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Sampling Tall Fescue for Endophytes and Alkaloids

Conservation Innovation Grant Project Fact Sheet

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Endophyte Presence and Ergot Alkaloid Concentrations

Toxic tall fescue stands (usually seeded with KY 31) contain a fungal endophyte (i.e., a fungus “within the plant”). The fungus produces toxic alkaloids that reduce animal performance and well-being.

Knowledge of endophyte presence and toxicity requires two separate tests. Fescue (Figure 1) tillers are gathered to determine the presence of endophyte (Figure 2) and to calculate the percentage of toxic fescue in pastures.

Sampling fescue for ergot alkaloid concentration provides a comprehensive picture of pasture toxicity and is helpful for managing fescue pastures across a farm – rather than simply determining presence and absence of the endophyte. As testing can be expensive, consider your objectives and farm management when prioritizing fields to sample or dates when samples will be taken.

Figure 1. Tall fescue can be seen in bunches but has short rhizomes allowing it to spread and form sod (top left). The seed head is a tight panicle early in development then begins to open (top right). Leaves are ribbed and do not wrap around the stem (bottom left). Leaf tips are marked by a constriction (ellipse; bottom right). Photos by Marie Rothwell and John Fike.

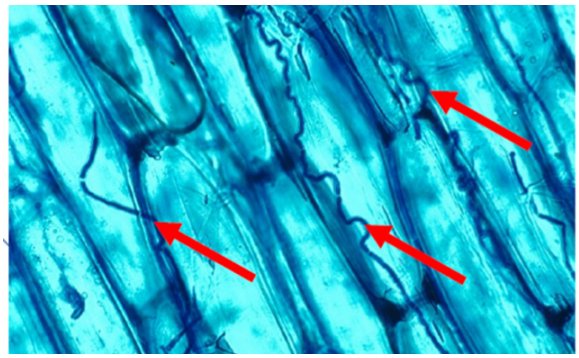

Figure 2. Fungal mycelia in tall fescue (blue stained lines indicated by the arrows) live between the cells of the fescue plant. Photo by Nick Hill, courtesy of USDA-ARS.

When to sample?

- Sampling is best once the fescue seed head has emerged on plants that are healthy and green.
- Early spring sampling may reduce the accuracy of test results as the endophyte does not become active in the plant until after spring green-up.
- Avoid tillers with seed heads.
- In most parts of Virginia, seed heads generally develop in the latter part of May and remain through mid-July if undisturbed.

Figure 3. Avoid manure and urine patches when sampling fescue fields. (Photos by John Benner.)

Figure 4. Cut healthy stems at the base of the plant at the soil surface. Remove leaf tissue above the collar (right) (Photos by John Benner and John Fike)

How to Sample for Endophyte Presence in Fescue Pastures?

- Only fescue (see Figure 1) plants should be selected for endophyte analysis. Some grass species can be mistaken for fescue.
- Sampling should be done on living plant tissue. Dried samples will not have active endophytes.
- Collect tiller samples from 20 to 50 different plants throughout the field. Samples must be representative of the pasture as a whole.
- Where possible, avoid sampling areas that are near urine patches and manure pats, or that appear to have clumped growth (Figure 3).
- Collect tillers larger than 1/8" diameter
- To sample, follow the tiller to its union with the crown, and cut off the tiller at the ground surface. Trim away any excess leaf from the sample and clip the tiller to a total length of around 4", being sure the base of the tiller remains intact (Figure 4)
- Transfer tillers into a zip-lock bag and keep cool and fresh throughout sampling and shipping using a damp paper towel

Using the Information:

- Once infection and toxicity levels of pastures are known, a plan may be developed to manage and reduce livestock alkaloid intake through pasture management (rotation and overseeding), supplementation and ultimately renovation.
- Rotation can be used to strategically avoid toxic pastures during early lactation and breeding.
- Over-seeding legumes can help dilute the amount of fescue (and toxins) consumed by diversifying pasture composition, but they do not eliminate fescue toxicity.

*Where to Send Samples**

Sample handling and testing fee information is available from:

- **Agrinostics Ltd. Co.** (info@agrinostics.com) http://www.agrinostics.com/index.html
- **Auburn University Fescue Diagnostic Laboratory** http://www.ag.auburn.edu/enpl/services/fescue.htm
- **North Carolina Department of Ag and Consumer Services** Plant Industry Division, Seed Section Endophyte Testing Service https://www.ncagr.gov/plantindustry/seedandfertilizer/seed/Endophyte.htm
- **University of Kentucky Seed Laboratory Division of Regulatory Services** http://www.rs.uky.edu/seed/ServiceTesting/howto_submitsamples.php
- **University of Kentucky Veterinary Diagnostic Laboratory** http://www.vdl.uky.edu/TestInformation

**The list above is provided for information purposes only. Inclusion does not imply an endorsement from USDA NRCS. Certified labs that can provide this testing service for Virginia can contact J.B. Daniel at j.b.daniel@usda.gov to be added to the list.*

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