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2015 Tall Fescue and Bromegrass Report

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Introduction

Tall fescue (*Festuca arundinacea*) is a productive, well-adapted, persistent, soil-conserving, cool-season grass grown on approximately 5½ million acres in Kentucky. This grass, used for both hay and pasture, is the forage base of most of Kentucky's livestock enterprises, particularly beef cattle.

Much of the tall fescue in Kentucky is infected with an internal fungus (endophyte) that produces ergot alkaloids and results in decreased weight gains in growing ruminants and lower pregnancy rates in breeding stock, especially in hot weather. Varieties are now available that are free of this fungal endophyte or infected with a nontoxic endophyte. Varieties in the latter group are also referred to as "novel" or "friendly" endophyte varieties, because their endophyte improves stand survival without creating animal production problems.

Smooth bromegrass (*Bromus inermis Leyss*) is a perennial pasture and hay grass native of Europe. It has creeping underground stems or rootstocks from which the leafy stems arise. Smooth bromegrass is palatable to all classes of livestock, from emergence to the heading stage. Meadow bromegrass (*Bromus biebersteinii Roem. & Schult*) is a native of southeastern Europe and the adjacent Near East. It resembles smooth bromegrass but has only short rhizomes or none at all. Meadow bromegrass is densely tufted and has a similar growth habit to tall fescue. Hybrid bromegrasses are a cross between smooth and meadow bromegrasses. Alaska bromegrass (*Bromus sitchensis*), also called Sitka bromegrass, is a long-lived perennial bunchgrass that will actively grow at moderate rates during the

Table 1. Temperature and rainfall at Lexington, Kentucky, in 2012, 2013, 2014, and 2015.

	2012				2013				2014				2015[2]			
	Temp		Rainfall		Temp		Rainfall		Temp		Rainfall		Temp		Rainfall	
	°F	DEP[1]	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	38	+7	4.80	+1.94	38	+7	4.50	+1.64	25	-6	2.28	-.58	32	+1	2.17	-0.69
FEB	40	+5	5.39	+2.18	36	+1	1.78	-1.43	30	-5	5.47	+2.26	26	14	3.08	-0.13
MAR	56	+12	5.64	+1.24	39	-5	5.47	+1.07	39	-5	3.08	-1.32	45	+1	7.34	+2.94
APR	56	+1	3.26	-0.62	55	0	4.46	+0.58	58	+3	5.27	-1.89	57	+2	13.19	+9.31
MAY	69	+5	4.02	-0.45	65	+1	5.23	+.076	66	+2	5.72	+1.25	69	+5	3.02	-1.45
JUN	73	+1	2.42	-1.24	72	0	7.32	+3.66	75	+3	2.93	-0.73	75	+3	8.20	+4.54
JUL	81	+5	2.50	-2.50	72	-4	9.33	+4.33	74	-2	3.18	-1.82	77	+1	10.22	+5.22
AUG	75	0	1.68	-2.25	72	-3	3.68	-0.25	76	+1	6.53	+2.60	74	-1	3.49	-0.44
SEP	67	-1	6.40	+3.20	67	-1	2.21	-0.99	69	+1	3.63	+.43	72	+4	3.49	+0.29
OCT	55	-2	2.00	-0.57	55	-2	7.02	+4.45	57	0	5.55	+2.98	59	+2	2.78	+0.21
NOV	43	-2	1.81	-0.65	41	-4	3.06	-0.33	41	-4	2.79	-0.60				
DEC	42	+6	9.57	+4.94	36	0	4.19	+0.21	40	+4	2.47	-1.51				
Total			49.49	+4.94			58.25	+13.70			49.4	+4.85			56.98	+19.80

[1] DEP is departure from the long-term average.
[2] 2015 data is for the ten months through October.

Table 2. Temperature and rainfall at Princeton, Kentucky, in 2012, 2013, 2014, and 2015.

	2012				2013				2014				2015[2]			
	Temp		Rainfall		Temp		Rainfall		Temp		Rainfall		Temp		Rainfall	
	°F	DEP[1]	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	40	+6	3.01	-0.79	38	+4	6.31	+2.51	30	-4	1.70	-2.10	34	0	1.51	-2.29
FEB	54	+6	1.73	-2.70	39	+1	3.09	-1.34	32	-6	4.75	+0.32	28	-10	4.16	-0.27
MAR	60	+13	3.27	-1.67	42	-5	4.34	-0.60	43	-4	7.43	-0.51	46	-1	6.83	+1.89
APR	60	+1	0.62	-4.18	57	-2	5.72	+0.92	59	0	8.5	+3.70	60	+1	7.38	+2.58
MAY	71	+4	1.36	-3.60	66	-1	4.26	-0.70	68	+1	1.96	-3.00	68	+1	3.52	-1.44
JUN	74	-5	2.38	-1.47	74	-1	7.55	+3.70	76	+1	3.25	-0.60	76	+1	2.85	-1.00
JUL	83	+5	1.40	-2.89	75	-3	4.44	+0.15	73	-5	1.56	-2.73	79	+1	8.83	+4.54
AUG	77	0	4.27	+0.26	75	-2	5.59	+1.58	78	0	9.33	+5.32	73	-4	2.90	-1.11
SEP	69	-2	5.45	+1.82	71	0	5.37	+2.04	69	-2	0.97	-2.36	71	0	0.82	-2.51
OCT	57	-2	2.94	-0.11	59	0	4.04	+0.99	59	0	4.36	+1.31	60	+1	4.15	+1.10
NOV	45	-2	2.11	-2.52	44	-3	1.37	-3.26	41	-6	2.02	-2.61				
DEC	45	+6	4.77	-0.27	38	-1	5.41	+0.37	40	+1	1.84	-3.20				
Total			33.01	-18.12			57.49	+6.36			44.67	-6.46			42.95	+1.49

[1] DEP is departure from the long-term average.
[2] 2015 data is for the ten months through October.

Table 3. Temperature and rainfall at Quicksand, Kentucky, in 2013, 2014, and 2015.

	2013				2014				2015[2]			
	Temp		Rainfall		Temp		Rainfall		Temp		Rainfall	
	°F	DEP[1]	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	38	+7	5.61	+2.37	29	-2	2.66	-0.63	33	+2	1.89	-1.40
FEB	38	+5	1.81	-1.79	36	+3	4.52	+0.92	27	-6	3.67	+0.07
MAR	40	-1	4.55	+0.21	43	+2	5.68	+1.34	46	+5	6.51	+2.17
APR	56	+3	3.55	-0.55	58	+5	5.12	+1.02	57	+4	9.51	+5.41
MAY	64	+2	3.98	-0.50	65	+3	2.71	-1.77	67	+5	2.54	-1.94
JUN	73	+3	6.44	+2.62	75	+5	1.81	-2.01	74	+4	3.06	-0.76
JUL	75	+1	5.24	-0.01	72	-2	7.14	+1.89	76	+2	7.91	+2.66
AUG	73	0	5.85	+1.84	74	+1	7.94	+3.93	73	0	3.48	-0.53
SEP	68	+2	1.71	-1.81	69	+3	1.93	-1.59	70	+4	2.05	-1.47
OCT	58	+4	2.07	-0.84	57	+3	6.36	+3.45	57	+3	2.51	-0.40
NOV	43	+1	3.05	-0.83	41	-1	3.10	-0.78				
DEC	40	+7	6.84	+2.70	41	+8	2.41	-1.73				
Total			50.70	+3.36			51.38	+4.04			43.13	+3.81

[1] DEP is departure from the long-term average.
[2] 2015 data is for the ten months through October.

spring and summer season. It does not spread by rhizomes and is more suited to environments with harsh winters.

Prairie bromegrass (*Bromus wildenowii*) is a tall, cool-season, leafy short-lived, perennial, deep-rooted bunchgrass. It was introduced from South America. Seedheads are produced throughout the growing season, and to maintain productive stands for several years, it is necessary to manage at least one growth cycle each year for seed production and natural reseeding. Some prairie bromegrasses are susceptible to winterkill. Mountain bromegrass (*Bromus marginatus*) is native to North America from Alaska to northern Mexico, where it can be found in many types of habitat. It is a short-lived, perennial, cool-season, sod-forming grass. Leafy growth and a deep, well-branched root system give protection on erodible slopes. It is similar to California bromegrass (*Bromus carinatus*), and some consider them to be synonymous.

All bromegrasses have several advantages over tall fescue, including retaining quality as they mature and better growth during dry weather, but they are generally less well adapted in Kentucky.

This report provides current yield data on tall fescue varieties and similar grass species in trials in Kentucky as well as guidelines for selecting tall fescue varieties. Tables 14 and 15 show a summary of all tall fescue and bromegrass varieties tested in Kentucky for the past 15 years. 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 a large number of other forage publications.

Important Selection Considerations

Local adaptation and seasonal yield. Before purchasing tall fescue seed, make sure that the variety is adapted to Kentucky, as indicated by good performance across years and locations in replicated yield trials such as those presented in this publication. Choose high-yielding persistent varieties and varieties that are productive during the desired season of use.

Table 4. Descriptive scheme for the stages of development in perennial forage grasses.

Code	Description	Remarks
	Leaf development	
11	First leaf unfolded	Applicable to regrowth of established (plants) and to primary growth of seedlings.
12	2 leaves unfolded	Further subdivision by means of leafdevelopment index (see text).
13	3 leaves unfolded	
•	•••••	
19	9 or more leaves unfolded	
	Sheath elongation	
20	No elongated sheath	Denotes first phase of new spring growth after overwintering. This character is used instead of tillering which is difficult to record in established stands.
21	1 elongated sheath	
22	2 elongated sheaths	
23	3 elongated sheaths	
•	•••••	
29	9 or more elongated sheaths	
	Tillering (alternative to sheath elongation)	
21	Main shoot only	Applicable to primary growth of seedlings or to single tiller transplants.
22	Main shoot and 1 tiller	
23	Main shoot and 2 tillers	
24	Main shoot and 3 tillers	
•	•••••	
29	Main shoot and 9 or more tillers	
	Stem elongation	
31	First node palpable	More precisely an accumulation of nodes. Fertile and sterile tillers distinguishable.
32	Second node palpable	
33	Third node palpable	
34	Fourth node palpable	
35	Fifth node palpable	
37	Flag leaf just visible	
39	Flag leaf ligule/collar just visible	
	Booting	
45	Boot swollen	
	Inflorescence emergence	
50	Upper 1 to 2 cm of inflorescence visible	
52	¼ of inflorescence emerged	
54	½ of inflorescence emerged	
56	¾ of inflorescence emerged	
58	Base of inflorescence just visible	
	Anthesis	
60	Preanthesis	Inflorescence-bearing internode is visible. No anthers are visible.
62	Beginning of anthesis	First anthers appear.
64	Maximum anthesis	Maximum pollen shedding.
66	End of anthesis	No more pollen shedding.
	Seed ripening	
75	Endosperm milky	Inflorescence green
85	Endosperm soft doughy	No seeds loosening when inflorescence is hit on palm.
87	Endosperm hard doughy	Inflorescence losing chlorophyll; a few seeds loosening when inflorescence hit on palm
91	Endosperm hard	Inflorescence-bearing internode losing chlorophyll; seeds loosening in quantity when inflorescence hit on palm.
93	Endosperm hard and dry	Final stage of seed development; most seeds shed.

Source: J. Allan Smith and Virgil W. Hayes. 14th International Grasslands Conference Proc. p. 416-418. June 14-24, 1981, Lexington, Kentucky.

Tall fescues are often classified as either "Mediterranean" or "Continental" types according to the area from which the parental material for the variety originated. In general, the Mediterranean types (e.g., Cajun and Fawn) are more productive in the fall and winter than the Continental types (such as Kentucky 31). Although they mature earlier in the spring, the Mediterranean types become dormant and nonproductive during the summer in Kentucky and are more susceptible than Continental varieties to leaf diseases such as helminthsporium and rhizoctonia. Therefore, Mediterranean varieties are less preferred for use in Kentucky than Continental types. Because Mediterranean varieties mature earlier in the spring, first-cutting yields are generally higher when the two types

are harvested at the same time. However, the Continental types produce more in the summer, allowing for extended grazing.

Endophyte level. Seed with infection levels of less than 5 percent is regarded as endophyte-free. A statement to that effect will be displayed prominently on a green tag attached to the seed bag. If no tag is present, assume the seed is infected with the toxic endophyte. Several varieties, both with and without the endophyte, are adapted for use in Kentucky. With the new "novel endophyte" tall fescues, the seed tag should specify the infection level. Also, seed of these varieties should be handled carefully to preserve this infection, which means keeping seed cool and planting as soon as possible. "Novel endophyte" varieties need a high infection level to improve stand survival.

Seed quality. Buy premium-quality seed that is high in germination and purity levels and free from weed seed. Buy certified seed of improved varieties. An improved variety is one that has performed well in independent trials. The label also includes the test date (which must be within the previous nine months), the level of germination, and the amount of other crop and weed seed. Order seed well in advance of planting time to assure that it will be available when needed.

Description of the Tests

Data from seven studies are reported. Tall fescue varieties were sown at Lexington (2012, 2013 and 2014), Princeton (2012), and Quicksand (2013). The bromegrass trials were sown in Lexington in 2012 and 2014. The soils at Lexington (Maury), Princeton (Crider), and Quicksand (Nolin) are well-drained silt loams. They are well suited for tall fescue and bromegrass production.

Table 5. Dry-matter yields, seedling vigor, maturity, and stand persistence of tall fescue and festulolium (FL) varieties sown September 7, 2012, at Lexington, Kentucky.

Variety	Seedling Vigor[1] Oct 16, 2012	Maturity[2]			Percent Stand							Yield (tons/acre)						
		2013	2014	2015	2012	2013		2014		2015		2013	2014	2015				3-year Total
		May 20	May 9	May 11	Oct 16	Mar 20	Oct 22	Apr 9	Oct 28	Apr 6	Oct 29	Total	Total	May 11	Jun 17	Aug 10	Total	
Commercial Varieties-Available for Farm Use																		
BarOptima PLUS E34[3]	2.4	56.0	45.0	51.0	89.3	91	92	93	94	94	94	8.53	3.71	1.36	0.55	0.99	2.89	15.14*
Estancia Arkshield[3]	3.4	56.0	54.0	57.0	95.8	97	97	97	97	97	97	7.60	3.87	1.62	0.40	1.44	3.46	14.93*
Jesup EF	2.5	58.0	55.5	56.5	95.0	97	96	96	96	97	96	8.51	3.49	1.51	0.41	0.90	2.82	14.82*
Teton II	2.6	58.5	56.5	56.5	93.0	93	94	94	94	94	94	8.00	3.56	1.66	0.31	1.27	3.24	14.80*
Bull	2.1	58.5	57.0	57.5	90.5	91	92	92	94	94	94	7.53	3.69	1.59	0.38	1.23	3.20	14.42*
Jesup MaxQ[3]	1.8	57.5	56.0	56.5	93.5	95	96	96	96	96	96	7.90	3.30	1.56	0.38	0.97	2.92	14.11*
Select	2.9	57.0	55.5	56.0	94.3	95	96	97	96	94	94	8.14	3.14	1.46	0.30	0.98	2.74	14.03*
Bronson	2.9	56.5	56.5	55.5	93.3	97	97	97	97	97	96	7.54	3.41	1.75	0.31	0.96	3.02	13.97*
Tuscany II	3.3	57.0	53.5	56.0	96.5	95	96	95	95	95	95	8.08	3.25	1.28	0.34	0.72	2.35	13.68
KY31+[3]	4.3	56.0	47.5	52.0	99.0	99	99	99	99	98	97	8.13	2.99	1.33	0.38	0.57	2.29	13.41
Cowgirl	2.6	57.5	55.5	55.5	95.8	96	96	97	97	97	97	7.25	3.28	1.48	0.32	0.92	2.71	13.24
Kentucky 32	2.0	58.5	56.0	57.0	92.3	92	92	94	94	94	94	7.65	3.11	1.30	0.32	0.78	2.40	13.16
Flourish	2.0	56.5	46.3	53.5	90.5	92	93	94	94	94	94	7.66	2.77	1.18	0.30	1.01	2.49	12.92
Mahulena (FL)	1.9	59.5	58.0	58.0	83.8	88	91	92	92	92	92	6.65	3.15	1.48	0.33	0.76	2.57	12.37
Fojtan (FL)	2.5	56.5	50.0	53.0	89.8	90	92	94	94	94	95	7.08	2.60	1.18	0.32	0.71	2.21	11.90
Experimental Varieties																		
TF 0401	2.9	58.0	55.5	55.5	95.0	96	96	95	95	96	96	8.09	3.60	1.42	0.44	0.93	2.79	14.48*
IS-FTF 70	3.1	56.0	46.3	50.5	95.8	96	97	97	97	97	97	8.32	3.29	1.18	0.38	0.96	2.52	14.12*
KYFA0906	3.4	56.0	47.5	50.5	95.0	97	96	96	96	95	95	8.43	3.29	1.25	0.38	0.71	2.34	14.05*
PPG-FTF 104	2.0	56.0	48.5	50.0	89.3	90	93	93	93	93	92	7.97	3.27	1.15	0.36	0.91	2.42	13.66
KYFA0905	2.6	56.5	48.0	52.5	91.8	92	94	94	95	95	95	8.03	3.02	1.30	0.31	0.98	2.58	13.63
KYFA0901	3.5	56.5	56.0	56.5	95.8	96	96	95	96	95	95	7.65	3.13	1.45	0.42	0.66	2.53	13.31
KY31-[3]	3.5	56.5	52.5	56.0	98.5	99	99	99	99	99	99	7.63	2.96	1.15	0.34	0.78	2.28	12.87
Mean	2.7	57.0	52.6	54.7	93.0	94.0	95	95	95	95	95	7.84	3.27	1.39	0.36	0.92	2.67	13.77
CV,%	20.7	2.1	3.6	2.6	3.0	3.0	2	2	2	2	2	7.37	11.70	12.29	27.03	33.21	13.47	7.22
LSD,0.05	0.8	1.7	2.7	2.0	4.0	4.0	3	3	3	3	3	0.82	0.54	0.24	0.14	0.43	0.51	1.40

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.

[2] 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. See Table 4 for complete scale.

[3] KY 31- is the variety KY31 from which the toxic endophyte has been removed. Jesup MaxQ and Estancia Arkshield contain a non-toxic endophyte. BarOptima PLUS E34 contains a beneficial endophyte. KY31+ contains the toxic endophyte. The other fescue varieties in this test do not contain an endophyte.

*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 6. Dry-matter yields, seedling vigor, maturity, and stand persistence of tall fescue varieties sown September 5, 2013, at Lexington, Kentucky.

Variety	Seedling Vigor[1] Oct 14, 2013	Maturity[2] 2014 May 8	Maturity[2] 2015 May 11	Percent Stand 2013 Oct 14	Percent Stand 2014 Apr 2	Percent Stand 2014 Oct 28	Percent Stand 2015 Apr 3	Percent Stand 2015 Oct 29	Yield (tons/acre) 2014 Total	Yield (tons/acre) 2015 May 11	Yield (tons/acre) 2015 Jun 17	Yield (tons/acre) 2015 Aug 7	Yield (tons/acre) 2015 Total	2-year Total
Commercial Varieties-Available for Farm Use														
BarOptima PLUS E34[3]	3.4	48.0	50.5	100	97	99	99	99	4.19	1.50	0.26	0.74	2.50	6.69*
KY31+[3]	4.3	49.8	53.0	100	100	100	100	100	3.96	1.46	0.37	0.80	2.62	6.59*
Goliath	3.4	56.0	56.0	99	96	97	97	97	3.99	1.49	0.26	0.89	2.59	6.56*
Cajun II	3.0	55.0	56.5	96	82	92	92	92	3.46	1.77	0.25	0.90	2.91	6.37*
Select	4.0	55.0	55.5	99	98	99	99	99	4.08	1.47	0.26	0.54	2.27	6.35*
Jesup MaxQ[3]	3.0	56.0	55.5	100	96	98	98	98	3.66	1.53	0.21	0.76	2.50	6.16*
Bronson	3.5	55.5	55.5	100	95	95	96	96	3.26	1.81	0.33	0.71	2.84	6.10*
Lacefield MaxQ II[3]	4.0	50.8	54.5	100	99	100	100	100	3.74	1.38	0.15	0.82	2.35	6.09*
Experimental Varieties														
AGRFA-179/AR584[3]	4.0	44.8	50.0	100	97	100	100	100	4.42	1.46	0.21	0.84	2.51	6.93*
KYFA9732/AR584[3]	4.1	45.0	50.5	100	99	100	100	100	4.39	1.37	0.23	0.73	2.33	6.72*
GT213/AR584[3]	4.1	52.5	51.5	100	100	100	100	100	4.32	1.42	0.19	0.69	2.31	6.63*
HTWC4	3.9	51.8	55.5	100	97	99	99	99	4.01	1.53	0.19	0.84	2.56	6.57*
KYFA0701	4.6	52.5	54.0	100	98	98	98	98	4.07	1.49	0.18	0.78	2.45	6.52*
KYFA9821/AR584[3]	3.1	50.5	56.0	99	97	99	99	99	3.82	1.61	0.15	0.88	2.64	6.45*
AGRFA-178/AR584[3]	3.4	46.3	51.0	100	99	100	99	99	3.94	1.31	0.20	0.85	2.36	6.30*
KY31-[3]	3.1	52.5	54.5	100	98	99	99	99	4.01	1.38	0.15	0.73	2.26	6.28*
BARFAF13131	2.3	49.3	54.0	99	85	93	93	93	3.51	1.49	0.17	0.90	2.56	6.07*
AGRFA-200/AR584[3]	4.4	41.0	45.0	100	99	100	100	100	3.80	1.12	0.20	0.59	1.92	5.72*
AGRFA-201/AR605[3]	2.1	55.0	56.5	99	93	94	95	95	3.23	1.53	0.26	0.41	2.21	5.44
Mean	3.6	50.9	53.4	99	96	98	98	98	3.89	1.48	0.22	0.76	2.46	6.34
CV,%	16.7	5.3	2.0	1	4	2	2	2	12.62	14.09	59.99	35.87	19.23	14.23
LSD,0.05	0.8	3.8	1.5	2	5	3	3	3	0.70	0.30	0.18	0.39	0.68	1.29

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[2] 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. See Table 4 for complete scale.
[3] KY 31- is the variety KY31 from which the toxic endophyte has been removed. Jesup MaxQ and Lacefield MaxQ II contain a non-toxic endophyte. BarOptima PLUS E34 contains a beneficial endophyte. AR584 and AR605 are non-toxic endophytes inserted into the experimental tall fescue varieties. KY31+ contains the toxic endophyte. The other fescue varieties in this test do not contain an endophyte.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Seedings were made at the rate of 25 pounds per acre for tall fescue and 20 pounds per acre for bromegrass into a prepared seedbed with a disk drill. Plots were 5 feet by 20 feet in a randomized complete block design with four replications with a harvested plot area of 5 feet by 15 feet. Nitrogen was topdressed at 60 pounds per acre of actual nitrogen in March, after the first cutting, and again in late summer, for a total of 180 pounds per acre over the season. The tests were harvested using a sickle-type forage plot harvester to simulate a spring cut hay/summer grazing/fall stockpile management system. The first cutting was harvested when all tall fescue and bromegrass varieties had reached at least the boot stage. Fresh weight samples were taken at each harvest to calculate dry matter production. Management practices for these tests regarding establishment, fertility (P, K, and lime based on regular soil tests), weed control, and harvest timing were in accordance with University of Kentucky recommendations.

Results and Discussion

Weather data for Lexington, Princeton, and Quicksand are presented in tables 1, 2, and 3.

Ratings for maturity (see Table 4 for maturity scale), stand, and dry-matter yields (tons/A) are reported in tables 5 through 11. Yields are given by cutting

Table 7. Dry-matter yields, seedling vigor, maturity, and stand persistence of bromegrass varieties sown September 5, 2014, at Lexington, Kentucky.

Variety	Type	Seedling Vigor[1] Oct 9, 2014	Maturity[2] 2015 May 6	Percent Stand 2014 Oct 9	Percent Stand 2015 Apr 2	Percent Stand 2015 Oct 29	Yield (tons/acre) 2015 May 6	Yield (tons/acre) 2015 Jun 15	Yield (tons/acre) 2015 Aug 10	Yield (tons/acre) 2015 Total
Commercial Varieties-Available for Farm Use										
MacBeth	meadow	4.8	56.0	81	89	89	1.07	0.81	1.51	3.39*
Carlton	smooth	4.0	29.0	85	70	77	0.33	0.84	1.42	2.59
AC Knowles	hybrid	4.3	48.5	93	88	89	0.42	0.81	1.17	2.40
Experimental Varieties										
BARBcFiFRRL	meadow	4.8	57.0	95	94	94	0.96	0.92	1.37	3.25*
MSB	–	4.8	46.3	94	89	91	0.85	0.88	1.36	3.10*
GO-13SBF	smooth	4.3	51.5	82	82	84	0.50	0.95	1.50	2.95*
Mean		4.5	48.0	88	86	87	0.69	0.87	1.39	2.95
CV,%		15.0	4.5	13	13	11	31.63	17.24	22.79	16.26
LSD,0.05		1.0	3.3	17	17	14	0.33	0.23	0.48	0.72

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[2] 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. See Table 4 for complete scale.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

date for 2015 and as total annual production. Stated yields are adjusted for percent weeds, therefore the tonnage given is for crop only. Varieties are listed by total yield in descending order. Experimental varieties are listed separately at the bottom of the tables.

Statistical analyses were performed on all data to determine if the apparent differences are truly due to varietal differences or just to chance. In the tables, varieties that are 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 and the LSD (Least Significant Difference) 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.

Tables 12 and 13 summarize information about distributors, and yield performance across locations for all varieties currently included in tests discussed in this report. Varieties are listed in alphabetical order by species, with the experimental varieties at the bottom. Remember that experimental varieties are not available for farm use; commercial varieties can be purchased from agricultural distributors. In tables 12 and 13, an open block indicates that the variety was not in that particular test (labeled at the top of the column); an "x" in the block means that the variety was in the test but yielded significantly less than the top-yielding variety. A single asterisk (*) means that the variety was not significantly different from the top variety based on the 0.05 LSD. It is best to choose a variety that has performed well over several years and locations. Remember to consider the relative spring maturity and the distribution of yield across the growing season when evaluating productivity of tall fescue and bromegrass varieties (tables 5-11).

Tables 14 and 15 are summaries of yield data from 2000 to 2015 of commercial varieties that have been entered in the Kentucky trials. The data is listed as a percentage of the mean of the commercial varieties entered in each specific trial. In other words, the mean for each trial is 100 percent—varieties with percentages over 100 yielded better than average and varieties with percentages less than 100 yielded lower than average. Direct, statistical comparisons of varieties cannot be made using the table 14 and 15 summaries, but these comparisons do help to identify varieties for further consideration. Varieties that have performed better than average over many years and at several locations have very stable performance, while others may have performed very well in wet years or on particular soil types. These details may influence variety choice, and the information can be found in the yearly reports. See the footnotes in tables 14 and 15 to determine to which yearly report to refer.

Table 8. Dry-matter yields, seedling vigor, maturity, and stand persistence of tall fescue varieties sown September 4, 2014, at Lexington, Kentucky.

Variety	Seedling Vigor[1] Oct 9, 2014	Maturity[2] 2015 May 6	Percent Stand 2014 Oct 9	Percent Stand 2015 Apr 2	Percent Stand 2015 Oct 29	Yield (tons/acre) 2015 May 6	Yield (tons/acre) 2015 Jun 17	Yield (tons/acre) 2015 Aug 11	Yield (tons/acre) 2015 Total
Commercial Varieties-Available for Farm Use									
Jesup MaxQ[3]	4.1	54.0	100	100	100	1.67	0.64	1.31	3.61*
Select	3.5	53.0	98	99	99	1.59	0.71	1.31	3.61*
Drover	3.5	56.5	98	97	97	1.63	0.63	1.32	3.58*
SS-0705TFSL	4.6	52.0	100	100	100	1.52	0.75	1.17	3.44*
Brutus	4.0	51.5	100	100	100	1.55	0.49	1.28	3.32*
Lacefield MaxQ II[3]	4.4	50.5	100	100	100	1.53	0.50	1.26	3.30*
Kentucky 32	3.6	55.0	99	100	100	1.46	0.62	1.05	3.12*
Teton II	4.0	56.0	98	99	99	1.44	0.62	1.03	3.09*
BarOptima PLUS E34[3]	3.9	46.3	100	99	99	1.48	0.59	1.00	3.07*
KY31+[3]	4.6	46.3	100	100	100	1.18	0.60	1.19	2.97*
Cajun II	4.3	55.5	100	100	100	1.58	0.63	0.63	2.84
Experimental Varieties									
KYFA1104	3.9	49.8	99	100	99	1.35	0.70	1.56	3.61*
KYFA1114/AR584[3]	4.3	47.5	100	100	100	1.45	0.64	1.51	3.60*
PPG-FTF-109	4.3	55.5	100	100	100	1.66	0.55	1.34	2.56*
KYFA1110	4.5	53.5	100	100	99	1.59	0.58	1.30	3.47*
13SLTF10-3	3.8	46.3	100	99	99	1.22	0.68	1.55	3.45*
NFTF 1044	3.5	51.5	100	100	99	1.60	0.72	1.12	3.44*
GO-12F	4.1	46.3	100	100	99	1.49	0.63	1.32	3.44*
KYFA1106	4.8	46.3	100	100	100	1.61	0.61	1.16	3.38*
KY31-[3]	3.9	52.0	100	99	99	1.53	0.55	1.29	3.38*
NFTF 1051	4.4	54.5	99	99	98	1.53	0.58	1.14	3.26*
PPG-FTF-106	3.9	56.5	99	99	99	1.58	0.66	1.00	3.24*
KYFA1103	4.4	53.5	100	100	100	1.63	0.56	1.04	3.23*
NFTF 1370	3.9	53.5	100	100	100	1.51	0.58	1.13	3.21*
TFBG13-1	3.8	56.0	98	99	98	1.61	0.53	1.06	3.19*
PPG-FTF-105	3.5	56.0	98	99	99	1.45	0.57	1.09	3.11*
KYFA1113/AR584[3]	4.8	45.0	100	99	99	1.37	0.68	1.04	3.09*
KYFA1108	3.8	47.5	100	100	100	1.34	0.47	1.27	3.08*
13SLTF10-2	4.0	45.0	100	100	99	1.09	0.65	1.29	3.03*
BARFAF13131	3.3	49.3	96	97	97	1.28	0.59	1.01	2.89*
KYFA1112	3.1	46.8	100	100	100	1.13	0.50	1.21	2.84
KYFA0905	3.6	47.5	98	98	98	1.13	0.56	1.09	2.78
KYFA1115/AR584[3]	3.5	46.3	100	100	100	1.32	0.53	0.91	2.76
KYFA1111	3.4	45.0	99	99	99	1.11	0.50	0.82	2.43
Mean	4.0	50.8	99.0	99	99	1.45	0.60	1.17	3.22
CV,%	14.6	3.9	2.0	1	1	15.69	17.48	33.47	16.60
LSD,0.05	0.8	2.8	2.0	2	2	0.32	0.15	0.55	0.75

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[2] 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. See Table 4 for complete scale.
[3] KY 31- is the variety KY31 from which the toxic endophyte has been removed. Jesup MaxQ and Lacefield MaxQ II contain a non-toxic endophyte. BarOptima PLUS E34 contains a beneficial endophyte. AR584 is a non-toxic endophyte inserted into the experimental tall fescue varieties. KY31+ contains the toxic endophyte. The other fescue varieties in this test do not contain an endophyte.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Summary

Selecting a good variety of tall fescue and bromegrass is an important first step in establishing a productive stand of grass. Proper management, beginning with seedbed preparation and continuing throughout the life of the stand, is necessary for even the highest-yielding variety to produce to its genetic potential.

The following is a list of University of Kentucky Cooperative Extension publications related to tall fescue management available from your county Extension office and are listed in the "Publications" section of the UK Forage website, www.uky.edu/Ag/Forage:

- Lime and Fertilizer Recommendations (AGR-1)
- Grain and Forage Crop Guide for Kentucky (AGR-18)
- Tall Fescue (AGR-59)
- Establishing Forage Crops (AGR-64)
- Tall Fescue in Kentucky (AGR-108)
- Forage Identification and Use Guide (AGR-175)
- Rotational Grazing (ID-143)

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Table 9. Dry-matter yields, seedling vigor, maturity, and stand persistence of tall fescue and festulolium (FL) varieties sown September 12, 2012, at Princeton, Kentucky.

		Maturity[2]			Percent Stand						Yield (tons/acre)							
	Seedling Vigor[1]	2013	2014	2015	2012	2013		2014		2015	2013	2014	2015					3-year
Variety	Oct 29, 2012	May 14	May 20	May 7	Oct 29	Mar 19	Oct 25	Apr 9	Oct 22	Apr 14	Oct 23	Total	Total	May 7	Jun 10	Aug 12	Oct 23	Total	Total
Commercial Varieties-Available for Farm Use																			
Mahulena (FL)	2.5	59.0	61.5	58.0	100	100	100	100	100	100	100	7.72	3.06	1.35	0.42	0.57	0.61	2.95	13.73*
Tuscany II	3.6	56.5	59.5	53.5	100	100	100	99	99	98	96	7.78	3.11	1.06	0.37	0.62	0.64	2.69	13.59*
Estancia Arkshield[3]	4.6	57.5	60.0	55.0	100	100	100	100	100	100	100	7.21	3.12	1.03	0.36	0.81	0.67	2.87	13.20*
Kentucky 32	2.3	57.0	61.5	56.0	99	99	99	98	100	100	100	7.23	3.11	1.16	0.30	0.61	0.58	2.65	13.00*
KY31+[3]	5.0	54.5	56.0	53.5	100	100	100	100	100	100	100	7.37	2.86	1.11	0.38	0.68	0.57	2.74	12.97*
Flourish	2.3	55.0	58.0	52.0	97	99	99	99	99	98	98	7.66	2.92	0.90	0.33	0.61	0.50	2.34	12.93*
Select	3.1	56.5	60.5	54.5	99	100	100	100	99	99	99	7.31	2.98	1.25	0.28	0.36	0.64	2.53	12.84*
BarOptima PLUS E34[3]	3.0	53.5	57.0	50.5	100	100	100	100	100	100	100	7.37	3.04	1.05	0.29	0.39	0.68	2.40	12.81*
Jesup EF	4.0	57.5	61.5	55.0	100	100	100	100	100	100	100	7.25	2.99	1.13	0.39	0.43	0.57	2.52	12.77*
Teton II	2.8	57.5	60.5	57.5	100	100	100	100	99	99	100	7.49	2.79	1.18	0.44	0.37	0.44	2.44	12.72*
Bull	3.4	58.0	60.0	57.5	99	100	100	100	100	99	98	7.21	2.82	1.26	0.26	0.69	0.47	2.67	12.70*
Jesup MaxQ[3]	3.6	57.5	61.5	56.5	100	100	100	100	99	99	99	7.44	2.61	1.08	0.37	0.47	0.57	2.49	12.54
Fojtan (FL)	2.5	53.5	57.5	53.0	100	100	100	100	100	100	100	7.17	2.80	1.09	0.36	0.67	0.41	2.54	12.52
Cowgirl	3.0	56.5	59.5	55.5	100	100	100	100	100	100	100	7.03	3.09	1.05	0.32	0.59	0.39	2.36	12.48
Bronson	3.4	56.5	59.5	56.5	100	100	100	100	96	97	97	6.59	2.70	1.08	0.32	0.44	0.57	2.41	11.70
Experimental Varieties																			
TF 0401	3.3	57.0	59.0	55.0	100	100	100	100	100	100	100	8.22	3.40	1.17	0.44	0.57	0.59	2.77	14.39*
KYFA0901	3.8	57.0	61.5	57.0	100	100	100	100	100	100	100	7.28	3.11	1.21	0.37	0.61	0.64	2.84	13.23*
IS-FTF 70	2.8	53.0	57.0	52.0	100	100	100	97	98	98	99	7.70	2.94	1.04	0.35	0.60	0.54	2.53	13.18*
KY31-[3]	4.6	55.5	59.5	53.5	100	100	100	100	99	99	99	7.70	2.95	1.24	0.32	0.53	0.43	2.52	13.16*
KYFA0906	4.1	54.5	56.5	53.0	100	100	100	100	100	100	100	7.35	3.08	1.01	0.38	0.62	0.67	2.68	13.11*
KYFA0905	3.8	54.5	57.5	53.0	100	100	100	100	100	100	100	7.38	2.92	1.13	0.29	0.64	0.56	2.62	12.92*
PPG-FTF 104	2.5	55.0	57.5	52.5	99	99	99	99	99	99	99	7.13	2.65	0.98	0.28	0.38	0.58	2.22	11.99
Mean	3.4	56.0	59.2	54.6	100	100	100	100	99	99	99	7.39	2.96	1.12	0.35	0.56	0.56	2.58	12.93
CV,%	19.0	2.0	2.8	3.1	1	0	0	1	2	2	2	7.93	14.24	15.15	29.58	43.37	50.42	20.81	9.61
LSD,0.05	0.9	1.6	2.3	2.4	2	1	1	2	3	3	3	0.83	0.60	0.24	0.14	0.34	0.40	0.76	1.75

1 Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.

2 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. See Table 4 for complete scale.

3 KY 31- is the variety KY31 from which the toxic endophyte has been removed. Jesup MaxQ and Estancia Arkshield contain a non-toxic endophyte. BarOptima PLUS E34 contains a beneficial endophyte. KY31+ contains the toxic endophyte. The other fescue varieties in this test do not contain an endophyte.

*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 10. Dry-matter yields, seedling vigor, maturity, and stand persistence of bromegrass varieties sown September 7, 2012, at Lexington, Kentucky.

Variety	Type	Seedling Vigor[1] Oct 16, 2012	Maturity[2] 2013	Maturity[2] 2014		Maturity[2] 2015	Percent Stand 2012	Percent Stand 2013		Percent Stand 2014		Percent Stand 2015		Yield (tons/acre) 2013	Yield (tons/acre) 2014	Yield (tons/acre) 2015				3-year Total
			May 20	May 12	Jun 13	May 11	Oct 16	Mar 20	Oct 22	Apr 9	Oct 27	Apr 6	Oct 29	Total	Total	May 11	Jun 16	Aug 5	Total	
Commercial Varieties-Available for Farm Use																				
Fleet	meadow	1.7	62.0	60.0	29.0	58.0	72	71	87	87	87	91	89	5.66	3.54	1.15	0.56	1.17	2.88	12.08*
Macbeth	meadow	2.6	62.0	59.2	29.0	57.6	94	91	92	92	92	94	95	5.86	3.47	0.97	0.63	0.91	2.51	11.85*
AC Knowles	hybrid	2.5	60.5	55.5	60.0	53.0	95	87	92	92	92	92	88	5.56	3.32	0.80	0.72	0.92	2.44	11.32*
Peak	smooth	4.0	58.0	54.5	29.0	49.8	91	86	86	84	86	88	88	5.18	3.10	1.04	0.54	1.30	2.87	11.15*
Carlton	smooth	3.3	56.0	52.0	60.0	45.0	92	75	86	86	86	88	85	4.46	2.36	0.43	0.49	1.35	2.26	9.08
Experimental Varieties																				
BARBcF1FRRL	meadow	3.8	61.5	60.0	29.0	58.0	98	94	94	93	94	93	92	5.90	3.73	1.19	0.66	1.05	2.90	12.54*
BARBiF1GRL	smooth	4.5	57.5	55.0	29.0	53.5	99	98	98	98	98	98	98	5.67	3.50	1.41	0.62	0.94	2.97	12.15*
MSB	–	3.9	56.5	53.0	29.0	52.5	96	92	93	93	94	94	94	5.32	3.22	1.30	0.47	1.19	2.97	11.51*
Mean		3.3	59.3	56.1	36.8	53.4	93	87	91	91	91	92	91	5.46	3.28	1.03	0.59	1.10	2.72	11.45
CV,%		26.0	1.5	1.9	0.0	3.8	7	10	5	5	4	2	5	13.86	13.94	15.00	36.67	30.92	17.56	11.36
LSD,0.05		1.3	1.3	1.6	0.0	3.0	10	12	7	7	6	3	6	1.12	0.68	0.23	0.32	0.50	0.71	1.93

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[2] 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. See Table 4 for complete scale.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 11. Dry-matter yields, seedling vigor, and stand persistence of tall fescue varieties sown August 29, 2013, at Quicksand,Kentucky.

Variety	Seedling Vigor[1] Oct 3, 2013	Percent Stand 2013	Percent Stand 2014		Percent Stand 2015		Yield (tons/acre) 2014	Yield (tons/acre) 2015				2-year Total
		Oct 3	Mar 27	Nov 3	Apr 8	Oct 29	Total	May 11	Aug 3	Sep 24	Total	
Commercial Varieties-Available for Farm Use												
Lacefield MaxQ II[2]	3.6	100	99	99	99	99	6.69	2.23	1.44	0.90	4.57	11.27*
KY31+[2]	3.3	100	100	100	100	100	6.24	1.51	1.57	1.30	4.39	10.63
Select	3.3	100	98	98	98	98	6.11	2.08	1.14	0.79	4.01	10.12
Jesup MaxQ[2]	2.0	100	97	98	99	99	5.83	1.88	1.21	1.12	4.21	10.05
Bull	2.0	100	98	97	97	97	5.72	2.08	0.90	0.75	3.73	9.45
BarOptima PLUS E34[2]	2.3	99	97	97	97	97	5.71	1.95	1.11	0.54	3.60	9.31
Cajun II	1.5	95	78	90	90	92	4.00	1.89	1.39	0.96	4.25	8.25
Experimental Varieties												
KYFA9732/AR584[2]	4.3	100	100	100	100	100	7.34	2.11	1.71	1.11	4.94	12.27*
KY31-[2]	2.0	100	96	98	98	98	6.91	1.90	1.35	1.13	4.37	11.28*
KYFA0701	4.5	100	100	99	99	99	6.01	1.85	1.50	1.01	4.36	10.37
KYFA9821/AR584[2]	1.5	100	98	98	99	99	5.80	2.05	1.46	1.00	4.51	10.31
HTWC4	3.1	100	94	97	97	97	5.55	1.63	1.48	0.92	4.03	9.58
Mean	2.8	99	96	98	98	98	5.99	1.93	1.35	0.96	4.25	10.24
CV,%	33.6	1	5	2	2	2	11.24	15.79	22.06	17.98	11.83	8.57
LSD,0.05	1.3	1	6	3	3	3	0.97	0.44	0.43	0.25	0.72	1.26

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[2] KY 31- is the variety KY31 from which the toxic endophyte has been removed. Jesup MaxQ and Lacefield MaxQ II contain a non-toxic endophyte. BarOptima PLUS E34 contains a beneficial endophyte. AR584 is a non-toxic endophyte inserted into the experimental tall fescue varieties. KY31+ contains the toxic endophyte. The other fescue varieties in this test do not contain an endophyte.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 12. Performance of bromegrass varieties across years at Lexington.

Variety	Type	Proprietor/KY Distributor	2012[1] 2013[2]	2012[1] 2014	2012[1] 2015	2014 2015
Commercial Varieties-Available for Farm Use						
AC Knowles	hybrid	Agriculture Canada	*	*	*	x
Carlton	smooth	Pickseed USA	x[3]	x	*	x
Fleet	meadow	Agriculture Canada	*	*	*	
MacBeth	meadow	Cisco Seeds	*	*	*	*
Peak	smooth	Allied Seed	*	*	*	
Experimental Varieties						
BAR BcF1FRRL	meadow	Barenbrug USA	*	*	*	*
BAR BiF1GRL	smooth	Barenbrug USA	*	*	*	
GO-13SBF	smooth	Grassland Oregon				*
MSB	–	Pickseed USA	*	*	*	*

[1] Establishment year.
[2] Harvest year.
[3] "x" in the box indicates the variety was in the test but yielded significantly less than the top yielding variety in the test. Open boxes indicate the variety was not in the test.
*Not significantly different from the highest yielding variety in the test.

Table 13. Performance of tall fescue varieties across years and locations in Kentucky.

		Lexington						Princeton			Quicksand	
		2012[1]			2013		2014	2012			2013	
Variety	Proprietor/KY Distributor	13[2]	14	15	14	15	15	13	14	15	14	15
Commercial Varieties-Available for Farm Use												
BarOptima PLUS E34[4]	Barenbrug USA	*	*	x	*	*	*	x[3]	*	*	x	x
Bronson	Ampac Seed	x	*	*	x	*		x	x	*		
Brutus	Saddle Butte Ag. Inc.						*					
Bull	Caudill Seed	x	*	*				x	*	*	x	x
Cajun II	Smith Seed Services				x	*	x				x	*
Cowgirl	PureSeed	x	*	x				x	*	*		
Drover	Barenbrug USA						*					
Estancia Arkshield[4]	Mountain View Seeds	x	*	*				x	*	*		
Flourish	Allied Seed	x	x	x				*	*	*		
Goliath	Ampac Seed				*	*						
Kentucky 32	Oregro Seeds	x	x	x			*	x	*	*		
KY31+[4]	Ky Agric. Exp. Station/Public	*	x	x	*	*	*	x	*	*	x	*
Jesup EF	Pennington Seed	*	*	x				x	*	*		
Jesup MaxQ[4]	Pennington Seed	*	*	x	x	*	*	*	x	*	x	x
Lacefield MaxQ II[4]	Pennington Seed				*	*	*				*	*
Select	FFR/Southern States	*	x	x	*	*	*	x	*	*	x	x
SS-0705TFSL	FFR/Southern States						*					
Teton II	Mountain View Seeds	*	*	*			*	*	x	*		
Tuscany II	Seed Research of Oregon	*	*	x				*	*	*		
Experimental Varieties												
AGRFA-178/AR584[4]	AgResearch				*	*						
AGRFA-179/AR584[4]	AgResearch				*	*						
AGRFA-200/AR584[4]	AgResearch				*	x						
AGRFA-201/AR605[4]	AgResearch				x	*						
BARFAF13131	Barenbrug USA				x	*	*					
GO-12F	Grassland Oregon						*					
GT213/AR584[4]	AgResearch				*	*						
HTWC4	KY Agric. Exp. Station				*	*					x	x
IS-FTF 70	DLF International Seeds	*	*	x				*	*	*		
KY31-[4]	KY Agric. Exp. Station	x	x	x	*	*	*	*	*	*	*	*
KYFA0701	KY Agric. Exp. Station				*	*					x	*
KYFA0901	KY Agric. Exp. Station	x	x	x				x	*	*		
KYFA0905	KY Agric. Exp. Station	*	x	x			x	*	*	*		
KYFA0906	KY Agric. Exp. Station	*	*	x				x	*	*		
KYFA1103	KY Agric. Exp. Station						*					
KYFA1104	KY Agric. Exp. Station						*					
KYFA1106	KY Agric. Exp. Station						*					
KYFA1108	KY Agric. Exp. Station						*					
KYFA1110	KY Agric. Exp. Station						*					
KYFA1111	KY Agric. Exp. Station						x					
KYFA1112	KY Agric. Exp. Station						x					
KYFA1113/AR584[4]	KY Agric. Exp. Station						*					
KYFA1114/AR584[4]	KY Agric. Exp. Station						*					
KYFA1115/AR584[4]	KY Agric. Exp. Station						x					
KYFA9732/AR584[4]	KY Agric. Exp. Station				*	*					*	*
KYFA9821/AR584[4]	KY Agric. Exp. Station				*	*					x	*
NFTF 1044	Noble Foundation						*					
NFTF 1051	Noble Foundation						*					
NFTF 1370	Noble Foundation						*					
PPG-FTF 104	Mountain View Seeds	*	*	x				x	x	*		
PPG-FTF-105	Mountain View Seeds						*					
PPG-FTF-106	Mountain View Seeds						*					
PPG-FTF-109	Mountain View Seeds						*					
TF 0401	Brett Young	*	*	x				*	*	*		
TFBG13-1	Oregro Seeds						*					
13SLTF10-2	Oregro Seeds						*					
13SLTF10-3	Oregro Seeds						*					

[1] Establishment year.
[2] Harvest year.
[3] "x" in the box indicates the variety was in the test but yielded significantly less than the top yielding variety in the test. Open boxes indicate the variety was not in the test.
[4] KY31- is the variety KY31 from which the toxic endophyte has been removed. KY31+ contains the toxic endophyte. Jesup MaxQ, Estancia Arkshield and Lacefield MaxQ II contain a non-toxic endophyte. BarOptima PLUS E34 contains a beneficial endophyte. AR584 and AR605 are non-toxic endophytes inserted into the experimental tall fescue varieties. The other varieties do not contain an endophyte.
*Not significantly different from the highest yielding variety in the test.

Table 14. Summary of Kentucky tall fescue yield trials 2000-2015 (yield shown as a percentage of the mean of the commercial varieties in the trial).

		Lexington								Princeton							Quicksand				
		01[1,2]	03	05	07	09	11	12	13	00	02	04	06	08	10	12	01	03	05	13	Mean[3]
Variety	Proprietor	3-yr[4]	2-yr	3-yr	3-yr	3-yr	3-yr	3-yr	2-yr	2-yr	3-yr	3-yr	3-yr	3-yr	3-yr	3-yr	2-yr	2-yr	4-yr	2-yr	(#trials)
Atlas Select	ProSeeds Marketing													96							–
Aprilia	ProSeeds Marketing													94							–
BarElite	Barenbrug USA				99		100								92						97(3)
Bariane	Barenbrug USA		87	99															95		94(3)
Barolex	Barenbrug USA			90																	–
BarOptima PLUS E34[5]	Barenbrug USA			122	101		107	108	105						99	100				94	105(6)
Bronson	Ampac Seed			88	100	105	102	99	96						101	91			102		98(9)
Bull	Improved Forages		98	102				100		102	104					99		97		96	100(8)
Cajun II	Smith Seed Services						97		100						101					84	95(4)
Carmine	DLF International	99															97				98(2)
Cowgirl	Rose-AgriSeeds							94						102	100	98					99(4)
DuraMax GOLD[5]	DLF International						102						106								104(2)
Enhance	Allied Seed						93					107									100(2)
Estancia ArkShield[5]	Mountain View Seeds		102					106			101					102					103(4)
Festival	Pickseed West	107										102					107				105(3)
Flourish	Allied Seed							92								101					97(2)
Goliath	Ampac Seed					100			103						99						101(3)
Hoedown	DLF International	104															106				105(2)
HyMark	Fraser Seeds						91							102							97(2)
Jesup EF	Pennington Seed						98	105							103	100					102(4)
Jesup MaxQ[5]	Pennington Seed			98	104	110	103	100	97		94			95	100	98		100	102	102	100(13)
Johnstone	ProSeeds Marketing	108																			–
KENHY	KY Agric Exp Sta.											89									–
Kentucky 32	Oregro Seeds						93	94						99	94	101					96(5)
Kokanee	Ampac Seed	89								86											88(2)
KY31+[5]	KY Agric Exp Sta.	118	112	108	105	102	93	95	104	108	104		104	93	112	101	124	98	110	108	106(18)
Lacefield MaxQ II[5]	Pennington Seed								96											114	105(2)
Maximize	Turf-Seed	95															93				97(4)
Martin2 647[5]	DLF International						104														–
Nanryo	Jap. Grassland ForageSeed/ USDA-ARS, El Reno, OK				99																–
Noria	ProSeeds Marketing				100																–
RAD-ERF50	Radix Research, Inc.													113							–
Resolute	Ampac Seed	90															65				78(2)
Savory	DLF International												92								–
Seine	Advanta Seeds											96									–
Select	FFR/Sou. St.	106	94	99	102	98	90	100	100	105	97	105	102	105	99	100	112	102	91	103	101(29)
Stockman	Seed Research of OR		108									101	98					105			103(4)
Teton II	Mountain View Seeds						107	105								99					103(3)
Texoma MaxQ II[5]	Pennington Seed			95																	–
TF0203G	Seed Research of OR				90																–
Tower 647[5]	DLF International						98														–
Tuscany	Forage Genetics	112																			–
Tuscany II	Seed Research of OR							97					98			106					100(3)
5CAN	Brett Young					86															–

[1] Year trial was established.

[2] Use this summary table as a guide in making variety decisions, but refer to specific yearly reports to determine statistical differences in forage yield between varieties. To find actual yields, look in the yearly report for the final year of each specific trial. For example, the Lexington trial planted in 2012 was harvested two years, so the final report would be "2015 Tall Fescue Report" archived in the KY Forage website at www.uky.edu/Ag/Forage.

[3] Mean only presented when respective variety was included in two or more trials.

[4] Number of years of data.

[5] KY31+ contains the toxic endophyte. Jesup MaxQ, Texoma MaxQ II, Lacefield MaxQ II, DuraMax GOLD, Martin2 647, Tower 647 and Estancia Arkshield contain a contain a non-toxic endophyte. BarOptima PLUS E34 contains a beneficial endophyte. The other fescue varieties in this table do not contain an endophyte.

Table 15. Summary of Kentucky bromegrass yield trials at Lexington 2006-2015 (yield shown as a percentage of the mean of the commercial varieties in the trial.)

Variety	Type	Proprietor/KY Distributor	2006[1,2] 4-yr[4]	2008 3-yr	2010 3-yr	2012 3-yr	Mean[3] (#trials)
AC Knowles	hybrid	Agriculture Canada	85		82	102	90(3)
Bigfoot	hybrid	Grassland Oregon	108	116	105		110(3)
Canterbury	mountain	Barenbrug USA		79			–
Carlton	smooth	Pickseed USA				82	–
Doina	smooth	Barenbrug USA		114	108		111(2)
Fleet	meadow	Agriculture Canada	110			109	110(2)
Hakari	Alaska	Barenbrug USA		85	85		85(2)
MacBeth	meadow	Cisco Seeds		136	119	107	121(3)
Olga	smooth	Barenbrug USA		116	101		109(2()
Peak	smooth	Allied Seed		97		100	99(2)
Persister	prairie	DLF International		72			–
RAD-BI29	smooth	Columbia Seeds	96	86			91(2)

[1] Year trial was established.
[2] Use this summary table as a guide in making variety decisions, but refer to specific yearly reports to determine statistical differences in forage yield between varieties. To find actual yields, look in the yearly report for the final year of each specific trial. For example, the Lexington trial planted in 2012 was harvested three years, so the final report would be "2015 Tall Fescue and Brome Report" archived in the KY Forage website at www.uky.edu/Ag/Forage.
[3] Mean only presented when respective variety was included in two or more trials.
[4] Number of years of data.

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