

Concepts in Nutrition

Range Beef Cow Symposium XXIII speakers address cow herd nutrition.

by **KINDRA GORDON & TROY SMITH**, field editors;
photos by **TROY SMITH**

Several speakers at the Range Beef Cow Symposium XXIII in Rapid City, S.D., addressed nutrition of the beef cow herd and its long-term effects. Here's a sampling of some of the synopses posted within the *Angus Journal's* online coverage of the symposium, which can be found at www.rangebeefcow.com.



► “We used to think grass was the cheapest place for gains, but that has changed,” said Karla Jenkins, NU range management cow-calf specialist at the Panhandle Research & Extension Center in Scottsbluff.

Limit-feeding cows in confinement using crop residues

As grazing lands have become less available, either due to drought or because of urbanization or conversion to cropland, producers might consider feeding cows in confinement for a period of time, suggested Karla Jenkins as she addressed attendees Dec. 3. Jenkins is a range management cow-calf specialist with the University of Nebraska (NU) at the Panhandle Research & Extension Center in Scottsbluff.

She and her colleagues have been conducting studies to learn more about limit-feeding cows in confinement. She stressed that limit-feeding means you want the animals to maintain weight, not gain weight.

“Producers may need to rethink their utilization of grass and think outside the box as they look at different possibilities,” Jenkins said, particularly as the industry faces drought recovery of pastures and higher grazing costs. She suggested confinement may

become a part of a producer's system and provide opportunities to save high-quality grass for gains.

“We used to think grass was the cheapest place for gains, but that has changed,” she added.

For those who utilize limit-feeding in confinement, Jenkins said there are some key considerations. They include:

● **Knowing the nutrient content of feedstuffs**, which can be tricky with byproducts. She encouraged using total digestible nutrient (TDN) values produced by universities for feeding trials. Extension personnel can assist in helping develop a diet.

● **Understanding the nutrient requirements of cows**. The cow's needs will change depending on stage of gestation or lactation, and if she has a calf at her side the diet will need to be adjusted to account for the feed the calf consumes, too.

● **Recognizing that byproducts don't always have to mean ethanol**. She suggested looking at other regionally available byproducts, such as beet pulp for producers in Western Nebraska. If a feedstuff is seasonally available, it might be an opportunity to bag and store it until it is needed for feed, as well.

While the cow confinement studies that Jenkins is involved with are in their second year, she reported that from the first year of data they have not seen differences in performance between early-weaned and late-weaned pairs, between weaning weights of calves, body condition scores of cows, or pregnancy rates of cows.

— by Kindra Gordon

Lifetime effect of pregnant-cow nutrition on replacement-heifer progeny

“We can decrease marbling before calves are born based on how we feed cows,” reported Rick Funston, a researcher at the NU Central Research and Extension Center at North Platte.

Funston led off a series of speakers focused on the topic of “fetal programming,” which is explained as how what the cow eats and what she endures during pregnancy impact subsequent lifetime performance of the calf she's carrying.

Regarding his statement about research showing a decrease in a calf's marbling before it is even born, Funston added,



► A researcher at NU's Central Research and Extension Center at North Platte, Rick Funston says fetal-programming responses can result from a negative nutrition environment, which can be caused by several factors.

“These cattle were all the same genetics, and we are affecting things we are selecting for. This brings home the point — it [selection] is not going to work unless it is managed for.”

Fetal programming has been studied in humans, and now, the consequences to calves from cows fed restricted diets is being researched more.

Funston shared data from several studies showing that restrictions to a cow's diet during pregnancy can impact weaning weight and carcass weight of the steers, as well as fertility of heifers before they're ever born.

Funston says fetal-programming responses can result from a negative nutrition environment, which can be caused by several factors, including:

- Breeding of young dams who compete for nutrients with rapidly growing fetal systems;
- Increased incidences of multiple fetuses or large litters;
- Selection for increased milk production, which competes for nutrients with increased energy demand from fetal and placental growth; or
- Breeding of livestock during high environmental temperatures and pregnancy occurring during periods of poor pasture conditions.

The bottom line to this ongoing research is that proper management of cow nutrition during gestation can improve progeny performance and health. Interestingly, new research with mice also

suggests there may be a paternal influence to fetal programming.

— by Kindra Gordon, field editor

Cow-nutrition effects on progeny carcass and meat characteristics

Fetal programming research has shown that a cow's nutritional status during pregnancy can have far-reaching effects on her calf. Not only does it impact the calf's health and performance, but evidence suggests it's likely to influence the calf's carcass characteristics. Learning more about those effects was the focus of research discussed by South Dakota State University (SDSU) meat scientist Amanda Blair.

“As a meat scientist, I'm concerned with muscle and fat. Beef consumers are concerned with beef's appearance, palatability (tenderness, juiciness, etc.) and cost, but all of those things come down to muscle and fat,” stated Blair. “So can we use our knowledge (of fetal programming) to manipulate development of muscle and fat?”

According to Blair, South Dakota researchers have been looking for answers by focusing particularly on the effects of cow nutrition during the second

trimester. While a calf's muscle-fiber numbers are set at birth, the second trimester is thought to be an important period of muscle and fat cell development.

Blair described a study involving two groups of cows whose respective diets were designed to maintain one group in adequate body condition [body condition score (BCS) 5-5.5] during a 98-day mid-gestation period,

while the second group was allowed to lose about two-thirds of a condition score during that period. After completion of the 98-day period, the cows were commingled and managed as a common group through calving. After weaning, all calves received the same management during backgrounding and finishing periods.

Postharvest carcass evaluation showed that calves born to cows whose diets were energy-restricted during mid-gestation exhibited less backfat. Carcass yield grades were also lower than for calves born to cows whose diets were not energy-restricted. Researchers saw no significant differences in marbling scores,

(Continued on page 56)

While a calf's muscle-fiber numbers are set at birth, the second trimester is thought to be an important period of muscle and fat cell development.

Concepts in Nutrition *(from page 55)*

but calves from dams on restricted diets produced carcasses with less subcutaneous fat. There were no differences in meat color or tenderness measured by shear force.

“Maternal energy status had no

influence on the degree of muscling as measured by ribeye area, although alterations in maternal energy occurred during what has been suggested to be the period of maximal fetal muscle-fiber development,” reported Blair.

Differences in fat deposition led Blair to believe there may be opportunities to positively affect marbling and subcutaneous fat thickness relative to lean muscle during prenatal development.

— *by Troy Smith*



► While a calf's muscle-fiber numbers are set at birth, the second trimester is thought to be an important period of muscle and fat cell development, said Amanda Blair, SDSU meat scientist.

Nutritional management following AI

A failure to achieve anticipated pregnancy rates among heifers bred by artificial insemination (AI) might not be due to low fertility. It might not be due to improper AI technique. Even when heifers are well-developed and fertile, and when synchronization protocols and insemination are performed correctly, results are sometimes disappointing.

Scott Lake reminded cow-calf producers that pregnancy rates can suffer when post-AI heifer diets change abruptly. The University of Wyoming (UW) beef cattle specialist said shifting heifers to a lower plane of nutrition after AI is particularly risky.



► “We sometimes forget that high-concentrate diets can put heifers at a disadvantage when they go back to an all-forage diet,” said Scott Lake, UW beef cattle specialist.

Lake said replacement heifers are commonly developed in drylots and fed relatively high-energy diets. Such heifers often cycle well and respond to estrous-synchronization protocols.

“We sometimes forget that high-concentrate diets can put heifers at a disadvantage when they go back to an all-forage diet. Heifers bred in the spring may be turned out on grass that is washy, too. They can't get the calories they are used to,” said Lake. “A drop to

Replacement heifers are commonly developed in drylots and fed relatively high-energy diets. Such heifers often cycle well and respond to estrous-synchronization protocols.

a maintenance diet can put them on a negative plane of nutrition immediately after AI, and it can result in lower pregnancy rates.”

Lake cited evidence indicating that heifers transitioned from drylot to pasture can lose more than 3 pounds per day during the first week. Research suggests heifers whose dietary plane of nutrition decreases immediately following AI may exhibit decreased AI pregnancy rates and decreased overall breeding-season pregnancy rates. Post-AI nutrient restriction may also result in poor-quality embryos that are unable to successfully signal maternal recognition of pregnancy. The result is early embryo loss.

According to Lake, these results suggest that the early embryo, oviduct and uterus are sensitive to immediate changes in nutrition. In addition, nutrient restriction following breeding appears to alter oviductal and uterine support for embryo growth and pregnancy recognition. Lake advised producers to manage nutrition so that breeding females do not experience a negative energy balance following AI.

— by *Troy Smith, field editor*

More details available online

Jenkins, Funston, Blair and Lake spoke Tuesday at RBCS XXIII. Visit www.rangebeefcow.com/2013 to view their PowerPoints, read their proceedings or listen to their presentations.

The RBCS is a biennial educational symposium offering practical production management information. It is sponsored by the Cooperative Extension Service and animal science departments of the University of Wyoming, South Dakota State University, Colorado State University and the University of Nebraska.

Comprehensive coverage of the symposium is available online at www.rangebeefcow.com. Compiled by the *Angus Journal* editorial team, the site is made possible through sponsorship of *LiveAuctions.tv* and the cooperation of the host committee and speakers.

