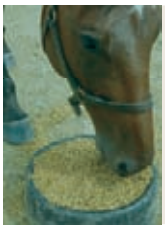


Fescue Toxicosis

BY JANICE L. HOLLAND, PHD

Horse owners know the drill when it comes to keeping their charges safe and sound: Beware of sharp edges, slippery mud, contaminated equipment. But what happens when danger lurks in the very grass your horses graze? The ever-popular tall fescue grass, for instance, contains a fungus that can be toxic to pregnant mares and, potentially, exercising horses. This article will discuss fescue toxicosis as a health concern and ways to avoid it.

A Brief History

Tall fescue (*Festuca arundinacea*) is a cool-season perennial grass found frequently both in pasture and in hay fed to horses. Although likely of European origin, the plant was first collected in the United States in 1931 from where it was growing on a Kentucky hillside. In subsequent research trials it proved to have a variety of positive qualities, including the ability to grow well in the transition zones between the Northern and Southern states, tolerate heat and drought, establish easily, tolerate overgrazing, and resist destruction by pests. Agronomists cultivated the plant and released the seed as "KY 31" in the early 1940s. Because of its positive qualities, tall fescue became very popular in pastures, and it is estimated that currently more than 8.5 million beef cattle and at least 700,000 horses consume pasture that contains fescue. Despite these positive attributes, however, many livestock managers noticed health problems in animals consuming tall fescue. Research

Protect pregnant mares, and other horses, from the dangers of consuming endophyte-infected tall fescue grass

in the 1970s to determine the cause led researchers straight to a toxin-producing fungus living symbiotically within the grass: endophyte—the very organism that confers those positive growing qualities.

ANNE M. EBERHARDT

The same organism that makes fescue good pasture grass can be toxic in broodmares

What is Fescue Toxicosis?

Fescue toxicosis is a condition observed in livestock consuming tall fescue that contains the endophyte fungus *Neotyphodium coenophialum*. The fungus thrives in the plant's seed and stem and is transmitted from one field to another through the seed. This fungal endophyte produces highly toxic ergot alkaloids.

Ergot alkaloids mimic dopamine within the body and bind to dopamine receptors, suppressing prolactin (a hormone secreted by the pituitary gland that simulates and sustains lactation) production. In late-term broodmares natural prolactin increase causes the muscles within and surrounding the reproductive tract to relax so the mare can foal without difficulty. Thus, failed prolactin production in a mare that has consumed the endophyte leads to many reproductive problems. Affected mares also produce less progestin (hormones involved in maintaining pregnancy), leading to early embryonic loss (abortions).

Some studies estimate 90% of all pastures containing fescue are infected with this endophyte. The fungus is also found in fescue hay, which can remain toxic for several years after harvesting, according to the American Association of Equine Practitioners. Scientists have, however, recently developed novel nontoxic endophyte-infected tall fescue that is commercially available and safe for all classes of horses.

Signs of Fescue Toxicity

Signs of toxicity vary between cattle and horses. In affected cattle the most common signs include poor growth or weight gain, poor hair coat and overall unthrifty appearance, reduced conception rates, heat intolerance, and lameness. Affected animals might not consume as much feed because they spend less time grazing and more time standing in shady areas or even streams in an attempt to cool themselves. Cattle might also have elevated heart rates and body temperature. Because many of these signs are most obvious during the warmer months, fescue toxicosis is often called "summer slump."

In horses, clinical signs are most often reproductive in nature. Prior to foaling, broodmares might exhibit poor body condition possibly related to decreased

HAY IS NOT FOR HORSES

THEY DESERVE PREMIUM WESTERN FORAGE

Of course horses need hay, but not just any hay.
Since hay is the first consideration when it comes to nutrition, skimping on quality could keep your horse from doing his best for you.
Do your best for your horse.

Feed Standlee Premium Western Forage™. All natural. Always available.

Standlee
PREMIUM WESTERN FORAGE™

CHECK OUT OUR COMPLETE PRODUCT LINE OR FIND A STORE NEAR YOU AT
WWW.STANDLEEFORAGE.COM

COURTESY UNIVERSITY OF KENTUCKY

A nontoxic variety of tall fescue is available

feed intake, prolonged gestation, lack of mammary development, premature placental separation that reduces oxygen availability to the fetus ("red bag"), and dystocia (difficult foaling), which can damage the reproductive tract. Affected mares are also more likely to abort their foals. If the mare does foal, she might not produce milk, might retain the placenta longer than normal, and might be difficult to get back in foal. Because of the delay in foaling, foals of affected mares might be larger than normal, although dysmature (not fully developed).

Testing Fescue

Because endophyte-infected tall fescue does not outwardly appear any different than the endophyte-free plant, testing can help you determine if the fungus is present. Extension specialists in your area can recommend a nearby lab (e.g., the Seed Laboratory at the University of Kentucky) to complete the testing and will provide the paperwork necessary for proper sampling and identification. But when deciding whether to test your fescue, keep the following in mind:

1. Most currently available laboratory tests cannot distinguish between the nontoxic and toxic endophytes, so if you have planted novel nontoxic endophyte-infected tall fescue, testing is not a good investment.
2. Because of the benefits the endophyte provides to the tall fescue plant, it is difficult to eradicate from fields completely. The plant is resistant to many environmental factors that would eradicate "normal" plants. Also, because wind, birds, and other wildlife can transport seeds from one field to another, it is almost impossible to prevent seed from contaminating a pasture, unless neighboring farms also eliminate their fescue. Therefore, it might be less expensive to manage your herd as if the endophyte is present.
3. If you do decide to test your fields, then proper sampling is important. Collect samples when the plants have been growing well for at least a month, with stems at least one-eighth inch in diameter.

Fescue Management

How you manage your tall fescue fields depends on a variety of factors, including type of horses, available land and farm equipment, and monetary investment.

"I tell people to graze tall fescue when it is six to eight inches tall and pull the horses off it when it's three to four inches in height so that it can rest," suggested Amy Burk, associate professor and extension equine specialist in the University of Maryland's Animal and Avian Sciences Department. "It usually takes about three weeks for it to grow to six inches again, when it's ready to be grazed. Tall fescue is tolerant of heavy grazing and is remarkably tolerant to overgrazing over the winter. However, it still needs to be rested during the grazing season or, like any other grass plant, it will die."

One of the advantages to keeping the fescue plants between three and eight inches tall is that the plants will remain in a "vegetative" state with little to no stem and seed production. This will drastically reduce horses' fungus consumption.

"At the very least, it is important to keep fields mowed to prevent the seed heads from forming," explained Kyle Newman, a microbiologist and lab director at Venture Laboratories in Lexington, Ky. "But I also highly recommend that broodmares stay off of fescue pastures."

> "I tell people to graze tall fescue when it is six to eight inches tall and pull the horses off it when it's three to four inches in height so that it can rest."
>
> -AMY BURK

Burk also recommends owners not feed broodmares any tall fescue pasture or hay unless it's of the "endophyte-friendly" or "modified-endophyte" varieties mentioned earlier. These varieties contain an endophyte that gives the plant the desirable characteristics of hardiness and pest resistance but does not produce the alkaloids that cause reproductive problems. Horses consume these novel endophyte tall fescue varieties readily, and they're as safe for broodmares as other forages.

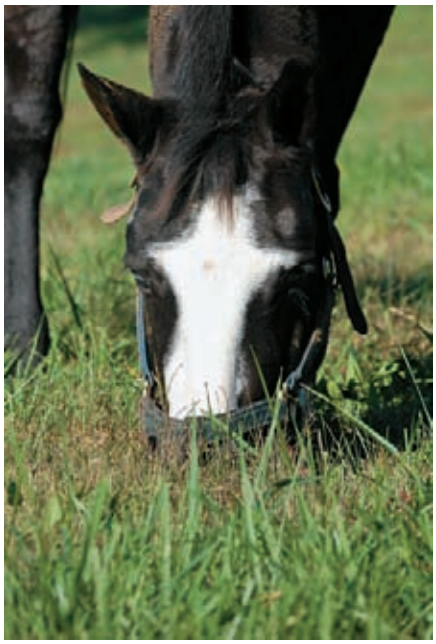
For farms housing broodmares, Burk recommends eliminating tall fescue from pastures using multiple herbicide applications. "Fescue is very hardy, and it often withstands a single herbicide application," she said. "I instruct people to hit it twice with Roundup prior to a fall replanting of the more desirable grass. That way they know it's truly dead prior to seeding a new grass seed."

Because scientists have not determined an exact amount of endophyte-infected tall fescue broodmares can safely eat, Burk says she errs on the conservative side and recommends broodmares graze pastures with no ergot alkaloids.

"Ergot alkaloid production varies in the plant with season and growing condition," she said. "Therefore, some years the mares won't have the characteristic fescue reproductive problems, but some years they will.

"There is some data on threshold levels of concern but...the best option is to avoid the toxins," Newman added.

If broodmare owners cannot eliminate endophyte-infected tall fescue in their



ERICA LARSON

Fescue with ergot alkaloids should be avoided in pasture and in hay

STANDLEE OFFERS FORAGE OPTIONS

Because hay is the first consideration when it comes to nutrition, skimping on quality could keep your horse from performing at its best.

Standlee Hay Company, Inc., is a leader in the forage industry. Standlee Premium Western Forage™ products are available in alfalfa, alfalfa blends, orchard grass, and timothy grass and come in different formats including bales (compressed bales, compressed and shrink-wrapped Grab & Go™ bales), cubes, pellets, chopped, and shreds to provide the most digestible, easy-to-use forage options.

The nutrient requirements of horses vary according to age. For example, young, growing horses have the highest requirements for protein to develop and maintain muscle and bone. Alfalfa products or alfalfa-mixed products provide the largest amount of high-quality protein.

Another important factor when considering the nutritional requirement of horses is activity level. Training, competing, and lactation drastically increase the calorie requirement of horses. Standlee Premium Western Forage™ products are harvested at the optimum state of maturity to deliver maximum calories.

For more than 30 years, Standlee has done nothing but grow and produce the best Premium Western Forage and forage-based products. The company relentlessly perfects its farm, procurement, production, and delivery processes to make sure the highest-quality and most nutritious products are delivered to consumers and their horses.

Quality is evident in Standlee Premium Western Forage™ products and in the way Standlee Hay Company does business. After all, the Standlee family name is on every package and has been for three generations.

Check out the complete line of products at www.StandleeForage.com.

ANNE M. EBERHARDT

Fescue toxicosis can affect other horses, not just broodmares

fields, they should manage mares on drylots and feed a fescue-free hay. Owners should also work closely with their veterinarians to devise management plans for these mares during the last several months of gestation, which might include administering domperidone injections to prevent the alkaloid from attaching to dopamine receptors. This can counter some of the problems associated with toxin ingestion and allow for a more normal foaling.

Other veterinary recommendations, according to the AAEP, might include having supplemental colostrum (the mare's antibody-rich first milk) on hand for the foal, in case the mare is not producing milk, and making sure veterinary assistance is available.

Recent Research

Endophyte-infected fescue's effects on pregnant mares are well-documented, but how does the toxin affect other classes of horses? Burk describes one study in which researchers fed exercising horses endophytic tall fescue seed, but they observed no significant differences in performance or health between study horses and controls. In a more recent study, Webb et al. (2012) noted increased respiration rates and rectal temperatures in exercising horses consuming infected fescue seed. They concluded that this might indicate the fescue caused the horses' blood vessels to constrict, resulting in a less effective cooling process. In another study, Parks et al. (2009) said results suggested endophyte-infected tall fescue has a minimal effect on performance, but they did note a potential problem with thermoregulation after exercise.

Ultimately, scientists need to conduct more research on this forage's effect on horses, according to Karen McDowell, associate professor in the Department of Veterinary Science at the University of Kentucky. "There have been suggestions in the literature that endophyte-infected tall fescue is associated with a variety of maladies, such as altered estrous cycles, mare and stallion infertility, early pregnancy loss, or decreased growth and performance, but data are sparse and often conflicting," she said.

McDowell has been conducting research that might help determine more specifically what occurs in pregnant mares grazing tall fescue. "We have developed a model of monitoring fescue toxicosis with Doppler ultrasonography, and we have shown that a very sensitive response to horses ingesting endophyte-infected fescue seed (in an experimental setup) is vascular constriction," she explained. "This is not surprising since it has been known for a long time that tall fescue causes vasoconstriction in cattle. This spring we are initiating a multi-year grazing trial where we will use the Doppler ultrasonography to monitor pregnant mares grazing tall fescue. We do not know at this time whether vasoconstriction is associated with deleterious health effects observed in pregnant mares, but it may be associated with other effects."

Take-Home Message

Although scientists and veterinarians have been well aware of fescue toxicosis in horses since the 1970s, there is more work to be done to understand this condition fully. While the majority of the problems associated with endophyte-infected tall fescue have been associated with broodmares, there could possibly be effects in other classes of horses, as well, and research on this topic is currently under way. Most experts recommend eradicating infected fescue from pasture and hay fields, particularly in fields grazed by pregnant mares, or planting instead a fescue variety containing novel endophytes. Horse owners attempting to manage fescue should work closely with their veterinarians and equine nutritionists. BH

*the*HORSE YOUR GUIDE TO EQUINE HEALTH CARE
Excerpted from The Horse: Your Guide to Equine Health Care. Free weekly newsletters at *www.TheHorse.com*