



Tall Fescue Renovation with Endophyte-Free Seed

J.F. PEDERSEN, C.C. KING, JR., C.S. HOVELAND,
L.A. SMITH, and H.W. GRIMES*

TALL FESCUE (*Festuca arundinacea* Schreb.) seed essentially free of the endophytic fungus *Acremonium coenophialum* Morgan-Jones and Gams, is currently becoming available in the marketplace. Since the presence of this fungus in tall fescue has been associated with poor animal performance¹, many old stands of tall fescue that

are infected with *A. coenophialum* will undoubtedly be replanted with *A. coenophialum*-free seed.

Since the fungus is thought to spread only by infected seed², pasture renovation with endophyte-free seed should be most successful where all of the seed produced by the old fescue stand have become non-viable. In simulated pasture conditions in Oregon, Rampton and Ching³ demonstrated that less than 1 percent of tall fescue seed remained

*Assistant Professor, Professor, and former Professor, Department of Agronomy and Soils; and Superintendent and Associate Superintendent, Black Belt Substation, respectively.

¹HOVELAND, C.S., R.L. HAALAND, C.C. KING, JR., W.B. ANTHONY, E.M. CLARK, J.A. MCGUIRE, L.A. SMITH, H.W. GRIMES, AND J.L. HOLLIMAN. 1980. Association of *Epichloe typhina* Fungus and Steer Performance on Tall Fescue Pasture. *Agron. J.* 72:1064-1065.

²NEILL, J.C. 1941. The Endophytes of *Loium* and *Festuca*. *New Zealand J. of Sci. and Tech.* 23:185-193.

³RAMPTON, H.H. AND TE MAY CHING. 1966. Longevity and Dormancy in Seeds of Several Cool-season Grasses and Legumes Buried in Soil. *Agron. J.* 58:220-222.



viable after 1 year when buried 1 inch deep. When buried 7 inches for a year, recovered seed germinated at a 7.6 percent rate. After 2 years of burial at depths of 1-7 inches, no tall fescue seed was germinable. However, under normal conditions, a new supply of seed could be produced each year.

An experiment was established on an old tall fescue stand at the Black Belt Substation, Marion Junction, Alabama, to determine the amount of natural reseeding of tall fescue from remnant seed after different methods of stand destruction and different methods of subsequent land management. Main plots were 20 feet x 24 feet and were either chisel plowed or moldboard plowed at 6-8 inches September 18, 1980. Each main plot was divided into two 12-foot x 20-foot subplots and either seeded to soybeans or fallowed each summer until the completion of the experiment. The entire experiment was replicated three times. Soybean subplots were disked and rotary tilled twice prior to planting on May 21, 1981, and June 9, 1982, in 30-inch rows. Lorox[®] and Prowl[®] were used on the soybean plots at recommended rates for weed control. The fallowed subplots were disked or rotary tilled as necessary (5 times per year) to prevent any volunteer fescue from making seed and to control weeds during the summers of 1981 and 1982.

Tall fescue seedlings were counted on each subplot December 11, 1980, March 20, 1981, May 7, 1982, and March 23, 1983. The average number of volunteer seedlings per subplot (240 square feet) is listed for each sampling date in the accompanying table. No statistically significant differences were found between main plots (chisel plow vs. moldboard plow) or between subplots (soybeans vs. fallow). When all treatments were averaged, the number of seedlings per plot in December 1980 and March 1981 was significantly higher than in May 1982 and March 1983.

Although the chisel-plowed plots appeared to have more seedlings in the first year than did the moldboard plowed plots, so much variability was present between replications that no conclusion could be drawn as to differences between chisel and moldboard plowing. The data clearly indi-

cate that fescue seedlings were almost eliminated after 18 months of being cropped or fallowed.

In practice, the number of volunteer tall fescue seedlings per unit area that would be of practical importance would vary with the use of the newly established tall fescue stand. If certified seed are to be produced, Alabama certification standards for registered or certified tall fescue seed production require that seed be planted on land that has not been seeded to the same species for the 5 previous crop years to prevent contamination⁴. If non-certified seed production from a stand established from *A. coenophialum*-free seed is planned, these data and the results of Rampton and Ching's study in Oregon indicate that the area to be planted should be kept out of fescue production for more than 1 year.

If the new stand is to be used for pasture, the interpretation of these results becomes more difficult. The amount of tolerable contamination in a new pasture is unknown. However, it can be seen that significantly less contamination would be expected if the area was kept out of fescue production for one complete growing season.

A practical approach to maximizing the use of an established tall fescue stand prior to the seeding of a new cultivar or an *A. coenophialum*-free pasture can be extrapolated from this information. By preventing any established fescue from producing seed in the same year a new stand is to be planted, a situation would be created in which any remnant seed would be approximately 15 months old when the new stand is planted. Based on our data, and Rampton and Ching's data³, under such conditions few or no tall fescue seed would be expected to be germinable after that length of time. Intensive grazing, mowing, or the chemical destruction of the sod prior to seed formation should be effective in preventing seed formation. Additionally, the old sod would have to be killed prior to planting to prevent vegetative contamination of the new stand.

⁴Official Seed Certification Standards for Alabama. Ala. Crop Improvement Assoc., Inc.

AVERAGE NUMBERS OF TALL FESCUE SEEDLINGS PER PLOT
AFTER DIFFERENT METHODS OF STAND DESTRUCTION

Treatment, plow type-crop	Seedlings, by date counted			
	Dec. 1980	Mar. 1981	May 1982	Mar. 1983
	<i>No.</i>	<i>No.</i>	<i>No.</i>	<i>No.</i>
Chisel-soybean.....	16.3	14.3	1.3	0.0
Chisel-fallow.....	25.3	12.0	1.5	.0
Moldboard-soybean.....	7.3	10.0	.3	.7
Moldboard-fallow.....	5.0	4.3	.7	.0
Average.....	13.5	10.2	1.0	.2

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

