Progress Report 391

The 1996 Tall Fescue Report

The Forage Variety Testing Program
Serving Kentucky's Farmers With Pride From East to West

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Introduction

Tall fescue (*Festuca arundinacea*) 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 report provides current yield data on tall fescue varieties and a few perennial ryegrass included in yield trials in Kentucky as well as guidelines for selecting tall fescue varieties.

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 and Fawn, 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 Helminthsporium 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 five studies will be reported. Tall fescue varieties were sown in 1994 at Princeton, Quicksand, on a reclaimed surface mine site near Quicksand, and at Lexington in 1995 as part of The Forage Variety Testing Program. Also, a test was sown in 1994 at Lexington as part of the Kentucky Tall Fescue Breeding Program. The soils at Quicksand (Pope), Lexington (Maury) and Princeton (Crider) were well-drained silt loams. All are well-suited tall fescue production. The planting medium at the surface mine is material composed primarily of gray shale and sandstone. These materials are almost always very low in organic matter and frequently low in phosphorus and potassium. This medium can be well drained to the point of being droughty or poorly drained to the point of remaining flooded, depending on the particle size of the material below and the degree of compaction. Seedings were made at the rate of 20 lb/A into a prepared seedbed with a disk drill. Plots were 4' x 15' in a randomized complete block design with four replications. 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 to simulate a spring cut hay/summer grazing/fall stockpile management system. The first cutting was harvested at each location when spring growth of alfalfa was at the bud/first flower stage and all tall fescue varieties had reached at least the boot stage. Fresh weights were measured in the field and converted to dry matter production using long-term averages for percent dry matter of tall fescue. Management of all tests for establishment, fertility, weed control, and harvest management was according to University of Kentucky Cooperative Extension Service recommendations.

Results and Discussion

Weather data for Quicksand, Lexington, and Princeton are presented in Table 1. Temperatures across the state were warmer in the winter and late spring with March and April somewhat cooler. July and August were near normal at all locations except Lexington where July was cooler. September was also cooler except at Quicksand, which was near normal. Temperatures in October were near normal everywhere except Quicksand, which was much warmer. All locations measured a surplus of >3 inches of precipitation for the growing season. Generally, January, April, May, and September were wetter than normal, while February, March, and August were drier. June and October were wetter at Quicksand and Princeton but dry at Lexington. July was dry everywhere but Princeton. Precipitation was not only unevenly distributed across the season at all locations but also within months. There were numerous rainfall events of greater than 1 inch and several instances in which the total rainfall for the month fell in a matter of 2-3 days.

Ratings for percent stand and maturity and dry matter yields (tons/acre) are reported in Tables 2-6. Yields are given by cutting date and as total annual production. Varieties are listed within species by descending maturity rating, if taken, otherwise they are listed by descending total yield. Experimental varieties are listed separately at the bottom of the tables and are not available commercially. 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 (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 CV's and larger LSD's.

This was an interesting year for cool-season grass production across the state. Varieties at Quicksand were at a later stage of maturity than varieties at Princeton at harvest-time (Tables 2 & 6). This would be expected since they were harvested a week later. Second year yields at Quicksand were very near 1995 production. This phenomenon, which also occurred in the orchardgrass test at Quicksand, has not been previously observed in any cool season grass test in the Variety Testing Program. The cutting taken at the post-mine site was also only slightly less than the first harvest of 1995, even though the 1995 harvest was delayed by one month (Table 3). As expected, the Breeding Test at Lexington (Table 4) had second year yields that were lower than the previous year but they were still as high as first year yields for most other tests. The Variety test at Lexington (Table 5) was much less mature than other tests at harvest-time even though it was harvested between the Princeton and Quicksand tests. First cutting yields were extremely low also, especially for the first production year. This may have been due to a bitter cold spell 2-5 February, during which daily high temperatures averaged only 14 F and lows averaged -3 F. This cold snap occurred in the middle of a two-month period which had a daily average temperature 3 degrees above normal. Several varieties experienced a great amount of winter-kill from this episode as indicated by the percent stand ratings. Most varieties yielded better than expected in subsequent cuttings and achieved total yields that were reasonable compared to other tests of the same age. The 1994 test at Princeton had second year yields that were very near those of a test planted in 1992 at Princeton (1994 Kentucky Tall Fescue Variety Test Report, KY Agr. Exp. Sta. Progress Report 371). 'Advance', an endophyte-free variety from New Zealand, had considerably less percent stand after 2 years than the other tall fescue varieties.

Several of the tall fescue varieties tested are free of the endophyte. Some producers have had low success in using endophyte-free or low endophyte varieties due to poor stand establishment, by initiating grazing too early on the new stand, or by placing excessive grazing pressure on established stands as a form of habit. 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.

Several perennial ryegrass varieties were included in the studies sown in 1994. These were treated the same as the tall fescue varieties. They are listed at the under the tall fescue varieties in Tables 2, 4, 5, & 6, again in order of descending maturity or total yield. The varieties planted at Princeton and Quicksand were also planted at the post-mine site (Table 3) but did not survive the harsh environment. At other locations where stands were rated the perennial ryegrasses generally had lower percent stands than the tall fescue varieties after two years. 'Bison' performed well at all locations, uniformly across the growing season. At Princeton and Lexington it did not yield as well in the first cutting but compensated later on (Tables 5 & 6). In the Lexington test 'WVPB-PER-90-1', an earlier maturing variety that survived winter-kill or 'set-back' yielded well early compared to 'Bison' but did not perform well in subsequent harvests. 'Zero-Nui' did not yield well anywhere except in the Breeding test where it performed as well as the tall fescues. 'Moy' performed well early at Princeton while 'BG3' had better yields later; neither produced well as 'Bison' or 'Greenstone', which also did well at Quicksand. 'Greenstone' produced more early at Quicksand but later at Princeton. Both 'BG3' and 'Moy' performed better later at Quicksand, well enough to equal 'Bison' and 'Greenstone. In the Breeding test (Table 4) 'Linn' yielded as well as 'Zero-Nui' with nearly half of its production occurring in the second cutting. While not significantly different from 'Linn' and 'Zero-nui' in total production, the yields of 'KYPRG1' were

much less numerically. Most of that difference is observed in the first cutting.

While the performance of some varieties of perennial ryegrass appears encouraging, even greater than that of tall fescue in some tests, giving support to their greater use in Kentucky, 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. This is indicated by the percent stand ratings at Lexington and Princeton (Tables 5 & 6). Fields sown to ryegrass will generally need to be reseeded periodically. The perennial ryegrass varieties sown at Quicksand and Princeton were also sown at the surface mine in 1994 but did not survive in that harsh environment.

Table 7 summarizes information about distributors, endophyte infection, and yield performance across locations 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 dealerships. In table 7, 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. Remember to consider the distribution of yield across the growing season when evaluating productivity of tall fescue varieties (Tables 2-6).

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 below and are available from your local county Extension office.

AGR-1 Lime and Fertilizer Recommendations
ASC-16 Beef: Grass Tetany in Beef Cattle
AGR-18 Grain and Forage Crop Guide for Kentucky
AGR-26 Renovating Hay and Pasture Fields
AGR-44 Season of the Year Affects Nutritional Value of Tall Fescue
AGR-59 Tall Fescue
AGR-64 Establishing Forage Crops
AGR-103 Fertilization of Cool-Season Grasses
AGR-108 Tall fescue in Kentucky
AGR-119 Alternatives for Fungus Infected Tall Fescue

AGR-126 Replacement of an Endophyte-Infected Tall Fescue Stand
Seed tags: What They Reveal
PPA-9 Collecting plant specimens for Disease Diagnosis

PPA-30 Sampling for the Tall Fescue Endophyte in Hay and Pasture Fields

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Table 1. Temperature and Rainfall at Quicksand, Lexington, and Princeton in 1996.

	Quicksand				Lexington				Princeton			
	Temp		Rainfall		Temp		Rainfall		Temp		Rainfall	
MON	F	DEP	IN	DEP	F	DEP	IN	DEP	F	DEP	IN	DEP
JAN	34	+3	5.02	+1.73	31	+0	4.38	+1.52	36	+2	4.94	+1.14
FEB	38	+5	2.17	-1.43	36	+1	1.50	-1.71	40	+2	1.74	-2.69
MAR	39	-2	4.04	-0.30	39	-5	4.44	+0.04	43	-4	4.38	-0.56
APR	52	-1	4.59	+0.49	51	-4	5.15	+1.27	56	-3	5.98	+1.18
MAY	66	+4	5.65	+1.17	66	+2	8.23	+3.76	70	+3	5.19	+0.23
JUN	72	+2	5.17	+1.35	72	+0	3.45	-0.21	75	+0	4.13	+0.28
JUL	73	-1	4.75	-0.50	73	-3	4.80	-0.20	77	-1	7.04	+2.75
AUG	74	+1	2.79	-1.22	74	-1	3.13	-0.80	78	+1	0.82	-3.19
SEP	66	+0	4.86	+1.34	66	-2	5.11	+1.91	69	-2	6.52	+3.19
OCT	58	+4	3.44	+0.53	57	-0	1.39	-1.18	61	+2	6.21	+3.16

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

Table 2. Dry Matter Yields (Tons/acre) and Maturity Ratings of Tall Fescue and Perennial Ryegrass Varieties Sown 24 August 1994, at Quicksand, Kentucky.

Variety	Maturity May 15	1995 Total	1996 Harvests				1996 Total	2-yr Total
			May 15	Jun 14	Aug 17	Oct 29		
Commercial Varieties - Available for Farm Use								
FESTORINA, TF	9.50	3.98	1.04	0.47	0.89	1.06	3.47	7.44
ADVANCE, TF	9.00	3.91	0.92	0.56*	0.98*	1.06	3.53	7.44
BARCEL, TF	9.00	3.52	0.96	0.54*	1.03*	1.13	3.66*	7.18
CATTLE-CLUB, TF	9.00	3.99	1.30*	0.55*	1.17*	1.24	4.27*	8.26*
ENFORCER, TF	9.00	4.20*	1.25*	0.49	0.95*	1.22	3.92*	8.11*
JOHNSTONE, TF	9.00	4.01	1.02	0.52	1.22*	1.09	3.85*	7.87
KY31IN, TF	9.00	5.16**	1.32**	0.58*	1.14*	0.97	4.02*	9.18*
STARGRAZER, TF	9.00	5.03*	1.00	0.59*	0.89	1.44*	3.93*	8.96*
GREENSTONE, PRG	9.00+	4.66++	1.41++	0.54	1.28	0.96+	4.19+	8.85++
ZERO-NUI, PRG	9.00+	3.16	0.81	0.51	1.25	1.06+	3.63	6.79
BISON, PRG	3.50	4.41+	1.35+	0.80++	1.40+	0.78+	4.34+	8.75+
Experimental Varieties - Not Available for Farm Use								
ISI8872, TF	11.00**	4.88*	1.21*	0.48	1.00*	1.23	3.92*	8.80*
GA-178, TF	10.50*	4.64*	1.23*	0.57*	1.24*	1.12	4.15*	8.79*
GA-199B, TF	10.50*	4.41*	1.17*	0.50	0.79	1.85**	4.30**	8.71*
ISI8873, TF	10.00*	4.80*	1.23*	0.58*	1.16*	1.14	4.11*	8.91*
KY31CL, TF	10.00*	5.03*	1.19*	0.59*	1.08*	1.31	4.17*	9.19**
BAR-FA2HG, TF	9.00	3.74	1.11*	0.49	1.11*	1.20	3.91*	7.64
BAR-FA4113, TF	9.00	3.64	1.00	0.49	0.95*	1.23	3.68*	7.32
KYTF2, TF	9.00	4.73*	1.20*	0.58*	0.90	1.19	3.88*	8.61*
KYTF1, TF	7.00	4.60*	1.25*	0.62**	1.37**	1.03	4.28*	8.88*
BG3, PRG	9.50++	2.84	1.04	0.69	1.85++	1.00+	4.58++	7.42
MOY, PRG	9.00+	3.24	1.34+	0.51	1.26	1.12++	4.23+	7.47
MEAN	9.02	4.21	1.15	0.56	1.13	1.16	4.00	8.21
CV, %	11.39	16.36	15.50	12.90	28.89	29.84	12.91	11.07
LSD, 0.05	1.45	0.97	0.25	0.10	0.46	0.49	0.73	1.28

1995 total includes 4 harvests dated May 02, Jun 15, Aug 11, and Oct 31.
*Maturity rating scale: 1=vegetative **3**=early boot **5**=mid boot **7**=late boot **9**=early head **11**=full head **13**=early bloom **15**=full bloom **17**=seed (dough) **19**=mature seed*
***Highest numerical value in the column for tall fescue (TF).*
**Not significantly different from the highest numerical value in the column for tall fescue (TF) based on the 5% LSD.*
++Highest numerical value in the column for perennial ryegrass (PRG).
+Not significantly different from the highest numerical value in the column for perennial ryegrass (PRG) based on the 5% LSD.

Table 3. Dry Matter Yields (Tons/acre) of Tall Fescue Varieties Sown 24 August 1994, on Post-Mine Land near Quicksand, Kentucky.

Variety	1995 Total	1996		2-yr Total
		May 15	Total	
Commercial Varieties - Available for Farm Use				
KY31IN	0.99**	0.41*	0.41*	1.40*
STARGRAZER	0.90*	0.42*	0.42*	1.32*
ENFORCER	0.76*	0.46*	0.46*	1.22*
JOHNSTONE	0.77*	0.39*	0.39*	1.16*
CATTLE-CLUB	0.57	0.39*	0.39*	0.96
BARCEL	0.62	0.14	0.14	0.76
ADVANCE	0.55	0.14	0.14	0.69
FESTORINA	0.37	0.16	0.16	0.53
Experimental Varieties - Not Available for Farm Use				
ISI8872	0.91*	0.49*	0.49*	1.41**
GA-178	0.73*	0.50*	0.50*	1.23*
KY31CL	0.67	0.51**	0.51**	1.18*
KYTF1	0.69*	0.41*	0.41*	1.11*
GA-199B	0.59	0.43*	0.43*	1.02*
ISI8873	0.59	0.21	0.21	0.80
KYTF2	0.51	0.23	0.23	0.74
BAR-FA4113	0.38	0.22	0.22	0.60
BAR-FA2HG	0.27	0.16	0.16	0.43
MEAN	0.65	0.34	0.34	0.99
CV, %	33.98	36.11	36.11	28.83
LSD, 0.05	0.32	0.18	0.18	0.41

1995 total includes 2 harvests dated Jun 15 and Oct 31.
***Highest numerical value in the column.*
**Not significantly different from the highest numerical value in the column based on the 5% LSD.*

Table 4. Dry Matter Yields (Tons/acre) for Tall Fescue Varieties Sown 19 September 1994, at Lexington, Kentucky as Part Of the Tall Fescue Breeding Program.

Variety	1995 Total	1996 Harvests				1996 Total	2-yr Total
		May 21	Jul 11	Sep 03	Oct 25		
Commercial Varieties - Available for Farm Use							
JOHNSTONE, TF	7.71*	2.00**	2.14*	1.31*	0.96**	6.41**	14.12**
KY31IN, TF	8.34**	1.90*	1.84*	1.23*	0.82*	5.78*	14.12**
CATTLE-CLUB, TF	8.10*	1.54*	1.49*	1.21*	0.94*	5.18*	13.27*
PHYTER, TF	8.06*	1.27*	1.76*	1.40*	0.61*	5.04*	13.10*
FORAGER, TF	7.32*	1.79*	2.32**	0.95	0.68*	5.75*	13.06*
FAWN, TF	7.54*	1.74*	1.97*	1.08*	0.72*	5.51*	13.04*
CAJUN, TF	6.89	1.83*	1.95*	1.48**	0.66*	5.92*	12.81*
LINN, PRG	6.29++	1.11+	2.49++	1.02+	0.76+	5.39+	11.68++
ZERO-NUI, PRG	5.60+	1.74++	1.91+	1.33++	1.03++	6.01++	11.61+
Experimental Varieties - Not Available for Farm Use							
KYTF2, TF	8.08*	1.85*	1.90*	1.29*	0.71*	5.75*	13.83*
KYTF1, TF	7.54*	1.73*	1.85*	1.21*	0.78*	5.56*	13.10*
KY31CL, TF	7.57*	1.76*	1.81*	0.99	0.86*	5.42*	12.99*
KYPRG1, PRG	5.98+	0.58	1.38+	1.02+	0.62+	3.60+	9.58+
MEAN	7.31	1.60	1.91	1.19	0.78	5.48	12.79
CV, %	12.54	49.09	45.52	24.42	46.51	33.29	16.01
LSD, 0.05	1.31	1.13	1.25	0.42	0.52	2.62	2.95

1995 total includes 3 harvests dated Jun 06, Jul 18, and Oct 26.
*Maturity rating scale: **1**=vegetative **3**=early boot **5**=mid boot **7**=late boot **9**=early head **11**=full head **13**=early bloom **15**=full bloom **17**=seed (dough) **19**=mature seed*
***Highest numerical value in the column for tall fescue (TF).*
**Not significantly different from the highest numerical value in the column for tall fescue (TF) based on the 5% LSD.*
***Highest numerical value in the column for perennial ryegrass (PRG).*
**Not significantly different from the highest numerical value in the column for perennial ryegrass (PRG) based on the 5% LSD.*

Table 5. Dry Matter Yields (Tons/acre) and Ratings for Percent Stand And Maturity for Tall Fescue and Perennial Ryegrass Varieties Sown 6 September 1995, at Lexington, Kentucky.

Variety	% Stand Apr 16 96	Maturity May 13 96	1996 Harvests				1996 Total
			May 13	Jun 14	Aug 19	Oct 28	
Commercial Varieties - Available for Farm Use							
CATTLE-CLUB, TF	92.50*	6.50	0.46*	1.32*	0.80	1.57*	4.15*
FESTORINA, TF	90.00*	6.50	0.41	1.25*	0.78	1.76*	4.20*
KY31IN, TF	93.75**	6.50	0.37	1.39*	0.99	1.77**	4.52**
FUEGO, TF	76.25	5.50	0.17	1.05	0.83	1.47*	3.51
BISON, PRG	38.75	4.00	0.29	2.52++	0.81++	1.37++	4.99++
Experimental Varieties - Not Available for Farm Use							
FTF9077, TF	91.25*	9.00**	0.55*	1.31*	0.93	1.49*	4.27*
GA153, TF	50.00	8.50*	0.08	1.01	1.45**	1.53*	4.07*
KY31CL, TF	92.50*	8.50*	0.59**	1.44**	0.84	1.29	4.16*
FA89K, TF	83.75*	7.50*	0.38	1.34*	1.10	1.65*	4.48*
GA156, TF	70.00	4.50	0.12	1.11	1.07	1.68*	3.99
WVPB-PER-90-1, PRG	93.75++	9.00++	0.55++	1.61	0.19	0.88	3.23
MEAN	79.32	6.91	0.36	1.40	0.89	1.50	4.14
CV, %	9.07	22.54	30.11	11.42	15.83	17.44	7.86
LSD, 0.05	10.38	2.25	0.16	0.23	0.20	0.38	0.47

*Maturity rating scale: **1**=vegetative **3**=early boot **5**=mid boot **7**=late boot **9**=early head **11**=full head **13**=early bloom **15**=full bloom **17**=seed (dough) **19**=mature seed*

***Highest numerical value in the column for tall fescue (TF).*

**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 (PRG).

+Not significantly different from the highest numerical value in the column for perennial ryegrass based on the 5% LSD.

Table 6. Dry Matter Yields (Tons/acre) and Ratings for Percent Stand and Maturity of Tall Fescue and Perennial Ryegrass Varieties Sown 2 September 1994, at Princeton, Kentucky.

Variety	% Stand May 09 96	Maturity May 09 96	1995 Total	1996 Harvests				1996 Total	2-yr Total
				May 09	Jun 13	Aug 15	Oct 31		
Commercial Varieties - Available for Farm Use									
FESTORINA, TF	100.00**	9.00*	5.45*	1.26*	0.43*	0.16	0.95	2.80*	8.26*
JOHNSTONE, TF	100.00**	9.00*	4.78	1.05*	0.42*	0.23*	0.80	2.49	7.28
BARCEL, TF	100.00**	8.50*	5.02	1.03*	0.49*	0.10	0.98*	2.60*	7.62
CATTLE-CLUB, TF	100.00**	8.50*	5.18	1.18*	0.37	0.18	0.81	2.53	7.71
ENFORCER, TF	100.00**	8.50*	4.72	1.10*	0.36	0.14	0.68	2.28	7.00
KY31IN, TF	100.00**	8.50*	5.22	1.15*	0.35	0.13	0.75	2.38	7.60
STARGRAZER, TF	100.00**	8.50*	5.82*	1.17*	0.38	0.28*	1.14*	2.98*	8.80*
ADVANCE, TF	88.5	7.50	5.24	0.75	0.48*	0.30*	1.18*	2.71*	7.96
ZERO-NUI, PRG	11.25	3.00	4.11	0.37	0.33	0.42+	0.47+	1.58	5.69
GREENSTONE, PRG	36.25	2.00	4.81	0.50	0.61	0.50+	0.48+	2.09+	6.90
BISON, PRG	60.00	1.00	6.67++	0.40	1.00++	0.54++	0.76++	2.71++	9.38++
Experimental Varieties - Not Available for Farm Use									
ISI8872, TF	100.00**	10.50**	5.86*	1.36*	0.40*	0.27*	1.02*	3.06*	8.92*
GA-199B, TF	100.00**	9.50*	6.26**	1.26*	0.56**	0.38*	1.06*	3.27**	9.53**
GAJESIMPIN, TF	100.00**	9.50*	5.03	1.21*	0.29	0.25*	0.80	2.53	7.56
GAJESIMPCL, TF	100.00**	9.50*	5.12	1.41**	0.39*	0.14	0.72	2.66*	7.78
ISI8873, TF	100.00**	9.50*	5.98*	1.19*	0.37	0.31*	1.31**	3.17*	9.15*
KY31CL, TF	100.00**	9.50*	5.99*	1.26*	0.40*	0.30*	1.24*	3.21*	9.20*
GA-178, TF	100.00**	9.00*	5.47*	1.02*	0.41*	0.20*	0.82	2.45	7.92
KYTF1, TF	100.00**	8.50*	5.86*	1.16*	0.50*	0.37*	0.98*	3.00*	8.87*
BAR-FA2HG, TF	100.00**	7.00	4.02	1.13*	0.40*	0.24*	0.67	2.44	6.46
KYTF2, TF	100.00**	7.00	5.33*	1.27*	0.52*	0.41**	0.68	2.89*	8.22*
BAR-FA4113, TF	100.00**	6.50	4.71	1.04*	0.40*	0.14	0.86	2.44	7.16
MOY, PRG	71.25+	6.50++	4.49	0.81++	0.30	0.28	0.41	1.79	6.28
BG3, PRG	80.00++	1.00	4.22	0.55	0.37	0.30+	0.56+	1.77	5.99
MEAN	89.48	7.40	5.22	1.03	0.44	0.27	0.84	2.58	7.80
CV, %	8.21	19.37	13.86	20.63	28.62	57.48	29.62	20.11	13.80
LSD, 0.05	10.36	2.02	1.02	0.30	0.18	0.22	0.35	0.73	1.52

1995 total includes 4 harvests dated May 04, Jun 06, Aug 10, and Nov 02.
*Maturity rating scale: **1**=vegetative **3**=early boot **5**=mid boot **7**=late boot **9**=early head **11**=full head **13**=early bloom **15**=full bloom **17**=seed (dough) **19**=mature seed*
***Highest numerical value in the column for tall fescue (TF).*
**Not significantly different from the highest numerical value in the column for tall fescue (tf) based on the 5% LSD.*
++Highest numerical value in the column for perennial ryegrass (PRG).
+Not significantly different from the highest numerical value in the column for perennial ryegrass (prg) based on the 5% LSD.

1996 Kentucky Tall Fescue Variety Tests—*L.M. Lauriault, J.C. Henning, T.D. Phillips, G.D. Lacefield, D.C. Ditsch, and E.L. Baker*

Table 7. Performance of tall fescue and perennial ryegrass varieties across years and locations.			**Quicksand**		**Post mine**		**Lexington**			**Princeton**	
			1994[1,2]		**1994**[2]		**1994**[3]		**1995**	**1994**[2]	
Variety	**Source/KY Distributor**	**EI**[4]	**95**[5]	**96**	**95**	**96**	**95**	**96**	**96**	**95**	**96**
Commercial Varieties - Available for Farm Use											
Advance, TF[6]	Modern Forage Systems/Oldfields Seed	free[7]									*
Barcel, TF	Barenbrug Research/Barenbrug USA	free		*							*
Cajun,TF	International Seeds/Green Seed	free						*			
Cattle Club, TF	Green Seed	free		*		*	*	*	*		
Enforcer, TF	Forbes Seed & Grain/to be determined	low	*	*	*	*					
Fawn, TF	Oregon State University/Public	free					*	*			
Festorina, TF	Advanta Seeds West/Oldfields Seeds	free							*	*	*
Forager, TF	FFR/Southern States	free					*	*			
Fuego, TF	Advanta Seeds West/Oldfields Seeds	free									
ISI 8874, TF	International Seeds/Green Seed	low									
Johnstone, TF	Willamette Seed (KY Agric. Exp. Sta.)/Public	free		*	*	*	*	**			
KY31IN, TF	KY Agric. Exp. Sta./Public	high	**	*	**	*	**	*	**		
Phyter, TF	FFR/Southern States	low					*	*			
PS-B27, TF	ProSeeds Marketing/Dobson-Hicks Co.	free									
SC89-3, TF	The Seed Connection	free									
Stargrazer, TF	FFR/Southern States	low	*	*	*	*				*	*
Bison, PRG	International Seeds	low	*	*					**	**	**
Greenstone, PRG	Modern Forage Systems/Oldfields Seed	free	**	*							*
Linn, PRG	Oregon State University/Public	free					**	*			
Zero Nui, PRG	Modern Forage Systems/Oldfields Seed	free					*	**			
Experimental Varieties - Not Available for Farm Use											
BAR FA 2HG, TF	Barenbrug Research/Experimental	free		*							
BAR FA 4113, TF	Barenbrug Research/Experimental	free		*							
FA89K, TF	Barenbrug Research/Experimental	free							*		
FTF9077, TF	International Seeds	free							*		
GA153, TF	GA Agric. Exp. Sta./Experimental	free							*		
GA156, TF	GA Agric. Exp. Sta./Experimental	free							*		
GA178, TF	GA Agric. Exp. Sta./Experimental	free	*	*	*	*				*	
GAJESIMPCL, TF	GA Agric. Exp. Sta./Experimental	free									*
GAJESIMPIN, TF	GA Agric. Exp. Sta./Experimental	high									
GA-199-B, TF	GA Agric. Exp. Sta./Experimental	free	*	**		*				**	**
ISI 8872, TF	International Seeds/Experimental	low	*	*	*	*				*	*
ISI 8873, TF	International Seeds/Experimental	low	*	*						*	*
KY31CL, TF	KY Agric. Exp. Sta./Experimental	free	*	*		**	*	*		*	*
KYTF1, TF	KY Agric. Exp. Sta./Experimental	free	*	*	*	*	*	*		*	*
KYTF2, TF	KY Agric. Exp. Sta./Experimental	free	*	*			*	*		*	*
BG3, PRG	Barenbrug Research/Experimental	free		**							
KYPRG1, PRG	KY Agric. Exp. Sta./Experimental	free					*	*			
Moy, PRG	Modern Forage Systems/Experimental	free[7]		*							
WVPB-PER-90-1, PRG	Willamette Valley Plant Breeders/Experimental	low									

[1] Establishment year
[2] Tests sown as part of The Forage Variety Testing Program
[3] Tests sown as part of the Kentucky Tall Fescue Breeding Program
[4] Endophyte Infection Level
[5] Harvest year
[6] TF=Tall Fescue; PRG= Perennial Ryegrass
[7] Plots were sown with seed containing dead endophyte, stand is endophyte-free
Shaded boxes indicate that the variety was not in the test.
***Highest yielding variety within species in the test for that year.*
**Not significantly different from the highest yielding variety within species in the test.*

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