Grazing Endophyte Infected Tall Fescue

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TALL FESCUE occupies about 35 million acres in the United States. Each year several million feeder cattle are grazed as yearlings or calves on these pastures. Research trails have demonstrated the negative effect of the endophyte *Acremonium coenophalum* on the growth and health of cattle grazing tall fescue infected with it. Cattle consuming endophytic tall fescue have shown lower feed intake, lower weight gains, lower milk production, higher respiration rate, higher rectal temperature, increased water consumption, rough hair coat, and more time spent in the shade. They have also exhibited excessive salivation, greater urine volume, reduced prolactin levels, reduced reproduction performance, and nervousness. Other more severe, even fatal manifestations are fat necrosis and fescue foot resulting in lameness and at times a sloughing off of hoofs, tail tips, or ear tips.

Research indicates that we can expect about a 0.1-lb./head/day reduction in performance for each 10 percent increase in endophyte infestation. A reduction in conception rate from 90 percent to 60 to 70 percent has been observed for cows grazing endophyte-infected fescue. These reductions in performance result in substantial losses to producers in the southeastern United States.

The fescue fungus remains an enigma. Researchers continue to provide some answers about the characteristics, symbiotic relationship, effects, and dissemination of the fungus. However, some key questions about the fungus and its relationship to the fescue plant remains unanswered. Exactly which alkaloids or toxins are responsible for the toxicity is still unknown. There are some indications that an ergot-type alkaloids, which is produced by the fungus, is the major cause of fescue toxicity.

A symbiotic relationship exists between the fungus and the fescue plant. The plant provides the fungus with a source of nutrition, a means of dispersal, and protection from the environment. More importantly, the fungus provides several benefits to the plant. These include: (1) increased seedling vigor; (2) increased resistance to environmental stresses; (3) increased resistance to insects and diseases; and (4) increases resistance to herbivores.

The degree of fungal infection is variable but appears to be quite high in most of the fescue-producing areas of the country. In southern Illinois the average infection rate was 78 percent.
with approximately 75 percent of the samples having an infection rate of 80 percent or higher. Because pasture renovation may be difficult and expensive, it is important to develop methods to manage the infected fescue to minimize its toxic effect.

It is necessary to know the level of infestation so that informed decisions can be made about the management of the fescue. A leaflet, "Illinois Tall Fescue Toxicity Diagnostic Program," providing complete information on sampling for fescue-fungus is available at Illinois County Extension offices.

**MANAGEMENT OF INFECTED FESCUE**

0 to 10 percent infestation: No detrimental effects should be observed. To prevent increased infestation, the pastures should be clipped once or twice in the spring or early summer to prevent seedhead formation. This is important because the seed spreads the fungus.

20 to 40 percent infestation: The economic threshold for renovation may not be reached. The practices discussed in the management section will be of benefit with these pastures.

50 to 100 percent infestations: It may be economical to kill the old fescue stand and reseed with fungus-free seed or other grasses. However, some of this fescue is on ground that does not lend itself to renovation for topographical reasons. If the fescue cannot be renovated, then it is necessary to manage the infected pastures.

**Renovation of Infected pastures**

There are three course of action for renovation of infected pastures: (1) dilution with a legume; (2) killing the fescue and reseeding a cool season grass; and (3) killing the fescue and reseeding a warm season grass.

Dilution with a legume can be accomplished by no-till seeding red clover and Ladino clover into the fescue pasture. A no-till drill allows maximum seed-to-soil contact. An alternative is to broadcast a "forest seeding" in late winter and drag or harrow to knock the seed to the soil surface. Late winter of early spring seeding is preferred over fall seeding to prevent competition and to provide 2 full years of clover production.

A suggested initial seeding would be 8 pounds of red clover and ½ pound of Ladino per acre. Thereafter, frost seed 3 pounds of red clover and ½ pound of Ladino every year or two, depending on the previous year’s stand. Lespedeza can be substituted in areas too steep to apply fertilizer.

Rotational grazing is important to maintain the stand. If legumes are maintained in at least 20 percent of the stand, they will help offset the effects of the endophytic fungus.

**Reseeding Cool Season Grasses**

Removal of existing stands will be most complete using a combination of herbicides, tillage, and planting annual crops for 1 to 2 years before returning the field to fescue. Producers who do not have the necessary equipment for traditional cropping practices may substitute herbicides for tillage. A procedure to observe for reseeding pasture follows. (This procedure was adapted from the extension booklet, "Tall Fescue and the Endophyte fungus Situation in Illinois.")
RESEEDING PASTURE

1. Prior to reseeding, prevent old stand from going to seed for 1, and preferably 2 years, by heavy grazing and mowing. Fungus in old stand seed will probably not be viable if seed is more than 1-year old.

2. Buy certified endophyte-free seed.

3. Consider endophyte-free varieties that are proven to be good performers. Also investigate yield, seedling vigor, palatability, digestibility, animal performance, distribution of growth (date of maturity in spring and regrowth in the fall), disease resistance, and adaptability to region (winter-hardiness, etc). Palatability, digestibility, and animal performance are expensive to test and therefore the hardest information to find.

4. Late summer or early fall is the recommended time for no-till reseeding of tall fescue. Severe grass weed problems result from spring seeding. Wait until the following spring to add the clover to the new stand to prevent competition with the new fescue and provided 2 full years of clover production.

5. Seeding rate recommended for reseeding of fescue is 15 pounds per acre.

6. Kill the old fescue stand as thoroughly as possible. Graze heavily all summer and then apply chemicals and reseed about the first of September.

One application of Roundup or two applications of paraquat appear to be adequate to control old stands. The two applications of paraquat are applied 10 to 14 days apart if fescue regrowth is active. If not, one may have to wait until active growth occurs.

Paraquat has the advantage of being less expensive than Roundup, and the double application reduces the chance of skipped areas. Rates for paraquat application are 1 quart per acre for the first application and 1 pint to 1 quart for the second application.

The standard application rate for Roundup is 3 quarts per acre; however, Monsanto Chemical Co. reports that 2 quarts will be adequate if the applicator: (1) uses flat fan nozzle with correct boom height; (2) uses only 5 to 10 gallons of water per acre; (3) uses a 0.5 to 1 percent surfactant; and (4) uses 25 to 35 pounds of spray pressure. One quart sometimes works on active fall growth.

7. As was indicated earlier, legumes are needed in the reseeded fescue stand to add to total forage growth during the fescue’s summer dormant period, and to provide nitrogen for the grass.

Reseeding Warm Season Grasses

Generally, the same procedure is used to establish warm season grasses. The only exception is that the warm season grasses should be no-till seeded into a killed fescue sod base in late spring.
Management of Cattle on Endophytic Fescue

Managing infected pastures may be possible to avoid many of the toxicity problems. Implementing the following grazing management guidelines will help to minimize the toxic effects of the endophytic fungus.

GRAZING MANAGEMENT GUIDELINES

1. Graze closely because the endophyte is concentrated in stems and seedheads. Intensive grazing will help by increasing leaves and reducing stems.

2. Do not stockpile spring fescue growth for fall grazing. Stockpiling fall fescue growth for winter grazing is acceptable for the cowherd, but watch closely for signs of fescue foot.

3. Prevent seedhead by grazing intensively when possible and clipping is necessary.

4. Excess spring forage should be cut for hay when the first seedhead appears or before seedhead emergence. Regrowth can be grazed until summer dormancy. Clip, graze, or hay in the boot stage to prevent heading. A second harvest may be necessary to prevent late emerging seedheads.

5. Remove cattle from fescue during summer months. Forage quality is insufficient for most livestock during the summer dormancy period. Graze cattle on warm season grasses or on other cool season grasses that were harvested for hay and allowed to regrow.

6. Feeding supplemental feed or hay other than infected fescue hay can reduce problems if you cannot remove cattle from the infected pastures. Research indicates that from 2 to 5 pounds of supplemental feed are necessary to alleviate the symptoms of fescue toxicity. Performance may still not equal that of noninfected pastures.

7. Graze fields low in endophytes if it is not possible to remove cattle from fescue during the summer months.

8. Avoid excess nitrogen applications (more nitrogen than the plant can utilize in a growing season). Do not produce more fescue than can be used by grazing or haying. Not only is the money wasted, but the toxic effects may be intensified.

9. Implant calves and stocker cattle to reduce the influence of the endophytic fungus. Research indicates that the response to implanting is proportionally larger on infected than noninfected pastures. The calves must be gaining weight for this response to be observed.

10. Change the breeding season for cows so that they are not bred during the summer. Moving the cows to fall or winter calving has been shown to improve conception rates.
SUMMARY

There is no definite answer to the question of whether or not to renovate infected fescue. The response depends on many factors, such as class of livestock to be grazed, level of infection, and type and amounts of other forages. Clearly, with old, infected fescue some changes in management may be necessary to maximize performance. By using the suggested management practices, it will be possible to minimize the effects of the endophytic fungus.

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