



# 2017 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 horses 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 [www.uky.edu/Ag/Forage](http://www.uky.edu/Ag/Forage), contains electronic versions of all forage variety testing reports from Kentucky and surrounding states and from a large number of other forage publications.

## 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 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.

## Description of the Tests

Tests were established in Lexington in the fall of 2013, 2014, 2015, and 2016. 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 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 seed-heads 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

Table 1. Temperature and rainfall at Lexington, Kentucky in 2014, 2015, 2016, and 2017.

	2014				2015				2016				2017 <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	25	-6	2.28	-5.8	32	+1	2.17	-0.69	32	+1	0.80	-2.06	40	+9	6.81	+3.95
FEB	30	-5	5.47	+2.26	26	-9	3.08	-0.13	38	+3	6.09	+2.88	47	+12	4.46	+1.25
MAR	39	-5	3.08	-1.32	45	+1	7.34	+2.94	52	+8	4.07	-0.33	48	+4	3.34	-1.06
APR	58	+3	5.27	-1.89	57	+2	13.19	+9.31	57	+2	3.97	+0.09	62	+7	4.17	+0.29
MAY	66	+2	5.72	+1.25	69	+5	3.02	-1.45	64	0	9.17	+4.70	66	+2	7.74	+3.27
JUN	75	+3	2.93	-0.73	75	+3	8.20	+4.54	76	+4	5.09	+1.43	73	+1	7.68	+4.02
JUL	74	-2	3.18	-1.82	77	+1	10.22	+5.22	79	+3	7.43	+2.43	76	0	4.49	-0.51
AUG	76	+1	6.53	+2.60	74	-1	3.49	-0.44	79	+4	4.37	+0.44	74	-1	6.66	+2.73
SEP	69	+1	3.63	+4.43	72	+4	3.49	+0.29	74	+6	2.18	-1.02	69	+1	4.72	+1.52
OCT	57	0	5.55	+2.98	59	+2	2.78	+0.21	64	+7	0.37	-2.20	60	+3	6.06	+3.49
NOV	41	-4	2.79	-0.60	51	+6	3.72	+0.33	51	+6	1.94	-1.45				
DEC	40	+4	2.47	-1.51	49	+13	8.42	+4.44	37	+1	9.4	+5.42				
Total			49.4	+4.85			69.12	+24.57			54.88	+10.33			56.13	+18.95

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

<sup>2</sup> 2017 data is for the ten months through October.

**Table 2. Seedling vigor, grazing preference, and stand persistence of forage grasses sown September 6, 2013, in a horse grazing tolerance study at Lexington, Kentucky.**

Variety	Species	Seedling Vigor <sup>1</sup> Oct 15, 2013	Grazing Preference <sup>2</sup>				Percent Stand									
			2014	2015	2016	2017	2013	2014			2015		2016		2017	
			May 6	May 1	May 3	May 26	Oct 15	Apr 7	Oct 20	Apr 6	Nov 10	Mar 29	Oct 14	Mar 22	Oct 11	
<b>Commercial Varieties-Available for Farm Use</b>																
Jesup MaxQ <sup>3</sup>	tall fescue	4.3	2.0	1.7	1.0	1.0	99	99	99	99	99	98	97	97	97*	
KY31+ <sup>3</sup>	tall fescue	4.2	4.6	2.4	1.0	1.0	100	98	98	98	98	98	97	97	97*	
BarOptima PLUS E34 <sup>3</sup>	tall fescue	4.5	4.8	3.0	2.5	1.0	99	98	99	99	98	98	96	96	96*	
Lacefield MaxQII <sup>3</sup>	tall fescue	4.3	2.8	2.5	1.2	1.0	84	99	99	99	98	97	96	96	96*	
Select	tall fescue	4.2	1.8	1.7	1.2	1.2	99	97	97	97	95	96	94	91	90*	
Cajun II	tall fescue	3.0	2.8	1.5	1.0	1.0	91	92	93	93	90	89	88	88	88*	
Persist	orchardgrass	3.6	5.8	5.0	5.0	5.3	98	96	97	97	65	65	32	30	30	
Benchmark Plus	orchardgrass	4.2	5.7	5.3	6.0	6.7	96	94	96	94	61	63	40	38	28	
Clair	timothy	2.0	7.6	7.2	5.3	6.8	–	54	48	44	38	38	23	21	14	
Tekapo	orchardgrass	4.3	7.6	6.8	6.8	6.8	99	69	75	71	47	30	22	21	13	
Prodigy	orchardgrass	4.4	6.0	6.7	7.5	8.0	98	94	93	91	30	27	16	17	11	
Comtral	timothy	3.0	8.0	8.2	7.3	8.7	62	80	68	60	23	31	15	10	7	
Climax	timothy	2.7	8.8	8.3	8.2	9.0	67	77	62	50	22	18	9	4	4	
<b>Experimental Varieties</b>																
KYFA9732/AR584 <sup>3</sup>	tall fescue	4.8	4.2	2.8	1.3	1.0	99	99	99	99	99	99	98	98	98*	
KYFA0701	tall fescue	4.5	3.7	2.5	1.0	1.0	99	99	99	99	96	95	93	93	93*	
KY31- <sup>3</sup>	tall fescue	4.0	3.1	2.6	1.1	1.0	99	98	98	97	92	92	92	92	92*	
HTWC4	tall fescue	3.8	2.8	2.8	1.0	1.3	99	98	98	97	92	91	88	88	85*	
BARFAF13131	tall fescue	3.2	4.7	2.2	1.0	1.0	88	84	91	82	88	88	84	83	83	
KYFA9821/AR584 <sup>3</sup>	tall fescue	3.4	3.2	2.3	1.0	1.0	96	96	96	96	95	94	94	94	79	
Mean		3.9	4.7	3.9	3.2	3.3	88	91	90	87	75	74	67	66	63	
CV,%		22.4	23.9	25.6	26.3	41.6	16	13	12	15	16	15	15	15	19	
LSD,0.05		1.1	1.3	1.2	1.0	1.6	16	13	13	14	14	13	12	11	14	

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

<sup>2</sup> Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2014-9 days, 2015-4 days, 2016-12 days, 2017-30 days.

<sup>3</sup> 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, but is not recommended in pastures with late term mares since it produces low levels of ergovaline. 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.

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 2014, 2015, 2016, and 2017 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: 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 summarizes information about distributors and persistence across

**Table 3. Seedling vigor, grazing preference, and stand persistence of forage grasses sown September 9, 2014, in a horse grazing tolerance study at Lexington, Kentucky.**

Variety	Species	Seedling Vigor <sup>1</sup> Oct 9, 2014	Grazing Preference <sup>2</sup>			Percent Stand						
			2015	2016	2017	2014	2015		2016		2017	
			May 1	Apr 26	May 31	Oct 9	Apr 6	Oct 21	Mar 29	Oct 14	Mar 24	Oct 11
<b>Commercial Varieties-Available for Farm Use</b>												
BarOptima PLUS E34 <sup>3</sup>	tall fescue	3.3	2.5	1.0	1.0	99	99	100	100	99	99	99*
KY31+ <sup>3</sup>	tall fescue	5.0	2.0	1.0	1.0	100	100	100	100	99	99	99*
Jesup MaxQ <sup>3</sup>	tall fescue	3.8	1.8	1.0	1.0	99	100	100	100	99	98	98*
SS-0705TFSL	tall fescue	4.2	2.0	1.0	1.0	99	100	99	99	99	98	98*
Select	tall fescue	3.6	1.2	1.0	1.0	97	99	98	99	98	97	97*
Persist	orchardgrass	3.3	2.7	3.2	4.0	99	99	98	96	60	52	57
SS0708OGDT	orchardgrass	4.4	3.3	3.8	5.7	100	100	99	98	56	47	51
Benchmark Plus	orchardgrass	3.7	3.0	3.8	5.5	99	99	98	97	48	45	49
Profit	orchardgrass	4.5	2.8	3.3	5.8	100	100	80	96	45	32	38
Power	perennial ryegrass	4.8	5.7	5.8	8.4	100	96	95	96	40	10	18
Grand Daddy	perennial ryegrass	4.4	3.5	3.0	4.5	98	98	95	94	38	10	10
<b>Experimental Varieties</b>												
NFTF 1370	tall fescue	4.5	1.3	1.0	1.0	100	100	100	100	100	100	100*
KY31- <sup>3</sup>	tall fescue	4.3	2.2	1.0	1.0	98	99	99	99	100	99	100*
NFTF 1044	tall fescue	3.8	1.8	1.0	1.2	100	100	100	100	100	99	99*
NFTF 1051	tall fescue	3.8	1.2	1.0	1.0	100	100	100	100	98	98	98*
2014.90.19	orchardgrass	4.3	2.7	3.2	4.8	100	100	99	99	70	68	68
B-14.0516	orchardgrass	2.3	4.2	5.3	5.5	95	95	94	94	51	38	39
OG 1102G	orchardgrass	3.8	3.2	3.6	6.0	100	100	98	98	50	34	36
OG 0901G	orchardgrass	3.8	3.3	5.5	6.2	98	99	98	97	56	33	35
OG 1101G	orchardgrass	3.6	3.4	4.2	6.4	100	100	95	94	36	24	22
Mean		4.0	2.7	3.7	3.5	99	99	97	98	72	64	67
CV,%		16.1	28.1	30.9	43.0	2	2	8	3	17	20	22
LSD,0.05		0.7	0.9	1.0	1.8	2	3	9	3	14	15	17

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

<sup>2</sup> Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2015-4 days, 2016-5 days, 2017-35 days.

<sup>3</sup> KY 31- is the variety KY31 from which the toxic endophyte has been removed. KY31+ contains the toxic endophyte. Jesup MaxQ contains a non-toxic endophyte.

BarOptima PLUS E34 contains a beneficial endophyte, but it is not recommended in pastures with late term mares since it produces low levels of ergovaline. 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.

years for all varieties in these tests. Varieties are listed in alphabetical order, with experimental varieties listed at the bottom. 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 indicates the variety was in the test but was significantly different from the most persistent variety. A single asterisk (\*) means that the variety was not significantly different from the most persistent variety in that study based on the 0.05 LSD. It is best to choose a variety that has performed well over several years.

Tables 7 and 8 are summaries of stand persistence data from 1999 to 2017 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 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 the information can be found in the yearly reports. See footnotes in tables 7 and 8 to determine which yearly report should be referenced.

## 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. 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.

**Table 4. 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	Seedling Vigor <sup>1</sup> Oct 19, 2015	Grazing Preference <sup>2</sup>		Percent Stand				
			2016	2017	2015	2016		2017	
			Apr 26	May 31	Oct 19	Mar 29	Oct 14	Mar 24	Oct 9
<b>Commercial Varieties-Available for Farm Use</b>									
Jesup MaxQ <sup>3</sup>	tall fescue	3.5	1.4	1.0	100	100	100	100	100*
KY31+ <sup>3</sup>	tall fescue	3.6	1.8	1.0	100	100	100	100	100*
Lacefield MaxQII <sup>3</sup>	tall fescue	3.7	1.8	1.0	100	100	100	100	100*
Select	tall fescue	3.3	1.5	1.0	100	100	100	100	100*
SS-0705TFSL	tall fescue	3.3	1.5	1.0	100	100	100	100	100*
BarOptima PLUS E34 <sup>3</sup>	tall fescue	3.0	1.9	1.0	100	100	99	99	99*
Persist	orchardgrass	3.3	2.7	1.7	100	100	97	97	97*
Tekapo	orchardgrass	3.3	4.2	2.7	100	100	97	95	95*
Prairie	orchardgrass	3.3	2.7	3.0	100	100	94	92	93*
SS-0708OGDT	orchardgrass	3.7	2.5	3.5	100	100	94	93	92*
Grand Daddy	perennial ryegrass	4.3	3.5	3.3	100	100	96	95	86
Power	perennial ryegrass	4.7	4.5	8.2	100	100	93	87	57
Spring Green	festulolium	4.8	3.7	7.8	100	100	88	85	52
Duo	festulolium	5.0	6.3	8.8	100	98	72	70	37
<b>Experimental Varieties</b>									
KY31- <sup>3</sup>	tall fescue	3.3	1.6	1.0	100	100	100	100	100*
KYFA1113	tall fescue	3.4	1.7	1.0	100	100	100	100	100*
KYFA1114	tall fescue	3.6	1.8	1.2	100	100	100	100	100*
KYFA9821/AR584 <sup>3</sup>	tall fescue	3.8	1.5	1.0	100	100	100	100	100*
KYFA1311	tall fescue	3.2	1.5	1.0	100	100	98	99	99*
KYDG1002	orchardgrass	3.2	3.2	2.7	100	100	96	93	88
KYDG1001	orchardgrass	3.3	3.0	4.0	100	100	93	92	82
KYFL1013	festulolium	4.9	3.5	8.5	100	100	86	78	33
Mean		3.7	2.6	3.0	100	100	96	94	87
CV,%		9.2	27.0	24.5	0	1	7	7	9
LSD,0.05		0.4	0.8	1.3	0	1	7	8	9

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

<sup>2</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.

<sup>3</sup> KY 31- is the variety KY31 from which the toxic endophyte has been removed. KY31+ contains the toxic endophyte. Jesup MaxQ and Lacefield MaxQII contain a non-toxic endophyte. BarOptima PLUS E34 contains a beneficial endophyte, but is not recommended for pastures with late term mares since it produces low levels of ergovaline. AR584 is a non-toxic endophyte inserted into the experimental tall fescue variety. 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.

## About the Authors

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**Table 5. 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	Seedling Vigor <sup>1</sup> Oct 6, 2016	Grazing Preference <sup>2</sup> May 26, 2017	Percent Stand		
				2016	2017	
				Oct 6	Mar 15	Oct 9
<b>Commercial Varieties-Available for Farm Use</b>						
KY31+ <sup>3</sup>	tall fescue	2.5	1.2	100	100	100*
BarOptima PLUS E34 <sup>3</sup>	tall fescue	2.3	1.5	100	100	100*
Cajun II	tall fescue	2.8	1.3	100	100	99*
Lacefield MaxQII <sup>3</sup>	tall fescue	3.7	1.3	100	100	99*
SS0705TFSL	tall fescue	3.0	2.5	100	100	99*
Jesup MaxQ <sup>3</sup>	tall fescue	3.6	1.5	100	100	98*
Remington	perennial ryegrass	4.3	8.3	100	100	98*
Spring Green	festulolium	3.8	6.7	100	100	98*
PayDay	perennial ryegrass	3.9	8.3	100	100	98*
Persist	orchardgrass	2.8	3.2	100	100	98*
Prairie	orchardgrass	3.3	5.2	100	100	97*
SS0708DGDT	orchardgrass	3.8	4.7	100	100	96*
Linn	perennial ryegrass	4.7	6.2	100	100	95*
Vision	bentgrass	1.0	9.0	75	78	86
Duo	festulolium	4.8	6.7	100	98	68
Giant	bentgrass	1.0	8.7	73	68	57
<b>Experimental Varieties</b>						
KYFA1303	tall fescue	4.0	2.0	100	100	100*
KYFA9732/AR584 <sup>3</sup>	tall fescue	3.8	1.8	100	100	100*
KYFA1201	tall fescue	3.2	1.5	100	100	100*
KY31- <sup>3</sup>	tall fescue	2.8	1.3	100	100	99*
KYFA9304	tall fescue	3.5	1.7	100	100	99*
KYDG1001	orchardgrass	3.5	5.7	100	100	99*
KYDG1002	orchardgrass	4.2	5.0	100	100	97*
KYFL1301	festulolium	4.0	6.5	100	100	94*
Mean		3.3	4.2	98	98	95
CV,%		15.7	26.1	4	4	8
LSD,0.05		0.6	1.3	4	4	8

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

<sup>2</sup> Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 35 days.

<sup>3</sup> KY 31- is the variety KY31 from which the toxic endophyte has been removed. KY31+ contains the toxic endophyte. Jesup MaxQ and Lacefield MaxQII contain a non-toxic endophyte. BarOptima PLUS E34 contains a beneficial endophyte, but is not recommended in pastures with late term mares since it produces low levels of ergovaline. AR584 is a non-toxic endophyte inserted into the experimental tall fescue variety. 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. Summary of persistence of forage grasses under heavy grazing pressure by horses across years at Lexington, Kentucky.

Variety	Species	Proprietor/ KY Distributor	2013			2014			2015			2016			2017		
			Apr	May	Jun	Mar	Apr	May	Jun	Mar	Apr	May	Jun	Mar	Apr	May	Jun
<b>Commercial Varieties-Available for Farm Use</b>																	
BarOptima PLUS E343	tall fescue	Barenbrug USA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Benchmark Plus	orchardgrass	Southern States	*	*	X <sup>4</sup>	X	X	X	*	*	*	*	*	*	*	*	*
Cajun II	tall fescue	Smith Seed Services	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Clair	timothy	Turner Seed	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Climax	timothy	Canada Agr. Res. Station	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Comtral	timothy	Caudill Seed	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Duo	festulolium	Ampac Seed Company															
Giant	redtop bent	Pure Seed Testing															
Grand Daddy	perennial ryegrass	Smith Seed Services							*	X	X	X	X	X	X	X	X
Jesup Max Q <sup>3</sup>	tall fescue	Pennington Seed	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
KY 31+3	tall fescue	Public	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Lacefield MaxQ II <sup>3</sup>	tall fescue	Pennington Seed	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Linn	perennial ryegrass	Public															
PayDay	perennial ryegrass	Mountain View Seeds															
Persist	orchardgrass	Smith Seed Services	*	*	*	X	X	X	*	*	*	*	*	*	*	*	*
Power	perennial ryegrass	Ampac Seed Company															
Prairie	orchardgrass	Turner Seed							X	X	X	X	X	X	X	X	X
Prodigy	orchardgrass	Caudill Seed	*	*	*	X	X	X	*	*	*	*	*	*	*	*	*
Profit	orchardgrass	Ampac Seed Company							*	X	X	X	X	X	X	X	X
Remington	perennial ryegrass	Barenbrug USA															
Select	tall fescue	Southern States	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Spring Green	festulolium	Rose-Agri Seed															
SS-0705TFSL	tall fescue	Southern States							*	*	*	*	*	*	*	*	*
SS-0708OGDT	orchardgrass	Southern States							*	*	*	*	*	*	*	*	*
Tekapo	orchardgrass	Ampac Seed Company	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Vision	colonial bentgrass	Blue Moon Farms															
<b>Experimental Varieties</b>																	
B-14-0516	orchardgrass	Blue Moon Farms							X	X	X	X	X	X	X	X	X
BARAF 13131	tall fescue	Barenbrug USA	X	*	*	*	X	X	*	*	*	*	*	*	*	*	*
HTWC4	tall fescue	KY Agric. Exp. Station	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
KY 31-3	tall fescue	KY Agric. Exp. Station	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
KYDG1001	orchardgrass	KY Agric. Exp. Station															
KYDG1002	orchardgrass	KY Agric. Exp. Station															
KYFA0701	tall fescue	KY Agric. Exp. Station	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
KYFA1113	tall fescue	KY Agric. Exp. Station															
KYFA1114	tall fescue	KY Agric. Exp. Station															
KYFA1201	tall fescue	KY Agric. Exp. Station															
KYFA1301	tall fescue	KY Agric. Exp. Station															
KYFA1303	tall fescue	KY Agric. Exp. Station															
KYFA1311	tall fescue	KY Agric. Exp. Station															

continued



Table 6. continued

Variety	Species	Proprietor/ KY Distributor	2013 <sup>1</sup>						2014						2015						2016	
			Apr <sup>2</sup>	Oct	2014	Apr	Nov	Mar	Oct	Mar	Oct	Mar	Oct	Mar	Oct	Mar	Oct	Mar	Oct	Mar	Oct	
KYFA9304	tall fescue	KY Agric. Exp. Station	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
KYFA9732/AR584 <sup>3</sup>	tall fescue	KY Agric. Exp. Station	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
KYFA9821/AR584 <sup>3</sup>	tall fescue	KY Agric. Exp. Station	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
KYFL1013	festulolium	KY Agric. Exp. Station																				
NFTF 1044	tall fescue	Noble Foundation	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
NFTF 1051	tall fescue	Noble Foundation	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
NFTF 1370	tall fescue	Noble Foundation	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
OG 0901G	orchardgrass	FFR/Southern States																				
OG 1101G	orchardgrass	FFR/Southern States																				
OG 1102G	orchardgrass	FFR/Southern States																				
2014:90:19	orchardgrass	KY Agric. Exp. Station																				

1 Establishment year.

2 Date of rating of percent stand.

3 KY 31- is the variety KY31 from which the toxic endophyte has been removed. KY31+ contains the toxic endophyte. Jesup MaxQ and Lacefield MaxQ II contain a non-toxic endophyte.

BarOptima PLUS E34 contains a beneficial endophyte, but is not recommended in pastures with late term mares since it produces low levels of ergovaline. AR584 is a non-toxic endophyte inserted into the experimental tall fescue varieties. The other fescue varieties in this table do not contain an endophyte.

4 "x" in the block indicates the variety was in the test but the stand survival was significantly less than the most persistent variety. An open block indicates the variety was not in the test.

\*Not significantly different from the most persistent variety in the test.

Table 7. Summary of 1999-2017 Kentucky tall fescue horse grazing tolerance trials in Lexington (stand persistence shown as a percent of the stand rating of KY 31-).

Variety	Proprietor/KY Distributor	1999 <sup>1,2</sup>		2001		2002		2003		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		Mean <sup>3</sup> (#trials)		
		3-yr <sup>4</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	4-yr	4-yr	4-yr	4-yr	4-yr	4-yr	4-yr	4-yr	4-yr	4-yr	4-yr	4-yr	4-yr	4-yr	4-yr					
BarOptima PLUS E34 <sup>5</sup>	Barenbrug																107														101(6)			
Bronson	Ampac Seed	80																																
Cajun II	Smith Seed																																	
Cattle Club	Green Seed	95																																
Cowgirl	Rose Agri-Seed																		105															
Festorina	Advanta Seed	102																																
Jesup MaxQ <sup>5</sup>	Pennington Seed																																	
Johnstone	ProSeeds																																	
KY31+ <sup>5</sup>	KY Agri. Exp.Sta.																																	
KY31- <sup>5</sup>	KY Agri. Exp.Sta.	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100(15)		
Lacefield MaxQ II <sup>5</sup>	Pennington Seed																																	
Naniyo	Japanese Grassland For. Seed																																	
Seine	Seed Research of OR																																	
Select	Southern States	82																																
Stargrazer	Southern States	70																																
Stockman	Seed Research of OR																																	

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 four years so the final report would be "2014 Cool-Season Grass Horse Grazing Tolerance Report" archived in the KY Forage website at [www.uky.edu/Ag/Forage](http://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 KY 31- is the variety KY31 from which the toxic endophyte has been removed. KY31+ contains the toxic endophyte. Jesup MaxQ and Lacefield MaxQII contain a non-toxic endophyte. BarOptima PLUS E34 contains a beneficial endophyte, but is not recommended in pastures with late term mares since it produces low levels of ergovaline. The other fescue varieties in this table do not contain an endophyte.

**Table 8. Summary of 1999-2017 Kentucky orchardgrass horse grazing tolerance trials 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	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	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	101	119(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					114		103	101	92	112	146	117	112(6)
Potomac	Public				117									–
Prairie	Turner Seed			100										–
Prodigy	Caudill Seed											54		–
Profit	Ampac Seed							93	86		92		78	87(4)
SS-0708OGDT	Southern States									104			105	105(2)
Tekapo	Ampac Seed	101	115		93	30		92	100	83	87	63		92(8)

<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 in 2010 was grazed four years so the final report would be "2014 Cool-Season Grass Horse Grazing Tolerance Report" archived in the KY Forage website at [www.uky.edu/Ag/Forage](http://www.uky.edu/Ag/Forage).

<sup>3</sup> Due to high variation during 2005 these values are not included in the overall mean.

<sup>4</sup> Mean only presented when respective variety was included in two or more trials.

<sup>5</sup> Number of years of data.