Animal Science Research and Demonstration Projects

Batesville Livestock and Forestry Research Station

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Best Management Practices to Minimize Tall Fescue Toxicosis

Estimated losses associated with tall fescue toxicosis exceed $1 billion annually. Best management practices of moving the calving season and incorporating novel ('animal friendly') tall fescue resulted in $82 greater value per calf sold and $299 per cow exposed from fall-born compared with spring-born calves. **With 900,000 cows in Arkansas, this is a potential $188-million-dollar economic impact to the Arkansas beef cattle industry.**

- **Fall calving vs. Spring calving cows grazing toxic fescue**
  - 46 more calves per 100 cows
  - 44 lbs greater weaning weight
- **Incorporate 25% of toxic tall fescue pasture to novel tall fescue for cows**
  - 36 more calves per 100 cows
  - $179 more calf sold per cow exposed
- **Use of novel tall fescue improved soil organic matter and microbial biomass**
  - Breakeven cost for 25% of novel tall fescue - $241 per acre
- **Stocker cattle grazing novel tall fescue vs. toxic**
  - 184 lbs greater gain during the fall, winter, and spring
  - $157 greater return per acre

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300 Day Grazing Program for Improving Management of Arkansas Forage and Livestock Systems

Initiated in 2008, educational programs combined with on-farm demonstrations of rotational grazing, incorporation of legumes, winter annuals, and stockpiled forages achieved grazing seasons of approximately 300 days with an average savings of $9,600 savings/farm. **With over 28,000 farms in Arkansas producing cattle, this is potentially a $268-million-dollar economic impact to the Arkansas livestock industry.**

- At least 11,300 people attended presentations/field days.
- 227 state, regional, and national presentations.
- 18 videos have been loaded 6,020 times with 757 plays.
- Programs started in other states
  - University of Kentucky, Oklahoma State University, Samuel Roberts Noble Foundation (Ardmore, OK), University of Georgia, Mississippi State University, and Virginia Tech University.

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Bovine Respiratory and Gastrointestinal Tract Microbiome of Growing Steers

Bovine respiratory disease (BRD) accounts for 70 to 80% of all feedlot morbidity and 40 to 50% of all mortality. Not only does this result in increased medication costs for morbid cattle, these cattle usually grow slower, are less efficient in converting feed to gain, and their carcasses have a lower quality grade. **BRD causes an estimated $800 to $900 million annually in economic losses.**

- Objectives are to examine the effects of diet on the bovine respiratory (oral and nasal) and gastrointestinal tract (rumen and lower gut) microbiome (bacterial community).
- This research will lead to the **identification of potential probiotics that increase feed utilization efficiency** and growth performance of beef cattle.
- Long term – identification of a panel of biomarkers for the accurate and rapid diagnosis and prediction of the onset of BRD and to develop efficient management strategies (e.g. probiotics) **to replace antibiotics.**

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Novel Technologies to Determine and Alleviate Tall Fescue Toxicosis in Beef Cattle

Objectives are to identify novel molecular technologies to detect signs of tall fescue toxicosis and heat stress in beef cattle that will be used to select more productive cattle.
- **Study 1** - identify new biomarkers of heat and fescue stress in fall calving beef cows.
  - Select cattle that have either good and poor performance and identify bacteria/microbes, metabolites and transcripts that differ between animals on toxic and novel tall fescue.
- **Study 2** - breeding trial to identify what genetic variation in Brahman based cattle (i.e. Brangus) makes them more heat and fescue toxin tolerant.
  - Investigate how genetics and genomics can be used to improve meat quality in Brahman based cattle.
- **Study 3** - collaboration with the University of Missouri ($3 million grant from USDA-NIFA) to identify genetic variation related to hair shedding score which is use as an indicator of fescue stress.
  - 650 animals to be genotyped for 250,000 single nucleotide polymorphisms (SNPs; differences in the genetic makeup).