University of Kentucky
College of Agriculture, Food and Environment
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2019 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 5.5 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 and has the advantage of greater seedling vigor than smooth bromegrass. Hybrid bromegrasses are a cross between smooth and meadow bromegrasses that combine the vigorous growth of smooth bromegrass with the leafiness and good regrowth of meadow bromegrass. Alaska bromegrass (*Bromus sitchensis*), also called Sitka bromegrass, is a long-lived perennial bunchgrass that will actively grow at moderate rates during the 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

Table 1. Temperature and rainfall at Lexington, Kentucky, in 2017, 2018, and 2019

	2017				2018				2019[2]			
	Temp		Rainfall		Temp		Rainfall		Temp		Rainfall	
	°F	DEP[1]	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	40	+9	6.81	+3.95	31	0	2.01	-0.85	33	+2	4.11	+1.25
FEB	47	+12	4.46	+1.25	45	+10	9.77	+6.56	42	+7	7.64	+4.43
MAR	48	+4	3.34	-1.06	42	-2.	5.16	+0.76	43	-1	3.44	-0.91
APR	62	+7	4.17	+0.29	50	-5	5.52	+1.64	54	+4	4.76	+0.88
MAY	66	+2	7.74	+3.27	73	+9	8.39	+3.92	69	+5	4.49	+0.02
JUN	73	+1	7.68	+4.02	76	+4	6.42	+2.76	73	+1	6.13	+2.47
JUL	76	0	4.49	-0.51	77	+1	6.15	+1.15	79	+3	3.30	-1.70
AUG	74	-1	6.66	+2.73	77	+2	6.45	+2.52	77	+2	2.42	-1.51
SEP	69	+1	4.72	+1.52	74	+6	12.88	+9.68	77	+9	0.18	-3.02
OCT	60	+3	6.06	+3.49	59	+2	6.54	+3.97	61	+4	8.15	+5.58
NOV	47	+2	3.09	-0.30	42	-3	5.64	+2.25				
DEC	35	-1	2.66	-1.32	40	+4	7.35	+3.37				
Total			61.88	+17.33			82.28	+37.73			44.67	+7.49

[1] DEP is departure from the long-term average.
[2] 2019 data is for ten months through October.

Table 2. Temperature and rainfall at Quicksand, Kentucky, in 2017, 2018, and 2019

	2017				2018				2019[2]			
	Temp		Rainfall		Temp		Rainfall		Temp		Rainfall	
	°F	DEP[1]	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	43	+12	4.61	+1.32	31	0	1.71	-1.58	37	+6	4.93	+1.64
FEB	46	+13	2.27	-1.33	48	+15	7.56	+3.96	45	+12	8.15	+4.55
MAR	48	+7	4.13	-0.21	44	+3	5.90	+1.56	44	+3	2.15	-2.19
APR	62	+9	4.23	+0.13	52	-1	4.07	-0.03	58	+5	2.55	-1.55
MAY	65	+3	6.33	+1.85	71	+9	5.28	+0.80	68	+6	3.91	-0.57
JUN	71	+1	5.82	+2.00	75	+5	5.47	+1.65	72	+2	8.35	+4.53
JUL	76	+2	5.76	+0.51	76	+2	5.39	+0.14	77	+3	6.32	+1.07
AUG	73	0	6.59	+2.58	75	+2	3.23	-0.78	75	+2	1.57	-2.44
SEP	68	+2	2.57	-0.95	74	+8	8.70	+5.18	74	+8	0.04	-3.48
OCT	59	+5	5.56	+2.65	59	+5	4.54	+1.63	60	+6	6.80	+3.89
NOV	47	+5	1.33	-2.55	43	+1	5.03	+1.15				
DEC	37	+4	3.28	-0.86	41	+8	7.07	+2.93				
Total			52.48	+5.14			63.95	+16.61			44.77	+5.45

[1] DEP is departure from the long-term average.
[2] 2019 data is for the ten months through October.

Table 3. Temperature and rainfall at Princeton, Kentucky, in 2018 and 2019

	2018				2019[2]			
	Temp		Rainfall		Temp		Rainfall	
	°F	DEP[1]	IN	DEP	°F	DEP	IN	DEP
JAN	32	-2	4.28	+0.48	36	+2	3.62	-0.18
FEB	45	+7	9.50	+5.07	43	+5	11.14	+6.71
MAR	47	0	9.53	-1.41	44	-3	3.34	-1.60
APR	53	-6	4.90	+0.10	59	0	4.50	-0.30
MAY	74	+7	4.69	-0.27	69	+2	5.61	+0.05
JUN	78	+3	7.80	+3.95	73	*2	4.33	+0.48
JUL	78	0	2.58	-1.71	77	-1	3.12	-1.17
AUG	77	0	2.68	-1.33	76	-1	6.31	+2.30
SEP	74	+4	5.61	+2.28	75	+4	0.34	-2.99
OCT	61	+2	2.96	-0.09	59	0	6.36	+3.31
NOV	42	-5	4.77	+0.14				
DEC	42	+3	5.45	+0.41				
Total			58.75	7.62			48.67	+7.21

[1] DEP is departure from the long-term average.
[2] 2019 data is for the ten months through October.

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 habitats. 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 16 and 17 show a summary of all tall fescue and bromegrass varieties tested in Kentucky for the past 17 years. The UK Forage Extension website at forages.ca.uky.edu 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.

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. Look

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. Further subdivision by means of leaf development index (see text).
12	2 leaves unfolded	Further subdivision by means of leaf development 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: Smith, J. Allan, and Virgil W. Hayes. 1981. p. 416-418. 14th International Grasslands Conference Proc. 1981. June 14-24, 1981, Lexington, Kentucky.

Table 5. Dry matter yields, seedling vigor, maturity, and stand persistence of tall fescue and meadow fescue (MF) varieties sown September 7, 2016, at Lexington, Kentucky

Variety	Endophyte Status[1]	Seedling Vigor[2] Oct 16, 2016	Maturity[3]			Percent Stand							Yield (tons/acre)					
			2017	2018	2019	2016	2017		2018		2019		2017	2018	2019			3-year Total
			May 3	May 11	May 9	Oct 5	Mar 14	Oct 31	Mar 15	Oct 19	Mar 22	Oct 17	Total	Total	May 9	Jun 24	Total	
Commercial Varieties-Available for Farm Use																		
Jesup MaxQ	novel	4.8	56.5	54.5	57.5	100	100	100	100	100	100	100	5.95	3.44	0.93	1.28	2.20	11.59*
SS0705TFSL	free	3.9	56.0	54.0	56.5	100	100	100	100	100	100	99	6.08	3.06	0.78	1.17	1.95	11.09*
Tower Protek	novel	3.0	51.0	46.3	49.8	99	100	100	100	100	100	98	5.95	2.97	0.84	1.09	1.93	10.86*
Teton II	free	3.8	57.0	56.0	56.0	100	100	100	100	100	100	96	6.13	2.96	0.75	1.01	1.76	10.84*
KY31+	toxic	4.0	52.0	49.0	53.0	100	100	100	100	100	100	98	6.25	2.96	0.68	0.90	1.58	10.78*
Select	free	3.9	55.5	53.5	56.5	100	100	100	100	100	100	94	5.93	2.95	0.83	0.94	1.78	10.65*
Kora Protek	novel	3.5	51.0	51.0	48.8	100	100	100	100	100	100	99	5.64	3.30	0.85	0.82	1.68	10.62*
Tower	free	2.5	53.5	35.5	47.5	99	100	100	100	100	100	96	6.35	2.32	0.70	1.15	1.85	10.53*
Bronson	free	3.5	55.5	51.8	55.5	100	100	100	100	100	100	100	5.50	3.04	0.93	0.97	1.90	10.44*
BarOptima PLUS E34	novel	3.1	51.0	46.3	45.0	100	100	100	100	100	100	99	5.54	2.90	0.90	1.03	1.93	10.38*
Cajun II	free	4.4	55.5	55.0	57.0	100	100	100	100	100	100	100	4.97	3.01	1.15	1.15	2.30	10.28*
Estancia Arkshield	novel	4.1	54.0	53.0	56.0	100	100	100	100	100	100	100	4.98	3.13	1.03	0.94	1.97	10.08*
Martin2 Protek	novel	3.5	57.0	54.5	56.5	100	100	100	100	100	100	91	5.49	2.78	0.75	0.99	1.74	10.01*
Lacefield MaxQII	novel	4.1	53.0	52.5	52.0	100	100	100	100	100	100	99	5.06	2.99	0.76	0.84	1.60	9.65
Payload	free	3.9	56.0	52.5	54.5	100	100	100	100	100	100	100	4.92	2.62	0.85	0.92	1.77	9.31
Cosmonaut (MF)	free	4.1	50.0	29.0	47.8	100	100	97	96	95	79	48	5.05	1.57	0.56	0.68	1.23	7.85
Experimental Varieties																		
KYFA1531	free	4.5	54.0	49.8	55.0	100	100	100	100	100	100	100	6.59	3.20	0.95	1.18	2.13	11.92*
KYFA1537	free	4.9	54.5	52.0	55.0	100	100	100	100	100	100	100	6.28	3.36	0.83	1.04	1.86	11.50*
IS-FTF 70	free	3.3	53.0	50.3	50.5	100	100	100	100	100	100	96	6.00	3.10	1.05	1.20	2.25	11.35*
TFCB4C2	free	2.9	55.0	55.0	57.5	100	100	100	100	100	100	100	6.08	3.32	1.01	0.90	1.91	11.31*
KYFA1533	free	4.6	54.0	52.3	54.5	100	100	100	100	100	100	100	5.96	3.11	1.02	1.03	2.04	11.11*
KYFA1536	free	4.4	55.0	53.0	54.5	100	100	100	100	100	100	100	5.81	3.16	1.07	0.93	1.99	10.96*
TFCB3C2	free	3.3	56.5	54.0	57.0	100	100	100	100	100	100	99	5.57	3.20	1.05	1.07	2.12	10.89*
RAD-HAN33	free	3.1	55.5	54.0	55.0	100	100	100	100	100	100	99	5.78	2.86	0.96	1.22	2.18	10.82*
TFSoft	free	3.8	54.5	55.5	56.0	100	100	100	100	100	100	96	5.53	2.98	0.90	1.38	2.28	10.79*
KYFA9304	free	4.8	52.0	51.5	54.0	100	100	100	100	100	100	97	5.87	2.92	0.90	1.02	1.92	10.71*
KYFA1303	free	4.6	51.0	52.0	52.5	100	100	100	100	100	100	100	5.86	3.25	0.62	0.94	1.56	10.68*
KYFA1532	free	4.4	54.5	51.0	54.0	100	100	100	100	100	100	100	5.68	2.87	0.80	1.25	2.05	10.61*
TFCB5C2	free	3.8	54.5	50.8	56.0	100	100	100	100	100	100	100	5.79	2.95	0.71	1.11	1.81	10.56*
KYFA9611	free	2.4	52.0	41.0	48.5	98	99	100	100	100	99	97	6.38	2.59	0.56	1.01	1.57	10.53*
KYFA1535	free	4.6	55.0	53.5	56.0	100	100	100	100	100	100	100	5.59	3.42	0.61	0.81	1.42	10.43*
KYFA1201	free	4.1	55.5	52.0	56.0	100	100	100	100	100	100	98	5.49	3.12	0.88	0.89	1.77	10.37*
TFCB1bC2	free	3.3	53.5	48.8	54.0	100	100	100	100	100	100	100	5.57	3.16	0.71	0.87	1.58	10.31*
KYFA9732/AR584	novel	4.4	53.0	46.3	53.0	100	100	100	100	100	100	98	5.98	2.85	0.60	0.87	1.47	10.29*
RAD-HAN19	free	3.1	53.0	51.5	53.5	100	100	100	100	100	100	98	5.24	3.18	0.78	1.09	1.87	10.28*
KYFA1534	free	4.5	56.0	53.5	56.0	100	100	100	100	100	100	100	5.77	2.74	0.81	0.84	1.64	10.15*
DLFPS-FTF93	free	3.8	57.5	56.0	58.0	100	100	100	100	100	100	98	5.24	2.63	1.03	0.93	1.97	9.84
TF0503	free	4.0	55.0	50.5	56.0	100	100	100	100	100	100	100	5.28	2.65	0.84	0.98	1.82	9.75
KY31-	free	4.1	53.5	51.5	54.5	100	100	100	100	100	100	99	4.82	3.09	0.77	0.96	1.73	9.64
PPG-FTF112	free	3.1	52.5	38.3	49.3	100	100	100	100	100	100	100	5.30	2.68	0.69	0.91	1.60	9.58
IS-FTF54 Protek	novel	3.0	57.5	56.0	58.0	100	100	100	100	100	100	100	5.12	2.59	0.93	0.94	1.87	9.57
DLFPS-FTF96	free	3.5	53.0	53.5	53.5	100	100	100	100	100	100	100	5.07	2.64	0.79	1.03	1.82	9.53
IS-FTF73	free	3.1	51.5	45.3	47.5	100	100	100	100	100	100	100	5.19	2.50	0.69	0.91	1.60	9.28
SLTF10-3	free	3.1	53.5	50.0	49.5	100	100	100	100	100	100	94	5.07	2.32	0.64	0.94	1.57	8.96
KYFP0901 (MF)	free	4.4	50.0	35.3	52.0	100	100	100	99	97	96	61	4.26	1.64	0.69	0.68	1.37	7.27
15610912	free	2.8	52.5	50.8	55.0	98	98	68	63	63	53	48	2.26	1.52	0.41	0.46	0.87	4.64
Mean		3.8	54.0	50.2	53.7	100	100	99	99	99	98	95	5.53	2.86	0.82	0.98	1.80	10.19
CV,%		12.9	3.2	7.5	3.8	1	1	4	3	3	5	7	17.22	17.84	24.80	22.49	18.50	13.59
LSD,0.05		0.7	2.4	5.3	2.9	1	0	6	5	5	7	9	1.33	0.71	0.28	0.31	0.44	1.94

[1] Free-varieties that do not contain an endophyte. Toxic-KY31+ contains a toxic endophyte. Novel-varieties that contain an endophyte that aids persistence but is not toxic to cattle.

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

[3] 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.

for Alliance for Grassland Renewal seed quality assurance printed on each bag of novel fescue seed.

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 nine studies are reported. Tall fescue varieties were sown at Lexington (2016, 2017, and 2018), Princeton (2017) and Quicksand (2016 & 2018). The bromegrass trials were sown in Lexington in 2016, 2017, and 2018. 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.

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, Quicksand, and Princeton are presented in Tables 1 through 3.

Ratings for maturity (see Table 4 for maturity scale), stand, and dry matter yields (tons/A) are reported in Tables 5 through 13. Yields are given by cutting date for 2019 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

Table 6. Dry matter yields, seedling vigor, maturity, and stand persistence of tall fescue and meadow fescue (MF) varieties sown September 8, 2017, at Lexington, Kentucky

			Maturity[3]		Percent Stand					Yield (tons/acre)				
			2018	2019	2017	2018		2019		2018	2019			
Variety	Endophyte Status[1]	Seedling Vigor[2] Oct 12, 2017	May 8	May 6	Oct 12	Mar 14	Oct 19	Mar 22	Oct 17	Total	May 6	Jun 24	Total	2-year Total
Commercial Varieties-Available for Farm Use														
Jesup MaxQ	novel	4.0	54.0	55.5	100	100	100	100	100	5.38	1.09	1.07	2.16	7.55*
SS0705TFSL	free	4.0	51.0	53.5	100	99	99	99	99	5.42	1.18	0.92	2.10	7.52*
Cajun II	free	3.9	52.5	55.5	99	99	99	99	100	5.29	1.18	1.02	2.19	7.49*
KY31+	toxic	4.3	46.3	51.5	100	100	100	100	100	5.32	0.85	0.75	1.60	6.92*
BarOptima PLUS E34	novel	3.3	45.0	48.8	99	95	98	98	100	4.59	1.00	0.78	1.78	6.37*
Lacefield MaxQII	novel	4.0	46.3	53.0	100	100	100	100	100	4.77	0.67	0.91	1.59	6.36*
Pradel (MF)	free	3.9	45.0	45.0	100	100	100	98	51	4.13	0.66	0.62	1.28	5.41
Experimental Varieties														
KYFA1305	free	4.0	45.0	53.3	100	100	100	100	100	5.54	0.71	1.06	1.77	7.31*
KYFA1306	free	3.8	49.3	49.8	78	100	100	100	100	5.44	0.88	0.80	1.68	7.13*
FTF94	free	2.1	52.5	56.0	86	86	89	89	95	4.78	0.98	1.13	2.10	6.88*
KYFA1304	free	2.9	49.8	53.5	91	90	91	91	94	5.07	0.97	0.80	1.77	6.83*
KYFA9304	free	4.0	48.5	52.0	99	99	99	99	99	4.85	0.87	1.09	1.96	6.80*
KYFA1405	free	2.8	46.3	52.0	83	83	87	95	96	4.85	1.05	0.91	1.95	6.80*
KYFA1404	free	2.9	45.0	50.3	98	98	98	99	99	4.60	1.02	1.02	2.04	6.64*
STF50	free	2.3	52.5	53.0	93	91	93	93	93	4.49	1.17	0.84	2.01	6.50*
RAD-ERF37	free	3.3	51.5	56.0	97	96	97	98	98	4.48	1.13	0.88	2.01	6.49*
KY31-	free	3.5	50.3	52.5	100	100	100	100	100	4.38	0.83	0.96	1.79	6.17
KYFP1301 (MF)	free	3.8	45.0	45.0	98	98	98	97	81	4.42	0.69	0.77	1.46	5.87
BARFA6BTR179	free	3.3	45.0	46.8	98	98	99	98	96	3.86	0.82	0.81	1.63	5.49
KYFA1606	free	1.0	45.0	52.3	63	51	53	65	59	3.49	0.72	0.60	1.31	4.87
Mean		3.3	48.3	51.8	94	94	95	96	93	4.77	0.92	0.89	1.81	6.59
CV,%		18.4	4.5	5.2	14	10	8	8	9	16.33	26.45	26.23	19.60	14.29
LSD,0.05		0.9	3.0	3.8	19	13	11	11	11	1.11	0.35	0.33	0.50	1.35

[1] Free-varieties that do not contain an endophyte. Toxic-KY31+ contains a toxic endophyte. Novel-varieties that contain an endophyte that aids persistence . but is not toxic to cattle.

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

[3] 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 7. Dry matter yields, seedling vigor, maturity, and stand persistence of tall fescue and festulolium (FL) varieties sown September 4, 2018, at Lexington, Kentucky

Variety	Endophyte Status[1]	Seedling Vigor[2] Sep 28, 2018	Maturity[3] 2019 May 6	Percent Stand 2018 Sep 28	Percent Stand 2019 Mar 22	Percent Stand 2019 Oct 17	Yield (tons/acre) 2019 May 6	Yield (tons/acre) 2019 Jun 24	Yield (tons/acre) 2019 Total
Commercial Varieties-Available for Farm Use									
Cajun II	free	4.9	56.5	100	100	100	1.68	1.69	3.37*
KY31+	toxic	4.9	55.5	100	100	100	1.61	1.63	3.23*
Bull	free	4.5	57.5	100	100	100	1.69	1.47	3.15*
Estancia Arkshield	novel	4.3	56.5	100	100	100	1.60	1.55	3.15*
Lacefield MaxQII	novel	4.4	55.5	100	100	100	1.48	1.58	3.07*
Jesup MaxQ	novel	4.8	56.5	100	100	100	1.55	1.40	2.95*
SS0705TFSL	free	4.8	56.5	100	100	100	1.45	1.24	2.69*
Kentucky 32	free	4.9	56.0	100	100	100	1.33	1.32	2.65*
BarOptima PLUS E34	novel	4.8	52.0	100	100	100	1.30	1.30	2.60
Experimental Varieties									
KYFA9304	free	4.9	55.0	100	100	100	1.49	1.70	3.19*
BARFAF137	free	4.5	51.5	100	100	100	1.41	1.64	3.05*
KYFA9821/AR584	novel	4.8	56.0	100	100	100	1.58	1.45	3.04*
B-18.1787	free	4.5	57.5	100	100	100	1.57	1.42	2.99*
KY31-	free	5.0	55.0	100	100	100	1.35	1.60	2.95*
FTF2(FL)	free	4.8	56.5	100	100	100	1.39	1.49	2.88*
BARFAF135	free	4.9	53.0	100	100	100	1.34	1.52	2.87*
KYFA9611	free	4.6	52.0	100	100	100	1.21	1.62	2.83*
KYFA1704	free	4.8	54.0	100	100	100	1.20	1.53	2.72*
7016	free	4.9	56.0	100	100	100	1.48	1.23	2.70*
FTF89	free	4.9	57.0	100	100	100	1.47	1.18	2.65*
7FACF82	free	5.0	51.0	100	100	100	1.20	1.41	2.62
BARFAF131	free	3.4	55.0	100	100	100	1.44	1.15	2.59
BARFABTR7NEA23	novel	3.9	54.0	100	100	100	1.24	1.27	2.50
RADMRF20	free	4.8	54.5	100	100	100	1.27	1.22	2.49
BARFA6BR-179	free	4.3	50.5	100	99	99	0.95	1.31	2.26
SLTF10-3	free	4.6	54.5	100	100	100	0.90	1.19	2.09
Mean		4.6	54.8	100	100	100	1.39	1.43	2.82
CV,%		6.2	2.0	0	0	0	22.45	16.76	18.22
LSD,0.05		0.4	1.6	0	1	1	0.44	0.34	0.72

[1] Free-varieties that do not contain an endophyte. Toxic-KY31+ contains a toxic endophyte. Novel-varieties that contain an endophyte that aids persistence but is not toxic to cattle.
[2] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[3] 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.

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 14 and 15 show information about proprietors/distributors for all varieties included in the 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. 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 through 13).

Tables 16 and 17 are summaries of yield data from 2000 to 2019 for tall fescue and from 2006 to 2019 for bromegrass 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 16 and 17 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

Table 8. Dry matter yields, seedling vigor, maturity, and stand persistence of tall fescue varieties sown September 22, 2017, at Princeton, Kentucky

Variety	Endophyte Status[1]	Seedling Vigor[2] Nov 14	Maturity[3] 2019 May 7	Percent Stand					Yield (tons/acre)[4]			
				2017	2018		2019		2019			
				Nov 14	Apr 5	Oct 11	Apr 3	Nov 4	May 7	Jun 21	Aug 14	Total
Commercial Varieties-Available for Farm Use												
Lacefield MaxQII	novel	3.4	56.0	99	95	96	99	99	1.71	0.98	0.58	3.27*
Cajun II	free	2.9	56.5	98	91	93	99	99	1.83	1.01	0.46	3.24*
SS0705TFSL	free	3.5	56.0	100	98	98	100	100	1.52	1.05	0.65	3.22*
Jesup MaxQ	novel	3.8	56.5	100	99	99	100	100	1.50	1.13	0.44	3.19*
BarOptima PLUS E34	novel	3.5	53.5	100	98	98	98	98	1.59	1.01	0.56	3.16*
KY31+	toxic	3.5	54.5	100	99	100	99	99	1.46	0.98	0.47	2.91
Experimental Varieties												
KYFA1405	free	3.0	56.0	99	98	98	99	98	1.69	1.11	0.71	3.51*
FTF94	free	2.6	57.5	95	86	86	96	96	1.90	0.84	0.55	3.29*
KY31-	free	3.8	54.5	100	98	98	99	99	1.55	1.03	0.67	3.24*
KYFA1304	free	3.0	57.5	96	88	88	98	94	1.73	0.96	0.51	3.20*
STF50	free	3.4	57.0	100	97	98	99	99	1.85	0.89	0.43	3.18*
RAD-ERF37	free	3.3	57.5	99	87	88	97	93	1.86	0.87	0.44	3.17*
KYFA1305	free	3.6	54.5	100	96	96	99	99	1.58	1.00	0.56	3.15*
KYFA1404	free	3.0	55.5	99	95	96	98	76	1.71	0.95	0.31	3.01*
KYFP1301	free	4.1	52.5	100	99	93	84	61	1.19	1.15	0.37	2.89
KYFA1306	free	3.4	54.5	100	98	98	77	100	1.53	1.00	0.22	2.82
KYFA9304	free	3.0	54.5	98	95	94	99	99	1.40	0.95	0.39	2.80
KYFA1606	free	3.0	57.0	99	28	30	24	24	0.66	1.15	0.72	2.53
Mean		3.3	55.6	99	91	91	92	91	1.57	1.00	0.51	3.11
CV,%		17.3	2.0	2	9	9	12	13	14.64	18.61	41.03	12.04
LSD,0.05		0.8	1.6	3	11	12	15	17	0.33	0.27	0.30	0.56

[1] Free-varieties that do not contain an endophyte. Toxic-KY31+ contains a toxic endophyte. Novel-varieties that contain an endophyte that aids persistence but is not toxic to cattle.
[2] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[3] 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.
[4] Due to mechanical and other issues, the 2018 yield data is not reported.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 9. Dry matter yields, seedling vigor, and stand persistence of tall fescue varieties sown September 2, 2016, at Quicksand, Kentucky

Variety	Endophyte Status[1]	Seedling Vigor[2] Nov 3, 2016	Percent Stand							Yield (tons/acre)						
			2016	2017		2018		2019		2017	2018	2019				3-year Total
			Nov 3	Mar 24	Nov 8	Apr 4	Oct 5	Mar 15	Oct 23	Total	Total	Apr 30	Jun 27	Sep 15	Total	
Commercial Varieties-Available for Farm Use																
BarOptima PLUS E34	novel	4.9	100	100	100	100	100	99	97	6.90	3.72	1.19	1.25	0.47	2.92	13.54*
Jesup MaxQ	novel	4.1	99	99	99	99	100	100	100	6.88	3.42	0.92	1.09	0.92	2.93	13.22*
Payload	free	4.0	98	98	98	98	98	98	98	6.19	3.82	0.87	1.05	0.77	2.69	12.70*
KY31+	toxic	3.3	98	97	98	98	98	98	98	5.87	3.51	1.00	1.33	0.86	3.19	12.57*
Martin2 Protek	novel	4.1	98	98	98	98	98	99	99	6.65	3.12	0.99	0.92	0.49	2.40	12.17*
Estancia Arkshield	novel	4.4	100	100	100	99	99	99	99	6.14	3.15	0.71	1.10	0.67	2.49	11.78*
Lacefield MaxQII	novel	4.3	100	100	100	100	100	100	100	5.67	3.33	0.78	1.09	0.84	2.71	11.71*
SS0705TFSL	free	2.4	95	95	95	96	96	97	97	6.25	2.98	0.62	1.07	0.59	2.29	11.52*
Cajun II	free	3.0	97	96	97	97	97	98	93	5.99	2.62	0.84	1.02	0.55	2.41	11.02*
Tower	free	2.0	91	90	94	93	93	91	83	5.54	2.92	0.76	0.95	0.27	1.98	10.45*
Teton II	free	3.3	99	98	98	97	98	99	98	5.44	2.75	0.79	0.83	0.62	2.24	10.43*
Select	free	2.8	96	96	96	96	96	97	96	5.12	2.40	0.84	0.86	0.66	2.35	9.87
Kora Protek	novel	4.4	100	100	100	100	100	100	99	5.57	2.39	0.59	0.93	0.36	1.89	9.84
Tower Protek	novel	2.8	99	96	98	98	98	98	96	5.09	2.13	0.51	0.93	0.56	2.00	9.21
Experimental Varieties																
TF0503	free	3.6	98	97	98	98	98	99	99	6.62	3.95	0.92	1.32	0.86	3.10	13.67*
KY31-	free	3.5	98	97	98	98	99	99	99	5.94	3.53	0.74	1.06	1.10	2.90	12.37*
PPG-FTF112	free	2.6	90	89	91	94	94	91	88	5.01	2.46	0.76	0.98	0.44	2.18	9.64
SLTF10-3	free	3.5	97	96	96	95	95	95	88	5.02	2.02	0.64	0.84	0.37	1.85	8.89
Mean		3.5	97	97	97	97	97	97	96	5.88	3.01	0.80	1.03	0.63	2.47	11.37
CV,%		28.0	3	4	3	2	2	3	5	18.01	25.19	24.81	24.42	38.74	22.30	17.41
LSD,0.05		1.4	4	5	4	3	3	3	7	1.50	1.08	0.28	0.36	0.35	0.78	2.81

[1] Free-varieties that do not contain an endophyte. Toxic-KY31+ contains a toxic endophyte. Novel-varieties that contain an endophyte that aids persistence but is not toxic to cattle.
[2] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 10. Dry matter yields, seedling vigor and stand persistence of tall fescue and festulolium (FL) varieties sown September 7, 2018, at Quicksand, Kentucky

Variety	Endophyte Status[1]	Seedling Vigor[2] Oct 5	Percent Stand			Yield (tons/acre)			
			2018	2019		2019			
			Oct 5	Mar 15	Oct 23	May 1	Jun 26	Sep3	Total
Commercial Varieties-Available for Farm Use									
KY31+	toxic	4.9	100	100	100	0.99	1.66	0.83	3.48*
Jesup MaxQ	novel	4.1	100	100	100	0.82	1.65	0.87	3.33*
Cajun II	free	4.5	100	100	100	0.71	1.34	1.06	3.11
SS0705TFSL	free	4.1	100	100	96	0.73	1.44	0.93	3.11
Lacefield MaxQII	novel	4.4	100	100	98	0.62	1.50	0.97	3.10
BarOptima PLUS E34	novel	4.0	100	100	91	0.57	1.28	0.74	2.59
Experimental Varieties									
KYFA9821/AR584	novel	4.5	100	100	99	1.18	1.80	1.51	4.49*
B-18.1787	free	4.0	100	100	100	1.12	1.58	1.37	4.07*
KYFA9611	free	4.6	100	100	99	0.85	1.92	1.10	3.87*
KYFA9304	free	4.8	100	100	100	0.94	1.64	1.11	3.68*
BARFAF131	free	3.5	94	99	96	0.70	1.58	1.10	3.38*
FTF89	free	4.9	100	100	100	0.87	1.55	0.91	3.33*
KY31-	free	4.6	99	100	100	0.78	1.55	0.97	3.31*
7016	free	4.4	100	100	99	0.91	1.38	0.86	3.15
KYFA1704	free	5.0	100	100	100	0.81	1.31	0.84	2.95
BARFA6BR-179	free	3.9	100	97	65	0.49	0.98	1.27	2.74
BARFAF137	free	4.6	100	100	94	0.72	1.19	0.69	2.61
FTF2(FL)	free	4.0	98	100	96	0.51	1.20	0.81	2.52
7FACF82	free	4.6	100	100	67	0.36	0.99	0.70	2.05
RADMRF20	free	4.8	100	100	100	0.36	0.86	0.82	2.04
BARFAF135	free	4.6	100	100	95	0.35	0.84	0.64	1.84
BARFABTR7NEA23	novel	4.0	100	88	87	0.30	0.86	0.58	1.74
Mean		4.4	100	99	94	0.71	1.37	0.94	3.02
CV,%		11.5	2	5	14	42.01	26.99	37.03	27.72
LSD,0.05		0.7	3	8	18	0.42	0.52	0.49	1.18

[1] Free-varieties that do not contain an endophyte. Toxic-KY31+ contains a toxic endophyte. Novel-varieties that contain an endophyte that aids persistence but is not toxic to cattle.
[2] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

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 16 and 17 to determine the yearly report that should be referenced.

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, forages.ca.uky.edu:

- 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 11. Dry matter yields, seedling vigor, maturity, and stand persistence of bromegrass varieties sown September 8, 2016, at Lexington, Kentucky

Variety	Type	Seedling Vigor[1] Oct 15, 2016	Maturity[2] 2017	2018		2019		Percent Stand 2016	2017	2018		2019		Yield (tons/acre) 2017	2018	2019				3-year Total
			Apr 20	May 9	Jun 15	May 2	Jun 6	Oct 5	Mar 14	Oct 31	Mar 15	Oct 10	Mar 22	Oct 18	Total	Total	May 2	Jun 6	Aug 12	Total	
Commercial Varieties-Available for Farm Use																					
Admiral	meadow	4.6	56.0	55.5	60.0	55.0	60.0	97	98	98	98	98	96	96	5.73	3.45	0.50	1.04	1.33	2.87	12.05*
MacBeth	meadow	4.1	56.0	54.5	60.0	54.0	60.0	97	99	99	99	99	98	98	5.75	3.44	0.56	0.97	1.15	2.67	11.87*
Arid	meadow	3.8	48.5	52.0	29.0	45.0	60.0	94	94	96	96	96	96	96	4.98	3.58	0.61	0.98	1.17	2.75	11.31*
Peak	smooth	3.4	45.0	52.5	59.5	46.3	60.0	93	92	93	94	86	94	94	4.87	3.51	0.55	1.05	1.16	2.76	11.14*
Mean		4.0	51.4	53.6	52.1	50.1	60.0	95	96	96	96	97	96	96	5.33	3.49	0.55	1.01	1.20	2.76	11.59
CV,%		20.6	4.2	3.1	1.0	3.5	0.0	4	2	2	2	2	2	2	10.19	12.59	21.65	15.49	18.62	15.50	3.67
LSD,0.05		1.3	3.5	2.6	0.8	2.8	0.0	6	4	3	3	3	4	4	0.87	0.70	0.19	0.25	0.36	0.69	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.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 12. Dry matter yields, seedling vigor, maturity, and stand persistence of bromegrass varieties sown September 8, 2017, at Lexington, Kentucky

Variety	Type	Seedling Vigor[1] Oct 12, 2017	Maturity[2] 2018		2019		Percent Stand 2017	2018		2019		Yield (tons/acre) 2018	2019				2-year Total
			May 8	Jun 15	May 2	Jun 6	Oct 12	Mar 14	Oct 18	Mar 22	Oct 18	Total	May 2	Jun 6	Aug 12	Total	
Commercial Varieties-Available for Farm Use																	
Macbeth	meadow	2.9	55.0	29.0	56.0	60.0	98	92	97	94	94	5.70	0.87	0.93	1.20	3.00	8.70*
Admiral	meadow	4.0	55.0	29.0	56.0	60.0	100	96	99	97	97	5.71	0.79	0.83	1.10	2.72	8.43*
Arid	meadow	2.1	46.3	29.0	45.0	60.0	94	88	92	93	95	4.38	0.82	0.76	1.32	2.90	7.28
Peak	smooth	2.9	48.0	29.0	45.0	60.0	98	95	97	97	97	4.58	0.63	0.76	0.86	2.25	6.83
Experimental Varieties																	
MB1303	meadow	3.1	56.0	29.0	56.5	60.0	99	98	99	97	98	5.77	0.82	0.89	1.36	3.07	8.85*
MB1302	meadow	3.0	54.5	29.0	53.5	60.0	98	95	97	95	95	5.86	0.90	0.89	1.02	2.81	8.67*
Mean		3.0	52.5	29.0	52.0	60.0	98	94	97	95	96	5.33	0.81	0.84	1.14	2.79	8.12
CV,%		17.0	3.4	0.0	1.9	0.0	1	6	3	3	2	10.70	21.73	16.56	19.81	16.38	11.45
LSD,0.05		0.8	2.7	0.0	1.5	0.0	2	9	4	4	3	0.86	0.26	0.21	0.34	0.69	1.35

[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 13. Dry matter yields, seedling vigor, maturity, and stand persistence of bromegrass varieties sown September 5, 2018, at Lexington, Kentucky

Variety	Type	Seedling Vigor[1]	Maturity[2]		Percent Stand			Yield (tons/acre)			
			2019		2018	2019		2019			
		Sep 28, 2018	May 2	Jun 6	Sep 28	Mar 22	Oct 18	May 2	Jun 6	Aug 12	Total
Commercial Varieties-Available for Farm Use											
Arsenal	meadow	3.9	57.5	44.5	94	97	97	1.98	0.82	1.25	4.05*
Admiral	meadow	4.3	56.0	44.5	96	98	98	2.02	0.95	1.07	4.04*
Peak	smooth	4.6	49.0	29.0	98	98	98	1.91	0.87	1.17	3.96*
Macbeth	meadow	3.4	55.0	52.3	92	97	97	1.72	0.89	1.22	3.83*
Artillery	meadow	4.8	46.3	29.0	97	98	98	1.78	0.68	1.32	3.78*
Carlton	smooth	4.0	45.0	60.0	95	95	97	0.81	1.05	0.99	2.85
Mean		4.2	51.6	38.0	95	97	98	1.75	0.87	1.18	3.80
CV,%		14.1	3.6	0.0	3	2	1	15.25	15.39	19.13	8.37
LSD,0.05		0.9	2.8	0.0	4	3	2	0.40	0.20	0.36	0.48

[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 14. Proprietors of tall fescue varieties in current trials

Variety	Endophyte Status[1]	Proprietor/KY Distributor
Commercial Varieties-Available for Farm Use		
BarOptima PLUS E34	novel	Barenbrug USA
Bronson	free	Ampac Seed
Bull	free	Improved Forages
Cajun II	free	Smith Seed Services
Estancia Arkshield	novel	Mountain View Seeds
Kentucky 32	free	Oregro Seeds
Kora Protek	novel	DLF-Pickseed
KY31+	toxic	Ky Agric. Exp. Station/Public
Jesup MaxQ	novel	Pennington Seed
Lacefield MaxQ II	novel	Pennington Seed
Martin 2 Protek	novel	DLF-Pickseed
Payload	free	Brett Young
Select	free	Southern States
SS-0705TFSL	free	Southern States
Teton II	free	Mountain View Seeds
Tower	free	DLF-Pickseed
Tower Protek	novel	DLF-Pickseed
Experimental Varieties[1]		
BARFABTR7NEA23	novel	Barenbrug USA
BARFAF131	free	Barenbrug USA
BARFAF135	free	Barenbrug USA
BARFAF137	free	Barenbrug USA
BARFA6BTR179	free	Barenbrug USA
B-18.1787	free	Blue Moon Farms
DLFPS-FTF-93	free	DLF-Pickseed
DLFPS-FTF-96	free	DLF-Pickseed
FTF89	free	DLF-Pickseed
FTF94	free	DLF-Pickseed
IS-FTF 54 Protek	novel	DLF-Pickseed
IS-FTF 70	free	DLF-Pickseed
IS-FTF 73	free	DLF-Pickseed
KY31-	free	KY Agric. Exp. Station
KYFA1201	free	KY Agric. Exp. Station

continued

Table 14. continued

Variety	Endophyte Status[1]	Proprietor/KY Distributor
KYFA1303	free	KY Agric. Exp. Station
KYFA1304	free	KY Agric. Exp. Station
KYFA1305	free	KY Agric. Exp. Station
KYFA1306	free	KY Agric. Exp. Station
KYFA1404	free	KY Agric. Exp. Station
KYFA1405	free	KY Agric. Exp. Station
KYFA1531	free	KY Agric. Exp. Station
KYFA1532	free	KY Agric. Exp. Station
KYFA1533	free	KY Agric. Exp. Station
KYFA1534	free	KY Agric. Exp. Station
KYFA1535	free	KY Agric. Exp. Station
KYFA1536	free	KY Agric. Exp. Station
KYFA1537	free	KY Agric. Exp. Station
KYFA1606	free	KY Agric. Exp. Station
KYFA1704	free	KY Agric. Exp. Station
KYFA9304	free	KY Agric. Exp. Station
KYFA9611	free	KY Agric. Exp. Station
KYFA9732/AR584	novel	KY Agric. Exp. Station
KYFA9821/AR584	novel	KY Agric. Exp. Station
PPG-FTF 112	free	Mountain View Seeds
RAD-ERF37	free	Radix Research
RAD-HAN19	free	Radix Research
RAD-HAN33	free	Radix Research
RADMRF20	free	Radix Research
SLTF10-3	free	Oregro Seeds
STF50	free	Smith Seed Services
TFCB1bC2	free	USDA-ARS
TFCB3C2	free	USDA-ARS
TFCB4C2	free	USDA-ARS
TFCB5C2	free	USDA-ARS
TF Soft	free	USDA-ARS
TF0503	free	USDA-ARS
7016	free	KY Agric. Exp. Station
7FACF82	free	Barenbrug USA

[1] Experimental varieties are not available commercially, but provide an indication of the progress being made by forage breeding companies.

Table 16. Summary of Kentucky tall fescue yield trials 2002-2019 (yield shown as a percentage of the mean of the commercial varieties in the trial)

			Lexington											Princeton							Quicksand				
Variety	Endophyte Status[1]	Proprietor	03[2,3] 2-yr[5]	05 3-yr	07 3-yr	09 3-yr	11 3-yr	12 3-yr	13 3-yr	14 3-yr	15 3-yr	16 3-yr	17 2-yr	02 3-yr	04 3-yr	06 3-yr	08 3-yr	10 3-yr	12 3-yr	15 2-yr	03 2-yr	05 4-yr	13 3-yr	16 3-yr	Mean[4] (#trials)
Atlas Select	free	ProSeeds Marketing															95								–
Aprilia	free	ProSeeds Marketing															93								–
Baguala	free	Allied Seed									92									96					94(2)
BarElite	free	Barenbrug USA			96		100											92							95(3)
Bariane	free	Barenbrug USA	87	99																		95			94(3)
Barolex	free	Barenbrug USA		90																					–
BarOptima PLUS E34	novel	Barenbrug USA		122	99		107	108	102	99	113	99	91					99	100	96			93	118	103(14)
Bronson	free	Ampac Seed		88	97	105	102	99	99			100						101	91	103		102			99(11)
Brutus	free	Saddle Butte Ag. Inc.								90															–
Bull	free	Improved Forages	98	102				100						104					99		97		95		99(7)
Cajun II	free	Smith Seed Services					97		105	99	99	98	106					101		104			90	96	101(10)
Cowgirl	free	Rose-AgriSeeds						94									102	100	98						99(4)
Dominate	free	Allied Seed									90									99					95(2)
Drover	free	Barenbrug USA								105	120														113(2)
DuraMax GOLD	novel	DLF Pickseed					102									106									104(2)
Enhance	free	Allied Seed					93								107										100(2)
Estancia ArkShield	novel	Mountain View Seeds	102					106				96		101					102					103	102(6)
Festival	free	Pickseed West													102										–
Flourish	free	Allied Seed						92											101						97(2)
FSG 402TF	free	Farm Science Genetics									92									103					98(2)
Goliath	free	Ampac Seed				100			104									99							101(3)
HyMark	free	Fraser Seeds					91				104						102			103					100(4)
Jesup EF	free	Pennington Seed					98	105										103	100						102(4)
Jesup MaxQ	novel	Pennington Seed		98	101	110	103	100	93	106	102	111	107	94			95	100	98	98	100	102	100	116	102(19)
KENHY	free	KY Agric Exp Sta.													89										–
Kentucky 32	free	Oregro Seeds					93	94		101							98	94	101						96(6)
Kora Protek	novel	DLF Pickseed										101												86	94(2)
KY31+	toxic	KY Agric Exp Sta.	112	108	102	102	93	95	103	100	99	103	98	104		104	93	112	101	92	98	110	110	110	102(21)
Lacefield MaxQ II	novel	Pennington Seed			109				97	104	93	92	90			101	106			105			113	102	101(11)
Martin2 Protek	novel	DLF Pickseed					104					96												106	102(3)
Nanryo	free	Jap. Grassland ForageSeed/			96																				–
Noria	free	ProSeeds Marketing			98																				–
Payload	free	Brett Young										89												111	100(2)
RAD-ERF50	free	Radix Research, Inc.															113								–
Savory	free	DLF Pickseed														91									–
Seine	free	Advanta Seeds													96										–
Select	free	Southern States	94	99	99	98	90	100	97	103	97	102		97	105	102	105	99	100	99	102	91	99	86	98(21)
SS-0705TFSL	free	Southern States								99	99	106	107							103				101	103(6)
Stockman	free	Seed Research of OR	108												101	97					105				103(4)
Teton II	free	Mountain View Seeds					107	105		96		103							99					91	100(6)
Texoma MaxQ II	novel	Pennington Seed		95																					–
TF0203G	free	Seed Research of OR			87																				–
Tower	free	DLF Pickseed										101												91	96(2)
Tower Protek	novel	DLF Pickseed					98					104												81	94(3)
Tuscany	free	Forage Genetics																							–
Tuscany II	free	Seed Research of OR						97								98			106						100(3)
5CAN	free	Brett Young				86																			–

[1] Free-varieties that do not contain an endophyte. Toxic-KY31+ contains a toxic endophyte. Novel-varieties that contain an endophyte that aids persistence but is not toxic to cattle.
[2] Year trial was established.
[3] 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 2 years, so the final report would be "2015 Tall Fescue Report" archived in the UK Forage website at <forages.ca.uky.edu>.
[4] Mean only presented when respective variety was included in two or more trials.
[5] Number of years of data.

Table 15. Proprietors of bromegrass varieties in current trials

Variety	Type	Proprietor/KY Distributor
Commercial Varieties-Available for Farm Use		
Admiral	meadow	Cisco Seeds
Arid	smooth	Mountain View Seeds
Arsenal	meadow	Barenbrug USA
Artillery	meadow	Barenbrug USA
Carlton	smooth	Pickseed USA
MacBeth	meadow	Cisco Seeds
Peak	smooth	Allied Seed
Experimental Varieties[1]		
MB1302	meadow	Allied Seed
MB1303	meadow	Allied Seed

[1] Experimental varieties are not available commercially, but provide an indication of the progress being made by forage breeding companies.

Table 17. Summary of Kentucky bromegrass yield trials at Lexington 2006-2019 (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	2014 3-yr	2015 3-yr	2016 3-yr	2017 2-yr	Mean[3] (#trials)
AC Knowles	hybrid	Agriculture Canada	85		82	102	89				89(4)
Admiral	meadow	Cisco Seeds							104	108	106(2)
Arid	meadow	Mountain View Seeds							96	93	95(2)
Bigfoot	hybrid	Grassland Oregon	108	116	105						110(3)
Canterbury	mountain	Barenbrug USA		79							–
Carlton	smooth	Pickseed USA				82	95				91(2)
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	116	107	102	111	114(7)
Olga	smooth	Barenbrug USA		116	101						109(2()
Peak	smooth	Allied Seed		97		100		93	96	87	95(5)
Persister	prairie	DLF Pickseed		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 3 years, so the final report would be "2015 Tall Fescue and Brome Report" archived in the UK Forage website at <forages.ca.uky.edu>.
[3] Mean only presented when respective variety was included in two or more trials.
[4] Number of years of data

11-2019