Repro Tracks

by **Cliff Lamb,** *Texas A&M University*

Reproductive research and innovation

This issue of the Angus Journal *focuses on research and technology, which is timely since I recently returned from a scientific meeting in Baltimore — the American Society of Animal Science annual meeting. At this meeting, we had the good fortune of interacting with many scientists in the United States and from around the world. At the meeting, scientists have the opportunity to share results from the latest experiments they are conducting.*

Looking to the future

While that may not be all that stimulating to many cattle producers, it does give many of us an opportunity to see what some of the latest developments are that could play a role in applied cattle production systems.

Fig. 1: Embryo loss from day of transfer until Day 28 for Angus or Brangus recipients on a maintenance or restricted diet

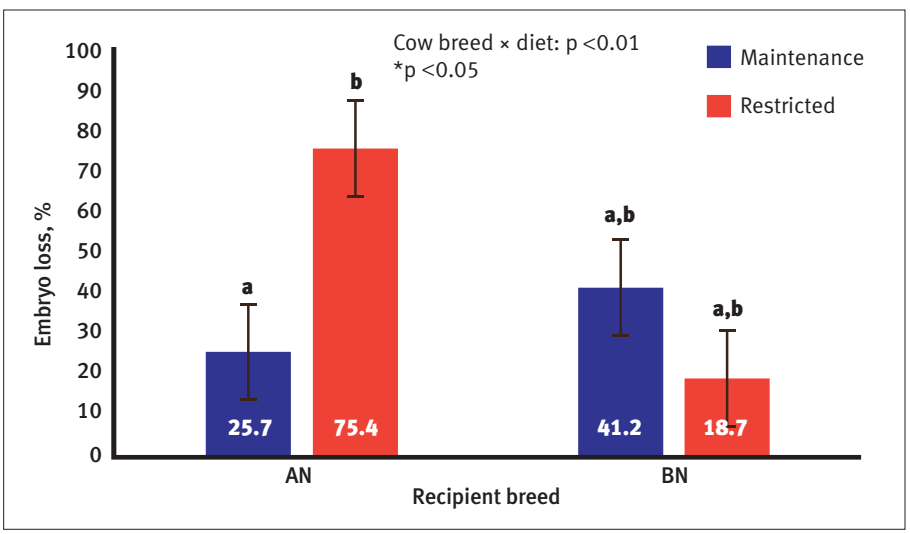
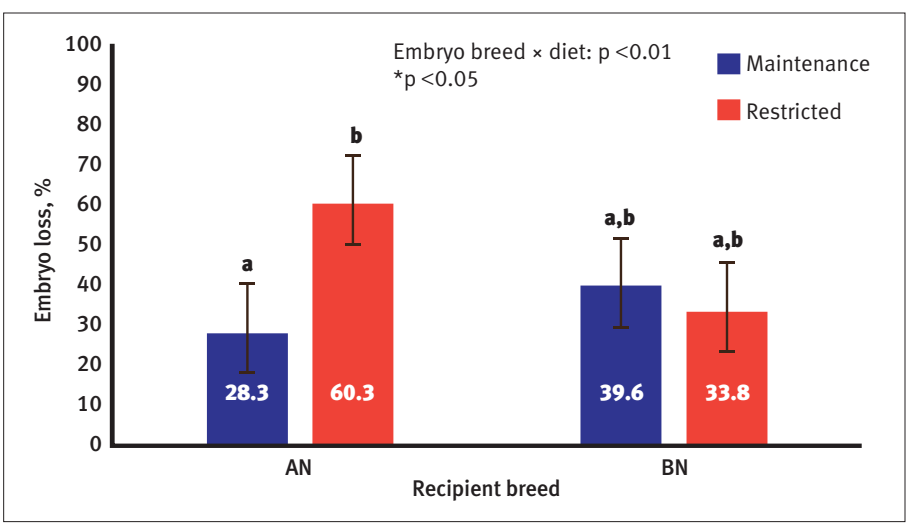


Fig. 2: Embryo loss from day of transfer until Day 28 for Angus or Brangus embryos transferred to recipients on a maintenance or restricted diet



We often lose sight of the fact that many of the management processes or tools we use in production agriculture required years to develop. Therefore, I thought I would interpret and share some of the interesting areas that scientists are currently working on in the area of reproduction.

What were some of the areas that scientists are focusing on that may have a future impact in cattle production?

The greatest proportion of studies reported on at these meetings focused on the impacts of nutrition during early, middle or late gestation on subsequent fetal or calf development. However, additional studies reported results on the influence of different vaccination combinations on reproductive outcomes, the relationship of feed efficiency to various physiological mechanisms, and studies trying to further understand how to manipulate the estrous cycle for a tighter synchrony resulting in better artificial insemination (AI) pregnancy rates. In addition, many studies were far more basic in nature, focusing on mechanisms and pathways that may one day lead to changes in how we manage or select our cattle.

What were the findings associated with the study focusing on vaccination type and reproductive outcomes?

A field trial (Perry et al., Abstract #440) was conducted on 10 herds of well-vaccinated cows and heifers [n=1,565; all of which had been on a modified-live virus (MLV) bovine herpesvirus 1 (BHV-1)/bovine viral diarrhea (BVD) vaccination program] to evaluate whether an MLV vaccine administered prebreeding would have negative effects on conception rates compared to a combined chemically altered/inactivated BHV-1/BVD vaccine (CA/IV).

Within herd, cows received either the MLV or CA/IV vaccine. Animals received a single (cows) or two injections (heifers) of either the MLV or CA/IV vaccine with the final injection occurring between 27 and 89 days before breeding.

Conception rates to AI were greater in the CA/IV (60%) vaccine group compared to the MLV (52%) vaccine group, and the authors indicated that vaccination of well-vaccinated beef cows and heifers with an MLV vaccine prebreeding (28-89 days) decreased AI conception rates compared to a CA/IV

vaccine. Certainly, if these results are valid, then additional work will need to be done to validate this study.

Could you please summarize the results of the study describing the intensity of estrus expression on fertility parameters?

After synchronization of estrus (Cooke et al., Abstract #485), all cows were fitted with a pedometer and inseminated by the same technician with semen from a single bull. Cows were classified by intensity of estrus according to physical activity as: Noestrus = cows that did not express estrus; or cows that expressed estrus with physical activity below (Lowestrus) or above (Hiestrus) the population median. Overall pregnancy rates were less in Noestrus vs. Hiestrus and Lowestrus, and similar between Hiestrus and Lowestrus (42.0%, 67.3% and 60.5%, respectively). The authors concluded that estrus expression and intensity, estimated by physical activity after estrus synchronization impacted fertility parameters and pregnancy success.

What are some interesting results related to nutrition and reproduction early in gestation?

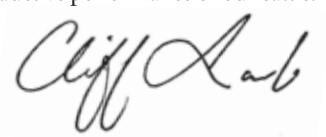
An interesting reciprocal embryo transfer study (Fontes et al., Abstract # 473) was designed to evaluate the impact of energy restriction on embryonic survival in Angus and Brangus genotypes. Recipient cows were assigned randomly to 1) a diet to meet daily maintenance requirements, or 2) restricted intake of nutrients to 70% of energy maintenance requirements (restricted).

Interestingly, Angus recipients receiving Angus or Brangus embryos that were on a restricted diet had greater embryo loss than Angus recipients on a maintenance diet or Brangus recipients on a maintenance or restricted diet (see Fig. 1). Similarly, Angus embryos transferred to Brangus or Angus recipients on a restricted diet had greater embryo loss than Angus embryos transferred to recipients on a maintenance diet or Brangus embryos transferred to Angus or Brangus recipients on a maintenance or restricted diet (see Fig. 2).

Therefore, perhaps Angus cattle are more susceptible to embryonic loss than Brangus cattle when exposed to undernutrition during the first trimester of pregnancy.

How has the enhanced technology altered how we do science?

As technology continues to improve, it assists scientists in discovering new ways to measure and test biological processes. For example, a study (Barca Junior et al., Abstract #471) used Doppler ultrasound to understand the thermoregulatory mechanisms and oxygen supply of the testis in cattle. The authors concluded that differences existed in supratesticular arteries from bulls and that Doppler ultrasound may become a useful tool to evaluate scrotal blood flow changes of the pampiniform plexus during the breeding season, since these differences play a role in the normal reproductive performance of bulls. Therefore, there are new tools and technologies that will continue to play a role in advancing reproductive performance of our cattle.



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