University of Kentucky
College of Agriculture, Food and Environment
Agricultural Experiment Station

2017 Cool-Season Grass Grazing Tolerance Report

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Introduction

Cool-season grasses such as tall fescue, orchardgrass, and Kentucky bluegrass are the primary pasture grasses in Kentucky. Other species such as perennial ryegrass, festulolium, and the brome grasses can be used in pasture systems. Little is known about the effect of variety on the grazing tolerance of these cool-season grass species.

The purpose of this report is to summarize current research on the grazing tolerance of varieties of tall fescue, orchardgrass, perennial ryegrass, and other species when they are subjected to continuous, heavy grazing pressure by cattle within the grazing season. This is not our recommendation on-farm, but indicates which varieties will survive a worst case scenario which often occurs over the life of a typical pasture. The main focus will be on plant stand survival. Tables 17, 18, and 19 show the summaries of all tall fescue, orchardgrass, and perennial ryegrass varieties tested in Kentucky during the past 15 years. The UK Forage Extension website, at www.uky.edu/Ag/Forage, contains electronic versions of all forage variety testing reports from Kentucky and surrounding states and from a large number of other forage publications.

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 and 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), 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.

Description of the Tests

Grass variety tests for grazing tolerance were established in Lexington in the fall of 2013, 2014, 2015, and 2016. The soil at Lexington (Maury) is a well-drained silt loam and is well-suited to tall fescue, orchardgrass, and perennial ryegrass production. 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 sown into a prepared seedbed using a disk drill. Grazing began in April and was continuous until late September. Plots were grazed down to below 4 inches quickly by steers or heifers and kept at 2 to 4 inches for the remainder of the grazing season. The trials were rated for grazing preference 10 to 20 days after cattle were allowed to start grazing. (A rating of 1 indicates no forage removed and a rating of 9 indicates all forage was grazed.) Individual trials occasionally were clipped to remove seedheads or weed growth not controlled by herbicides. Supplemental hay or soybean hulls were fed during periods of slowest growth. Animals were removed from plots after all fall growth had been removed and when little regrowth was expected. Visual ratings of percent stand were made in the fall several weeks after the cattle were removed to check stand survival after the grazing season and in the spring prior to grazing to check on

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

	2014				2015				2016				2017[2]			
	Temp		Rainfall		Temp		Rainfall		Temp		Rainfall		Temp		Rainfall	
	°F	DEP[1]	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	25	-6	2.28	-.58	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	+.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

[1] DEP is departure from the long-term average.
[2] 2017 data is for the ten months through October.

Table 2. Seedling vigor, grazing preference, and stand persistence of tall fescue varieties sown September 6, 2013, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor[1]	Grazing Preference[2]				Percent Stand								
		2014	2015	2016	2017	2013	2014		2015		2016		2017	
	Oct 14, 2013	May 1	May 1	May 3	Apr 26	Oct 14	Apr 2	Oct 6	Apr 6	Oct 21	Mar 24	Oct 5	Mar 22	Oct 19
Commercial Varieties-Available for Farm Use														
KY31+[3]	3.8	5.7	2.0	1.3	1.0	85	89	92	93	94	93	94	94	94*
BarOptima Plus E34[3]	3.3	5.3	2.5	3.2	3.0	78	81	89	90	94	93	93	93	94*
Lacefield MaxQII[3]	3.9	4.7	1.8	1.7	1.5	89	89	92	93	92	92	93	94	94*
Select	3.3	4.8	1.0	1.0	1.0	83	85	89	93	93	94	93	93	93*
JesupMaxQ[3]	3.1	4.0	1.7	1.0	1.0	73	82	89	92	88	91	92	93	93*
Bull	2.8	3.5	1.2	1.0	1.0	71	75	87	89	91	92	90	90	90*
Experimental Varieties														
KYFA0701	3.9	5.3	1.8	1.2	1.0	87	88	90	94	94	94	94	94	94*
GT213/AR584[3]	4.3	5.0	2.3	2.3	2.2	90	88	89	91	91	92	93	93	93*
AGRFA-200/AR584[3]	4.3	5.5	4.8	5.7	3.8	92	91	93	94	89	93	93	93	93*
KYFA9821/AR584[3]	3.1	5.7	1.3	1.0	1.0	54	74	86	91	91	92	93	93	93*
KY31-[3]	2.7	5.8	1.7	1.0	1.2	72	73	86	89	90	90	93	93	93*
KYFA9732/AR584[3]	3.9	6.0	3.3	2.5	1.7	89	87	92	92	92	91	92	93	93*
HTWC4	3.0	5.5	2.0	1.0	1.0	69	78	87	90	90	92	92	92	92*
AGRFA-201/AR605[3]	2.8	5.0	1.3	1.0	1.0	52	61	77	83	80	87	87	89	89*
AGRFA-179/AR584[3]	3.3	6.3	4.2	6.2	4.8	75	74	83	88	86	86	86	88	88
BARFAF13131	2.0	6.3	2.2	1.0	1.0	23	35	42	47	53	64	74	75	73
Mean	3.4	5.3	2.1	1.9	1.7	72	76	83	86	86	88	90	90	90
CV,%	24.2	21.1	34.3	22.2	33.0	21	14	12	11	12	9	6	6	6
LSD,0.05	1.0	1.3	0.8	0.5	0.6	18	12	11	11	12	9	7	6	6

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[2] Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2014-23 days, 2015-9 days, 2016-20 days, 2017-14 days.
[3] KY 31- is the variety KY31 from which the toxic endophyte has been removed. Jesup MaxQ and Lacefield MaxQII contain a non-toxic endophyte. BarOptima PLUS E34 contains a beneficial endophyte. AR584 and AR605 are non-toxic endophytes inserted into the experimental tall fescue varieties. KY31+ contains the toxic endophyte. The other fescue varieties in this test do not contain an endophyte.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 3. Seedling vigor, grazing preference, and stand persistence of tall fescue varieties sown September 9, 2014, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor[1]	Grazing Preference[2]			Percent Stand						
		2015	2016	2017	2014	2015		2016		2017	
	Oct 9, 2014	May 1	May 3	Apr 26	Oct 9	Apr 6	Oct 21	Mar 24	Oct 5	Mar 22	Oct 19
Commercial Varieties-Available for Farm Use											
SS-0705TFSL	4.8	2.3	1.0	1.5	100	100	100	100	100	100	100*
BarOptima Plus E34[3]	4.1	3.0	3.3	3.5	98	98	100	100	100	100	100*
KY31+[3]	4.8	2.7	1.3	2.3	100	100	100	100	100	100	100*
Jesup MaxQ[3]	4.8	2.0	1.0	1.3	100	100	100	100	100	100	99*
Select	4.6	1.2	1.0	1.5	99	99	100	100	100	100	99*
Lacefield MaxQII[3]	4.8	2.3	1.0	1.5	100	100	100	100	100	100	99*
Cajun II	4.8	1.5	1.0	1.2	100	100	100	100	100	99	98*
Experimental Varieties											
KY31-[3]	4.8	2.3	1.0	1.8	100	100	100	100	100	100	100*
KYFA1114/584[3]	4.8	2.8	1.2	1.7	99	100	100	100	100	100	100*
KYFA1115/584[3]	4.4	3.0	2.3	3.3	99	99	100	100	100	100	100*
NFTF 1044	4.3	2.0	1.0	1.8	99	100	100	100	100	100	100*
KYFA1113/584[3]	4.7	2.2	1.3	1.7	99	100	100	100	100	100	100*
NFTF 1370	4.7	1.8	1.0	1.0	100	100	100	100	100	100	100*
NFTF 1051	4.6	1.5	1.0	1.2	100	100	100	100	100	100	96
Mean	4.6	2.2	1.3	1.8	99	100	100	100	100	100	99
CV,%	10.3	39.3	32.8	34.3	1	1	0	0	0	1	2
LSD,0.05	0.6	1.0	0.5	0.7	1	1	0	0	0	1	3

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[2] Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2015-9 days, 2016-20 days, 2017-14 days.
[3] KY 31- is the variety KY31 from which the toxic endophyte has been removed. Jesup MaxQ and Lacefield MaxQII contain a non-toxic endophyte. BarOptima Plus E34 contains a beneficial endophyte. AR584 is a non-toxic endophyte inserted into the experimental tall fescue varieties. KY31+ contains the toxic endophyte. The other fescue varieties in this test do not contain an endophyte.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

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 November. 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 are presented in Table 1. Data on percent stand are presented in tables 2 through 13. Statistical analyses were performed on all entries (including experimentals) to determine if the apparent 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.

Kentucky 31 tall fescue with the endophyte (KY31+) is considered to be the most grazing-tolerant variety and was the grazing-tolerant check entry in all tall fescue trials. The central questions in grazing tolerance among tall fescues are: Can endophyte-free varieties persist as well as KY31+ and will the new novel, or "friendly," endophyte materials persist as well as other tolerant varieties? After three and four seasons, several fescue varieties were comparable to KY31+ in regard to grazing tolerance (tables 2, 3, and 17).

Table 14 (fescue), Table 15 (orchardgrass), and Table 16 (perennial ryegrass and festulolium) summarize information about distributors and persistence across 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 that the variety was in the test but plant survival was significantly less than 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.

Table 4. Seedling vigor, grazing preference, and stand persistence of tall fescue varieties sown September 3, 2015, in a cattle grazing tolerance study at Lexington, Kentucky.

	Seedling Vigor[1]	Grazing Preference[2]		Percent Stand				
		2016	2017	2015	2016		2017	
Variety	Oct 19, 2015	Apr 26	Apr 26	Oct 19	Mar 24	Oct 4	Mar 22	Oct 12
Commercial Varieties-Available for Farm Use								
Lacefield MaxQII[3]	4.6	2.3	1.8	99	100	100	100	100*
Jesup MaxQ[3]	4.7	1.5	1.0	99	100	100	100	100*
KY31+[3]	4.8	2.3	1.3	99	100	100	100	100*
SS-0705TFSL	4.5	1.4	1.0	99	100	100	100	100*
BarOptima Plus E34[3]	3.8	2.4	3.5	98	99	100	100	100*
Select	4.1	2.0	1.0	99	99	100	100	100*
Cajun II	4.1	1.3	1.0	96	100	99	99	99
Drover	4.4	1.0	1.0	98	99	99	99	99
FSG 402TF	4.3	1.8	1.0	98	99	99	99	99
Baguala	4.4	1.8	1.0	98	100	98	98	98
Dominate	4.4	2.0	1.2	98	100	97	98	97
Experimental Varieties								
KYFA1113	4.8	2.2	1.7	100	100	100	100	100*
KYFA1114	4.6	2.2	1.3	98	100	100	100	100*
KYFA1311	4.6	2.5	1.7	100	100	100	100	100*
KYFA9821/AR584[3]	4.8	1.8	1.3	99	100	100	100	100*
Drover+E34[3]	4.3	1.2	1.0	99	100	99	100	100*
KY31-[3]	4.8	2.3	1.3	99	100	100	100	100*
BARFAF131	3.7	3.5	1.3	98	100	99	100	99*
Mean	4.4	2.0	1.4	98	100	99	99	99
CV,%	8.8	31.7	35.3	2	1	1	1	1
LSD,0.05	0.4	0.7	0.6	3	1	1	1	1

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[2] Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2016-13 days, 2017-14 days.
[3] KY 31- is the variety KY31 from which the toxic endophyte has been removed. Jesup MaxQ and Lacefield MaxQII contain a non-toxic endophyte. BarOptima Plus E34 and Drover+E34 contain a beneficial endophyte. AR584 is a non-toxic endophyte inserted into the experimental tall fescue variety. 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.

Tables 17, 18, and 19 are summaries of stand persistence data from 2000 to 2017 of commercial tall fescue, orchardgrass, and perennial ryegrass varieties that have been entered in the Kentucky trials. In Table 17 the data is listed as a percentage of 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 tables 18 and 19 the data are 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 17, 18, and 19, 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 very well in wet years or on particular soil types. These details may influence variety choice, and the information can be found in the yearly reports. See footnotes in tables 17, 18, and 19 to determine which yearly report should be referenced.

Summary

These studies indicate that there are varieties of cool-season grasses that can tolerate overgrazing for multiple seasons

and still maintain reasonable stands. Some varieties of endophyte-free as well as novel, or "friendly," endophyte tall fescue have been able to maintain equivalent stands to endophyte-infected KY31. There is no KY31+ equivalent in orchardgrass; that is, no variety has historically been proven to be tolerant of overgrazing. However, some varieties have exhibited good tolerance to grazing abuse even after three and four seasons.

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 recommended that tall fescue or orchardgrass be continuously overgrazed as was done in these trials. Although several varieties expressed tolerance to the level of grazing pressure used in these trials, overgrazing greatly reduces yield and therefore profitability of these varieties. This information should be an indication of those varieties that will better withstand the occasional overgrazing that sometimes becomes necessary in livestock operations.

Good management for maximum life from any grass would be to: Allow it to become completely established before grazing, and avoid overgrazing it during times of extreme stress, such as drought.

About the Authors

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Table 5. Seedling vigor, grazing preference, and stand persistence of tall fescue and meadow fescue (MF) sown September 8, 2016, in a cattle grazing tolerance study at Lexington, Kentucky.

	Seedling Vigor[1]	Grazing Preference[2]		Percent Stand		
		2017		2016	2017	
Variety	Oct 5, 2016	Apr 26	Jun 2	Oct 5	Mar 15	Oct 11
Commercial Varieties-Available for Farm Use						
BarOptima Plus E34[3]	3.3	2.8	3.8	100	100	100*
Bronson	3.8	1.5	1.8	100	100	100*
Bull	3.1	1.0	1.5	100	100	100*
Goliath	3.7	1.5	2.7	100	100	100*
Jesup MaxQ[3]	4.5	1.8	3.0	100	100	100*
KY31+[3]	3.6	2.7	4.0	100	100	100*
Lacefield MaxQII[3]	4.4	2.0	4.0	100	100	100*
SS0705TFSL	4.2	1.5	2.8	99	100	100*
Cajun II	3.5	1.2	1.7	98	99	99*
Cosmonaut (MF)	3.6	5.2	7.8	99	99	99*
Experimental Varieties						
KY31-[3]	3.8	2.0	2.5	100	100	100*
KYFA1201	3.8	2.2	3.7	100	100	100*
KYFA1303	4.8	2.3	5.0	100	100	100*
KYFA9304	4.5	2.7	4.5	100	100	100*
KYFA9732/AR584[3]	4.1	2.5	3.8	100	100	100*
KYPP0901 (MF)	4.7	4.3	7.2	100	100	100*
Mean	4.0	2.3	3.7	100	100	100
CV,%	14.0	25.7	36.0	1	1	1
LSD,0.05	0.6	0.7	1.6	1	1	1

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[2] Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2017-14 days.
[3] KY 31- is the variety KY31 from which the toxic endophyte has been removed. Jesup MaxQ and Lacefield MaxQII contain a non-toxic endophyte. BarOptima Plus E34 contains a beneficial endophyte. AR584 is a non-toxic endophyte inserted into the experimental tall fescue varieties. KY31+ contains the toxic endophyte. The other fescue varieties in this test do not contain an endophyte.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 6. Seedling vigor, grazing preference, and stand persistence of orchardgrass varieties sown September 6, 2013, in a cattle grazing tolerance study at Lexington, Kentucky.

	Seedling Vigor[1]	Grazing Preference[2]				Percent Stand								
		2014	2015	2016	2017	2013	2014		2015		2016		2017	
Variety	Oct 14, 2013	May 1	May 1	May 3	Apr 26	Oct 14	Apr 2	Oct 6	Apr 6	Nov 10	Mar 24	Oct 17	Mar 22	Oct 19
Commercial Varieties-Available for Farm Use														
Benchmark Plus	3.7	7.8	2.7	6.7	3.0	77	33	49	53	43	44	25	27	20*
Prairie	4.2	6.8	3.0	6.3	3.2	78	34	48	53	43	42	24	23	18*
Prodigy	4.1	7.0	3.7	6.8	5.0	83	51	63	69	40	36	13	21	15*
Persist	3.3	7.6	2.2	6.0	2.2	70	31	51	55	44	33	16	22	14*
Profit	3.7	7.8	4.0	6.5	4.7	71	31	39	43	34	31	13	16	13*
Tekapo	4.5	8.3	4.2	8.0	4.2	88	12	23	22	18	13	8	10	9
Harvestar	3.4	7.8	3.5	7.8	5.0	63	18	29	27	22	14	7	5	7
Experimental Varieties														
B-SIG613	3.0	7.3	2.7	6.8	4.3	45	23	38	46	45	45	27	27	21*
Mean	3.8	7.5	3.2	6.8	3.9	72	29	42	46	36	32	17	19	15
CV,%	17.7	9.3	21.6	12.1	34.1	21	43	49	40	36	43	54	45	49
LSD,0.05	0.8	0.9	0.8	1.0	1.6	18	15	24	21	15	16	11	10	8

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[2] Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2014-9 days, 2015-10 days, 2016-20 days, 2017-14 days.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 7. Seedling vigor, grazing preference, and stand persistence of orchardgrass varieties sown September 9, 2014, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor[1]	Grazing Preference[2]				Percent Stand						
		2015	2016	2017		2014	2015		2016		2017	
	Oct 9, 2014	May 1	Apr 26	Apr 26	Jun 2	Oct 9	Apr 6	Oct 21	Mar 24	Oct 17	Mar 22	Oct 19
Commercial Varieties-Available for Farm Use												
Benchmark Plus	4.8	2.5	3.3	4.0	7.5	98	98	98	98	73	85	79*
Prodigy	4.8	2.7	3.3	4.5	7.3	100	100	97	98	75	80	73*
Persist	3.7	2.7	3.4	3.7	8.0	98	99	98	98	78	85	73*
SS-0708OGDT	4.7	2.5	3.2	4.7	8.0	99	99	98	99	75	83	64
Prairie	4.3	2.8	2.8	5.3	7.8	98	98	97	98	65	73	58
Tekapo	4.3	8.8	4.4	4.8	7.0	99	81	81	83	52	53	52
Profit	4.8	3.5	3.2	4.7	8.0	99	98	97	98	65	73	48
Harvestar	4.2	6.5	4.0	5.3	8.5	98	95	93	93	42	45	34
Experimental Varieties												
B-SIG613	4.5	2.0	3.3	4.3	7.8	98	99	98	98	86	91	84*
2014.90.16	4.3	2.2	2.5	4.0	7.0	98	98	99	99	81	88	76*
Mean	4.4	3.6	3.3	4.5	7.7	98	96	96	96	69	75	64
CV,%	10.6	24.3	26.6	24.7	17.1	2	4	3	3	16	11	19
LSD,0.05	0.5	1.0	1.0	1.3	1.5	3	4	4	4	13	10	14

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[2] Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2015-10 days, 2016-13 days, 2017-14 days.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 8. Seedling vigor, grazing preference, and stand persistence of orchardgrass varieties sown September 3, 2015, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor[1]	Grazing Preference[2]			Percent Stand				
		2016	2017		2015	2016		2017	
	Oct 19, 2015	Apr 26	Apr 26	Jun 2	Oct 19	Mar 24	Oct 4	Mar 22	Oct 19
Commercial Varieties-Available for Farm Use									
Persist	4.6	3.3	3.3	6.8	100	100	99	99	98*
Potomac	5.0	3.0	3.7	6.8	100	100	99	99	98*
Prairie	4.2	3.5	3.7	7.2	99	100	99	99	97*
SS-0708OGDT	4.8	3.3	3.3	6.3	100	100	99	99	97*
Profit	4.7	3.8	3.8	7.5	100	100	99	100	96*
Tekapo	4.5	7.0	5.0	8.0	100	96	97	98	95
Experimental Varieties									
OG-0707	4.8	3.2	3.8	6.8	100	100	100	100	98*
KYDG1001	3.8	4.7	4.8	8.0	100	100	98	98	97*
KYDG1002	4.3	5.0	4.8	7.2	100	100	99	98	97*
Dg82Ro1	3.5	4.5	4.5	7.5	99	100	97	98	93
Mean	4.4	4.1	4.1	7.2	100	100	99	99	97
CV,%	11.2	24.8	21.6	14.3	1	1	1	1	2
LSD,0.05	0.6	1.2	1.0	1.2	1	1	2	1	2

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[2] Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2016-13 days, 2017-14 days.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 9. Seedling vigor, grazing preference, and stand persistence of orchardgrass varieties sown September 8, 2016, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor[1]	Grazing Preference[2]		Percent Stand		
		2017		2016	2017	
	Oct 5	Apr 26	Jun 2	Oct 5	Mar 15	Oct 11
Commercial Varieties-Available for Farm Use						
Drover	3.4	4.8	8.3	100	100	100*
Elise	3.4	5.3	7.8	100	100	100*
Harvestar	3.7	4.3	8.3	100	100	100*
Persist	4.1	3.2	6.8	100	100	100*
Potomac	4.2	2.8	7.0	100	100	100*
Prairie	4.1	2.8	6.5	100	100	100*
Prodigy	4.2	3.5	7.3	100	100	100*
SS0707OGDT	4.8	3.0	7.3	100	100	100*
Experimental Varieties						
KYDG1001	4.3	4.2	7.2	100	100	100*
KYDG1002	4.4	4.2	8.2	100	100	100*
Mean	4.1	3.8	7.5	100	100	100.0
CV,%	12.4	22.1	14.3	0	0	0
LSD,0.05	0.6	1.0	1.2	0	0	0

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[2] Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2017-14 days.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 13. Seedling vigor, grazing preference, and stand persistence of perennial ryegrass and festulolium (FL) varieties sown September 8, 2016, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor[1]	Grazing Preference[2]		Percent Stand		
		2017		2016	2017	
	Oct 5	Apr 26	Jun 2	Oct 5	Mar 15	Oct 11
Commercial Varieties-Available for Farm Use						
Linn (certified)	4.1	2.5	2.0	100	100	100*
Remington	4.2	2.8	4.3	100	100	100*
Calibra	4.8	4.0	5.2	100	100	100*
PayDay	3.9	4.0	4.8	100	100	100*
Melpetra	3.0	5.0	6.3	100	100	100*
Spring Green (FL)	3.7	3.3	3.8	100	100	100*
Duo (FL)	4.9	4.5	5.2	100	100	88
Experimental Varieties						
BARLP15261	4.0	3.5	5.0	100	100	100*
BARLP15COW	4.4	2.3	2.8	100	100	100*
BARLP16237	3.6	3.3	5.0	100	100	100*
KYFL1301 (FL)	4.3	4.0	4.7	100	100	99*
BARLP16238	4.0	2.8	3.7	100	100	99*
Mean	4.1	3.5	4.4	100	100	99.0
CV,%	11.1	34.6	30.4	0	0	2
LSD,0.05	0.5	1.0	1.5	0	0	2

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[2] Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2017-14 days.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 10. Seedling vigor, grazing preference, and stand persistence of perennial ryegrass varieties sown September 6, 2013, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor[1]	Grazing Preference[2]					Percent Stand								
		2014	2015	2016	2017		2013	2014		2015		2016		2017	
	Oct 14, 2013	May 1	May 1	May 3	Apr 26	Jun 2	Oct 14	Apr 2	Oct 6	Apr 6	Oct 21	Mar 24	Oct 17	Mar 22	Oct 19
Commercial Varieties-Available for Farm Use															
Victorian	4.6	4.7	1.8	3.7	1.2	1.8	98	93	94	96	91	93	90	91	87*
PayDay	3.6	5.8	4.3	4.5	3.0	5.5	92	93	94	95	92	95	82	83	77*
Linn (certified)	3.6	4.8	3.0	4.0	2.0	2.7	95	95	96	97	91	92	85	81	73
Power	3.7	6.0	4.3	4.8	3.2	6.0	94	95	94	96	91	93	80	78	68
Experimental Varieties															
B-13.0205	3.8	5.8	3.8	4.7	3.2	5.7	95	95	93	94	92	92	78	80	77*
Mean	3.8	5.4	3.5	4.3	2.5	4.3	95	94	94	95	91	93	83	83	76
CV,%	15.2	14.8	18.3	16.9	33.2	30.4	3	4	4	3	4	2	5	6	11
LSD,0.05	0.7	1.0	0.8	0.9	1.0	1.6	3	4	4	4	4	2	5	6	10

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[2] Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2014-9 days, 2015-10 days, 2016-20 days, 2017-14 days.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 11. Seedling vigor, grazing preference, and stand persistence of perennial ryegrass varieties sown September 9, 2014, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor[1]	Grazing Preference[2]				Winter Injury[3]	Percent Stand						
		2015	2016	2017			2014	2015		2016		2017	
	Oct 9, 2014	May 1	May 3	Apr 26	Jun 2	Jan 29, 2015	Oct 9	Apr 6	Oct 21	Mar 24	Oct 5	Mar 22	Oct 19
Commercial Varieties-Available for Farm Use													
Remington PLUS NEA2[4]	4.8	5.0	3.5	4.5	7.7	2.5	100	100	100	100	100	99	97*
Remington	4.4	4.3	3.8	4.5	7.7	2.3	97	99	99	100	99	99	93*
BG34	4.9	3.2	3.7	4.7	6.3	2.8	100	100	99	99	95	90	85
Granddaddy	3.9	3.5	2.0	2.7	3.0	2.7	96	98	97	97	96	84	78
Power	4.2	4.5	3.8	4.7	7.2	4.7	95	98	97	98	92	81	74
PayDay	4.4	4.3	3.7	5.7	7.2	4.5	97	98	99	100	94	82	73
Calibra	4.6	3.3	4.2	5.0	7.2	3.8	97	99	98	98	95	86	70
Linn (certified)	4.5	2.8	2.5	4.0	4.5	7.0	99	100	99	99	92	80	69
Experimental Varieties													
AGRLP157-AR1[4]	4.8	3.5	3.7	3.8	7.0	3.3	100	100	100	100	98	96	93*
AGRLP156-AR1[4]	5.0	3.2	3.0	3.8	5.0	4.3	100	100	99	99	94	89	87*
Mean	4.5	3.8	3.4	4.3	6.3	3.8	98	99	99	99	95	89	82
CV,%	9.7	21.8	20.4	16.7	22.0	26.4	3	1	1	1	4	10	11
LSD,0.05	0.5	1.0	0.8	0.8	1.6	1.2	3	2	2	1	4	10	11

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[2] Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2015-10 days, 2016-20 days, 2017-14 days.
[3] Winter injury based on a score of 1 to 9 with 9 being the greatest amount of injury.
[4] Remington PLUS NEA2 contains a non-toxic endophyte. AR1 is a non-toxic endophyte inserted into the experimental perennial ryegrass varieties.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 12. Seedling vigor, grazing preference, and stand persistence of perennial ryegrass and festulolium (FL) varieties sown September 3, 2015, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor[1]	Grazing Preference[2]			Winter Injury[3]	Pertcent Stand				
		2016	2017			2015	2016		2017	
	Oct 19, 2015	Apr 26	Apr 26	Jun 2	Jan 29, 2016	Oct 19	Mar 24	Oct 4	Mar 22	Oct 19
Commercial Varieties-Available for Farm Use										
Remington	4.4	1.7	3.2	7.2	0.9	100	100	100	100	99*
Remington PLUS NEA2[4]	4.3	1.8	3.5	7.2	1.0	100	100	100	99	98*
Grand Daddy	3.3	2.4	2.3	4.8	1.1	98	100	99	99	95*
SpringGreen (FL)	4.3	2.3	4.2	6.8	1.3	99	100	96	95	90*
Power	4.3	2.0	4.2	6.5	1.5	100	100	99	97	90*
Albion	3.1	1.9	3.5	8.3	1.0	84	100	99	97	89*
BG-34	3.5	1.5	3.3	6.8	1.3	99	100	99	90	86
Calibra	4.7	2.1	4.0	7.0	1.1	100	100	98	97	86
Linn (certified)	3.8	1.8	3.0	2.3	2.7	100	100	97	96	84
Duo (FL)	4.9	4.8	3.8	5.2	7.5	100	92	88	87	76
Barvitra	5.0	3.5	4.7	6.2	2.3	100	100	62	42	35
Experimental Varieties										
BARLP15261	3.4	1.8	3.3	7.7	0.8	100	100	100	100	98*
GPT-14021	3.7	2.2	3.7	7.7	0.8	100	100	100	100	98*
GDP-14018	4.3	1.7	3.8	7.0	1.9	100	100	98	98	97*
KYFL1013 (FL)	4.7	2.7	3.8	4.3	1.0	100	100	99	98	91*
GDP-14017	4.2	1.9	2.8	4.2	2.7	100	100	93	88	88*
TAL-PR-04	3.8	4.2	2.8	2.7	6.8	100	88	93	93	87*
TAL-PR-02	4.0	4.2	2.8	4.2	5.8	100	84	92	93	85
KYFA9819 (FL)	4.0	2.2	3.8	5.3	0.9	99	100	98	92	70
GPT-14023	4.2	6.2	3.5	5.3	7.8	100	34	62	69	64
GDP-14019	4.1	6.5	3.7	5.8	8.5	100	33	65	57	57
TAL-PR-03	2.6	3.3	3.2	4.5	5.0	98	95	84	55	41
Mean	4.0	2.8	3.5	5.8	2.9	99	92	92	88	82
CV,%	12.4	25.5	24.4	25.0	20.1	3	10	10	11	13
LSD,0.05	0.6	0.8	1.0	1.7	0.7	4	11	10	11	12

[1] Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
[2] Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2016-13 days, 2017-14 days.
[3] Winter injury based on a score of 1 to 9 with 9 being the greatest amount of injury.
[4] Remington PLUS NEA2 contains a non-toxic endophyte.
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 14. Summary of persistence of tall fescue varieties under heavy grazing pressure across years at Lexington, Kentucky.[1]

Variety	Proprietor/ KY Distributor	2013[2]								2014						2015				2016	
		Apr	Nov	Apr	Oct	Mar	Oct	Mar	Oct	Apr	Oct	Mar	Oct	Mar	Oct	Apr	Oct	Mar	Oct	Mar	Oct
		2014[3]		2015		2016		2017		2015		2016		2017		2016		2017		2017	
Commercial Varieties-Available for Farm Use																					
Baguala	Allied Seed															*	x[5]	x	x		
BarOptima PLUS E34[4]	Barenbrug USA	*	*	*	*	*	*	*	*	x	*	*	*	*	*	*	*	*	*	*	*
Bronson	Ampac Seed																			*	*
Bull	Caudill Seed	x	*	*	*	*	*	*	*											*	*
Cajun II	Smith Seed Services	x	x	x	x	x	x	x	x	*	*	*	*	*	*	*	x	*	*	*	*
Dominate	Allied Seed															*	x	x	x		
Drover	Barenbrug USA															*	*	*	*		
FSG 402TF	Farm Service Genetics															*	*	*	*		
Goliath	Ampac Seed																			*	*
Jesup MaxQ[4]	Pennington Seed	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
KY 31+[4]	KY Agric. Exp. Station	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Lacefield MaxQ II[4]	Pennington Seed	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Select	Southern States	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
SS-0705TFSL	Southern States									*	*	*	*	*	*	*	*	*	*	*	*
Experimental Varieties																					
AGRFA-179/AR584[4]	AgResearch (USA)	x	*	*	*	*	x	*	x												
AGRFA-200/AR584[4]	AgResearch (USA)	*	*	*	*	*	*	*	*												
AGRFA-201/AR584[4]	AgResearch (USA)	x	x	x	x	*	x	*	*												
BARFAF13131	Barenbrug USA	x	x	x	x	x	x	x	x							*	*	*	*		
Drover/E34[4]	Barenbrug USA															*	*	*	*		
GT213/AR584[4]	AgResearch (USA)	x	*	*	*	*	*	*	*												
HTWC4	KY Agric. Exp. Station	x	*	*	*	*	*	*	*												
KY 31-[4]	KY Agric. Exp. Station	x	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
KY0701	KY Agric. Exp. Station	*	*	*	*	*	*	*	*												
KYFA1113	KY Agric. Exp. Station															*	*	*	*		
KYFA1113/AR584[4]	KY Agric. Exp. Station									*	*	*	*	*	*						
KYFA1114	KY Agric. Exp. Station															*	*	*	*		
KYFA1114/AR584[4]	KY Agric. Exp. Station									*	*	*	*	*	*						
KYFA1115/AR584[4]	KY Agric. Exp. Station									*	*	*	*	*	*						
KYFA1201	KY Agric. Exp. Station																			*	*
KYFA1311	KY Agric. Exp. Station															*	*	*	*		
KYFA1303	KY Agric. Exp. Station																			*	*
KYFA9304	KY Agric. Exp. Station																			*	*
KYFA9732/AR584[4]	KY Agric. Exp. Station	*	*	*	*	*	*	*	*											*	*
KYFA9821/AR584[4]	KY Agric. Exp. Station	x	*	*	*	*	*	*	*							*	*	*	*		
NFTF 1044	Noble Foundation									*	*	*	*	*	*						
NFTF 1051	Noble Foundation									*	*	*	*	*	x						
NFTF 1370	Noble Foundation									*	*	*	*	*	*						
PPG-FTF 104	Mountain View Seeds																				

[1] For detailed stand ratings over years, see individual trial tables.
[2] Establishment year.
[3] Date of rating of percent stand.
[4] 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 and Drover/E34 contain a beneficial endophyte. AR584 is a non-toxic endophyte inserted into experimental tall fescue varieties. The other fescue varieties in this table do not contain an endophyte.
[5] "x" in the block indicates the variety was in the test but plant 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 15. Summary of persistence of orchardgrass varieties under heavy grazing pressure across years at Lexington, Kentucky.

Variety	Proprietor/ KY Distributor	2013[1]								2014						2015				2016	
		Apr	Oct	Apr	Nov	Mar	Oct	Mar	Oct	Apr	Oct	Mar	Oct	Mar	Oct	Mar	Oct	Mar	Oct	Mar	Oct
		2014[2]		2015		2016		2017		2015		2016		2017		2016		2017		2017	
Commercial Varieties-Available for Farm Use																					
Benchmark Plus	Southern States	x[3]	*	*	*	*	*	*	*	*	*	*	*	*	*						
Devour	Mountain View Seeds																			*	*
Elise	Pure Seed																			*	*
Harvestar	Columbia Seeds	x	x	x	x	x	x	x	x	*	x	*	x	x	x					*	*
Persist	Smith Seed Services	x	*	*	*	*	x	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Potomac	Public															*	*	*	*	*	*
Prairie	Turner Seed	x	*	*	*	*	*	*	*	*	*	*	x	x	x	*	*	*	*	*	*
Prodigy	Caudill Seed	*	*	*	*	*	x	*	*	*	*	*	*	*	*					*	*
Profit	Ampac Seed Co.	x	*	x	*	*	x	x	*	*	*	*	x	x	x	*	*	*	*		
SS-0708OGDT	Southern States									*	*	*	*	*	x	*	*	*	*	*	*
Tekapo	Ampac Seed Co.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
Experimental Varieties																					
2014.90.16	KY Agric. Exp. Station									*	*	*	*	*	*						
B-SIG 613	Blue Moon Farms	x	*	x	*	*	*	*	*	*	*	*	*	*	*						
Dg82Ro1	Barenbrug															*	x	x	x		
KYDG1001	KY Agric. Exp. Station															*	x	x	*	*	*
KYDG1002	KY Agric. Exp. Station															*	*	x	*	*	*
OG-0707	Allied															*	*	*	*		

[1] Establishment year.
[2] Date of visual rating of percent stand.
[3] "x" in the block indicate the variety was in the test but stand survival was significantly less than the most persistent variety. Open blocks indicate the variety was not in the test.
*Not significantly different from the most persistent variety.

Table 19. Summary of 2000-2017 Kentucky perennial ryegrass and festulolium (FL) grazing tolerance trials in Lexington (stand persistence shown as a percent of the mean of the commercial varieties in the trial).

Variety	Type	Proprietor	2000[1,2]	2001	2003	2007	2008	2010	2011	2012	2013	2014	Mean[3]
			4yr[4]	3yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	3yr	(#trials)
AGRLP103	–	AgResearch USA	128		86								107(2)
Aries	diploid	Ampac Seed		139									–
Barfest (FL)	MF x PR[6]	Barenbrug USA						116	112				114(2)
Boost	tetraploid	Allied Seed					101	83	95	104			96(4)
Calibra	tetraploid	DLF International								120		88	104(2)
Citadel	tetraploid	Donley Seed	107										–
Duo (FL)	MF x PR[6]	Ampac Seed	116				95	72	90	115			98(5)
Grand Daddy	tetraploid	Smith Seed Services		121		82		100	81	103		99	98(6)
Lasso	diploid	DLF-Jenks		130									–
Linn (certified)	diploid	Public	112	129	63		95	108	95	103	96	87	99(9)
Maverick	tetraploid	Ampac Seed		36									–
Meadow Green (FL)	MF xIR[6]	Pure Seed								15			–
PayDay	tetraploid	Mountain View Seeds									101	92	97(2)
Polly II	tetraploid	FS Growmark	36	68									52(2)
Power	tetraploid	Ampac Seed				158		107	112	109	89	94	112(6)
Quartet	tetraploid	Ampac Seed		77		59							60(3)
Remington	tetraploid	Barenbrug USA			151							118	135(2)
Remington PLUS NEA2[5]	tetraploid	Barenbrug USA										122	–
Spring Green (FL)	MF x PR[6]	Rose Agri-Seed	101				109	115	115	120			112(5)
TetraGain	tetraploid	Pure Seed								112			–
Victorian	diploid	Caudill Seed									114		–

[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 Grazing Tolerance Report" archived in the KY Forage website at www.uky.edu/Ag/Forage.
[3] Mean only presented when respective variety was included in two or more trials.
[4] Number of years of data.
[5] Remington PLUS NEA2 contains a non-toxic endophyte.
[6] MF = meadow fescue, PR = perennial ryegrass, IR = Italian ryegrass.

Table 16. Summary of persistence of perennial ryegrass and festulolium (FL) varieties under heavy grazing pressure across years at Lexington, Kentucky.

Variety	Proprietor/ KY Distributor	2013[1]								2014						2015				2016	
		Apr	Nov	Apr	Oct	Mar	Oct	Mar	Oct	Apr	Oct	Mar	Oct	Mar	Oct	Mar	Oct	Mar	Oct	Mar	Oct
		2014[2]		2015		2016		2017		2015		2016		2017		2016		2017		2017	
Commercial Varieties-Available for Farm Use																					
Albion	Grassland Oregon															*	*	*	*		
Barvitra	Barenbrug USA															*	x[3]	x	x		
BG34	Barenbrug USA									*	*	*	x	*	x	*	*	*	x		
Calibra	DLF International									*	x	x	x	x	x	*	*	*	x	*	*
Duo (FL)	Ampac Seed Co.															*	x	x	x	*	x
Grand Daddy	Smith Seed	*	*	x	*	*	x	x	*	*	x	x	*	x	x	*	*	*	*		
Linn (certified)	Public	*	*	*	*	*	*	x	x	*	*	*	x	x	x	*	*	*	x	*	*
Melpetra	Hood River Seed																			*	*
PayDay	Mountain View Seeds	*	*	*	*	*	x	x	*	*	*	*	x	x	x					*	*
Power	Ampac Seed Co.	*	*	*	*	*	x	x	x	*	x	x	x	x	x	*	*	*	*		
Remington	Barenbrug USA									*	*	*	*	*	*	*	*	*	*	*	*
Remington PLUS NEA2[4]	Barenbrug USA									*	*	*	*	*	*	*	*	*	*		
SpringGreen (FL)	Rose Agri-Seed															*	*	*	*	*	*
Victorian	Caudill Seed	*	*	*	*	*	*	*	*												
Experimental Varieties																					
AGRLP156-AR1[4]	Ag. Research									*	*	*	x	*	*						
AGRLP157-AR1[4]	Ag. Research									*	*	*	*	*	*						
BARLP15261	Barenbrug USA															*	*	*	*	*	*
BARLP15COW	Barenbrug USA																			*	*
BARLP16237	Barenbrug USA																			*	*
BARLP16238	Barenbrug USA																			*	*
B-13.0205	Blue Moon Farms	*	*	*	*	*	x	x	*												
GPD-14017	Ag. Research															*	*	x	*		
GPD-14018	Ag. Research															*	*	*	*		
GPD-14019	Ag. Research															x	x	x	x		
GPT-14021	Ag. Research															*	*	*	*		
GPT-14023	Ag. Research															x	x	x	x		
KYFA1013 (FL)	KY Agric.Exp. Station															*	*	*	*		
KYFL1301 (FL)	KY Agric.Exp. Station																			*	*
KYFA9819 (FL)	KY Agric.Exp. Station															*	*	*	x		
TAL-PR-02	Ag. Research															x	*	*	x		
TAL-PR-03	Ag. Research															*	x	x	x		
TAL-PR-04	Ag. Research															x	*	*	*		

[1] Establishment year.
[2] Date of visual rating of percent stand.
[3] "x" in the block indicates the variety was in the test but plant survival was significantly less than the most persistent variety. An open block indicates the variety was not in the test.
[4] Remington PLUS NEA2 contains a non-toxic endophyte. AR1 is a non-toxic endophyte inserted into the experimental perennial ryegrass varieties.
*Not significantly different from the most persistent variety.

Table 17. Summary of 2000-2017 Kentucky tall fescue grazing tolerance trials (stand persistence shown as a percent of the stand rating of KY 31+).

		Lexington															Princeton	
		2000[1,2]	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2002	Mean[3]
Variety	Proprietor	4yr[4]	4yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	3yr	4yr	(#trials)
Advance MaxQ[5]	Pennington Seed							94										–
Bariane	Barenbrug USA				89		75	47	29									60(4)
BarElite	Barenbrug USA								96									–
Barolex	Barenbrug USA						78	101	86									88(3)
BarOptima PLUS E34[5]	Barenbrug USA						100		97			98	100	98	100	100		99(7)
Bronson	Ampac Seed										98	98						98(2)
Bull	Caudill Seed														96			–
Cajun II	Smith Seed Services											98				98		93(3)
Cattle Club	Green Seed	93	91															92(2)
Carmine	DLF-Jenks		90															–
Cowgirl	Rose Agri-Seed					99								99				99(2)
Festival	Pickseed West		100	101													89	97(3)
Flourish	Allied Seed													98				–
Goliath	Ampac Seed											98						–
Hoedown	DLF-Jenks	88																–
HyMark	Fraser Seeds									95			100					98(2)
Jesup MaxQ[5]	Pennington Seed			103	97		68	102	97	97	99	98	100	99	99	99	105	97(13)
Johnstone	Proseeds		92															–
KY31+[5]	KY Agri. Exp Sta.	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100(16)
KY31-[5]	KY Agri. Exp Sta.		98	103	98	100	83	101	100	98	99	99	100	100	99	100	105	99(15)
Kokanee	Ampac Seed	43																–
Lacefield MaxQ II[5]	Pennington Seed						82	102	99	98	98	97			100	99		97(8)
Maximize	Rose Agri-Seed		99															–
Nanryo	Japanese Grassland For. Seed								100									–
Orygun	–			99														–
Resolute	Ampac Seed		23															–
Select	Southern States	107	101	100	100		67	100	93	95	97	100	100	99	99	99	98	97(15)
SS0705TFSL	Southern States															100		–
Stargrazer	Southern States	86	89															79(4)
Stockman	Seed Res. of OR					102												–
Texoma MaxQ II[5]	Pennington Seed						88	100	98									95(3)
Tuscany II	Seed Res. of OR							101										–
Verdant	Am.Grass Seed							97										–

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

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

[4] Number of years of data.

[5] KY 31- is the variety KY31 from which the toxic endophyte has been removed. KY31+ contains the toxic endophyte. Jesup MaxQ, Advance MaxQ, Texoma MaxQ II, and Lacefield MaxQ II contain a non-toxic endophyte. BarOptima PLUS E34 contains a beneficial endophyte. The other fescue varieties in this table do not contain an endophyte.

Table 18. Summary of 2000-2017 Kentucky orchardgrass grazing tolerance trials (stand persistence shown as a percent of the mean of the commercial varieties in the trial).

		Lexington													Princeton	
		2000[1,2]	2001	2002	2003	2004	2005[3]	2007	2009	2010	2011	2012	20133	2014	2002	Mean[4]
Variety	Proprietor	4yr[5]	4yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	3yr	4yr	(#trials)
Abertop	Pennington Seed			38												–
Albert	Univ. of Wisconsin		115													–
Amba	DLF-Jenks		71													–
Ambrosia	Pennington Seed							94								–
Athos	DLF-Jenks		93				60									–
Benchmark	Southern States	118	123	114											133	122(4)
Benchmark Plus	Southern States			120			152	135	106	106	108	115	146	131	133	119(8)
Boone	Public	102														–
Command	Seed Research of OR					81										–
Crown Royale	Donley Seed		100													–
Crown Royale Plus	Donley Seed			124											83	104(2)
Elise	Pure Seed											97				–
Hallmark	James VanLeeuwen		115		113										83	104(3)
Harvestar	Columbia Seeds							75		89	94		51	57		79(4)
Haymate	Southern States	53	115	100	118										83	94(5)
Intensiv	Barenbrug USA				51											–
Mammoth	DLF-Jenks		115													–
Megabite	Turf Seed		77													–
Niva	DLF-Jenks			76											83	80(2)
Persist	Smith Seed						138	107	103	100	96	115	102	121		107(6)
Potomac (certified)	Public			116		119									117	117(3)
Prairie	Turner Seed	127	121								94		131	96	83	104(5)
Prodigy	Caudill Seed												109	121		–
Profile	Scott Seed			116												–
Profit	Ampac Seed								95	99	102	94	95	80		94(5)
Tekapo	Ampac Seed		55	74	118		50	103	95	105	106	80	66	86	100	92(10)
Takena	Smith Seed		99													–
Seco	Southern States							85								–
SS0708OGDT	Southern States													106		–

[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 Grazing Tolerance Report" archived in the KY Forage website at www.uky.edu/Ag/Forage.

[3] Due to high variation during 2005 and 2013 trials 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.

Stand thinning may have been greater for preferred varieties due to closer grazing. See individual trial tables for preference ratings.

12-2017