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Performance of Tall Fescue Varieties in Alabama

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Information contained herein is available to all without regard to race, color, sex, or national origin.

Performance of Tall Fescue Varieties in Alabama

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TALL FESCUE (*Festuca arundinacea* Schreb.) is the most widely grown grass species in the northern half of Alabama. It is also grown in the southern part of the State on wet sites and clay soils. The popularity of tall fescue is based on such factors as ease of establishment, long productive season, and tolerance to pests, soil acidity, poor drainage, and overgrazing.

Poor animal performance and low winter forage production are two major problems associated with tall fescue in Alabama. The problem of poor animal performance is associated with fescue toxicosis, which is being investigated in another Alabama Agricultural Experiment Station project. Researchers have found a fungus (*Acremonium coenophialum* Morgan-Jones and Gams) growing within tall fescue on pastures where fescue toxicosis of cattle occurs. Poor winter production of the variety Kentucky 31, which is grown on virtually all the tall fescue acreage in the State, is the source of the other major problem with tall fescue. Varieties that are more winter-productive are needed, particularly in central and southern Alabama.

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MATERIALS AND METHODS

Seven tall fescue variety trials were conducted in Alabama during the years 1974-81. Tall fescue varieties were planted in rows 6 inches apart using plots 4 x 20 feet with four replications, in late September or October. Plots were harvested with a flail-type harvester two to five times each year. A sample of green forage was collected from each plot at each harvest and oven dried for dry matter determination. Yields are reported as pounds dry matter per acre. Nitrogen fertilizer was applied each year in September or October and again in February and April, making a total of 150 to 200 pounds of nitrogen per acre annually. Lime, P, and K were applied according to soil test recommendations.

Tall fescue varieties in the trials were:

B-2—A tall fescue x ryegrass hybrid from Berger & Plate, Oregon.

Clarine—Non-winter-dormant variety from France.

Fawn—Developed at Oregon State University for spring vigor and high seed yield.

Goar—Developed in southern California for early maturity and tolerance to high summer temperature.

Hokuryo—A variety from the National Hokkaido Agricultural Experiment Station, Hokkaido, Japan.

Jebel—Obtained from National Seed Development Organization, Cambridge, England.

Kasba—Obtained from National Seed Development Organization, Cambridge, England.

Kenhy—Tall fescue x ryegrass hybrid developed by USDA-University of Kentucky. This variety was selected for superior yield, digestibility, and palatability.

Kentucky 31—Found growing on Suiter Farm in eastern Kentucky in 1931 where it had been growing since 1887. Most of the tall fescue in the United States originated from this source.

Kentucky 31 (BB fungus-free)—Seed harvested from Kentucky 31 fields at the Black Belt Substation in west central Alabama that were essentially free of *A. coenophialum*.

Kentucky 31 (BB fungus-infected)—Seed harvested from Kentucky 31 fields at the Black Belt Substation in west central Alabama that were heavily infected with *A. coenophialum*.

Missouri-96—Developed at the University of Missouri for fine leaves, higher animal intake, and some rust resistance.

Triumph—Developed at Auburn University Agricultural Experiment Station from Mediterranean germplasm for higher winter

production. It also has a more open sod, allowing better legume growth. Triumph seed should be available for fall of 1983 planting.

Vejo—A variety from the University of Zagreb, Yugoslavia.

Yamanami—A variety from the National Hokkaido Agricultural Experiment Station, Hokkaido, Japan.

RESULTS

Northern Alabama

Tall fescue is well adapted in northern Alabama. At the Tennessee Valley Substation, Belle Mina, on Decatur clay soil, first-year yields were high on all varieties except Vejo, table 1. During the second year, Triumph produced over twice the late winter (October 11-April 10) yield of Kentucky 31, table 2. In addition, Triumph produced more total yield than other varieties. Other tests have shown that Triumph has less cold tolerance than Kentucky 31, but once established, Triumph survived winters as well as other varieties.

TABLE 1. FIRST-YEAR FORAGE PRODUCTION OF TALL FESCUE VARIETIES AT THE TENNESSEE VALLEY SUBSTATION, BELLE MINA, 1978-79 (PLANTED SEPTEMBER 1978)

Variety	Pounds of dry forage per acre					Total
	March 21	April 10	May 15	June 27	August 10	
Kentucky 31	230 bc*	987 b	3,263 a	1,305 a	1,432 a	7,217 a
Triumph	686 a	964 b	2,069 b	1,569 a	1,358 a	6,646 ab
Missouri-96	260 bc	924 b	2,966 a	1,202 b	1,090 b	6,442 bc
B-2	466 ab	1,253 a	3,136 a	891 b	298 d	6,044 c
Vejo	59 d	610 c	2,207 b	809 c	359 d	4,044 d

*Means within a column marked with the same letter are not significantly different at 5 percent level.

TABLE 2. SECOND-YEAR FORAGE PRODUCTION OF TALL FESCUE VARIETIES AT THE TENNESSEE VALLEY SUBSTATION, BELLE MINA, 1979-80 (PLANTED SEPTEMBER 1978)

Variety	Pounds of dry forage per acre				Total
	October 11	April 10	April 30	May 23	
Triumph	1,852 a*	2,992 a	1,200 a	695 a	6,739 a
Kentucky 31	1,903 a	1,376 b	1,405 a	622 a	5,306 bc
Missouri-96	1,420 b	1,123 b	1,307 a	584 a	4,434 c
B-2	609 c	603 c	976 b	396 a	2,584 d
Vejo	936 c	266 d	710 c	465 a	2,377 d

*Means within a column marked with the same letter are not significantly different at 5 percent level.

Central Alabama

On a Cahaba fine sandy loam soil at the Plant Breeding Unit, Tallassee, Triumph furnished more than three times the January to early March production and 1,500 pounds per acre more total forage than Kentucky 31 over a 4-year period, table 3. The additional dry forage produced by Triumph during January to early March came at a

TABLE 3. WINTER (JANUARY - EARLY MARCH) AND TOTAL ANNUAL FORAGE PRODUCTION OF TALL FESCUE VARIETIES AT PLANT BREEDING UNIT, TALLASSEE, 4-YEAR AVERAGE, 1975-78 (PLANTED OCTOBER 1974)

Variety	Pounds of dry forage per acre	
	Winter production (January-early March)	Total
Triumph	1,659 a*	8,076 a
Fawn	790 b	6,654 b
Kentucky 31	517 c	6,559 bc
Yamanami	742 b	6,294 bc
Goar	876 b	5,882 bc
Kenhy	437 c	5,809 c
Hokuryo	372 c	4,480 d

*Means within a column marked with the same letter are not significantly different at 5 percent level.

TABLE 4. FIRST-YEAR FORAGE YIELD OF TALL FESCUE VARIETIES AT PLANT BREEDING UNIT, TALLASSEE, 1978-79 (PLANTED OCTOBER 1978)

Variety	Pounds of dry forage per acre					Total
	March 20	April 5	April 30	May 29	August 6	
Triumph	1,628 a*	819 a	1,635 b	1,466 a	3,496 bc	9,044 a
Kentucky 31	933 c	718 a	2,286 a	1,007 bc	4,033 a	8,977 a
Kentucky 31 (BB fungus-free)	1,036 bc	802 a	2,141 a	872 c	4,093 a	8,944 a
Missouri-96	1,006 bc	774 a	1,916 a	1,032 bc	3,107 c	7,835 b
B-2	844 c	564 b	2,183 a	1,014 bc	466 d	5,071 c

*Means within a column marked with the same letter are not significantly different at 5 percent level.

TABLE 5. SECOND-YEAR FORAGE YIELD OF TALL FESCUE VARIETIES AT PLANT BREEDING UNIT, TALLASSEE, 1979-80 (PLANTED OCTOBER 1978)

Variety	Pounds of dry forage per acre				Total
	October 26	December 3	March 25	April 22	
Triumph	3,449 a	1,299 a	1,840 a	3,685 a	10,273 a
Kentucky 31 (BB fungus-free) ..	3,737 a	1,000 b	698 b	2,922 b	8,357 ab
Kentucky 31	2,963 b	855 c	696 b	2,848 b	7,362 b
Missouri-96	2,081 c	824 c	590 b	2,343 c	5,838 c
B-2	0	0	527 b	1,228 d	1,755 d

*Means within a column marked with the same letter are not significantly different at 5 percent level.

critical time of the year when feed supplies are generally short. Crown rust was a serious problem some years on Fawn and Goar in these tests.

In a later trial at the Plant Breeding Unit, Triumph furnished more winter forage than other varieties over a 2-year period, tables 4 and 5. Total yield of 4½ tons per acre was obtained with Triumph in both growing seasons.

At the Prattville Experiment Field on Lucedale fine sandy loam in

TABLE 6. FIRST-YEAR FORAGE YIELD OF TALL FESCUE VARIETIES AT PRATTVILLE EXPERIMENT FIELD, PRATTVILLE, 1978-79 (PLANTED OCTOBER 1978)

Variety	Pounds of dry forage per acre			
	April 6	April 27	June 14	Total
Triumph	1,359 a*	916 a	1,700 a	3,975 a
Missouri-96	1,195 a	946 a	1,533 a	3,674 a
Kentucky 31 (BB fungus-free)	877 ab	910 a	1,720 a	3,527 a
Kentucky 31	842 b	875 a	1,630 a	3,346 a
Clarine	506 bc	745 a	1,534 a	2,785 a

*Means within a column marked with the same letter are not significantly different at 5 percent level.

TABLE 7. SECOND-YEAR FORAGE YIELD OF TALL FESCUE VARIETIES AT PRATTVILLE EXPERIMENT FIELD, PRATTVILLE, 1978-79 (PLANTED OCTOBER 1978)

Variety	Pounds of dry forage per acre					Total
	December 7	March 14	April 7	April 28	June 13	
Triumph	3,827 a*	1,264 a	1,713 a	881 b	451 c	8,136 a
Kentucky 31 (BB fungus-free)	3,622 a	689 b	1,377 bc	1,424 a	543 bc	7,655 a
Clarine	3,847 a	920 ab	1,260 c	1,035 b	450 c	7,512 ab
Kentucky 31	3,290 ab	558 bc	1,384 bc	1,395 a	567 ab	7,194 ab
Missouri-96	2,820 b	359 c	1,213 c	1,446 a	665 a	6,503 b

*Means within a column marked with the same letter are not significantly different at 5 percent level.

TABLE 8. THIRD-YEAR FORAGE YIELD OF TALL FESCUE VARIETIES AT PRATTVILLE EXPERIMENT FIELD, PRATTVILLE, 1980-81 (PLANTED OCTOBER 1978)

Variety	Percent stand, January 6	Pounds of dry forage per acre				Total
		January 6	March 26	April 27	June 8	
Triumph	100	410 b*	1,752 a	1,911 a	385 a	4,459 a
Kentucky 31 (BB fungus-free)	100	395 b	1,014 b	2,195 a	417 a	4,020 ab
Kentucky 31	95	396 b	676 c	1,954 a	429 a	3,456 abc
Clarine	100	711 a	974 bc	1,118 b	245 b	3,047 cd
Missouri-96	80	218 c	668 c	1,460 b	432 a	2,778 d

*Means within a column marked with the same letter are not significantly different at the 5 percent level.

central Alabama, winter production of Triumph was generally much higher than that of Kentucky 31 over a 3-year period, tables 6, 7, and 8. Spring drought during the third year reduced yields. Stands of Missouri-96 were reduced by the third year. Crown rust was a problem on Clarine.

In a later trial at the Prattville Experiment Field, winter production of Triumph was substantially higher than all Kentucky 31 entries, especially during the second year, tables 9 and 10. Establishment of a pasture sod from *A. coenophialum*-infected Kentucky 31 seed from the Black Belt Substation was faster than from commercial Kentucky 31 seed, resulting in somewhat more early production, table 9. By the end of the second year, however, there was no difference in forage yield among the three Kentucky 31 seed sources, table 10. Again, Clarine was observed to be susceptible to crown rust.

Establishment was slow on Sumter clay at the Black Belt Substation, Marion Junction, in west central Alabama, causing relatively

TABLE 9. FIRST-YEAR FORAGE YIELD OF TALL FESCUE VARIETIES AT PRATTVILLE EXPERIMENT FIELD, PRATTVILLE, 1979-80 (PLANTED SEPTEMBER 1979)

Variety	Pounds of dry forage per acre				
	March 14	April 7	April 28	June 13	Total
Kentucky 31 (BB fungus-infected) .	538 ab*	1,473 a	1,418 a	997 a	4,426 a
Triumph	693 a	1,335 ab	1,016 b	1,118 a	4,162 a
Kentucky 31 (BB fungus-free)	310 c	1,394 ab	1,460 a	915 a	4,079 a
Clarine	556 ab	1,211 bc	1,058 b	1,126 a	3,951 a
Kentucky 31	251 c	1,230 bc	1,383 a	1,002 a	3,866 a
Kasba	460 ab	1,046 cd	835 b	551 b	3,072 b
Jebel	492 b	991 d	878 b	574 b	2,935 b

*Means within a column marked with the same letter are not significantly different at 5 percent level.

TABLE 10. SECOND-YEAR FORAGE YIELD OF TALL FESCUE VARIETIES AT PRATTVILLE EXPERIMENT FIELD, PRATTVILLE, 1980-81 (PLANTED SEPTEMBER 1979)

Variety	Pounds of dry forage per acre				
	January 6	March 26	April 21	June 9	Total
Triumph	1,669 a*	2,303 a	1,980 bc	568 a	6,521 a
Kentucky 31 (BB fungus-free)	1,219 ab	1,130 b	2,411 a	466 b	5,226 b
Clarine	1,521 ab	1,377 b	1,739 c	432 bc	5,070 b
Kentucky 31 (BB fungus-infected) .	1,243 ab	1,182 b	2,245 ab	378 cd	5,047 b
Kentucky 31	1,182 bc	1,157 b	2,266 ab	402 bc	5,007 b
Kasba	886 c	1,164 b	1,137 d	261 d	3,448 c
Jebel	772 c	1,249 b	984 d	264 d	3,269 c

*Means within a column marked with the same letter are not significantly different at 5 percent level.

TABLE 11. FIRST-YEAR FORAGE PRODUCTION OF TALL FESCUE VARIETIES AT BLACK BELT SUBSTATION, MARION JUNCTION, 1978-79 (PLANTED SEPTEMBER 1978)

Variety	Pounds of dry forage per acre		
	May 3	May 24	Total
Clarine	2,404 a*	520 a	3,224 a
Triumph	2,604 a	838 a	2,987 ab
Kentucky 31	2,635 a	337 a	2,972 ab
Missouri-96	2,222 b	392 a	2,614 b

*Means within a column marked with the same letter are not significantly different at 5 percent level.

TABLE 12. SECOND-YEAR FORAGE PRODUCTION OF TALL FESCUE VARIETIES AT BLACK BELT SUBSTATION, MARION JUNCTION, 1979-80 (PLANTED SEPTEMBER 1978)

Variety	Pounds of dry forage per acre					
	October 1	December 10	April 1	April 22	May 21	Total
Clarine	2,459 a*	978 a	2,908 a	1,409 b	691 a	8,462 a
Triumph	1,772 a	640 b	3,098 a	1,363 b	711 a	7,514 ab
Kentucky 31	2,215 a	426 bc	2,040 b	1,782 a	787 a	7,276 ab
Missouri-96	1,090 b	354 c	2,100 b	1,732 a	681 a	5,896 b

*Means within a column marked with the same letter are not significantly different at 5 percent level.

low first year forage yields, table 11. However, good yields were obtained the second year, table 12. Clarine and Triumph produced more forage from December 10 to April 1 than Kentucky 31 and Missouri-96. Autumn production of Missouri-96 was substantially lower than the other entries. Clarine was observed to be susceptible to crown rust.

Southern Alabama

In the planting on Marlboro fine sandy loam at the Gulf Coast Substation, Fairhope, in southwestern Alabama, seedling vigor of commercial Kentucky 31 was less than other entries. First-year yields of commercial Kentucky 31 were also less than other entries, table 13. Good stands were obtained for all entries. During the second year, autumn and winter production of Triumph was much higher than that of all entries of Kentucky 31, table 14. Clarine autumn production equalled Triumph, but winter production was less. Clarine was observed to be highly susceptible to rust. Total forage yield of the *A. coenophialum*-infected Kentucky 31 was higher than the *A. coenophialum*-free Kentucky 31 during 1979-80, but not during 1980-81. No explanation can be given for this difference. Grass samples collected during the spring of 1981 showed a heavy infection

TABLE 13. FIRST-YEAR FORAGE YIELD OF TALL FESCUE VARIETIES AT GULF COAST SUBSTATION, FAIRHOPE, 1979-80 (PLANTED OCTOBER 1979)

Variety	Pounds of dry forage per acre		
	March 6	April 9	Total
Triumph	2,126 a*	2,431 a	4,557 a
Kentucky 31 (BB fungus-infected)	2,064 a	2,326 ab	4,390 a
Kasba	2,095 a	2,164 abc	4,259 ab
Jebel	2,139 a	2,060 bc	4,199 ab
Clarine	2,111 a	1,973 c	4,084 ab
Kentucky 31 (BB fungus-free)	1,639 ab	2,295 ab	3,934 b
Kentucky 31	989 b	1,871 c	2,860 c

*Means within a column marked with the same letter are not significantly different at 5 percent level.

TABLE 14. SECOND-YEAR FORAGE YIELD OF TALL FESCUE VARIETIES AT GULF COAST SUBSTATION, FAIRHOPE, 1980-81 (PLANTED OCTOBER 1979)

Variety	Pounds of dry forage per acre				
	October 31	December 29	April 2	May 8	Total
Triumph	1,048 a*	1,823 a	3,388 a	782 de	7,041 a
Clarine	845 ab	1,796 a	2,263 b	998 cd	5,902 b
Kentucky 31 (BB fungus-infected) .	805 ab	1,344 b	1,974 bc	1,448 ab	5,571 bc
Kentucky 31 (BB fungus-free)	618 bc	1,165 b	1,522 c	1,572 a	4,877 cd
Kentucky 31	567 bc	968 bc	1,557 c	1,207 bc	4,299 de
Kasba	284 cd	1,010 b	1,771 c	645 e	3,710 ef
Jebel	99 d	571 cd	1,525 c	627 e	2,822 f

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of *A. coenophialum* fungus in the original *A. coenophialum*-infected seed, while forage from the *A. coenophialum*-free seed was still free of the fungus. Triumph has also been found to be free of *A. coenophialum* to date.

SUMMARY

Seven tall fescue variety trials were conducted at five locations in Alabama for 2 to 4 years.

Triumph and Kentucky 31 yields were generally acceptable at all locations in the State. However, past experience has shown that tall fescue persistence over many years on sandy upland soils in southern Alabama would be expected to be poor.

Triumph tall fescue was the most productive variety at all locations, with winter production being considerably higher than that of Kentucky 31. Annual yields of Triumph averaged from 3 to over 4 tons of dry forage per acre, generally exceeding that of Kentucky 31.

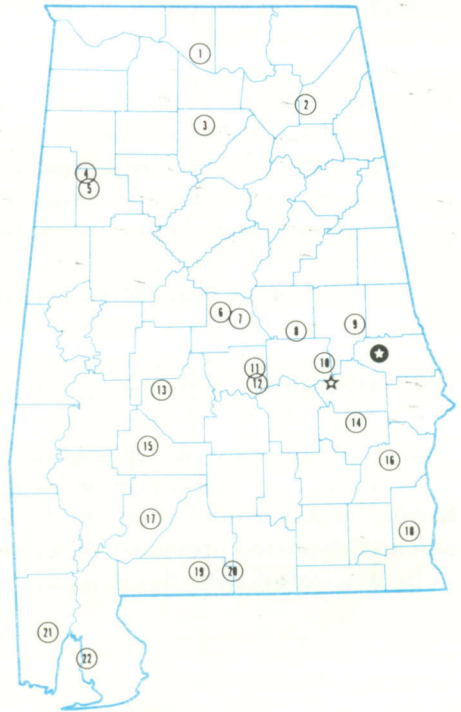
Triumph tall fescue was winter hardy throughout the State after the establishment year. However, other work has shown that late plantings of Triumph in northern Alabama may suffer winter stand losses. Thus, it is essential to plant this variety in September to obtain well established plants for winter survival.

For superior winter production, Triumph is the recommended variety. Other varieties appear no better than Kentucky 31.

No consistent differences in forage yield due to infection of tall fescue by *A. coenophialum* were shown in this report. However, research reported previously has shown lowered cattle performance to be associated with the presence of this fungus.

Alabama's Agricultural Experiment Station System AUBURN UNIVERSITY

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Research Unit Identification

- ★ Main Agricultural Experiment Station, Auburn.
- ☆ E. V. Smith Research Center, Shorter.

1. Tennessee Valley Substation, Belle Mina.
2. Sand Mountain Substation, Crossville.
3. North Alabama Horticulture Substation, Cullman.
4. Upper Coastal Plain Substation, Winfield.
5. Forestry Unit, Fayette County.
6. Foundation Seed Stocks Farm, Thorsby.
7. Chilton Area Horticulture Substation, Clanton.
8. Forestry Unit, Coosa County.
9. Piedmont Substation, Camp Hill.
10. Plant Breeding Unit, Tallassee.
11. Forestry Unit, Autauga County.
12. Prattville Experiment Field, Prattville.
13. Black Belt Substation, Marion Junction.
14. The Turnipseed-Ikenberry Place, Union Springs.
15. Lower Coastal Plain Substation, Camden.
16. Forestry Unit, Barbour County.
17. Monroeville Experiment Field, Monroeville.
18. Wiregrass Substation, Headland.
19. Brewton Experiment Field, Brewton.
20. Solon Dixon Forestry Education Center, Covington and Escambia counties.
21. Ornamental Horticulture Field Station, Spring Hill.
22. Gulf Coast Substation, Fairhope.