6.78	----	6.78	----	----
Pfister 488 corn	----	----	----	5.04	----
L.S.D. (5 per cent)	----	----	*1.12*	*0.80*	*1.08*

Disease Resistance. The newer sorghum varieties described in this report were developed in the semi-arid region of the western United States and may not have sufficient disease resistance in humid areas. Several of these varieties grown in fields where rotation was not practiced were badly damaged by red rot (*Colletotrichum graminicolum* (Ces.) A. W. Wils). Red rot is a disease of the interior of stalks and may cause lodging. The Sart

TABLE 3. YIELDS OF SILAGE VARIETIES AT PIEDMONT SUBSTATION, CAMP HILL, 1960-61

Entry	Oven dry forage yields per acre					
	1960 harvests			1961		2-year av. total
	First	Second	Total	Total	Lodging	
	Tons	*Tons*	*Tons*	*Tons*	*Pct.*	*Tons*
Asgrow Beefbuilder	----	----	----	6.26	50	----
Sart	6.79	----	6.79	4.91	0	5.85
NK-315	----	----	----	4.86	90	----
DeKalb FS-22	4.87	----	4.87	4.19	0	4.53
NK-320	4.23	----	4.23	4.58	95	4.40
Taylor-Evans Yieldmaker	----	----	----	4.56	90	----
NK-300	3.35	----	3.35	4.68	0	4.01
DeKalb FS-1A	3.95	----	3.95	3.86	0	3.90
Gahi-1 millet	4.22	0.34	4.56	----	----	----
Starr millet	2.72	0.54	3.26	----	----	----
Dixie 18 corn	4.66	----	4.66	5.10	0	4.88
L.S.D. (5 per cent)	----	----	*1.41*	*N.S.*	----	*N.S.*

variety is highly resistant to red rot and Tracy has some resistance.

Sugar Content. Sugar content of the juice of sorghums was determined in the field with a hand refractometer. The content of dissolved solids (an indirect measure of sugar) in the plant juice varied from 7 to 20 per cent, Table 1.

Yield. Yields are reported as oven dry matter rather than green weight because stage of maturity, time of harvest, and weather conditions affect moisture content, Tables 2-6. Dry matter content of the forages at harvest generally varied from 25 to 35 per cent.

Corn yields varied from 4.01 to 6.78 tons of dry forage per acre as compared with sorghum yields of 3.27 to 12.25 tons. Corn, pearlmillet, Sudax-11, and Sorghum almum yields usually were lower than those from the tall forage sorghums.

At Belle Mina, Table 2, and Camp Hill, Table 3, only one cutting of sorghum can normally be expected. In central and southern Alabama, the early maturing varieties often make sufficient regrowth from the stubble to mature before frost.

TABLE 4. YIELDS OF SILAGE VARIETIES AT PLANT BREEDING UNIT, TALLASSEE, 1960-61

Entry	Oven dry forage yields per acre						
	1960 harvests			1961 harvests			2-year av. total
	First	Second	Total	First	Second	Total	
	Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*
Lindsey 115F	5.91	4.86	10.77	3.55	6.58	10.13	10.45
DeKalb FS-22	4.79	3.88	8.67	5.90	4.75	10.65	9.66
Taylor-Evans Yieldmaker	5.22	3.65	8.87	3.26	5.88	9.14	9.00
Frontier S-212	----	----	----	5.04	4.06	9.10	----
NK-330	4.64	3.79	8.43	4.73	4.22	8.95	8.69
Asgrow Beefbuilder	6.76	2.07[1]	8.83	5.04	2.85	7.89	8.36
NK-320	4.30	3.95	8.25	3.19	5.32	8.51	8.38
NK-315	3.52	4.88	8.40	3.12	5.02	8.14	8.27
Lindsey 101F	3.68	3.98	7.66	3.13	5.62	8.75	8.20
NK-300	3.26	3.75	7.01	3.01	4.26	7.27	7.14
Sart	6.87	----	6.87	6.90	----	6.90	6.88
DeKalb FS-1A	2.71	3.70	6.41	2.57	3.80	6.37	6.39
Tracy	----	----	----	6.31	----	6.31	----
Brawley	----	----	----	6.03	----	6.03	----
Orange	4.78	----	4.78	----	----	----	----
Silo King	4.47[2]	----	4.47	4.96[3]	----	4.96	4.71
Pfister 488 corn	----	----	----	5.44	----	5.44	----
Dixie 18 corn	----	----	----	5.13	----	5.13	----
L.S.D. (5 per cent)	*0.96*	*1.04*	*1.58*	*0.80*	*0.91*	*0.91*	*1.51*

[1] 40 per cent lodged.
[2] 10 per cent lodged.
[3] 20 per cent lodged.

TABLE 5. YIELDS OF SILAGE VARIETIES AT BLACK BELT SUBSTATION, MARION JUNCTION, 1960-61

Entry	Oven dry forage yields per acre						
	1960 harvests			1961 harvests			2-year av. total
	First	Second	Total	First	Second	Total	
	Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*
Sart	12.08	----	12.08	8.38	----	8.38	10.23
Lindsey 101F	----	----	----	5.18	3.69	8.87	----
Asgrow Beefbuilder	----	----	----	8.46	----	8.46	----
NK-315	----	----	----	4.78	3.83	8.61	----
Lindsey 115F	6.38	----	6.38	7.40	----	7.40	6.89
Silo King	5.38	----	5.38	4.68	3.29	7.97	6.68
NK-320	5.61	----	5.61	3.83	3.65	7.48	6.54
Taylor-Evans Yieldmaker	5.98	----	5.98	7.15	----	7.15	6.56
NK-330	----	----	----	6.63	----	6.63	----
NK-300	5.10	----	5.10	3.67	3.33	7.00	6.05
Tracy	6.05	----	6.05	----	----	----	----
DeKalb FS-22	5.79	----	5.79	5.86	----	5.86	5.83
Orange	5.00	----	5.00	----	----	----	----
DeKalb FS-1A	3.86	----	3.86	3.10	2.90	6.00	4.93
DeKalb Sudax-11	4.68	3.34	8.02	3.96	3.41	7.37	7.70
Dixie 18 corn	5.49	----	5.49	4.01	----	4.01	4.75
L.S.D. (5 per cent)	----	----	*1.23*	*1.36*	----	*1.02*	*1.44*

TABLE 6. YIELDS OF SILAGE VARIETIES AT GULF COAST SUBSTATION, FAIRHOPE, 1960-61

Entry	Oven dry forage yields per acre							
	1960 harvests				1961 harvests			2-year av. total
	Lodging	First	Second	Total	First	Second	Total	
	Pct.	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*
Sart	4	7.44	3.51	10.95	8.65	3.60	12.25	11.60
Asgrow Beefbuilder	----	----	----	----	7.98[1]	3.31	11.29	----
Taylor-Evans Yieldmaker	----	----	----	----	7.28[1]	3.35	10.63	----
DeKalb FS-22	7	6.16	4.60	10.76	6.72	3.89	10.61	10.68
Lindsey 115F	----	----	----	----	7.18	3.20	10.38	----
NK-320	90	5.76	2.94	8.70	5.47	2.72	8.19	8.44
Tracy	0	6.55	1.69	8.24	----	----	----	----
NK-300	0	4.81	2.58	7.39	5.11	2.46	7.57	7.48
DeKalb FS-1A	1	3.91	2.75	6.66	3.94	2.39	6.33	6.49
Orange	10	5.78	----	5.78	----	----	----	----
Combine Sagrain	0	4.98	----	4.98	----	----	----	----
Dixie 18 corn	0	5.70	----	5.70	6.32	----	6.32	6.01
Pioneer 309A corn	----	----	----	----	4.48	----	4.48	----
L.S.D. (5 per cent)	----	*1.30*	*0.96*	*1.76*	*0.78*	----	*0.87*	*1.24*

[1] 5 per cent lodged.

Yields from the second cutting sometimes exceed those from the first cutting. If a second cutting is expected, planting must be done early and the crop sidedressed with nitrogen after the first cutting. Second cutting yields given in the tables were harvested only from varieties that headed before frost. Regrowth from some varieties was quite vigorous. Regrowth was usually poor on Silo King and Tracy even though they are not late maturing varieties.

SUMMARY

A large number of forage sorghum varieties with widely different characteristics have been tested at five Alabama locations for 2 years. Since 3 years of testing are considered necessary to give a good measure of the performance of a variety, this report is preliminary. However, the data should be of value in selecting a variety.

Corn, pearlmillet, Sorghum almum, and Sudax-11 yields usually were lower than those from the tall forage sorghums. On the basis of available information, some sorghum varieties can be recommended on a trial basis. These varieties are listed alphabetically within each sub-group and are equally acceptable except as noted.

HIGH FORAGE YIELD, LOW GRAIN, HIGH SUGAR
Early maturity—DeKalb FS-22
Medium maturity—Tracy
Late maturity—Sart
Excess lodging has sometimes occurred with Sart.

HIGH FORAGE YIELD, MEDIUM GRAIN, MEDIUM TO HIGH SUGAR
Early maturity—Lindsey 101F, NK-315
Medium maturity—Beefbuilder, Lindsey 115F, Yieldmaker
All except Lindsey 101F have lodged badly in several tests.

LOWER FORAGE YIELD, HIGH GRAIN, LOW SUGAR
Early maturity—NK-300, NK-320
NK-320 has lodged badly in several tests.