# 2009 Native Warm-Season Perennial Grasses Report

UNIVERSITY OF KENTUCKY<sup>®</sup> College of Agriculture

G.L. Olson, S.R. Smith, T.D. Phillips, and G.D. Lacefield, UK Department of Plant and Soil Sciences

### Introduction

Kentucky's pasture and hay acres are largely seeded in cool-season species. This practice results in a natural decline in midsummer production and often limits livestock production. High-yielding, native warm-season perennial grasses are viable options for Kentucky livestock enterprises and the emerging biomass market and provide an additional benefit of wildlife habitat. Little is known about the performance of different varieties of the primary native warm-season species in Kentucky. They include switchgrass (Panicum virgatum L.), big bluestem (Andropogon gerardii Vitman), indiangrass (Sorghastrum nutans [L.] Nash) and eastern gamagrass (Tripsacum dactyloides L.). This report provides current yield and plant characteristic data for 2001 to 2009.

The UK Forage Extension Web site at www.uky.edu/Ag/Forage contains electronic versions of all forage variety testing reports from Kentucky and surrounding states and from a large number of other forage publications.

## **Description of the Tests**

Small (5 by 15 feet) plots of switchgrass, big bluestem, indiangrass, and eastern gamagrass varieties were established in the summer of 2000 at the UK Agriculture Experiment Station at Lexington, Kentucky. The background for each variety is described in Table 1. Although normally established using seed, to ensure uniform stands these experimental plots were established by transplanting small plants raised in greenhouse float trays from seed or sprigs. Plots were allowed to become established during the remainder of 2000. Transplants were set 1 foot apart using four rows per plot. The plots were arranged in a randomized complete block

Big Bluestem	KYAG 9601	Ecotype collection from western KY / near Land between the
5		Lakes area with minimal selection for disease resistance.
	Wapiti	Ecotype collection from Hart County, Kentucky by Randy and John Seymour/Roundstone Native Seeds.
	Pawnee	Released variety from Nebraska.
	Kaw	Released variety from Kansas.
	Roundtree	Released variety from Missouri (orginial plant collection from lowa).
Indiangrass	Cheyenne	Released variety from Oklahoma.
	Rumsey	Released variety from Missouri (original plant collection from Illinois).
	Nebraska 54	Ecotype collection from Nebraska and released as a variety.
	Osage	Original plants collected from Kansas and Oklahoma, released as a variety from Kansas.
	Washington County	Ecotype collection from the Bluegrass Parkway right-of- way in Washington County by Tim Phillips/University of Kentucky with minimal selection for improved agronomic characteristics.
	Big Barren Indian	Ecotype collection from Hart county, Kentucky by Randy and John Seymour/Roundstone Native Seeds.
Eastern gamagrass	Meade County	Ecotype collection from Meade County, Kentucky by Henry Burkwat with minimal selection for disease resistance.
	Hart	Ecotype collection from Hart County, Kentucky by Randy and John Seymour/Roundstone Native Seeds.
	Highlander	Released variety from Mississippi.
	PMK 24	Ecotype collection from Kansas and Oklahoma (similar to Pete).
	luka	Released variety
	Jackson	Released variety
Switchgrass	Alamo	Released variety from Texas (lowland type).
	Cave-in-Rock	Released variety from Illinois (upland type).
	KYPV 9504	Original plants collected from West Virginia to form KY-1625 then selected for uniform leaf color and width (upland type).
	KYPV 9505	Original plants collected from West Virginia to form KY-1625 then selected for improved agronomic characteristics (upland type).
	KYPV 9506	Original plants collected from West Virginia to form KY-1625 then selected for improved agronomic characteristics (upland type).
	Trailblazer	Released variety from Nebraska with selection for improved digestibility (upland type).

design, with four replications. The soil at Lexington is a well-drained Maury silt loam that is well suited for grass production. The grasses were harvested once or twice during the summer when approximately 50 percent of the plants were heading. Plots were harvested to 6 inches in 2001 to 2003 and in 2005 to 2009 using a mechanical sickle bar harvester. In 2004 the height of cut was 3 to 4 inches. Fresh weight samples were taken at each harvest to determine dry matter production. Plots were fertilized with 60 lb/A of actual N at spring greenup, and other fertilizers (lime, P, and K) were applied according to University of Kentucky recommendations.

#### Results

Weather data for Lexington for 2001 to 2009 are presented in Table 2. In 2004 precipitation in Lexington was 7.5 inches above long-term averages. In the 2005, 2007 and 2008 growing seasons, rainfall



in Lexington was well below the longterm average. Yield data (on a dry matter basis) are presented in Tables 3 through 6. Eastern gamagrass and switchgrass matured earlier than did big bluestem, and indiangrass showed the latest maturity of all species.

Statistical analyses were performed on all data to determine if the apparent differences were due to varietal differences or due to chance. In the tables, varieties not significantly different from the top variety in the column for that characteristic are marked with one asterisk (\*). To determine if two varieties are truly different, compare the difference between them to 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 the given locations. The Coefficient of Variation (CV) is a measure of the variability of the data and is included for each column of means. Low variability is desirable, and increased variability within a study results in higher CVs and larger LSDs.

#### Discussion

These results indicate that warm-season native grasses have potential in Kentucky for livestock producers, as biomass crops, and for wildlife habitat, but there are several limitations to widespread use. The establishment challenges (slow germination and emergence) make these grasses susceptible to weed competition during the seeding year. Currently no herbicides are labeled for the establishment of these grasses except those applied to suppress the existing vegetation, such as paraquat or glyphosate. This situation is changing, but it is likely that Kentucky farmers will continue to have limited options for residual weed control with these grasses. Therefore, producers should plan to use cultural weed control options such as mowing or light grazing. In addition, these grasses must be rotationally grazed and allowed to rest in the fall to build up sufficient energy reserves for overwinter survival.

The yields of these species are high and come in mid- to late summer, when coolseason grasses are not productive. These grasses can play a role in Kentucky hay, pasture and biomass production systems if producers are prepared to manage them through the establishment phase and supply proper management to achieve persistence. Varieties of native grasses are limited, and the overall supply of seed varies annually. The commercial varieties shown here appear to be adapted to Kentucky but will vary in yield potential. Before buying seed of varieties not tested in Kentucky, review yield and survival information from adjacent states. When warm-season native grass varieties are moved more than 300 miles north or south from their point of origin, long-term survival suffers.

		20	01			20	02			20	03			20	04			20	05	
	Tempe	rature	Rai	infall	Tempe	rature	Ra	infall	Tempe	rature	Ra	infall	Tempe	rature	Ra	infall	Tempe	erature	Rai	infall
	°F	DEP <sup>1</sup>	IN	DEP	°F	DEP	IN	DEP												
JAN	31	0	0.92	-1.94	38	+7	2.12	-0.74	26	-5	0.96	-1.90	30	-1	3.14	+0.28	37	+6	4.35	+1.49
FEB	40	+5	3.20	-0.01	38	+3	1.28	-1.93	32	-3	3.59	+0.38	36	+1	1.32	-1.89	39	+4	1.68	-1.53
MAR	40	-4	2.73	-1.67	45	+1	7.93	+3.53	47	+3	2.09	-2.31	47	+3	3.43	-0.97	41	-3	2.79	-1.61
APR	59	+4	1.66	-2.22	58	+3	4.19	0.31	57	+2	3.14	-0.74	55	0	3.06	-0.82	56	+1	3.30	-0.58
MAY	66	+2	4.85	+0.38	61	-3	4.36	-0.11	63	-1	6.68	+2.21	68	+4	9.79	+5.32	61	-3	1.78	-2.69
JUN	71	-1	2.04	-1.12	74	+2	2.45	-1.21	69	-3	4.85	+1.19	72	0	3.13	-0.53	75	+3	1.33	-2.33
JUL	75	-1	5.58	+0.58	78	+2	1.10	-3.90	74	-2	2.68	-2.32	73	-3	7.65	+2.65	77	+1	3.30	-1.70
AUG	76	+1	4.75	+0.82	77	+2	0.95	-2.98	75	0	5.26	+1.33	71	-4	2.91	-1.02	78	+3	3.34	-0.59
SEP	65	-3	2.99	-0.21	72	+4	4.90	1.70	65	-3	4.22	+1.02	68	0	2.61	-0.59	72	+4	0.59	-2.21
ОСТ	56	-1	3.62	+1.05	55	-2	5.61	3.04	56	-1	1.61	-0.96	58	+1	5.65	+3.08	58	+1	0.92	-1.65
NOV	51	+6	2.83	-0.56	43	-2	3.76	0.37	50	+5	4.63	+1.24	49	+4	6.29	+2.90	47	+2	1.54	-1.85
DEC	41	+5	2.57	-1.41	36	0	4.11	-1.13	36	0	3.26	-0.72	36	0	3.20	-0.78	32	-4	2.19	-1.79
Total			37.74	-6.81			42.73	-1.79			42.97	-1.58			52.18	+7.63			27.51	-17.04

		20	06			20	07			20	08			20	09 <sup>2</sup>	
	Tempe	erature	Rai	infall	Tempe	erature	Rai	infall	Tempe	erature	Ra	infall	Tempe	erature	Ra	infall
	°F	DEP <sup>1</sup>	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	42	+11	4.77	+1.91	37	+6	2.93	+0.07	33	+2	4.60	+1.74	28	-3	2.45	-0.41
FEB	36	+1	2.13	-1.08	27	-8	1.83	-1.38	36	+1	5.37	+2.16	38	+3	2.86	-0.35
MAR	44	0	3.05	-1.35	52	+8	1.97	-2.43	45	+1	6.28	+1.88	48	+4	2.19	-2.21
APR	59	+4	3.52	-0.36	53	-2	3.87	-0.01	55	0	5.72	+1.84	55	0	4.48	+0.60
MAY	62	-2	2.99	-1.48	68	+4	1.45	-3.02	62	-2	4.88	+0.41	64	0	5.05	+0.58
JUN	70	-2	1.82	-1.84	74	+2	1.77	-1.89	74	+2	3.30	-0.36	74	+2	5.41	+1.75
JUL	76	0	5.13	+0.13	74	-2	6.90	+1.90	76	0	2.54	-2.46	71	-5	5.89	+0.89
AUG	76	+1	3.23	-0.70	80	+5	2.56	-1.37	75	0	1.08	-2.85	73	-2	5.38	+1.45
SEP	64	-4	9.27	+6.07	72	+4	1.15	-2.05	72	+4	1.21	-1.99	68	0	5.37	+2.17
ОСТ	54	-3	4.88	+2.31	63	+6	5.28	+2.71	57	0	1.35	-1.22	54	-3	4.83	+2.26
NOV	47	+2	1.78	-1.61	46	+1	2.86	-0.53	43	-2	2.28	-1.11	49	+4	0.94	-2.45
DEC	42	+6	2.45	-1.53	40	+4	5.29	+1.31	35	-1	4.76	+0.78				
Total			45.02	+0.47			37.86	-6.69			43.37	-1.18			44.85	+4.28

<sup>2</sup> 2009 data is for eleven months through November.

## Summary

This study indicates that native grasses can contribute significantly to pasture, hay and biomass production systems in Kentucky. For further information on native grasses in Kentucky, refer to the College of Agriculture publication *Native Warm-Season Perennial Grasses for Forage in Kentucky* (AGR-145), available at your county Extension office or online at http://www.uky.edu/ Ag/Forage.

# Acknowledgment

Funding for this research was provided by the Kentucky Fish and Wildlife Commission and The Nature Conservancy.

# Authors

- G.L. Olson, Research Specialist, Forages
- S.R. Smith, Extension Associate Professor, Forages
- T.D. Phillips, Associate Professor, Tall Fescue Breeding
- G.D. Lacefield, Extension Professor, Forages

Table 3. Dry matter yields and maturity of big bluestem varieties transpla	matter yie	lds and m	aturity of	big bluest	em varieti	es transpla	inted July	18, 2000 a	t Lexingto	anted July 18, 2000 at Lexington, Kentucky.	×							
			Maturity	ırity <sup>1</sup>								Yield (tons/A) <sup>2</sup>	ons/A) <sup>2</sup>					
	2004	2005	2006	2007	2008	2009	2001	2002	2003	2004	2005	2006	2007	2008		2009		8-vear
Variety	Jul 28	Jul 26	Jul 18	Jul 23	Jul 3	Jun30	Total	Total	Total	Total	Total	Total	Total	Total	Jun 30	Aug 25	Total	Total <sup>3</sup>
KYAG 9601	50.0	60.0	46.3	46.3	39.8	35.5	4.37	4.55	3.46	7.21	3.15	4.11	4.57	4.78	3.44	1.15	4.60	36.42*
Wapiti <sup>4</sup>	50.0	45.0	45.0	45.0	36.5	35.5	Ι	3.78	4.51	6.65	2.63	3.32	3.96	4.29	3.37	1.41	4.78	33.93*
Pawnee	62.0	62.0	52.5	55.0	44.0	46.3	4.83	3.37	3.82	6.35	2.62	3.08	3.53	3.98	3.36	1.10	4.45	31.21
Kaw	62.0	62.0	54.5	56.0	46.0	50.0	4.78	3.39	3.99	4.82	2.59	2.39	3.48	3.43	3.43	0.91	4.35	28.44
Roundtree	62.0	62.0	54.0	52.5	37.5	46.3	4.67	2.77	1.79	5.19	2.02	2.76	3.23	3.19	3.02	1.21	4.23	25.18
Mean	57.2	58.2	50.5	51.0	40.8	42.7	4.66	3.57	3.51	6.04	2.61	3.13	3.75	3.93	3.32	1.16	4.48	31.04
CV,%	0.0	0.0	4.0	4.6	12.5	10.4	10.18	13.05	8.25	8.86	9.10	15.60	7.95	14.33	10.50	14.72	10.40	6.73
LSD,0.05	0.0	0.0	3.1	3.6	7.9	6.8	0.8	0.7	0.5	0.8	0.4	0.8	0.5	0.9	0.5	0.3	0.7	3.2
<ol> <li>Maturity rating scale: 37=flag leaf emergence, 45=boot swollen, 50=beginning of inflorescence emergence, 58=complete emergence of inflorescence, 62=beginning of pollen shed.</li> <li>Total yield in 2001, 2004 and 2008 is from 2 harvests.</li> <li>2001 yield data is not included in the multiyear total.</li> <li>Due to variation in transplant size and growth, this entry was not fully established until 2002.</li> <li>Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.</li> </ol>	ting scale: 3 n 2001, 200 lata is not i ation in trar antly differe	(7=flag lea 04 and 200 ncluded in 1splant size	f emergend 8 is from 2 the multiy and grow	ce, 45=booi harvests. ear total. th, this enti numerical v	t swollen, 5 ry was not 1 alue in the	0=beginnii fully establi column, bi	ng of inflor ished until ased on the	escence en 2002. 2005 LSD.	nergence, 5	8=complet	e emerger	ice of inflor	escence, 62	:=beginnin	ig of poller	shed.		

42.38\* 34.64 34.50 8-year Total<sup>3</sup> 30.42 33.07 37.01 47.08\* 15.01 8.37 Aug 25 33.90 2009 5.96 4.55 4.19 4.48 5.26 2.69 6.22 6.17 Aug 22 2008 15.85 5.45 3.98 4.71 4.36 3.60 4.85 5.82 1.1 Maturity rating scale: 37=flag leaf emergence, 45=boot swollen, 50=beginning of inflorescence emergence, 58=complete emergence of inflorescence, 62=beginning of pollen shed. Total yield in 2004 is from 2 harvests. 2001 yield data is not included in the multiyear total. Due to variation in transplant size and growth, this entry was not fully established until 2002. Not significantly different from the highest numerical value in the column, based on the 0.05 LSD. Aug 9 13.26 0.76 2007 3.83 2.90 3.09 3.34 5.52 4.77 3.35 Aug 2 15.88 2006 3.77 0.90 3.46 3.13 5.20 3.05 Yield (tons/A)<sup>2</sup> 4.83 2.97 Aug 18 2005 13.80 2.46 3.08 2.03 2.44 1.92 .86 0.51 3.4 18.19 2004 Total 5.19 5.26 5.87 6.47 5.41 7.50 5.41 1.61 Aug 14 2003 22.19 5.79 5.79 6.31 5.90 5.44 4.33 6.95 1.94 Table 4. Dry matter yields and maturity of Indiangrass varieties transplanted July 18, 2000 at Lexington, Kentucky Jul 16 2002 15.04 5.38 6.88 5.67 6.63 5.29 4.98 1.22 2.84 2001 Aug 7 6.21 9.10 0.87 6.25 7.12 6.24 6.44 5.01 Aug 25 2009 57.0 53.0 61.5 58.5 59.0 56.0 57.5 4.8 5.5 Aug 22 2008 42.8 40.5 42.0 41.3 36.0 40.0 37.5 6.8 4. Aug 9 2007 45.0 47.5 46.3 45.0 45.6 45.0 45.0 3.6 2.5 Maturity Aug 2 2006 45.0 45.0 42.0 45.0 46.3 44.7 45.0 2.3 Aug 18 2005 68.0 68.0 68.0 56.5 56.5 61.3 13.6 12.5 50.8 Jul 28 2004 45.0 45.0 45.0 45.0 45.0 45.0 45.0 0.0 **2002** Jul 16 37.3 35.9 6.7 3.6 36.5 36.8 34.5 36.0 34.5 Washington County Big Barren Indian<sup>4</sup> Nebraska 54 Cheyenne Rumsey SD,0.05 Variety Usage Mean SV:%

(tons/A)2           2007         2009           2007         2008 $2003$ 2009         201         4.01           3.56         4.04         2.00         2.01         4.01         4.01           3.78         3.73         1.81         2.08         3.90         3.90           3.78         3.77         3.83         1.73         2.25         3.90         3.82           3.77         3.83         1.73         2.25         3.90         3.82         3.54           3.77         3.83         1.73         2.25         3.82         3.82         3.82           3.25         3.50         1.81         2.08         1.17         2.36         3.82           3.25         3.50         1.81         2.35         3.82         3.82           3.25         3.50         1.17         2.36         3.54           3.23         3.51         0.26         0.26         0.23           10.91         12.17         14.31         8.35         8.92           0.53         0.64         0.40         0.26         0.26         0.26           0.51         0.26	Table 5. Dry matter yields and maturity of eastern gamagrass varieties transplanted July 18, 2000 at Lexington, Kentucky.	y matter )	yields an	d maturi	ty of eas	tern gam	agrass v	arieties ti	ransplan	ted July	18, 2000	at Lexin	gton, Ke	ntucky.						
003         2004         2005         2006         2007         2008         2009         2003         2009         2003         2003         2009         2001         401         201         401         201         401         201         401         201         401         2003         3.99         3.77         3.83         1.31         2.09         2.01         4.01 <th></th> <th></th> <th></th> <th>_</th> <th>Maturity</th> <th>را</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Yield (t</th> <th>ons/A)<sup>2</sup></th> <th></th> <th></th> <th></th> <th></th> <th></th>				_	Maturity	را								Yield (t	ons/A) <sup>2</sup>					
trail         Total         Total <t< th=""><th></th><th>2002</th><th>2004</th><th>2005</th><th>2006</th><th>2007</th><th>2008</th><th>2009</th><th>2001</th><th>2002</th><th>2003</th><th>2004</th><th>2005</th><th>2006</th><th>2007</th><th>2008</th><th></th><th>2009</th><th>_</th><th>8-year</th></t<>		2002	2004	2005	2006	2007	2008	2009	2001	2002	2003	2004	2005	2006	2007	2008		2009	_	8-year
30         8.38         4.64         4.21         3.56         4.04         2.00         2.01         4.01           .09         7.65         4.13         4.22         3.78         3.73         1.81         2.08         3.90           .09         7.65         4.13         4.22         3.78         3.77         3.83         1.73         2.08         3.90           .10         4.65         2.33         2.99         2.47         2.99         2.04         1.79         3.82           .10         4.65         2.33         2.89         2.47         2.99         2.04         1.79         3.82           .10         4.65         2.33         2.89         2.47         2.99         2.04         1.79         3.82           .10         4.65         2.33         18.46         10.91         12.17         14.93         3.85           .154         1.05         0.96         0.53         0.64         3.35         8.92           .159         1.16         3.17         14.31         8.35         8.92           .159         1.16         3.13         16.10         12.11         8.13           .161         1.10<	Variety	Jun 18		Jun 28	_	٦	-	Jun15	Total	Total	Total	Total	Total	Total	Total	Total	Jun 15	Aug 25		Total <sup>3</sup>
09 $765$ $4.13$ $4.22$ $3.78$ $3.77$ $3.83$ $1.73$ $2.08$ $3.90$ $58$ $5.35$ $3.07$ $3.47$ $3.25$ $3.50$ $2.37$ $2.08$ $3.93$ $58$ $5.35$ $3.07$ $3.47$ $3.25$ $3.50$ $1.73$ $2.25$ $3.98$ $68$ $4.83$ $1.31$ $2.09$ $2.54$ $2.89$ $1.17$ $2.36$ $3.54$ $68$ $4.83$ $1.31$ $2.09$ $2.54$ $2.89$ $1.17$ $2.36$ $3.54$ $68$ $4.83$ $1.31$ $2.09$ $2.53$ $3.60$ $1.85$ $8.92$ $82$ $1.59$ $2.13$ $8.46$ $10.91$ $12.17$ $14.31$ $8.35$ $8.92$ $82$ $1.56$ $0.53$ $0.64$ $0.40$ $0.26$ $0.53$ $82$ $1.59$ $0.53$ $0.64$ $0.40$ $0.26$ $0.53$ $82$ <	Meade County	53.3	75.0	61.0	46.8	45.8	38.5	38.5	7.91	8.00	12.30	8.38	4.64	4.21	3.56	4.04	2.00	2.01		49.15*
1/4         7.52         3.38         3.91         3.77         3.83         1.73         2.25         3.98           58         5.35         3.07         3.47         3.25         3.50         2.37         2.10         4.47           10         4.65         2.33         2.89         2.47         2.99         2.04         1.79         3.82           68         4.83         1.31         2.09         2.54         2.89         1.77         2.36         3.54           58         6.40         3.14         3.46         3.23         3.50         1.85         2.10         3.55           512         15.99         2.213         18.46         10.91         12.17         1.43         8.35         8.92           512         15.99         2.15         0.54         0.26         0.53         8.25         8.92           621         1.59         2.15         0.64         0.26         0.26         0.53           82         1.54         1.05         1.2.17         1.2.35         8.92           82         1.54         1.05         0.53         0.54         0.53           82         1.56         0.53	Hart	46.5	75.0	49.5	40.0	29.5	31.5	32.0	4.98	7.27	11.09	7.65	4.13	4.22	3.78	3.73	1.81	2.08	3.90	45.76*
58         5.35         3.07         3.47         3.25         3.50         2.37         2.10         4.47           10         4.65         2.33         2.89         2.47         2.99         2.04         1.79         3.82           68         4.83         1.31         2.09         2.54         2.89         1.17         2.36         3.82           58         6.40         3.14         3.46         3.23         3.50         1.85         2.10         3.95           51         1.5.9         2.213         18.46         10.91         12.17         14.31         8.35         8.92           51         1.5.9         2.213         18.46         10.91         12.17         14.31         8.35         8.92           82         1.5.9         2.213         18.46         10.91         12.17         14.33         8.35         8.92           82         1.5.9         2.31         3.846         10.31         12.17         13.85         5.01         3.95           82         1.5.9         2.58         0.06         0.53         8.5         0.50         13.85         14           82         1.58         2.05         2.	<b>Highlander</b>		75.0	61.0	49.3	49.5	53.0	53.8	I	7.16	10.74	7.52	3.38	3.91	3.77	3.83	1.73	2.25	3.98	44.30*
10         465         2.33         2.89         2.47         2.99         2.04         1.77         2.36         3.82           68         483         1.31         2.09         2.54         2.89         1.17         2.36         3.82           58         640         3.14         3.46         3.23         3.50         1.85         2.10         3.95           58         640         3.14         3.46         3.23         3.50         1.85         2.10         3.95           82         1.59         2.03         0.96         0.53         0.64         0.40         0.26         0.53           82         1.59         2.03         0.64         0.40         0.26         0.53           82         1.59         2.15         9         1.17         1.31         8.35         8.92           82         1.59         2.05         0.53         0.64         0.70         0.56         0.53           82         1.59         2.15         1.2.17         1.413         8.92         8.92           84         0.50         0.51         0.64         0.70         0.67         3.65           84         0.50	PMK 24 <sup>5</sup>	63.3	75.0	85.0	64.0	62.0	65.0	63.0	6.38	5.80	8.58	5.35	3.07	3.47	3.25	3.50	2.37	2.10	4.47	37.49
68         483         1.31         2.09         2.54         2.89         1.17         2.36         3.54           58         6.40         3.14         3.46         3.23         3.50         1.85         2.10         3.95           82         1.599         22.13         18.46         10.91         12.17         14.31         8.35         8.92           82         1.599         22.13         18.46         10.91         12.17         14.31         8.35         8.92           82         1.59         2.06         0.53         0.64         0.40         0.26         0.33           82         1.59         2.09         0.53         0.64         0.40         0.26         0.33           82         1.59         0.96         0.53         0.64         0.40         0.26         0.33           82         1.59         2.59         0.50         0.53         2.69         3.63           84         0.50         0.53         3.04         1.07         3.64         0.64         3.64           84         0.59         3.05         1.08         3.12         3.64         3.64         3.64         3.64         3.64	luka <sup>4</sup>	63.8	75.0	85.0	64.0	62.0	67.0	63.5	I	3.24	7.10	4.65	2.33	2.89	2.47	2.99	2.04	1.79	3.82	29.50
58         640         3.14         3.46         3.23         3.50         1.85         2.10         3.95           82         1.5.9         22.13         18.46         10.91         12.17         14.31         8.35         8.92           82         1.5.9         22.13         18.46         10.91         12.17         14.31         8.35         8.92           mergence, 58=complete emergence of inflorescence, 62=beginning of pollen s         0.64         0.40         0.53         8           mergence, 58=complete emergence of inflorescence, 62=beginning of pollen s         7         7         7         7           nergence, 58=complete emergence of inflorescence, 62=beginning of pollen s         9         3         9         3         6         3           nergence, 58=complete emergence of inflorescence, 62=beginning of pollen s         7         7         7         7         7           nergence, 58=complete emergence of inflorescence, 62=beginning of pollen s         7         7         7         7           nergence, 58=complete emergence of inflorescence, 62=beginning of pollen s         7         7         7         7           nergence, 58=complete emergence, 61         7         7         7         7         7         7	ackson <sup>4</sup>	43.5	75.0	49.0	45.7	37.8	37.3	43.3	I	3.78	7.68	4.83	1.31	2.09	2.54	2.89	1.17	2.36	3.54	28.66
58         640         3.14         3.46         3.23         3.50         1.85         2.10         3.95         82         1.5.99         22.13         18.46         10.91         12.17         14.31         8.35         8.92         82         82         1.5.9         22.13         18.46         10.91         12.17         14.31         8.35         8.92         82         82         1.55         1.05         0.56         0.53         0.64         0.40         0.26         0.53         82         82         82         82         835         892         835         835         892         835         836         835         836         835         836         835         836         835         836         837         836         836         836         836         836         836         836         836         836         836         836         836         836         836         836         836																				
	lean	53.5	75.0	65.1	51.9	47.8	48.7	49.0	6.42	5.88	9.58	6.40	3.14	3.46	3.23	3.50	1.85	2.10	3.95	39.14
82         1.54         1.05         0.96         0.53         0.64         0.40         0.26         0.53           mergence, 58=complete emergence of inflorescence, 62=beginning of pollens           restricted         0.00         0.00         0.00         0.00         0.00           restricted         0.00         0.00         0.00         0.00         0.00         0.00           restricted         0.00         0.00         0.00         0.00         0.00         0.00           restricted         0.00         2000         2007         2008         2001         2001           restricted         1016         1018         Total         1013         0.013         3.04           restricted         0.01         2.03         2.03         3.17         0.51         3.68           restricted         0.01         2.03         3.04         4.15         2.60         2.14         1.00         3.14           restricted         0.30         3.30         2.33         2.33         0.31         3.04         2.83           restricted         0.30         3.31         2.33         2.33         2.33         2.32         2.62         2.83           <	.V,%	7.2	0.0	16.4	2.8	21.6	14.3	15.3	10.19	10.82	12.62	15.99	22.13	18.46	10.91	12.17	14.31	8.35	8.92	9.19
mergence, 58=complete emergence of inflorescence, 62=beginning of pollens         It Lexington, Kentucky.         It Lexington, Kentucky.         It Lexington, Kentucky.         Yield (tons/A) <sup>2</sup> OOS       2007       2008       2009         It Lexington, Kentucky.         Yield (tons/A) <sup>2</sup> OS       2006       2007       2008       2009         At 6.24       4.16       4.05       6.52       3.95       3.17       0.51       3.68         At 6.24       4.16       4.15       2.60       2.14       1.00       3.14         At 6.24       4.16       4.15       2.60       2.14       1.00       3.14         At 6.24       4.16       3.05       3.07       2.03       2.14       1.00       3.14         At 6.24       4.15       2.00       2.14       1.00       3.14       2.62         At 6.24       4.15       2.05       2.14       1.00       3.14       2.62         At 6.24       4.15       2.16       3.68       0.15       2.62       2.62	SD,0.05	2.8	0.0	16.0	2.2	15.5	10.5	11.3	1.13	0.96	1.82	1.54	1.05	0.96	0.53	0.64	0.40	0.26	0.53	5.42
Maturity           Tend (constrate           2002         2004         2005         2006         2007         2006         2007         2006         2007         2006         2007         2006         2007         2006         2007         2006         2007         2006         2007         2006         2007         2006         2007         2006         2007         2006         2007         2006         2007         2006         2007         2006         2007         2006         2007         2008         2008         2008         2008         2008         2008         2008         2008         2008         2008         2008         2008         2007         2008 <th>able 6. Dı</th> <th>y matter</th> <th>yields an</th> <th>d maturi</th> <th>ity of swi</th> <th>itchgrass</th> <th>varieties</th> <th>s transpla</th> <th>Inted Jul</th> <th>y 18, 200</th> <th>00 at Lexi</th> <th>ington, K</th> <th>entucky.</th> <th>  . '</th> <th>C/W/</th> <th></th> <th></th> <th></th> <th></th> <th></th>	able 6. Dı	y matter	yields an	d maturi	ity of swi	itchgrass	varieties	s transpla	Inted Jul	y 18, 200	00 at Lexi	ington, K	entucky.	. '	C/W/					
2002         2004         2005         2006         2007         2008         2009         2001         2003         2006         2007         2008         2009         2001           th         Jun 18         Jul 28         Jul 26         Jul 18         Jun 30         Total         Jul 26         Jul 18         Total         Jun 30         Aug 25         Total           0         47.5         50.0         45.0				_	Maturity									Yield (t	ons/A) <sup>4</sup>					
ty         Jun 18         Jul 28         Jul 26         Jul 18         Jun 30         Jun 30         Total         Total         Jul 26         Jul 18         Jun 30         Aug 25         Total           in Rock         55.8         75.0         65.0         45.0         5.64         7.44         6.24         4.16         4.65         6.52         3.95         3.17         0.51         3.68           0         47.5         50.0         45.0         45.0         85.0         7.26         5.64         7.44         6.24         4.16         4.65         6.52         3.95         3.17         0.51         3.68           9504         49.8         75.0         45.0         45.5         45.0         8.67         7.33         6.30         3.19         3.97         5.19         3.57         3.56         0.15         2.83           9505         52.0         75.0         51.3         55.5         4.81         7.41         6.34         3.03         3.03         2.93         2.66         0.15         2.83         3.56         3.05         3.17         0.05         7.02         2.62         3.56         4.01         3.03         2.48         3.66         0.15		2002	_	2005	-	2007	-	2009	2001	2002	2003	2004	2005	2006	2007	2008		2009		9-yea
0         47.5         500         45.0         45.0         45.0         85.0         11.59         4.85         2.03         3.04         4.15         2.60         2.14         1.00         3.14           9504         49.8         75.0         56.5         53.5         33.0         39.0         45.0         5.73         4.62         7.33         6.30         3.19         3.97         5.19         3.55         2.99         0.57         3.56           9505         52.0         75.0         61.3         55.5         42.0         5.53         4.62         7.33         6.30         3.19         3.97         5.19         3.55         2.99         0.57         3.56           9505         52.5         75.0         51.3         55.5         4.81         7.41         6.34         3.09         3.85         4.23         2.68         0.15         2.83           9506         52.5         75.0         57.0         35.1         7.04         5.91         3.28         3.03         2.37         0.25         2.62           102         7.10         13.28         5.07         7.04         5.91         3.28         2.10         1.55         0.14	<b>/ariety</b> Cave in Roc		_	<b>Jul 26</b> 75.0		<b>Jun 19</b> 45.0		<b>Jun 30</b> 56.0	<b>Total</b> 7.26	<b>Total</b> 5.64	Total 7.44	<b>Total</b> 6.24	<b>Jul 26</b> 4.16	<b>Jul 18</b> 4.65	<b>Total</b> 6.52	<b>Total</b> 3.95	<b>Jun 30</b> 3.17	Aug 25 0.51		<b>Total</b>
9504         49.8         75.0         56.5         53.5         33.0         39.0         45.0         5.3         46.2         7.33         6.30         3.19         3.97         5.19         3.55         2.99         0.57         3.56           9505         52.0         75.0         61.3         55.5         42.0         34.5         46.3         5.52         4.81         7.41         6.34         3.09         3.85         4.23         2.93         2.68         0.15         2.83           9506         52.5         75.0         57.0         34.0         3.63         5.07         7.04         5.91         3.03         3.03         2.37         0.25         2.62           9506         52.5         75.0         54.0         35.8         49.5         4.41         4.28         5.75         4.77         2.38         3.03         2.37         0.25         2.62           1azer         51.0         75.0         71.8         56.5         45.0         33.8         49.5         4.41         4.28         5.75         4.77         2.38         2.26         2.10         1.55         0.14         1.70           124         70.4         51.0	Alamo		50.0	45.0	45.0	45.0	41.5	45.0	8.68	8.00	11.59	4.85	2.03	3.04	4.15	2.60	2.14	1.00	3.14	48.08
9505         52.0         75.0         61.3         55.5         42.0         34.5         46.3         5.52         4.81         7.41         6.34         3.09         3.85         4.23         2.93         2.68         0.15         2.83           9506         52.5         75.0         57.0         54.0         35.8         31.5         51.8         5.08         5.07         7.04         5.91         3.28         3.03         2.37         0.25         2.62           9506         52.5         75.0         57.0         35.8         31.5         51.8         5.08         5.07         7.04         5.91         3.28         3.03         2.37         0.25         2.62         2.62           lazer         51.0         75.0         57.0         54.1         4.28         5.75         4.77         2.38         2.10         1.55         0.14         1.70           lazer         51.4         70.4         61.1         2.48         4.05         4.41         4.28         5.75         4.77         2.38         2.26         2.10         1.55         0.14         1.70           12.4         40.4         51.1         2.48         5.41         7.76	XPV 9504	49.8	75.0	56.5	53.5	33.0	39.0	45.0	5.53	4.62	7.33	6.30	3.19	3.97	5.19	3.55	2.99	0.57	3.56	43.25
9506         52.5         75.0         57.0         54.0         35.8         31.5         51.8         50.8         50.7         7.04         5.91         3.28         3.61         4.04         3.03         2.37         0.25         2.62           lazer         51.0         75.0         71.8         56.5         45.0         33.8         49.5         4.41         4.28         5.75         4.77         2.38         2.26         2.10         1.55         0.14         1.70           lazer         51.0         75.0         71.8         56.5         45.0         33.8         49.5         4.41         4.28         5.75         4.77         2.38         2.26         2.10         1.55         0.14         1.70           10         11.0         54.4         41.0         37.7         48.9         6.08         5.41         7.76         5.73         3.02         3.65         4.40         3.03         2.48         0.44         2.92           2.2         0.0         8.3         1.3         9.4         8.3         6.5         9.15         8.71         7.76         5.73         3.02         3.03         13.09         12.36         70.26         2.1.28	(YPV 9505	52.0	75.0	61.3	55.5	42.0	34.5	46.3	5.52	4.81	7.41	6.34	3.09	3.85	4.23	2.93	2.68	0.15	2.83	41.01
lazer         51.0         75.0         71.8         56.5         45.0         33.8         49.5         4.41         4.28         5.75         4.77         2.38         2.26         2.210         1.55         0.14         1.70           51.4         70.4         61.1         54.4         41.0         37.7         48.9         6.08         5.41         7.76         5.73         3.02         3.56         4.40         3.03         2.48         0.44         2.92           2.2         0.0         8.3         1.3         9.4         8.3         6.5         9.15         8.71         15.54         16.19         16.19         12.36         15.98         70.26         21.28           2.2         0.0         8.3         1.3         9.4         8.3         6.5         9.15         8.71         15.54         16.19         16.19         12.36         15.98         70.26         21.28           0.0         7.6         1.0         5.8         4.7         4.8         0.84         0.71         1.82         1.40         0.74         1.18         0.37         0.56         0.60         0.46         0.94	(YPV 9506	52.5	75.0	57.0	54.0	35.8	31.5	51.8	5.08	5.07	7.04	5.91	3.28	3.61	4.04	3.03	2.37	0.25	2.62	39.69
51.4         70.4         61.1         54.4         41.0         37.7         48.9         6.08         5.41         7.76         5.73         3.02         3.56         4.40         3.03         2.48         0.44         2.92           2.2         0.0         8.3         1.3         9.4         8.3         6.5         9.15         8.71         15.54         16.19         16.19         12.97         13.09         12.36         7.0.26         21.28           0.0         7.6         1.0         5.8         4.7         4.8         0.84         0.71         1.82         1.40         0.74         1.18         0.56         0.60         0.46         0.94           0.55         1.0         5.8         4.7         4.8         0.84         0.71         1.82         1.40         0.74         1.18         0.56         0.60         0.46         0.94	Trailblazer	51.0	75.0	71.8	56.5	45.0	33.8	49.5	4.41	4.28	5.75	4.77	2.38	2.26	2.25	2.10	1.55	0.14	1.70	29.90
2.2         0.0         8.3         1.3         9.4         8.3         6.5         9.15         8.71         15.54         16.19         16.19         17.09         12.36         15.98         70.26         21.28           0.0         7.6         1.0         5.8         4.7         4.8         0.84         0.71         1.82         1.40         0.74         1.18         0.66         0.66         0.46         0.94	Aean	51.4	70.4	61.1	54.4	41.0	37.7	48.9	6.08	5.41	7.76	5.73	3.02	3.56	4.40	3.03	2.48	0.44	2.92	41.91
1.7   0.0   7.6   1.0   5.8   4.7   4.8   0.84   0.71   1.82   1.40   0.74   1.18   0.87   0.56   0.60   0.46   0.94	.V,%	2.2	0.0	8.3	1.3	9.4	8.3	6.5	9.15	8.71	15.54	16.19	16.19	21.97	13.09	12.36	15.98	70.26	21.28	7.79
	SD,0.05	1.7	0.0	7.6	1.0	5.8	4.7	4.8	0.84	0.71	1.82	1.40	0.74	1.18	0.87	0.56	0.60	0.46	0.94	4.92

LSD0.051.70.07.61.05.84.74.80.840.711.821.400.741.180.870.560.600.460.944.921Maturity rating scale: 37=flag leaf emergence, 45=boot swollen, 50=beginning of inflorescence emergence, 58=complete emergence of inflorescence, 62=beginning of pollen shed.2Total yield is from 2 harvests in 2001, 2002, 2003, 2004, 2007 and 2008.\*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Mention or display of a trademark, proprietary product, or firm in text or figures does not constitute an endorsement and does not imply approval to the exclusion of other suitable products or firms.



The College of Agriculture is an Equal Opportunity Organization 12-2009