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The 1999 Summer Forage Annuals Report

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Introduction

The summer annual grasses are an important forage crop in Kentucky, used mainly as emergency or supplemental hay and pasture crops. Little information is available on the yield potential in Kentucky about the newer cultivars of these grasses. The purpose of this publication is to summarize 1999 yield trials with pearl millet, sudangrass, sorghum-sudangrass hybrids, and forage sorghums.

Considerations in Selecting a Variety

The major factor in determining a variety of summer annual grass is yield, both total and seasonal. Growth after first cutting is strongly dependent on available moisture and nitrogen fertilization. Summer annual grasses in general have different characteristics and uses. Pearl millets vary considerably in height and can be used for both pasture and hay. They also have the advantage of not having any potential for prussic acid, or hydrogen cyanide (HCN), poisoning. Sudangrasses, sorghum-sudangrass hybrids, and forage sorghums are all related grasses (in the sorghum family). They all have potential for prussic acid (cyanide) poisoning when immature shoots are grazed. Sudangrasses are considered to have the least potential for prussic acid poisoning and forage sorghums the most, with sorghum-sudangrasses being intermediate. Sudangrasses have smaller, finer stems than sorghum-sudan hybrids, which have finer stems than forage sorghums. Consequently, sudangrasses and sorghum-sudan hybrids are more easily cured for hay than forage sorghums. Pearl millets, sudans, and sorghum-sudans typically are harvested multiple times during the growing season, and forage sorghums usually are harvested only once.

Description of the Tests

A summer forage annuals variety test was established at Lexington and Quicksand in 1999 as part of the forage variety testing program. Summer forage annuals tested included pearl millets, sorghum-sudangrasses, and forage sorghums. The soils at Lexington (Maury) and Quicksand (Pope) are well suited to annual grasses in that they are generally well-drained silt loams. Plots were 5 x 15 feet in a randomized complete block design with eight replications at Lexington and four replications at Quicksand. In each location, pearl millet, sorghum-sudangrass, and forage sorghum were sown at 25, 30, and 15 pounds of seed per acre, respectively, into a prepared seedbed using a disk drill. Plots were harvested with a sickle-type forage plot harvester. First cutting was made at six weeks after planting. Harvest intervals for the second and third cuttings were at six and eight weeks, respectively. Fresh weight samples were taken at each harvest to calculate percent dry matter production. Management of all tests for establishment, fertility, pest control, and harvest management was according to University of Kentucky Cooperative Extension Service recommendations. Pests were controlled so that they would not limit yield. The Lexington location was irrigated to establish the stand. Nitrogen was applied at 60 pounds per acre two weeks after planting and immediately after each harvest. The Quicksand location received more rainfall, which allowed for three harvests versus only two at Lexington.

Results and Discussion

Weather data for Lexington and Quicksand are presented in Table 1. The 1999 growing season was hotter and drier than in any recent year. During the growing season, temperature was 6° to 10° higher than normal and rainfall was 1 inch to 4 inches lower than normal for each month at both locations except for August at Quicksand. Lack of rainfall severely affected production for all three harvests.

Yield data (on a dry matter basis) for all tests are reported in Tables 2 through 7. Varieties are listed in order from highest to lowest total production. Yields are given by cutting and as a total for the year. Statistical analyses were performed on all yield data to determine if the apparent differences are truly due to variety or just due to chance. Varieties not significantly different from the highest numerical value in a column are marked with one asterisk (*). To determine if two varieties are truly different, compare the difference between the two varieties to the Least Significant Difference (LSD) at the bottom of the column. If the difference is equal to or greater than the LSD, the varieties are truly different when grown under the conditions at a given location. The Coefficient of Variation (CV), which is a measure of the variability of the data, is included for each column of means. Low variability is desirable, and increased variability within a study results in higher CVs and larger LSDs.

Table 8 summarizes information about proprietors, distributors, and yield performance across locations for all the varieties included in the tests discussed in this report. Varieties are listed in alphabetical order. In Table 8, shaded areas indicate that the variety was not in that particular test (labeled at the top of the column), while white or unshaded blocks mean that the variety was in the test. A single asterisk (*) means that the variety was not significantly different from the top-yielding variety based

on the 5% LSD. It is best to choose a variety that has performed well over several years and locations, as indicated by the asterisks. Make sure seed of the variety is properly labeled and will be available when needed.

Summary

Summer annual grasses can be an important supplemental source of pasture, hay, and silage in Kentucky. Varieties should be selected for the seasonal and total yield characteristics and for their suitability for the method of harvest to be employed (pasture, hay, or silage).

Table 1. Temperature and rainfall at Lexington, Kentucky, and Quicksand, Kentucky, in 1999.

	Lexington				Quicksand			
	Temp		Rainfall		Temp		Rainfall	
MON	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	36	+5	5.64	+2.78	39	+8	6.29	+3.00
FEB	40	+5	2.32	-0.89	41	+8	3.18	-0.42
MAR	40	-4	3.27	-1.13	42	+1	3.09	-1.25
APR	56	+1	1.87	-2.01	60	+7	3.49	-0.61
MAY	65	+1	1.35	-3.12	66	+4	2.48	-2.00
JUN	74	+2	3.89	+0.23	73	+3	2.65	-1.17
JUL	80	+4	1.00	-4.00	78	+4	2.59	-2.66
AUG	75	0	1.31	-2.62	74	+1	6.62	+2.61
SEP	69	+1	1.03	-2.17	69	+3	1.13	-2.39
OCT	57	0	1.91	-0.66	58	+4	3.07	+0.16
NOV	51	+6	1.70	-1.69	53	+11	2.65	-1.23

DEP is departure from the long-term average for that location.

Table 2. Dry matter yields (tons/acre) and maturity of pearl millet and sudan-grass varieties and a soybean/pearl millet mixture sown June 9, 1999, at Lexington, Kentucky.[1]

Variety	Type[2]	Maturity[3] July 26, 1999	1999 Harvests Jul 26	1999 Harvests Oct 15	1999 Total
Commercial Varieties—available for farm use					
Trudan10	SU	40.0	2.24 *	1.98 *	4.22 *
Millex 32	PM	50.0 *	2.84 *	0.84	3.68 *
Leafy Green	PM	30.0	1.93	1.20	3.12
FFR 120	SU	40.0	1.83	1.21	3.04
MilHy 500	PM	30.0	1.76	1.17	2.93
Hutcheson/MilHy 500	S/PM	30.0	1.72	1.05	2.77
Mean		36.7	2.05	1.24	3.29
CV, %			34.72	10.07	22.33
LSD, 0.05			0.72	0.13	0.75

[1] This test received irrigation to establish the stand and 60 pounds N per acre applied June 22 and July 27.
[2] PM = pearl millet, SU = sudangrass, S/PM = soybean/pearl millet mixture.
[3] Maturity rating scale: 37=flag leaf visible, 45=boot swollen, 50=beginning of inflorescence emergence, 58=complete emergence of inflorescence, 62=beginning of pollen shedding.
* Not significantly different from the top-ranked variety in the column, based on the 0.05 LSD.

Table 3. Dry matter yields (tons/acre) of pearl millet and sudan-grass varieties and a soybean/pearl millet mixture sown June 9, 1999, at Quicksand, Kentucky.[1]

Variety	Type[2]	1999 Harvests Jul 23	1999 Harvests Sep 2	1999 Harvests Oct 26	1999 Total
Commercial Varieties—available for commercial use					
Trudan 10	SU	2.23 *	3.12 *	0.39 *	5.74 *
Millex 32	PM	2.34 *	1.94	0.28 *	4.56
MilHy 500	PM	1.86	2.12	0.26 *	4.25
Leafy Green	PM	2.01	1.94	0.23	4.18
FFR 120	SU	1.82	1.98	0.30 *	4.11
Hutcheson/Leafy Green	S/PM	1.71	1.86	0.24	3.80
Mean		1.99	2.16	0.28	4.44
CV, %		6.57	12.59	30.86	7.43
LSD, 0.05		0.20	0.41	0.13	0.50

[1] Nitrogen applied at 60 pounds N per acre on June 22, July 27, and September 3.
[2] PM = pearl millet, SU = sudangrass, S/PM = soybean/pearl millet mixture.
* Not significantly different from the top-ranked variety in the column, based on the 0.05 LSD.

Table 4. Dry matter yields (tons/acre) and maturity of sorghum-sudangrass varieties and a soybean/sorghum-sudangrass mixture sown June 9, 1999, at Lexington, Kentucky.[1]

Variety	Maturity[2] July 26, 1999	1999 Harvests Jul 26	1999 Harvests Oct 15	1999 Total
Commercial Varieties—available for farm use				
FFR 211A	32.5 *	2.55 *	1.84 *	4.39 *
Sordan 79	34.0 *	2.18	1.89 *	4.08 *
DK SX 17	32.5 *	2.29	1.75 *	4.04 *
Greengraze Supreme	37.5 *	2.34 *	1.69 *	4.03 *
Greengrazer V	37.5 *	2.25	1.65	3.90
Greengraze 2	39.0 *	2.13	1.67 *	3.80
Hutcheson/FFR 211A[3]	32.5 *	1.96	1.72 *	3.69
SS 200 BMR	36.5 *	2.03	1.50	3.54
DK SX 15	37.5 *	2.10	1.39	3.49
Greengraze Extra	36.5 *	2.05	1.21	3.26
Mean	35.6	2.19	1.63	3.82
CV, %		7.82	10.16	6.54
LSD, 0.05		0.25	0.24	0.36

[1] This test received irrigation to establish the stand and 60 pounds N per acre applied June 22 and July 27.
[2] Maturity rating scale: 37=flag leaf visible, 45=boot swollen, 50=beginning of inflorescence emergence, 58=complete emergence of inflorescence, 62=beginning of pollen shedding.
[3] Mixture of Hutcheson soybean and FFR 211A sorghum-sudangrass.
* Not significantly different from the top-ranked variety in the column, based on the 0.05 LSD.

Table 5. Dry matter yields (tons/acre) of sorghum-sudangrass varieties and a soybean/sorghum-sudangrass mixture sown June 9, 1999, at Quicksand, Kentucky.[1]

Variety	1999 Harvests			1999 Total
	Jul 23	Sep 2	Oct 26	
Commercial Varieties—available for farm use				
DK SX 15	2.89 *	2.56 *	0.40 *	5.85 *
FFR 211A	3.02 *	2.29 *	0.36 *	5.67 *
DK SX 17	2.66 *	2.20 *	0.37 *	5.23 *
Greengraze Supreme	2.68 *	2.15 *	0.37 *	5.20 *
Sordan 79	2.50	2.18 *	0.38 *	5.06
Greengrazer V	2.62 *	2.07	0.34 *	5.03
Greengraze 2	2.58	1.94	0.39 *	4.90
Hutcheson/FFR 211A [2]	2.19	2.16 *	0.33 *	4.69
SS 200 BMR	2.22	1.50	0.30 *	4.03
Greengraze Extra	2.35	1.34	0.22	3.91
Mean	2.57	2.04	0.35	4.96
CV, %	11.85	16.18	28.21	10.29
LSD, 0.05	0.44	0.48	0.14	0.74

[1] Nitrogen applied at 60 pounds N per acre on June 22, July 27, and September 3.
[2] Mixture of Hutcheson soybean and FFR 211A sorghum-sudangrass.
* Not significantly different from the top-ranked variety in the column, based on the 0.05 LSD.

Table 6. Dry matter yields (tons/acre) and maturity of forage sorghum varieties and a soybean/forage sorghum mixture sown June 9, 1999, at Lexington, Kentucky.[1]

Variety	Maturity [2] July 26, 1999	1999 Harvests		1999 Total
		Jul 27	Oct 15	
Commercial Varieties—available for farm use				
DKFS 5	30.0 *	2.63 *	1.48 *	4.11 *
BMR 100	30.0 *	2.31	1.57 *	3.88 *
NK 300	30.0 *	2.25	1.61 *	3.86 *
Hutcheson/DKFS 5 [3]	30.0 *	2.09	1.46 *	3.55
Hutcheson	30.0 *	0.79	0.00	0.79
Mean	30.0	2.02	1.22	3.24
CV, %		7.21	21.76	10.89
LSD, 0.05		0.15	0.27	0.36

[1] This test received irrigation to establish the stand and 60 pounds N per acre applied June 22 and July 27.
[2] All varieties were at jointing stage when cut. Maturity rating scale: 31=first node palpable, 37=flag leaf visible, 45=boot swollen, 50=beginning of inflorescence emergence, 58=complete emergence of inflorescence, 62=beginning of pollen shedding.
[3] Mixture of Hutcheson soybean variety and DKFS 5 forage sorghum.
* Not significantly different from the top-ranked variety in the column, based on the 0.05 LSD.

Table 7. Dry matter yields (tons/acre) of forage sorghum varieties and a soybean/forage sorghum mixture sown June 9, 1999, at Quicksand, Kentucky.[1]

Variety	1999 Harvests			1999 Total
	Jul 23	Sep 2	Oct 26	
Commercial Varieties—available for farm use				
DKFS 5	2.74 *	1.19 *	0.25 *	4.18 *
BMR 100	2.27	1.45 *	0.23 *	3.95 *
NK 300	2.36 *	1.31 *	0.24 *	3.91 *
Hutcheson/DKFS 5 [2]	2.20	1.04 *	0.21 *	3.45
Hutcheson	0.87	0.00	0.00	0.87
Mean	2.09	1.00	0.19	3.27
CV, %	12.11	30.00	26.79	14.19
LSD, 0.05	0.39	0.46	0.08	0.72

[1] Nitrogen applied at 60 pounds N per acre on June 22, July 27, and September 3.
[2] Mixture of Hutcheson soybean and DKFS 5 forage sorghum.
* Not significantly different from the top-ranked variety in the column, based on the 0.05 LSD.

Table 8. Characterization and performance of summer forage annual varieties across locations in 1999.

Variety	Species[1]	Proprietor/Kentucky Distributor	Lexington	Quicksand
BMR 100	FS	ABT/To be announced	*	*
DKFS 5	FS	Dekalb	*	*
DK SX 15	SS	Dekalb		*
DK SX 17	SS	Dekalb	*	*
FFR 120	SU	FFR Cooperative		
FFR 211A	SS	FFR Cooperative	*	*
Greengraze 2	SS	ABT/To be announced		
Greengrazer V	SS	ABT/To be announced		
Greengraze Extra	SS	ABT/To be announced		
Greengraze Supreme	SS	ABT/To be announced	*	*
Hutcheson/DKFS 5	SB/FS	Ky certified seed dealer		
Hutcheson/FFR 211A	SB/SS	Ky certified seed dealer		
Hutcheson/Leafy Green	SB/PM	Ky certified seed dealer		
Hutcheson/MilHy 500	SB/PM	Ky certified seed dealer		
Hutcheson	SB	Ky certified seed dealer		
Leafy Green	PM	Green Seed Co.		
Milhy 500	PM	ABT/To be announced		
Millex 32	PM	Novartis	*	
NK 300	FS	Novartis	*	*
SS 200 BMR	SS	ABT/To be announced		
Sordan 79	SS	Novartis	*	
Trudan 10	SU	Novartis	*	*

[1] FS=forage sorghum, SB=soybean, SS=sorghum-sudangrass, SU=sudangrass, PM=pearl millet.
Shaded boxes indicate that the variety was not in the test.
Open boxes indicate the variety was in the test but yielded significantly less than the top-ranked variety in the test.
* Not significantly different from the top-ranked variety in the test.

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