

new fescue may resolve foaling complications

By Linda Breazeale

Researchers are looking for the best of both worlds as they evaluate the benefits and risks of two types of fescue when consumed by broodmares.

Tall fescue is an important forage grass for horses and is grown extensively throughout the southern and northeastern United States. In the late 1980s, horse owners noticed increased foaling problems in mares pastured on fescue infected with an endophyte (fungus). The endophyte is beneficial to the grass but produces ergot alkaloids that are toxic to livestock and horses. Horses are most susceptible to toxic fescue during pregnancy.

“Some of the pregnancy complications include placental thickening, prolonged gestations, complicated deliveries, the absence or reduction of milk production and high foal mortality,” said Peter Ryan, assistant professor at Mississippi State University and MAFES animal and dairy scientist. “Foal mortality is due to dysmaturity and oxygen deprivation that may result from poor blood flow to the placenta. Other problems with late-term foals include larger body size, abnormal and excessive hoof development and a higher incidence of stillborn births.”

MAFES researchers are in the third year of a project to study the effects of toxic, endophyte-infected fescue; nontoxic, endophyte-infected fescue; and endophyte-free fescue on pregnancies in horses.

CVM professor Richard Hopper, left, MSU student Marc Seitz, center, and MAFES animal and dairy scientist Peter Ryan examine a pregnant mare pastured on nontoxic, endophyte-infected fescue.

Late-term complications

The effects on late-term pregnancies were the focus for researchers in the first two years. During 2000 and 2001, 11 mares were grazed on toxic, endophyte-infected fescue, 11 were on nontoxic, endophyte-infected fescue and 12 were on endophyte-free fescue. Researchers collected blood and urine samples to perform hormone (progesterone and prolactin) and ergot alkaloid analyses. Newborns and the placenta were weighed at birth, and animal scientists watched for any abnormalities.

“Of the 11 mares on the nontoxic endophyte grass, only two had complications that were unrelated to fescue toxicity. Among the 12 mares on the endophyte-free pasture, only one required assistance during foaling,” Ryan said. “Among the 11 mares on the toxic, endophyte-infected grass, all but one experienced complications, including retained placenta, prolonged gestation, reduced milk production (agalactic) and abortion, that were consistent with fescue toxicity.”

Data from both years confirmed an increased risk to the foal when mares grazed on toxic fescue and minimal risk from the nontoxic, endophyte-infected fescue or the endophyte-free fescue.

Early-term exposure

In 2002, the third year of the study, researchers placed eight mares on each type of pasture before they were pregnant and kept them on those grasses to examine complications. Mares were monitored for early embryonic losses during the first 150 days of gestation.

Ryan said early-term exposure has never been studied thoroughly. The researchers wanted to determine if pregnancy complications depended on when mares were placed on the grasses.

“By mid to late spring of the first year, mares on the toxic fescue were performing poorly; of the five mares tested pregnant, two had lost their embryos. In the nontoxic fescue pasture, six mares were determined to be pregnant and progressing normally,” Ryan said.



David Winton



Jim Lytle

Linda Breazeale



Jill Lytle

“The 2002 results of early-term exposure suggest increased difficulties impregnating mares grazing toxic fescue. But we don’t have data from open mares monitored before and throughout their entire pregnancies,” he said. “This study will be repeated in the spring of 2003.”

Past challenges

The need for this type of research was magnified by extensive foal losses in Kentucky during the 2001 foaling season. Ryan said 5 to 10 percent of the 2001 foal crop was lost in Kentucky and neighboring states. An anticipated drop of 20 to 22 percent of the 2002 crop is expected due to the higher-than-normal incidence of early embryonic loss in the spring of 2001.

“Scientists have not found conclusive evidence for what caused the massive losses in 2001. Weather patterns, tent caterpillar infestations and cyanide from wild cherry trees have all been considered, as well as toxic fescue,” he said. “Bluegrass is more sensitive to cold weather, so there may have been more fescue than normal last year.”

Future hopes

Other universities have conducted studies on the effect of fescue on horses and cattle, but MSU is the first to study the effect of nontoxic, endophyte-infected fescue on horses. The grass is marketed by Pennington Seed under the name Max-Q. Pennington Seed and MAFES are cosponsoring the study.

David Lang, associate professor of plant and soil sciences, is part of the team analyzing the grass. Jessup is one of two varieties of nontoxic, endophyte-infected fescues developed by Mississippi native and MSU alumnus Joe Bouton, now a professor of agronomy at the University of Georgia. Researchers are monitoring the toxicity in fescue throughout its use from pasture to hay.

“In the toxic, endophyte-infected fescue, the toxin is present throughout the growing process and even in the hay after harvest. In the nontoxic varieties, the

toxins remain near zero throughout the entire growing period,” Lang said.

“Endophyte-infected fescue has greater stand survival, increased yield, improved seeding performance, increased insect resistance and enhanced drought tolerance,” Lang said. “The hardy nature of the endophyte-infected fescue seems to make it the ideal choice for livestock forage. However, cattle, sheep and horses all exhibit various problems related to fescue toxicosis.”

Sheep that are grazed on infected pastures have reduced reproductive efficiency, but they are less critically affected than cattle. Fescue toxicosis in cattle elevates body temperature and respiration rates and leads to reduced milk production and poor reproductive performance. Vascular constriction, or reduced blood flow to extremities, can cause cattle to lose parts of their ears and tails and lead to hoof sloughing.

“We need to find the best of both worlds — a grass that is hardy in hot, humid areas, yet will not cause health problems in livestock,” Lang said.

Study partners

“You cannot do a study of this magnitude without the help of many people. Countless students and others took part in late-night foal watches and data gathering,” Ryan said. “Other researchers from the animal and dairy science department include Brian Rude and Scott Willard. From the College of Veterinary Medicine, David Christiansen, Richard Hopper and Dan Scruggs were very important in the research.”

Researchers at other universities also were involved.

“Ergot alkaloids were sent to Nick Hill at the University of Georgia for analysis, and Carol Bagnell at Rutgers University studied the relaxin component that impacts placental dysfunction,” Ryan said.