

Operational Model of the Alliance for Grassland Renewal

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Abstract. Novel endophyte tall fescue was developed over 20 years ago, and novel endophyte cultivars are among the most innovative cultivars developed in recent decades. Yet adoption of novel endophyte technology is slow. In order to expedite adoption, a diverse group of stakeholders self assembled as the Alliance for Grassland Renewal, a nonprofit organization that includes colleagues from the sectors of industry, university, government, and production. Since 2012, the Alliance has held workshops for producers, educators, and industry across the southeastern US, where tall fescue is the predominant pasture grass. Also since 2012, the Alliance has monitored and reported endophyte purity and viability in novel endophyte cultivars. Activities of the Alliance are self-funded according to a fee structure developed by its Board of Directors. At present, the Alliance has expanded to include seven land-grant universities and seven private companies, along with partners in the federal government, livestock production, and nonprofit organizations.

Introduction

Fescue toxicosis costs livestock producers \$1 billion USD annually and is the most economically devastating forage-livestock disorder in the eastern US (Roberts and Andrae 2018). Fescue toxicosis is caused by ergot alkaloids, which are toxins produced by the endophytic fungus, *Epichloë coenophiala* [(Morgan-Jones & W. Gams) C.W. Bacon & Schardl, comb. nov.] (Bacon et al. 1977), which colonizes tall fescue, *Lolium arundinaceum* (Schreb.) Darbysh.] (Lyons et al. 1986).

A solution to fescue toxicosis was identified and implemented in the mid-1980s, when plant breeders released tall fescue cultivars that did not contain the endophyte. These cultivars, known as “endophyte-free,” were non-toxic and had the same nutritive value as common tall fescue. However, endophyte-free cultivars lacked persistence, as they were susceptible to a wide range of biotic and abiotic stresses.

In the late 1990s, cultivars were developed that are both persistent in the field and are non-toxic to cattle. These cultivars, known as “novel endophyte” tall fescue, were infected with unique strains of the endophyte. These novel strains produced little or no ergot alkaloids. In grazing trials across the Fescue Belt (Fig. 1), novel endophyte cultivars have supported excellent livestock performance while persisting under grazing over multiple years.

The adoption of novel endophyte technology has been slow. Major reasons for slow adoption include expense and complexity of pasture renovation (Roberts and Andrae 2005). Other reasons include poor messaging, as understanding of the science and recommendations for planting were inconsistent among companies and states in the Fescue Belt (Fig. 1).

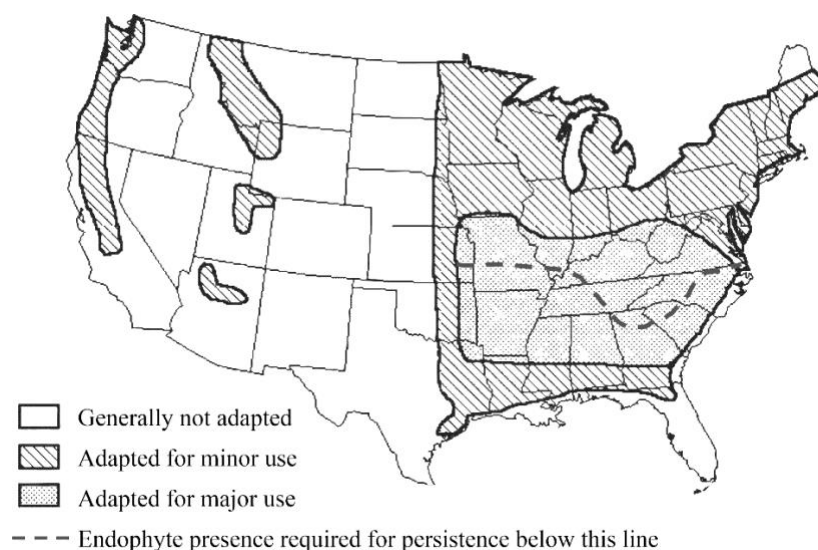


Figure 1. The Fescue Belt of the US.

Methods

In order to expedite the adoption of novel endophyte technology, a committee (group used multiple times) of diverse stakeholders agreed to explore the formation of a group who could work together to facilitate the adoption of novel endophyte technology. A pilot group met throughout 2011 and decided on a formal name for this effort, “The Alliance for Grassland Renewal.” That year, the group also set four objectives: 1) Education, 2) Quality Control, 3) Incentives, and 4) Promotion.

In order to fund the above objectives, the Alliance developed an internal fee structure, where universities contributed \$1,500 USD annually, and private companies contributed \$5,000 USD annually. Fees from the nonprofit organizations ranged from in-kind payments to \$5,000 USD annually. Fees were not collected from producers or government workers.

Regarding the Education objective, the Alliance decided to hold 1-day workshops in March of each year. These workshops would rotate through the Fescue Belt in the US (Fig. 1), where tall fescue is the predominant cool-season pasture grass. Workshops would be taught by leading experts in fescue toxicosis and management, and topics would include the severity of fescue toxicosis, reliability solutions via new cultivars, and methods for replacing toxic tall fescue with a novel endophyte.

Regarding the Quality Control objective, the Alliance decided to monitor the endophyte strain and viability in seed lots harvested each year. The Alliance also decided to pursue animal safety standards.

Results and Discussion

Formation of the Board of Directors

The Alliance membership formalized and grew to attract the broad spectrum of stakeholders, including extension educators, industry representatives, university researchers, nonprofit organizations, government workers, and livestock producers. The Alliance formed a Board of Directors, and the current partners (Table 1) represent fescue-based livestock production across the Fescue Belt and the Oregon seed industry (Fig. 2).

Table 1. Current partner organizations on the Alliance for Grassland Renewal Board of Directors.

Category	Partner
University	University of Missouri University of Kentucky North Carolina State University Virginia Tech University University of Georgia Clemson University Auburn University
Industry	Agrinostics, Ltd Barenbrug USA Corteva (originally Dow AgroSciences) DLF Pickseed (originally DLF International) Grasslandz (originally AgResearch) Mountain View Seeds Pennington Seed
Government	Natural Resource Conservation Service
Nonprofit	Missouri Forage and Grassland Council
Key Producers	



Figure 2. Geographic locations of the Alliance for Grassland Renewal Board of Directors.

Education

Alliance workshops began in 2012 in Missouri and continued to spread through the Fescue Belt. Over the following 10 years, 1-day workshops have been held in Oklahoma, Kansas, Kentucky, North Carolina, Georgia, South Carolina, Maryland, and Tennessee (Fig 3). All of these have been in-person venues.

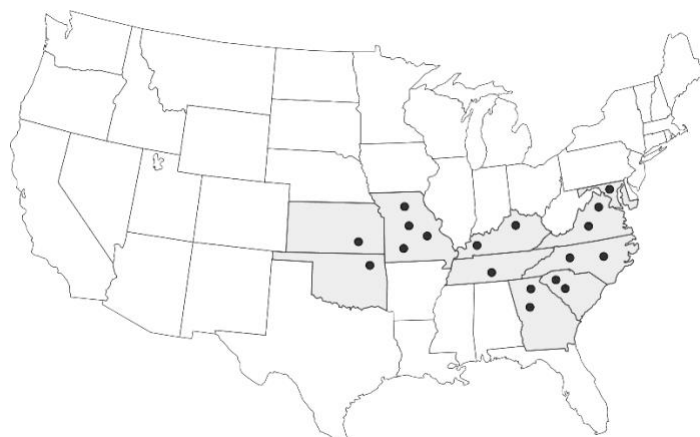


Figure 3. Location of workshops held by the Alliance for Grassland Renewal, 2012 - 2022.

The curriculum for the 1-day workshop begins with a discussion of fescue toxicosis and its impact on animal performance and the enterprise. The curriculum continues with establishment methods and seed quality of novel endophyte cultivars. The curriculum discusses management of the pastures and economic analysis, which includes cost of establishment and cost recovery concepts. In the latter half of the workshops, seed company representatives discuss their products and have time to visit with producers in the field. The final talks are producer panels and possible incentive programs. Through the workshops are demonstrations, such as microscopic viewing of the endophyte, calibration of a no-till drill, and visit to field plots.

In addition to the standard workshops, the Alliance has held workshops for targeted audiences. These workshops are abbreviated and virtual, and several have been held for colleagues working for University Extension and the Natural Resource Conservation Service. Additional virtual workshops have targeted colleagues working in the forage seed industry.

Quality Control

The Alliance set quality control standards for endophyte purity and viability. Alliance-approved seed would contain at least 95% novel endophyte in seed bags purchased and planted. Seed lots were required to have at least 70% viable endophyte, which ensured against establishment of low endophyte fields. All seed lots that met quality standards would be marked with the Alliance logo (Fig. 4).

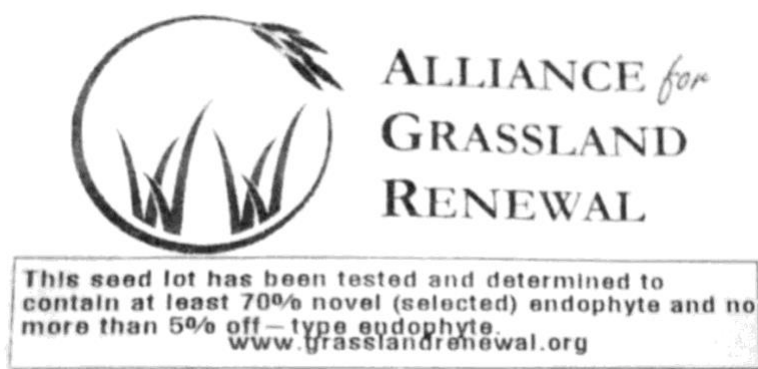


Figure 4. Logo stamped onto a seed bag that passed the quality standards of the Alliance for Grassland Renewal.

Other Objectives

The two other objectives, incentives and promotion, continue to be pursued but with less success compared to the objectives of Education and Quality Control. Of the two, the Incentives objective has the greatest untapped potential for increasing adoption of novel endophyte technology, as cost-share programs could be initiated to support the replacement of toxic tall fescue with novel endophyte tall fescue. Compared to novel endophyte cultivars, the common toxic tall fescue, such as Kentucky 31 tall fescue, has more negative impact on soil microbes, water quality, and the food web.

Conclusions and/or Implications

The Alliance for Grassland Renewal has created a unique model for funding and delivering educational programs whose goal is to implement new practices. The Alliance uses a non-traditional fee structure, as both university and industry partners contribute to underwrite the workshops and activities. The annual collection of these fees creates an environment where ownership is vested among university Extension programs, government entities, and commercial partners. In addition to the funding aspect, the Alliance model requires collaboration among competitors, as private companies work together to foster on-farm adoption of novel endophytes and to monitor the quality of novel endophyte seed. Finally, the Alliance model is unique in its delivery. Alliance workshops rotate across states in the Fescue Belt each year, and its nationally recognized experts bring site-specific management to the local farmers and educators in NRCS and university Extension. This assures the workshop attendees that the endophyte and varieties are well adapted to their area and can be established and managed on their farms. Confidence encourages adoption.

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