

2009 Annual and Perennial Ryegrass and Festulolium 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 productive for three to four months and is used primarily for late fall and early to late spring pasture. Winter growth occurs only during mild winters. There is also increased interest in this crop for high quality baleage. There are two main types of annual ryegrasses. The most commonly used type in Kentucky is Italian ryegrass. The other is sometimes referred to as Westerwolds ryegrass. The Westerwolds type is a true annual in that stands seeded in the spring produce seedheads that summer, and there is little regrowth after seedheads are produced. Westerwolds ryegrass varieties are commonly used in the lower south (Florida to Texas) because they can be seeded in the fall and will survive the winter. In Kentucky, winter survival can be an issue for Westerwolds varieties, so before planting one of these varieties, review winter survival results for Kentucky.

Italian ryegrass is native to Southern Europe and is not a true annual. In Kentucky most varieties behave as biennials or short-lived perennials, depending on environmental conditions. Italian ryegrasses provide high yields of quality forage and show quick regrowth. If planted in the spring there will be no or few seed heads that summer (vernalization is required). Spring planting of Italian ryegrass is common in northern states (e.g., Wisconsin, Minnesota) for summer grazing, but most current varieties do not dependably survive Kentucky

summers. Italian ryegrasses are almost always planted late summer to early fall in Kentucky and typically provide forage production into early summer.

Both forage and turf types of annual ryegrasses are available. Turf types are low growing and have poor yield. Turf types are also infected with a fungal endophyte that lives inside the plant, protecting it from insect attack but producing a toxin that reduces performance of grazing animals. All turf types are infected. Plant only forage-type varieties for grazing, hay, or silage.

Perennial ryegrass can be used as a short-lived hay or pasture plant and has growth characteristics similar to tall fescue. It is more persistent than Italian ryegrass but less persistent than other cool-season grass species. It tillers more profusely but is lower growing than Italian ryegrass and will not form a seedhead in the seeding year. There are both diploid (two sets of chromosomes) and tetraploid (four sets of chromosomes) varieties of perennial ryegrass. Tetraploids have larger tillers and seedheads and wider leaves. Tetraploid types tend to be taller and less dense than diploid types even in

early stages of regrowth. Diploid types produce more tillers, have better stand persistence, and are more tolerant to heavy grazing.

Intermediate or hybrid ryegrass (*Lolium hybridum*, *Hauska*) is the result of a cross between Italian ryegrass and perennial ryegrass. It is not as winter hardy but is higher yielding than perennial ryegrass and more persistent and winter hardy than Italian ryegrass. Its uses would be similar to perennial ryegrass.

Festuloliums are hybrids between various fescues and ryegrasses with higher quality than tall fescue and improved stand survival over perennial ryegrass. Their use in Kentucky is still limited because they do not survive as long as 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. Tables 11, 12 and 13 show summaries of all annual and perennial ryegrass and festulolium varieties tested in Kentucky for the past ten years. The UK Forage Extension Web site at www.uky.edu/Ag/Forage contains electronic versions of all forage variety

Table 1. Temperature and rainfall at Lexington, Kentucky in 2007, 2008 and 2009.

	2007				2008				2009 ²			
	Temperature		Rainfall		Temperature		Rainfall		Temperature		Rainfall	
	°F	DEP ¹	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	37	+6	2.93	+0.07	33	+2	4.60	+1.74	28	-3	2.45	-0.41
FEB	27	-8	1.83	-1.38	36	+1	5.37	+2.16	38	+3	2.86	-0.35
MAR	52	+8	1.97	-2.43	45	+1	6.28	+1.88	48	+4	2.19	-2.21
APR	53	-2	3.87	-0.01	55	0	5.72	+1.84	55	0	4.48	+0.60
MAY	68	+4	1.45	-3.02	62	-2	4.88	+0.41	64	0	5.05	+0.58
JUN	74	+2	1.77	-1.89	74	+2	3.30	-0.36	74	+2	5.41	+1.75
JUL	74	-2	6.90	+1.90	76	0	2.54	-2.46	71	-5	5.89	+0.89
AUG	80	+5	2.56	-1.37	75	0	1.08	-2.85	73	-2	5.38	+1.45
SEP	72	+4	1.15	-2.05	72	+4	1.21	-1.99	68	0	5.37	+2.17
OCT	63	+6	5.28	+2.71	57	0	1.35	-1.22	54	-3	4.83	+2.26
NOV	46	+1	2.86	-0.53	43	-2	2.28	-1.11	49	+4	0.94	-2.45
DEC	40	+4	5.29	+1.31	35	-1	4.76	+0.78				
Total			37.86	-6.69			43.37	-1.18			44.85	+4.28

¹ DEP is departure from the long-term average.

² 2009 data is for eleven months through November.

testing reports from Kentucky and surrounding states and 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 trials, such as those presented in this publication. Choose high-yielding varieties, but choose varieties that are productive during the desired season of use.

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 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

Table 2. Dry matter yields, seedling vigor, maturity and stand persistence of annual ryegrass varieties sown September 21, 2006 at Lexington, Kentucky.

Variety	Seedling Vigor ¹ Nov 10, 2006	Maturity ² 2007 May 10	Percent Stand		Yield (tons/A)		
			2006	2007	2007		
			Nov 10	Mar 26	May 10	Jun 11	Total
Commercial Varieties—Available for Farm Use							
Marshall	4.0	50.5	100	100	1.82	1.19	3.00*
Stockaid	4.5	52.0	100	100	1.57	0.88	2.46
Jackson	4.8	51.0	100	95	1.05	0.82	1.87
Fantastic	4.3	54.5	100	73	0.61	0.82	1.43
Flying A	4.0	54.0	100	48	0.50	0.67	1.16
Abundant	3.8	55.0	100	6	0.07	0.28	0.36
T-Rex	3.8	54.5	100	2	0.03	0.32	0.34
Diamond T	3.8	53.3	100	3	0.00	0.25	0.25
Experimental Varieties							
NE/FL2005misc2xLRCT	5.0	52.5	100	100	1.61	1.07	2.69*
NE/FLNewSelect17LRCT	4.3	51.5	100	100	1.59	0.96	2.55
ME4	4.0	50.5	100	98	1.39	1.02	2.41
ME94	4.5	50.0	100	99	1.44	0.93	2.37
FL/NE2006 Misc2xLRCT	5.0	52.0	100	100	1.46	0.89	2.35
WMN97	3.5	51.5	100	97	1.41	0.91	2.32
Florlina	4.3	53.0	100	97	1.20	0.93	2.13
FKx2006PE LRCT	4.5	53.5	100	100	1.28	0.72	2.00
FLx2004(new4)LRCT	3.3	54.0	100	87	0.79	0.93	1.72
KYLM 9801	4.3	55.5	100	38	0.38	0.70	1.08
M/FL2006G4xER	4.0	55.0	100	9	0.07	0.22	0.29
AM-4N-06	4.0	53.3	100	4	0.02	0.26	0.28
Mean	4.2	52.8	100.0	67.6	0.92	0.74	1.65
CV,%	12.0	2.4	0.0	12.9	15.45	31.42	17.75
LSD,0.05	0.7	1.9	0.0	12.4	0.20	0.33	0.42

¹ Vigor score based on 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.

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

turf types are infected. This endophyte is similar to the endophyte of tall fescue and produces alkaloids that are toxic to cattle and horses.

continued on page 4.

Table 3. Dry matter yields, seedling vigor, maturity and stand persistence of annual ryegrass varieties sown September 6, 2007 at Lexington, Kentucky.

Variety	Seedling Vigor ¹ Oct 25, 2007	Maturity ² 2008			Percent Stand		Yield (tons/A)					
		2008			2007	2008	2008					
		Apr 23	May 17	Jun 11	Oct 25	Mar 27	Dec 18	Apr 23	May 17	Jun 11	Jul 1	Total
Commercial Varieties—Available for Farm Use												
Jackson	4.3	32.8	45.0	62.0	100	98	0.61	1.58	0.74	0.68	0.13	3.74*
Marshall	3.5	33.0	46.3	61.5	100	100	0.39	1.56	0.81	0.75	0.13	3.63*
DH-3	3.3	32.8	52.0	61.5	100	95	0.55	1.17	0.77	0.68	0.13	3.30
Striker	4.3	32.3	52.5	61.0	98	89	0.54	1.03	0.83	0.70	0.16	3.26
Fantastic	2.3	33.3	46.8	62.0	97	99	0.30	1.47	0.68	0.53	0.07	3.06
Gulf	4.0	31.5	58.0	61.5	100	66	0.63	0.55	0.62	0.54	0.10	2.45
Graze-N-Gro	3.5	31.8	54.5	61.0	99	63	0.53	0.54	0.70	0.51	0.15	2.43
Experimental Varieties												
LM5005B	2.8	31.0	48.8	60.0	96	75	0.28	0.75	0.89	0.79	0.24	2.94
Mean	3.5	32.3	50.5	61.3	98.6	85.5	0.48	1.08	0.75	0.65	0.14	3.10
CV,%	31.6	2.1	4.7	1.4	2.6	12.4	31.0	15.1	10.5	8.4	30.2	8.2
LSD,0.05	1.6	1.0	3.5	1.3	3.8	15.5	0.22	0.24	0.12	0.08	0.06	0.37

¹ Vigor score based on 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.

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

Table 4. Dry matter yields, seedling vigor, maturity and stand persistence of annual ryegrass varieties sown September 11, 2008 at Lexington, Kentucky.

Variety	Seedling Vigor ¹ Oct 21, 2008	Maturity ²		Percent Stand			Yield (tons/A)				
		2009		2008	2009	2008	2009				
		May 10	Jun 5	Oct 21	Apr 6	Dec 22	May 10	Jun 5	Jun 29	Aug 7	Total
Commercial Varieties—Available for Farm Use											
Acrobat	3.0	49.8	53.0	100	98	0.06	1.96	1.02	1.02	0.88	4.94*
Marshall	4.3	54.0	55.0	98	99	0.21	2.01	0.96	0.15	0.09	3.42
Bruiser	4.8	54.7	54.7	98	73	0.25	1.25	0.58	0.12	0.05	2.24
Jackson	4.3	54.7	55.3	98	74	0.14	1.33	0.44	0.07	0.05	2.02
Flying A	4.1	54.0	59.0	98	49	0.19	1.03	0.61	0.13	0.06	2.02
Tam 90	3.3	54.5	56.5	100	49	0.07	1.05	0.32	0.06	0.15	1.66
TAMTBO	3.5	54.0	57.0	97	21	0.20	0.85	0.39	0.12	0.05	1.61
TetraPro	4.0	56.0	56.0	97	14	0.14	0.61	0.34	0.09	0.19	1.36
Feast II	3.5	45.0	56.0	99	2	0.04	0.24	0.20	0.20	0.51	1.19
DH-3	4.3	55.5	60.7	100	13	0.14	0.47	0.26	0.01	0.04	0.92
Gulf	3.8	56.0	60.0	100	9	0.25	0.29	0.19	0.01	0.14	0.89
Experimental Varieties											
IS-LMT 6	3.3	47.5	52.8	97	87	0.13	2.02	1.12	1.11	0.86	5.24*
IS-LMT 5	3.6	45.0	55.0	98	95	0.07	2.14	0.84	0.90	0.74	4.68*
IS-LMD 7	3.5	45.0	51.5	100	100	0.07	1.84	0.75	0.68	0.88	4.23*
FL/NE2006 (misc2X)LRLT	2.8	52.5	54.0	98	98	0.11	2.14	0.78	0.15	0.09	3.27
ME 4	3.5	53.0	55.5	99	100	0.13	1.69	0.91	0.13	0.10	2.97
PSG 29 BF06	2.5	45.0	52.0	96	61	0.05	1.26	0.46	0.59	0.45	2.81
ME 94	3.0	52.5	55.5	98	98	0.05	1.77	0.84	0.11	0.04	2.81
07-WW	4.0	54.0	55.0	99	85	0.12	1.67	0.55	0.18	0.14	2.66
AM-4N-06	4.0	55.3	57.3	96	5	0.17	0.39	0.27	0.09	0.15	1.07
TXR 2006-T22	3.0	50.3	60.0	96	1	0.07	0.19	0.30	0.05	0.04	0.64
Mean	3.6	51.7	55.5	98.1	58.4	0.13	1.25	0.58	0.28	0.27	2.51
CV,%	21.1	3.5	3.9	2.7	35.7	94.59	36.58	42.24	50.31	65.82	30.49
LSD,0.05	1.1	2.8	3.5	3.7	29.5	0.17	0.64	0.35	0.20	0.25	1.08

¹ Vigor score based on 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.

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

Table 5. Dry matter yields, seedling vigor, maturity and stand persistence of perennial ryegrass varieties sown September 7, 2006 at Lexington, Kentucky.

Variety	Seedling Vigor ¹ Oct 25, 2006	Maturity ²		Percent Stand						Yield (tons/A)				
		2007	2008	2006	2007		2008		2009	2007	2008		2-yr Total	
		May 9	May 23	Oct 25	Mar 26	Oct 11	Apr 3	Nov 18	Apr 7	Total	May 23	Jul 1		Total
Commercial Varieties—Available for Farm Use														
RAD-MI125	4.5	32.8	46.3	100	98	97	94	74	0 ³	3.46	1.71	0.35	2.06	5.53*
Granddaddy	3.8	32.0	54.5	100	100	75	98	70	0	2.90	1.65	0.11	1.77	4.67
Linn	3.8	52.5	59.5	100	100	100	100	86	0	2.67	1.73	0.11	1.84	4.51
GreenGold	3.3	32.3	47.0	100	100	98	98	79	0	3.04	1.16	0.20	1.36	4.40
BG34	3.8	32.3	44.8	100	100	97	99	65	0	2.83	0.86	0.21	1.07	3.90
Experimental Varieties														
ORTET-05	3.8	33.0	52.0	100	100	99	100	91	0	3.51	2.06	0.18	2.24	5.75*
GO-ABE	4.5	52.0	57.5	100	96	83	45	23	0	2.97	1.40	0.38	1.78	4.74
KRC-6576	4.8	32.3	47.3	100	100	99	99	86	0	3.05	1.30	0.29	1.59	4.64
KRC-6577	3.3	31.3	32.0	100	100	98	96	88	0	3.24	0.93	0.34	1.27	4.51
KRC-6578	4.3	31.8	36.3	100	98	98	95	85	0	3.02	1.02	0.30	1.32	4.34
GO-ABD	4.3	32.3	52.5	100	98	97	94	84	0	2.66	1.08	0.26	1.34	4.00
KRC-6579	3.3	31.0	33.0	100	100	98	95	83	0	2.72	0.92	0.28	1.19	3.91
KRC-6554	2.8	31.0	39.0	100	100	77	98	75	0	2.59	0.79	0.23	1.02	3.61
GO-ABA	3.5	31.8	40.5	100	100	97	93	90	0	2.54	0.77	0.24	1.01	3.55
KRC-6575	4.0	31.3	32.5	100	100	97	98	69	0	2.27	0.87	0.19	1.06	3.33
Mean	3.8	34.6	45.0	100.0	99.3	93.8	93.3	76.4		2.90	1.22	0.24	1.46	4.36
CV,%	15.5	1.9	10.8	0.0	1.3	17.0	5.7	14.1		10.0	11.6	19.5	10.3	7.8
LSD,0.05	0.8	1.0	6.9	0.0	1.8	22.7	7.6	15.4		0.41	0.20	0.07	0.21	0.49

¹ Vigor score based on 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.

³ Due to winterkill there was not enough ryegrass greenup to get a stand rating.

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

Table 6. Dry matter yields, seedling vigor, maturity and stand persistence of perennial ryegrass and festulolium (FL) varieties sown September 6, 2007 at Lexington, Kentucky.

Variety	Seedling Vigor ¹ Oct 25, 2007	Maturity ²		Percent Stand					Yield (tons/A)					2-year Total	
		2008	2009	2007	2008		2009		2008	2009					
		May 13	May 21	Oct 25	Mar 26	Oct 21	Apr 7	Oct 30	Total	May 21	Jun 16	Aug 7	Oct 20		Total
Commercial Varieties—Available for Farm Use															
SpringGreen (FL)	2.8	51.0	55.0	98	100	97	40	59	4.85	0.99	0.53	1.16	0.41	3.09	7.95*
Boost	3.3	50.3	54.5	98	99	97	43	59	4.50	1.18	0.37	1.26	0.43	3.24	7.74*
Eurostar	1.8	37.8	50.3	97	99	98	58	84	3.90	0.97	0.36	1.12	0.67	3.12	7.02*
Power	1.8	46.3	52.5	98	100	98	45	71	4.10	0.73	0.47	0.95	0.51	2.65	6.76
Granddaddy	2.3	51.5	56.0	98	100	99	50	88	3.60	0.97	0.39	1.14	0.47	2.96	6.56
Linn	3.0	56.0	57.0	100	100	100	26	51	3.18	0.61	0.24	0.78	0.20	1.83	5.02
Feeder	1.8	36.3	32.0	100	100	97	28	46	3.17	0.39	0.20	0.62	0.30	1.50	4.67
Quartet	4.3	32.8	—	100	73	80	0	2	2.43	0.00	0.02	0.16	0.10	0.28	2.71
Experimental Varieties															
KYFA 9819 (FL)	1.8	49.8	54.0	93	99	97	26	31	4.76	0.88	0.37	0.95	0.26	2.46	7.22*
KYFA 0236 (FL)	3.0	46.3	45.0	99	100	100	1	10	4.83	0.12	0.45	1.00	0.21	1.77	6.60
LP2006DA	4.0	43.3	—	100	31	56	0	3	2.60	0.01	0.00	0.19	0.21	0.40	3.01
Mean	2.7	45.5	51.6	98.3	90.7	92.5	28.8	45.9	3.81	0.62	0.31	0.85	0.34	2.12	5.93
CV,%	26.0	9.4	3.3	1.9	16.4	10.6	57.4	41.3	9.36	46.54	42.30	37.12	29.34	24.58	11.54
LSD,0.05	1.0	6.2	2.7	2.8	21.5	14.2	23.9	27.4	0.52	0.42	0.19	0.45	0.14	0.75	0.99

¹ Vigor score based on 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.

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

Description of the Tests

Data from six studies are reported. Annual ryegrass tests were established in the fall of 2006, 2007 and 2008 at Lexington. Perennial ryegrass (with festulolium) tests were established at Lexington in the fall of 2006, 2007 and 2008. The soil at Lexington is a well-drained silt loam (Maury) and is well suited for ryegrass production.

Seedlings were made at the rate of 25 lb/A into a prepared seedbed with a disk drill. Plots were 5 by 20 feet in a randomized complete block design with four replications with a harvested plot area of 5 by 15 feet. Nitrogen was topdressed at 60 lb/A of actual N in March, May, 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 Lexington are presented in Table 1.

Ratings for maturity and dry matter yields (tons/A) are reported in Tables 2 through 7. Yields are given by cutting date and as total annual production. Stated

Table 7. Dry matter yields, seedling vigor, maturity and stand persistence of perennial ryegrass, festulolium (FL) and tall fescue (TF) varieties sown September 11, 2008 at Lexington, Kentucky.

Variety	Seedling Vigor ¹ Oct 21, 2008	Maturity ²		Percent Stand			Yield (tons/A)				
		2009	2008	2008	2009		2009				
		May 21	Oct 21	Apr 7	Oct 30	May 13	Jun 29	Aug 13	Oct 21	Total	
Commercial Varieties—Available for Farm Use											
SpringGreen (FL)	4.3	57.0	100	100	98	3.70	0.72	0.53	0.83	5.78*	
Boost	3.5	55.5	99	100	99	3.44	0.74	0.51	0.69	5.37*	
Ortet	3.9	56.0	97	100	98	3.29	0.68	0.50	0.57	5.05*	
Duo (FL)	5.0	59.0	100	100	89	3.31	0.88	0.29	0.52	4.99*	
Sweet Tart (FL)	4.8	57.0	100	100	98	2.67	0.58	0.44	0.73	4.41	
Power	3.8	55.0	100	100	100	2.73	0.42	0.39	0.82	4.36	
Calibra	3.8	52.8	100	100	100	2.58	0.37	0.39	0.74	4.07	
Herbal	3.1	47.8	100	100	100	1.99	0.39	0.34	0.71	3.42	
Linn	3.5	58.5	99	100	100	2.23	0.26	0.37	0.53	3.38	
Experimental Varieties											
RAD-CPS211	3.8	55.5	99	100	98	3.34	0.83	0.65	0.81	5.63*	
PSG 47 MOL	4.0	56.0	78	100	98	2.98	0.98	0.38	0.69	5.03*	
PSG AM 108	4.0	56.0	100	100	99	3.21	0.42	0.44	0.79	4.85	
AGRFA 174 (TF)	1.8	58.0	98	99	100	1.73	0.59	0.68	1.10	4.10	
WFLS (FL)	5.0	57.0	100	73	26	2.86	0.68	0.19	0.24	3.97	
KFa 605 (TF)	1.8	57.0	98	99	100	1.68	0.45	0.55	1.01	3.69	
Mean	3.7	55.9	97.7	98.0	93.4	2.78	0.60	0.44	0.72	4.54	
CV,%	12.8	4.5	12.1	7.2	3.9	18.54	25.44	18.49	18.83	12.71	
LSD,0.05	0.7	3.6	16.8	10.1	5.2	0.74	0.22	0.12	0.19	0.82	

¹ Vigor score based on 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.

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

yields are adjusted for percent weeds; therefore, the tonnage given is for crop only. 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. Unlike annual ryegrasses, perennials should be productive under Kentucky conditions for an average of two to three growing seasons.

The perennial ryegrass tests contained several festuloliums that are hybrids of meadow fescue and perennial ryegrass and have some of the characteristics of both. The festuloliums were in fescue trials from 1999-2005.

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 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 the given locations. The Coefficient of Variation (CV) is a measure of the variability of the data and is included for each column of

Table 8. Performance of annual ryegrass varieties sown in 2008 at Lexington.¹

Variety	Type	Proprietor/KY Distributor	Lexington	
			2008 ²	2009 ³
Commercial Varieties—Available for Farm Use				
Acrobat		ProSeeds Marketing		*
Bruiser	Westerwold diploid	Ampac Seed		x ⁴
DH-3	Westerwold diploid	Allied Seed		x
Feast II	Italian tetraploid	Ampac Seed		x
Flying A	Westerwold diploid	Oregro Seeds		x
Gulf	Westerwold diploid	Public		x
Jackson	Westerwold diploid	The Wax Company		x
Marshall	Westerwold diploid	The Wax Company		x
Tam 90	Italian diploid	Texas A&M		x
TAMTBO	Italian tetraploid	Oregro Seeds		x
TetraPro	Italian tetraploid	Texas A&M		x
Experimental Varieties				
AM-4N-06	Westerwold tetraploid	Ampac Seed		x
FL/NE2006 (misc2x)LRLT	Westerwold diploid	Oregro Seeds		x
IS-LMD 7	Italian diploid	DLF International		*
IS-LMT 5	Italian tetraploid	DLF International		*
IS-LMT 6	Italian tetraploid	DLF International		*
ME4	Westerwold diploid	The Wax Company		x
ME-94	Westerwold diploid	The Wax Company		x
PSG 29 BF06	Italian tetraploid	Pick Seeds West		x
TXR 2006-T22	Italian tetraploid	Texas A&M		x
07-WW	Westerwold diploid	Oregro Seeds		x

¹ See Table 11 for yield data on named varieties from 1999-2009.
² Establishment year.
³ Harvest year.
⁴ X in the box indicates the variety was in the test but yielded significantly less than the top yielding variety. Open boxes indicate the variety was not in the test.
* Not significantly different from the highest yielding variety in the test.

means. Low variability is desirable; increased variability within a study results in higher CVs and larger LSDs.

Tables 8, 9 and 10 summarize information about distributors and yield performance for all annual and perennial ryegrass and festulolium 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; commercial varieties can be purchased from agricultural distributors. In Tables 8, 9 and 10, an open block indicates that the variety was not in that particular

Table 9. Performance of perennial ryegrass across years.

Variety (ploidy)	Proprietor/KY Distributor	Lexington		
		2007 ¹	2008 ²	2009
Commercial Varieties—Available for Farm Use				
Boost (tetraploid)	Allied Seed	*	*	*
Calibra (tetraploid)	DLF International			x ³
Eurostar (tetraploid)	Seed Research of Oregon	x	*	
Feeder (diploid)	Seed Research of Oregon	x	x	
Granddaddy (tetraploid)	Smith Seed Services	x	*	
Herbal	ProSeeds Marketing			x
Linn (diploid)	Public	x	x	x
ORTET (tetraploid)	Oregro Seeds, Inc.			*
Power (tetraploid)	Ampac Seed Company	x	*	x
Quartet (tetraploid)	Ampac Seed Company	x	x	
Experimental Varieties				
LP2006DA (tetraploid)	Cropmark Seeds	x	x	
PSG AM 108 (tetraploid)	Pickseed West			x
PSG 47 MOL (tetraploid)	Pickseed West			*
RAD-CPS211 (tetraploid)	Radix Research			*

¹ Establishment year.
² Harvest year.
³ X in the box indicates the variety was in the test but yielded significantly less than the top yielding variety. Open boxes indicate the variety was not in the test.
* Not significantly different from the highest yielding variety in the test.

Table 10. Performance of festulolium varieties at Lexington.

Variety	Proprietor/KY Distributor	Lexington		
		2007 ¹	2008 ²	2009
Commercial Varieties—Available for Farm Use				
Duo	Ampac Seed			*
SpringGreen	Turf Seed	*	*	*
Sweet Tart	ProSeeds Marketing			x ³
Experimental Varieties				
KYFA 0236	KY. Agric. Exper. Sta.	*	*	
KYFA 9819	KY. Agric. Exper. Sta.	*	x	
WFLS	Rose AgriSeed			x

¹ Establishment year.
² Harvest year.
³ X in the box indicates the variety was in the test but yielded significantly less than the top yielding variety. Open boxes indicate the variety was not in the test.
* Not significantly different from the highest yielding variety in the test.

Table 11. Summary of Kentucky Annual Ryegrass Yield Trials 1999-2009 (yield shown as a percentage of the mean of the commercial varieties in the trial).

Variety	Proprietor	Lexington ¹							Princeton			Bowling Green		Mean ⁴ (#trials)	
		1999 ^{2,3}	2001	2003	2004	2005	2006	2007	2008	2000	2002	2004	2000		2003
All trials are 1 year yields															
Abundant						26									-
Acrobat	Proseeds Marketing							244							-
Andy	DLF International	112	105						99						105(3)
Angus I	DLF International										80				-
Aurelia	Forage Genetics		120								130				125(2)
Avance	DLF International	113							109						111(2)
Barextra	Barenbrug									117					-
Big Daddy	FFR/Sou. St.	87	86						90	85		104			90(5)
Bruiser	Ampac Seed							111							-
Common	Public								85	85		95	87		88(4)
DH-3	Allied Seed						106	45							76(2)
Diamond T						18									-
Domino	DLF International									121					-
Fantastic	Ampac Seed	83				105	98		90			97			92(4)
Feast	Ampac Seed		90												-
Feast II	Ampac Seed		98					59		123					93(3)
Flying A	Oregro Seeds					85		100							-
Graze-N-Gro	Seed Research of OR			105				78			94		107		96(4)
Gulf	Public		72					78	44	81	77	57	86		71(7)
Hercules	Barenbrug	114								110					112(2)
Jackson	The Wax Co.				80	100	138	120	100		87			96	97(6)
Jeanne	DLF International		124												-
Jumbo	Barenbrug			103										104	104(2)
King	Lewis Seed		92												-
Marshall	The Wax Co.	87		92	120	100	221	116	169	102	97		114	106	110(10)
Monarque	Seed Research of OR										117				-
Passerel Plus	Pennington Seed										100				-
Rio		88								100	97		102		97(4)
Spark	DLF International	87											83		85(2)
Stockaid						181									-
Striker	Seed Research of OR							104							-
TAMTBO	Oregro Seeds								80						-
Tam 90									82		85				84(2)
TetraPro									67						-
Tetrelite II	DLF International										122				-
T-Rex						25									-
Winter Star	Ampac Seed		87								96				92(2)
Zorro	DLF International	120	127							135	130		118		126(5)

¹ In annual ryegrass, low yielding varieties usually result from winterkill. Note: Due to severe winterkill, yield results from the 2006 planting were not included in the overall mean. See Table 2 for yield and stand data for the 2006 planting.

² Year trial was established.

³ Use this summary table as a guide in making variety decisions, but refer to specific yearly reports to determine statistical differences in forage yield between varieties. To find actual yields, look in the yearly report for the final year of each specific trial. For example, the Lexington trial planted in 1999 was harvested 1 year, so the final report would be "2000 Annual and Perennial Ryegrass Report" archived in the KY Forage website at <www.uky.edu/Ag/Forage>.

⁴ Mean only presented when respective variety was included in two or more trials.

test (labeled at the top of the column); 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, based on the 0.05 LSD. 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 7).

Tables 11, 12 and 13 are summaries of yield data from 1999 to 2009 of commercial varieties that have been entered in the Kentucky trials. The data is 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 yielded better than average, and varieties with percentages less than 100 yielded lower than average. Direct, statistical comparisons of varieties cannot be made using the summary Tables

11, 12 and 13, but these comparisons do help to identify varieties for further consideration. Varieties that have performed better than average over many years and at several locations 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 11, 12 and 13 to determine which yearly report to refer to.

Table 12. Summary of Kentucky Perennial Ryegrass Yield Trials 1999-2009 (yield shown as a percentage of the mean of the commercial varieties in the trial).

Variety	Proprietor	Lexington							Princeton		Bowling Green		Mean ^{3,4} (#trials)
		1999 ^{1,2} 2yr ⁵	2001 2yr	2003 2yr	2004 3yr	2005 3yr	2006 2yr	2007 2yr	2000 2yr	2002 3yr	2000 2yr	2003 2yr	
Aires	Ampac Seed		95							93			94(2)
Amazon	AgriBioTech	108			99					107			104(3)
Anaconda	Caudill Seed	113							95		103		104(3)
Aubisque	Seed Research of OR			144								99	122(2)
Bandit	Grassland West								106		114		110(2)
Bastion C-2	Seed Research of OR				91								-
Bestfor	Improved Forages								113	107	120		113(3)
Bestfor Plus	Improved Forages			116	108	118						136	120(4)
BG-34	Barenbrug					83	85						84(2)
Bison	International Seeds											140	-
Boost	Allied Seed							128					-
Boxer	AgriBioTech	121							106				114(2)
Calibra	DLF International									112			-
CAS MP64	Cascade International		97										-
Citadel	Ag Canada	101							94	113	103		103(4)
Derby	Public										74		-
Eurostar	Seed Research of OR							116					-
Feeder	Seed Research of OR							77					-
Granddaddy	Smith Seed		118				101	108		111			110(4)
GreenGold	Grasslands Oregon						96						-
Lasso	DLF International		98										-
Linn	Public	87	98	98	102		98	83	87	88	77		91(9)
Manhattan										85			-
Mara	Barenbrug										85		-
Matrix	Cropmark seeds			77								64	-
Maverick Gold	Ampac Seed		97							71			84(2)
Polly II	FFR/Sou. St.	104							110		125		113(3)
Polly Plus	Allied Seed			64								60	62(2)
Power	Ampac Seed							112					-
Quartermaster	Radix Research					122							-
Quartet	Ampac Seed		97			56		45		113			78(4)
RAD-CPS212	Radix Research					134							-
RAD-MI125	Mountain View Seeds						120						-
Sampson	International Seeds	87											-
Sierra	Lewis Seed Co.					89							-
Tonga	Kings AgriSeeds					96							-
Yatsyn	Barenbrug	80							89				85(2)

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 forage yield between varieties. To find actual yields, look in the yearly report for the final year of each specific trial. For example, the Lexington trial planted in 1999 was harvested 2 years, so the final report would be "2001 Annual and Perennial Ryegrass Report" archived in the KY Forage website at <www.uky.edu/Ag/Forage>.

³ Mean only presented when respective variety was included in two or more trials.

⁴ In perennial ryegrass, low yielding varieties usually result from winterkill or summer mortality.

⁵ Number of years of data.

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.

The following is a list of University of Kentucky Cooperative Extension publications related to ryegrass management. They are available from your county Extension office and at www.uky.edu/Ag/Forage.

- AGR-1—Lime and Fertilizer Recommendations
- AGR-18—Grain and Forage Crop Guide for Kentucky
- AGR-64—Establishing Forage Crops
- AGR-175—Forage Identification and Use Guide
- AGR-179—Annual Ryegrass
- ID-142—New Recommendations for Perennial Ryegrass Seedings for Kentucky Horse Farms
- ID-147—Establishing and Managing Horse Pastures

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Table 13. Summary of Kentucky Festulolium Yield Trials 1999-2009 (yield shown as a percentage of the mean of the commercial varieties in the trial).¹

Variety	Proprietor	Lexington					Princeton	Quicksand		Mean ⁴ (#trials)
		1999 ^{2,3} 2-yr ⁵	2001 3-yr	2003 2-yr	2005 3-yr	2007 2yr	2000 2-yr	2001 2-yr	2003 2-yr	
Duo	Ampac Seed	104			84					94(2)
Felina	DLF International		101							-
Hykor	DLF International			98					98	98(2)
Spring Green	Turf-Seed		88		105	101		97		98(4)
Vorage	Improved Forages						99			-

¹ The festuloliums were in fescue trials from 1999-2005.

² Year trial was established.

³ Use this summary table as a guide in making variety decisions, but refer to specific yearly reports to determine statistical differences in forage yield between varieties. To find actual yields, look in the yearly report for the final year of each specific trial. For example, the Lexington trial planted in 1999 was harvested 2 years, so the final report would be "2001 Tall Fescue Report" archived in the KY Forage website at <www.uky.edu/Ag/Forage>.

⁴ Mean only presented when respective variety was included in two or more trials.

⁵ Number of years of data.



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