

2012 Cool-Season Grass Grazing Tolerance Report

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Introduction

Cool-season grasses such as tall fescue and orchardgrass are the primary pasture grasses in Kentucky. Other species such as perennial ryegrass, festulolium, and prairie brome 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. The main focus will be on plant stand survival. Tables 15, 16, and 17 show the summaries of all tall fescue, orchardgrass, and perennial ryegrass varieties tested in Kentucky during the past 15 years. The UK Forage Extension Web site, 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, 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.

Description of the Tests

Grass variety tests for grazing tolerance were established in Lexington in the fall of 2008, 2009, 2010, and 2011. The soil at Lexington (Maury) is a well-drained silt loam and is well-suited to tall fescue, orchardgrass, and 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

Table 1. Temperature and rainfall at Lexington, Kentucky, in 2009, 2010, 2011, and 2012.

	2009				2010				2011				2012 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	28	-3	2.45	-0.41	29	-2	2.40	-0.46	29	-2	2.10	-0.76	38	+7	4.80	+1.94
FEB	38	+3	2.86	-0.35	29	-6	1.38	-1.83	39	+4	6.34	+3.13	40	+5	5.39	+2.18
MAR	48	+4	2.19	-2.21	47	+3	1.05	-3.35	47	+3	4.76	+0.36	56	+12	5.64	+1.24
APR	55	0	4.48	+0.60	59	+4	2.74	-1.14	58	+3	12.36	+8.48	56	+1	3.26	-0.62
MAY	64	0	5.05	+0.58	67	+3	7.84	+3.37	64	0	6.72	+2.25	69	+5	4.02	-0.45
JUN	74	+2	5.41	-1.75	76	+4	4.61	+0.95	74	+2	2.61	-1.05	73	+1	2.42	-1.24
JUL	71	-5	5.89	+0.89	78	+2	5.49	+0.49	80	+4	6.29	1.29	81	+5	2.50	-2.50
AUG	73	-2	5.38	+1.45	78	+3	1.54	-2.39	75	0	2.89	-1.04	75	0	1.68	-2.25
SEP	68	0	5.37	+2.17	71	+3	1.14	-2.06	66	-2	5.52	+2.32	67	-1	6.40	+3.20
OCT	54	-3	4.83	+2.26	59	+2	1.22	-1.35	55	-2	4.10	+1.53	55	-2	2.00	-0.57
NOV	49	+4	0.94	-2.45	47	+2	4.58	+1.19	50	+5	9.53	+6.14				
DEC	36	0	3.86	-0.12	28	-8	2.15	-1.93	41	+5	5.58	+1.60				
Total			48.71	+4.16			36.14	-8.41			68.80	+24.25			38.11	+0.93

¹ DEP is departure from the long-term average.

² 2011 data is for the ten months through October.

Table 2. Seedling vigor, grazing preference, and stand persistence of tall fescue varieties sown September 11, 2008, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor ¹ Oct 13, 2008	Grazing Preference ²				Percent Stand									
		2009	2010	2011	2012	2008	2009		2010		2011		2012		
		May 14	May 3	May 2	May 2	Oct 13	Apr 8	Oct 12	Apr 6	Nov 22	Mar 31	Oct 4	Mar 23	Oct 12	
Commercial Varieties—Available for Farm Use															
KY31+ ³	2.5	6.8	4.5	3.2	2.2	98	100	100	100	100	100	100	100	100*	
Jesup MaxQ	2.3	8.8	1.7	1.7	1.2	98	87	89	92	94	96	97	100	97*	
Select	3.3	2.2	2.2	1.2	2.0	98	100	100	100	100	99	98	98	95	
HyMark	3.8	2.8	3.2	1.7	1.2	99	100	100	100	100	99	99	100	95	
Experimental Varieties															
KYFA9821/AR584	3.5	3.7	2.8	2.7	1.8	100	100	100	100	100	100	100	100	99*	
KYFA9301/AR584	4.7	2.7	3.0	2.0	1.2	100	100	100	100	100	100	100	100	98*	
KY31- ³	2.5	4.3	2.8	1.5	1.8	98	99	100	100	100	100	100	100	98*	
GA-186	3.7	6.0	2.7	1.7	1.0	100	96	97	98	97	97	98	100	97*	
GA-593R	3.3	4.2	1.7	1.5	1.3	100	96	97	98	98	98	99	100	97*	
NFTF 1070	2.8	4.5	3.0	1.8	1.5	99	99	98	98	99	100	100	100	97*	
AGRFA 144	2.5	3.7	1.7	1.7	1.5	98	98	99	99	98	98	99	100	96	
TF 0201	2.5	6.2	3.0	2.5	2.0	100	99	100	100	100	100	100	100	96	
Mean	3.1	4.7	2.7	1.9	1.6	99	98	98	99	99	99	99	99	97	
CV,%	24.9	41.0	36.6	34.6	46.7	2	5	4	3	2	2	2	1	3	
LSD,0.05	0.9	2.2	1.1	0.8	0.8	3	6	5	4	3	3	2	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; 2009-16 days, 2010-15 days, 2011-14 days, 2012-29 days.

³ 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. AR584 is a non-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.

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 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 11. Statistical analyses were performed on all entries (including experimentals) to determine if the apparent differences are truly due to variety. Varieties not

Table 3. Seedling vigor, grazing preference, and stand persistence of tall fescue varieties sown September 3, 2009, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor ¹ Oct 12, 2009	Grazing Preference ²			Percent Stand							
		2010	2011	2012	2009	2010		2011		2012		
		Apr 28	May 2	May 2	Oct 12	Apr 7	Nov 22	Mar 16	Oct 4	Mar 23	Oct 13	
Commercial Varieties—Available for Farm Use												
KY31+ ³	4.3	6.7	4.5	1.8	100	100	100	100	100	100	100	99*
Jesup MaxQ	2.8	3.3	2.8	1.5	96	98	100	99	99	99	99	99*
Bronson	3.5	3.0	1.8	1.0	99	99	99	100	100	100	100	97*
Select	2.8	4.7	2.2	1.2	97	98	100	99	99	99	99	97*
Experimental Varieties												
AgR 1521	2.3	5.0	3.0	1.5	95	99	100	100	100	100	100	99*
GA-29	3.7	3.7	1.7	1.3	99	99	100	100	99	99	99	98*
AgR 1502	2.7	6.3	3.5	1.2	99	99	99	100	100	99	99	98*
KY31- ³	3.7	5.8	2.7	2.2	100	99	100	100	100	100	100	98*
KYFA0701	4.3	4.7	3.5	1.5	100	99	99	99	99	100	100	98*
TF 0202	3.3	7.1	4.0	3.7	98	97	98	99	98	98	98	94
Mean	3.4	5.0	3.0	1.7	98	99	100	100	99	99	99	98
CV,%	19.7	38.7	43.3	34.3	2	1	1	1	1	1	1	2
LSD,0.05	0.8	2.3	1.5	0.7	2	1	1	1	1	1	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; 2010-10 days, 2011-14 days, 2012-29 days.

³ KY 31- is the variety KY31 from which the toxic endophyte has been removed. KY31+ contains the toxic endophyte. Jesup MaxQ, AgR1502 and AgR1521 contain a non-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.

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: 1) Can endophyte-free varieties persist as well as KY31+; and 2) 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 and 3).

Table 12 (fescue), Table 13 (orchardgrass), and Table 14 (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.

Tables 15, 16, and 17 are summaries of stand persistence data from 1996 to 2012 of commercial tall fescue, orchardgrass, and perennial ryegrass varieties that have been entered in the Kentucky trials. In Table 15 the data is listed as a percentage of KY31+. In other words, in the tall fescue trials KY31+ is 100 percent. Variet-

Table 4. Seedling vigor, grazing preference, and stand persistence of tall fescue varieties sown September 1, 2010, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor ¹ Oct 14, 2010	Grazing Preference ²		Percent Stand				
		2011	2012	2010	2011		2012	
		Apr 25	May 2	Oct 14	Mar 15	Oct 4	Mar 23	Oct 10
Commercial Varieties—Available for Farm Use								
Jesup EF	3.1	2.3	1.0	99	100	99	99	99*
KY31+ ³	3.3	5.8	1.2	99	99	99	98	99*
Jesup MaxQ	1.6	3.7	1.5	96	98	98	98	98*
Bronson	3.9	2.8	1.3	99	100	99	99	98*
Select	3.4	3.5	1.5	99	99	99	99	97*
Cajun II	3.6	3.2	1.0	99	99	99	99	97
Goliath	3.5	2.8	1.3	99	100	98	99	97
BarOptima PlusE34	2.2	6.5	1.8	95	97	98	97	97
Experimental Varieties								
AgR 1521	2.6	4.2	1.0	98	99	99	99	99*
TF 0202	2.9	6.5	1.5	98	99	99	98	99*
KY31- ³	3.8	4.7	1.2	99	99	99	99	99*
KYFA0601	3.7	4.0	1.7	99	99	99	99	98*
KYFA0701	3.5	4.3	1.3	98	99	99	98	98*
GA29	2.5	2.8	1.7	97	98	98	97	97*
AgR 1502	3.1	4.7	2.0	99	99	99	98	97
KYFA0901	2.6	4.8	1.2	96	96	96	95	96
Mean	3.1	4.2	1.4	98	99	98	98	98
CV,%	25.5	25.3	55.2	2	2	2	2	2
LSD,0.05	0.9	1.2	0.9	3	2	2	2	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; 2011-7 days, 2012-29 days.

³ KY 31- is the variety KY31 from which the toxic endophyte has been removed. KY31+ contains the toxic endophyte. Jesup MaxQ, AgR1502 and AgR1521 contain a non-toxic endophyte. BarOptima PLUS E34 contains a beneficial 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 5. Seedling vigor, grazing preference, and stand persistence of tall fescue varieties sown September 13, 2011, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor ¹ Oct 11, 2011	Grazing Preference ² May 2, 2012	Percent Stand		
			2011	2012	
			Oct 11	Mar 23	Oct 10
Commercial Varieties—Available for Farm Use					
BarOptima PlusE34	4.4	3.3	100	100	100*
HyMark	4.8	1.5	100	100	100*
Jesup EF	4.9	2.2	100	100	100*
Jesup MaxQ	4.5	2.6	100	100	100*
KY31+ ³	4.7	4.3	100	100	100*
Select	4.4	2.0	100	100	100*
Experimental Varieties					
AGRFA 148	4.7	2.8	100	100	100*
KY31- ³	4.7	4.7	100	100	100*
KYFA0804	4.9	1.0	100	100	100*
KYFA0902	4.8	3.0	100	100	100*
KYFA0905	4.8	4.3	100	100	100*
NFTF 1411	4.8	2.7	100	100	100*
Mean	4.7	2.9	100	100	100
CV,%	5.8	28.3	0	0	0
LSD,0.05	0.3	0.9	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; 7 days.

³ 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. 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 3, 2009, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor ¹ Oct 12, 2009	Grazing Preference ²			Percent Stand						
		2010	2011	2012	2009	2010		2011		2012	
		Apr 28	May 2	May 2	Oct 12	Apr 7	Nov 22	Mar 16	Nov 7	Mar 23	Oct 13
Commercial Varieties—Available for Farm Use											
Benchmark Plus	4.2	7.3	5.8	1.5	91	96	94	94	83	85	89*
Persist	2.7	7.5	4.8	1.0	85	95	95	95	77	82	87*
Tekapo	2.0	8.8	6.0	1.7	79	85	86	89	68	71	85*
Profit	2.7	7.7	5.8	1.3	87	94	90	93	74	82	83*
Mean	2.9	7.8	5.6	1.4	86	92	91	93	75	80	86
CV,%	29.3	9.1	22.1	34.1	7	5	7	4	23	17	8
LSD,0.05	1.0	0.9	1.5	0.6	8	6	8	5	21	17	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; 2010-10 days, 2011-14 days, 2012-29 days.

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

ies with percentages over 100 persisted better than KY31+, and varieties with percentages less than 100 persisted less than KY31+. In tables 16 and 17 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 15, 16, and 17, 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 15, 16, and 17 to determine to which yearly report to refer.

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

Table 7. Seedling vigor, grazing preference, and stand persistence of orchardgrass varieties sown September 1, 2010, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor ¹ Oct 12, 2010	Grazing Preference ²		Percent Stand				
		2011	2012	2010	2011		2012	
		Apr 25	May 2	Oct 14	Mar 15	Oct 4	Mar 23	Oct 10
Commercial Varieties—Available for Farm Use								
Tekapo	3.0	6.2	1.3	100	100	97	98	99*
Benchmark Plus	3.7	6.2	1.0	100	98	97	98	98*
Harvestar	2.8	7.7	2.0	99	100	96	97	98*
Profit	3.7	6.0	1.7	100	100	98	98	98*
Persist	1.2	7.5	1.2	91	93	92	93	95
Experimental Varieties								
OG0503	3.0	6.7	1.3	99	99	99	99	99*
OG9902	4.5	5.5	1.3	100	100	98	98	99*
Mean	3.1	6.5	1.4	98	99	97	97	98
CV,%	20.5	20.5	44.6	2	3	2	2	2
LSD,0.05	0.8	1.6	0.7	3	4	3	2	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; 2011-7 days, 2012-29 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 13, 2011, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor ¹ Oct 11, 2011	Grazing Preference ² May 2, 2012	Percent Stand		
			2011	2012	
			Oct 11	Mar 23	Oct 10
Commercial Varieties—Available for Farm Use					
Benchmark Plus	5.0	1.2	100	100	100*
Harvestar	4.8	1.5	100	100	100*
Persist	4.9	1.8	100	100	100*
Prairie	4.8	1.5	100	100	100*
Profit	5.0	1.3	100	100	100*
Tekapo	4.9	1.8	100	100	100*
Mean	4.9	1.5	100	100	100
CV,%	3.5	48.4	0	0	0
LSD,00.5	0.2	0.9	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; 2012-29 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 perennial ryegrass, festulolium (FL), and tall fescue (TF) varieties sown September 16, 2008, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor ¹ Oct 13, 2008	Grazing Preference ²				Percent Stand								
		2009	2010	2011	2012	2008	2009		2010		2011		2012	
		May 14	Apr 28	May 2	May 2	Oct 13	Apr 8	Oct 12	Apr 7	Nov 22	Mar 31	Nov 7	Mar 23	Oct 24
Commercial Varieties—Available for Farm Use														
SpringGreen (FL)	3.7	7.7	8.8	8.5	8.0	98	100	100	100	83	83	80	84	52
Boost	3.8	7.3	7.8	7.3	7.7	99	100	100	100	74	68	68	78	48
Duo (FL)	5.0	6.0	8.3	8.2	7.7	99	97	95	98	64	55	58	67	45
Linn	3.5	5.8	7.5	6.5	5.0	98	100	100	99	84	76	70	76	45
Experimental Varieties														
AGRFA174 (TF)	1.8	5.8	2.0	2.5	2.7	96	97	99	99	99	96	89	98	96*
Mean	3.6	6.5	6.9	6.6	6.2	98	99	99	99	81	76	73	80	57
CV,%	11.1	17.5	12.8	18.9	10.9	3	2	2	1	13	15	17	11	17
LSD,0.05	0.5	1.4	1.1	1.5	0.8	3	2	2	1	14	13	15	11	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; 2009-16 days, 2010-15 days, 2011-14 days, 2012-29 days.

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

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.
- Avoid overgrazing it during times of extreme stress, such as drought.

Table 10. Seedling vigor, grazing preference, and stand persistence of perennial ryegrass and festulolium (FL) varieties sown September 1, 2010, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor ¹ Oct 14, 2010	Grazing Preference ²		Percent Stand				
		2011	2012	2010	2011		2012	
		Apr 25	May 2	Oct 14	Mar 15	Oct 4	Mar 23	Oct 10
Commercial Varieties—Available for Farm Use								
Power	3.7	7.5	2.5	100	100	99	99	93*
Linn	3.7	4.5	1.2	100	100	100	100	91*
Barfest (FL)	4.0	6.7	2.2	100	100	99	99	90*
Spring Green (FL)	3.7	5.7	2.5	100	100	100	100	87*
Granddaddy	3.7	6.3	1.7	100	100	100	100	86*
BG34	4.2	7.7	1.2	100	100	100	100	86
Boost	4.3	4.8	2.2	100	99	99	100	79
Duo (FL)	5.0	4.0	3.0	100	99	88	93	72
Mean	4.0	5.9	2.0	100	100	98	99	85
CV,%	12.7	19.6	28.4	0	1	1	2	6
LSD,0.05	0.6	1.4	0.7	0	1	1	2	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; 2011-days, 2012-29 days.

*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 11. Seedling vigor, grazing preference, and stand persistence of perennial ryegrass and festulolium (FL) varieties sown September 13, 2011, in a cattle grazing tolerance study at Lexington, Kentucky.

Variety	Seedling Vigor ¹ Oct 11, 2011	Grazing Preference ² May 2, 2012	Percent Stand		
			2011	2012	
			Oct 11	Mar 23	Oct 10
Commercial Varieties—Available for Farm Use					
Power	4.1	2.7	100	100	99*
Barfest (FL)	4.0	3.3	100	100	98*
Boost	4.1	3.2	100	100	98*
BG34	4.0	1.3	100	100	98*
Granddaddy	3.9	2.3	100	100	98*
Spring Green (FL)	4.1	2.7	100	100	98*
Duo (FL)	5.0	3.2	100	100	91*
Linn	3.8	1.3	100	100	84
Experimental Varieties					
KYFA1015 (FL)	3.9	3.7	100	100	99*
KYFA1016 (FL)	4.2	2.8	100	100	98*
Mean	4.1	2.7	100	100	96
CV,%	5.1	30.9	0	0	12
LSD,0.05	0.2	1.0	0	0	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; 2012-29 days.

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

Table 12. Summary of persistence of tall fescue varieties under heavy grazing pressure across years at Lexington, Kentucky.¹

Variety	Proprietor/ KY distributor	2009 ²				2008 ²				2009				2010				2011	
		Apr	Oct	Apr	Oct	Apr	Oct	Apr	Oct	Apr	Oct	Apr	Oct	Apr	Oct	Apr	Oct	Mar	Oct
		2009 ³		2010		2010		2011		2011		2012		2012		2010		2011	
Commercial Varieties—Available for Farm Use																			
BarOptima PLUS E34	Barenbrug USA																		
Bronson	Ampac Seed																		
Cajun II	Smith Seed Services																		
Goliath	Ampac Seed																		
HyMark	Fraser Seeds	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Jesup EF	Pennington Seed																		
Jesup Max Q	Pennington Seed	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
KY 31+4	KY Agric. Exp. Station	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Select	FFR/Southern States	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Experimental Varieties																			
AgR 1502	AgResearch (USA)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
AgR 1521	AgResearch (USA)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
AGRFA 144	Noble Foundation/ AgResearch (USA)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
AGRFA 148	AgResearch (USA)																		
GA-29	Univ. of Georgia																		
GA-186	Univ. of Georgia	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
GA-593R	Univ. of Georgia	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
KY 31-4	KY Agric. Exp. Station	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
KYFA 0601	KY Agric. Exp. Station																		
KYFA 0701	KY Agric. Exp. Station																		
KYFA0804	KY Agric. Exp. Station																		
KYFA 0901	KY Agric. Exp. Station																		
KYFA0902	KY Agric. Exp. Station																		
KYFA0905	KY Agric. Exp. Station																		
NFTF 1070	Noble Foundation	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
NFTF 1411	Noble Foundation																		
TF0201	Winfield Solutions LLC	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
TF0202	Allied Seed																		

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, AgR1502 and AgR1521 contain a non-toxic endophyte. BarOptima PLUS E34 contains a beneficial endophyte. The other fescue varieties in this table do not contain an endophyte.

⁵ 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 13. Summary of persistence of orchardgrass varieties under heavy grazing pressure across years at Lexington, Kentucky.

Variety	Proprietor/KY distributor	2009 ¹						2010				2011		
		Apr	Nov	Mar	Nov	Mar	Oct	Mar	Oct	Mar	Oct	Mar	Oct	
		2010 ²		2011		2012		2011		2012		2012		
Commercial Varieties—Available for Farm Use														
Benchmark Plus	FFR/Southern States	*	*	*	*	*	*	*	*	*	*	*	*	*
Harvestar	Columbia seeds								*	*	*	*	*	*
Persist	Smith Seed Services	*	*	*	*	*	*	*	x ³	X	X	X	*	*
Prairie	Turner Seed												*	*
Profit	Ampac Seed Co.	*	*	*	*	*	*	*	*	*	*	*	*	*
Tekapo	Ampac Seed Co.	X	X	X	*	*	*	*	*	*	*	*	*	*
Experimental Varieties														
OG0503	FFR/Southern States								*	*	*	*		
OG9902	FFR/Southern States								*	*	*	*		

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

Variety	Proprietor/KY Distributor	2008 ¹								2010				2011	
		Apr	Oct	Apr	Nov	Mar	Nov	Mar	Oct	Mar	Oct	Mar	Oct	Mar	Oct
		2009 ²		2010		2011		2012		2011		2012		2012	
Commercial Varieties—Available for Farm Use															
Barfest (FL)	Barenbrug USA									*	*	*	*	*	*
BG34	Barenbrug USA									*	*	*	X	*	*
Boost	Allied Seed	*	*	*	*	x ³	*	*	*	*	*	*	X	*	*
Duo (FL)	Ampac Seed Co.	X	X	X	X	X	X	X	*	*	X	X	X	*	*
Granddaddy	Smith Seed									*	*	*	*	*	*
Linn	Public	*	*	*	*	*	*	*	*	*	*	*	*	*	X
Power	Ampac Seed Co.									*	*	*	*	*	*
SpringGreen (FL)	Rose Agri-Seed	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Experimental Varieties															
KYFA1015 (FL)	KY Agric.Exp. Station													*	*
KYFA1016 (FL)	KY Agric.Exp. Station													*	*

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.

*Not significantly different from the most persistent variety.

Table 16. Summary of 1996-2012 Kentucky orchardgrass grazing tolerance trials (stand persistence shown as a percent of the mean of the commercial varieties in the trial).

Variety	Proprietor	Lexington										Princeton			Mean ³ (#trials)			
		1996 ^{1,2} 3yr ⁴	1997 4yr	1998 3yr	1999 4yr	2000 4yr	2001 4yr	2002 4yr	2003 4yr	2004 4yr	2005 4yr	2007 4yr	2009 3yr	2002 4yr				
Abertop	Pennington Seed																	
Albert	Univ. of Wisconsin									115								
Amba	DLF-Jenks									71								
Ambrosia	Pennington Seed		90												94			92(2)
Athos	DLF-Jenks									93					60			77(2)
Benchmark	FFR/Sou. States	100	105	115	94	118	123	114									133	113(8)
Benchmark Plus	FFR/Sou. States							120							152	135	103	129(5)
Boone	Public			131		102												117(2)
Cheyenne	Western Prod. Inc.			94														
Command	Seed Research of OR											81						
Crown Royale	Donley Seed		86	96						100								91(2)
Crown Royale Plus	Donley Seed							124									83	104(2)
Hallmark	James VanLeeuwen	107		104	103					115		113					83	104(6)
Harvestar	Columbia Seeds														75			
Haymate	FFR/Sou. States	93	71	102	96	53				115	100	118					83	92(9)
Intensiv	Barenbrug USA											51						
Mammoth	DLF-Jenks									115								
Megabite	Turf Seed									77								
Niva	DLF-Jenks										76						83	80(2)
Persist	Smith Seed														138	107	101	115(3)
Pizza	Advanta Seeds			63														
Potomac	Public	98																
Prairie	Turner Seed					127	121						119					113(4)
Profile	Scott Seed	98						116										110(3)
Profit	Ampac Seed																97	107(2)
Progress	Scott Seed	111																
Tekapo	Ampac Seed	93	166	92	104			74		55	74	118		50	103	99	100	96(11)
Takana	Smith Seed		81							99								90(2)
Seco	FFR/Sou. States															85		
WP300	Western Prod. Inc.			94														

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 1997 was grazed four years so the final report would be "2001 Cool-Season Grass Grazing Tolerance Report" archived in the KY Forage Web site 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. Stand thinning may have been greater for preferred varieties due to closer grazing. See individual trial tables for preference ratings.

Table 17. Summary of 2000-2012 Kentucky perennial ryegrass and festulolium (FL) grazing tolerance trials (stand persistence shown as a percent of the mean of the commercial varieties in the trial).

Variety	Proprietor	2000 ^{1,2}	2001	2003	2005	2007	2008	Mean ³ (#trials)
		4yr ⁴	3yr	4yr	3yr	4yr	3yr	
AGRLP103	AgResearch USA	128		86				107(2)
Aries	Ampac Seed		139					–
BG 34	Barenbrug USA				176 ⁵	145 ⁵		185(2)
Boost	Allied Seed						101	–
Citadel	Donley Seed	107						–
Duo (FL)	Ampac Seed	116					95	106(2)
Granddaddy	Smith Seed Services		121			70		89(2)
Lasso	DLF-Jenks		130					–
Linn	Public	112	129	63			95	100(4)
Maverick	Ampac Seed		36					–
Polly II	FFR/Southern States	36	68					52(2)
Power	Ampac Seed					134		–
Quartet	Ampac Seed		77		63	50		60(3)
Remington	Barenbrug USA			151 ⁵				–
Spring Green (FL)	Rose Agri-Seed	101					109	105(2)
Tonga	Ampac Seed				61			–

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 2000 was grazed four years so the final report would be "2004 Cool-Season Grass Grazing Tolerance Report" archived in the KY Forage Web site 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 Grazing tolerance values for these entries may have been elevated due to the low survival of the other commercial varieties in the trials for these years.



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