

2003 Cool-Season Grass Grazing Variety Report: Tolerance to Horses

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Introduction

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

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

Description of the Tests

Tests were established in Lexington in the fall of 2000, 2001, and 2002. 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 by 15 feet in a randomized complete block design with each variety replicated six times. Plots were seeded at the recommended seeding rate per acre and were planted into a prepared seedbed using a disk drill. Grazing was continuous from April to October.

Plots were grazed down to below 4 inches quickly and kept at that height or below for the remainder of the grazing season. Supplemental hay was fed during periods of slowest growth. Visual ratings of percent stand were made in the fall and spring after each grazing season. Grass plots were fertilized with 60 pounds of actual N per acre in the spring, and other fertilizer (lime, P, and K) was applied as needed.

Results and Discussion

Weather data for Lexington for 2002 and 2003 are presented in Table 1.

Data on percent stand are presented in Tables 2, 3, and 4.

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 Signifi-

cant Difference (LSD) at the bottom of the column. If the difference is equal to or greater than the LSD, the varieties are truly different when grown under the conditions at a given location. The Coefficient of Variation (CV), which is a measure of the variability of the data, is included for each column of means. Low variability is desirable, and increased variability within a study results in higher CVs and larger LSDs.

In general, commercial varieties of tall fescue and orchardgrass tolerated overgrazing well (Tables 2, 3, and 4), but the varieties of timothy and prairiegrass (*Bromus willdenoii*) in these trials did not. The sensitivity of timothy and prairiegrass to heavy grazing is not surprising, as these are both erect species and sensitive to heavy defoliation. Bluegrass as a species is expected to be more tolerant of heavy grazing. However, Ginger is intolerant of overgrazing (Table 2).

Perennial ryegrasses vary in tolerance to grazing. Several ryegrasses and a ryegrass hybrid (Duo) show good survival (Tables 2, 3). Mara and Duo were among the most persistent after three seasons of grazing (Table 2).

Differences in tolerance among varieties could be due to true grazing tolerance but also to preference, especially where highly palatable species such as bluegrass and ryegrass are alongside tall fescue. These data should be taken as an indication of tolerance to short durations of overgrazing. For best pasture stands, forage grasses should not be abused as in this study.

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. However, there are no proven grazing-tolerant varieties for the other species. Still, certain varieties are clearly more tolerant than others (Aries versus Maverick Gold).

Table 5 summarizes information about distributors and persistence across locations and years for all varieties in these tests. Varieties are listed in alphabetical order with experimental varieties listed at the bottom. Shaded areas indicate that the variety was not in that particular test (labeled at the top of the column), while clear blocks mean the variety was in the test. A single asterisk (*) means that the variety was not significantly different from the top-yielding variety in that study. It is best to choose a variety that has performed well over several years.

Summary

These studies indicate that there are varieties of cool-season grasses that can tolerate overgrazing by horses for one to three seasons and still maintain reasonable stands. This information should be used along with yield and other information (for example, relative maturity in spring) in selecting the best grass variety for each individual use. It is not generally recommended that tall fescue or orchardgrass or other cool-season grasses be continuously overgrazed as was done in this trial. Although

several varieties expressed tolerance to the level of grazing pressure used in these trials, overgrazing greatly reduces 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 occurs.

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

Table 1. Temperature and rainfall at Lexington during the 2002 and 2003 growing seasons.

	2002				2003			
	Temp		Rainfall		Temp		Rainfall	
	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	38	+7	2.12	-0.7	26	-5	0.96	-1.90
FEB	38	+3	1.28	-1.9	32	-3	3.59	+0.38
MAR	45	+1	7.93	3.5	47	+3	2.09	-2.31
APR	58	+3	4.19	0.3	57	+2	3.14	-0.74
MAY	61	-3	4.36	-0.1	63	-1	6.68	+2.21
JUN	74	+2	2.45	-1.2	69	-3	4.85	+1.19
JUL	78	+2	1.10	-3.9	74	-2	2.68	-2.32
AUG	77	+2	0.95	-3.0	75	0	5.26	+1.33
SEP	72	+4	4.90	1.7	65	-3	4.22	+1.02
OCT	55	-2	5.61	3.0	56	-1	1.61	-0.96
NOV	43	-2	3.76	0.4	50	+5	4.63	+1.24
TOTAL			38.7	-1.92			39.71	-0.86

DEP is departure from the long-term average for that location.

Table 2. Percent stand of forage grasses planted September 19, 2000, at Lexington, Kentucky, in a horse grazing tolerance trial.

Variety	Type ¹	Percent Stand				
		Oct 15, 2001	Apr 2, 2002	Oct 11, 2002	Mar 25, 2003	Oct 30, 2003
Commercial Varieties—Available for Farm Use						
Duo	festulolium	66	82	76	84	68*
Mara	diploid perennial ryegrass	77	89	73	84	68*
Tekapo	orchardgrass	77	83	64	74	57*
Cattleclub	tall fescue	69	78	68	83	53
Barcarella	tall fescue	56	70	65	83	48
Haymate	orchardgrass	68	75	53	63	43
Kokanee	tall fescue	58	73	36	69	41
Stargrazer	tall fescue	62	75	63	83	38
Ginger	Kentucky bluegrass	9	43	8	55	34
Tuukka	timothy	18	50	6	20	15
Experimental Varieties						
Og 9705g	orchardgrass	61	68	55	60	46
K5568k	orchardgrass	73	79	53	66	38
K5632m	prairie brome	7	28	3	11	4
K5633d	prairie brome	8	33	4	16	1
Mean	-	50.45	66.07	44.82	60.71	39.45
CV, %	-	22.05	19.01	27.24	19.43	29.99
LSD, 0.05	-	12.83	14.48	14.08	13.60	13.64
* Not significantly different from the highest value in the column, based on the 0.05 LSD.						
¹ All tall fescues are endophyte free.						

Table 3. Seedling vigor rating and percent stand of forage grasses sown September 12, 2001 at Lexington, Kentucky in a horse grazing tolerance study.

Variety	Type	Seedling Vigor ¹ Nov 2, 2001	Percent Stand			
			April 4, 2002	October 15, 2002	March 28, 2003	October 27, 2003
Commercial Varieties—Available for Farm Use						
Aries	diploid perennial ryegrass	5	90	79	90	77*
Kenblue	forage bluegrass	2	89	77	88	73*
Grand Daddy	tetraploid perennial ryegrass	5	90	78	89	72*
Slezanka	forage bluegrass	3	88	74	87	72*
Crown Royale	orchardgrass	4	90	66	79	65*
Albert	orchardgrass	3	90	62	78	62*
Platini	forage bluegrass	2	90	70	86	60*
Quartet	tetraploid perennial ryegrass	5	78	62	83	57
Ky31+ ²	tall fescue	4	90	60	81	54
Prairie	orchardgrass	4	90	58	73	51
Johnstone	tall fescue	4	89	48	73	41
Maverick Gold	diploid perennial ryegrass	5	28	21	57	23
Fure	meadow fescue	3	90	21	56	18
Clair	timothy	2	89	21	64	16
Colt	timothy	3	90	15	59	13
Experimental Varieties						
KYFA 9301	tall fescue	4	90	71	85	60*
KYFA 9304	tall fescue	4	90	61	81	59
OG 9705G	orchardgrass	2	90	57	70	57
KY 31- ²	tall fescue	4	90	58	82	56
PP 10	mixture	3	88	48	75	29
PP 11	mixture	5	48	23	68	26
Mean	-	3.48	84.21	53.75	76.27	49.44
CV, %	-	12.46	5.10	26.00	12.26	30.83
LSD, 0.05	-	0.50	4.92	16.01	10.71	17.46

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

¹ Based on 1 to 5 scale with 5 being the most vigorous.

² "+" indicates variety is endophyte infected; "-" indicates variety is endophyte free.

Table 4. Seedling vigor rating and percent stand of forage grasses sown September 19, 2002 at Lexington, Kentucky in a horse grazing tolerance study.				
Variety	Type	Seedling Vigor Oct 31, 2002 ¹	Percent Stand	
			March 25, 2003	October 30, 2003
Commercial Varieties—Available for Farm Use				
Duo	festulolium	5	90	79*
Select	tall fescue	4	90	78*
Crown Royale Plus	orchardgrass	4	89	73*
Jesup Max Q	tall fescue	4	90	71*
Haymate	orchardgrass	3	85	68*
Certified Potomac	orchardgrass	4	89	67
Uncertified Potomac	orchardgrass	4	88	65
Benchmark	orchardgrass	4	86	60
Tekapo	orchardgrass	3	82	55
Certified Kenblue	forage bluegrass	2	88	36
Experimental Varieties				
KY 31-	tall fescue	4	90	79*
KYFA 9304	tall fescue	5	90	79*
Benchmark Plus	orchardgrass	4	89	74*
S-22	forage bluegrass	2	88	45
VB 5649	forage bluegrass	2	88	34
HB 120	forage bluegrass	1	89	26
HB 121	forage bluegrass	2	90	19
KYPP 9901	forage bluegrass	1	84	8
Mean	-	3.10	88.10	56.37
CV, %	-	15.94	2.94	16.80
LSD, 0.05	-	0.57	2.97	10.87
* Not significantly different from the highest value in the column, based on the 0.05 LSD. ¹ Based on 1 to 5 scale with 5 being the most vigorous.				

Table 5. Persistence of forage grasses under heavy grazing pressure by horses across years.

Variety	Species	Proprietor/KY Distributor	2000 ¹			2001			2002	
			Oct 2002 ²	Mar 2003	Oct 2003	Oct 2002	Mar 2003	Oct 2003	Mar 2003	Oct 2003
Commercial Varieties—Available for Farm Use										
Albert	orchardgrass	University of Wisconsin						*		
Aries	diploid perennial ryegrass	Ampac Seed Company				*	*	*		
Barcarella	tall fescue	Barenbrug	*	*						
Benchmark	orchardgrass	FFR Cooperative								
Cattle Club	tall fescue	-	*	*						
Clair	timothy	public								
Crown Royale	orchardgrass	Grassland Oregon				*	*	*	*	*
Colt	timothy	FFR Cooperative								
Duo	festulolium	Ampac Seed Company	*	*	*				*	*
Fure	meadow fescue	DLF-Jenks								
Ginger	Kentucky bluegrass	Dye Seed Ranch, Inc. ProSeeds Marketing								
Grand Daddy	tetraploid perennial ryegrass	Smith Seed Services				*	*	*		
Haymate	orchardgrass	FFR Cooperative							*	*
Jesup Max Q	tall fescue								*	*
Johnstone	tall fescue	Proseeds Marketing								
Kenblue	forage bluegrass	public				*	*	*	*	
Kokanee	tall fescue	Ampac Seed Company								
KY 31+	tall fescue	public				*	*			
Mara	diploid perennial ryegrass	Barenbrug	*	*	*					
Maverick Gold	diploid perennial ryegrass	Ampac Seed Company								
Platini	forage bluegrass	DLF-Jenks				*	*	*		
Potomac certified									*	
Potomac uncertified									*	
Prairie	orchardgrass	Turner Seed, Inc. of Kentucky								
Quartet	tetraploid perennial ryegrass	Ampac Seed Company					*			
Select	endophyte free tall fescue	FFR Cooperative							*	*
Slezanka	forage bluegrass	DLF-Jenks				*	*	*		
Stargrazer	tall fescue	FFR Cooperative	*	*						
Tekapo	orchardgrass	Ampac Seed Company	*	*	*					
Tuukka	timothy	Ampac Seed Company								

Table 5. Persistence of forage grasses under heavy grazing pressure by horses across years.

Variety	Species	Proprietor/KY Distributor	2000 ¹			2001			2002	
			Oct 2002 ²	Mar 2003	Oct 2003	Oct 2002	Mar 2003	Oct 2003	Mar 2003	Oct 2003
Experimental Varieties										
Benchmark Plus	orchardgrass	FFR Cooperative							*	*
K5568k	orchardgrass	Ampac Seed Company								
K5632m	prairiegrass	Ampac Seed Company								
K5633d	prairiegrass	Ampac Seed Company								
Ky31-	tall fescue	University of Kentucky					*		*	*
KYFA9301	tall fescue	University of Kentucky				*	*	*		
KYFA9304	tall fescue	University of Kentucky					*		*	*
OG9705g	orchardgrass	FFR Cooperative								
PP 10	mixture	Ampac Seed Company								
PP 11	mixture	Ampac Seed Company								
HB120	forage bluegrass	DLF—Jenks							*	
HB121	forage bluegrass	DLF—Jenks							*	
KYPP 9901	forage bluegrass	University of Kentucky							*	
S-22	forage bluegrass	Barenbrug USA							*	
VB 5649	forage bluegrass	Barenbrug USA							*	

¹ Establishment year.

² Date of visual estimation of percent stand.

* Not significantly different from the most persistent variety in the test. Shaded boxes indicate that the variety was not in the test. Open boxes indicate the variety was in the test but persistence was significantly less than the top-ranked variety in the test.

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