

THE EFFECT OF ENDOPHYTE-RIDDEN FESCUE ON EARLY PREGNANCY

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It has been well known that fescue grass containing the endophytic fungus, *Acremonium coenophialum*, has detrimental effects on pregnant mares when consumed during late gestation. Common problems include prolonged gestation, dystocia (foaling problems), agalactia (no milk production), thickened placenta, poor foal viability and decreased concentrations of prolactin and progesterone. However, few studies have evaluated the effects of this fungus on early pregnancy. Dr. J. P. Brendemuehl, at Tuskegee University in Alabama, has done some work with respect to the effects of infected fescue on the transitional mare. During spring transition, the number and size of follicles from January through April were found to be lower and smaller in mares grazing on endophyte-infected fescue pastures compared to mares on non-endophyte pastures. The time to first ovulation was also delayed 43 days in mares ingesting infected fescue (May 28 vs. April 15). Brendemuehl and coworkers also found that cycling mares were affected by endophyte-ridden fescue. Prolonged luteal function, decreased pregnancy rates on a per cycle basis and increased embryonic death rates were all evident in cycling mares that grazed on infected fescue. Forty-five percent (45%) of the mares on infected pastures were pregnant 14 days after ovulation compared to 75% of mares that grazed on endophyte-free fescue. Also noted, 30% of those mares ingesting the endophyte-ridden fescue

lost their pregnancies during early embryonic development compared to 10% of the mares on endophyte-free pastures. From these data, it appears evident that endophyte-ridden fescue can have dramatic effects on the transitional and cycling mare.

The objective of a recent study by Arns and coworkers (1997) was to investigate the effects of increasing dietary concentrations of ergovaline, the problematic ergot alkaloid produced *A. coenophialum*, on establishment and maintenance of pregnancy in the mare. Earlier work by Brendemuehl (1994) examined the reproductive status of bred mares ingesting 1171



Amissville, VA. To minimize consumption of endophyte-ridden fescue, mares at ERC are limited to no more than 2 hours of pasture grazing per day during breeding, early gestation (first 50 days) or late gestation (last 45-50 days).

ng ergovaline/g wet grass. Therefore, Arns and associates felt it necessary to evaluate the effects of lower levels of ergovaline consumption. Twelve cycling mares of light-horse breeds were randomly assigned to receive diets that contained either no ergovaline, low levels (150-158 ppb ergovaline/kg total diet) of ergovaline or high levels (308-315 ppb ergovaline/kg total diet) of ergovaline. The diet of each mare consisted of 52% orchard grass and 48% grain concentrate. Dietary ergovaline was introduced as infected fescue seed mixed into the concentrate. Following 7 days of diet acclimation, reproductive cycles of all mares were monitored for follicular development and ovulation. Mares in estrus were bred every other day by artificial insemination once a follicle

reached 30 mm in size. In evaluating body condition score, those mares fed the high ergovaline (HE) diet tended to have a lower average daily weight gain compared mares fed no ergovaline (NE). Mares on low ergovaline (LE) diets had no difference in average daily gain. Reproductive efficiency was measured by overall conception rates, cycles per conception, length of estrus and preovulatory size of follicles. All of these parameters were found to be similar for mares in all three groups. Consumption of infected fescue seed also did not have an effect on embryonic vesicular sizes on day 14, 21, or 28 of gestation. There were however, higher progesterone concentrations during the luteal phase in mares fed LE or HE diets. Also, prolactin concentrations were lower in LE and HE mares. The researchers of this study believe that weight loss occurred as a result of a decrease in food consumption rather than a direct effect from injecting ergot alkaloids. Also, small sample size and individual variation may have been responsible for the lower progesterone concentrations found in mares fed no ergovaline. Brendemuehl (1994) as well as studies in other species clearly defined endophyte-fed animals as having lower progesterone levels.

Few studies have accurately quantified the amount of toxin (ergot alkaloid) necessary to induce an effect on nutritional or reproductive status in horses. It is clear that infected fescue pastures elicit different effects in gestating mares from year to year. Concentrations of ergot alkaloids do fluctuate with management and

environmental conditions. Work by Arns seems to suggest that dietary concentrations of ergovaline up to 308 ppb/kg total diet consumed has no adverse effects on reproductive performance in cycling mares. Signs of fescue toxicosis have been seen in horses fed concentrations of ergovaline in excess of 325 ppb/kg total diet. More research is needed before one can recommend a specific concentration of ergot alkaloid that is safe.

It may be prudent for any breeder living in a region of the country where fescue grass is prominent to assess their pasture for endophyte infestation. Virginia pastures are well known for their prominence of tall fescue grass. Testing of pastures at ERC found that fescue grass made up 20-30% of the total grass population in the fields and 58% of the fescue was indeed infested with the endophyte fungus. Because consumption of certain levels of endophyte-ridden fescue has been shown to affect mares during the first 30 days and last 30 days of gestation, one should constantly be aware of exposure in pasture as well as in cut hay being fed. Apparently, ingestion of infected fescue has little to no affect on mares in the middle of gestation. The present policy at Equine Reproduction Concepts is that no mare at our facility will be exposed to endophyte-ridden fescue in cut hay or pasture form during breeding, early gestation (first 50 days) or late gestation (last 45-50 days). If someone is concerned that their pregnant mare has been exposed to infected fescue during a vulnerable period, please consult a veterinarian for possible treatment.