

REPRO TRACKS

by Cliff Lamb, Texas A&M University

Fescue Toxicosis

How does fescue toxicosis affect reproductive performance in beef cattle?

Many cattle producers raise their cattle in the Southeast and Midwest regions of the United States. A common cool-season forage cattle in these regions are exposed to is tall fescue (*Lolium arundinaceum*), primarily Kentucky 31 (KY-31).

Fescue toxicosis is a result of cattle grazing endophyte-infested tall fescue, specifically consuming ergot alkaloid toxins produced by the endophytic fungus.

KY-31 has a symbiotic relationship with a fungal endophyte (*Epichloë coenophiala*) that produces ergot alkaloid toxins. Fescue toxicosis is a result of cattle grazing endophyte-infested tall fescue, specifically consuming ergot alkaloid toxins produced by the endophytic fungus. When cattle consume endophyte-infested tall fescue, the resulting effects are decreased feed and forage intake, decreased weight gain, poor reproductive performance, reduced milk production, and increased body temperatures.

As a result, it is estimated that fescue toxicosis contributes to more than \$2 billion in annual economic loss to the U.S. livestock industries.

Effects on performance

Reproductive failure in cattle following ergot alkaloid exposure can

be attributed to changes in sperm motility and morphology, altered ovarian follicle development, ovarian dysfunction, and reduced circulating steroid hormone concentrations, subsequently leading to reduced pregnancy rates.

However, the multifaceted nature of the effect of fescue on reproductive performance tends to result in inconsistent responses. These responses may be related to seasonal or annual fluctuations in toxin load, in combination with the age and genetic background of the cattle and/or elevated environmental temperature, which would influence reproductive tract function.

The precise mechanisms of how or at what stage of the reproductive cycle ergot alkaloids in endophyte-infested tall fescue alter the reproductive tract are unknown. However, it is possible exposure prior to or after artificial insemination (AI) has a negative effect on pregnancy rates and response to estrous synchronization. Several studies have examined first-service conception rates to AI following exposure to endophyte-infested tall fescue.

Pregnancy rates

In one study conducted in Alabama, 96% of beef heifers raised on low-endophyte fescue conceived, compared to 55% of those raised on high-endophyte fescue.

Another study in North Carolina tracked AI pregnancy rates in replacement beef heifers exposed to high and low levels of endophyte-infested fescue pastures over a three-year period. Pregnancy rates to AI in the replacement beef heifers exposed to high-endophyte fescue were reduced compared to the pregnancy rates in heifers exposed to low-endophyte fescue. Interestingly, at the end of the breeding season, pregnancy rates did not differ between heifers exposed to low- or high-endophyte fescue.

Bull fertility

Fescue toxicosis may also have an effect on the ability of a bull to pass a breeding soundness exam (sometimes referred to as a BSE) or reduce the ability of sperm to be frozen for future use.

While some producers may not see any negative effects in their bulls' performance, others may notice a decline in the percentage of bulls passing a breeding soundness exam.

Many of the negative effects of

endophyte fescue on males tend to be associated with the time of year and climate. Bulls exposed to endophyte fescue in the summer months are more likely to experience a negative effect on sperm. A study using semen from bulls exposed to endophyte fescue to produce *in vitro* fertilized (IVF) embryos resulted in an 18% decrease in embryo formation compared to semen from bulls grazing nontoxic pastures.

Managing the effects

Producers currently have several available options to limit — but not completely eliminate — the negative effects of fescue toxicosis. Endophyte-infested fescue pastures

can be either renovated or intensively managed to improve animal performance.

Some approaches include inter-seeding legumes into infested fescue pasture or suppressing fescue seedhead production via clipping or chemical control. Newer strategies are exploring effective methods to renovate infested fescue pasture where an application of herbicide is followed by a smother crop and then the planting of nontoxic fescue.

Producers may also consider altering the timing in which cattle are exposed to the highest concentration of toxins in infested fescue. One approach may be to transition the herd from a spring-

calving and early-summer breeding (when toxin concentrations are greatest) system to a fall-calving and winter-breeding system (when toxin concentrations are decreased).

Ultimately, seasonal or annual fluctuations in ergot alkaloid concentrations in combination with the age and genetic background of cattle should be taken into account to avoid negative effects on reproduction of the herd. **AJ**

Editor's note: Cliff Lamb is the animal science department head and a professor at Texas A&M University in College Station, Texas.



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