

## ARE YOUR PASTURES POISONOUS?

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What would you do if you found out that there was a poison hiding somewhere in your pastures? What would you do if you found out that it was lowering your weaning weights by 60-90 lbs/head or reducing gains on your stockers by 40%? What if I told you that this poison caused you to have a 60-70% calf crop instead of a 90%+ calf crop? What would you do if you found out this toxin was causing your cows to spend about 20% less time grazing, drink 25% more water, lose up to 2 points of body condition, and produce about 25% less milk for their calves? You know what you’d do. You would get rid of that poison.

Unfortunately, some pastures have plants in them that are toxic, even though many producers do not realize these toxins are present. The toxic compounds are called ergot alkaloids, and these compounds interfere with normal hormone endocrine function and cause the animal’s blood flow to be constricted. These ergot alkaloids are produced by a fungus that lives inside of certain varieties of tall fescue. Scientists refer to such a fungus as an endophyte. The parts of that word, “Endo” (which means within) and “phyte” (meaning a plant), explain that we are dealing with an organism living inside of the plant. In this case, we are dealing with a species known as *Epicloë coenophialia*, which is a fungi that grows in between the cells within tall fescue.

### The Effects on Animal Performance

The toxic ergot alkaloids produced by this fungal endophyte cause a whole suite of maladies in the cattle that consume the plants that are infected. These problems are broadly referred to as “fescue toxicosis.” The complete list of symptoms is too long to include, but the most problematic are high body temperature, failure to shed the winter hair coat, reduced feed intake, poor weight gain, difficulties in giving birth, and low pregnancy rates (Figure 1). Combined, the effects of these toxins are estimated to cost U.S. beef producers nearly \$2 Billion annually.

Of course, the biggest economic consequence is that animal performance suffers substantially. For example, cow-calf herds grazing toxic tall fescue often produce 30% fewer calves, and those calves may be 60 to 90 lbs lighter than cattle grazing the non-toxic, novel endophyte tall fescues (Table 1). These cattle seem to lag behind even after they make it to the feedlot. In a Georgia study, calves that had been backgrounded on toxic tall fescue ended up approximately 100 lbs lighter than similar calves on non-toxic tall fescue when they were finally shipped to a feedlot in Oklahoma, and they stayed approximately



**Figure 1.** A heifer suffering from fescue toxicosis in the foreground and a heifer of the same age provided non-toxic, novel endophyte tall fescue in the background.

100 lbs lighter until they were harvested nearly 120 days later (Figure 2).

## There is A Better Way

Despite all the problems associated with toxic tall fescue, the plant has a lot of agronomic attributes. The high yields, resilience under grazing, high quality, and late fall productivity of tall fescue that made it so popular originally is still needed. Researchers first tried killing out the endophyte. The resulting endophyte-free tall fescue solved the animal performance problems, but the stands tended to die out within a couple years. It turns out that the endophyte creates other compounds that increase the drought and pest tolerance of the tall fescue, traits that are crucial for persistence.

In the mid-1990s, Dr. Joe Bouton took a sabbatical leave from his post as a professor and forage breeder at the University of Georgia, and he spent several months working with Dr. Gary Latch in New Zealand's federal agricultural research agency, AgResearch Limited. Together, they took some non-toxic endophytes that Latch had identified and, using tweezers and a scalpel, infected some high-performing endophyte-free varieties of tall fescue that Bouton had developed. The result was the first commercialized non-toxic, novel endophyte tall fescue varieties on the market: 'Jesup MaxQ™' and 'GA 5 MaxQ™.' Pennington Seed, Inc. (Madison, GA) obtained the rights to sell these novel endophyte varieties in North America. Though both were sold when first released in 2000, Pennington Seed eventually simplified the production and marketing of the novel endophyte varieties and sold only 'Jesup MaxQ™.' Since then, several other non-toxic "novel" and "friendly" endophyte tall fescue varieties have been brought to the market.

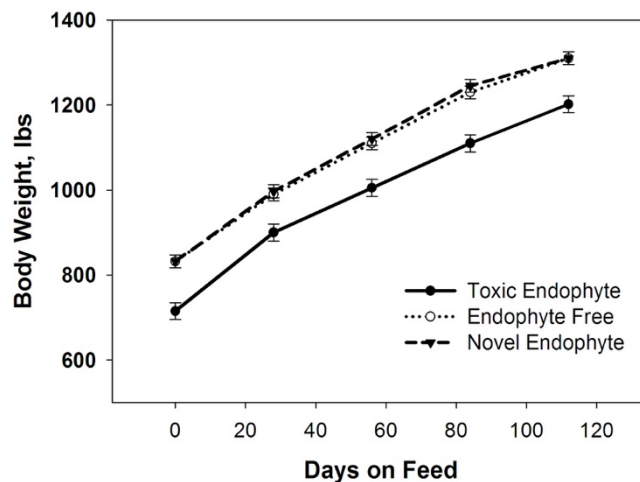
**Table 1.** Cow-calf performance on toxic or novel endophyte (NE) tall fescue stands.<sup>†</sup>

	Toxic	NE
<b>Cow Performance</b>		
Wt. at end of breeding, lbs.	1110	1236
Wt. at end of weaning, lbs.	1005	1122
BCS at end of breeding <sup>‡</sup>	5.4	5.7
Pregnancy Rate, %	44.7	85.1
<b>Calf Performance</b>		
Actual Weaning Wt., lbs.	461	529
Adj. (205 d) Weaning Wt., lbs.	436	504
ADG (birth to wean), lbs. <sup>§</sup>	1.7	2.1
<b>Replacement Heifers</b>		
Actual Weaning Wt., lbs.	459	498
Calving Rate, %	64.1	90.6

<sup>†</sup> Adapted from University of Arkansas Experiment Station Reports by Coffey et al. (2007 and 2008).

<sup>‡</sup> BCS: Body Condition Score.

<sup>§</sup> ADG, Average Daily Gain.



**Figure 2.** Subsequent feedlot performance of cattle that had grazed toxic, endophyte-free, and novel tall fescue during the stocker phase. Cattle originally grazed pastures in Eatonton and Calhoun, Georgia, and were finished in Stillwater, Oklahoma (Duckett et al., 2001).

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## **Renewing Our Grasslands**

In the 1940s and 50s, a huge educational effort was undertaken to encourage farmers to protect their soil by planting pasture instead of tilling fragile soils. Ironically, tall fescue was a major part of the solution to those issues, and it wasn't until 30-40 years later that there was a realization that a fungal endophyte was causing problems. Now there is a need for a new educational effort. The next chapter in the saga of tall fescue must include organizations and incentives that help producers take steps to convert these toxic fields into stands of non-toxic, endophyte tall fescue.

In 2012, the Alliance of Grassland Renewal was formed to try to tackle this issue. The Alliance is a partnership of university specialists, nonprofit industry groups, educators and policy makers in the government, seed companies, testing labs, and producer groups. Their mission is to work together to educate producers about the problem, provide guidelines to ensure quality products in the seed industry, promote fescue seed products that contain non-toxic endophytes, and advocate for incentives that will help affected producers transition away from toxic tall fescue. The Alliance has been conducting educational workshops across much of the fescue belt, and UGA Extension will be working with them to host a workshop in Calhoun, GA on March 15, 2019. For more information about this workshop and what you can do to rid your pastures of this toxin, visit [www.georgiaforages.com](http://www.georgiaforages.com). Information about the subject matter covered at this workshop, the world renowned experts who will be presenting the information, and registration details can be found at <http://georgiaforages.caes.uga.edu/event/novel-tall-fescue-renovation-workshop.html>.