

2002 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 1999, 2000, and 2001. 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 ft x 15 ft 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 2001 and 2002 are presented in Table 1. After a wet spring, Kentucky experienced the fourth hottest and driest summer on record. 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 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 lo-

cation. 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, bluegrass, 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 (Tables 2, 3), while Kenblue and other bluegrasses show good tolerance (Table 4.)

Perennial ryegrasses vary in tolerance to grazing. Several ryegrasses and a ryegrass hybrid (Duo) show good survival (Tables 3, 4). Mara and Duo were among the most persistent after two seasons of grazing (Table 3).

Differences in tolerance among varieties could be due to true grazing tolerance but also to preference, especially where highly palatable species like 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 (Mara versus Polly II).

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 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 2001 and 2002 growing seasons.

	2001				2002			
	Temp		Rainfall		Temp		Rainfall	
	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	31	0	0.9	-1.9	38	+7	2.12	-0.7
FEB	40	+5	3.2	0	38	+3	1.28	-1.9
MAR	40	-4	2.7	-1.7	45	+1	7.93	3.5
APR	59	+4	1.7	-2.2	58	+3	4.19	0.3
MAY	66	+2	4.9	+0.4	61	-3	4.36	-0.1
JUN	71	-1	2.0	-1.6	74	+2	2.45	-1.2
JUL	75	-1	5.6	+0.6	78	+2	1.10	-3.9
AUG	76	+1	4.8	+0.8	77	+2	0.95	-3.0
SEP	65	-3	3.0	-0.2	72	+4	4.90	1.7
OCT	56	-1	3.6	+1.1	55	-2	5.61	3.0
NOV	51	+6	2.8	-0.6	43	-2	3.76	0.4
AVG	57.3	+0.7	3.2	-0.5	58.1	+1.6	3.5	-0.2

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

Table 2. Percent stand of forage grasses planted October 4, 1999, at Lexington, Kentucky, in a horse grazing tolerance study.

Variety	Type	Percent Stand				
		Sep 21, 2000	Apr 4, 2001	Oct 15, 2001	Apr 2, 2002	Oct 11, 2002
Commercial Varieties — Available for Farm Use						
Festorina	tall fescue ¹	95	86	67	78	67*
Benchmark	orchardgrass	98	86	66	79	63*
Cattle Club	tall fescue	97	85	70	78	63*
Tekapo	orchardgrass	99	81	70	71	61*
Haymate	orchardgrass	99	88	73	76	58*
Select	tall fescue	95	87	65	76	54*
Bronson	tall fescue	87	76	50	58	53*
Stargrazer	tall fescue	95	78	54	68	46
Ginger KB 6	Kentucky bluegrass	50	63	5	33	5
Horseblend	timothy	40	42	5	23	4
Polly II	tetraploid perennial ryegrass	61	63	5	32	3
Experimental Varieties — Not Available for Farm Use						
KYOG 2	orchardgrass	100	88	71	80	68*
OG 9705g	orchardgrass	98	88	73	82	68*
KYFA 9304	tall fescue	99	89	67	78	68*
Ky31-	tall fescue	98	87	69	81	66*
KYFA 9301	tall fescue	98	87	63	77	63*
KYTF 2	tall fescue	100	89	66	75	53*
Ampac pp6	mixture	89	79	41	58	38
Ampac pp7	mixture	72	66	32	54	30
KY-Early	timothy	45	55	3	29	8
KYPP 9301	timothy	43	53	6	31	4
Mean	-	84	77	49	63	45
CV, %	-	13.04	10.08	21.34	17.41	31.54
LSD, 0.05	-	12.50	8.87	11.87	12.48	16.21

* 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 planted September 19, 2000, at Lexington, Kentucky, in a horse grazing tolerance trial.

Variety	Type	Seedling Vigor ¹ Oct 31, 2000	Percent Stand			
			Apr 9, 2001	Oct 15, 2001	Apr 2, 2002	Oct 11, 2002
Commercial Varieties — Available for Farm Use						
Duo	festulolium	5	90	66	82	76*
Mara	diploid perennial ryegrass	5	90	77	89	73*
Cattle Club	tall fescue ²	4	90	69	78	68*
Barcarella	tall fescue	3	88	56	70	65*
Tekapo	orchardgrass	2	89	77	83	64*
Stargrazer	tall fescue	3	89	62	75	63*
Haymate	orchardgrass	3	90	68	75	53
Kokanee	tall fescue	4	90	58	73	36
Ginger	Kentucky bluegrass	1	90	9	43	8
Tuukka	timothy	2	90	18	50	6
Experimental Varieties — Not Available for Farm Use						
OG 9705g	orchardgrass	2	90	61	68	55
K5568k	orchardgrass	3	90	73	79	53
K5633d	prairie brome	5	81	8	33	4
K5632m	prairie brome	4	84	7	28	3
Mean	-	3.2	89	50	66	45
CV, %	-	18.18	2.47	22.05	19.01	27.24
LSD, 0.05	-	0.67	2.53	12.83	14.48	14.08

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

¹ Based on 0 to 5 scale with 5 being the most vigorous.

² All tall fescues are endophyte free.

Table 4. 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	
			Apr 4, 2002	Oct 15, 2002
Commercial Varieties — Available for Farm Use				
Aries	diploid perennial ryegrass	5	90	79*
Grand Daddy	tetraploid perennial ryegrass	5	90	78*
Kenblue	forage bluegrass	2	89	77*
Slezanka	forage bluegrass	3	88	74*
Platini	forage bluegrass	2	90	70*
Crown Royale	orchardgrass	4	90	66*
Albert	orchardgrass	3	90	62
Quartet	tetraploid perennial ryegrass	5	78	62
Ky31+ ²	tall fescue	4	90	60
Prairie	orchardgrass	4	90	58
Johnstone	tall fescue	4	89	48
Fure	meadow fescue	3	90	21
Clair	timothy	2	89	21
Maverick Gold	diploid perennial ryegrass	5	28	21
Colt	timothy	3	90	15
Experimental Varieties — Not Available for Farm Use				
KYFA9301	tall fescue	4	90	71*
KYFA9304	tall fescue	4	90	61
Ky31- ²	tall fescue	4	90	58
OG 9705g	orchardgrass	2	90	57
PP 10	mixture	3	88	48
PP 11	mixture	5	48	23
Mean		3.5	84	54
CV, %		12.46	5.10	26.00
LSD, 0.05		0.50	4.92	16.01

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

¹ Based on 0 to 5 scale with 5 being most vigorous.

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

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

Variety	Species	Proprietor/KY Distributor	Lexington					
			1999 ¹		2000		2001	
			April 2002 ²	Oct 2002	April 2002	Oct 2002	April 2002	Oct 2002
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	*	*				
Bronson	tall fescue	Ampac Seed Company		*				
Cattle Club	tall fescue	-	*	*	*	*		
Clair	timothy	public					*	
Crown Royale	orchardgrass	Grassland Oregon					*	*
Colt	timothy	FFR Cooperative					*	
Duo	festulolium	Ampac Seed Company			*	*		
Festorina	tall fescue	Advanta Seeds West	*	*				
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	*	*	*			
Horseblend Dolina plus Tundra	timothy	DLF-Jenks						
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					*	*
Polly II	tetraploid perennial ryegrass	FFR Cooperative						
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						
Experimental Varieties — Not Available for Farm Use								
Ampac PP7	mixture	Ampac Seed Company						
Ampac PP6	mixture	Ampac Seed Company						
K5568k	orchardgrass	Ampac Seed Company			*			
K5632m	prairiegrass	Ampac Seed Company						
K5633d	prairiegrass	Ampac Seed Company						
KY-Early	timothy	University of Kentucky						
Ky31-	tall fescue	University of Kentucky	*	*			*	
KYFA9301	tall fescue	University of Kentucky	*	*			*	*
KYFA9304	tall fescue	University of Kentucky	*	*			*	
KYOG2	orchardgrass	University of Kentucky	*	*				
KYPP9301	timothy	University of Kentucky						
KYTF2	tall fescue	University of Kentucky	*	*				
OG9705g	orchardgrass	FFR Cooperative	*	*	*		*	
PP 10	mixture	Ampac Seed Company					*	
PP 11	mixture	Ampac Seed Company						

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.