



2022 Cool-season Grass Horse-grazing Tolerance Report

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Introduction

Cool-season forages 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 evaluate varieties of these grasses for persistence when subjected to close, continual 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 continual heavy grazing pressure by horses within the growing season. The main focus will be on stand survival, but data on seedling vigor and grazing preference are also included.

Consult the UK Forage Extension website (<https://forages.ca.uky.edu>) to access all forage variety testing reports from Kentucky and surrounding states as well as several other forage publications.

Important Selection Considerations

Local adaptation and seasonal yield. Select a variety that is adapted to Kentucky as indicated by good performance across years and locations in replicated trials, such as those presented in this publication. Grazing persistence data should be used in combination with yield data to select the best variety for pasture use. Refer to the appropriate yield trial reports for 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. Take note of other information on the label including 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 it will be available when needed.

Important: When seeding perennial ryegrasses for pasture for horses of any kind, insist on an endophyte-free variety. The endophyte level should be stated on a green tag on every bag of seed. Most forage types of perennial ryegrass are endophyte free, but most new turf types are infected. The ryegrass endophyte is similar to that 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 (keep the endophyte fungus alive), 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 ergovaline. 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 sensitive to ergovaline during their last trimester.

Description of the Tests

Tests were established in Lexington in the fall of 2018, 2019, 2020, and 2021. 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 continual from April to October.

In spring, plots were grazed down to below 4 inches quickly

Table 1. Temperature and rainfall at Lexington, Kentucky, in 2019, 2020, 2021, and 2022.

	2019				2020				2021				2022 ²			
	Temperature		Rainfall		Temperature		Rainfall		Temperature		Rainfall		Temperature		Rainfall	
	°F	DEP ¹	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	33	+2	4.11	+1.25	40	+9	3.72	+0.86	34	+3	4.51	+1.65	29	-2	4.93	+2.07
FEB	42	+7	7.64	+4.43	38	+3	5.14	+1.93	31	-4	4.60	+1.39	38	+3	7.69	+4.48
MAR	43	-1	3.49	-0.91	51	+7	3.79	-0.61	50	+6	5.12	+0.72	49	+5	4.27	-0.13
APR	54	+4	4.76	+0.88	52	-3	4.92	+1.04	54	-1	2.72	-1.16	55	0	3.71	-0.17
MAY	69	+5	4.49	+0.02	62	-2	5.69	+1.22	62	-2	4.34	-0.13	69	+5	3.84	-0.63
JUN	73	+1	6.13	+2.47	72	0	2.56	-1.10	73	+1	6.26	+2.60	76	+4	2.10	-1.56
JUL	79	+3	3.30	-1.70	79	+3	3.23	-1.77	75	-1	5.90	+0.90	80	+4	6.46	+1.46
AUG	77	+2	2.42	-1.51	75	0	3.41	-0.52	76	+1	6.16	+2.23	77	+2	4.27	+0.34
SEP	77	+9	0.18	-3.02	68	0	4.43	+0.83	69	+1	3.03	-0.17	70	+2	1.50	-1.70
OCT	61	+4	7.55	+5.58	57	0	4.98	+2.41	62	+5	4.64	+2.10	57	0	0.96	-1.61
NOV	41	-4	5.39	+2.00	49	+4	2.18	-1.21	43	-2	2.13	-1.26				
DEC	43	+7	5.74	+1.76	36	0	2.27	-1.71	47	+11	4.41	+0.43				
Total			55.20	+10.65			45.92	+1.37			53.85	+9.30			39.73	+2.55

¹DEP is departure from the long-term average.

²2022 data is for ten months through October.

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 and in the spring prior to resuming grazing to assess 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 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. 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) is a measure of the variability of the data and is included for each column of means. Low variability is desirable, and increased variability within a study results in higher CVs and larger LSDs.

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 frequent, close 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 when highly palatable species such as Kentucky bluegrass and perennial ryegrass were in the same test as tall fescue. Horses tend to graze the preferred species and varieties more intensely than others. 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

Table 2. 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	Fescue Endophyte Status ¹	Seedling Vigor ² Sep 28, 2018	Grazing Preference ³				Percent Stand									
				2019 May 21	2020 May 20	2021 May 4	2022 May 6	2018 Sep 28	2019 Apr 4	2020 Oct 24	2021 Mar 19	2020 Oct 13	2021 Mar 29	2022 Oct 22	2021 Mar 25	2022 Oct 24	
Commercial Varieties-Available for Farm Use																	
Jesup MaxQ	tall fescue	novel	4.4	1.8	1.5	1.0	1.0	99	100	99	99	99	99	99	99	99	99*
SS0705TFSL	tall fescue	free	4.1	1.0	1.2	1.0	1.0	97	99	99	100	99	99	99	99	99	99*
KY31+	tall fescue	toxic	4.6	1.5	1.5	1.0	1.2	100	100	100	100	99	99	99	99	99	99*
Lacefield MaxOll	tall fescue	novel	3.8	1.3	1.5	1.2	1.0	98	99	98	98	98	98	98	98	98	98*
Persist	orchardgrass	—	4.8	5.5	4.2	3.7	2.8	100	100	100	100	100	86	69	69	53	53
SS0708OGDT	orchardgrass	—	5.0	6.2	4.2	4.3	3.2	100	100	100	99	99	82	82	60	47	38
Prairie	orchardgrass	—	4.8	6.7	4.7	4.5	2.3	100	100	100	98	98	64	64	40	33	35
Prodigy	orchardgrass	—	4.8	6.5	4.8	4.3	2.7	100	100	100	99	99	58	58	37	30	28
Experimental Varieties																	
KY31-	tall fescue	free	4.3	2.3	1.8	1.5	1.0	99	99	99	99	100	100	100	100	100	100*
KYFA9304	tall fescue	free	4.5	2.5	1.7	1.3	1.0	99	100	100	100	100	100	100	100	100	100*
KYFA9521/AP584	tall fescue	novel	4.2	1.0	1.5	1.2	1.0	99	100	100	100	99	99	99	99	99	99*
KYFA1704	tall fescue	free	3.9	1.7	1.2	1.2	1.0	99	99	99	99	99	99	99	99	99	98*
7016	tall fescue	free	4.1	1.3	1.0	1.3	1.0	98	98	98	98	98	98	98	98	98	98*
KYFA9611	tall fescue	free	3.8	3.8	2.7	1.0	1.0	99	99	99	99	98	98	98	98	98	97*
Mean			4.4	3.1	2.4	2.0	1.5	99	99	99	99	93	91	85	83	82	82
CV%			8.2	24.5	42.4	33.7	34.4	1	1	1	1	10	10	11	10	10	12
LSD 0.05			0.4	0.9	1.2	0.8	0.6	2	1	1	1	11	10	11	10	10	11

¹Free-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.

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

³Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating: 2019–30 days, 2020–30 days, 2021–15 days, 2022–22 days.

*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 forage grasses sown September 5, 2019, in a horse-grazing tolerance study at Lexington, Kentucky.

Variety	Species	Fescue Endophyte Status ¹	Seedling Vigor ² Oct 25, 2019	Grazing Preference ³			Percent Stand						
				2020	2021	2022	2019	2020		2021		2022	
				May 20	May 4	May 6	Oct 25	Mar 19	Oct 13	Mar 29	Oct 22	Mar 25	Oct 24
Commercial Varieties-Available for Farm Use													
KY31+	tall fescue	toxic	3.6	2.3	1.0	1.2	100	100	100	100	100	100	100*
SS0705TFSL	tall fescue	free	3.5	2.3	1.2	1.2	100	100	99	99	99	99	100*
Lacefield MaxQII	tall fescue	novel	3.3	2.5	1.0	1.0	100	100	99	99	99	99	99*
Texoma MaxQII	tall fescue	novel	3.0	2.7	1.0	1.0	100	100	100	100	100	100	98*
Jesup MaxQII	tall fescue	novel	3.2	2.0	1.0	1.2	100	100	99	99	99	99	84*
Remington	perennial ryegrass	—	4.8	6.7	6.7	6.2	100	100	100	100	88	88	80*
Remington PLUS NEA2 ⁴	perennial ryegrass	—	4.7	7.2	5.8	7.2	100	100	100	100	88	86	77
Prairie	orchardgrass	—	3.2	6.3	4.2	3.2	100	100	90	91	73	68	68
Linn	perennial ryegrass	—	5.0	3.2	4.0	4.2	100	100	100	100	87	83	67
Persist	orchardgrass	—	3.3	6.5	3.8	4.2	100	100	80	93	84	83	66
PayDay	perennial ryegrass	—	4.8	5.2	5.0	5.3	100	100	100	100	85	79	61
Prodigy	orchardgrass	—	3.3	6.5	4.2	3.7	100	100	96	94	65	63	57
Clair	timothy	—	2.8	7.8	6.7	6.0	97	98	80	83	37	25	12
Climax	timothy	—	3.2	7.3	7.3	7.2	98	100	80	86	43	40	11
KYEarly	timothy	—	1.0	6.5	5.2	6.3	— ⁵	76	35	42	22	18	8
MacBeth	bromegrass	—	2.3	5.2	4.8	6.2	96	93	24	23	14	14	7
Experimental Varieties													
KYFA9611	tall fescue	free	3.4	3.5	3.2	2.0	100	100	100	100	98	98	98*
KY31-	tall fescue	free	3.7	2.5	1.0	1.2	100	100	100	100	99	99	84*
MB1302	bromegrass	—	3.0	5.2	4.3	5.0	94	94	38	36	15	15	19
11PHL4806	timothy	—	3.0	6.5	4.8	4.7	98	100	78	86	30	27	13
Mean			3.4	4.9	3.8	3.9	99	98	85	86	71	69	60
CV,%			12.0	23.0	24.3	29.7	3	4	15	9	16	18	31
LSD,0.05			0.5	1.3	1.1	1.3	3	5	15	9	13	14	21

¹Free—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.

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

³Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating: 2020—30 days, 2021—15 days, 2022—22days.

⁴Remington PLUS NEA2 contains a nontoxic (novel) endophyte.

⁵Germination and seedling growth was very slow and could not get a good stand rating in the fall.

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

Table 4. Seedling vigor, grazing preference, and stand persistence of forage grasses sown September 8, 2020, in a horse -grazing tolerance study at Lexington, Kentucky.

Variety	Species	Fescue Endophyte Status ¹	Seedling Vigor ² Oct 2, 2020	Grazing Preference ³		Percent Stand				
				2021	2022	2020	2021		2022	
				May 4	May 6	Oct 2	Mar 29	Oct 22	Mar 25	Oct 24
Commercial Varieties-Available for Farm Use										
Cajun II	tall fescue	free	3.8	1.7	1.0	100	100	100	100	100
Estancia Arkshield	tall fescue	novel	3.5	1.7	1.0	100	100	99	100	100
Jesup MaxQII	tall fescue	novel	3.8	1.5	1.2	100	100	100	100	100
KY31+	tall fescue	toxic	3.8	1.8	1.5	100	100	100	100	100
Lacefield MaxQII	tall fescue	novel	3.7	2.0	1.0	100	100	100	100	100
SS0505TFSL	tall fescue	free	3.7	2.0	1.0	100	100	100	100	100
Remington	perennial ryegrass	—	4.5	5.0	7.8	100	100	98	98	94
Persist	orchardgrass	—	3.8	4.3	4.0	100	100	96	95	92
Prairie	orchardgrass	—	3.7	3.8	4.7	100	100	92	92	88
Power	perennial ryegrass	—	4.7	4.8	6.7	100	100	94	94	87
Profit	orchardgrass	—	3.4	4.0	5.2	100	100	93	93	87
Linn (certified)	perennial ryegrass	—	4.5	4.2	4.3	100	100	92	92	79
Ginger	Kentucky bluegrass	—	2.8	5.3	5.7	100	100	62	57	37
Experimental Varieties										
KY31-	tall fescue	free	4.0	2.2	1.2	100	100	100	100	100
KYFA9611	tall fescue	free	3.6	2.3	3.7	100	100	100	100	100
SEPP16-6	Kentucky bluegrass	—	2.8	4.6	6.0	100	100	82	68	40
Mean			3.8	3.2	3.5	100	100	94	93	88
CV,%			17.8	24.7	19.2	0	0	8	7	8
LSD,0.05			0.8	0.9	0.8	0	0	9	7	8

¹Free—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.

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

³Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2021—15 days, 2022—22 days.

*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 10, 2021, in a horse-grazing tolerance study at Lexington, Kentucky.

Variety	Species	Fescue Endophyte Status ¹	Seedling Vigor ² Oct 5, 2021	Grazing Preference ³ May 6, 2022	Percent Stand		
					2021	2022	
					Oct 5	Mar 24	Oct 24
Commercial Varieties-Available for Farm Use							
Cajun II	tall fescue	free	3.7	1.0	100	100	100*
Jesup MaxQII	tall fescue	novel	3.2	1.2	100	100	100*
KY31+	tall fescue	toxic	3.8	1.2	100	100	100*
Lacefield MaxQII	tall fescue	novel	4.0	1.3	100	100	100*
Remington	perennial ryegrass	—	4.8	6.7	100	100	100*
SS0705TFSL	tall fescue	free	3.8	1.3	100	100	100*
SS0708OGDT	orchardgrass	—	3.8	3.3	100	100	100*
Texoma MaxQII	tall fescue	novel	3.5	1.0	100	100	100*
Persist	orchardgrass	—	4.0	4.2	100	100	100*
Profit	orchardgrass	—	4.0	4.8	100	100	100*
PayDay	perennial ryegrass	—	4.6	6.2	100	100	99*
Prodigy	orchardgrass	—	4.0	4.8	100	100	98*
Prairie	orchardgrass	—	3.8	3.3	100	100	98*
TetragainSLT	perennial ryegrass	—	4.8	5.0	100	100	94
Linn	perennial ryegrass	—	4.9	4.0	100	100	86
Experimental Varieties							
KY31-	tall fescue	free	4.0	1.2	100	100	100*
Mean			4.0	3.2	100	100	98
CV,%			9.3	24.4	0	0	5
LSD,0.05			0.4	0.9	0	0	5

¹Free—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.

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

³Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating: 2022–22 days.

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

all varieties in these tests. Varieties are listed in alphabetical order, with experimental varieties at the bottom.

How to Interpret the Summary Tables

Tables 7 and 8 are summaries of stand-persistence data from 1999 to 2022 of commercial tall fescue and orchardgrass varieties that have been entered in the Kentucky trials. In Table 7 the data for each is listed as a percentage of endophyte-free KY31 (KY31-). In other words, the stand-persistence values for all varieties in the tall fescue trials are set as a percentage of KY31-, that's value is set as 100 percent. Varieties with percentages over 100 persisted better than KY31-, and varieties with percentages less than 100 persisted less well 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, values for persistence of the varieties in the trial is expressed as a percentage of the mean

value for that trial. Varieties with percentages over 100 persisted better than average, and varieties with percentages less than 100 persisted less well than average. Statistical differences between varieties cannot be determined using the data in tables 7 and 8, but comparisons can 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 can influence variety choice, and more information can be found in the yearly reports. See the 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. This table is included to show grazing tolerance of grass species not shown in Horse Tolerance Summary tables.

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

Variety	Species	Endophyte Status ¹	Proprietor/ KY Distributor
Commercial Varieties-Available for Farm Use			
Cajun II	tall fescue	free	Smith Seed Services
Clair	timothy		Turner Seed
Climax	timothy		Canada Agr. Res. Station
Estancia Arkshield	tall fescue	novel	Mountain View Seeds
Ginger	Kentucky bluegrass		Proseeds Marketing
Jesup Max Q	tall fescue	novel	Pennington Seed
Jesup MaxQII	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 (certified)	perennial ryegrass		Public
Macbeth	bromegrass		Cisco Seeds
PayDay	perennial ryegrass		Mountain View Seeds
Persist	orchardgrass		Smith Seed Services
Power	perennial ryegrass		Ampac Seed
Prairie	orchardgrass		Turner Seed
Prodigy	orchardgrass		Caudill Seed
Profit	orchardgrass		Ampac Seed
Remington	perennial ryegrass		Barenbrug USA
Remington PLUS NEA2	perennial ryegrass	novel	Barenbrug USA
SS-0705TFSL	tall fescue	free	Southern States
SS-0708OGDT	orchardgrass		Southern States
TetragainSLT	perennial ryegrass		Smith Seed Services
Texoma MaxQII	tall fescue	novel	Pennington Seed
Experimental Varieties²			
KY 31-	tall fescue	free	KY Agric. Exp. Station
KYFA1704	tall fescue	free	KY Agric. Exp. Station
KYFA9304	tall fescue	free	KY Agric. Exp. Station
KYFA9611	tall fescue	free	KY Agric. Exp. Station
KYFA9821/AR584	tall fescue	novel	KY Agric. Exp. Station
MB1302	bromegrass		Allied Seed
SEPP16-6	Kentucky bluegrass		Smith Seed Services
11PHL4806	timothy		Barenbrug USA
7016	tall fescue	free	KY Agric. Exp. Station

¹Free-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, bromegrass, timothy and Kentucky bluegrass do not contain an endophyte and forage type perennial ryegrass varieties do not contain a toxic endophyte.

²Experimental varieties are not available commercially, but provide an indication of the progress being made by forage breeding companies.

Table 7. Summary of 2002-2022 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 ¹	Proprietor/KY Distributor	2002 ^{2,3} 4-yr ⁵	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 4-yr	2017 4-yr	2018 4-yr	2019 3-yr	Mean ⁴ (#trials)
BarOptima PLUS E34 ⁶	novel	Barenbrug USA																			101(9)
Cajun II	free	Smith Seed Services															101				99(2)
Cowgirl	free	Rose Agri-Seed							105				99								102(2)
Jesup MaxQ	novel	Pennington Seed	98			78			104	97	100	101	97	105	98	100	99	101	99	100	98(14)
KY31+	toxic	KY Agri. Exp.Sta.				102	109	120	107	101	101	101	99	105	99	100	101	100	100	119	104(15)
KY31-	free	KY Agri. Exp.Sta.	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100(18)
Lacefield MaxQ II	novel	Pennington Seed					105	110		98				104		100	100	100	98	118	104(9)
Namryo	free	Japanese Grassland Forage Seed						72													-
Seine	free	Seed Research of Oregon			135																-
Select	free	Southern States	109	94	99	73	104	76	108	98	100	101	98	98	97	100					97(14)
SS0705TFSL	free	Southern States													98	100	100	101	99	119	103(6)
Stockman	free	Seed Research of Oregon			125																-
Texoma MaxQII	novel	Pennington Seed																		117	-

¹Free-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.

²Year trial was established.

³Use 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 the fall of 2016 was grazed 4 years so the final report would be "2020 Cool-Season Grass Horse Grazing Tolerance Report" archived in the UK Forage website (<https://forages.ca.uky.edu>).

⁴Mean only presented when respective variety was included in two or more trials.

⁵Number of years of data.

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

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 (<https://forages.ca.uky.edu>) or the summary publication *2022 Long-Term Summary of Kentucky Forage Variety Trials* (PR-826) that shows variety comparisons over all species. Tall fescue, orchardgrass, or other cool-season grasses should not be continually overgrazed as was done in this trial. Although several varieties expressed tolerance to the level of grazing pressure in these trials, overgrazing greatly reduces forage production and stand persistence. This information should be used as an indication of those varieties which will better withstand overgrazing when it occurs.

Good management for maximum production and stand 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 <https://forages.ca.uky.edu>.

- Rotational Grazing (ID-43)
- Tall Fescue (AGR-59)
- Fescue Toxicosis (ID-221)
- Broadleaf Weeds of Kentucky Pastures (AGR-207)
- Weed Management in Grass Pastures, Hayfields and Other Farmstead Sites (AGR-172)
- Establishing Horse Pastures (ID-147)
- Improving Kentucky Horse Pastures

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Table 8. Summary of 1999-2022 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 ^{1,2}	2000	2001	2002	2005 ³	2006	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Mean ⁴ (#trials)
		3-yr ⁵	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	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	109	116	138	104	113(11)
Potomac	Public				117											65			91(2)
Prairie	Turner Seed			100										92	95	112	91	107	100(6)
Prodigy	Caudill Seed											54					73	90	72(3)
Profit	Ampac Seed							93	86		92		108						95(4)
SS-0708OGDT	Southern States									104			92	77	95	107	99		96(6)
Tekapo	Ampac Seed	101	115		93	30		92	100	83	87	63		108					94(9)

¹Year trial was established.

²Use 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 the fall of 2016 was grazed 4 years so the final report would be "2020 Cool-Season Grass Horse Grazing Tolerance Report" archived in the UK Forage website (<https://forages.ca.uky.edu>).

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

⁴Mean only presented when respective variety was included in two or more trials.

⁵Number of years of data.

Table 9. Summary of 2001-2022 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). These cattle-grazing trials are included to represent grazing tolerance of grass species not shown in horse tolerance summary tables.

Variety	Type	Proprietor	2001 ^{1,2}	2003	2007	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Mean ³ (#trials)
			3yr ⁴	4yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	4yr	3yr	
AGRLP103	-	AgResearch USA		86													-
Albion	tetraploid	Grassland Oregon										112					-
Aries	diploid	Ampac Seed	128														-
Barfest (FL)	MF x PR ⁶	Barenbrug USA					116	112									114(2)
BG-34	diploid	Barenbrug USA										78					-
Boost	tetraploid	Allied Seed				101	83	95	92								93(4)
Calibra	tetraploid	DLF International							106		88	90	98		94		95(5)
Citadel	tetraploid	Donley Seed															-
Duo (FL)	MF x PR ⁶	Ampac Seed				95	72	90	102			65	65				82(6)
Lasso	diploid	DLF-Jenks	120														-
Linn (certified)	diploid	Public	118	63		95	108	95	91	96	80	69	88	79	99	117	93(13)
Melpetra	tetraploid	Hood River Seed											90				-
PayDay	tetraploid	Mountain View Seeds								101	85			99	90	100	95(5)
Polly II	tetraploid	FS Growmark	63														52(2)
Power	tetraploid	Ampac Seed			158		107	112	96	89	79	78					103(7)
Quartet	tetraploid	Ampac Seed	70		59												68(2)
Remington	tetraploid	Barenbrug USA		151							138	168	169	124	116	119	141(7)
Remington PLUS NEA2 ⁵	tetraploid	Barenbrug USA									145	159		122	122	122	137(4)
Spring Green (FL)	MF x PR ⁶	Rose Agri-Seed				109	115	115	106			81	88				102(6)
TetraGain	tetraploid	Pure Seed							102					90			96(2)
TetraMag	tetraploid	Mountain View Seeds													89	51	70(2)
TetraSweet	tetraploid	Mountain View Seeds													89	87	88(2)
Victorian	diploid	Caudill Seed								114					109		112(2)

¹Year trial was established.

²Use 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 the fall of 2016 was grazed 4 years so the final report would be "2020 Cool-Season Grass Grazing Tolerance Report" archived in the UK Forage website (<https://forages.ca.uky.edu>).

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

⁴Number of years of data.

⁵Remington PLUS NEA2 contains a non-toxic (novel) endophyte.

⁶MF=meadow fescue, PR=perennial ryegrass, IR=Italian ryegrass.



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