

BEST PRACTICES: Managing Fescue in Solar Grazing Systems



Photo courtesy of Johnny Rogers

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Introduction

There has been significant solar development in the “Fescue Belt” region, which spans from Virginia to eastern Kansas and from Ohio to the northern regions of Georgia. In this region, tall fescue is the dominant forage. As a result, many solar arrays in the Fescue Belt have tall fescue present on site. In this fact sheet, we provide an overview of the challenges and opportunities fescue presents for solar grazing operations and how its presence may impact sheep grazing.

Understanding Fescue

Tall fescue is a hardy, cool-season forage that is highly productive and maintains its quality well into the winter months, offering opportunity for stockpiling and winter grazing. The Kentucky 31 (KY-31) variety of fescue has a symbiotic relationship with an endophytic fungus that makes the plant more resilient, yet it also produces toxins that affect grazing livestock. While significant impacts are observed in cattle, lesser impacts are observed in sheep. When KY-31 has been established on a solar site, there are several strategies solar graziers can employ to mitigate the impact of fescue toxicity.

Additionally, novel endophyte tall fescue varieties exist that do not cause the negative impacts observed with KY-31. Fescue can provide high-quality, long-lasting grazing opportunities; however, consideration should be given to the variety present so that proper management can be implemented to mitigate potential negative impacts. Turf-type tall fescues and endophyte-free varieties should be avoided in most situations. If applicable, these topics should be discussed in the pre-construction period on sites in the Fescue Belt.

Why Is Fescue Management Important for Solar Grazing?

Tall fescue presents both challenges and opportunities for solar grazing operations, particularly in the Fescue Belt region, and because:

- **It has a dominant U.S. presence.** It covers approximately 30 million acres.
- **It can be toxic.** KY-31 contains an endophyte fungus that produces ergovaline, which can cause significant health issues in all livestock species.
- **It has a significant economic impact.** Fescue toxicosis costs the cattle industry \$1-2 billion annually due to reduced animal performance and is a significant problem in pregnant cows.
- **It is prevalent at solar sites.** Many solar sites, especially those in the Fescue Belt, are established with tall fescue due to its persistence and erosion control capabilities.



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What Makes Tall Fescue Both Beneficial & Problematic?

Tall fescue presents a complex mix of advantages and disadvantages for graziers.

(+) Persistence: Extremely resilient under grazing pressure and adverse weather conditions, fescue’s durability provides long-term vegetation management solutions for solar sites.

(+) Extended Grazing Season: Maintains quality through winter months, enabling stockpiling for winter grazing and reducing winter feeding costs compared to hay-based systems.

(+) Reduced Inputs: Properly managed fescue requires minimal fertilization and maintenance compared to other forages.

(+) Improved Animal Performance: Strategic management can minimize performance losses while capitalizing on fescue’s persistence and quality.

(+) Adaptability: With proper management, fescue-based systems can support profitable sheep production despite challenges related to toxicity.

(-) Toxicity Effects: The KY-31 variety and its associated endophyte induce vasoconstriction and reduced prolactin production, resulting in increased heat stress susceptibility and decreased performance.

KY-31's Toxicity Affects Sheep and Cattle Differently

Different livestock species and breeds show varying levels of susceptibility to the toxicity of KY-31 fescue:

- **Cattle:** Show pronounced symptoms including elevated body temperature, rough hair coats, reduced weight gain, and poor reproductive performance. Heat-adapted breeds with improved hair shedding are generally more tolerant of fescue toxicity.
- **Sheep:** In general, sheep are less affected than cattle. Hair sheep may show greater tolerance than wool sheep due to improved heat adaptability.



Regional and Environmental Considerations

Regional and environmental factors significantly impact fescue management approaches.

- **The Fescue Belt** experiences the highest prevalence of KY-31 fescue.
- **The North Central Region** is now experiencing more fescue toxicity issues as the KY-31 variety expands northward with climate change. The reduced heat stress, severity, and duration of high temperatures may lessen animal impacts in this region.
- The impact to solar sites varies based on site location and fescue variety. Vegetation management becomes more challenging when sites are established with turf-type fescue varieties, which often contain high toxic endophyte levels. Microenvironments caused by shade, moisture, and soil conditions can also create a diverse botanical composition. Cool-season forage species thrive in solar shade, and fescue is more likely to be present under panels in shaded areas, especially in southern regions.
- Using a mixture of forage species adapted to the location and novel endophyte fescue varieties may be the best approach, considering the diverse microenvironments present in a solar array.

Managing Fescue in a Solar Grazing System

Novel endophyte varieties should be strongly considered whenever a solar site is developed in the Fescue Belt with grazing in mind. These improved, modern varieties with non-toxic endophyte strains provide the benefits of KY-31 tall fescue without the toxicity. When establishing new solar sites, the decision to plant novel endophyte varieties over toxic varieties has long-term, positive implications on management and animal performance.

When KY-31 is the fescue variety present on a solar site, toxin levels will increase significantly during rapid spring and early fall growth, particularly when seed heads develop. Toxicity effects are most pronounced during hot weather when vasoconstriction prevents animals from cooling properly. Several strategies can help mitigate fescue toxicity impacts in solar grazing operations when KY-31 tall fescue is present, including:

- **Dilution:** Introduce legumes like white clover and red clover to reduce the proportion of fescue in your flock's diet.
- **Grazing Height:** Maintain minimum grazing heights of 3-4 inches to avoid the highest toxin concentrations at the plant base.
- **Stockpiling:** Utilize stockpiled fescue for winter grazing when toxin levels naturally decline due to freezing temperatures.
- **Supplementation:** Provide protein and energy supplements to offset reduced performance.
- **Production Cycle Alignment:** Match lambing production cycles to fescue growth patterns, avoiding critical animal reproductive periods during peak toxicity. This will minimize heat stress and exposure to higher endophyte concentrations in seed heads to improve animal productivity.
- **Animal Selection:** Utilize more tolerant species and breeds, particularly hair sheep over wool breeds, for summer grazing.

Extending the Grazing Season by Stockpiling

Solar graziers have used stockpiling fescue as a strategy to extend the grazing season and reduce winter feed costs. Freezing and thawing during stockpiling slows fungus activity, reducing toxin accumulation.

- **Fall Stockpiling:** Begin stockpiling in August and early September by clipping or grazing to 3-4 inches and removing sheep from the pasture, paddock or array, then allow regrowth until winter grazing. A seed head will not regrow during stockpiling, allowing for significant forage accumulation without the height created by the seed head. This is particularly useful in solar sites for generating winter feed resources without creating additional mowing requirements.
- **Start Controlled Grazing in the Fall or Winter:** Begin grazing in late November or early December. Consider using strip grazing or other strategies to control access to forage and increase utilization rate. Stockpiled fescue will maintain its quality and exhibit reduced toxin levels throughout the winter, providing excellent nutrition.

Resources

Several resources are available to help solar graziers manage fescue effectively:

- The Alliance for Grassland Renewal (grasslandrenewal.org) provides education and resources on novel endophyte varieties.
- "The Wonder Grass" Book is available for free download from Auburn University and details the history and management of tall fescue. <https://aurora.auburn.edu/handle/11200/49449>
- Local extension offices offer region-specific recommendations for managing tall fescue.
- The American Solar Grazing Association network connects solar graziers to foster knowledge sharing, mentorship, and problem-solving.

"Close-up of tall fescue"
by Emorsgate Seeds, CC

