

2004 Annual and Perennial Ryegrass Report

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Introduction

Annual ryegrass (*Lolium multiflorum*) and perennial ryegrass (*Lolium perenne*) are high-quality, productive cool-season grasses used in Kentucky. Both have exceptionally high seedling vigor and are highly palatable to livestock.

Annual ryegrasses are increasing in use across Kentucky as more winter-hardy varieties are released and promoted. Annual ryegrass is used primarily for extra fall, winter, and early spring pasture. Winter growth occurs only during mild winters.

Perennial ryegrass can be used as a short-lived hay or pasture plant and has growth characteristics similar to tall fescue.

This report provides current yield data on annual and perennial ryegrass varieties in trials in Kentucky, as well as guidelines for selecting varieties.

Important Considerations in Selecting a Ryegrass Variety

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 trials, such as those presented in this publication. Choose high-yielding varieties, but choose varieties that are productive during the desired season of use.

Annual ryegrass is planted in the fall and makes most of its growth from late February through June. In years when fall temperatures remain mild and ryegrass is planted in early September, there can also be substantial forage in October and November.

Perennial ryegrass is more winter-hardy and persistent than annual ryegrass (two- to three-year stand life) but less so than other cool-season grasses such as tall fescue and orchardgrass. Hot, dry summers stress perennial ryegrass more than cold winters.

Seed Quality. Buy high-quality seed that is high in germination and 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 a listing of other crop and weed seed. Order seed well in advance of planting time to assure that it will be available when needed.

Important: When seeding perennial ryegrasses for horse pasture (of any kind), insist on an endophyte-free variety of perennial ryegrass. The endophyte level will be stated on a green tag on every bag of seed. Most forage types of perennial ryegrass are endophyte free, and most new turf types are infected. This endophyte is similar to the endophyte of tall fescue (which affects pregnant mares) but is different in its effect on horses. All horses grazing endophyte-infected perennial ryegrass may develop a neurological condition known as ryegrass staggers. In addition, infected perennial ryegrass may also produce ergot-type alkaloids such as those in infected tall fescue.

Description of the Tests

Data from five studies are reported. In the fall of 2003, annual ryegrass tests were established at Bowling Green and Lexington. Perennial ryegrass tests were established in the fall of 2003 at Lexington and Bowling Green and in the fall of 2002 at Princeton. The soils at Lexington, Bowling Green and Princeton are well-drained silt loams (Maury, Pembroke and Crider, respectively) and are well suited for ryegrass production.

Seedings were made at the rate of 20 lb/A into a prepared seedbed with a disk drill. Plots were 5 by 15 feet in a randomized complete block design with four replications. Nitrogen was topdressed at 60 lb/A of actual N in March, June and August.. The tests were harvested using a sickle-type forage plot harvester. The first cutting was harvested at each location when all ryegrass varieties had reached at least the boot stage. Fresh weight samples were taken at each harvest to calculate dry matter production. Management practices for these tests regarding establishment, fertility, weed control, and harvest timing were in accordance with University of Kentucky recommendations.

Results and Discussion

Weather data for 2004 in Lexington, Bowling Green and Princeton are presented in Table 1.

Ratings for maturity and dry matter yields (tons/acre) are reported in Tables 2 through 6. Yields are given by cutting date and as total annual production. Varieties are listed by total yield in descending order. Experimental varieties, listed separately at the bottom of the tables, are not available commercially.

In most years, annual ryegrasses can be expected to die or become unproductive after mid-June in their first summer.

The perennial ryegrass tests contained several festuloliums that are hybrids of meadow fescue and perennial ryegrass, having some of the characteristics of both. Unlike annual ryegrasses, perennials should be productive under Kentucky conditions for two or more growing seasons.

Statistical analyses were performed on all data (including experimentals) to determine if the apparent differences are truly due to varietal differences or just due to chance. Varieties not significantly different from the top variety in the column are marked with one asterisk (*). To determine if two varieties are truly different, compare the difference between them to the LSD (Least Significant Difference) 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 the given locations. 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.

Tables 7 and 8 summarize information about distributors and yield performance for all varieties currently included in tests discussed in this report. Varieties are listed in alphabetical order by species, with the experimental varieties at the bottom. Remember that experimental varieties are not available for farm use, while commercial varieties can be purchased from agricultural distributors. In Tables 7 and 8, an open block indicates that the variety was not in that particular test (labeled at the top of the

column), while an (x) in the block means that the variety was in the test but yielded significantly less than the top yielding variety. A single asterisk (*) means that the variety was not significantly different from the top variety. It is best to choose a variety that has performed well over several years and locations. Remember to consider the relative spring maturity and the distribution of yield across the growing season when evaluating productivity of ryegrass varieties (Tables 2 through 6).

Summary

Selecting a good variety of annual or perennial ryegrass is an important first step in establishing a productive stand of grass. Proper management, beginning with seedbed preparation and continuing throughout the life of the stand, is necessary for even the highest-yielding variety to produce to its genetic potential.

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Table 1. Temperature and rainfall at Bowling Green, Lexington and Princeton, Kentucky in 2004.

	Bowling Green				Lexington				Princeton			
	Temperature		Rainfall		Temperature		Rainfall		Temperature		Rainfall	
	°F	DEP	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	35	+1	2.96	-0.86	30	-1	3.14	+0.28	36	+2	4.12	+0.32
FEB	39	+1	2.74	-1.39	36	+1	1.32	-1.89	39	+1	2.44	-1.99
MAR	51	+5	4.03	-1.07	47	+3	3.43	-0.97	53	+6	4.28	-0.66
APR	57	0	5.66	+1.34	55	0	3.06	-0.82	59	0	5.32	+0.52
MAY	71	+5	8.69	+3.75	68	+4	9.79	+5.32	72	+5	7.34	+2.38
JUN	74	-1	3.82	-0.35	72	0	3.13	-0.53	74	-1	3.4	-0.45
JUL	76	-2	5.46	+0.72	73	-3	7.65	+2.65	75	-3	4.87	+0.58
AUG	73	-4	4.52	+1.01	71	-4	2.91	-1.02	73	-4	3.02	-0.99
SEP	70	0	1.09	-2.63	68	0	2.61	-0.59	71	0	0.2	-3.13
OCT	62	+4	5.69	+2.67	58	+1	5.65	+3.08	64	+5	4.03	+0.98
NOV	52	+6	5.5	+1.07	49	+4	6.29	+2.90	53	+6	6.94	+2.31
Total			50.16	+4.26			48.98	+8.41			45.96	-0.13

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

Table 2. Dry matter yields (tons/acre), seedling vigor, winterkill, maturity and stand rating of annual ryegrass varieties sown September 16, 2003 at Lexington, Kentucky.

Variety	Seedling Vigor ¹	% Winterkill ²	Maturity ³	Yield (tons/acre)					% Stand	
	2003	2004		2003	2004			Total Yield	Jul 26, 2004	
	Oct 31	Mar 25	May 4	Nov 21	May 5	Jun 10	Jul 27	Total		
Commercial Varieties—Available for Farm Use										
Graze-N-Gro	5.0	8.8	54.5	1.14	2.44	1.29	0.27	3.99	5.13*	42.5
Jumbo	4.0	22.5	50.0	0.97	2.53	1.30	0.24	4.08	5.04*	30.0
Marshall	4.8	0.0	52.5	1.09	2.00	1.17	0.24	3.41	4.50*	50.0
Experimental Varieties										
MO 1	4.8	1.3	52.8	1.06	2.16	1.26	0.30	3.71	4.78*	55.0
AGRLM 109	3.8	43.8	46.3	0.88	1.43	1.23	0.86	3.52	4.40*	85.0
Ducado	4.8	28.8	55.0	1.14	1.83	1.03	0.16	3.02	4.16*	22.5
AGRLM 108	3.5	62.5	46.3	0.86	0.99	1.07	0.67	2.73	3.59*	75.0
98 PX 4003 M3	5.0	80.0	45.0	1.25	0.90	1.06	0.34	2.30	3.55*	50.0
BB-MEX 1	5.0	85.0	48.5	1.14	0.93	1.11	0.22	2.26	3.39*	16.3
Shiwasuaoba	5.0	99.0	---	1.31	0.08	0.29	0.00	0.37	1.68	0
LM2001A	4.3	99.0	---	1.09	0.06	0.24	0.08	0.37	1.46	0
Mean	4.5	48.2	50.1	1.08	1.40	1.00	0.31	2.70	3.79	38.8
CV, %	8.4	22.9	5.4	10.54	22.85	17.52	29.17	14.38	10.13	27.5
LSD, 0.05	0.5	16.0	3.9	0.16	0.46	0.25	0.13	0.56	0.55	15.4

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

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

² Winterkill represents percentage of the stand that appeared dead on March 25, 2004. Recovery occurred for some varieties as the season progressed.

³ Maturity rating scale: 37=flag leaf emergence, 45=boot swollen, 50=beginning of inflorescence emergence, 58=complete emergence of inflorescence, 62=beginning of pollen shed.

Table 3. Dry matter yields (tons/acre) and maturity rating of annual ryegrass varieties sown October 2, 2003 at Bowling Green, Kentucky.

Variety	Maturity ¹	2004 Yields		
	Apr 29, 2004	Apr 29	Jun 9	Total
Commercial Varieties—Available for Farm Use				
Graze-N-Gro	50.3	2.68	1.49	4.16*
Marshall	49.8	2.43	1.72	4.15*
Jumbo	51.5	2.37	1.67	4.04*
Jackson	53.0	2.34	1.39	3.73*
Common	54.0	2.22	1.19	3.41
Experimental Varieties				
MO 1	49.3	2.07	1.54	3.61*
AGRLM 109	45.0	2.15	1.42	3.57*
BB-MEX 1	52.5	2.17	1.31	3.48
AGRLM 108	45.0	1.95	1.19	3.14
LM2001A	45.0	1.34	1.21	2.55
Mean	49.5	2.17	1.41	3.58
CV, %	3.8	18.36	10.25	13.13
LSD, 0.05	2.8	0.58	0.21	0.68

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

¹ Maturity rating scale: 37=flag leaf emergence, 45=boot swollen, 50=beginning of inflorescence emergence, 58=complete emergence of inflorescence, 62=beginning of pollen shed.

Table 4. Dry matter yields (tons/acre), seedling vigor and maturity rating of perennial ryegrass varieties sown September 16, 2003 at Lexington, Kentucky.							
Variety	Seedling Vigor ¹	Maturity ²	2004 Yields				
	Oct 31, 2003	May 13, 2004	May 13	Jun 18	Jul 28	Oct 5	Total
Commercial Varieties—Available for Farm Use							
Bestfor Plus	5.0	57.0	3.74	0.98	0.51	0.51	5.74*
Aubisque	4.0	52.0	3.41	0.54	0.65	0.73	5.32*
Linn	3.8	58.5	3.26	0.24	0.46	0.54	4.50
Matrix	4.0	53.5	2.16	0.54	0.72	0.70	4.12
Polly Plus	5.0	62.0	2.67	0.68	0.00	0.00	3.36
Experimental Varieties							
Kentaur B	4.5	45.0	3.76	0.56	0.86	0.69	5.87*
LPTROM99	3.5	48.5	3.37	0.52	0.55	0.87	5.31*
EFP122	4.0	57.0	2.56	0.23	0.47	0.66	3.91
Mean	4.2	54.2	3.12	0.53	0.53	0.59	4.77
CV, %	8.4	3.3	21.44	13.48	22.04	23.51	17.16
LSD, 0.05	0.5	2.6	0.98	0.10	0.17	0.20	1.20
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.							
¹ Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.							
² Maturity rating scale: 37=flag leaf emergence, 45=boot swollen, 50=beginning of inflorescence emergence, 58=complete emergence of inflorescence, 62=beginning of pollen shed.							

Table 5. Dry matter yields (tons/acre) and maturity rating of perennial ryegrass, festulolium (FL) and annual ryegrass (AR) varieties sown October 2, 2003 at Bowling Green, Kentucky.						
Variety	Maturity ¹		2004 Yields			
	Apr 29, 2004	Jun, 9 2004	Apr 29	Jun 9	Jul 20	Total
Commercial Varieties—Available for Farm Use						
Bison (AR)	45.0	62.0	2.33	2.08	0.97	5.38*
Bestfor Plus	46.8	60.0	2.77	1.72	0.72	5.21*
Duo (FL)	52.0	60.5	2.13	1.39	0.44	3.96
Aubisque	45.0	61.0	1.56	1.31	0.50	3.38
Polly Plus	54.5	60.0	2.23	1.05	0.00	3.28
Matrix	45.0	61.0	1.30	0.95	0.26	2.51
Experimental Varieties						
Kentaur B	45.0	61.0	1.68	1.79	1.01	4.47
Ducado (AR)	51.3	60.5	2.03	1.08	0.00	3.11
EFP122	51.3	62.0	1.91	0.88	0.22	3.00
Shiwasuaoba (AR)	56.0	61.0	0.70	0.47	0.02	1.19
Mean	49.2	60.9	1.86	1.27	0.41	3.55
CV, %	4.5	1.7	13.26	13.62	51.68	10.73
LSD, 0.05	3.2	1.5	0.36	0.25	0.31	0.55
*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.						
¹ Maturity rating scale: 37=flag leaf emergence, 45=boot swollen, 50=beginning of inflorescence emergence, 58=complete emergence of inflorescence, 62=beginning of pollen shed.						

Table 6. Dry matter yields (tons/acre) and maturity rating of perennial ryegrass, festulolium (FL) and Kentucky bluegrass (BG) varieties sown September 25, 2002 at Princeton, Kentucky.

Variety	Maturity ¹		Yields (tons/acre)			2-yr Total
	Jun 14, 2004	2003 Total	2004 ²			
			Jun 14	Jul 21	Total	
Commercial Varieties—Available for Farm Use						
Quartet	58.5	8.66	0.65	0.39	1.04	9.70*
Bestfor	58.5	7.30	1.17	0.47	1.64	8.94*
Granddaddy	57.5	7.84	0.75	0.32	1.07	8.91*
Citadel	58.0	7.52	1.00	0.36	1.36	8.88*
Calibra	58.0	7.60	0.84	0.23	1.07	8.67*
Amazon	58.5	6.96	0.67	0.35	1.01	7.97
Duo (FL)	58.0	6.23	0.99	0.30	1.29	7.52
Aires HD	58.0	6.43	0.62	0.29	0.91	7.33
Manhattan	58.0	5.74	0.81	0.11	0.92	6.67
Maverick Gold	59.0	5.10	0.66	0.44	1.10	6.20
Linn	58.5	5.36	0.40	0.23	0.63	5.99
Experimental Varieties						
EC 410	58.0	6.54	0.49	0.46	0.95	7.49
KYLP 9801	58.0	6.05	0.47	0.26	0.73	6.77
S-22 (BG)	---	5.72	0.53	0.34	0.86	6.59
Barberia	58.0	5.15	0.43	0.35	0.78	5.93
VB 5649 (BG)	---	4.30	0.55	0.31	0.87	5.16
Mean	58.2	6.41	0.69	0.32	1.01	7.41
CV, %	1.2	11.85	21.70	47.82	23.68	9.75
LSD, 0.05	0.2	1.08	0.21	0.22	0.34	1.03

*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.
¹ Maturity rating scale: 37=flag leaf emergence, 45=boot swollen, 50=beginning of inflorescence emergence, 58=complete emergence of inflorescence, 62=beginning of pollen shed.
² This study was inadvertently mowed in late April, so there was no Spring harvest. Due to a dry September, a fall harvest was not taken.

Table 7. Performance of annual ryegrass varieties across locations.

Variety	Proprietor/KY Distributor	Lexington	Bowling Green	
		2003 ¹	2003	2003 ³
		2004 ²	2004	2004
Commercial Varieties—Available for Farm Use				
Bison	International Seeds			*
Common	Public		x	
Graze-N-Gro	Seed Research of Oregon	*	*	
Jackson	The Wax Company		*	
Jumbo	Barenbrug USA	*	*	
Marshall	The Wax Company	*	*	
Experimental Varieties				
98 PX 4003 M3	DLF International Seeds	*		
AGRLM 108	AgResearch USA Limited	*	x	
AGRLM 109	AgResearch USA Limited	*	*	
BB-MEX 1	Barenbrug USA	*	x	
Ducado	Pennington Seed, Inc.	*		x
LM2001A	Cropmark Seeds LTD	x	x	
MO 1	University of Missouri	*	*	
Shiwasuaoba	Pennington Seed, Inc.	x		x

*Not significantly different from the highest yielding variety in the test.
Open box indicates the variety was not in the test, while an (x) in the box indicates the variety was in the test but yielded significantly less than the top yielding variety.
¹ Establishment year.
² Harvest year.
³ These entries were included in the perennial ryegrass test.

Table 8. Performance of perennial ryegrass, festulolium (FL) and Kentucky bluegrass (BG) varieties across years and locations.					
Variety	Proprietor/KY Distributor	Lexington	Bowling Green	Princeton	
		2003¹	2003	2002	
		2004²	2004	2003	2004
Commercial Varieties—Available for Farm Use					
Aires HD	Ampac Seed Company			X	X
Amazon	ProSeeds Marketing			X	X
Aubisque	Seed Research of Oregon	*	X		
Bestfor	Improved Forages			X	*
Bestfor Plus	Improved Forages	*	*		
Calibra	DLF-Jenks			X	X
Citadel	Ag Canada			X	*
Duo (FL)	Ampac Seed Company		X	X	X
Granddaddy	Smith Seed Services			X	X
Linn	Public	X		X	X
Manhattan				X	X
Matrix	Cropmark Seeds LTD	X	X		
Maverick Gold	Ampac Seed Company			X	X
Polly Plus	Allied Seed, L.L.C.	X	X		
Quartet	Ampac Seed Company			*	X
Experimental Varieties					
Barberia	Barenbrug USA			X	X
EC 410	Emerald Commodities, Inc.			X	X
EFP 122	Radix Research, Inc.	X	X		
Kentaur B	DLF Internatiional Seeds	*	X		
KYLP 9801	KY Agric. Exp. Station			X	X
LPROM99	Barenbrug USA	*			
S-22 (BG)	Barenbrug USA			X	X
VB 5649 (BG)	Barenbrug USA			X	X
*Not significantly different from the highest yielding variety in the test. Open box indicates that the variety was not in the test, while an (x) in the box indicates the variety was in the test but yielded significantly less than the top yielding variety. ¹ Establishment year. ² Harvest year.					



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