

Converting from Wildtype to Novel Tall Fescue

Conservation Innovation Grant Project Fact Sheet



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Tall Fescue

Tall fescue is the predominant forage in the upper South, largely because it is well-adapted to the region's soils and climatic conditions, tolerates drought, is competitive and persists under a wide range of management. This is largely due to its association with a fungal endophyte (a fungus living within the plant).



Wildtype vs. Novel Endophytes

Endophytes support tall fescue growth and persistence, but the common, 'wildtype' strain found in 'KY31' tall fescue produces toxic alkaloids that harm livestock (Figure 1). Once this was realized as a problem, scientists removed the endophyte and promoted "endophyte-free" fescue - but it did not persist. The newest technology has been to create the best of both worlds. Novel, non-toxic endophytes

have been discovered and combined with tall fescue to create a pasture grass with high persistence.

Deciding Whether to Renovate

Most producers recognize the signs of fescue toxicosis (e.g., rough hair coats, missing tail switches, poor weight gain and low reproduction). Pasture testing can aid decisions about pasture renovation and management (Figure 2).

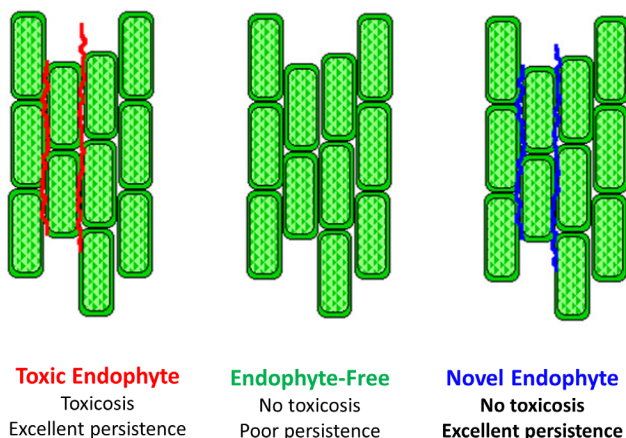


Figure 1. A common schematic of tall fescue plant cells with different endophyte status.

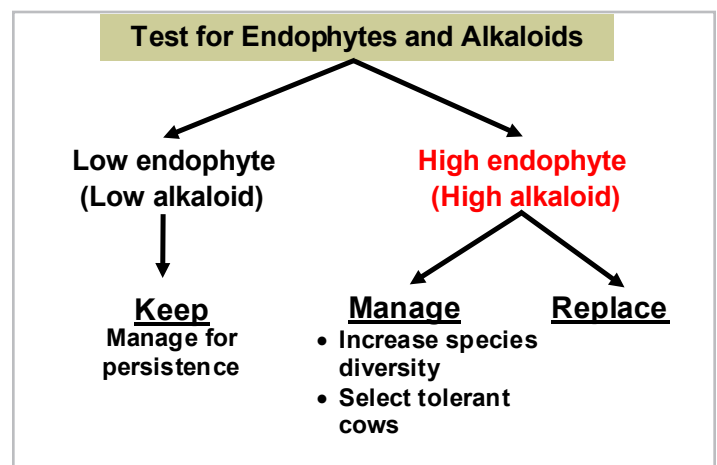


Figure 2. Decision tree for fescue management based on endophyte presence or alkaloid levels.

How Much Renovation Is Enough?

It may be challenging financially to renovate the whole farm. However, research from Arkansas (Caldwell et al., 2013) indicates that planting 25 percent of a farm with novel fescue for use during breeding and weaning periods can improve farm profit.

Renovating Toxic Pastures

Keys to successful renovation include:

- Eliminating toxic fescue plants and seed
- Ensuring viable endophyte in novel fescue
- Having suitable establishment conditions

Endophytes in tall fescue are passed from mother plant to seedling through the seed - and fescue is a prolific seed producer. To avoid contaminating a new planting of novel fescue, it is critical to kill all the existing toxic fescue and to keep any toxic seed from growing.

The seed can survive for some time, but the endophyte will die by or before 18 months. Thus, toxic seeds should be kept out of fields to be renovated for a similar period of time. This can be managed with close grazing or clipping.

Time and poor storage conditions can kill the endophyte in a seed bag - just as in the field. Use novel fescue seed that has been certified by the Alliance for Grassland Renewal (Figure 3).

Figure 3. This “Alliance” insignia, found on novel fescue seed tags or bags, indicates the seed has been tested and has viable novel endophyte. The label will also have a “use by” date.



Establishing new stands presents risks, but many factors are within a grower's control.

- Fall planting is recommended
- Ensure soil pH and fertility are adequate; apply lime and nutrients according to soil test
- Have fields weed- and fescue-free at planting
- Be sure fields are not affected by carryover herbicide
- Do not plant seed too deep
- Kill broadleaf weeds in late winter if needed
- Fertilize at planting and in March
- Let grass establish before planting legumes

Renovation Schemes

Three general schemes (Figure 4) are used for fescue renovation. The schemes use at least two herbicide applications, with the latter helping ensure escapes are killed. The spray-wait-spray approach may be the most economical, but many farmers choose spray-smother-spray to help meet forage supply needs. The smother crops used in these systems should have upright growth habits to allow better herbicide penetration to the understory when they are killed out. Avoid low-growing grasses such as annual ryegrass or crabgrass that can cover (and protect) escapes.

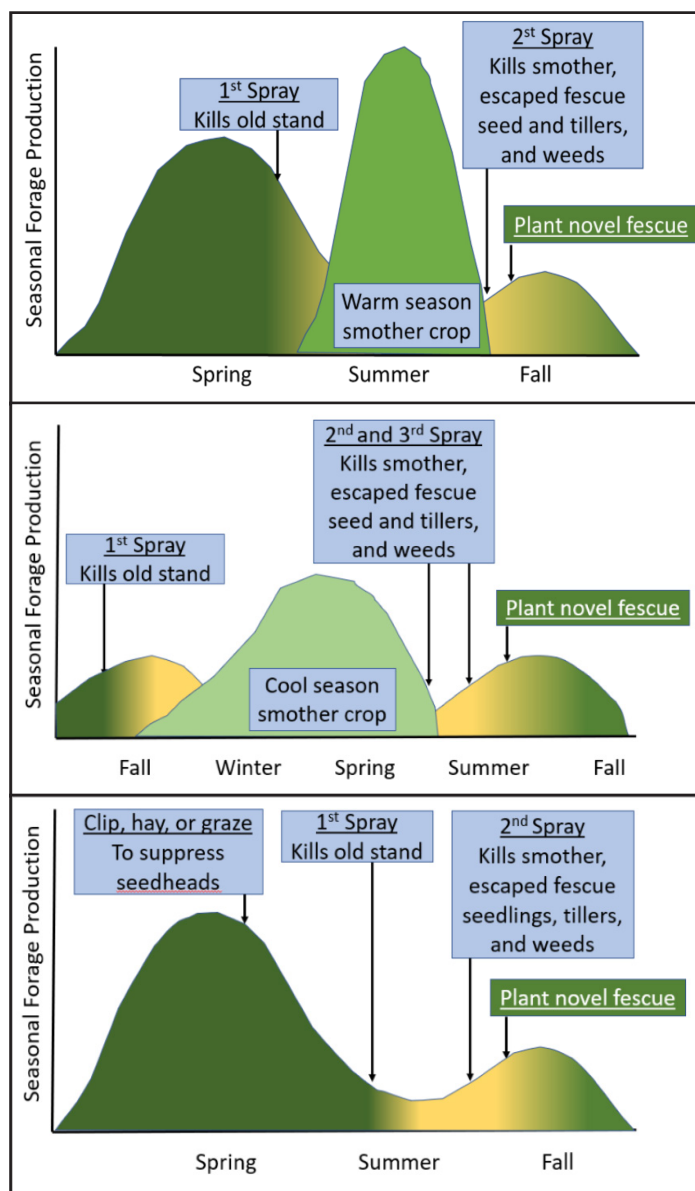


Figure 4. Spray-summer smother-spray (top), spray fall smother-spray (middle), and spray-wait-spray (bottom) schemes are used to renovate toxic fescue pastures. Note that the fall smother regime starts in fall and covers a much longer span of time.

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