



Research Update

► Summaries of current beef cattle research

Study shows no advantage to delaying calf implants at feedlots

Two recent studies by Kansas State University (K-State) scientists indicate that delaying the administration of growth-promoting implants to calves did not provide an advantage over implanting immediately upon arrival at a feedlot.

“There has been speculation in the beef industry that calves at high risk of developing respiratory disease would benefit if an implant was not given immediately upon arrival at the feedlot, but rather was delayed and given after a few weeks’ time,” said Chris Reinhardt, feedlot specialist with K-State Research and Extension. “The idea was to allow high-risk calves to become better acclimated to the feedlot and the new environment in general, as well as to get over any respiratory disease challenges they had upon arrival. Until now, however, there has been no data to support or refute that theory.”

Reinhardt, teamed up with K-State veterinarian Dan Thomson in two studies to test the theory. Thomson is director of K-State’s Beef Cattle Institute. The research was supported by a USDA Animal Health Grant.

The first study followed 1,600 high-risk steers at a commercial Kansas feedlot. Half the steers were given the growth-promotant implant Revalor-XS immediately upon arrival, and the other half were implanted six weeks after arrival. The researchers monitored the steers’ health and growth rate from arrival through harvest.

“The results indicated that delaying the implants did not improve any health or performance outcomes over providing the implant upon arrival,” Reinhardt said. “Providing the implant on arrival actually led to a numerical improvement in carcass weight at slaughter.”

The second project, a small metabolism study, was conducted at the K-State research farms.

“We conducted the second study to look more deeply into the metabolic factors at play in calves undergoing nutritional stress in the presence or absence of an implant,” Reinhardt said. “We learned that there are certain factors that implants alter. But we also found that nutrient supply and presence of the implant did not interact.”

The results of the second study somewhat confirmed what the scientists found in the first study — that the disease process, and any potential nutrient stress brought on by disease — did not suppress the activity of the implant given upon feedlot arrival, he said. That suggests that high-risk calves can be implanted immediately upon feedlot arrival with no detrimental impact on health or performance (such as growth and weight gain) outcomes.

— by Mary Lou Peter, K-State Research & Extension

Does a long, difficult delivery affect rebreeding of the cow?

In addition to being the greatest cause of baby calf mortality, calving difficulty markedly reduces reproductive performance during the next breeding season. Cattle suffering from calving difficulty have been reported (Brinks, et al. 1973) to have pregnancy rates decreased by 14% and those that did become pregnant to calve 13 days later at the next calving.

Results from a Montana study (Doornbos, et al., 1984) showed that heifers receiving assistance in early Stage 2 of parturition returned to heat earlier in the postcalving period and had higher pregnancy rates than heifers receiving traditionally accepted obstetric assistance. In this study, heifers were either assisted about one hour after the fetal membranes (water bag) appeared (EARLY) or were assisted only if calving was not completed within two hours of the appearance of the water bag (LATE).

Heifers that were allowed to endure a prolonged labor (LATE) had a 17% lower rate of cycling at the start of the next breeding season. In addition, the rebreeding percentage was 20% lower than the counterparts (EARLY) that were given assistance in the first hour of labor.

First-calf heifers should deliver the calf in about one hour. The starting time is the first appearance of the water bag and ends with complete delivery of the calf. Mature cows that have calved previously should proceed much faster and should deliver the calf in about a half hour.

Always check to be certain that cervical dilation has been completed before you start to pull a calf. If you are uncertain about whether cervical dilation has taken place or if

the calf is in a deliverable position, call your veterinarian immediately. Prolonged deliveries of baby calves (in excess of 1.5 or 2 hours) often result in weakened calves and reduced rebreeding performance in young cows.

— by Glenn Selk, OSU emeritus extension animal scientist

K-State research develops hamburger rich with omega-3 fatty acids

Jim Drouillard, professor of animal sciences and industry, developed a technique that enriches ground beef with omega-3 fatty acids — fatty acids that have been shown to reduce heart disease, cholesterol and high blood pressure. The enriched ground beef is named GreatO Premium Ground Beef and is being sold through Manhattan, Kan.-based company NBO3 Technologies LLC. It was to be available mid-February at select retailers in Buffalo, N.Y., and expand to leading retailers and restaurants nationwide later this year.

Omega-3 fatty acids are found in fish and plant oils. The United States currently does not have a recommended daily intake of omega-3s, though many doctors and nutritionists recommend between 1,200-1,600 mg daily, depending on a person’s age and health.

A quarter-pound hamburger made of the enriched ground beef has 200 mg of omega-3s and tastes the same as regular ground beef, Drouillard said. This makes the ground beef an alternative for people who want to add or increase their omega-3 fatty acids intake but do not want fish or supplements to do so.

The health benefits of omega-3s are not limited to humans. Studies show that dairy and beef cattle with an enriched diet of flaxseed and other omega-3-rich grains have fewer respiratory diseases. The cattle also have higher fertility rates, which helps offset infertility among dairy cattle.

The technology to enrich ground beef with omega-3s is a spinoff of flaxseed research Drouillard began in 1998. Drouillard and his students studied flax for several of its omega-3 fatty acids that may suppress inflammation and reduce diabetes in cattle. Research showed that omega-3 levels dramatically increased in the cattle as more flaxseed was introduced into their diet.

Keeping the omega-3s from becoming saturated fats in cattle’s digestive system is a challenge, however. Microorganisms in the rumen modify most of the ingested fats and turn them into saturated fats. This causes ground beef to have low levels of omega-3s.

Christian Alvarado Gilis, a doctoral candidate in animal sciences and industry, is researching how to improve omega-3 levels

in cattle diets to further enhance the fat profile of beef.

According to Drouillard, substituting omega-3 fatty acids for saturated fats does not change the ground beef's flavor.

"Knowing that there are a lot of desirable flavor characteristics associated with the fat in beef, we performed tons of sensory panel tests with Kansas State University's meat science faculty and with the department of human nutrition throughout the years to ensure that the flavor is not compromised," Drouillard said. "We found that our panelists were never able to detect appreciable differences in the flavor profiles of the omega-3 rich beef and non-omega-3 beef, even though the fats are quite different."

The owners of NBO3 Technologies LLC have worked closely with Drouillard in developing the concept, and after more than a decade of research on improving the enrichment process, have started to distribute omega-3-enriched ground beef to retailers and food vendors. It will be the first ground beef to carry the U.S. Food and Drug Administration (FDA) seal of approval for containing omega-3 fatty acids.

— Adapted from release by Greg Tammen, K-State Research & Extension

Research indicates MLV vaccine has negative effect on pregnancy success

A study sponsored by Novartis Animal Health and published in the January 2013 issue of *Theriogenology*, the journal of animal reproduction, raises questions about using modified-live virus (MLV) vaccines in breeding females and naïve heifers. The research from South Dakota State University (SDSU) investigated the effects of vaccination type in conjunction with first-induced, timed-artificial insemination (TAI) protocols. The findings showed synchronized naïve beef heifers vaccinated with a five-way MLV vaccine were more likely to have abnormal estrous cycles. This same group of heifers also had significantly lower pregnancy rates than those vaccinated with a well-adjuvanted, inactivated vaccine (INV).

"The vaccination of naïve heifers with an MLV containing infectious bovine rhinotracheitis (IBR) at the start of a fixed-time AI protocol had a negative effect on pregnancy success," says veterinarian Chris Chase, SDSU professor and co-author of the study. "In the end, we had less than 50% of animals in the MLV group conceive, so the abnormal cycles were quite high," he says.

The group of heifers receiving an MLV prebreeding experienced a 48% pregnancy rate vs. 86% in the INV test group. In

addition, heifers that experienced an abnormal estrous cycle following MLV vaccination had only a 38% conception rate. Those results were attributed to the detrimental effects MLVs can have on fertility for subsequent ovulations.

Similar conclusions were drawn from an investigation into the onset of abortions in a University of Wyoming beef herd following administration of MLV vaccines. That study directly implicated MLV vaccines with the 25% abortion rate and pregnancy loss, even though the vaccines were administered in full accordance with label directions.

To access the study published in *Theriogenology*, "The Effects of Vaccination on Serum Hormone Concentrations and Conception Rates in Synchronized Naïve Beef Heifers," go to <http://dx.doi.org/10.1016/j.theriogenology.2012.10.005>.

All vaccinations of the 59 crossbred heifers in this study were administered at the appropriate time across four test groups. Estrous cycles were synchronized at the time of vaccination and heifers were bred by AI. All conception rates were then calculated following breeding and pregnancy diagnosis.

— Adapted from news release by Novartis Animal Health.

