

# HORSE PASTURES: HOW MUCH TALL FESCUE IF TOO MUCH?

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## Introduction

Horse owners and managers have known for many years that endophyte infected tall fescue can cause a variety of issues with late term pregnant mares. Research has shown that grazing pure stands induces extreme physiological changes, while grazing pastures completely free of E+ tall fescue is virtually safe. However few pastures are pure stands or completely free of tall fescue. We know that the “danger level” changes over the seasons and that management can greatly reduce the risk of mares grazing infected pastures. Understanding what is “too much” can help us weigh the risks of symptoms to the cost of removal.

## General Guidelines for Tall Fescue in Horse Pastures in Kentucky

We are often asked the question, “How much fescue is too much?” This is a very good question since the vast majority of horse farms in Kentucky have at least some tall fescue. The following are general guidelines; more research is required to provide definite recommendations. ***The best prevention of tall fescue problems with late term mares is to provide an ample supply of desirable forage grasses and legumes.*** When given the choice, most horses prefer bluegrass and orchardgrass to tall fescue. If all desirable species are grazed down though, they will not hesitate to consume the tall fescue that is left.

The guidelines below assume that the tall fescue present in the pasture is mostly infected and that the pasture contains other desirable grasses with minimal weeds and bare soil.

**< 10% tall fescue** – Very small risk to late term mares. In fact, the only risk would be during severe stress periods (for example, in a hot, dry summer) when the tall fescue may be growing and the KY bluegrass is dormant.

**10 to 25% tall fescue** – Risk to late term mares is small, but no guarantees. Remember that fescue toxicity is based on how much fescue your horses are consuming, not on how much is present in the pasture. For example, if the last 60-90 days of pregnancy occur in late March/early April or late

November/early December, then watch mares carefully. During these time periods fescue will likely outgrow bluegrass, and then the fescue percentage available may be higher than 25%. You may want to consider using a herbicide to reduce fescue in the pasture.

**25 to 50% tall fescue** – Risk to late term mares is significant, especially during periods when grasses are stressed. At these percentages the use of an herbicide to suppress fescue is a very valid option if you plan to graze late term mares in this pasture. Remember to overseed the pasture following spraying. With Plateau, residue after spraying will be present for 2 months, and this residue will inhibit the growth of new seedlings.

**50 to 75% tall fescue** – Risk to late term mares is high. Do not graze pregnant mares during the last 60-90 days of pregnancy. At these levels herbicides to suppress fescue may have the negative result of opening up a lot of bare ground for weed growth. At these fescue levels, a complete reestablishment of the pasture is recommended if you plan to graze late term mares.

**75 to 100% tall fescue** – Risk to late term mares is very high. Do not graze pregnant mares during the last 60-90 days of pregnancy.

### **Interpreting Ergovaline Levels**

**Remember that fescue is not the problem, it is the ergovaline produced by the fungal endophyte growing in most tall fescue plants.** If your field contains 100% endophyte free tall fescue or a new non-toxic or novel endophyte variety, then ergovaline will not be present. Additionally, fields vary in the percentage of tall fescue plants that are infected with the fungal endophyte. If the percentage of infected plants in your field is low, then your risk of problems is greatly reduced.

The summary of research shown below indicates ergovaline levels are safe for pregnant mares below 300 ppb during the last trimester (Table 1), but extension recommendations in MO prefer to follow a conservative threshold of 150 ppb during late-term gestation. At the University of Kentucky, recent reports to horse farms involved in another project have used a 200 ppb threshold.

<b>Table 1. Summary of ergovaline research on mares during late term pregnancy (last 60-90 days)</b>		
<b>Concentration of Ergovaline</b>	<b>Symptom</b>	<b>Reference</b>
400+ ppb	Decreased reproductive efficiency	Brendemuehl 1994; AL
300-500 ppb	Dystocia with foal survivability greatly reduced. Gestation longer, little or no lactation	Putnam 1991; AL Aldrich-Markham 2003; OR

<b>Table 2. Summary of ergovaline research on mares during conception and the first trimester of pregnancy (first 110 days)</b>		
<b>Concentration of Ergovaline</b>	<b>Symptom</b>	<b>Reference</b>
160 ppb	No clear signs of fescue toxicosis	Arns et al 1997
300-400 ppb	Weight loss, higher concentrations of progesterone; no adverse effects on the establishment and maintenance of pregnancy through day 28	Arns et al 1997
867 ppb	Lower progesterone concentration; no effect on embryonic development; no pregnancies lost	Brendemuehl 1996
1170 ppb	Significantly prolonged luteal function; decreased 14 day viable pregnancy rate per cycle; increased early embryonic death rates	Brendemuehl 1994

### **Understanding Ergovaline Concentrations in Your Pastures**

Laboratories throughout the U.S. are beginning to analyze tall fescue samples to determine the ergovaline concentration in a pasture. This sampling is useful in further quantifying the risk of a certain pasture to a late term mare, however remember that ergovaline levels change throughout the season.

Ergovaline concentrations are typically reported in parts per billion (ppb) of a pure sample of tall fescue. However, essentially all pastures will contain other forages as well. Most horses prefer bluegrass and orchardgrass to tall fescue,

therefore diluting the ergovaline concentration. Hay, clover and supplemental feed will also help to dilute the concentration of ergovaline in the total diet.

Given the above explanation we believe that “ergovaline based on available forage” is a useful tool in evaluating risk of a pasture. To determine this, estimate the percent tall fescue present in a pasture and the % of desirable forages (typically tall fescue, bluegrass, orchardgrass and clover) in the entire pasture. These use the formula below:

$$\frac{\% \text{tall fescue}}{\% \text{tall fescue} + \% \text{bluegrass} + \% \text{orchardgrass} + \% \text{clover}} \times \text{ergovaline (ppb)}$$

### **Example 1:**

Your mare is turned out in a field 24 hours a day and is not supplemented hay or grain. You estimate that you have 17% tall fescue, 22% bluegrass, 11% orchardgrass and 10% clover and recent lab results indicate that the fescue in your field has an ergovaline concentration of 422 ppb.

$$\frac{\% \text{tall fescue}}{\% \text{tall fescue} + \% \text{bluegrass} + \% \text{orchardgrass} + \% \text{clover}} \times \text{ergovaline (ppb)}$$

$$0.17 / (0.17+0.22+0.11+0.10) \times 422 = \underline{119.56 \text{ ppb ergovaline in available forage}}$$

This pasture is a low risk for late term mares at this moment. However as composition of the pasture changes, the ergovaline concentration in the diet could increase.

### **Example 2**

Your neighbor does not believe that tall fescue poses any risks to late term mares, therefore he planted KY 31+ in his field, however he is a poor farmer so his field is 52% tall fescue, 17% bluegrass, 8% Orchardgrass and no clover. To make a comparison, the local county agent sampled his field for ergovaline concentration and resulted in 511 ppb. His mare is turned out 7 am to 7pm and is fed hay in a stall during the night. We assume that 50% of her diet is from the pasture.

$$\frac{\% \text{tall fescue}}{\% \text{tall fescue} + \% \text{bluegrass} + \% \text{orchardgrass} + \% \text{clover}} \times \text{ergovaline (ppb)}$$

$$0.52 / (0.52+0.17+0.08) \times 511 = 345.1 \text{ ppb ergovaline in the } \underline{\text{pasture}}$$

Because pasture is only 50% of the diet, we divide 345.1 by 2, giving 172.55ppb ergovaline in the total diet.

As long as your neighbor continues to supplement hay to his mare, the risk of fescue toxicity is low. However without this supplemental feeding, his mare would be at risk for a variety of complications including foal loss, difficulty foaling and agalactia.

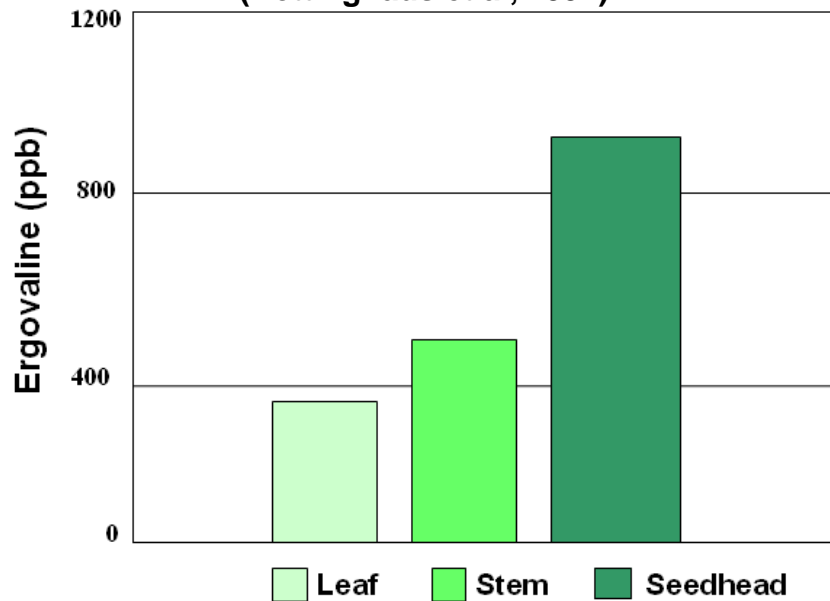
Remember, during severe stress periods or very early or late in the season tall fescue may be the only grass growing. Therefore, the percentage of other grasses has little meaning and without other grasses available, horses on these pastures will consume 100% tall fescue. On the other hand, if you have well managed pastures and ample growth of bluegrass and orchardgrass, horses usually select these grasses over tall fescue and the amount of tall fescue consumed will be less than the percentages given in this report.

### **Managing around Tall Fescue in Horse Pastures**

“Managing around” tall fescue is often discussed as a common practice, but is rarely clearly outlined. Managing around simply means to do what you can with what you have and avoid high risk situations. There are 3 concepts used to do this:

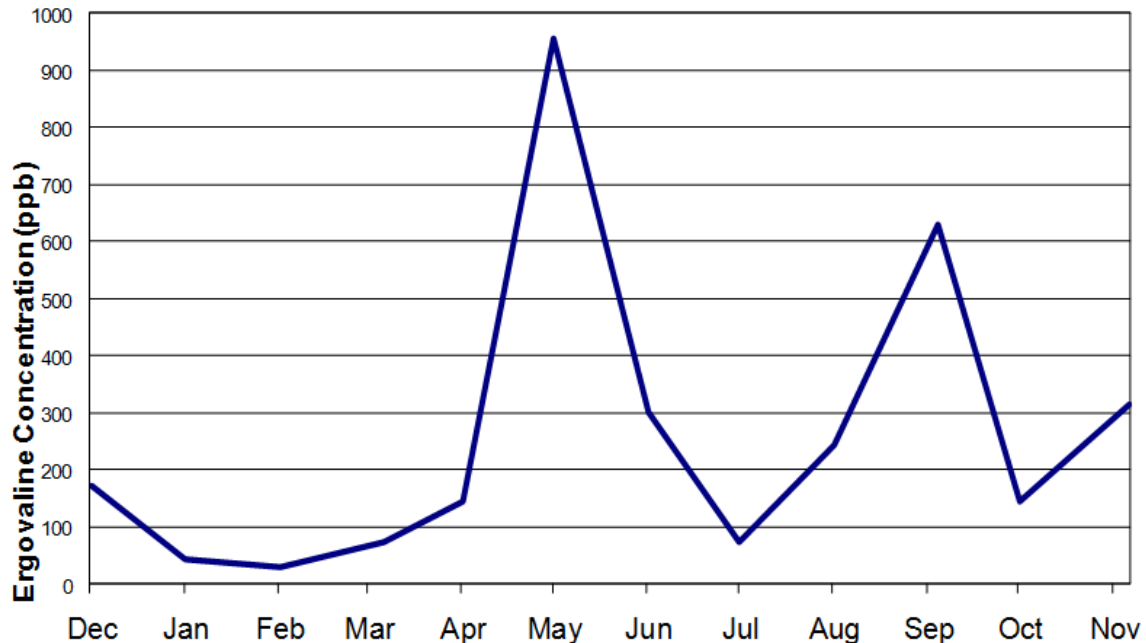
- 1) Dilute – as seen in the examples in the section above, diluting tall fescue concentrations in the total diet can be an effective way to reduce the risk of tall fescue toxicity. Having a good stand of more desirable grasses is the best way to do this. If fescue is too prevalent, providing hay might be necessary. Remember that free choice hay in the pasture is only effective if the horses are willing to eat it, and most will not if lush grasses, including tall fescue, are available.
- 2) Forage Height – ergovaline is typically most concentrated in the seedhead and stem and less in the leaves, see figure 1. Regular mowing at 4-6 inches during the spring will remove seedheads and stems and encourage more leafy growth. Leaves still produce ergovaline, but are likely to be in a safer range. Recent research has shown that very high concentrations can be found in the base of the plant as well. Typically a horse grazing a 6 inch plant will not consume this lowest portion, however when the entire pasture is only 2-3 inches tall, horses will readily graze to the ground.

**Figure 1. Distribution of Ergovaline within the Tall Fescue Plant (Rottinghaus et al, 1991)**



- 3) Avoid – despite excellent pasture management, conditions will sometimes dictate that even well maintained pastures can still be dangerous. Stress due to excessive heat or grazing pressure will greatly increase ergovaline levels in the plant. Also, ergovaline concentrations, as seen in figure 2, vary across the year and typically follow the growth curve of tall fescue. Therefore concentrations are typically highest in the spring, with a smaller peak in the fall. It may be necessary to identify pastures with the lowest risk (lowest % fescue) and turn late term pregnant mares in those pastures to avoid the highest risk areas.

**Figure 2. Monthly Ergovaline Concentrations on a Kentucky Pasture in 2007.**  
(Collaboration with Kentucky Farm Clinic and University of Kentucky Forages)



Remember that ultimately the only way to truly know the risk of a pasture is to sample and analyze for ergovaline concentrations. However understanding these general concepts can help to minimize the risk.

### **Removal of Tall Fescue from Kentucky Bluegrass Pastures**

If managing around tall fescue is not a viable option for a farm, removal of tall fescue is a possibility through the use of herbicides.

**Tall Fescue Removal Option 1.** In pastures with greater than 50% tall fescue, it may be desirable to kill all the grasses with glyphosate (Roundup or other glyphosate containing product) and seed a desirable grass. The optimum method for this approach is to ***apply glyphosate in mid-July and seed desirable grasses in early September***. It is important to have at least 4-6 weeks between glyphosate treatment and grass seeding—this allows the grasses killed by glyphosate to decay and not interfere with emergence of the seedling grasses. A ***second application*** of glyphosate immediately before seeding can be helpful to suppress surviving tall fescue plants or weed growth. It is essential that existing tall fescue not be allowed to go to seed during the year of establishment. An even better approach is to use the spray-smother-spray approach outlined in the establishment section above.

**Tall Fescue Removal Option 2.** When the tall fescue infestation is less than 50%, the other option is to selectively remove tall fescue with herbicides. Research at UK has shown good control from ***Plateau applied at 10 or 12 ounces/acre***. Plateau must be applied with methylated seed oil or a non-ionic surfactant; consult the Plateau label for specifics. Tall fescue was controlled at these rates when applied from May through October. Two consecutive annual applications did not harm Kentucky bluegrass. Weekly mowing of the pasture did not reduce tall fescue control from Plateau applications. Cimarron at 1 ounce/acre will also remove tall fescue; however, the amount of tall fescue removal from Cimarron is less than that obtained from Plateau. It is difficult to completely eliminate tall fescue from horse pastures in Central Kentucky. Fescue can be suppressed and bluegrass encouraged with this approach, but repeat applications are often necessary in subsequent years. Remember to overseed the pasture following spraying of Plateau or Cimarron. With Plateau, residue after spraying will be present for 2 months, and this residue will inhibit the growth of new seedlings. Some managers have had success in seeding one month after application, but young grass seedlings may be damaged especially during dry periods.

**Issues - Orchardgrass.** Care should be exercised when applying Plateau to pastures that contain orchardgrass. Under good growing conditions (warm, moist soil and warm air temperature) our research has revealed excellent tall fescue control without injury to the orchardgrass. However, under abnormally cool, dry conditions in early spring experienced near Lexington in 2005, orchardgrass injury was noted in some fields from treatment of Plateau.

**Issues – Plateau and Cimarron Persistence in Soil.** Follow the label directions for seeding pastures after Plateau or Cimarron applications. Under very dry conditions such as the summer of 2005, Plateau can persist in the soil and prevent germination and emergence of Kentucky bluegrass and orchardgrass. Consult the Plateau label for specific instructions.

**Issues – Nimblewill.** Plateau and Cimarron can be used to reduce tall fescue in pastures, but will have no effect on nimblewill or other grass weeds. Some farms have found that when they successfully reduce tall fescue (especially when it is growing in large patches) they have an increase in nimblewill, crabgrass, yellow foxtail, etc.... This occurs because the removal of fescue provides bare ground and if nimblewill or other weedy grasses are present they tend to fill into these areas. All of these grasses germinate readily from seed, and existing nimblewill and crabgrass plants can also spread. Fortunately, all of these weedy grasses are killed when using glyphosate for a complete renovation, but may still



germinate from seed if a healthy stand of cool season grasses is not established before late spring/early summer.

### **Conclusion**

Tall fescue is found in virtually every pasture in Kentucky and completely eliminating the risk of toxicosis is impossible. The goal of horse owners and managers is to evaluate the current state of their pastures and understand how to manage around tall fescue. Understanding peaks in ergovaline production and how management can reduce or increase these peaks is an important yet simple step in reducing risk to pregnant mares. Maintaining a mixture of desirable pasture grasses and grazing late term mares in pastures with lower tall fescue presence are essential.

### **Resources**

For information on endophyte percentage testing, visit <http://www.ca.uky.edu/agc/pubs/ppa/ppa30/ppa30.pdf>

For information on ergovaline concentration analysis: contact your local county extension agent. Ergovaline analysis is offered to the public for a fee by the University of Kentucky Veterinary Diagnostic Lab (UK VDL).

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