

# 1998 Cool-Season Grass Grazing Tolerance Variety Report

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## Introduction

Cool-season grasses such as tall fescue and orchardgrass are the dominant pasture grasses in Kentucky. While variety evaluations for yield have been carried out for many years, little work has been done to establish the grazing tolerance of these varieties.

This report summarizes current research on the grazing tolerance of tall fescue and orchardgrass varieties when subjected to continuous, heavy grazing pressure within the grazing season. Although some yield data are presented, the focus is on plant stand survival.

## Description of the Tests

Grass variety tests for grazing tolerance were established in Lexington in the fall of 1994, 1996, and 1997. The soils at this location are well-drained silt loams and are well suited to tall fescue and orchardgrass production. Plots were 5 by 15 feet in a randomized complete block design with each variety replicated either four times (1994 study) or six times (1996, 1997).

In each test, 20 pounds of seed per acre were planted in a prepared seedbed using a disk drill. Plots were harvested with a sickle-type mechanized harvester in the spring for yield. Fresh weights were measured in the field and converted to dry matter production using long-term averages for tall fescue and dry matter percent or oven-dried bulk samples for orchardgrass. Plots were allowed to regrow to 6 to 8 inches and then were quickly grazed down to below 4 inches by cows and/or heifers and kept at or below that height for the remainder of the grazing season. Supplemental hay was 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 and spring after each grazing season. Grass plots were fertilized with 60 pounds of actual N per acre in the spring, and other fertilizers (lime, P, and K) were applied as needed.

The varieties included in the 1994 and 1996 seedings for grazing tolerance were re-randomized and planted in a small plot yield trial operated under hay management for all cuttings (Tables 2 and 4 for tall fescue, Tables 7 and 9 for orchardgrass). These studies were seeded at the same time as the grazing tolerance plot (Tables 1 and 3 for tall fescue, Tables 6 and 8 for orchardgrass).

## Results and Discussion

Data on percent stand and on dry matter yield are presented in Tables 1 through 10. Tables 2 and 4 represent only dry matter yield data taken from tall fescue studies planted with varieties identical to those in Tables 1 and 3. Tables 7 and 9 represent a similar relationship to Tables 6 and 8 for orchardgrass. This parallel structure was meant to determine grazing tolerance and yield under the same environmental conditions.

Statistical analyses were performed on all entries (including experimentals) to determine if apparent differences are truly due to variety or just to chance. 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.

Tall fescue: Endophyte infection improved grazing tolerance (Tables 1, 3). Infected Ky 31 and Ga-Jesup persisted better than their uninfected versions. However, Cattle-Club and Richmond (both endophyte free) were as tolerant to overgrazing as Ky 31+ (Table 1). Grazing pressure was sufficient in the 1994 study to reduce stands of Stargrazer to less than half that of the most grazing-tolerant variety in the trial. This spread in survival indicates that separation of varieties was achieved in this trial. In the 1996 seeding, Festorina, Dovey, Barcel, and Stargrazer were all statistically equal to Ky 31+ (Table 3). Separation in the 1996 seeding was not as great as in the 1994 study. Areas in this study will be grazed in 1999 for a third season.

Orchardgrass: Stand survival in the 1994 seeding ranged from 3.75 percent to 18.8 percent due to winter-kill during 1996-97 (Table 6). Benchmark, Profile, and Hallmark were the most grazing tolerant in the 1996 seeding (Table 8). Some variety separations were beginning to appear even after one season of grazing (Table 9). In general, orchardgrass would be expected to be less tolerant of overgrazing than tall fescue. However, except for the winter-kill in 1996-97, both orchardgrass and tall fescue have performed similarly—at least over the short duration of these studies.

## Summary

These studies indicate tall fescue and orchardgrass varieties have been developed which express tolerance to overgrazing without going out of stand. The presence of the endophyte in tall fescue aided in tolerance to overgrazing but was not essential to stand persistence.

This information should be used along with yield information and other data (relative maturity in spring, for example) in selecting the best grass variety for each use. Tall fescue and orchardgrass should *not* be continuously overgrazed as

in this trial. While 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 indicates 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 include allowing it to become completely established before grazing and avoiding overgrazing during times of extreme stress such as drought.

**Table 1. Dry matter yields (tons/acre) and percent stand of tall fescue varieties sown September 3, 1994, in Lexington, Kentucky, for grazing tolerance purposes.**

Variety	Seedling Vigor <sup>1</sup>	Yield				Percent Stand		
	Oct 1995	May 12 1995	May 13 1996	May 20 1997	3-yr Total	Nov 1995	Dec 1996	Jun 1997
<b>Commercial Varieties - Available for Farm Use</b>								
CATTLE-CLUB	5.25	3.17*	0.65	0.59*	4.40*	82.50*	80.56*	83.75*
RICHMOND	4.00	3.28*	0.41	0.75*	4.44*	77.50*	55.56	72.50*
KY31+ <sup>2</sup>	7.00	2.86*	0.6	0.49*	3.95	77.50*	66.67	72.50*
GA JESUP +	7.25	3.33*	0.93*	0.45*	4.71*	80.00*	63.89	61.25
JOHNSTONE	5.75	3.26*	0.78*	0.64*	4.68*	78.75*	52.78	56.25
DLF-5	4.20	3.63*	0.89*	0.50*	4.98*	72.00*	44.44	48
GA JESUP -	5.00	3.70*	0.70*	0.82*	5.22*	78.75*	58.33	47.5
STARGRAZER-	5.75	3.67*	0.59	0.51*	4.77*	77.50*	41.67	35
<b>Experimental Varieties - Not Available for Farm Use</b>								
KYTF2	5.33	2.57	0.49	0.32*	3.38	80.00*	48.11	63.33*
GA JESUP +	7.25	3.33*	0.93*	0.45*	4.71*	80.00*	63.89	61.25
ISI8872	4.50	3.54*	0.63	0.33*	4.49*	76.25*	41.67	58.75
GA199B	5.50	3.46*	0.84*	0.41*	4.71*	77.50*	58.33	57.5
KY31-	6.00	3.70*	0.66	0.40*	4.91*	71.25*	58.33	56.25
KYTF1	5.00	3.70*	0.72*	0.26	4.69*	82.50*	50	56.25
TF-88-14	3.50	3.15*	0.66	0.73*	4.54*	80.00*	44.44	55
GA JESUP -	5.00	3.70*	0.70*	0.82*	5.22*	78.75*	58.33	47.5
CAS-LA34	3.50	2.97*	0.4	0.66*	4.03*	70.00*	41.67	41.25
OFI-93M	6.75	3.16*	0.55	0.48*	4.19*	72.50*	33.33	6.25
Mean	5.27	3.32	0.66	0.53	4.52	77.16	53.02	54.46
LSD, 0.05	1.64	0.93	0.26	0.52	1.27	15.7	13.22	21.7
CV, %	21.90	19.5	27.4	68.5	19.3	14.3	29.4	31.8

<sup>1</sup> Scale: 0 (not stand) - 9 (most vigor).

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

<sup>2</sup> "+" indicates variety is endophyte infected; "-" indicates variety is endophyte free. All others are endophyte free.

**Table 2. Dry matter yields (tons/acre) of tall fescue varieties sown September 3, 1994, at Lexington, Kentucky, for hay management purposes.**

Variety	Vigor <sup>1</sup>	Yield			
	Oct 5 1995	1995	1996	May 20 1997	3-Yr Total
<b>Commercial Varieties - Available for Farm Use</b>					
DLF-5	4.75	4.80*	2.37*	1.26*	8.43*
STARGRAZER- <sup>2</sup>	5.75*	4.89*	2.04*	1.23*	8.16*
GA JESUP-	5.00*	4.74*	2.15*	1.18*	8.07*
GA JESUP+	5.75*	4.40*	2.17*	1.40*	7.97*
JOHNSTONE	5.25*	4.78*	1.87	1.18*	7.83*
KY31+ <sup>2</sup>	6.25*	4.16	1.96*	1.42*	7.55*
RICHMOND	2.75	3.43	1.65	1.27*	6.35
CATTLE-CLUB	5.00	3.32	1.45	1.17*	5.94
<b>Experimental Varieties - Not Available for Farm Use</b>					
GA-199B	5.50*	4.95*	2.12*	1.38*	8.46*
OFI-93M	5.75*	5.35*	2.50*	0.55	8.39*
TF-88-14	4.50	4.58*	2.35*	1.44*	8.36*
FTF8872	4.75	4.75*	2.31*	1.24*	8.30*
KYTF1	5.75*	4.59*	2.10*	1.18*	7.87*
KYTF2	5.75*	4.31	2.07*	1.27*	7.65*
KY31-	5.75*	4.21	1.83	1.20*	7.24*
CAS-LA 34	3.25	3.58	1.82	1.24*	6.64
Mean	5.09	4.43	2.05	1.23	7.70
CV, %	20.24	16.23	21.16	17.84	15.21
LSD, 0.05	1.47	1.02	0.62	0.31	1.67
1995 total includes 4 harvests dated May 11, Jun 9, Aug 8, and Oct 30. 1996 total includes 2 harvests dated May 13 and June 10. Cuttings after June 10 were not available due to grazing damage. * Not significantly different from the highest numerical value in the column, based on the 0.05 LSD. <sup>1</sup> Vigor ratings are on a 0 to 9 scale, with 9 being most vigorous. <sup>2</sup> "+" indicates variety is endophyte infected; "-" indicates variety is endophyte free. All others are endophyte free.					

**Table 3. Dry matter yields (tons/acre) and vigor and stand ratings of tall fescue and Kentucky Bluegrass (BG) varieties sown August 23, 1996, at Lexington, Kentucky, for grazing tolerance purposes.**

Variety	Seedling Vigor <sup>1</sup>	Yield			Percent Stand			
		May 19 1997	May 22 1998	2-Yr Total	Jan 14 1998	Apr 20 1998	Jun 4 1998	Nov 22 1998
<b>Commercial Varieties - Available for Farm Use</b>								
KENBLUE (BG)	2.5	1.07	2.5	3.56	100*	78.3	68.3	80.8*
FESTORINA	5	1.83	3.32*	5.16	98.3*	86.7*	80.0*	74.2*
LATO (BG)	3	1.23	2.77	4.01	90.0	76.7	73.3*	72.5*
KY31+ <sup>2</sup>	5.5	1.96	3.31*	5.27*	98.3*	85.0*	76.7*	62.5
DOVEY	7.5*	1.17	3	4.17	91.7	86.7*	81.7*	60.00
BARCEL	4.33	1.93	3.27*	5.21	93.3*	85.0*	73.3*	59.2
STARGRAZER	5.17	2.1*	3.48*	5.58*	91.7	83.3*	73.3*	51.7
<b>Experimental Varieties - Not Available for Farm Use</b>								
KYFA9303	5.5	1.96	3.52*	5.48*	96.7*	81.7*	80.0*	70.8*
BARFA4113	5.33	1.64	3.02	4.67	95.0*	85.0*	76.7*	68.3*
BARFA2HG	3.67	1.64	3.04	4.68	90.0	78.3	75.0*	66.7*
KYFA9304	6.17	2.26*	3.58*	5.84*	100*	86.7*	78.3*	65.8
BAR-FA-6FRD	4.67	1.68	3.03	4.71	95.0*	86.7*	75.0*	65.8
KYFA9404	7.33*	1.86	3.27*	5.12	95.0*	86.7*	81.7*	65.0
KYTF2	6	2.38*	3.49*	5.87*	100*	80.0	81.7*	63.3
KYFA9403	6	2.36*	3.5*	5.86*	96.7*	85.0*	76.7*	62.5
KY31- <sup>2</sup>	6.17	2.12*	3.12	5.24*	96.7*	81.7	76.7*	62.5
KYFA9301	6	2.2*	3.46*	5.66*	100*	83.3*	78.3*	60.8
TF9201	7.33*	2.16*	3.37*	5.53*	98.3*	86.7*	78.3*	59.2
FA89K	6.17	2.12*	3.36*	5.48*	96.7*	83.3*	70.0	55.0
GA156	6	1.64	3.41*	5.05	93.3*	83.3*	66.7	50.8
KYFA9302	6.17	1.51	3.14	4.65	90.0	85.0*	76.7*	45.0
TF9005	2	1.63	2.98	4.61	78.3	78.3	71.7*	41.7
GA153	5.83	1.5	3.38*	4.88	85.0	86.7*	66.7	29.2
MEAN	5.36	1.82	3.23	5.06	94.40	83.5	75.5	60.6
CV, %	18.70	18.43	10.39	11.43	7.08	6.22	11.84	21.39
LSD, 0.05	1.15	0.39	0.38	0.66	7.60	5.90	10.20	14.80

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

<sup>1</sup> Establishment vigor rating taken October 17, 1996. 0 to 9 scale, with 9 being most vigorous.

<sup>2</sup> "+" indicates variety is endophyte infected; "-" indicates variety is endophyte free. All others are endophyte free.

**Table 4. Dry matter yields (tons/acre) of tall fescue and Kentucky bluegrass (BG) varieties sown August 23, 1996, at Lexington, Kentucky, for hay management purposes.**

Variety	1997 Total	1998 Harvests				1998 Total	2-yr Total
		May 20	Jul 10	Aug 17	Oct 29		
<b>Commercial Varieties - Available for Farm Use</b>							
Stargrazer	8.28*	3.63*	1.73*	0.58	0.25	6.19*	14.47*
KY31+ <sup>1</sup>	7.74	3.54*	1.58	0.67*	0.33	6.12*	13.86*
Dovey	6.99	3.45*	1.93*	0.72*	0.62*	6.73*	13.72*
Barcel	7.02	3.30	1.53	0.61	0.33	5.78	12.80
Festorina	7.00	2.79	1.45	0.58	0.39	5.22	12.22
Lato (BG)	5.33	2.91	1.18	0.41	0.20	4.70	10.03
Kenblue (BG)	3.81	3.02	1.04	0.28	0.27	4.61	8.42
<b>Experimental Varieties - Not Available for Farm Use</b>							
TF9201	8.81*	3.53*	1.74*	0.60	0.28	6.15*	14.96*
KYTF2	8.26*	3.77*	1.80*	0.62	0.32	6.50*	14.76*
KY31- <sup>1</sup>	8.37*	3.61*	1.62	0.63	0.44	6.30*	14.67*
KYFA9403	8.14*	3.80*	1.68	0.73*	0.32	6.53*	14.67*
KYFA9303	7.65	4.01*	1.58	0.66*	0.49	6.74*	14.39*
KYFA9304	7.77	3.54*	1.62	0.65*	0.33	6.15*	13.93*
TF9005	7.23	3.58*	1.43	0.78*	0.41	6.19*	13.42
KYFA9404	7.13	3.60*	1.53	0.60	0.51*	6.25*	13.37
BARFA4113	7.45	3.30	1.54	0.58	0.36	5.79	13.24
GA156	7.19	3.56*	1.48	0.66*	0.32	6.02*	13.20
KYFA9302	7.40	3.21	1.55	0.61	0.44	5.80	13.20
KYFA9301	7.45	3.29	1.44	0.65*	0.31	5.69	13.13
FA-89K	7.39	3.02	1.49	0.66*	0.44	5.61	13.00
BAR-FA-6FR	7.1	3.30	1.49	0.62	0.39	5.79	12.85
BARFA2HG	6.77	3.18	1.43	0.58	0.25	5.44	12.21
GA153	5.89	3.53*	1.47	0.55	0.34	5.89	11.78
Mean	7.22	3.41	1.64	0.61	0.36	5.92	13.14
CV, %	9.67	14.28	9.88	15.32	24.28	9.50	7.29
LSD, 0.05	0.99	0.69	0.21	0.13	0.12	0.79	1.35

1997 total includes 4 harvests taken May 20, Jul 9, Aug 19, and Nov 12.

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

<sup>1</sup> "+" indicates variety is endophyte infected; "-" indicates variety is endophyte free.

**Table 5. Dry matter yields (tons/acre) and stand ratings of tall fescue varieties sown September 5, 1997, at Lexington, Kentucky, for grazing tolerance purposes.**

Variety	1998 Yield May 19	Percent Stand Sep 9, 1998
<b>Commercial Varieties - Available for Farm Use</b>		
Ky31+ <sup>1</sup>	2.42*	100.0*
Johnstone	1.76	100.0*
Festorina	2.00	100.0*
Jesup	2.12	100.0*
Martin II	2.01	98.15*
Cattle-Club	1.93	98.15*
Southern Cross	1.62	90.74
<b>Experimental Varieties - Not Available for Farm Use</b>		
KYFA9302	2.03	100.0*
KYTF2	2.03	100.0*
KYFA9304	2.16*	100.0*
KYFA9301	1.97	100.0*
TF8805	2.22*	100.0*
KY31- <sup>1</sup>	2.32*	100.0*
KYFA9303	2.00	100.0*
B-1	1.64	98.15*
WVPB-TF-500	1.86	88.89
MEAN	2.01	98.38
CV, %	11.42	2.35
LSD, 0.05	0.26	2.66
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD. <sup>1</sup> "+" indicates variety is endophyte infected; "-" indicates variety is endophyte free. All others are endophyte free.		

**Table 6. Dry matter yields (tons/acre) and stand characteristics of orchardgrass varieties sown September 3, 1994, in Lexington, Kentucky, for grazing tolerance purposes.**

Variety	Seedling Vigor <sup>1</sup>	Yield <sup>2</sup>			Stand		
	Oct 5	Total 1995	Total 1996	2-Year Total	Nov 8 1995	Dec 21 1996	June 18 1997
<b>Commercial Varieties - Available for Farm Use</b>							
SHILOH	7.00*	3.42*	1.09*	4.51	78.75*	85.00*	18.80*
BENCHMARK	5.50	4.22*	1.43*	5.66*	72.50*	85.00*	15.00*
DAWN	7.25*	3.92*	0.55	4.47	58.75	65.00*	11.25*
TAKENA	6.00*	3.72*	0.92	4.64*	81.25*	70.00*	11.25*
POTOMAC	5.50	3.51*	1.21*	4.71*	57.50	80.00*	7.50
HALLMARK	6.50*	3.56*	1.20*	4.76*	78.75*	65.00*	7.50
CONDOR	6.00*	3.31	0.91	4.22	71.25*	70.00*	7.50
WARRIOR	5.75	3.29	1.16*	4.44	77.50*	65.00*	6.25
DLF-26	4.75	3.71*	0.75	4.45	78.75*	65.00*	6.25
PIZZA	5.75	3.39*	0.56	3.96	62.50	40.00	3.75
<b>Experimental Varieties - Not Available for Farm Use</b>							
GA-OG1	5.25	3.34	1.33*	4.67*	88.75*	60.00	15.00*
FOG-94	5.75	3.59*	1.03*	4.62*	70.00*	80.00*	10.00
CAS-LG4	4.50	3.44*	0.72	4.16	78.75*	75.00*	7.50
CAS-MG8	6.25*	3.96*	0.97	4.93*	78.75*	60.00	6.25
Mean	5.84	3.60	0.99	4.59	73.84	68.93	9.56
LSD, 0.05	1.38	0.86	0.46	1.05	21.88	22.20	8.21
CV, %	16.60	16.80	32.40	16.00	20.70	34.90	60.00
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.							
<sup>1</sup> Vigor ratings are on a 0 to 9 scale, with 9 being most vigorous.							
<sup>2</sup> Yields for first cutting 1997 are not reported due to winter-kill.							

<b>Table 7. Dry matter yields (tons/acre) of orchardgrass varieties sown September 3, 1994, at Lexington, Kentucky, for hay management purposes.</b>					
	<b>Seedling Vigor<sup>1</sup></b>	<b>Yield</b>			
<b>Variety</b>	<b>Oct 5, 1995</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>3-Yr Total</b>
<b>Commercial Varieties - Available for Farm Use</b>					
CONDOR	5.00	5.85*	2.86*	0.48	9.19*
BENCHMARK	6.25*	5.76*	2.46	0.81	9.03*
WARRIOR	6.00*	5.87*	2.53	0.56	8.96*
HALLMARK	6.50*	5.58*	2.52	0.80	8.89*
SHILOH	6.50*	5.41*	2.71*	0.56	8.69*
DAWN	6.75*	5.31*	2.46	0.83	8.60*
TAKENA	5.00	4.95*	2.57	0.70	8.21*
DLF-26	4.25	4.72	2.60	0.83	8.15*
PIZZA	4.75	4.48	2.47	0.48	7.43
POTOMAC	5.25	4.48	2.25	0.65	7.38
<b>Experimental Varieties - Not Available for Farm Use</b>					
GA-OG1	5.75*	5.11*	3.11*	1.24*	9.47*
FOG-94	5.25	4.69	2.41	0.68	7.79
CAS-MG8	5.75*	4.71	2.48	0.59	7.78
CAS-LG7	5.00	4.62	1.99	0.43	7.04
Mean	5.57	5.11	2.53	0.69	8.33
CV, %	15.36	14.28	12.82	33.35	11.98
LSD, 0.05	1.22	1.04	0.46	0.33	1.43
1995 total includes 4 harvests dated May 11, Jun 9, Aug 8, and Oct 30. 1996 total includes 2 harvests dated May 13 and June 10. Cuttings after June 10 were not available due to grazing damage. * Not significantly different from the highest numerical value in the column, based on the 0.05 LSD. <sup>1</sup> Establishment vigor score: 0 = least vigorous, 9 = most vigorous					



**Table 8. Dry matter yields (tons/acre) and maturity and stand ratings of orchardgrass varieties sown August 23, 1996, at Lexington, Kentucky, for grazing tolerance purposes.**

Variety	Maturity <sup>1</sup>	Yield			Percent Stand	
	May 14 1997	May 19 1997	May 26 1998	2-yr Total	Jan 14 1998	Nov 22 1998
<b>Commercial Varieties - Available for Farm Use</b>						
Benchmark	53.00*	1.42	3.46*	4.88	91.70*	76.83*
Profile	52.67*	1.49	3.38	4.87	95.00*	72.33*
Hallmark	55.17*	1.57	3.60*	5.17	95.00*	71.17*
Progress	48.00	1.15	3.15	4.30	93.30*	67.67
Potomac	52.83*	1.71	3.30	5.01	96.70*	60.17
Haymate	47.67	2.61*	3.91*	6.52*	88.30	56.33
Tekapo	46.50	1.42	3.38	4.80	65.00	43.50
<b>Experimental Varieties - Not Available for Farm Use</b>						
OG9201	43.83	1.66	3.55*	5.21	95.00*	74.17*
KYOG2	51.83*	1.28	3.76*	5.04	96.70*	72.17*
MOWTOL 85II	51.67*	1.50	3.65*	5.15	93.33*	71.17*
OG8703	54.17*	1.43	3.58*	5.01	96.70*	71.17*
9007238	52.83*	1.64	3.24	4.88	90.00	67.67*
MOWTOL GRAY	49.33*	1.79*	3.43	5.22	93.33*	60.33
<b>MEAN</b>						
	50.70	1.58	3.50	5.08	90.71	61.76
<b>CV, %</b>						
	11.21	49.24	11.58	18.37	5.89	19.21
<b>LSD, 0.05</b>						
	6.60	0.90	0.47	1.08	0.62	14.08

1997 total includes 4 harvests taken May 21, Jul 8, Aug 21, and Nov 13.

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

<sup>1</sup>Maturity rating score: 37 = flag leaf visible 45= boot swollen 50 = beginning of inflorescence 58 = complete emergence of inflorescence 62 = beginning of pollen shedding

**Table 9. Dry Matter yields (tons/acre) of orchardgrass varieties sown August 23, 1996, at Lexington, Kentucky, for hay management purposes.**

Variety	1997 Total	1998 Harvests				1998 Total	2-yr Total
		May 21	Jul 10	Aug 17	Oct 29		
<b>Commercial Varieties - Available for Farm Use</b>							
Benchmark	7.65*	2.6	1.6*	0.3*	0.26*	4.75*	12.40*
Potomac	6.24*	2.49	1.46*	0.30*	0.21*	4.46	10.71*
Hallmark	5.96*	2.48	1.47*	0.32*	0.24*	4.51	10.46*
Haymate	5.57	2.75*	1.51*	0.25	0.22*	4.73*	10.30*
Progress	6.05*	2.03	1.46*	0.33*	0.25*	4.08	10.13
Tekapo, Fndn	5.88*	2.22	1.32	0.30*	0.20*	4.03	9.91
Profile	5.65	2.26	1.34*	0.26*	0.21*	4.08	9.73
<b>Experimental Varieties - Not Available for Farm Use</b>							
OG9201	5.72*	3.15*	1.44*	0.34*	0.29*	5.23*	10.95*
MowTolGray	6.54*	2.36	1.47*	0.27*	0.19*	4.30	10.83*
OG8703	5.97*	2.79*	1.50*	0.30*	0.22*	4.81*	10.77*
MowTol85II	5.95*	2.71*	1.44*	0.31*	0.25*	4.71*	10.67*
KYOG2	5.45	2.97*	1.67*	0.34*	0.18	5.15*	10.61*
9007238	5.19	2.36	1.34	0.36*	0.26*	4.32	9.51
Mean	6.07	2.54	1.48	0.30	0.24	4.56	10.54
CV, %	22.80	13.04	19.04	23.64	32.01	9.69	14.76
LSD, 0.05	1.98	0.47	0.40	0.10	0.11	0.63	2.24

1997 total includes 4 harvests taken May 21, Jul 8, Aug 21, and Nov 13.

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

**Table 10. Dry matter yields (tons/acre) and stand ratings of orchardgrass varieties sown September 8, 1997, at Lexington, Kentucky, in a grazing trial.**

Variety	Seedling	Yield	Percent Stand
	Vigor <sup>1</sup>	May 19,1998	Sep 30,1998
<b>Commercial Varieties - Available for Farm Use</b>			
Benchmark	6.67*	1.79*	88.3*
Condor	6.67*	2.01*	85.0*
Crown	7.67*	1.60	85.0*
Haymate	6.50*	1.91*	85.0*
Warrior	7.33*	1.88*	81.7
Takena	6.67*	1.84*	81.7
Ambrosia	5.83	1.93*	78.3
Tekapo	5.83	1.59	78.3
<b>Experimental Varieties - Not Available for Farm Use</b>			
93E	6.67*	1.53	88.3*
93M	6.00	1.88*	86.7*
93L	7.00*	1.94*	86.7*
AV61	6.00	2.14*	86.7*
Mean	6.57	1.83	84.3
CV, %	17.89	17.18	5.83
LSD, 0.05	1.36	0.37	05.7

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

<sup>1</sup> Establishment vigor rating taken October 13, 1997, with 1 being weakest and 10 being most vigorous.

Table 11. Persistence of tall fescue and Kentucky Bluegrass (BG) varieties under heavy grazing pressure across years and locations.		Lexington							
		1994 <sup>1</sup>			1996			1997	
Variety	Proprietor/KY Distributor	Nov <sup>2</sup> 1995	Dec 1996	Jun 1997	Jan 1998	Apr 1998	Jun 1998	Nov 1998	Sep 1998
<b>Commercial Varieties - Available for Farm Use</b>									
Barcel	Barenbrug Research/Barenbrug				*	*	*		
Cattle-Club	Green Seed	*	*	*					*
DLF-5	D.L.F. Trifolium	*							
Dovey	Barenbrug Research/Barenbrug					*	*		
Festorina	Advanta Seeds West/Oldfields				*	*	*	*	*
GA Jesup +	Pennington Seed	*							
GA Jesup -	Pennington Seed	*							*
Johnstone	Willamette Seed Co./Public	*							*
Kenblue (BG)	KY Agric. Exp. Sta./Public				*			*	
KY31+ (Endophyte infected)	KY Agric. Exp. Sta./Public	*		*	*	*	*		*
Lato (BG)	Turf-Seed Inc.						*	*	
Martin II	International Seeds, Inc.								*
Richmond	Cascade International Seed Co,	*		*					
Southern Cross									
Stargrazer	FFR/Southern States	*				*	*		
<b>Experimental Varieties - Not Available for Farm Use</b>									
B-1	Olsen-Fennell Seeds Inc.								*
BARFA2HG	Barenbrug						*	*	
BARFA4113	Barenbrug				*	*	*	*	
BARFA6FRD	Barenbrug				*	*	*		
CAS-LA34	Cascade International Seed Co,	*							
FA89K	Barenbrug				*	*			
GA153	GA Agric. Exp. Sta./Experimental					*			
GA156	GA Agric. Exp. Sta./Experimental				*	*			
GA199B	GA Agric. Exp. Sta./Experimental	*							
KY31- (endophyte free)	KY Agric. Exp. Sta./Experimental	*			*		*		*
KYFA9301	KY Agric. Exp. Sta./Experimental				*	*	*		*
KYFA9302	KY Agric. Exp. Sta./Experimental					*	*		*
KYFA9303	KY Agric. Exp. Sta./Experimental				*	*	*	*	*
KYFA9304	KY Agric. Exp. Sta./Experimental				*	*	*		*
KYFA9403	KY Agric. Exp. Sta./Experimental				*	*	*		
KYFA9404	KY Agric. Exp. Sta./Experimental				*	*	*		
KYTF1	KY Agric. Exp. Sta./Experimental	*							
KYTF2	KY Agric. Exp. Sta./Experimental	*		*	*		*		*
ISI8872	International Seeds	*							
OFI 93M	Olsen-Fennell Seeds Inc.	*							
TF8805	FFR Cooperative								*
TF8814	Forbes Seed and Grain, Inc.	*							
TF9005	Barenbrug						*		
TF9201	FFR Cooperative				*	*	*		
WVPB TF500	Western Production Inc.								
<sup>1</sup> Establishment year <sup>2</sup> Date of measurement 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.									

Table 12. Persistence of orchardgrass varieties under heavy grazing pressure across years and locations.		Lexington					
		1994 <sup>1</sup>		1996		1997	1998
Variety	Proprietor/KY Distributor	Nov <sup>2</sup> 1995	Dec 1996	Jun 1997	Jan 1998	Nov 1998	Sep 1998
<b>Commercial Varieties - Available for Farm Use</b>							
Ambrosia	Pennington Seeds						
Benchmark	FFR/Southern States	*	*	*	*	*	*
Condor	Hansford Seed Co.	*	*				*
Crown	Scott Seed Co./Sphar Seed Co.						*
Dawn	Royal Seeds		*	*			
DLF-26	D.L.F. Trifolium	*	*				
Hallmark	James VanLeeuwen	*	*		*	*	
Haymate	FFR/Southern States						*
Pizza	Advanta Seeds West						
Potomac	USDA/Public		*		*		
Profile	J. W. Jenks Seed/Scott Seed				*	*	
Progress	J. W. Jenks Seed/Scott Seed				*		
Shiloh	Green Seed	*	*	*			
Takena	Smith Seed	*	*	*			
Tekapo, Fndn	Modern Forage Systems/Oldfields Seed						
Warrior	Olsen-Fennel Seeds Inc.	*	*				
<b>Experimental Varieties - Not Available for Farm Use</b>							
9007238	NRCS/USDA					*	
AV-61	Western Production Inc.						*
CAS-MG8	Cascade International Seed Co.	*					
CAS-LG4	Cascade International Seed Co.	*	*				
FOG-94	Forbes Seed and Grain, Inc.	*	*				
GA-OG1	University of Georgia	*		*			
KYOG2	KY Agric. Exp. Sta/Experimental				*	*	
MowTol 85 II	International Seeds, Inc.				*	*	
Mow 13 Tol	International Seeds, Inc.				*		
OFI93E	Olsen-Fennel						*
OFI93L	Olsen-Fennel						*
OFI93M	Olsen-Fennel						*
OG8703	Fine Lawn Research/Geo.W. Hill				*	*	
OG9201	J&M Seed				*	*	

<sup>1</sup> Establishment year.

<sup>2</sup> Date of measurement 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.

