



## PRODUCTION TECHNOLOGY--CROPS

### PERFORMANCE OF FORAGE BERMUDAGRASS VARIETIES IN OKLAHOMA TESTS, 1998-2003

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**BERMUDAGRASS**, *Cynodon dactylon* (L.) Pers., is used for pasture and hay over much of the southern USA. This introduced, perennial, sod-forming grass serves as the principal forage base for many livestock enterprises because of its high forage production capability and the management flexibility that it provides. Bermudagrass varieties may differ in performance characteristics relating to establishment, adaptation, forage production and forage quality. Varieties poorly adapted to an area decline in stand density and productivity one or more years following establishment. Conversely, stands of well-adapted varieties will last indefinitely. Varieties also may differ substantially in forage production capability, and to a lesser degree, in forage quality characteristics. Consequently, deciding which bermudagrass variety to plant is important. To aid in selecting varieties, comparative performance data are reported from field tests conducted over the past few years. Data are also reported for experimental bermudagrass varieties included in performance testing.

### DESCRIPTION OF THE TESTS

Forage yield data are reported from five field tests conducted at three sites. Locations and details of the tests are given in Table 1. Information about the bermudagrass varieties in the tests is given in Table 2. The recently released Midland 99 and Ozark varieties were listed in reports preceding their release by their experimental designations 74X 21-6 and 74X 12-6, respectively. Plots in all tests were started by transplanting greenhouse-grown plants about 2 feet apart in each of two rows. The rows were spaced 2 feet apart equidistant from the center of the plot. Yield determinations were made by harvesting growth from an area about 3 feet in width and 10 to 15 feet in length through the middle of each plot. All tests were dryland except Test 1997-1 at the Oklahoma Panhandle Research and Extension Center at Goodwell, OK. Test 1997-1 was irrigated with approximately six acre-inches of water per month through the growing season. All tests received nitrogen fertilizer in the amount of 300 pounds N/acre/year, split into three applications of 100 pounds N/acre. Nitrogen was first applied when the bermudagrasses initiated growth in the spring, usually in mid-April. The second and third N applications followed the first and second harvests, respectively, which usually occurred in early June and early July. Soil pH, phosphorus, and potash levels were maintained at recommended levels based on soil test results. This fertilizer program provided a high yield environment in the absence of yield limiting factors such as low soil moisture, disease and winter injury. The high yield environment was provided so that the bermudagrass varieties could express their genetic potential for forage yield.

## RESULTS

**Weather Data.** Precipitation amounts received at the respective test sites during the reported test years (1998-2003) are given in Table 3. Precipitation received during 2003 at both the Chickasha and Haskell dryland sites was slightly over 13 inches below their respective normals of 34.8 and 47.2 inches. Dry periods occurred at each site during the growing season that resulted in reduced growth. However, prolonged severe drought has not occurred at either site over the duration of the tests. Severity of winters has been mild to average. The 1998-99, 1999-2000, and 2002-2003 winters at all three locations were mild resulting in minimal low temperature stress to the bermudagrass varieties. The severity of the 2000-2001 and 2001-2002 winters was closer to normal, resulting in substantially greater low-temperature stress to plants compared to the previous few winters.

**Winter Survival.** Visual ratings of 2003 early-season growth (green-up and height) of bermudagrass varieties are given in Tables 4, 7, and 12 for Test 1997-1 at Goodwell and Tests 1998-1 and 2001-1 at Haskell, respectively. Differences among varieties in date and rate of green-up following stressful winters generally are predictive of the relative cold tolerance of the varieties. However, differences among varieties in green-up may vary among locations because of variety by location interactions. Goodwell typically has the coldest winters of the test sites.

**Forage Yields.** Forage yield data are given in Tables 5 and 6 (Test 1997-1), 8 and 9 (Test 1998-1), 10 and 11 (Test 1998-2), 13 and 14 (Test 2000-1), and 15 and 16 (Test 2001-2). The high biomass yields reflect the high yield environment management imposed on the tests. Bermudagrass varieties differed significantly ( $P < 0.05$ ) for seasonal total forage yield in all tests for all test years. In Test 1997-1 at Goodwell, the 6-year mean yield of Ozark (12.11 tons/dm/ac/yr) was significantly higher than those of all other commercial varieties. Midland 99 and Hardie had respective mean yields of 10.94 and 10.83 tons dm/ac/yr that significantly exceeded the yields of all other commercial varieties except Ozark. The experimental varieties at Goodwell with the highest 6-year mean yields were ERS 94X 2-8, 84X 16-66, and LCB 84X 19-16. In Test 1998-1 at Haskell, the 5-year mean forage yield of Midland 99 was greater than that of Tifton 44, which was greater than Greenfield. The 5-year mean yields in Test 1998-2 for the three commercial varieties were Midland 99=Tifton 44>Greenfield. Midland 99 and Tifton 44 have yielded approximately 4 tons/acre/year more dry matter than Greenfield in Test 1998-2. Midland 99 and Tifton 44 have similar 2-year mean yields in Tests 2001-1 (Haskell) and 2001-2 (Chickasha). In Test 2001-1 the mean 2-year yield of Ozark was significantly higher than that of Tifton 44, but not significantly different from that of Midland 99. The yields of Midland 99, Ozark, and Tifton 44 did not differ significantly in 2003 in Test 2001-2 at Chickasha. The experimental variety A12245 has performed exceptionally well in Tests 2001-1 and 2001-2.

## DISCUSSION

Of the commercial varieties tested, Midland has been grown in Oklahoma since the 1950's and is a proven dependable variety, particularly for central and western portions of the state. Greenfield, also released in the 1950's, has been grown most extensively in the eastern half of the state. Its popularity stems from good establishment capability and sustained productivity

over many soil types and management conditions. In eastern Oklahoma, producers generally feel that Midland is suited for production on well-drained soils, but performs less well than Greenfield on finer textured soils that tend to be less well drained. Hardie has high yield potential and superior forage quality, but is limited by susceptibility to leaf spotting disease and intolerance to low soil pH (<5.5). Each of these conditions can result in stand thinning and loss of productivity of Hardie. Tifton 44 has high yield potential and relatively broad adaptation to the state. Midland 99 is a new variety indicated by extensive testing to have good adaptation to Oklahoma, high forage production potential, and good forage quality. Ozark is a new variety indicated by extensive testing to have good adaptation to the northern part of the bermudagrass use zone where it has demonstrated high forage yield capability and good stand persistence.

Quickstand and Greenfield have excellent cold tolerance, aggressive establishment capability, and form dense sods. These are often referred to as “grazing type” varieties because of their shorter stature and denser sod relative to varieties like Midland, Midland 99, Tifton 44, and Ozark, which are referred to as “hay types”. The “grazing type” and the “hay type” varieties are used both for grazing and haying. The shorter stature “grazing type” varieties will typically spread faster during establishment and achieve a complete cover more rapidly than the named “hay type” varieties. However, once mature stands are achieved the “grazing type” varieties have lower forage yield potential than the “hay type” varieties. The greater yield potential of the “hay type” varieties compared to the “grazing type” varieties is realized to the greatest extent in high yield environments. Mature stands of the more dense “grazing type” varieties generally resist weed invasion better than mature stands of the less dense “hay type” varieties. Faster stands of varieties like Midland, Midland 99, Tifton 44, and Ozark are usually achieved by planting 30 or more bushels of sprigs per acre in comparison to lower sprig planting rates.

The substantial differences among seeded bermudagrass varieties in cold tolerance and forage yield potential are important considerations for producers. Guymon and Wrangler have a level of cold tolerance sufficient for the northern part of the bermudagrass use zone. Many seeded bermudagrass varieties currently being marketed have moderate to low freeze tolerance and are less well adapted to northern latitudes where bermudagrass is used. The choices of using a seeded vs. clonal variety and which seeded variety to use should be made taking into account the average severity of winters for a given site and the forage yield goal. Seed of bermudagrass varieties is frequently blended in an attempt to combine the desirable traits of the different varieties. Such blends are usually sold under a brand name. Some additional information on seeded bermudagrass variety performance was included in previous reports (PT 2002-3 and PT 2003-3).

**Table 1.** Location and characteristics of the bermudagrass tests from which data are reported herein.

<b>Test 1997-1</b>	
<b>Location</b>	Oklahoma Panhandle Research and Extension Center, Goodwell, OK
<b>Date Planted</b>	June 3, 1997
<b>Soil Type</b>	Richfield clay loam
<b>Treatments</b>	19 varieties
<b>Experimental Design</b>	Randomized complete block, 4 replications
<b>Irrigated or Dryland</b>	Irrigated
<b>Test 1998-1</b>	
<b>Location</b>	Eastern Research Station, Haskell, OK
<b>Date Planted</b>	May 12, 1998
<b>Soil Type</b>	Taloka silt loam
<b>Treatments</b>	12 varieties
<b>Experimental Design</b>	Randomized complete block, 4 replications
<b>Irrigated or Dryland</b>	Dryland
<b>Test 1998-2</b>	
<b>Location</b>	South Central Research Station, Chickasha, OK
<b>Date Planted</b>	May 6, 1998
<b>Soil Type</b>	McLain silt loam
<b>Treatments</b>	12 varieties
<b>Experimental Design</b>	Randomized complete block, 4 replications
<b>Irrigated or Dryland</b>	Dryland
<b>Test 2001-1</b>	
<b>Location</b>	Eastern Research Station, Haskell, OK
<b>Date Planted</b>	May 16, 2001
<b>Soil Type</b>	Taloka silt loam
<b>Treatments</b>	17 varieties
<b>Experimental Design</b>	Randomized complete block, 4 replications
<b>Irrigated or Dryland</b>	Dryland
<b>Test 2001-2</b>	
<b>Location</b>	South Central Research Station, Chickasha, OK
<b>Date Planted</b>	May 24, 2001
<b>Soil Type</b>	McLain silt loam
<b>Treatments</b>	17 varieties
<b>Experimental Design</b>	Randomized complete block, 4 replications
<b>Irrigated or Dryland</b>	Dryland

**Table 2.** Information on commercial and experimental varieties included in bermudagrass tests.

Variety or Brand	Date Released	How Planted	Origin/Owner
<b>COMMERCIAL VARIETIES - AVAILABLE FOR FARM USE</b>			
CD90160	2000	Seed	Cebeco International Seeds, Halsey, OR
Greenfield	1954	Sprigs	Oklahoma AES <sup>1</sup>
Guymon	1982	Seed	Oklahoma AES
Hardie	1974	Sprigs	Oklahoma AES
Midland	1953	Sprigs	Oklahoma AES & USDA-ARS <sup>2</sup>
Midland 99	1999	Sprigs	Oklahoma, Arkansas, Kansas, & Missouri AESs; USDA-ARS & Noble Foundation
Ozark	2001	Sprigs	Missouri, Oklahoma, Arkansas & Kansas AESs; Noble Foundation & USDA-ARS
Quickstand	1993	Sprigs	Kentucky AES & USDA-NRCS <sup>3</sup>
Tifton 44	1978	Sprigs	USDA-ARS & Georgia AES
Wrangler	1999	Seed	Johnston Seed Co., Enid, OK
<b>EXPERIMENTAL VARIETIES – NOT AVAILABLE FOR FARM USE</b>			
A12199	NA	Sprigs	Oklahoma AES
A12244	NA	Sprigs	Oklahoma AES
A12245	NA	Sprigs	Oklahoma AES
A12246	NA	Sprigs	Oklahoma AES
ERS-C	NA	Sprigs	Oklahoma AES
ERS 16S-1	NA	Sprigs	Oklahoma AES
ERS 16S-2	NA	Sprigs	Oklahoma AES
ERS 16S-3	NA	Sprigs	Oklahoma AES
ERS 16S-4	NA	Sprigs	Oklahoma AES
ERS 16S-5	NA	Sprigs	Oklahoma AES
ERS 16S-6	NA	Sprigs	Oklahoma AES
ERS 16S-7	NA	Sprigs	Oklahoma AES
ERS 16S-8	NA	Sprigs	Oklahoma AES
ERS 16S-9	NA	Sprigs	Oklahoma AES
ERS 16S-10	NA	Sprigs	Oklahoma AES
SCRS-C	NA	Sprigs	Oklahoma AES
LCB 84X 16-66	NA	Sprigs	Oklahoma AES
LCB 84X 19-16	NA	Sprigs	Oklahoma AES
ERS 94X 2-8	NA	Sprigs	Oklahoma AES
ERS 94X 5-12	NA	Sprigs	Oklahoma AES
ERS 94X 6-13	NA	Sprigs	Oklahoma AES
ERS 94X 13-9	NA	Sprigs	Oklahoma AES

<sup>1</sup>AES=Agricultural Experiment Station. <sup>2</sup>ARS=Agricultural Research Service. <sup>3</sup>NRCS=Natural Resources Conservation Service. <sup>4</sup>Blend of Cheyenne and Giant seed. <sup>5</sup>Blend of Common and Giant seed.

**Table 3.** Precipitation amounts (inches) received by month for the test locations and test years.

Month	1998	1999	2000	2001	2002	2003	1998	1999	2000	2001	2002	2003
	ERS <sup>1</sup>						OPREC <sup>2</sup>					
January	4.91	2.62	0.71	4.20	2.41	0.15	0.10	0.73	0.20	0.47	0.22	0.03
February	0.63	2.25	1.52	4.97	0.80	2.79	0.70	0.05	0.05	1.04	0.36	0.21
March	5.17	5.05	4.03	0.89	3.12	3.62	1.69	1.96	5.39	1.82	0.00	1.28
April	2.25	8.86	3.20	2.19	4.46	1.37	0.81	4.77	1.93	1.00	0.52	0.53
May	3.70	11.07	1.53	9.13	8.70	6.20	0.73	1.82	1.01	1.09	2.06	1.84
June	3.08	6.81	6.88	2.64	2.32	3.12	0.87	2.85	2.29	0.61	1.37	5.26
July	2.14	0.00	1.72	0.04	3.46	0.29	4.13	0.20	0.76	0.00	2.63	1.87
August	2.63	2.07	0.00	2.50	3.54	5.36	2.57	0.75	1.09	0.66	0.28	1.19
September	6.32	7.66	2.61	2.43	1.14	3.49	0.24	0.36	0.03	0.27	2.46	1.62
October	8.43	2.07	10.85	6.86	4.18	3.16	6.77	2.27	5.68	0.00	3.41	0.14
November	3.61	1.45	3.32	5.96	1.03	2.19	0.87	0.00	0.02	0.72	0.11	0.56
December	2.30	3.61	1.45	2.66	3.76	1.86	0.47	0.27	0.14	0.12	0.89	0.18
Month	SCRS <sup>3</sup>											
	1998	1999	2000	2001	2002	2003						
January	6.29	1.92	1.99	3.35	2.23	0.06						
February	0.54	1.29	3.05	2.87	0.89	1.13						
March	5.96	3.90	3.25	0.79	1.98	1.55						
April	4.11	6.61	3.96	0.71	4.97	2.23						
May	0.86	3.69	8.31	5.12	2.12	2.99						
June	2.10	4.66	9.20	0.61	4.03	5.32						
July	0.00	0.42	2.98	0.49	3.18	1.01						
August	0.68	1.98	0.00	3.39	1.67	4.38						
September	0.92	2.26	3.12	2.45	3.32	1.02						
October	3.82	2.06	5.30	1.56	8.05	0.40						
November	3.40	0.04	4.46	1.07	0.49	0.78						
December	1.58	3.35	1.26	1.19	2.35	0.84						

<sup>1</sup>Eastern Research Station, Haskell, OK; <sup>2</sup>Oklahoma Panhandle Research & Extension Center, Goodwell, OK.<sup>3</sup>South Central Research Station, Chickasha, OK.**Table 4.** Notes taken on bermudagrass Test 1997-1, Oklahoma Panhandle Research & Extension Center, Goodwell, OK. 2003.

Variety	Greenup <sup>1</sup>			Appearance <sup>2</sup>
	April 3	April 10	April 28	Oct. 29
<b>Commercial Varieties – Available for Farm Use</b>				
Greenfield	5	18	100	8.50
Guymon	18	28	93	7.75
Hardie	10	30	65	2.25
Midland	28	45	95	5.75
Midland 99	10	15	75	6.50
Ozark	8	23	90	8.50
Quickstand	5	8	80	7.50
Tifton-44	18	35	75	3.25
Wrangler	20	40	90	8.00
<b>Experimental Varieties – Not Available for Farm Use</b>				
A-12199	0	8	80	8.00
CD 90160	18	33	75	7.00
ERS 94X 13-9	5	10	68	6.25
ERS 94X 2-8	8	20	63	2.75
ERS 94X 5-12	3	3	50	5.00
ERS 94X 6-13	5	10	53	3.75
ERS-C	5	18	98	8.75
LCB 84X 16-66	13	33	85	8.25
LCB 84X 19-16	28	45	90	7.00
SCRS-C	13	28	83	6.25
Mean	11	23	79	6.37
CV (%)	74	49	15	22
5% LSD	12	16	17	2.03

<sup>1</sup>Visually estimated percent of plot area with new growth.<sup>2</sup>Overall appearance related to growth, stand density and cover, absence of weeds, etc. using a rating scale 1 to 9, with 9 being best.

**Table 5.** Forage yields (tons dry matter/acre) of commercial and experimental bermudagrass varieties in Test 1997-1, Oklahoma Panhandle Research and Extension Center, Goodwell, OK. 2003.

Variety	2003 Harvest Dates <sup>1</sup>				Total
	6/12	7/8	8/5	9/9	
<b>Commercial Varieties – Available for Farm Use</b>					
Ozark	1.92	4.93*	5.79*	2.47	15.11*
Midland 99	1.52	4.54*	4.91	2.50	13.47
Greenfield	1.71	5.26**	4.19	1.99	13.15
Midland	1.83	4.10*	4.16	2.57	12.66
Tifton 44	1.71	3.47	5.11	2.05	12.34
Guymon	1.64	4.36*	3.88	2.31	12.19
Hardie	1.35	2.48	5.32	2.67	11.82
Wrangler	1.59	4.35*	3.60	2.12	11.66
Quickstand	1.62	4.12*	2.70	2.30	10.74
<b>Experimental Varieties – Not Available for Farm Use</b>					
ERS 94X 2-8	1.68	4.63*	6.90**	2.75	15.96**
ERS 94X 13-9	1.82	5.20*	6.24*	2.27	15.53*
LCB 84X 16-66	1.88	4.69*	5.48*	2.44	14.49*
LCB 84X 19-16	1.80	4.38*	5.47*	2.37	14.02*
ERS 94X 5-12	1.60	4.68*	4.84	2.45	13.57
CD 90160	2.11	4.46*	4.58	2.20	13.35
ERS-C	1.79	5.17*	4.01	2.16	13.13
SCRS-C	1.55	3.85*	4.06	2.47	11.93
A-12199	1.38	5.06*	3.05	2.04	11.53
ERS 94X 6-13	1.32	3.67	3.60	2.69	11.28
Mean	1.67	4.39	4.62	2.35	13.05
CV (%)	18	23	23	15	13
5% LSD	N.S.	1.44	1.53	N.S.	2.39

<sup>1</sup>All plots were mowed in mid-May because of cool-season grass infestation in some plots. Consequently, the 6/12/03 harvest yields of varieties were reduced, with the greatest reductions likely for the varieties with the best early growth.

\*\*Highest numerical value in column.

\*Not significantly different from the highest numerical value in the column based on 5% LSD.

N.S. = No significant difference among varieties at the 95% confidence level.

**Table 6.** Forage yields (tons dry matter/acre) of commercial and experimental bermudagrass varieties in Test 1997-1, Oklahoma Panhandle Research and Extension Center, Goodwell OK. 1998-2003.

Variety	Harvest Year						6-yr Mean
	1998	1999	2000	2001	2002	2003	
<b>Commercial Varieties – Available for Farm Use</b>							
Ozark	11.84*	8.00*	9.94*	14.53*	13.25*	15.10*	12.11*
Midland 99	10.16	7.60	8.53	13.00	12.86	13.48	10.94
Hardie	12.99**	8.03*	7.98	13.21	10.94	11.82	10.83
Midland	8.64	5.32	7.47	11.85	12.06	12.66	9.66
Guymon	9.65	4.49	5.51	11.16	11.60	12.20	9.23
Tifton 44	9.23	5.48	6.98	10.39	11.00	12.34	9.10
Wrangler	10.00	4.59	5.55	10.25	11.76	11.66	8.97
Quickstand	9.86	5.77	6.04	10.76	9.17	10.74	8.72
Greenfield	8.91	4.18	5.24	9.73	10.86	13.15	8.68
<b>Experimental Varieties – Not Available for Farm Use</b>							
ERS 94X 2-8	11.65*	8.99*	10.29**	13.10	14.80**	15.97**	12.46**
LCB 84X 16-66	11.93*	8.60*	8.86	16.07*	14.51*	14.49*	12.41*
LCB 84X 19-16	11.59*	9.74**	8.51	16.24**	13.89*	14.02*	12.33*
CD 90160	11.75*	6.85	7.56	13.30	13.67*	13.35	11.08
ERS 94X 13-9	9.48	6.45	7.95	13.00	13.30*	15.53*	10.95
SCRS-C	10.61	5.85	7.39	11.43	10.98	11.93	9.70
ERS 94X 5-12	9.23	5.57	6.31	11.10	12.29	13.57	9.66
ERS-C	8.82	4.76	5.50	9.75	11.00	13.14	8.83
A-12199	7.61	5.03	5.20	9.95	9.94	11.53	8.21
ERS 94X 6-13	8.08	5.07	6.13	7.69	9.04	11.28	7.88
Mean	10.11	6.33	7.21	11.91	11.94	13.05	10.09
CV (%)	16	20	11	15	13	13	15
5% LSD	2.34	1.77	1.09	2.60	2.14	2.39	0.85

\*\*Highest numerical value in column.

\*Not significantly different from the highest numerical value in the column based on 5% LSD.

**Table 7.** Spring growth of bermudagrass varieties in Test 98-1, Eastern Research Station, Haskell, OK. 2003.

Variety	April 17		May 20	
	Greenup <sup>1</sup>	Height (In) <sup>2</sup>	Greenup <sup>1</sup>	Height (In) <sup>2</sup>
<b>Commercial Varieties – Available for Farm Use</b>				
Midland 99	85	2.50	100	13.50
Tifton 44	93	2.00	99	11.00
Greenfield	100	2.00	100	6.50
<b>Experimental Varieties – Not Available for Farm Use</b>				
ERS 94X 2-8	55	2.50	76	13.50
LCB 84X 19-16	93	9.00	100	16.00
ERS 94X 13-9	90	2.00	99	10.50
LCB 84X 16-66	70	2.25	93	7.00
SCRS-C	100	2.00	100	7.50
ERS 94X 5-12	80	2.25	95	5.50
ERS 94X 6-13	6	0.50	78	3.75
ERS-C	100	2.00	100	6.50
A12199	100	1.75	100	3.00
Mean	81	2.56	95	8.69
CV (%)	8	14	4	18
5% LSD	9	4.23	6	2.21

<sup>1</sup>Visually estimated percent of plot area with new growth.

<sup>2</sup>Mean height of new growth in inches.

**Table 8.** Forage yields (tons dry matter/acre) of commercial and experimental bermudagrass varieties in Test 1998-1, Eastern Research Station, Haskell, OK. 2003.

Variety	2003 Harvest Dates				Total
	5/27	7/1	8/27	10/15	
<b>Commercial Varieties – Available for Farm Use</b>					
Midland 99	2.44*	2.63	2.39	1.64	9.10*
Tifton 44	2.43*	2.31	2.54*	1.07	8.35
Greenfield	1.91	1.86	0.60	0.98	5.35
<b>Experimental Varieties – Not Available for Farm Use</b>					
ERS 94X 13-9	2.27*	2.43	2.84**	1.82	9.36**
ERS 94X 2-8	1.55	2.61	2.39	2.10*	8.65*
LCB 84X 19-16	2.61**	2.35	1.90	1.75	8.61*
ERS 94X 6-13	0.52	3.22**	1.47	2.33**	7.54
SCRS-C	2.32*	2.35	1.61	1.17	7.45
ERS 94X 5-12	1.66	2.17	2.00	1.49	7.32
LCB 84X 16-66	1.37	1.89	1.29	1.88	6.43
ERS-C	2.09	1.92	0.72	0.98	5.71
A-12199	1.14	2.23	0.76	0.63	4.76
Mean	1.86	2.33	1.71	1.48	7.38
CV (%)	13	7	14	12	8
5% LSD	0.34	0.23	0.36	0.26	0.89

\*\* Highest numerical value in column.

\* Not significantly different from the highest numerical value in the column based on 5% LSD.

**Table 9.** Forage yields (tons dry matter/acre) of commercial and experimental bermudagrass varieties in Test 1998-1, Eastern Research Station, Haskell, OK. 1999-2003.

Variety	Harvest Year					5-Yr Mean
	1999	2000	2001	2002	2003	
<b>Commercial Varieties – Available for Farm Use</b>						
Midland 99	9.03*	8.47	7.38**	8.73**	9.10**	8.54**
Tifton 44	7.57	7.93	5.65	7.82*	8.35*	7.46
Greenfield	6.52	5.65	3.69	6.10	5.35	5.46
<b>Experimental Varieties – Not Available for Farm Use</b>						
ERS 94X 2-8	10.24**	9.82**	5.99	7.91*	8.65*	8.52*
LCB 84X 19-16	8.71	9.16*	7.11*	8.56*	8.61*	8.43*
ERS 94X 13-9	7.09	7.93	6.37	7.95*	9.36*	7.74
LCB 84X 16-66	8.70	7.51	5.58	6.76	6.43	7.00
SCRS-C	6.83	7.17	5.78	7.66	7.45	6.98
ERS 94X 5-12	7.26	7.28	4.75	7.61	7.32	6.84
ERS 94X 6-13	7.76	7.62	5.16	6.11	7.54	6.84
ERS-C	5.78	5.93	3.43	6.46	5.71	5.46
A12199	5.23	5.95	3.71	6.00	4.76	5.13
Mean	7.56	7.53	5.38	7.30	7.38	7.03
CV (%)	13	9	13	9	8	10
5% LSD	1.38	0.94	0.97	0.94	0.89	0.45

\*\*Highest numerical value in column.

\*Not significantly different from highest numerical value in the column based on the 5% LSD.

**Table 10.** Forage yields (tons dry matter/acre) of bermudagrass varieties in Test 1998-2, South Central Research Station, Chickasha, OK. 2003.

Variety	2003 Harvest Dates			Total
	5/29	7/7	9/15	
<b>Commercial Varieties – Available for Farm Use</b>				
Midland 99	1.16	3.96	3.30	8.42*
Tifton 44	1.99*	3.54	2.87	8.40*
Greenfield	0.82	3.87	0.98	5.67
<b>Experimental Varieties – Not Available for Farm Use</b>				
ERS 94X 13-9	1.34	4.19**	4.04**	9.57**
SCRS-C	1.83*	3.54	3.29	8.66*
LCB 84X 19-16	2.35**	3.24	2.71	8.30*
LCB 84X 16-66	2.15*	3.28	2.50	7.93
ERS 94X 2-8	0.98	3.40	3.10	7.48
ERS 94X 6-13	0.82	3.33	3.10	7.25
ERS 94X 5-12	0.41	3.34	2.99	6.74
A12199	0.64	3.77	2.06	6.47
ERS-C	0.87	2.60	1.05	4.52
Mean	1.28	3.51	2.66	7.45
CV (%)	35	18	16	16
5% LSD	0.64	N.S.	0.62	1.69

\*\*Highest numerical value in column.

\*Not significantly different from the highest numerical value in the column based on the 5% LSD.

N.S.= No significant difference among varieties at the 95% confidence level.

**Table 11.** Forage yields (tons dry matter/acre) of bermudagrass varieties in Test 1998-2, South Central Research Station, Chickasha, OK. 1999 -2003.

Variety	Harvest Year					5-Yr Mean
	1999	2000	2001	2002	2003	
<b>Commercial Varieties – Available for Farm Use</b>						
Midland 99	13.12*	10.97*	9.28**	9.14**	8.43*	10.18**
Tifton 44	12.03	12.26**	7.65	8.45*	8.40*	9.76*
Greenfield	8.91	6.73	4.04	5.52	5.67	6.17
<b>Experimental Varieties – Not Available for Farm Use</b>						
ERS 94X 2-8	14.21**	10.31*	8.68	6.80	7.48	9.50*
ERS 94X 13-9	10.95	10.38*	8.53	8.02*	9.57**	9.48*
LCB 84X 19-16	11.72	10.10*	8.41	7.92*	8.30*	9.29
SCRS-C	11.69	10.40*	7.35	7.26	8.67*	9.07
LCB 84X 16-66	13.00	7.46	6.08	6.82	7.93*	8.26
ERS 94X 6-13	10.43	8.90	6.20	4.99	7.25	7.55
A12199	8.56	7.21	6.03	6.15	6.47	6.88
ERS 94X 5-12	9.01	6.82	5.72	6.02	6.74	6.86
ERS-C	8.81	4.98	3.32	4.32	4.52	5.19
Mean	11.03	8.87	6.77	6.78	7.45	8.18
CV (%)	13	18	14	18	16	16
5% LSD	2.05	2.30	1.39	1.79	1.69	0.81

\*\*Highest numerical value in column.

\*Not significantly different from the highest numerical value in the column based on the 5% LSD.

**Table 12.** Greenup and height notes for bermudagrass varieties in Test 2001-1, Eastern Research Station, Haskell, OK. 2003.

Variety	April 17		May 20	
	Greenup <sup>1</sup>	Height <sup>2</sup>	Greenup <sup>1</sup>	Height <sup>2</sup>
<b>Commercial Varieties – Available for Farm Use</b>				
Midland 99	88	2.3	98	16.5
Ozark	90	2.0	95	14.0
Tifton-44	88	2.3	100	15.5
<b>Experimental Varieties – Not Available for Farm Use</b>				
A-12244	85	3.5	89	13.5
A-12245	90	2.5	100	15.5
A-12246	92	2.8	98	9.5
ERS 16S-1	88	2.0	99	12.0
ERS 16S-2	88	3.5	100	18.0
ERS 16S-3	95	2.3	100	16.0
ERS 16S-4	90	2.5	98	14.5
ERS 16S-5	100	2.0	100	5.5
ERS 16S-6	88	2.5	100	10.0
ERS 16S-7	85	2.0	99	8.5
ERS 16S-8	92	2.5	95	10.0
ERS 16S-9	87	2.8	100	10.5
ERS 16S-10	80	2.0	97	10.5
LCB 84X 16-66	88	3.8	99	13.5
Mean	89	3	98	12
CV (%)	5	21	2	12
5% LSD	6	0.8	3	2

<sup>1</sup>Visually estimated percentage of plot with living plant material.

<sup>2</sup>Height of new growth in inches.

**Table 13.** Forage yields (tons dry matter/acre) of commercial and experimental bermudagrass varieties in Test 2001-1, Eastern Research Station, Haskell, OK. 2003.

Variety	2003 Harvest Dates				Total
	5/28	7/2	8/28	10/16	
<b>Commercial Varieties – Available for Farm Use</b>					
Ozark	2.89	2.71	3.43*	1.77	10.80*
Midland 99	2.79	2.97	3.37*	1.19	10.32
Tifton 44	3.23**	2.89	3.26*	0.84	10.22
<b>Experimental Varieties – Not Available for Farm Use</b>					
A-12245	3.15*	2.93	3.21*	2.15*	11.44**
ERS 16S-4	2.73	2.75	3.38*	2.24**	11.10*
ERS16S-2	2.84	2.69	2.86*	1.84	10.23
ERS 16S-9	2.25	2.78	3.55**	1.39	9.97
ERS 16S-10	2.12	2.97	3.37*	1.38	9.84
LCB 84X 16-66	2.79	2.61	2.47	1.80	9.67
ERS 16S-3	2.75	2.85	2.97*	0.87	9.44
A-12246	2.29	2.73	3.51*	0.85	9.38
ERS16S-6	2.22	3.05**	3.05*	0.83	9.15
ERS 16S-1	2.44	2.77	3.09*	0.80	9.10
ERS 16S-7	2.12	2.93	3.15*	0.86	9.06
ERS 16S-8	2.31	2.63	2.32	1.22	8.48
ERS 16S-5	1.89	2.81	2.74	0.57	8.01
A-12244	2.23	2.15	2.37	0.78	7.53
Mean	2.53	2.78	3.07	1.26	9.63
CV (%)	9	5	10	15	6
5% LSD	0.33	0.21	0.43	0.26	0.81

\*\*Highest numerical value in column.

\*Not significantly different from the highest numerical value in the column based on 5% LSD.

**Table 14.** Forage yields (tons dry matter/acre) of commercial and experimental bermudagrass varieties in Test 2001-1, Eastern Research Station, Haskell, OK. 2002-2003.

Variety	Harvest Year		2-Yr Mean
	2002	2003	
<b>Commercial Varieties – Available for Farm Use</b>			
Ozark	11.71**	10.80*	11.25*
Midland 99	11.49*	10.32	10.90*
Tifton 44	10.90*	10.22	10.56
<b>Experimental Varieties – Not Available for Farm Use</b>			
A-12245	11.44*	11.44**	11.44**
ERS 16S-4	10.97*	11.10*	11.03*
ERS 16S-10	11.31*	9.84	10.58
ERS16S-2	10.61	10.23	10.42
ERS 16S-9	10.61	9.97	10.29
ERS 16S-7	10.89*	9.06	9.98
A-12246	10.51	9.38	9.95
ERS16S-6	10.20	9.15	9.67
ERS 16S-3	9.89	9.44	9.66
LCB 84X 16-66	9.61	9.68	9.64
ERS 16S-1	9.73	9.10	9.41
ERS 16S-8	9.29	8.48	8.89
A-12244	9.03	7.53	8.28
ERS 16S-5	8.13	8.01	8.07
Mean	10.37	9.63	10.00
CV (%)	7	6	6
5% LSD	1.02	0.81	0.63

\*\*Highest numerical value in column.

\*Not significantly different from the highest numerical value in the column based on 5% LSD.

**Table 15.** Forage yields (tons dry matter/acre) of bermudagrass varieties in Test 2001-2, South Central Research Station, Chickasha, OK. 2003.

Variety	2003 Harvest Dates			Total
	5/29	7/7	9/15	
<b>Commercial Varieties – Available for Farm Use</b>				
Midland 99	2.19	4.00	4.72**	10.91*
Ozark	2.45*	4.06*	3.85	10.36*
Tifton 44	2.82*	4.18*	3.19	10.19*
<b>Experimental Varieties – Not Available for Farm Use</b>				
ERS 16S-3	2.82	4.26*	4.14*	11.22**
A12245	3.04**	4.30*	3.71	11.05*
A12246	2.42*	4.50*	4.03*	10.95*
ERS 16S-4	2.57*	4.09*	3.48	10.14*
ERS 16S-8	2.13	4.35*	3.19	9.67
ERS 16S-1	1.91	3.62	3.71	9.24
ERS 16S-5	0.61	4.67**	3.77	9.05
LCB 84X 16-66	2.50	3.71	2.53	8.74
A12244	1.90	3.87	2.53	8.30
Mean	2.28	4.13	3.57	9.98
CV (%)	21	10	16	10
5% LSD	0.69	0.62	0.84	1.49

\*\*Highest numerical value in column.

\*Not significantly different from the highest numerical value in the column based on the 5% LSD.

**Table 16.** Forage yields (tons dry matter/acre) of bermudagrass varieties in Test 2001-2, South Central Research Station, Chickasha, OK. 2002-2003.

Variety	Harvest Year		2-Yr Mean
	2002	2003	
<b>Commercial Varieties – Available for Farm Use</b>			
Tifton 44	11.72*	10.19*	10.84*
Midland 99	10.97*	10.91*	10.93*
Ozark <sup>1</sup>	--	10.36*	--
<b>Experimental Varieties – Not Available for Farm Use</b>			
A12246	12.04*	10.95*	11.50**
A12245	11.82*	11.05*	11.44*
ERS 16S-3	11.44*	11.22**	11.33*
ERS 16S-4	12.44**	10.14*	10.91*
ERS 16S-8	9.98	9.67	9.77
ERS 16S-1	10.37	9.24	9.73
ERS 16S-5	9.79	9.05	9.37
LCB 84X 16-66	10.08	8.74	9.19
A12244	9.73	8.30	8.78
Mean	11.07	9.95	10.41
CV (%)	10	10	10
5% LSD	1.62	1.49	1.00

<sup>1</sup>Ozark was not harvested in 2002 due to herbicide injury on plots. The plots had recovered from the injury by 2003.

\*\*Highest numerical value in column.

\*Not significantly different from the highest numerical value in the column based on the 5% LSD.

Additional information on forage bermudagrass and related topics is contained in these publications available from your Cooperative Extension Office:

- PT 2003-3 Performance of Forage Bermudagrass Varieties in Oklahoma Tests, 1998-2002.
- PT 2002-3 Performance of Forage Bermudagrass Varieties in Oklahoma Tests, 1998-2001.
- PT 2001-9 Performance of Forage Bermudagrass Varieties in Oklahoma Tests, 1998-2000.
- PT 2000-8 Performance of Forage Bermudagrass Varieties in Oklahoma Tests, 1995-99.
- PT 96-9 Performance Of Forage Bermudagrass Varieties In Oklahoma Tests, 1992-1995.
- PT 1998-14 Performance Of Forage Bermudagrass Varieties In Oklahoma Tests, 1995-1997.
- F-2117 Forage Quality Interpretations
- F-2568 Protein-Nitrogen Relationships in Forages
- F-2583 Bermudagrass Varieties for Oklahoma
- F-2587 Bermudagrass for Grazing or Hay

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Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1913, in cooperation with the US Department of Agriculture, Sam E. Curl, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as Authorized by the Dean of the Division of Agricultural Sciences and Natural Resources.