

Making the Numbers Work



Scan Data and genomic testing help EPD accuracy in young animals.

by Bridget Beran

There are several ways to improve the accuracy of an animal's expected progeny differences (EPDs), but two of the most widely used methods are scan data and the 50K genomic test. Scan data collected via ultrasound is a proxy for collecting carcass data such as marbling, external fat and ribeye area on live animals and is collected at 301 to 530 days of age.

"If everyone collected genomic data and not scan data we would not do a very good job of predicting carcass traits. From an industry perspective, we need a balance of genomic and scan data."

—Dorian Garrick

"The value of ultrasound data toward improving the accuracy of the actual carcass EPDs is a function of the genetic correlation between the traits and the amount of data recorded on related animals," says Larry Kuehn, research geneticist for the U.S. Meat Animal Research Center.

"The availability of ultrasound scanning has revolutionized our ability to estimate the genetic merit of carcass traits in seedstock animals for over 15 years."

In recent years, many breed associations, including the American Hereford Association (AHA), have started doing tests on a panel that evaluates thousands of markers at the same time.

"The AHA released its first Genomic-Enhanced EPD (GE-EPD) in the fall of 2012, and that prediction panel was trained on nearly 1,500 animals and utilized a 50K," says Jack Ward, AHA chief operating officer and director of breed improvement. The AHA previously used a high density (HD) 77K panel, known as the GeneSeek Genetic Profiler-High Definition (GGP-HD), but recently recalibrated to release a new prediction panel to work across the Pan-American Cattle Evaluation (PACE) countries. The new low-density 30K panel is offered to breeders for \$35 and a GE-EPD panel is available for \$55.

One major benefit of genomic testing is that it can be done early in life. From one small DNA sample, such as a hair follicle, Hereford breeders can test a wide

variety of traits (see "Hereford DNA Testing Fees"). According to Matthew Spangler, University of Nebraska associate professor and Extension beef genetics specialist, researchers are also making efforts to collect genomic data before birth.

"While genotyping does cost money, marker testing can significantly improve the accuracy of EPDs by evaluating if the animal inherited 'good' or 'poor' versions of the markers from parents even before any phenotypic data has been collected on an animal," Kuehn adds. "While progeny tests will still improve accuracy beyond that achieved by marker tests, an early indication of genetic merit can help breeders choose which animals are worth evaluating for breeding stock in their herds."

Working together

According to Dorian Garrick, Iowa State University Lush chair in animal breeding and genetics and National Beef Cattle Consortium executive director, the GE-EPD test has the advantage when it comes to adding accuracy to traits across the board. Due to the large

amount of markers evaluated, DNA testing provides information to calculate all EPDs, while scan data can only contribute to carcass EPDs.

While scan data will only help improve the accuracy of carcass traits, its value should not be discounted. "If everyone collected genomic data and not scan data we would not do a very good job of predicting carcass traits," Garrick explains. "From an industry perspective, we need a balance of genomic and scan data."

Scan data and the GE-EPD panel are both included as sources for EPD data. According to Spangler, EPDs are, and have been, the best tools to make a genetic change within a breed or herd. The pairing of both scan data and the GE-EPD is invaluable for maintaining prediction accuracy and for further research and development within the breed.

"The development and continued refinement of genomic tools relies on having phenotypic records measure and recorded with the AHA," Spangler says. "So if producers discontinue weighing and scanning animals, the long-term viability of genomics will suffer."

For genomic tests like the GE-EPD panel, a large number of animals with genotypes and carcass data are required to develop accurate predictions. Especially for large national cattle evaluations, the more data the program has, the more accurate genomic testing becomes.

"Either marker tests or ultrasound measures will contribute to additional accuracy in carcass EPDs," Kuehn says, adding that including an ultrasound measurement with an animal that was genotyped early in life will result in additional accuracy. "Collection of actual carcass measurements, ultrasound



measurements and genotypes on an ongoing basis will further improve the robustness of these marker tests.”

While both forms of data collection can improve EPD accuracy, their value isn't as high for established herd sires or cattle with a large number of progeny.

“If an EPD has been accurately determined, such as from a progeny test with hundreds of offspring, then additional information cannot make it more accurate,” Garrick says.

However, for young calves with only their parental averages, these tests can vastly improve the accuracy of a calf's EPDs. Spangler adds that if a bull has a genomic test but never has progeny with ultrasound or carcass data recorded, this accuracy will not reach high levels.

“While it is understandable that producers may not want to allocate or dedicate costs over fewer technologies, it is important to note that the need for actual, measured, phenotypic data is never going to go away,” Kuehn says. “Neither scan data nor marker panels completely replace one another.”

Heritability

But the real question is how will these tests translate into an animal's progeny? According to Spangler, carcass traits are moderately heritable.

Ultrasound data currently has a high genetic correlation with actual carcass data that is better than the GE-EPD. However, carcass data markers detected by the GE-EPD panel are almost completely heritable. While the only absolute way to collect 100% accurate carcass data is by weighing and harvesting the animal's actual progeny, both scan data and the GE-EPD can help producers to make better decisions for the long-term quality of their herds.

“Both scan data and genomic marker panels are tools to help producers decide, at a relatively young age, which animals merit further progeny testing,” Kuehn says.

However, the field of genomics is ever evolving, and each new change equals better and more accurate predictions for producers. Heritability and genomic predictions are also on their way to improvement, according to Garrick.

“We have just developed improved predictions that will become available later in the year that are considerably better than the older 50K predictions,” Garrick explains.

While changes may come with new test developments, currently scan data and the GE-EPD panel are the best tools producers have for improving their EPDs.

Hereford DNA testing fees

GeneSeek Inc., the official DNA lab for the American Hereford Association (AHA), provides these tests for members. Please note the process to request DNA kits has not changed — Hereford breeders must continue to request a kit from AHA. Also the new LD panel has not shortened the testing time. Please continue to allow enough time to get data back for a production sale if you have a deadline.

Basic test — \$35 (no bulk rate available) includes profile, parentage, abnormalities

GE-EPD test — \$55 (no bulk rate available) includes profile, parentage (needs to be requested), abnormalities and GE-EPD

Stand-alone horned/polled (H/P) test — \$45

Full package — \$85 includes profile, parentage (needs to be requested), abnormalities, GE-EPD, H/P (needs to be requested) **HW**

“The genomic component is just another step in the evolution of performance tools that will allow seedstock breeders and their customers to identify genetics earlier in life and, in turn, to make more informed decisions and quicker generational turns,” Ward says.

Though either test will be effective in increasing EPD accuracy, the pairing of both tests not only will help the producer with his individual decisions for an animal, but also will help develop more accurate testing across the board for Herefords.

“It is important to understand that

these are two sources of information, that when used in EPDs, are both beneficial,” Spangler says. **HW**

Editor's Note: For more information, see “Genomics and the Rancher” in the August 2012 Hereford World and “DNA Testing Procedures,” posted at Hereford.org “Education Center” under the Herd Management Tools tab.