K-STATE Kansas State University Research and Extension

Beef Tips

July 2007 | Department of Animal Sciences & Industry | www.asi.ksu.edu/beeftips

Upcoming Events

K-State Beef Conference
August 9-10
details on page 4

Beef Stocker Conference
September 27
details on page 2

Applied Reproductive Strategies in Beef Cattle
September 11-12
Billings, MT
http://westcentral.unl.edu/beefrepro

Contributors

Dale Blasi
Stocker, Forages Nutrition & Mgt.
785-532-5427
dblasi@ksu.edu

Joel DeRouchey
Environmental Management
785-532-2280
jderouch@ksu.edu

Karl Harborth
Livestock Production
620-431-1530
harborth@ksu.edu

Larry Hollis
Extension Beef Veterinarian
785-532-1246
lhollis@ksu.edu

Sandy Johnson, Editor
Livestock Production
785-462-6281
sandyj@ksu.edu

Chris Reinhardt
Extension Feedlot Specialist
785-532-1672
cdr3@ksu.edu

Twig Marston
Cow-Calf Management
785-532-5428
twig@ksu.edu

Whole genome test to quantify numerous traits at a young age

Jennifer Minick Bormann, assistant professor, animal breeding and genetics

An exciting new development in beef cattle genetic technology was discussed at the Beef Improvement Federation Annual Research Symposium in June. Several researchers around the country are investigating the possibility of whole genome testing. To better understand the new technology, let's first review what genetic tools are currently available.

The best predictor of an animal's genetic merit for a trait is a high-accuracy EPD (expected progeny difference). High-accuracy EPDs can be considered the 'gold standard' of genetic prediction. The obvious problem is that it takes many progeny, and therefore many years, for a bull to get very high accuracy on his EPDs. This is one of the reasons for much of the recent research in molecular genetic technologies. It would be advantageous to identify superior sires at a younger age, without having to generate the many progeny needed to achieve high accuracy EPDs.

Traditional gene tests that producers are familiar with, such as GeneStar ™ marbling and tenderness, test for just a few genes. These genes account for a small proportion of the total variation in that trait. An advantage of using these tests is that they can be performed on the animal at a very young age. However, because they account for a relatively small proportion of the total variation, they don't provide nearly as much information as an EPD.

The whole genome test is a different way of looking at the animal's DNA. Interspersed throughout the genome (all the DNA) of an animal, there are small pieces of known DNA called markers. Most of these markers have no known biological function. They don't make the animal bigger, or smaller, or faster, or smarter, or anything. Just like functional genes, these markers can exist in variable forms, or alleles. For example, if we call the first marker A, the animal may have an A_1 allele or an A_2 allele. Some markers may have even more alleles.

Markers are useful because we can tell which alleles an animal carries from DNA extracted from blood or a hair follicle. Markers by themselves don't tell us anything, but we can figure out from phenotypic data if the markers are close to any genes that have a function in the animal. For example, we may discover that at our A marker, animals that have two copies of the A_1 allele gain faster than animals that have two copies of the A_2 allele. This means that the A marker is close to a gene that affects growth rate. The marker is linked to a functional gene for growth rate.

The idea behind whole genome testing is to have hundreds or thousands of identifiable markers scattered throughout the animal's genome. Then phenotypic records for the traits of importance (weight traits, carcass traits, fertility, etc.) will be analyzed to figure out the effects of different alleles at all the different markers on all the traits of importance. Once we know the effects of all the different marker alleles on all the traits, we can take DNA from a day-old calf and predict his genetic merit for all those traits.

See Whole genome testing on Page 2

Whole genome testing continued from page 1

"To maximize the potential benefits of whole genome testing, producers still need to collect performance data."

While whole genome testing is very promising technology, there are some drawbacks to consider. When the effects of markers are estimated, they are specific for the breed and management system that the data came from. For example, effects estimated in Angus can't be used in other breeds. Every breed will have to go to the huge effort and expense of estimating the effects. And what about composites? In theory, every different combination of breeds would have unique marker effects. We don't know what effect management will have. For example, will the effects of markers on carcass traits be the same in calf-fed and yearling-fed cattle?

Another problem is that the linkage, or relationships between the markers and the functional genes breaks down over time. When a sperm or egg cell is made, parts of the chromosomes will break off and reattach. This is called recombination, and it will break the association between markers and functional genes. We don't know how many years it will take for the whole genome test to become uninformative. Maybe 10 years, maybe 30 years; the research hasn't been done yet. From the time a test is released on the market, it will gradually be getting more uninformative every year. This gradual breakdown of linkage can be compensated for by re-estimating the effects of markers every few years. This is very expensive and time consuming, but most importantly, it REQUIRES DATA!!!!

Some companies and individuals are promising that this technology will eliminate the need for collecting data, but that is short-sighted. To maximize the potential benefits of whole genome testing, producers still need to collect performance data. This allows the marker effects to be re-estimated as the test becomes uninformative. This also provides a check on the accuracy of the whole genome test. Young bulls selected by the genome test will go on to generate many progeny and develop high accuracy EPDs. Those 'gold standard' EPDs can be a check on how well the genome test is sorting young bulls.

The bottom line is that whole genome testing is very promising technology that may allow producers to identify superior bulls at a younger age. However, don't throw away your scales, fire your ultrasound technician, or stop collecting carcass data! Good data will be required to maximize the benefits of whole genome testing.

Beef Stocker Conference to offer management tips

The 2007 KSU Beef Stocker Conference will be held on Thursday, September 27 at the Clarion Hotel, Manhattan, Kansas. This conference will offer practical information and management tips to optimize stocker operations. These tools will give producers greater flexibility as market and environmental conditions continue to unfold. The conference will include the following presentations: Cattle Market Outlook by Dr. Ted Schroeder, Kansas State University; Health Protocols that Add Value, Dr. Van Ricketts, Merial; Evaluating a Sick Calf, Dr. Brad White, Kansas State University; Selecting Your Antibiotic, Dr. Hans Coetzee, Kansas State University; Strategies for Controlling Input Costs, Dr. Dale Blasi, Kansas State University; and Using Byproduct Feeds for Receiving and Growing Diets, Dr. Sean Montgomery, Corn Belt Livestock Services. The day will conclude with a tour of the KSU Beef Stocker Unit and evening barbecue. Pre-registration of $20 is due by Sept. 14th or $30 the day of the conference. For more information, contact Lois Schreiner, 785-532-1267 or lschrein@ksu.edu.

Preconditioning combined with a marketing plan can increase calf returns

Larry C. Hollis, D.V.M., M. Ag, extension beef veterinarian

There are several different marketing opportunities available to Kansas cattle producers which will pay premiums for preconditioned calves. If you have good quality calves to start with, this is a way to add value and increase your bottom line. To take advantage of those markets, now is the time to begin making preparations.

First of all, we need to define preconditioning. Some producers think they have preconditioned a set of calves if they gave a 7-way blackleg and/or respiratory vaccination at branding or turnout time. However, those buyers who are willing to pay a premium are not looking for a calf that is advertised as having had "all its shots", but for a comprehensively-managed calf that is expected to have minimal health problems once it enters the feedlot. To that end, most of these buyers are looking for groups of quality calves that have had the following management practices completed:

1. Castrated, dehorned if necessary, and completely healed
2. Weaned 45 days
    a. Trained to eat feed from a bunk
    b. Trained to drink from an above ground waterer
3. Vaccinated twice with a 5-way MLV respiratory viral vaccine containing IBR, BVD types I & II, PI_3 and BRSV antigens
4. Vaccinated twice with a 7-way clostridial (blackleg) bacterin-toxoid
5. Vaccinated with a Mannheimia (Pasteurella) haemolytica bacterin-toxoid
6. Dewormed as needed

The buyers also prefer to have a written record of which products were used and the dates they were administered. Written documentation has value above the mere price of the calves based upon weight.

Next, producers need to know their different options for selling preconditioned calves. It won't pay to do all the work required for preconditioning if you don't have a specific marketing plan in place.

- Some auction markets in Kansas feature preconditioned calf sales where they bring in buyers looking for quality preconditioned calves. When selling through the auction, be sure to communicate with auction personnel to ensure that they know when your calves will be coming to the sale and exactly what you have done so that they can advertise your calves and help ensure that the right buyers are present on the day your calves are offered for sale.

- In some instances retained ownership may be the best way to capture the value of your calves. Many feedlots will partner with you on a set of calves the first year just to see how well they perform. If they do well, the feedlot is more likely to seek out the opportunity to partner with you on future groups of cattle, or buy the cattle outright.

- A review of video auction records has shown that many video buyers are willing to pay a premium for preconditioned cattle.

- Many of the branded beef marketing programs require or will pay extra for preconditioned cattle, and preconditioned cattle are a must if working through most natural or organic beef programs.

Best results are obtained when calves are preconditioned for a specific market or marketing program.

Now is the time to plan ahead for marketing this year's calf crop. If you have quality calves to offer, the price you receive may be improved by preconditioning those calves. However, it is imperative that you market those calves through a system that will help you make a profit above and beyond the cost of preconditioning.

"It won't pay to do all the work required for preconditioning if you don't have a specific marketing plan in place."

New BVD testing technology available at KSVDL

Kansas State Veterinary Diagnostic Laboratory (KSVDL) has recently completed a training course which will allow it to become the first laboratory in the United States to utilize the most sensitive BVDV test in the world. The technology was designed specifically for the detection of BVDV in both genotype 1 & 2 and all sub-genotype strains, including the difficult to detect HOBI and H138 strains. AnDiaTec manufactures the reagents used in the KSVDL.

AnDiaTec has developed a unique and proprietary lysis buffer that eliminates the need for the costly, labor-intensive and time-consuming RNA extraction step. When this lysis buffer is coupled with AnDiaTec's proprietary reagents, there is confidence in detecting a single positive ear notch in a pool of samples within a few short hours.

The technology is so sensitive that it is even possible to differentiate a Persistently Infected (PI) animal from a transiently infected animal in a pooled sample of blood, which could be particularly beneficial if someone wanted to do a complete herd evaluation.

AnDiaTec developed the reagents and a cost effective automated instrumentation testing system in close association with the German, Austrian and Swiss BVDV eradication programs and key opinion leaders around the world. Some labs are expecting to test over 1 million animals per year or 4,000 to 5,000 tests per day. Therefore, high quality results, smooth processes and fast turnaround are a must.

Kansas State Veterinary Diagnostic Laboratory is extremely pleased to be the first US laboratory to provide the AnDiaTec reagents to their clients. In the past, PCR technology was viewed as too difficult, unreliable or too costly to run in a high throughput environment. However, KSVDL staff are now able to effectively and efficiently use the simplified AnDiaTec reagents and automation to provide superior results and service for their clients.

Additional Information:

1. **Samples to be submitted:** ear notches (dry) or blood (unclotted)
2. **Shipping:** on ice within 2 days of collection – overnight recommended, please freeze the ear notches if shipment cannot occur within 2 days
3. **Turn-around time:** 24 hours after receipt of sample at KSVDL
4. **Results reported to veterinarian:** via fax, web Access, or phone
5. **Pricing:** Contact your veterinarian for pricing. Quantity discounts may apply.

Adding value to calves focus of K-State Beef Conference

The K-State Beef Conference will be held on August 9-10, 2007 in Weber Hall on the KSU campus. This conference is designed to provide take-home knowledge that will enhance the ability of cow/calf producers to improve profitability by adding value to calves. The program will include presentations from several producers who participate in value-added programs and the industry entity they partner with in the value added program. The conference will also include a session on understanding differences in carcass value and a choice between sessions on animal handling or practical cow feeding. Registration fee is $150 per participant and is due by August 3. A registration form and details are available at www.asi.ksu.edu/beefconference. For more information, contact Linda Siebold, lsiebold@oznet.ksu.edu; 785-532-1281.