



Understanding Tall Fescue Varieties and Their Management

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Tall fescue is one of the most adaptable grasses grown for pasture, hay, baleage, or as a companion with legumes in the central and northern part of Mississippi. Tall fescue can also be over-seeded into warm-season grass pastures in areas of adaptation in the Southeast US and fill the gap when warm-season grasses are dormant (fall and early spring). Kentucky 31 (K-31) or toxic tall fescue has been the primary tall fescue grass for pastures, but there has always been a problem with K-31 due to a toxic endophyte.

Endophyte is a naturally occurring fungus, whose entire lifecycle occurs within the tall fescue plant. The endophyte lives in a symbiotic relationship with the tall fescue plant, obtaining nutrients from it, and in return providing protection from insect pests and from overgrazing by livestock. Endophyte is transmitted only by seed, and its entire life cycle takes place inside plant tissues (Fig. 1). To reduce the toxic effects of the endophyte, plant breeders and researchers have worked for the last decade on developing new varieties that are **endophyte free** or contain a “friendly or novel” endophyte.

Toxic fescue (E+) causes problems in livestock. In horses, K-31 produces ergot alkaloids (Ergovaline) that can result in prolonged gestation and difficult births, thickened placentas, infection, foundering and difficult rebreeding, little or no milk may be produced and colostrums levels may be decreased. K-31 tall fescue should not be grazed by pregnant mares for 60-90 days before foaling. In cattle, it can cause a condition known as “summer slump.” This condition occurs during raised summer temperatures, shown by a tendency of the cattle to stay in the shade and water more than usual reducing their animal performance (Table 1). Toxic fescue also causes a winter problem called “fescue foot” with sloughing of hooves, ears, and tail due to blood circulation problems.

Endophyte-free (fungus free) and friendly- or novel-endophyte tall fescue varieties are now available to help reducing or eliminating this problem while still being productive (Table 2).

Endophyte-free (E-) varieties do not contain any endophytes and there is no production of toxic substances. Without the toxins, cattle performance and health are excellent, but drought intolerance and overgrazing have often resulted in nearly complete stand losses in 4 to 5 yr (depending on management and environmental conditions) (Fig. 2). Sev-

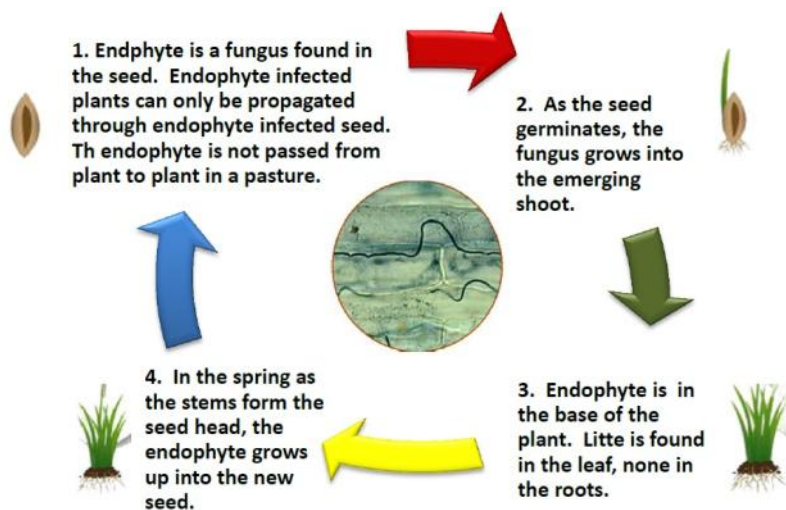


Figure 1. Tall fescue endophyte life cycle.

Table 1. Average daily gains of steers grazing tall fescue containing low or high incidence of endophyte infection.

Location	Average Daily gain	
	Low Endophyte ¹	High Endophyte ²
	lb/day	
Alabama	1.83	0.99
Arkansas	1.57	1.21
Georgia	2.27	0.81
Kentucky	1.54	0.99
Mississippi	1.50	1.01
Missouri	1.37	0.46
Oklahoma	1.87	1.37
Tennessee	1.48	1.06
Texas	2.14	1.01
Virginia	1.43	0.90
Average	1.70	0.98

¹Low endophyte = 0 to 10% infection; ²High endophyte = 70 to 100% infection. Infection was based on number of infected tillers per 100 tillers. Source: Ball, DM, G.D. Lacefield, C.S. Hoveland, and W.C. Young III. 2003. Tall fescue/endophyte concepts. Oregon Tall Fescue Commission. Special Pub. 1-03, Salem, OR.



Table 2. Dry matter yields of tall fescue varieties at three locations in Mississippi from 2000 to 2004.

Year	Varieties	Locations			Average
		Newton	Raymond	Starkville	
		----- lb/ac -----			
2000-01	Bronson	4201	5086	4559	4615
	Jesup MaxQ	4367	4891	4277	4512
	K-31	5035	4687	4859	4860
2001-02	Bronson	5316	8539	7304	7053
	Jesup MaxQ	6247	9034	5992	7091
	K-31	5875	8508	6631	7005
2002-03	Bronson	5653	3627	4963	4748
	Jesup MaxQ	6388	6903	5644	6312
	K-31	6257	6997	5950	6401
2003-04	Bronson	3831	--	3998	3914
	Jesup MaxQ	3842	--	4653	4248
	K-31	3640	--	5377	4509

Source: Lang et al. 2002-2004 Mississippi State University Variety Test Data.

eral commercial endophyte-varieties include Bronson, Kentucky 32, Tall Fescue Select, Enhance, and BarOptima Plus E34. A **friendly or novel-endophyte (NE+)** is a naturally occurring endophyte that has been identified as having properties that make it more useful than the native endophyte present in K-31. It does not produce any compounds that harm or slows animal performance. Usually this type of endophyte greatly enhances plant hardiness, better insect protection, and persistence over endophyte-free. A widely used and tested novel endophyte is called MaxQ and is grown in the tall fescue grass host Georgia-Jesup. New promising endophytes have been introduced into Georgia-Jesup and their performance is being measured in variety testing programs and grazing trials.

Although NE+ offer better animal performance, planting a novel-endophyte tall fescue variety has a two- to three higher establishment cost compared to K-31 or endophyte-free tall fescues. That means that the forage producer needs a guarantee that viable novel endophytes are being purchased, seeded, and established. Viability of endophytes, including that of novel endophytes, can be lost in seed before planting. Tall fescue seed with a dead novel endophyte will perform the same as the E- version of that cultivar. Seed containing a novel endophyte should be planted as soon the environmental conditions are favorable for establishment and should not be exposed to heat or high humidity. Economic evaluations of establishment cost and improved animal performance indicate that a stand of NE+ tall fescue would require 3 to 4 years to pay off and begin to return profit to the enterprise. The profitability of this action depends on the discount rate of the livestock and the stand life of the novel-endophyte tall fescue variety.

Successfully establishing a new pasture of E- or NE+ tall fescue on a site where E+ currently planted is of major concern to producers because it is a major operation. This means that the renovated pasture will be out of production for several months. Make plans to supply extra feed or reduce the number of animals during this period. There several things that a producer needs to consider when doing tall fescue renovation and they include: prevent seed head production in the existing K-31 stand, destroying the existing stand, seeding the new variety, and managing the new stand. To successfully achieve this task the following steps should be followed:

1. Take a soil sample to determine nutrient status and correct nutrient deficiencies (especially pH, P, K) before establishing the new tall fescue variety.
2. There are two methods ("spray-smother-spray" and "spray-spray-plant") that be used for for destroying an existing stand of toxic tall fescue. The "spray-smother-spray" method suggest to spray the E+ tall fescue before heading (6 to 12 inches) in the spring with glyphosate at a rate of 3 pts/ac in 3 to 10 gallons of water plus 0.5 to 1% surfactant. No-till plant pearl millet or sorghum-sudangras for hay during the summer. After the final cutting of hay, spray the regrowth with 3 pts/ac of glyphosate to kill any surviving tall fescue plants and weeds. Usually this method is very expensive and more problematic for most small producers than the "spray-spray-plant" method.

The "spray-spray-plant" method suggest a spring seed head suppression and applying glyphosate in late summer and again four to six weeks later will successfully kill the existing fescue. Planting with this method should be done within 1 to 3 days of the second herbicide application. The timing of this application protocol is critical, as sufficient regrowth by the survivors of the first application is needed to get a complete kill. Destroying the stand with an herbicide using either of these two methods will be faster, cheaper, and much

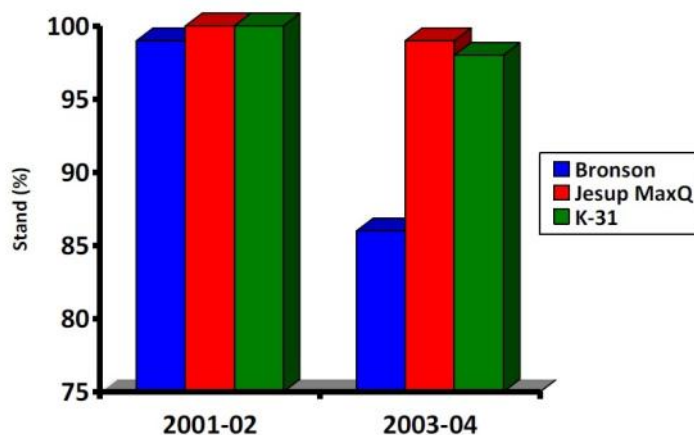


Figure 2. Stand reduction of three tall fescue varieties at Starkville, MS. Percent stands were measured in 2/12/02 and 4/29/04. Source: Lang et al. 2002-204 Mississippi State University Variety Test Data.



more effective than multiple tillage operations and will reduce soil erosion. Plowing alone will not sufficiently kill the existing stand and is not recommended.

3. E- and NE+ tall fescue can be planted at a seeding rate of 15-20 lb/ac. Successful plantings can be made between mid-September and late October. Spring seeding is generally not successful and is not recommended. No-till plating should follow 1-3 days after the second glyphosate application. Use a seeding rate of 20 lb/ac for no-till planting. Plantings can also be made into a firm, prepared seedbed. Drought and insects (army worms and grasshoppers) frequently cause problems with fall seeding. Dry weather can reduce germination and delay seed emergence. Stands that are not well-established by December could be winter-kill. Apply 50 lb N/ac at planting. Lime, phosphorus and potassium should be applied based on soil test recommendations. Apply 50 lb N/ac to the stand the following spring.
4. New stand of E- or NE+ tall fescue needs special treatment like any other newly established stand. Do not cut or graze new stands until plants have grown at least 8 inches. A very light grazing is recommended in late spring to avoid severe hoof action and stand damage. A light mowing might help control weeds and encourage tall fescue growth. Although E- and NE+ tall fescue could be persistent as the E+ tall fescue, maintain a grazing height of 3 inches and using rotational grazing will prolong its longevity. During the summer, tall fescue pastures become dormant or under moisture stress. Under these conditions, it is critical to reduce the stocking rate or rotate the livestock to warm-season pastures to avoid overgrazing. Do not cut tall fescue below 6 inches in the spring following establishment. Hay cutting should not be taken before May and a late cutting (mid- to late May) should be only done if the establishment resulted in an acceptable stand.

2010 Mississippi Forage & Grassland Conference

Forage Production Systems and Economic Sustainability

November 17, 2010
Mississippi Horse Park
716 East Poor House Road
Starkville, MS



Agenda:

- 7:30 – 8:30 Registration – Exhibits Open
- 8:30 – 8:40 Welcome and Opening Remarks (**Dr. Rocky Lemus**, MSU)
- 8:40 – 9:15 Economics of Forages (**Dr. John Michael Riley**, MSU)
- 9:15 – 9:50 Legumes in Pasture Systems (**Dr. Don Ball**, Auburn Univ.)
- 9:50 – 10:25 Native Warm-season Grasses as Forage Crops (**Dr. Joe Bouton**, Noble Foundation)
- 10:25 – 10:50 Break/Exhibits
- 10:50 – 11:25 Profitability of Forages in Mississippi (**Dr. Bisoondat Macoon**, MSU).
- 11:25 – 12:00 Nutrient Management in Pasture Systems (**Dr. Dennis Hancock**, Univ. of Georgia)
- 12:00 – 1:00 Lunch/Exhibits
- 1:00 – 1:35 Baleage Production and utilization (**Dr. Mike McCormick**, Louisiana State Univ.)
- 1:35 – 2:10 Pest and Pesticides Issues in Livestock Production (**Dr. Kristine Edwards**, MSU)
- 2:10 – 2:45 Utilization of Forages in Livestock Production Systems (**Dr. Don Ball**, Auburn Univ.)
- 2:45 – 3:15 Break/Exhibits
- 3:15 – 3:50 Equine Nutrition and Forage Alternatives (**Dr. Ray Smith**, Univ. of Kentucky)
- 3:50 – 4:25 Weed Control – Industry Update (**Dupont, Dow AgroSciences, and BSF**)
- 4:25 – 4:45 Reflections and Summary

The **2010 Mississippi Forage and Grassland Conference** will be held at the **Mississippi Horse Park** in **Starkville, MS on Wednesday, November 17**. It promises to be the best yet, with experts from six states speaking on important forage related topics. The conference agenda, information about speakers, and the conference pre-registration form can be found at the MSUCares Forage Website. **Pre-Registration** cost is **\$15** per person before November 12, 2010; after that date cost will be **\$20** per person. Registration includes lunch. Space is limited; early registration is encouraged.

For more information and registration form contact your local County Extension Office or visit the MSU Forage Website at <http://msucares.com/crops/forages/conference/>

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