

1994 Kentucky Tall Fescue Variety Test Report

L.M. Lauriault, J.C. Henning, T.D. Phillips, G.D. Lacefield, and T.G. Gray

Introduction

Tall fescue is a soil conserving, productive, well-adapted, persistent, cool- season grass that is grown on approximately 5.5 million acres in Kentucky. This grass is used for both hay and pasture and is the forage base of most of Kentucky's livestock enterprises, particularly beef cattle.

Much of the tall fescue in Kentucky is infected with an internal fungus (endophyte) that results in decreased weight gains in growing ruminants and lower pregnancy rates in breeding stock, especially in hot weather. Varieties are now available that are free of this fungal endophyte.

This publication will summarize data on the yield of many newer varieties and give guidelines for selecting a variety.

Important Considerations in Selecting a Tall Fescue Variety

Local Adaptation and Seasonal Yield. The variety should be adapted to Kentucky as indicated by 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.

Tall fescues are often classified as either "Mediterranean" or "European" types according to the area from which the parental material for the variety came. In general, the Mediterranean types (Cajun, for example) are more productive in the fall and winter than the European types such as Kentucky 31. While they mature earlier in the spring, the Mediterranean types become very dormant and non-productive during the summer in Kentucky and are more susceptible than European varieties to some leaf diseases, such as *Helminthosporium* and *Rhizoctonia*. Therefore, Mediterranean varieties are less preferred for use in Kentucky than European types. Because Mediterranean varieties mature earlier in the spring, first cutting yields are generally higher for these varieties when the two types are harvested at the same time. However, the European types produce more in the summer, allowing for extended grazing.

Endophyte Level. Make sure the seed has been tested for endophyte content. Seed with infection levels of less than 5% are regarded as being endophyte-free. This information will be prominently displayed on a green tag attached to the seed bag. If no tag is present, assume the seed is infected with the endophyte. Several varieties, both with and without the endophyte, are adapted for use in Kentucky as determined by the tests in this report.

Seed Quality. Buy either certified or Plant Variety Protected (PVP) seed, which will guarantee that the genetics and performance you are paying for are in the bag. Look for the blue tag, which must be attached to all bags of certified seed or look for Plant Variety Protection labelling, which is the proprietor's guarantee. Other information on the label will include the test date, which must be within the previous nine months, and the level of germination and other crop and weed seed. Order seed well in advance of planting time to assure that it will be available when needed.

Description of the Tests

Data from three studies will be reported. Plots of tall fescue varieties were sown in Lexington

and Princeton in the late summer of 1992 and again in Lexington in the late summer of 1993 as part of the Kentucky Forage Variety Testing Program. The objective of these studies was to compare dry matter yields of tall fescue varieties under simulated grazing and hay management schemes in different environments.

Seedlings were made at the rate of 20 lb/A into a prepared seedbed with a disk drill. To aid establishment 25 lb/A of nitrogen was applied and incorporated prior to planting. Plots were 4' x 15' in a randomized complete block design with four replications. Nitrogen was topdressed at 50 lb/A of actual N in March, May, and August. The tests were harvested using a sickle type forage plot harvester to simulate a spring cut hay/summer grazing/fall stockpile management system. Fresh weights were measured in the field and converted to dry matter yield using long-term averages for dry matter percents of tall fescue.

Soils at both locations are well-drained silt loams (Maury at Lexington and Crider at Princeton). All tests were managed according to University of Kentucky Cooperative Extension Service recommendations.

Results and Discussion

Weather data for Lexington and Princeton are presented in Table 1. With the exception of May, which was exceptionally cool at both locations, the spring was warmer than average at both locations. The summer and fall were much cooler than normal at Lexington, while Princeton had a near normal summer and fall. Precipitation was above average through May at Lexington, while it was near normal through April at Princeton. The remainder of the growing season was well below average at both locations.

Maturity ratings and dry matter yields (tons/acre) are reported in Tables 2, 3, and 4. Yields are given by cutting date and as total annual production. In these tables, varieties are listed by descending maturity rating. Experimental varieties, which are not available for purchase, are listed separately at the bottom. Statistical analyses were performed on all data (including experimentals) to determine if the apparent differences are truly due to varietal differences or just to random chance. In the tables, the variety with the highest numerical value in each column is marked with two asterisks (**) and those varieties not significantly different from that variety 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 (C.V.), 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 C.V.'s and larger L.S.D.'s.

Yields of 1992 seedlings at both locations were somewhat lower in 1994 than in 1993. This reduction, occurring mainly in the first and second cuttings, was also observed in variety trials for other cool-season grasses of the same age in Kentucky. Similarly, the 1994 yields of the test sown in 1993 at Lexington compare well to the 1993 yields of the tests sown in 1992.

Some of the endophyte-free varieties have been observed to have low seedling vigor, which has been blamed for some stand failures in some cases. While differences in seedling vigor have been noted between endophyte-free and endophyte-infected varieties, other work at the University of Kentucky indicates that seedling vigor differs from year to year in the same variety. The reason for this variation is not clear, but can be related to soil and environmental conditions at seeding, as well as age, size, and production environment of the seed. Stand establishment of endophyte-free varieties was not a problem in any of the variety tests discussed in this

publication.

It is recommended that late summer seeded low-endophyte tall fescues be harvested as hay the following spring to give the plants an opportunity to become established. After this cutting, follow recommendations about pasture fertilization and grazing rotation. Take care not to overgraze low endophyte tall fescue, especially during periods of extreme drought stress.

Two perennial ryegrass varieties were included in the 1992 studies and were treated the same as the tall fescue varieties. They are listed at the bottom of the commercial varieties in Tables 2 & 4, again in order of descending maturity. 'Bison' had the highest yield in 1993 of all varieties tested, but yields were greatly reduced in 1994. However, the 1994 yields of 'Bison' were equivalent to the best tall fescues at Lexington and were superior to the tall fescues at Princeton. The performance of 'Bison' appears encouraging and would seem to support greater use of perennial ryegrass in Kentucky; however, it is important to remember that perennial ryegrass is a short-lived grass in Kentucky and stands can be severely reduced by winter injury and/or summer drought stress. Therefore, fields seeded to ryegrass will need to be reseeded periodically. 'Jackaroo', which was developed as a grazing type having a lower growth habit and much finer leaves than 'Bison', produced yields in both years that are similar to the best tall fescues.

Three varieties of Bromus are in the 1993 test at Lexington (Table 3). 'Barton', a smooth brome variety, is included for comparison with the newer varieties of Bromus, 'Gala' and 'Matua'. While these are all different species of Bromus, they had of similar maturity in the spring. However, 'Matua' produced seedheads throughout the growing season while 'Barton' and 'Gala' did so only in the spring. Of the three Bromus species, 'Matua' was the only one that had yields comparable to tall fescue.

Table 5 lists all the varieties included in the Kentucky Tall Fescue Variety Tests as well as information about distributors, endophyte infection, and yield performance across locations in 1993. Varieties are listed in alphabetical order with the experimental varieties at the bottom. Remember that experimental varieties are not available for farm use, while commercial varieties can be purchased from dealerships. In this table, shaded areas indicate that the variety was not in that particular test (labelled at the top of the column) while clear blocks mean that the variety was in the test. A double asterisk (**) indicates that the variety was the highest yielding variety in the test for that year. A single asterisk (*) means that the variety was not significantly different from the highest yielding variety. It is best to choose a variety that has performed well over several years and locations, However, data from only one year is available at this time so give consideration to varieties that yielded highly at both locations. Remember to consider the distribution of yield across the growing season when evaluating productivity of tall fescue varieties (Tables 2, 3, and 4).

Summary

Selecting a good endophyte-free variety of tall fescue 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. Other College of Agriculture publications related to the establishment, management, and utilization of tall fescue are listed in Table 6 and are available from your local county extension office.

TABLE 1. TEMPERATURE AND RAINFALL IN LEXINGTON AND PRINCETON IN 1994.

MONTH	LEXINGTON				PRINCETON			
	TEMPERATURE		RAINFALL		TEMPERATURE		RAINFALL	
	F	DEP.	INCHES	DEP.	F	DEP.	INCHES	DEP.
JAN	25	-6	3.60	+0.03	30	-4	4.26	+0.40
FEB	36	+1	3.41	+0.15	41	+2	3.73	-0.71
MAR	43	-1	5.95	+1.12	49	+1	5.13	+0.69
APR	58	+3	6.02	+2.01	60	+1	5.48	+0.60
MAY	60	-4	4.05	-0.18	63	-6	0.84	-4.84
JUN	74	+2	2.01	-2.24	77	+2	4.19	+0.32
JUL	76	0	2.62	-2.33	78	0	3.89	-0.41
AUG	72	-3	5.86	+1.90	75	-1	1.69	-2.37
SEP	65	-3	1.43	-1.85	68	-1	2.28	-1.06
OCT	57	0	1.71	-0.55	61	+1	2.65	-0.67

TEMPERATURES ARE IN DEGREES FAHRENHEIT.

DEP. IS DEPARTURE FROM THE LONG-TERM AVERAGE FOR THAT LOCATION.

TABLE 2. DRY MATTER YIELDS (TONS/ACRE) AND MATURITY RATINGS OF TALL

VARIETY	MATURIT	1993	1994 HARVESTS			1994	2-YR
	MAY09	TOTAL	MAY10	JUN03	OCT24	TOTAL	TOTAL
COMMERCIAL VARIETIES - Available for farm use							
CAJUN	10.00**	6.25**	2.18**	0.46*	1.08*	3.72**	9.97**
MARTIN	10.00**	5.20	1.98*	0.37*	1.12*	3.47*	8.67
MOZARK	10.00**	5.59*	1.94*	0.47**	1.12*	3.54*	9.13*
OFI88B1	10.00**	5.21	1.93*	0.39*	1.13*	3.45*	8.66
PHYTER	9.75*	5.82*	1.74	0.44*	1.12*	3.31*	9.13*
JOHNSTONE	9.00	5.20	1.62	0.28	1.08*	2.97	8.17
MAXIMIZE	8.75	5.54	1.74	0.36	1.19*	3.29*	8.83
OFI88B15	8.50	5.11	1.55	0.36	1.02*	2.94	8.04
KY31IN	8.25	5.32	1.61	0.34	0.93	2.88	8.20
ISI8976	8.00	5.23	1.48	0.18	1.08*	2.74	7.97
STARGRAZER	8.00	6.18*	1.55	0.44*	1.14*	3.13	9.31*
CATTLE-CLUB	7.50	5.89*	1.67	0.34	1.21*	3.21*	9.10*
JACKAROO	10.00++	5.20	1.98++	0.17	1.13++	3.29+	8.48
BISON	3.00	8.25++	1.96+	0.70++	0.84+	3.50++	11.75++
EXPERIMENTAL VARIETIES - Not available for farm use							
GAI20L	10.00**	5.38	1.90	0.32	1.26**	3.47*	8.85
GA87E	10.00**	4.91	1.81	0.27	1.15*	3.23*	8.15
KY31CL	10.00**	5.73*	1.65	0.29	1.02*	2.96	8.69
TN-F-SYN-1	9.75*	4.87	1.52	0.27	1.21*	3.00	7.87
KENHY	9.00	5.96*	1.72	0.35	0.91	2.98	8.94
TF8805	8.75	5.84*	1.98*	0.30	1.23*	3.52*	9.36*
MEAN	8.91	5.63	1.77	0.36	1.10	3.23	8.86
CV, %	7.76	8.88	10.92	22.32	21.12	11.40	8.03
LSD, 0.05	0.98	0.71	0.27	0.11	0.33	0.52	1.01

MATURITY RATING 1=VEGETATIVE 11=FULL HEAD
 3=EARLY BOOT 13=EARLY BLOOM
 5=MID BOOT 15=FULL BLOOM
 7=LATE BOOT 17=SEED
 9=EARLY HEAD 19=MATURE SEED

1993 TOTAL INCLUDES 4 HARVESTS DATED MAY06, JUN07, JUL13, AND

**HIGHEST NUMERICAL VALUE IN THE COLUMN FOR TALL FESCUE.

*NOT SIGNIFICANTLY DIFFERENT FROM THE HIGHEST NUMERICAL VALUE IN THE

COLUMN FOR TALL FESCUE BASED ON THE 5% LSD.

++HIGHEST NUMERICAL VALUE IN THE COLUMN FOR PERENNIAL RYEGRASS.

+NOT SIGNIFICANTLY DIFFERENT FROM THE HIGHEST NUMERICAL VALUE IN THE

COLUMN FOR PERENNIAL RYEGRASS BASED ON THE 5% LSD.

TABLE 3. DRY MATTER YIELDS (TONS/ACRE) OF TALL FESCUE AND BROMUS VARIETIES SOWN 3 SEP 1993 AT LEXINGTON, KENTUCKY.

VARIETY	MATURIT		1994 HARVESTS				1994
	MAY09	MAY10	JUN03	JUL15	AUG11	OCT24	TOTAL
COMMERCIAL VARIETIES - Available for farm use							
SC89-3	10.50*	2.14	0.26	0.29*	0.18	1.13	4.00
ADVANCE	10.25	1.76	0.40**	0.33**	0.29**	1.39**	4.18*
PS-B27	10.25	1.82	0.16	0.23	0.18	1.22	3.61
CATTLE-CLUB	10.00	2.54*	0.23	0.17	0.08	1.18	4.20*
ISI8874	10.00	2.53*	0.30	0.27*	0.14	1.31*	4.54*
JOHNSTONE	10.00	2.30	0.28	0.19	0.13	1.22	4.12
KY31IN	10.00	2.81**	0.28	0.23	0.15	1.22	4.69**
STARGRAZER	10.00	2.43*	0.36*	0.29*	0.14	1.28*	4.51*
8404	10.00	2.62*	0.34*	0.19	0.16	1.32*	4.62*
MATUA, BROMUS	10.75++	2.23++	0.30++	0.52++	0.26++	0.95++	4.26++
GALA, BROMUS	10.50+	0.89	0.14	0.30	0.15	0.72	2.19
BARTON, BROMUS	10.25+	1.36	0.09	0.28	0.22	0.53	2.48
EXPERIMENTAL VARIETIES - Not available for farm use							
CAS-E60	11.00**	2.23	0.33*	0.21	0.16	1.30*	4.22*
CAS-E18	10.75*	2.63*	0.28	0.19	0.16	1.16	4.42*
WX9-200-6	10.50*	2.19	0.26	0.17	0.15	1.25*	4.02
KY31CL	10.00	2.55*	0.35*	0.22	0.11	1.24*	4.47*
MEAN	10.30	2.19	0.27	0.25	0.17	1.15	4.03
CV, %	3.64	14.74	23.99	22.33	23.66	10.44	9.92
LSD, 0.05	0.53	0.46	0.09	0.08	0.06	0.17	0.57

MATURITY RATING SCALE: 1=VEGETATIVE 11=FULL HEAD
 3=EARLY BOOT 13=EARLY BLOOM
 5=MID BOOT 15=FULL BLOOM
 7=LATE BOOT 17=SEED
 9=EARLY HEAD 19=MATURE SEED

**HIGHEST NUMERICAL VALUE IN THE COLUMN FOR TALL FESCUE.

*NOT SIGNIFICANTLY DIFFERENT FROM THE HIGHEST NUMERICAL VALUE IN THE

COLUMN FOR TALL FESCUE BASED ON THE 5% LSD.

++HIGHEST NUMERICAL VALUE IN THE COLUMN FOR BROMUS.

+NOT SIGNIFICANTLY DIFFERENT FROM THE HIGHEST NUMERICAL VALUE IN THE

COLUMN FOR BROMUS BASED ON THE 5% LSD.

TABLE 4. DRY MATTER YIELDS (TONS/ACRE) AND MATURITY RATINGS OF TALL FESCUE AND PERENNIAL RYEGRASS VARIETIES SOWN 16 SEP 1992 AT PRINCETON, KENTUCKY.

VARIETY	MATURIT 1993		1994 HARVESTS					1994	2-YR
	MAY02	TOTAL	MAY02	JUN01	JUN30	AUG03	OCT27	TOTAL	TOTAL
COMMERCIAL VARIETIES - Available for farm use									
CAJUN	10.00**	4.58*	1.38*	0.55*	0.23*	0.17*	0.27*	2.59*	7.17*
MARTIN	10.00**	4.16	1.45*	0.46	0.17*	0.23**	0.25	2.56*	6.72
MOZARK	10.00**	4.80*	1.49**	0.56*	0.20*	0.14*	0.33*	2.72**	7.52**
OFI88B1	10.00**	4.60*	1.44*	0.62*	0.19*	0.19*	0.25	2.70*	7.30*
PHYTER	9.50*	4.79*	1.29	0.63*	0.20*	0.16*	0.28*	2.55*	7.34*
MAXIMIZE	8.00*	4.67*	1.10	0.52	0.18*	0.13	0.17	2.10	6.77
KY31IN	7.00	4.56*	1.07	0.62*	0.23*	0.16*	0.39**	2.47*	7.03*
OFI88B15	6.50	4.30	0.98	0.50	0.18*	0.16*	0.33*	2.15	6.45
CATTLE-CLUB	5.50	4.60*	0.99	0.49	0.19*	0.12	0.23	2.01	6.61
JOHNSTONE	5.50	4.33	1.01	0.49	0.17*	0.16*	0.33*	2.16	6.49
ISI8976	3.00	3.70	1.04	0.49	0.19*	0.14*	0.29*	2.15	5.85
STARGRAZER	3.00	4.73*	1.01	0.65**	0.25**	0.21*	0.32*	2.44*	7.17*
JACKAROO	9.00++	4.29	0.97	0.46	0.16	0.26+	0.25++	2.10	6.39
BISON	1.00	7.27++	1.21++	1.40++	0.30++	0.27++	0.23+	3.40++	10.67++
EXPERIMENTAL VARIETIES - Not available for farm use									
GA87E	10.00**	4.48*	1.31	0.47	0.19*	0.15*	0.31*	2.43*	6.91*
GA120L	9.75*	4.89**	1.22	0.55*	0.22*	0.13	0.25	2.36	7.25*
TF8805	9.25*	4.70*	1.28	0.56*	0.23*	0.09	0.33*	2.49*	7.19*
KY31CL	8.25*	4.82*	1.16	0.53*	0.23*	0.15*	0.22	2.28	7.10*
TN-F-SYN-1	6.75	4.20	1.11	0.43	0.17*	0.12	0.31*	2.14	6.34
KENHY	6.50	4.28	1.05	0.59*	0.25**	0.22*	0.23	2.34	6.62
MEAN	7.43	4.64	1.18	0.58	0.21	0.17	0.28	2.41	7.04
CV, %	21.62	7.38	10.72	16.09	30.69	43.59	34.32	10.32	6.73
LSD, 0.05	2.27	0.45	0.18	0.13	0.09	0.10	0.14	0.35	0.67

MATURITY RATING SCALE: 1=VEGETATIVE 11=FULL HEAD
 3=EARLY BOOT 13=EARLY BLOOM
 5=MID BOOT 15=FULL BLOOM
 7=LATE BOOT 17=SEED
 9=EARLY HEAD 19=MATURE SEED

1993 TOTAL INCLUDES 4 HARVESTS DATED MAY06, JUN07, JUL13, AND OCT26.

**HIGHEST NUMERICAL VALUE IN THE COLUMN FOR TALL FESCUE.

*NOT SIGNIFICANTLY DIFFERENT FROM THE HIGHEST NUMERICAL VALUE IN THE COLUMN FOR TALL

FESCUE BASED ON THE 5% LSD.

++HIGHEST NUMERICAL VALUE IN THE COLUMN FOR PERENNIAL RYEGRASS.

+NOT SIGNIFICANTLY DIFFERENT FROM THE HIGHEST NUMERICAL VALUE IN THE COLUMN FOR

PERENNIAL RYEGRASS BASED ON THE 5% LSD.

Table 5. Characterization of tall fescue, Bromus, and perennial ryegrass varieties and their performance across years and locations. 1994 Kentucky Tall Fescue Variety Tests L.M. Lauriault, J.C. Henning, G.D. Lacefield, and T.G. Gray			Lexington			Princeton	
			1992 ¹		1993	1992	
Variety	Source/KY Distributor	EI ²	93 ³	94	94	93	94
COMMERCIAL VARIETIES - Available for farm use							
8404	Genesis Turf & Forage/Green Seed	free			*		
Advance	Agricom, AgResearch Grasslands	free			*		
Cajun	International Seeds/Green Seed	low	**	**		*	*
Cattle Club	Green Seed	free	*	*	*	*	
ISI 8874	International Seeds/Green Seed	low			*		
ISI 8976	International Seeds/Green Seed	low					
Johnstone	Willamette Seed (KY Agric. Exp.	free					
KY 31, endophyte-infected	KY Agric. Exp. Sta./Public	high			**	*	*
Martin	MO Agric. Exp. Sta./International Seeds	low		*			*
Maximize	Turf Seed, Inc./Geo. W. Hill, Bunton	low		*		*	
Mozark	MO Agric. Exp. Sta./International Seeds	free	*	*		*	**
OFI-88-B1	Olsen-Fennell Seeds	free		*		*	*
OFI-88-B15	Olsen-Fennell Seeds	free					
Phyter	FFR/Southern States	low	*	*		*	*
PS-B27	ProSeeds Marketing/Dobson-Hicks Co.	free					
SC89-3	The Seed Connection	free					
Stargrazer	FFR/Southern States	low	*		*	*	*
Barton, Bromus	Iowa Agric. Exp. Sta.	N/A					
Gala, Bromus	Cascade Seed Int'l/Modern Forage	N/A					
Matua, Bromus		N/A			**		
Bison perennial ryegrass		low	**	**		**	**
Jackaroo perennial	Wright Stephenson Seeds	free		*			
EXPERIMENTAL VARIETIES - Not available for farm use							
CAS-E18	Cascade Seed International/Experimental	free			*		
CAS-E60	Cascade Seed International/Experimental	free			*		
GA-87-E	GA Agric. Exp. Sta./Experimental	free		*		*	*
GA-120-L	GA Agric. Exp. Sta./Experimental	free		*		**	
Kenhy	KY Agric. Exp. Sta./unavailable	free	*				
KY 31, endophyte-free	KY Agric. Exp. Sta./Experimental	free	*		*	*	
TF8805	FFR/Experimental	free	*	*		*	*
TN-TF-SYN-1	TN Agric. Exp. Sta./Experimental	free					
WX9-200-6	Willamette Seed/Experimental	free					
¹ Establishment year	Indicates that the variety was not in the test.						
² Endophyte Infection	** Highest yielding variety within species in the test for that year.						
³ Harvest year	* Not significantly different from the highest yielding variety within species in the test.						
⁴ Plots were sown with seed containing dead endophyte, stand is endophyte-free.							

Table 6. University of Kentucky Extension Service publications related to tall fescue management.

Publication	Title
AGR-59	Tall fescue
AGR-108	Tall fescue in Kentucky
AGR-64	Establishing forage crops
-----	Seed tags: What they reveal
AGR-26	Renovating hay and pasture fields
PPA-30	Sampling for the tall fescue endophyte in pasture and hay fields
AGR-119	Alternatives for fungus infected tall fescue
AGR-126	Replacement of an endophyte infected tall fescue stand
AGR-18	Grain and forage crop guide for Kentucky
AGR-1	Lime and fertilizer recommendations
AGR-103	Fertilization of cool-season grasses
AGR-44	Season of the year affects nutritional value of tall fescue
PPA-9	Collecting plant specimens for disease diagnosis
ASC-16	Beef: Grass tetany in beef cattle