REDUCING FESCUE ENDOPHYTE LOSSES

By

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It was less than 30 years ago that the presence of an endophyte (internal fungus) was linked with fescue toxicity. The fungus is exclusively seed transmitted, and can only be detected through a laboratory analysis. Toxins produced by the fungus cause fescue toxicity. Unfortunately, most 'Kentucky' 31 fescue (the variety that occupies most of our fescue acreage) has a high level of fungus infection, which means that animal production on most fescue pastures is substantially lower than it could be. Since the role of the fungus in fescue toxicity became clear, a great deal of research has addressed this problem. A number of approaches to reduce or eliminate economic losses caused by the fescue endophyte have been identified.

Avoidance of the Endophyte: In some situations a livestock producer can simply avoid some or all of the problems caused by the endophyte. An example could be a beef producer who pastures beef cows on toxic-infected fescue but excludes yearlings because of greater economic impact of ingestion of toxins. Also, the adverse reaction of grazing animals to the toxins is greatest during warm weather. Hence, in some situations the timing of grazing of toxic fescue, especially by animals known to be especially sensitive to the toxins, may be an important consideration.

Use of Endophyte-free Tall Fescue: Endophyte infection is not genetically controlled, and thus is not a true varietal trait. However, since the early 1980s, endophyte-free seed of a number of fescue varieties has become commercially available. Endophyte-free fescue does not contain toxins and, therefore, does not cause any of the livestock disorders associated with the tall fescue endophyte. Animal performance in terms of gain/animal is thus strikingly better than on toxic, endophyte-infected fescue.

Unfortunately, endophyte-free fescue also does not contain certain endophyte-produced compounds that are important in stress tolerance and pest resistance in fescue plants. Consequently, endophyte-free fescue stands tend to be much less persistent than endophyte-infected stands, especially in climates and soils that are marginal for growing tall fescue, such as in Alabama.

Dilution of Endophyte Toxins: The quantity of endophyte toxins consumed by animals is directly correlated with the amount of toxic fescue consumed. Therefore, any management technique that reduces the quantity of toxic fescue in an animal's diet will reduce fescue toxicosis. For example, feeding grain, non-toxic hay, or other supplemental feed to animals on toxic fescue reduces the amount of toxins they take into their bodies.

Similarly, management of toxic fescue pastures to favor other grasses can dilute the fescue toxins in animals' diets.

Planting legumes such as white clover, red clover, alfalfa, or annual lespedeza in toxic fescue pastures is often a particularly feasible, effective, and relatively inexpensive way to dilute fungus toxins in animals' diets. This is not a long-term solution to the problem, but it can significantly improve animal performance in the short-term, especially in beef cow-calf operations.

Close Grazing or Clipping: Keeping toxic endophyte-infected pastures grazed closely has been shown to improve animal performance as compared to allowing forage to accumulate. Furthermore, close grazing or mowing of seedheads in toxic fescue pastures during spring and early summer may reduce subsequent toxin intake by reducing the ability of animals to selectively graze seedheads in which endophyte growth (and associated toxins) tends to be greater than in other plant parts.

Fescue Hay Considerations: Hay made from toxic fescue contains toxins, although not at as high a level as in green plant material. Thus, when animals consume toxic hay, their response is usually less adverse than when they graze on fescue pastures. Also hay is usually fed during the winter when temperatures are cooler, causing less adverse animal response. Nonetheless, toxins in fescue hay have an adverse effect on animal performance. This effect can be minimized or avoided simply by reducing or eliminating the feeding of toxic hay.

In addition, treatment of hay with anhydrous ammonia has been practiced by some producers. The main reason for this treatment is that anhydrous ammonia improves the digestibility of hay (especially highly fibrous hay) and adds some non-protein nitrogen. However, in recent years it has been learned that ammoniating hay reduces endophyte toxins in hay as well, thus giving producers who have access to anhydrous ammonia another reason to consider using this technique.

Stockpiled Fescue: A great attribute of tall fescue is that it is especially well suited to being stockpiled because it holds its forage quality quite well into winter. Recent research has shown that the toxin levels in stockpiled toxic fescue decline with time. This being the case, and in view of the relatively small drop in forage quality of stockpiled fescue, delaying use of stockpiled grass until mid-winter or so can reduce the amount of fungus toxins animals ingest.

Animal Supplements or Treatments: Dewormers have been shown to reduce fescue toxicosis in yearling beef animals. Dewormers are not considered to be an antidote to fungus toxins, but they avoid the compounding effect of animals being adversely affected by both worms and fungus toxins. Animals that receive dewormers while grazing toxic endophyte-infected fescue still have reduced performance as compared to animals that receive dewormers while grazing endophyte-free fescue.

Other additives, supplements, or treatments have been investigated, several of which have been of some value in reducing the symptoms though not eliminating the cause of fescue toxicosis, but none appear to have universal application. Research aimed at finding a reasonably-priced, effective material that will totally or nearly totally offset the effect of endophyte toxins continues.

Novel Endophyte Fescue: Research has led to identification of endophyte strains that do not produce the toxins that cause animal disorders but that do impart pest resistance and stress tolerance to fescue plants. These fungus strains, referred to by scientist as "novel endophytes," produce the desirable alkaloids but not the undesirable ones. Novel or non-toxic endophyte strains have been inserted into a few fescue varieties, some of which are now commercially available.

Grazing trials with lambs, beef steers, beef cows, and horses have shown excellent performance on novel endophyte fescue pastures, similar to that on endophyte-free fescue. A novel endophyte can also give tall fescue vigor, pest resistance, and tolerance to drought and grazing similar to that of toxic endophyte fescue. Thus, novel endophyte fescue offers the potential for long-lasting pastures and high animal productivity. However, different endophyte strains have different characteristics just as do different varieties of fescue. Therefore, a substantial amount of field-testing will be required to determine the suitability of any particular fungus/variety combination for a given geographical area.

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