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Mississippi Beef Cattle Improvement Association

Mississippi Beef Cattle Improvement Association—Productivity and Quality

Fundamentals of EPDs—Part 2

The information that is currently used to compute an EPD is: actual measurement of the animal, measurements of any ancestors (parents, grandparents, etc.), measurements of any collateral relatives (siblings, cousins, etc.), measurements on descendents (offspring, grand offspring, etc.) and measurements on correlated traits. For a particular animal, varying amounts of information may be used to compute its EPDs and a measurement on the animal is not necessarily a requirement. The benefit of adding more information to the computation on an animal's EPD is an increase in accuracy.

The basic model for genetic evaluations is:
Phenotype = Known Effects + Genetic Merit + Unexpected Variation

In this equation we know what the phenotype is, because we measured it, and we estimate the Known Effects through our knowledge of contemporary groups and how sires used across multiple contemporary groups perform differently. This leaves us with two unknowns: Genetic Merit, which is ultimately what we are interested in, and Unexpected Variation. Using simple algebra we can attempt to solve this equation to estimate the genetic merit:

Phenotype – Known Effects = Genetic Merit + Unexpected Variation

Unfortunately, we cannot completely isolate Genetic Merit and therefore our estimate or EPD will always be compromised. When confronted with this situation the logical approach to achieve the best estimate of Genetic Merit is to try to reduce the Unexpected Variation to as close to zero as possible. This is accomplished by the inclusion of more data; the more data that exists on an animal the greater the reduction in Unexpected Variation. For practical purposes EPDs relate to Genetic Merit and Accuracy relates to Unexplained Variation.

Differences in two bulls EPDs for a particular trait is the best estimate of the average difference we would expect to see in the progeny produced by those two bulls. In effect, EPDs are estimating the average value of the individual gametes that are being produced by an animal, sperm in the case of a bull. Because of random segregation each sperm produced by a bull has the potential to have a unique set of genes; that is why flush mates have different genetic make-up even though they are produced by the same sire and dam. If the actual genetic merit of each individual sperm could be determined from the ejaculate of a bull the results might resemble Chart 1. The bull's genetic potential is for 500 lbs of weaning weight and the largest proportion of his sperm would result in 500 lbs calves. However, the bull has some sperm that would result in a much lighter calf and other sperm that would result in a much heavier calf. In this example, on average his calves would weigh 500 lbs with some weighing as little as 450 lbs and some weighing as much as 550 lbs.

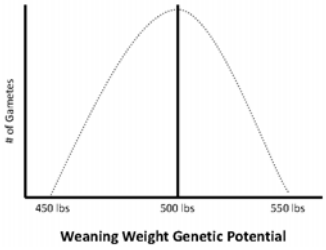

Chart 1. Example distribution of genetic potential of individual gametes produced by an animal.

Compare the first bull with genetic potential of 500 lbs with a second bull with the genetic potential of 525 lbs (Chart 2). On average the second bull's calves exceed the first bull's calves by 25 lbs, but note there is considerable overlap in the genetic potential of the two bulls. That is why an inferior bull can produce calves that exceed the performance of some of the calves of the superior bull, but on average the superior bull puts an additional 25 lbs on his calves and he should produce progeny that exceed the heaviest progeny of the inferior bull. In this scenario, assuming no unexpected variation, the superior bull would have a weaning weight EPD that was 25 lbs greater than the inferior bull.

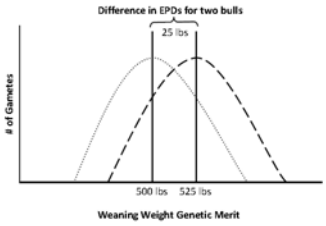

Chart 2. Example distribution of genetic potential of individual gametes produced by an animal.

Source: Darrh Bullock, Extension Professor, University of Kentucky , National Beef Cattle Evaluation Consortium, www.nbcec.org

Upcoming events:

- November 4-6—MSU Artificial Insemination School, Mississippi State, MS
- November 17—Mississippi Forage Conference, Starkville, MS
- January 20—Mississippi BCIA Spring Bull Sale nomination deadline
- February 11—MBCIA Annual Membership Meeting, Jackson, MS
- March 3—Hinds CC Bull Test Sale and Mississippi BCIA Spring Bull Sale, Hinds Community College Bull Sale Facility, Raymond, MS
- March 15—Applied Cattle Nutrition Workshop, MSU
- March 17-19—MSU Artificial Insemination School, Mississippi State, MS
- April 5—Cattlemen's Exchange Feeder Calf Board Sale, Winona, MS
- April 8—Beef Cattle Boot Camp, Prairie, MS
- April 15—Beef Cattle Boot Camp, Poplarville, MS

Inside this issue:

Animal Welfare in Cattle Production

The most recent NAHMS cow-calf survey shows that BQA participation and certification rates are highest in the Southeastern U.S.

"…Beef producers have long recognized sound animal husbandry practices are critical for the well-being of cattle, individual animal health and herd productivity."

Animal Well-Being

The more than 800,000 U.S. beef producers are committed to caring for their herds and producing safe, wholesome beef for consumers around the world. Several factors contribute to animal well-being including food, water, bone and muscle strength, immunity to illness, as well as overall behavior and health.

- Beef producers have long recognized sound animal husbandry practices – based on research and decades of practical experience – are critical for the well-being of cattle, individual animal health and herd productivity.

Beef Quality Assurance Program

The Beef Quality Assurance (BQA) program was initiated in 1987 to provide cattle producers with the tools and training necessary to assure animal health and well-being as well as provide a safe, quality product. These tools are the result of years of scientific research and practical experience and are continually updated to provide the latest in animal management information and technology. BQA includes guidelines on proper administration of animal health products, best management practices and animal handling recommendations and influences the management practices of more than 90 percent of cattle.

Producer Code for Cattle Care

The "Producer Code for Cattle Care," first developed in 1996, represents a comprehensive set of sound production practices, which includes the following recommendations:

- Provide adequate food, water and care to protect cattle health and well-being.
- Provide disease prevention practices to protect herd health.
- Provide facilities that allow safe and humane movement and/or restraint of livestock.
- Provide personnel with training to properly handle and care for cattle.

Industry Care and Handling Guidelines

In 2003, the beef industry expanded the code into best practices. Developed through the interaction of animal health and well-being experts and cattle producer leaders, the "Cattle Industry's Guidelines for the Care and Handling of Cattle" serve as a set of best practices for every aspect of cattle production and offer producers a self-evaluation checklist to help improve their production.

Scientific Guidance on Animal Welfare Practices

Animal welfare guidelines, standards and audits are developed with scientific guidance from veterinarians, animal scientists, agricultural engineers and animal well-being experts.

- Temple Grandin of Colorado State University, worked closely with beef packing plants to develop best practices for proper handling practices. Dr. Grandin also taught facility managers how to conduct regular internal audits of plant practices. The American Meat Institute, which represents packing plants, reports that more than 90 percent of its members administer these self audits.
- The Agricultural Research Service conducts scientific research into animal well-being through the Animal Well-Being and Stress Control System implemented in 1994 (http://www.ars.usda.gov/research/programs/programs.htm?NP_CODE=105).

Humane Handling Throughout the Production Process

Beef producers work with every segment in the production chain to ensure proper animal care continues after cattle leave the farm or ranch. For example, the educational "Focal Point" DVD encourages livestock market owners and operators to apply BQA principals in their facilities. More than 1,200 auction market operators received the DVD, which demonstrates best practices for facility design and handling techniques. Cattle transporters play a critical role in the health and welfare of cattle by delivering cattle safely to their destination. BQA's Master Cattle Transporter Training (TBQA) program ensures proper cattle handling, loading and unloading of cattle, management of weak or injured cattle and transpor-

Cattle Welfare (Cont.)

tation of cattle during hot or cold weather. The meat packing process has evolved over the years, based on the latest scientific research, to ensure both humane animal treatment and food safety. The Humane Slaughter Act of 1958 dictates strict animal handling and slaughtering standards for packing plants. Those standards are monitored by thousands of federal meat inspectors nationwide and include:

- All animals must have access to water. Those kept overnight must have plenty of room to lie down, and animals kept longer than 24 hours must also have access to feed.
- Handling and moving cattle through chutes and pens must not cause stress.
- Livestock must be rendered insensible to pain prior to slaughter.

Animal Welfare Resources

There are a variety of resources that help producers make informed animal health decisions.

- The National Animal Health Monitoring System (NAHMS) tracks industry trends, identifies opportunities for improvement and detects emerging problems. NAHMS information about animal health and welfare is available to beef producers through the Center for Animal Health Monitoring (http://www.aphis.usda.gov/vs/ceah/ncahs/index.htm).
- The Department of Transportation (DOT) works to ensure proper care when transporting animals. DOT regulations require that animals confined for 28 consecutive hours be unloaded in a humane way and given at least five consecutive hours of rest with access to feed and water.
- The USDA National Agricultural Library hosts an Animal Welfare Information Center online (http://awic.nal.usda.gov). It contains an extensive information covering all aspects of beef cattle care, husbandry, health, and welfare, as well as a list of Web sites.

Source: www.beefboard.org
Funded by The Beef Checkoff

"…A variety of government and industry resources are available to help producers make informed animal health decisions."

Animal Care Trainings Online

The Beef Cattle Institute offers a wide variety of online animal care trainings. Beef cattle trainings include the following:

- Animal Abuse Avoidance Training - 2 modules
- Calving Management - 1 module
- Animal Handling in Livestock Auction Markets: Employees - 5 modules
- Animal Handling in Livestock Auction Markets: Owners and Managers - 8 modules
- LMA Beginning the Discussion: Site License - 1 module
- Non Ambulatory Cattle Management Training - 3 modules
- Routine Cattle Surgery Techniques - 2 modules

Equine and dairy cattle trainings are also available.

Go to ***http://www.animalcaretraining.org***
Click on 'Beef'

The site allows you to complete the modules within each package at any time. There is no time limit for you to complete all the modules. You can monitor your progress at any time after you have registered and logged into the system. You will see a link to print your certificate after completing all the modules within a package for which you have enrolled. There are some steps that you will need to take in order to complete the training packages:

- Register as a participant.
- Pay for the selected package(s).
- Watch the training modules and answer the related questions.
- Upon completion, print your transcript and / or the certificate.

The Beef Cattle Institute hosts the International Symposium on Beef Cattle Welfare
http://isbcw.beefcattleinstitute.org/

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Send questions or comments to Jane Parish, Extension Beef Cattle Specialist, Mississippi State University Extension Service

Jane Parish

Visit MBCIA online at http://msucares.com/livestock/beef/mbcia/

MBCIA Membership Application

Name:_____

Address:_____

City:_____

County:_____ State:_____ Zip:_____

Phone:_____ Email:_____

(Check one) Seedstock:____ Commercial:____

Cattle breed(s):_____

Completed applications and $5 annual dues or $100 lifetime dues payable to Mississippi BCIA should be mailed to:

Mississippi Beef Cattle Improvement Association
Jane Parish, Extension Beef Cattle Specialist
Box 9815, Mississippi State, MS 39762

Reproductive Tract Prolapses

There are 3 basic types of reproductive tract prolapses:
- Vaginal prolapse
- Cervical prolapse
- Uterine prolapse

Vaginal and Cervical Prolapses

- Usually occur prepartum (before calving) during the last half of pregnancy; occasionally occur postpartum (after calving).
- Usually occur in cows; occasionally occur in heifers.
- Vaginal and cervical prolapses are classified as follows:
  - 1st degree—intermittent protrusion of the floor of the vagina. This type of prolapse occurs when the cow is lying down, and it corrects itself when the cow stands up.
  - 2nd degree—continuous protrusion of the vagina.
  - 3rd degree—continuous protrusion of the vagina and cervix (cervical prolapse).
  - 4th degree—a 2nd or 3rd degree prolapse that has been prolapsed so long the tissue is becoming necrotic (dead).
- *Vaginal and cervical prolapses reoccur and are heritable*. Therefore, it is probably best to have your veterinarian temporarily fix the prolapse with the intent of eventually culling the cow and her heifer offspring.

Uterine Prolapse

- EMERGENCY! Cows with a uterine prolapse will die without prompt medical attention.
- Contact your veterinarian immediately.
- Do not overly stress a cow with a uterine prolapse, and do not attempt to move her very far. A cow with a prolapsed uterus is often in shock and at great risk for fatal hemorrhaging.
- Always occurs postpartum.
- It is best to treat the cow on the farm if possible. If transport is necessary, be extremely cautious.
- If the cow survives treatment, she will likely develop a temporary uterine infection and be slower to breed back. She is not at any greater risk for uterine prolapse in subsequent years.
- This is not a heritable condition, and it is not likely to reoccur. Therefore, there is no need to cull the cow as long as she breeds back.

Differentiating Between Vaginal/Cervical and Uterine Prolapses

- If a reproductive tract prolapse occurs prepartum, it is a vaginal/cervical prolapse.
- If a reproductive tract prolapse occurs postpartum, it can either be a vaginal/cervical prolapse or a uterine prolapse, but it is most likely a uterine prolapse.
- If carnucles are present on the prolapsed tissue, the cow has a uterine prolapse. The carnucles are darker than the surrounding tissue, circular to oval in shape, and approximately 2 to 4 inches in diameter.

Source: ANR-1323. Alabama Cooperative Extension System.