

Fescue and Fertility

Fescue plays a large role in nutrition, reproduction.

by Kasey Brown, associate editor

Nutrition and reproduction are partners in a dance of profitability. Without reproduction, there is no calf to produce a paycheck. Without nutrition, there is no ability for a cow to breed back to produce a calf. Keeping both in balance requires knowledge and practice.

Energy and protein have a large effect on pregnancy rate. Mark McCann, professor and beef extension specialist for Virginia Tech, cited a 2013 review by Sandy Johnson, Kansas State University, and Rick Funston, University of Nebraska, that summarized that when cows and heifers were fed an adequate level of energy after calving, 92% were pregnant compared to 66% with inadequate energy after calving. When fed an adequate level of protein, the females achieved pregnancy rates of 90%, compared to 69% with inadequate protein after calving.

One way to monitor whether a cow has proper nutrition for reproduction is by scoring her body condition. Adequate body condition has a large influence on when a female returns to estrus after calving. A cow with a body condition score (BCS) of 3 takes 88.5 days to return to estrus, noted McCann. A cow in BCS 5, on the other hand, takes on average only 59.4 days to return to estrus. For more information on BCS, visit the *Angus Journal* topic website on the subject at www.cowbcs.info/.

However, getting cows to that BCS of 5 (or heifers to BCS 6) can differ by region through use of forages. The sources of energy and protein have a large effect on reproduction, which brings up the topic of fescue.

Fescue toxicity

“For those of us east of the Mississippi [River], most of our green grazed forages meet protein requirements,” McCann told the 170 attendees of the 2013 Applied Reproductive Strategies in Beef Cattle (ARSBC) symposium in Staunton, Va., Oct. 15-16.

Fescue plays a large role among forages in eastern states. McCann said about 90% of tall-fescue fields in the southeastern United States is infested by wild-type toxic fungus, and this fescue is consumed by cattle, horses

and sheep. This fungus, or endophyte, is symbiotic with the grass in that it makes the grass drought-tolerant and insect-resistant. However, it produces ergot alkaloids that are toxic to livestock, he explained.

These toxins are most prevalent when the plant is actively growing and dissipate with time after the plant stops growing. Toxin levels dissipate after harvest.

McCann reported data that showed endophyte levels in green-chopped forage at 1,200 parts per billion (ppb). When the fescue was ensiled, toxin levels dropped to 900 ppb. When it was cut for hay, levels dropped to 300 ppb, with most of that drop coming within the first week after harvest. Ammoniating the hay reduced toxin levels even further to 250 ppb.

McCann encouraged producers to test pastures for endophyte, as many pastures that are assumed to be too toxic aren't always at dangerous levels. On the other hand, there are management decisions that can increase toxins, so testing is imperative. Some states have state labs that test for alkaloids, though Virginia does not.

For those without a state lab, he recommended sending samples to Agrinostics Ltd. Co., a company in Georgia, for analysis.

Nitrogen fertilization increases levels of ergot

toxins. At 120 pounds (lb.) per acre, toxin levels in leaf blades increase from 250 ppb to about 400 ppb. Toxin levels in stems increased from 500 ppb to about 1,000 ppb. Seedheads are the most susceptible, McCann noted. Toxin levels in seedheads increase from about 900 ppb to about 1,500 ppb (see Fig. 1).

To suppress toxic fescue seedheads, McCann compared several options. Reported success with grazing, including rotational grazing, is anecdotal, he said. Clipping pastures is effective, but expensive. The herbicide Chaparral™ applied at a rate of 2 ounces per acre has been demonstrated to suppress stem and seedhead formation. That decreases the amount of forage growth, and increases the average quality of the forage, but kills clover that is often used to dilute fescue in cow diets. It also temporarily yellows the remaining forage.

McCann said a major sign of fescue toxicity in cattle is zero serum prolactin. Serum prolactin levels are the benchmark response, he said. It is like a light switch — if there is toxicity present, then serum prolactin doesn't decrease gradually, it immediately drops to near zero. Other signs include high rectal temperatures, heat stress behavior, lower average daily gain, lower gain per acre, and lower dry-matter intake. Available forage tends to be higher because cows eat less of what's there.

There is an option for “friendly fescue,”

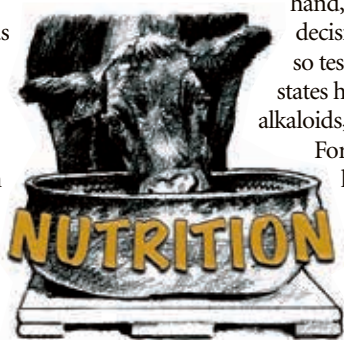
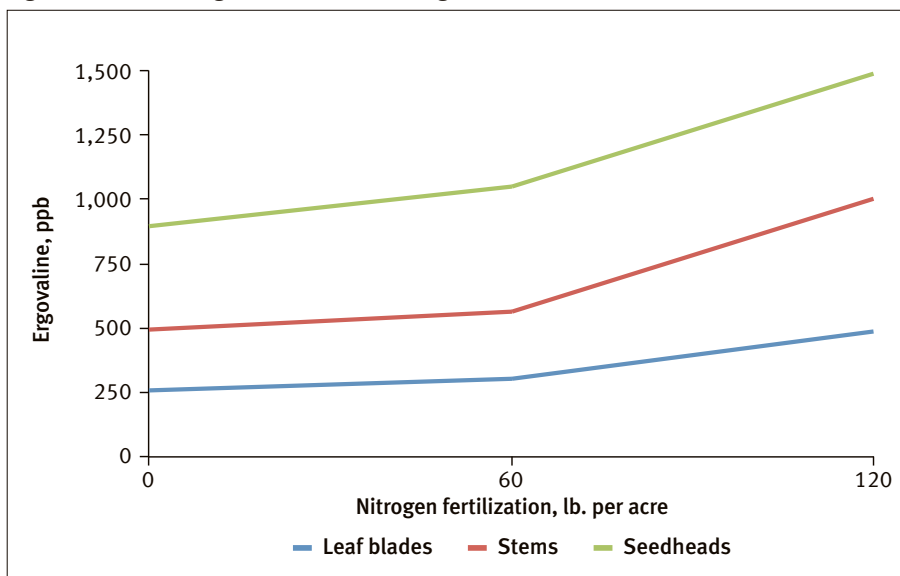


Fig. 1: Effect of nitrogen fertilization on ergovaline levels



which doesn't produce the toxins harmful to cattle, said McCann. The process removes the toxic endophyte and adds a novel nontoxic endophyte. He mentioned MaxQ® as an example. It is naturally occurring, has agronomic benefits and "combines the best of both worlds." This option requires more investment, though.

He explained that fescue toxins raise the body temperature of affected cattle. He shared study results of cattle that ate MaxQ or toxic tall fescue in summer months. On average, the body temperature of cattle grazing MaxQ was a full degree lower than cattle grazing toxic fescue. Conversely, in winter months, cattle grazing MaxQ were, on average, one degree warmer in body temperature (see. Figs. 2-3).

Reproductive consequences

In addition to decreased performance, fescue toxicity cuts into the dance of nutrition and reproduction.

Fescue toxins affect bulls by decreasing performance and elevating body temperatures. They have little impact on scrotal circumference or sperm motility or morphology, but they reduce the fertilization ability of the sperm. Affected cows show higher body temperatures, lower prolactin levels, lower cow and calf performance, lower pregnancy rate, lower embryo quality, and lower embryo development. The effects for both bulls and cows occur before Day 7 of embryo development.

Switching to fall calving has helped manage around fescue toxicity, reducing its effect on reproduction, McCann reported. In a 2013 study, cows were separated into groups by fall and spring calving, and then fed 100% infested fescue or 75% infested fescue and 25% friendly fescue. An additional spring-calving group was fed 100% friendly fescue. The calving rate was 90% in fall-calving herds fed 100% infested fescue, compared to 44% in spring-calving herds on the infested fescue (see Table 1).

McCann concluded by reiterating four mitigation strategies:

- ▶ dilute fescue stands with clover, other forage species or other feed;
- ▶ renovate pastures with "friendly fescue;"
- ▶ manage seedheads through grazing management or chemicals; and
- ▶ consider a fall calving season.

McCann spoke during Wednesday's ARSBC session focused on special issues in beef cattle reproduction. For more information, visit the Newsroom at www.appliedreprostrategies.com to listen to his presentation and to view his PowerPoint slides.

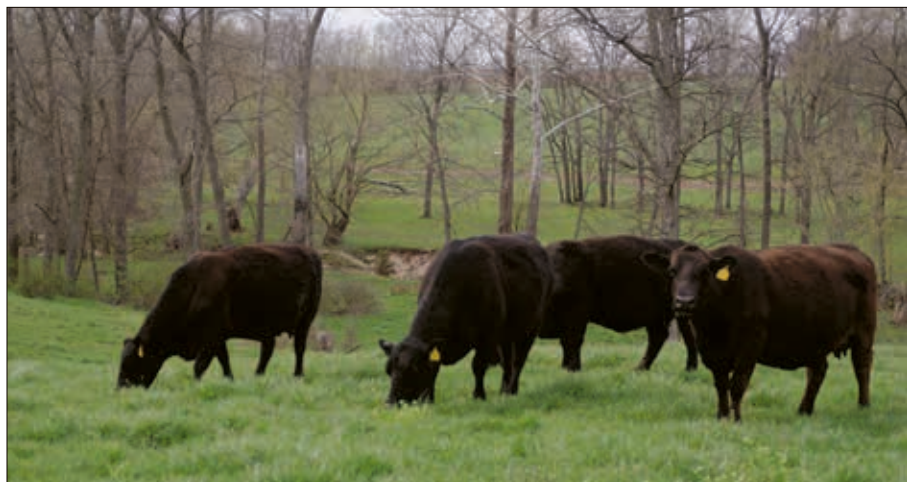
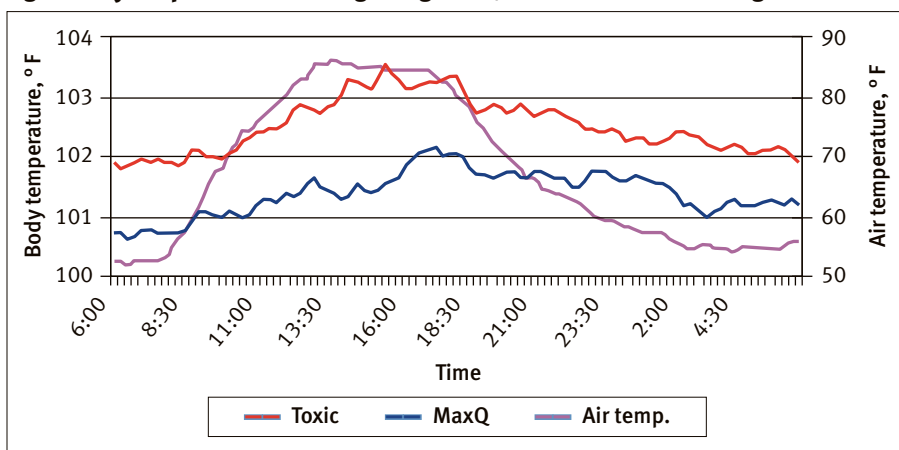


PHOTO BY SHAUNA ROSE HERMEL

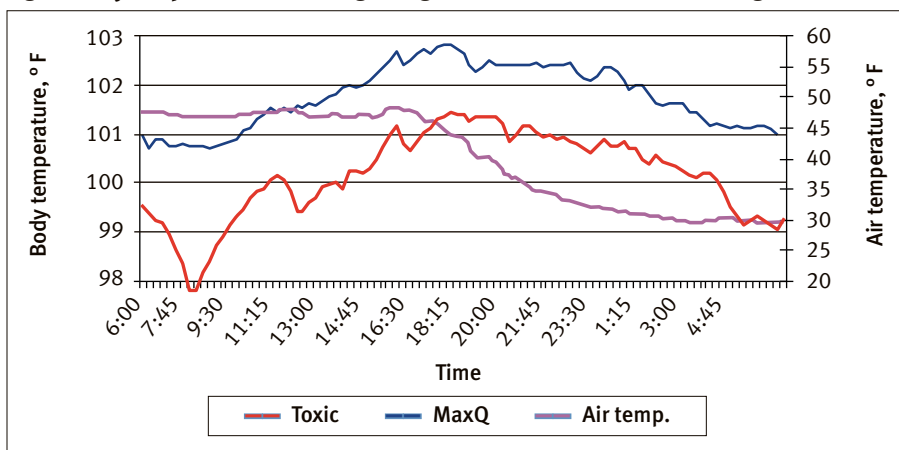
▶ Fescue plays a large role among forages in eastern states. McCann said about 90% of tall-fescue fields in the southeastern United States is infested by wild-type toxic fungus.

Fig. 2: Body temperature of cattle grazing MaxQ or toxic tall fescue during summer



Source: Watson et al., 2004.

Fig. 3: Body temperature of cattle grazing MaxQ or toxic tall fescue during winter



Source: Watson et al., 2004.

Table 1: Effects of calving season and strategic use of renovated fescue pastures

	F100	S100	F75	S75	Friendly
Cow wt. change during breeding, lb.	35	-46	-5	-11	-9
Calving rate, %	90	44	95	80	80
Weaning wt., lb.	528	491	557	499	581

Source: Caldwell, et al. 2013.

