

EVALUATION OF FUNGUS INFECTED, FUNGUS FREE AND NOVEL ENDOPHYTE FESCUES AS ROUGHAGE SOURCES FOR DEVELOPING REPLACEMENT HEIFERS

Roscoe L. Ivy¹, Jimmy L. Howell¹, Timothy G. Best¹, John E. Huston¹, Richard R. Evans and David J. Lang²

¹Prairie Research Unit, Prairie, MS 39756

²Dept. of Plant and Soil Science, Mississippi State University, Mississippi State MS 39762

ABSTRACT: Fescue is the most persistent perennial cool season forage available for use on the Blackland Prairie soils of eastern Mississippi. An estimated 35 to 40 million acres are grown in Mississippi and the rest of the south. The negative effects (reduced growth, milk loss, heat problems, failure to shed hair, etc.) associated with infected fescue are well known. The increased growth, milk, heat tolerance, and other positives provided by fungus free fescue are also known but these positives are offset by stand persistence problems. The novel or introduced endophyte fescues appear have the potential to provide the livestock producer with a forage that has the stand persistence of infected fescue and the animal production positives provided by the fungus free fescue. In this trial two of the novel or introduced endophyte fescues (IE), Georgia 5 and Jesup, were compared directly with their fungus infected and fungus free ecotypes. Infected Ky-31 was used as a standard. Crossbred replacement heifers were used to graze the paddocks. They were supplemented with soybean hulls when forage availability was less than forage needs. Gains for the 161 day trial were not significantly different except for endophyte infected Jesup, which was significantly lower than any other fescue and gains recorded for all of the varieties fall within the acceptable range of 1.0 to 1.5 lb/day for replacement heifers.

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KEY WORDS: Fescue, novel endophytes, fungus free fescue, infected fescue, heifers.

MATERIALS AND METHODS: Fourteen, five acre paddocks were planted no-till to Georgia 5 (infected)(GA5E+), Georgia 5 (fungus free)(GA5E-), Georgia 5 Novel or Introduced Endophyte(GA5IE), Jesup (infected)(JE+), Jesup (fungus free)(JE-), Jesup Novel or Introduced Endophyte(JIE) and infected Kentucky 31(Ky31E+) in the late fall of 1999. There were two replicates of each grass type. The paddocks were sprayed two times with Roundup® to kill the existing vegetation before seeding and P and K fertilization was applied as per soil test recommendations. Nitrogen applications were made in the spring of both 2000 and 2001 at the rate of 60# actual N per acre. The establishment year, 1999, was the second of three years of fall drought experienced in this area of the southern U.S. and the no-till seeding was delayed until early November due to the lack of rainfall. Once planted, the seedlings did not emerge until mid-December of 1999 and due to the mildness of the winter, seedlings continued to emerge into the late winter and early spring of 2000. Rainfall was well below normal in 2000, with recorded rainfall being approximately one-half of normal. Fescue stands were not only effected by the lack of rainfall but also by the fact that a high percentage of the new grass seedlings emerging were ryegrass. There had been no ryegrass planted into these paddocks for over twenty years. Due to the amount of ryegrass existing in the stand, we did not feel confident attributing all of the weight gains made by heifers in spring of 2000 solely to one of the grass types under investigation. The paddocks were clipped twice during the spring of 2000 to keep ryegrass from going to seed and few if any ryegrass seed matured. The stands in the paddocks in the fall of 2000 were essentially ryegrass free. In the spring of 2000, five crossbred replacement heifers were grazed on each paddock from late March until mid-May. Gains for all varieties were satisfactory but due to the ryegrass content, these gains will not be reported. In December 2000, 70 crossbred heifers, averaging 525 pounds each, were weighed and allotted to treatment groups. There were two replicates with 5 animals per replicate assigned to one of the seven grass treatments. All treatments were equally supplemented during the winter with hay and soybean hulls when adequate forage was not available. All paddocks were continually stocked for 161 continuous days beginning in early December through late May. Heifers were weighed at 28-day intervals. The heifers were synchronized and

bred once artificially in early May. After trial termination in late May, all heifers were placed with cleanup bulls for 45 days.

RESULTS: Gains for the entire 161 and for the last 21 days of the grazing period are given in Table 1.

Table 1. Heifer Gains on Fescue Varieties

VARIETY	ANIMAL NUMBER	161 DAY TMT MEAN ADG	FINAL 21 DAY TMT ADG
GA5IE	10	1.57	2.26
GA5E+	10	1.52	0.69
GA5E-	10	1.38	1.36
JIE	9	1.54	1.93
JE+	10	1.23	0.81
JE-	10	1.44	0.71
KY31	10	1.39	1.21

Heifer gains were not significantly different except for JE+. Gains for the entire 161 trial fell within the 1.0 to 1.5 pounds ADG, from weaning to breeding, necessary for heifers to reach puberty and to breed to calve as two-year olds. However, the gains seen in the last 40 to 50 days of the development period may be more important than total gain in increasing conception rate. A “flush” or rapid weight gain at the end of the development period, and just prior to breeding, has been shown to increase conception rates in cattle and sheep. Both of the novel or “introduced” endophyte fescues appeared to provide this flush. Heifers on the endophyte free fescues did not perform as well as expected in the final 21 days of the trial and this could well have been a reflection of total forage availability. The drought of 2000 was extremely hard on vegetation and weakened stands, especially those of the fungus free varieties. The gains from of the endophyte infected varieties are possibly somewhat higher than expected but a cooler spring than normal may have moderated the increased body temperature effects usually associated with the endophyte.

The reproductive data on heifers that were developed on the different varieties of fescue is presented in Table 2.

Table 2. Reproductive Performance of Heifers on Fescue Varieties

FESCUE VARIETY	AVG WT. at BREEDING in POUNDS	NO. of HEIFERS EXPOSED	NO. of HEIFERS BRED	% PREGNANT
GA5IE	792.2	9	5	55.5%
GA5E+	767.0	10	9	90.0%
GA5E-	747.5	8	7	87.5%
JIE	793.3	6	2	33.0%
JE+	746.7	6	4	67.0%
JE-	785.8	6	5	83.0%
KY31	757.3	8	6	75.0%

The numbers of heifers that were exposed are unequal due to culling prior to becoming a candidate for breeding and eventual entry into the cowherd. One heifer in the JIE was found in the pasture with a broken leg. The supposition was that during mounting activity, she came down on the leg in an awkward position and sustained the injury. The other heifers were culled on disposition, conformation and post weaning ADG. Upon reviewing the data, it was surprising that the heifers grazing the introduced endophyte fescues had the lowest pregnancy percentage. Equally surprising was the fact that GA5E+ had the greatest number of heifers exposed and the highest pregnancy rate at 90%. The numbers are small but interesting. One animal has too much impact in small data sets.