DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

July 2016

Beef Cattle Research Update

United States Department of Agriculture, University of Arkansas, and County Governments Cooperating

What's Inside

Choosing a Calving Date

(Funston, R. N.,et al., University of Nebraska, South Dakota State University and USDA-Agricultural Research Service)
Professional Animal Scientist 32:145-153 (April 2016)

One of the most important decisions a cow-calf producer must make is choosing a calving date. This decision must take into account the entire beef production system, environmental conditions, available resources and production and lifestyle goals. Calving season influences when other production events occur, such as peak lactation, rebreeding, weaning and marketing, all of which affect an operation's profitability and efficiency.

- Any calving system, regardless of date, should address the relationship between nutritional requirements of beef females and the quality and quantity of available feed. Nutritional status of beef females is influenced by stage of production and the environment, including length of growing season, forage species, day length, topography, forage quality and availability, ambient temperature, annual rainfall and weather extremes.
- Periods of growth, gestation and milk production each influence nutrient requirements for the growing and adult female. The relatively high nutritional requirements of cows in late gestation and early lactation can affect subsequent reproductive performance in limited nutritional environments.
- Operations with available high-quality feed resources and minimal environmental stress can sustain larger cow size and greater levels of milk production for increased economic returns. But under conditions of low feed availability and greater environmental stress, cow size and milk production should be limited.
- *Bos indicus*-influenced genetics has introduced a more heat-tolerant animal suited to perform in the hot, humid environment of the southeastern United States. Additionally, some beef producers in the Southeast choose a calving and breeding season when ambient temperatures are lower and extreme weather is less likely to disrupt breeding or create environmental stress during calving.
- Most spring-calving production systems have historically marketed cattle in November, resulting in a high calf supply. An increased supply at this time results in a lower price when compared with calf prices in winter or spring. Calves sold at an alternative time to November generally receive a higher price because of decreased supply at weaning and marketing. A higher price received must offset the potential added cost of harvested feeds needed to support an alternative calving system.

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Livestock and Climate Change: Facts and Fiction

(Mitloehner, F. M. Department of Animal Science, University of California, Davis)

UC-Davis Blog by Andy Fell, April 2016

As the November 2015 Global Climate Change Conference COP21 concluded in Paris, 196 countries reached agreement on the reduction of fossil fuel use and emissions in the production and consumption of energy, even to the extent of potentially phasing out fossil fuels entirely.

- Leading scientists throughout the U.S., as well as the U.S. Environmental Protection Agency, have quantified the impacts of livestock production in the U.S., which accounts for 4.2 percent of all GHG emissions, very far from the 18-51 percent range that advocates often cite.
- Breaking down the 4.2 percent EPA figure for livestock by animal species shows the following contributors: beef cattle, 2.2 percent; dairy cattle, 1.37 percent; swine, 0.47 percent; poultry, 0.08 percent; sheep, 0.03 percent; goats, 0.01 percent; and other (horses, etc.) 0.04 percent.
- Since the 1950s, the carbon footprint of the U.S. beef and dairy sector has shrunk as production increased or stayed the same.
  - ➢ In 1950, 22 million dairy cows produced 117 million tons milk. In 2015, 9 million dairy cows produced 209 million tons of milk. (Fifty-nine percent fewer cows produced 79 percent more milk than they did in 1950.)
  - ➢ Beef: In 1970, 140 million head of cattle produced 24 million tons of beef. In 2015, 90 million (36 percent fewer) head of cattle produced 24 million tons of beef.
- Globally, the U.S. is the country with the relatively lowest carbon footprint per unit of livestock product produced (i.e. meat, milk or eggs). The reason for this achievement largely lies in the production efficiencies of these commodities. Fewer animals are needed to produce a given quantity of animal protein food.
- The U.S. livestock, poultry and feed industries are some of the most efficient and lowest environmental impact systems in the world. The research, technologies and best practices that have been developed and implemented over time in the U.S. can also be shared with other production regions around the world.

Postinsemination Diet Change on Reproductive Performance in Beef Heifers

(Perry, G.A., et al., Department of Animal Science, South Dakota State University.)

Professional Animal Scientist 32:316-321 (June 2016)

Within the United States beef and dairy industries, reproductive failure costs approximately $1 billion annually, and the economic value of reproduction for commercial beef producers was reported to be five times greater than calf growth. One of the causes of reproductive failure could be nutritional stress in females during the early stages of pregnancy. Previous research has indicated that changes in diet can affect the uterine environment and embryo growth.

- An important part of any production system is reproductive performance associated with developing heifers. Heifers need to calve by 24 months of age to achieve maximum lifetime productivity, and pregnancy success during the breeding season has been correlated with the percentage of heifers that reached puberty before or early in the breeding season.
- Angus crossbred heifers (n = 336) were developed on a forage-based diet at one location and were randomly divided following insemination into one of three treatment groups: (1) heifers were moved to a drylot and fed a drylot ration [48 percent corn silage, 28 percent dried distillers grains with solubles (DDGS) and 24 percent hay; diet was formulated for 2 pounds per day weight gain], (2) heifers were moved to pasture alone or (3) heifers were moved to pasture and supplemented with 5 pounds per day per animal of DDGS
- Changing the diet (moved to a drylot or moved to pasture and supplemented with DDGS) of heifers that were developed with a high forage diet had no effect on AI conception rates or breeding season pregnancy rates, as long as body condition score was not reduced.
- Previously reported negative effects on pregnancy success when heifers developed in a drylot on a forage-based diet were moved to spring forage after AI are likely not mediated through the abrupt changes in diet and rumen microbes needed to adapt to the new diet, but more likely are due to decreased dry matter intake as a result of having to learn grazing behavior.

Strategies to Predict and Improve Eating Quality of Cooked Beef Using Carcass and Meat Composition Traits in Angus Cattle

(Mateescu, R. G. et al., University of Florida, Texas Tech University and Oklahoma State University)
Journal of Animal Science 94:2160-2171 (May 2016)

Product quality is a high priority for the beef industry because of its importance as a major driver of consumer demand for beef and the ability of the industry to improve it. A two-pronged approach based on implementation of a genetic program to improve eating quality and a system to communicate eating quality and increase the probability that consumers' eating quality expectations are met is outlined. The objectives of this study were 1) to identify the best carcass and meat composition traits to be used in a selection program to improve eating quality and 2) to develop a relatively small number of classes that reflect real and perceptible differences in eating quality that can be communicated to consumers and identify a subset of carcass and meat composition traits with the highest predictive accuracy across all eating quality classes.

- The challenge for the industry with respect to eating quality is complex, and a systems approach that encompasses pre- and postharvest production practices, meat science and genetics is needed. Consumers are the last link of the beef production chain, and delivering a consistent eating quality is critically important in building consumers' confidence and loyalty and, subsequently, increasing the demand for beef. Currently, emphasis is on postmortem aging, reported to be an average aging time of 20.5 days at retail, and increased marbling.
- In this study, eating quality is considered a relevant breeding objective, and a selection index based on two indicator traits, Warner-Bratzler shear force (indicator of tenderness of meat) and intramuscular fat content, was developed to select for eating quality as a correlated trait in Angus cattle.
  - ➢ The indicator traits are difficult to measure on live animals, and a DNA test that can accurately identify cattle with superior genetics for Warner-Bratzler shear force (indicator of tenderness of meat) and intramuscular fat content would help to overcome this difficulty.
- The second and equally important step is the development and implementation of a system to communicate eating quality to consumers and improve the probability that consumers' eating quality expectations are met. An appropriate strategy should be the development of a relatively small number of classes that reflect real and perceptible differences in eating quality that can be communicated to consumers using a simple system, such as labeling.
  - ➢ A predictive model that would assign the product (whole carcasses or components) to the appropriate eating quality class on the basis of Warner-Bratzler shear force and intramuscular fat content indicators was developed and was shown to be significantly better in predicting eating quality relative to the current system based on USDA quality grade.

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