



# 2019 Cool-Season Grass Horse Grazing Tolerance Report

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## Introduction

Cool-season grasses such as Kentucky bluegrass, tall fescue, and orchardgrass are dominant pasture grasses for horses in Kentucky. Variety evaluations for yield have been carried out for many years, but little work has been done to establish the effect of variety on persistence when subjected to close, continuous grazing by horses.

The purpose of this report is to summarize current research on the grazing tolerance of varieties of tall fescue, orchardgrass, and other species when subjected to continuous heavy grazing pressure by horses within the grazing season. The main focus will be on stand survival.

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 from a large number of other forage publications.

## Important Selection Considerations

**Local adaptation and seasonal yield.** The variety should be adapted to Kentucky as indicated by good winter

survival and good performance across years and locations in replicated yield and grazing trials, such as those presented in this publication. Choose high-yielding persistent varieties and varieties that are productive during the desired season of use. Refer to the appropriate yield trial reports for yield data on specific varieties of interest.

**Seed quality.** Buy premium-quality seed that is high in germination, high in purity, and free from weed seed. Buy certified seed or proprietary seed of an improved variety. An improved variety is one that has performed well in independent trials. Other information on the label will include the test date (which must be within the previous nine months), the level of germination, and the percentage of other crop and weed seed. Order seed well in advance of planting time to assure that it will be available when needed.

**Important:** When seeding perennial ryegrasses for horse pasture (of any kind), insist on an endophyte-free variety. The endophyte level will be stated on a green tag on every bag of seed. Most forage types of perennial ryegrass are endophyte free, and most new turf types are infected. This endophyte is similar to the endophyte of tall fescue and produces

alkaloids that are toxic to horses and cattle. Similarly, when seeding tall fescue insist on endophyte-free or novel endophyte varieties (the endophyte level will be stated on a green tag on every bag of seed). Seed of novel endophyte varieties should be handled carefully to preserve the infection, which means keeping seed cool and planting as soon as possible. Novel endophyte tall fescue varieties are good options for horses because of their improved persistence and absence of the toxic alkaloid. The exception is the novel endophyte variety BarOptima PLUS E34. It contains low levels of the alkaloid ergovaline and therefore should never be seeded in pastures where pregnant mares are grazing, since they are very sensitive to ergovaline during their last trimester.

## Description of the Tests

Tests were established in Lexington in the fall of 2015, 2016, 2017, and 2018. The soils at this location are well-drained silt loams and are well suited to tall fescue, orchardgrass, and other cool-season grasses. Plots were 5 feet by 15 feet in a randomized complete block design, with each variety replicated six times. Plots were seeded at the recommended seeding rate per acre and were planted

Table 1. Temperature and rainfall at Lexington, Kentucky in 2016, 2017, 2018, and 2019

	2016				2017				2018				2019 <sup>2</sup>			
	Temp		Rainfall		Temp		Rainfall		Temp		Rainfall		Temp		Rainfall	
	°F	DEP <sup>1</sup>	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	32	+1	0.80	-2.06	40	+9	6.81	+3.95	31	0	2.01	-0.85	33	+2	4.11	+1.25
FEB	38	+3	6.09	+2.88	47	+12	4.46	+1.25	45	+10	9.77	+6.56	42	+7	7.64	+4.43
MAR	52	+8	4.07	-0.33	48	+4	3.34	-1.06	42	-2	5.16	+0.76	43	-1	3.44	-0.91
APR	57	+2	3.97	+0.09	62	+7	4.17	+0.29	50	-5	5.52	+1.64	54	+4	4.76	+0.88
MAY	64	0	9.17	+4.70	66	+2	7.74	+3.27	73	+9	8.39	+3.92	69	+5	4.49	+0.02
JUN	76	+4	5.09	+1.43	73	+1	7.68	+4.02	76	+4	6.42	+2.76	73	+1	6.13	+2.47
JUL	79	+3	7.43	+2.43	76	0	4.49	-0.51	77	+1	6.15	+1.15	79	+3	3.30	-1.70
AUG	79	+4	4.37	+0.44	74	-1	6.66	+2.73	77	+2	6.45	+2.52	77	+2	2.42	-1.51
SEP	74	+6	2.18	-1.02	69	+1	4.72	+1.52	74	+6	12.88	+9.68	77	+9	0.18	-3.02
OCT	64	+7	0.37	-2.20	60	+3	6.06	+3.49	59	+2	6.54	+3.97	61	+4	8.15	+5.58
NOV	51	+6	1.94	-1.45	47	+2	3.09	-0.30	42	-3	5.64	+2.25				
DEC	37	+1	9.4	+5.42	35	-1	2.66	-1.32	40	+4	7.35	+3.37				
Total			54.88	+10.33			61.88	+17.33			82.28	+37.73			44.67	+7.49

<sup>1</sup> DEP is departure from the long-term average.

<sup>2</sup> 2019 data is for ten months through October.

**Table 2. Seedling vigor, grazing preference, and stand persistence of forage grasses sown September 3, 2015, in a horse grazing tolerance study at Lexington, Kentucky**

Variety	Species	Endophyte Status <sup>1</sup>	Seedling Vigor <sup>2</sup> Oct 19, 2015	Grazing Preference <sup>3</sup>				Percent Stand								
				2016	2017	2018	2019	2015	2016		2017		2018		2019	
				Apr 26	May 31	May 18	May 19	Oct 19	Mar 29	Oct 14	Mar 24	Oct 9	Mar 15	Oct 31	Apr 4	Oct 24
<b>Commercial Varieties-Available for Farm Use</b>																
Jesup MaxQ	tall fescue	novel	3.5	1.4	1.0	3.0	1.2	100	100	100	100	100	100	100	100	100*
KY31+	tall fescue	toxic	3.6	1.8	1.0	2.5	1.5	100	100	100	100	100	100	100	100	100*
Lacefield MaxQII	tall fescue	novel	3.7	1.8	1.0	2.8	1.0	100	100	100	100	100	100	100	100	100*
Select	tall fescue	free	3.3	1.5	1.0	2.6	1.0	100	100	100	100	100	100	100	100	100*
SS-0705TFSL	tall fescue	free	3.3	1.5	1.0	2.7	1.8	100	100	100	100	100	100	100	100	100*
BarOptima PLUS E34 <sup>4</sup>	tall fescue	novel	3.0	1.9	1.0	3.2	2.2	100	100	99	99	99	99	99	99	99*
Persist	orchardgrass		3.3	2.7	1.7	7.8	6.7	100	100	97	97	97	97	25	23	16
Tekapo	orchardgrass		3.3	4.2	2.7	8.0	7.0	100	100	97	95	95	95	25	22	14
Prairie	orchardgrass		3.3	2.7	3.0	7.7	7.8	100	100	94	92	93	93	20	20	12
SS-0708OGDT	orchardgrass		3.7	2.5	3.5	7.5	8.0	100	100	94	93	92	92	21	19	10
Power	perennial ryegrass		4.7	4.5	8.2	8.8	9.0	100	100	93	87	57	52	55	11	5
Duo	festulolium		5.0	6.3	8.8	9.0	9.0	100	98	72	70	37	27	12	9	3
SpringGreen	festulolium		4.8	3.7	7.8	8.8	9.0	100	100	88	85	52	43	18	11	3
<b>Experimental Varieties</b>																
KY31-	tall fescue	free	3.3	1.6	1.0	3.2	1.2	100	100	100	100	100	100	100	100	100*
KYFA1113	tall fescue	free	3.4	1.7	1.0	2.7	1.0	100	100	100	100	100	100	100	100	100*
KYFA9821/AR584	tall fescue	novel	3.8	1.5	1.0	2.7	1.0	100	100	100	100	100	100	100	100	100*
KYFA1114	tall fescue	free	3.6	1.8	1.2	3.3	1.2	100	100	100	100	100	100	100	100	100*
KYFA1311	tall fescue	free	3.2	1.5	1.0	2.8	1.2	100	100	98	99	99	99	99	99	99*
KYDG1001	orchardgrass		3.3	3.0	4.0	7.7	7.5	100	100	93	92	82	88	30	19	10
KYDG1002	orchardgrass		3.2	3.2	2.7	6.3	7.3	100	100	96	93	88	88	27	20	9
KYFL1013	festulolium		4.9	3.5	8.5	8.8	9.0	100	100	86	78	33	20	10	4	2
Mean			3.7	2.6	3.0	5.3	4.5	100	100	96	94	87	85	64	59	56
CV,%			9.4	27.7	31.2	16.7	19.2	0	1	7	8	9	8	35	14	9
LSD,0.05			0.4	0.8	1.1	1.0	1.0	0	2	8	8	9	8	26	9	6

<sup>1</sup> 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. Orchardgrass and festulolium do not contain an endophyte and forage type perennial ryegrass varieties do not contain a toxic endophyte.

<sup>2</sup> Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.

<sup>3</sup> Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2016-5 days, 2017-35 days, 2018-25 days, 2019-30 days.

<sup>4</sup> BarOptima PLUS E34 is not recommended for pregnant mares because it produces low levels of the alkaloid ergovaline.

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

into a prepared seedbed using a disk drill. Grazing was continuous from April to October.

Plots were grazed down to below 4 inches quickly and were maintained at 1 to 3 inches for the remainder of the grazing season. Individual trials were occasionally clipped to remove seedheads or weed growth not controlled by herbicides. Supplemental hay was fed during periods of slowest growth. Visual ratings of percent stand were made in the fall several weeks after the horses were removed to check stand survival after the grazing season and in the spring prior to grazing to check on winter survival and spring growth. Since trials were seeded in rows, persistence ratings were based on density within a row and not total ground cover. Grass plots were fertilized with 30 pounds of actual N per acre in March, 30 pounds of actual N in May, and 40 pounds of actual N in early November

after horses were removed from the pasture. Other fertilizers (lime, P, and K) were applied as needed according to the University of Kentucky soil test recommendations.

## Results and Discussion

Weather data for Lexington for 2016, 2017, 2018, and 2019 are presented in Table 1. Data on percent stand are presented in Tables 2, 3, 4, and 5.

Statistical analyses were performed on all entries (including experimentals) to determine if numerical differences are truly due to variety. Varieties not significantly different from the highest numerical value in a column are marked with one asterisk (\*). To determine if two varieties are truly different, compare the difference between the two varieties to the Least Significant Difference (LSD) at the bottom of the column. If the difference is equal to or greater than the LSD,

the varieties are truly different when grown under the conditions at a given location. The coefficient of variation (CV), which is a measure of the variability of the data, is included for each column of means. Low variability is desirable, and increased variability within a study results in higher CVs and larger LSDs.

In general, commercial varieties of tall fescue and orchardgrass tolerated overgrazing well (Tables 2, 3, and 4), but the varieties of timothy in these trials did not. The sensitivity of timothy to heavy grazing was not surprising, as it is an erect species and sensitive to heavy defoliation. Perennial ryegrasses, Kentucky bluegrasses, and festuloliums vary in tolerance to grazing by horses.

The lack of a defined "grazing-tolerant variety" for these species makes absolute interpretation difficult. For example, endophyte-infected Kentucky 31 (KY31+) is known to be grazing tolerant. (Note:

**Table 3. Seedling vigor, grazing preference, and stand persistence of forage grasses sown September 8, 2016, in a horse grazing tolerance study at Lexington, Kentucky**

Variety	Species	Endophyte Status <sup>1</sup>	Seedling Vigor <sup>2</sup> Oct 6, 2016	Grazing Preference <sup>3</sup>			Percent Stand						
				2017	2018	2019	2016	2017		2018		2019	
				May 26	May 18	May 21	Oct 6	Mar 15	Oct 9	Mar 16	Nov 2	Apr 4	Oct 24
<b>Commercial Varieties-Available for Farm Use</b>													
KY31+	tall fescue	toxic	2.5	1.2	1.7	2.0	100	100	100	100	100	85	100*
BarOptima PLUS E3 <sup>4</sup>	tall fescue	novel	2.3	1.5	2.0	2.3	100	100	100	100	100	100	100*
Cajun II	tall fescue	free	2.8	1.3	1.3	1.3	100	100	99	100	100	100	100*
Lacefield MaxQII	tall fescue	novel	3.7	1.3	1.3	1.5	100	100	99	99	99	99	99*
SS0705TFSL	tall fescue	free	3.0	2.5	1.3	1.5	100	100	99	99	99	99	99*
Jesup MaxQ	tall fescue	novel	3.6	1.5	1.3	1.2	100	100	98	98	98	98	98*
Vision	colonial bentgrass		1.0	9.0	8.2	7.3	75	78	86	88	92	93	90
Remington	perennial ryegrass		4.3	8.3	9.0	9.0	100	100	98	98	58	61	43
Persist	orchardgrass		2.8	3.2	7.8	7.5	100	100	98	98	30	33	14
PayDay	perennial ryegrass		3.9	8.3	8.8	9.0	100	100	98	93	23	29	14
Prairie	orchardgrass		3.3	5.2	7.7	6.2	100	100	97	97	21	23	10
SS0708DGDT	orchardgrass		3.8	4.7	7.0	8.0	100	100	96	97	23	27	9
SpringGreen	festulolium		3.8	6.7	8.5	9.0	100	100	98	98	28	30	7
Giant	redtop bentgrass		1.0	8.7	8.2	8.5	73	68	57	80	25	23	7
Linn	perennial ryegrass		4.7	6.2	7.8	8.8	100	100	95	95	23	16	4
Duo	festulolium		4.8	6.7	9.0	9.0	100	98	68	56	18	10	2
<b>Experimental Varieties</b>													
KYFA1303	tall fescue	free	4.0	2.0	1.5	1.7	100	100	100	100	100	100	100*
KYFA9732/AR584	tall fescue	novel	3.8	1.8	1.7	2.3	100	100	100	100	100	100	100*
KYFA1201	tall fescue	free	3.2	1.5	1.5	1.3	100	100	100	100	100	99	99*
KY31-	tall fescue	free	2.8	1.3	1.5	1.5	100	100	99	99	99	99	99*
KYFA9304	tall fescue	free	3.5	1.7	1.8	2.0	100	100	99	99	84	99	99*
KYDG1001	orchardgrass		3.5	5.7	8.2	7.8	100	100	99	99	19	18	8
KYDG1002	orchardgrass		4.2	5.0	8.0	8.7	100	100	97	97	15	15	7
KYFL1301	festulolium		4.2	6.5	8.8	9.0	100	100	94	93	15	16	5
Mean			3.3	4.2	5.7	5.3	98	98	95	95	61	61	55
CV,%			15.7	26.1	13.5	18.9	4	4	8	7	20	20	13
LSD,0.05			0.6	1.3	0.8	1.1	4	4	8	7	14	14	8

<sup>1</sup> 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. Orchardgrass, bentgrass and festulolium do not contain an endophyte and forage type perennial ryegrass varieties do not contain a toxic endophyte.

<sup>2</sup> Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.

<sup>3</sup> Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2017-35 days, 2018-25 days, 2019-30 days.

<sup>4</sup> BarOptima PLUS E34 is not recommended for pregnant mares because it produces low levels of the alkaloid ergovaline.

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

KY31+ is not recommended for late term mares because of toxicity issues associated with ergovaline production.) However, there are no proven grazing-tolerant varieties for the other species. Still, certain varieties were clearly more tolerant than others.

Differences in tolerance among varieties could be due to true grazing tolerance but also to preference, especially where highly palatable species such as Kentucky bluegrass and perennial ryegrass were in the same test as tall fescue. Horses may graze the preferred varieties more intensely than the less preferred varieties. Because of potential preference between species, comparison between varieties is most accurate within a species. These data should be taken as an indication of tolerance to periods of overgrazing. For best pasture stands, forage grasses should not be abused as in this study.

Tables 2, 3, 4, and 5 include preference ratings made two to three weeks after horses started grazing. These ratings do not provide information on initial preference but do provide a good indication of the varieties that the horses repeatedly grazed during the first few weeks on pasture.

Table 6 shows information about proprietors/distributors for all varieties in these tests. Varieties are listed in alphabetical order, with experimental varieties at the bottom.

Tables 7 and 8 are summaries of stand persistence data from 1999 to 2019 of commercial tall fescue and orchardgrass varieties that have been entered in the Kentucky trials. In Table 7 the data is listed as a percentage of endophyte-free KY31 (KY31-). In other words, in the tall fescue trials KY31- is 100 percent. Varieties

with percentages over 100 persisted better than KY31-, and varieties with percentages less than 100 persisted less than KY31-. In Table 8 the data is listed as a percentage of the mean of the commercial orchardgrass varieties entered in each specific trial. In other words, the mean for each trial is 100 percent. Varieties with percentages over 100 persisted better than average, and varieties with percentages less than 100 persisted less than average. Direct, statistical comparisons of varieties cannot be made using the summary Tables 7 and 8, but these comparisons do help identify varieties for further consideration. Varieties that have performed better than average over many years have very stable performance; others may have performed well in wet years or on particular soil types. These details may influence variety choice, and

**Table 4. Seedling vigor, grazing preference, and stand persistence of forage grasses sown September 9, 2017, in a horse grazing tolerance study at Lexington, Kentucky**

Variety	Species	Endophyte Status <sup>1</sup>	Seedling Vigor <sup>2</sup> Oct 12, 2017	Grazing Preference <sup>3</sup>		Percent Stand				
				2018	2019	2017	2018		2019	
				May 18	May 21	Oct 12	Mar 15	Nov 2	Apr 4	Oct 24
<b>Commercial Varieties-Available for Farm Use</b>										
Jesup MaxQ	tall fescue	novel	3.3	1.5	1.3	100	100	100	100	100*
SS0705TFSL	tall fescue	free	3.3	1.3	1.3	100	100	100	100	100*
KY31+	tall fescue	toxic	3.3	2.2	1.5	99	98	99	99	99*
BarOptima PLUS E34 <sup>4</sup>	tall fescue	novel	3.3	2.8	3.0	100	100	99	99	99*
Lacefield MaxQII	tall fescue	novel	3.6	1.5	1.0	99	99	100	100	99*
Persist	orchardgrass		3.4	5.5	5.3	100	99	91	89	62
Prairie	orchardgrass		3.3	5.3	6.5	99	99	87	88	55
SS0708OGDT	orchardgrass		4.3	5.8	7.0	100	100	90	91	52
Potomac	orchardgrass		4.2	4.2	5.8	100	100	94	94	45
Climax	timothy		2.5	6.3	8.3	85	93	89	83	17
Clair	timothy		1.9	7.5	8.7	75	86	78	80	13
KYEarly	timothy		1.3	6.2	7.3	58	85	85	85	13
<b>Experimental Varieties</b>										
KYFA9304	tall fescue	free	3.4	2.0	1.2	100	100	100	100	100*
KYFA1306	tall fescue	free	3.5	1.7	1.3	100	100	100	100	100*
KYFA1305	tall fescue	free	3.8	1.5	1.8	98	98	99	99	99*
KY31-	tall fescue	free	3.3	2.3	1.5	98	98	99	99	99*
KYFA1304	tall fescue	free	3.1	1.2	1.3	99	99	99	99	99*
KYFA1404	tall fescue	free	3.0	1.8	1.8	99	99	99	99	99*
KYFA1405	tall fescue	free	2.3	1.8	1.3	97	97	97	98	97*
NC-JimGraze	timothy		2.4	5.2	7.5	94	98	94	94	20
Mean			3.1	3.4	3.8	95	97	95	95	73
CV,%			20.7	32.5	28.9	8	4	5	5	16
LSD,0.05			0.7	1.3	1.2	9	4	5	5	13

<sup>1</sup> 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. Orchardgrass and timothy do not contain an endophyte.

<sup>2</sup> Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.

<sup>3</sup> Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2018-25 days, 2019-30 days.

<sup>4</sup> BarOptima PLUS E34 is not recommended for pregnant mares because it produces low levels of the alkaloid ergovaline.

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

**Table 5. Seedling vigor, grazing preference, and stand persistence of forage grasses sown September 5, 2018, in a horse grazing tolerance study at Lexington, Kentucky**

Variety	Species	Endophyte Status <sup>1</sup>	Seedling Vigor <sup>2</sup> Sep 28, 2018	Grazing Preference <sup>3</sup> May 21, 2019	Percent Stand		
					2018	2019	
					Sep 28	Apr 4	Oct 24
<b>Commercial Varieties-Available for Farm Use</b>							
KY31+	tall fescue	toxic	4.6	1.5	100	100	100*
Persist	orchardgrass		4.8	5.5	100	100	100*
Jesup MaxQ	tall fescue	novel	4.4	1.8	99	100	100*
Prodigy	orchardgrass		4.8	6.5	100	100	99*
SS0705TFSL	tall fescue	free	4.1	1.0	97	99	99*
SS0708OGDT	orchardgrass		5.0	6.2	100	100	99*
Lacefield MaxQII	tall fescue	novel	3.8	1.3	98	99	99
Prairie	orchardgrass		4.8	6.7	100	100	98
<b>Experimental Varieties</b>							
KYFA9821/AR584	tall fescue	novel	4.2	1.0	99	100	100*
KYFA9304	tall fescue	free	4.5	2.5	99	100	100*
KY31-	tall fescue	free	4.3	2.3	99	99	99*
KYFA1704	tall fescue	free	3.9	1.7	99	99	99
KYFA9611	tall fescue	free	3.8	3.8	99	99	99
7016	tall fescue	free	4.1	1.3	98	98	98
Mean			4.4	3.1	99	99	99
CV,%			8.2	28.5	1	1	1
LSD,0.05			0.4	0.9	2	1	1

<sup>1</sup> 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. Orchardgrass does not contain an endophyte.

<sup>2</sup> Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.

<sup>3</sup> Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; , 2019-30 days.

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

the information can be found in the yearly reports. See footnotes in Tables 7 and 8 to determine which yearly report should be referenced. Table 9 is a summary of perennial ryegrass and festulolium varieties in the cattle tolerance grazing trials (included to represent grazing tolerance of grass species not shown in Horse Tolerance Summary tables).

## Summary

These studies indicate there are varieties of cool-season grasses that can tolerate overgrazing by horses for three to four seasons and maintain reasonable stands. This information should be used along with yield and other information (for example, relative maturity in spring) in selecting the best grass variety for each individual use. See yield variety trials on the UK Forage website at [forages.ca.uky.edu](http://forages.ca.uky.edu) or the summary publication “2019 Long-Term Summary of Kentucky Forage Variety Trials” (PR-774) that shows variety comparisons over all species. It is not generally recommended that tall fescue, orchardgrass, or other cool-season grasses be continually overgrazed as was done in this trial. Although several varieties expressed tolerance to the level of grazing pressure used in these trials, overgrazing greatly reduces forage production. This information should be an indication of those varieties that will better withstand overgrazing when it occurs.

Good management for maximum life from any grass would be to allow complete establishment before grazing and to avoid overgrazing during times of extreme stress, such as drought.

For further information about grazing management, refer to the following College of Agriculture publications, available at the local county Extension office or in the publication section of the UK Forage website at [forages.ca.uky.edu](http://forages.ca.uky.edu).

- Rotational Grazing (ID-43)
- Tall Fescue (AGR-59)
- Fescue Toxicosis (ID-221)
- Broadleaf Weeds of Kentucky Pastures (AGR-207)

## About the Authors

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**Table 6. Proprietors of forage grasses in current horse grazing trials in Kentucky**

Variety	Species	Endophyte Status <sup>1</sup>	Proprietor/ KY Distributor
<b>Commercial Varieties-Available for Farm Use</b>			
BarOptima PLUS E34 <sup>2</sup>	tall fescue	novel	Barenbrug USA
Cajun II	tall fescue	free	Smith Seed Services
Clair	timothy		Turner Seed
Climax	timothy		Canada Agr. Res. Station
Duo	festulolium		Ampac Seed Company
Giant	redtop bentgrass		Pure Seed Testing
Jesup Max Q	tall fescue	novel	Pennington Seed
KY Early	timothy		Smith Seed Services
KY 31+	tall fescue	toxic	Public
Lacefield MaxQ II	tall fescue	novel	Pennington Seed
Linn	perennial ryegrass		Public
PayDay	perennial ryegrass		Mountain View Seeds
Persist	orchardgrass		Smith Seed Services
Potomac	orchardgrass		Public
Power	perennial ryegrass		Ampac Seed Company
Prairie	orchardgrass		Turner Seed
Prodigy	orchardgrass		Caudill Seed
Remington	perennial ryegrass		Barenbrug USA
Select	tall fescue	free	Southern States
Spring Green	festulolium		Rose-Agri Seed
SS-0705TFSL	tall fescue	free	Southern States
SS-0708OGDT	orchardgrass		Southern States
Tekapo	orchardgrass		Ampac Seed Company
Vision	colonial bentgrass		Blue Moon Farms
<b>Experimental Varieties<sup>3</sup></b>			
KY 31-	tall fescue	free	KY Agric. Exp. Station
KYDG1001	orchardgrass		KY Agric. Exp. Station
KYDG1002	orchardgrass		KY Agric. Exp. Station
KYFA1113	tall fescue	free	KY Agric. Exp. Station
KYFA1114	tall fescue	free	KY Agric. Exp. Station
KYFA1201	tall fescue	free	KY Agric. Exp. Station
KYFA1303	tall fescue	free	KY Agric. Exp. Station
KYFA1304	tall fescue	free	KY Agric. Exp. Station
KYFA1305	tall fescue	free	KY Agric. Exp. Station
KYFA1306	tall fescue	free	KY Agric. Exp. Station
KYFA1311	tall fescue	free	KY Agric. Exp. Station
KYFA1404	tall fescue	free	KY Agric. Exp. Station
KYFA1405	tall fescue	free	KY Agric. Exp. Station
KYFA1704	tall fescue	free	KY Agric. Exp. Station
KYFA9304	tall fescue	free	KY Agric. Exp. Station
KYFA9732/AR584	tall fescue	novel	KY Agric. Exp. Station
KYFA9821/AR584	tall fescue	novel	KY Agric. Exp. Station
KYFL1013	festulolium		KY Agric. Exp. Station
KYFL1301	festulolium		KY Agric. Exp. Station
NC-JimGraze	timothy		Green Consulting Serv.
7016	tall fescue	free	KY Agric. Exp. Station

<sup>1</sup> 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. Orchardgrass, bentgrass, timothy and festulolium do not contain an endophyte and forage type perennial ryegrass varieties do not contain a toxic endophyte.

<sup>2</sup> BarOptima PLUS E34 is not recommended for pregnant mares because it produces low levels of the alkaloid ergovaline.

<sup>3</sup> Experimental varieties are not available commercially, but provide an indication of the progress being made by forage breeding companies.

**Table 7. Summary of 1999-2019 Kentucky tall fescue horse grazing tolerance trials with three or more years of data in Lexington (stand persistence shown as a percent of the stand rating of the endophyte free variety KY 31-)**

Variety	Endophyte Status <sup>1</sup>	Proprietor/KY Distributor	1999 <sup>2,3</sup> 3-yr <sup>5</sup>	2001 4-yr	2002 4-yr	2003 4-yr	2004 4-yr	2005 4-yr	2006 4-yr	2007 4-yr	2008 4-yr	2009 4-yr	2010 4-yr	2011 4-yr	2012 4-yr	2013 4-yr	2014 4-yr	2015 4-yr	2016 3-yr	Mean <sup>4</sup> (#trials)
BarOptima PLUS E34 <sup>6</sup>	novel	Barenbrug USA								107			101	101	95	104	99	99	101	101(8)
Bronson	free	Ampac Seed	80													96			101	99(2)
Cajun II	free	Smith Seed Services																		
Cattle Club	free	Green Seed	95												99					
Cowgirl	free	Rose Agri-Seed									105									102(2)
Festorina	free	Advanta Seed	102																	
Jesup MaxQ	novel	Pennington Seed			98			78			104	97	100	101	97	105	98	100	99	98(11)
Johnstone	free	ProSeeds Marketing		88																
KY31+	toxic	KY Agri. Exp.Sta.		105				102	109	120	107	101	101	101	99	105	99	100	101	104(13)
KY31-	free	KY Agri. Exp.Sta.	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100(17)
Lacefield MaxQ II	novel	Pennington Seed						105	110							104			100	103(6)
Namyo	free	Japanese Grassland Forage Seed								72										
Seine	free	Seed Research of Oregon					135													
Select	free	Southern States	82	109	109	94	99	73	104	76	108	98	100	101	98	98	97	100		96(15)
SS0705TFL	free	Southern States																	100	99(3)
Stargrazer	free	Southern States	70																	
Stockman	free	Seed Research of Oregon					125													

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 stand persistence between varieties. To find actual persistence ratings, look in the yearly report for the final year of each specific trial. For example, the Lexington trial planted in 2010 was grazed 4 years so the final report would be "2014 Cool-Season Grass Horse Grazing Tolerance Report" (PR-685) 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.

6 BarOptima PLUS E34 is not recommended for pregnant mares because it produces low levels of the alkaloid ergovaline.

**Table 8. Summary of 1999-2019 Kentucky orchardgrass horse grazing tolerance trials with three or more years of data in Lexington (stand persistence shown as a percentage of the mean of the commercial varieties in the trial)**

Variety	Proprietor/KY Distributor	1999 <sup>1,2</sup>	2000	2001	2002	2005 <sup>3</sup>	2006	2009	2010	2011	2012	2013	2014	2015	2016	Mean <sup>4</sup> (#trials)
		3-yr <sup>5</sup>	4-yr	4-yr	4-yr	4-yr	4-yr	4-yr	4-yr	4-yr	4-yr	4-yr	4-yr	4-yr	3-yr	
Albert	Univ. of Wisconsin			95												
Ambrosia	Amer.Grass Seed Prod.						61									
Benchmark	Southern States	104			85											95(2)
Benchmark Plus	Southern States				111	157	139	111	114	121	121	137	105			120(8)
Crown Royale	Grassland Oregon			95												
Crown Royale Plus	Grassland Oregon				97											
Elise	Pure Seed										87					
Haymate	Southern States	96	85		97											93(3)
Persist	Smith Seed Services					114		103	101	92	112	146	95	123	127	112(8)
Potomac	Public				117											
Prairie	Turner Seed			100										92	91	92(2)
Prodigy	Caudill Seed											54				
Proft	Ampac Seed							93	86		92		108			95(4)
SS-0708OGDT	Southern States									104			92	77	90	91(4)
Tekapo	Ampac Seed	101	115		93	30		92	100	83	87	63	108			94(9)

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 stand persistence between varieties. To find actual persistence ratings, look in the yearly report for the final year of each specific trial. For example, the Lexington trial planted in 2010 was grazed 4 years so the final report would be "2014 Cool-Season Grass Horse Grazing Tolerance Report" (PR-685) archived in the UK Forage website at forages.ca.uky.edu.  
3 Due to high variation during 2005 these values are not included in the overall mean  
4 Mean only presented when respective variety was included in two or more trials.  
5 Number of years of data

**Table 9. Summary of 2000-2019 Kentucky perennial ryegrass and festulolium (FL) cattle grazing tolerance trials in Lexington (stand persistence shown as a percent of the mean of the commercial varieties in the trial, included to represent grazing tolerance of grass species not shown in Horse Tolerance Summary Tables**

Variety	Type	Proprietor	2000 <sup>1,2</sup>	2001	2003	2007	2008	2010	2011	2012	2013	2014	2015	2016	Mean <sup>3</sup> (#trials)	
			4yr <sup>4</sup>	3yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	3yr		
AGRLP103	–	AgResearch USA	128		86										107(2)	
Albion	tetraploid	Grassland Oregon											120		–	
Aries	diploid	Ampac Seed		139											–	
Barfest (FL)	MF x PR <sup>6</sup>	Barenbrug USA						116	112						114(2)	
Barvitra	diploid	Barenbrug USA											35		–	
BG-34	diploid	Barenbrug USA											83		–	
Boost	tetraploid	Allied Seed					101	83	95	104					96(4)	
Calibra	tetraploid	DLF International								120		88	97	108	103(4)	
Citadel	tetraploid	Donley Seed	107												–	
Duo (FL)	MF x PR <sup>6</sup>	Ampac Seed	116				95	72	90	115			70	67	89(7)	
Lasso	diploid	DLF-Jenks		130											–	
Linn (certified)	diploid	Public	112	129	63		95	108	95	103	96	80	74	96	96(11)	
Maverick	tetraploid	Ampac Seed		36											–	
Meadow Green (FL)	MF x IR <sup>6</sup>	Pure Seed								15					–	
Melpetra	tetraploid	Hood River Seed												106	–	
PayDay	tetraploid	Mountain View Seeds									101	85			93(2)	
Polly II	tetraploid	FS Growmark	36	68											52(2)	
Power	tetraploid	Ampac Seed				158		107	112	109	89	79	83		105(7)	
Quartet	tetraploid	Ampac Seed		77		59									68(2)	
Remington	tetraploid	Barenbrug USA			151								138	180	135	151(3)
Remington PLUS NEA2 <sup>5</sup>	tetraploid	Barenbrug USA										145	171		158(3)	
Spring Green (FL)	MF x PR <sup>6</sup>	Rose Agri-Seed	101				109	115	115	120			87	89	105(7)	
TetraGain	tetraploid	Pure Seed								112					–	
Victorian	diploid	Caudill Seed									114				–	

<sup>1</sup> Year trial was established.

<sup>2</sup> Use this summary table as a guide in making variety decisions, but refer to specific yearly reports to determine statistical differences in stand persistence between varieties. To find actual persistence ratings, look in the yearly report for the final year of each specific trial. For example, the Lexington trial planted in 2010 was grazed 4 years so the final report would be “2014 Cool-Season Grass Grazing Tolerance Report” (PR-684) archived in the UK Forage website at forages.ca.uky.edu.

<sup>3</sup> Mean only presented when respective variety was included in two or more trials.

<sup>4</sup> Number of years of data.

<sup>5</sup> Remington PLUS NEA2 contains a non-toxic (novel) endophyte.

<sup>6</sup> MF=meadow fescue, PR=perennial ryegrass, IR=Italian ryegrass.



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12-2018