BY THE NUMBERS

by Kelli Retallick-Riley and André Garcia, Angus Genetics Inc.

A World Without Carcass Ultrasound Data

The elimination of carcass ultrasound data recording would mean less accurate EPDs and slowed genetic progress for meat quality traits.

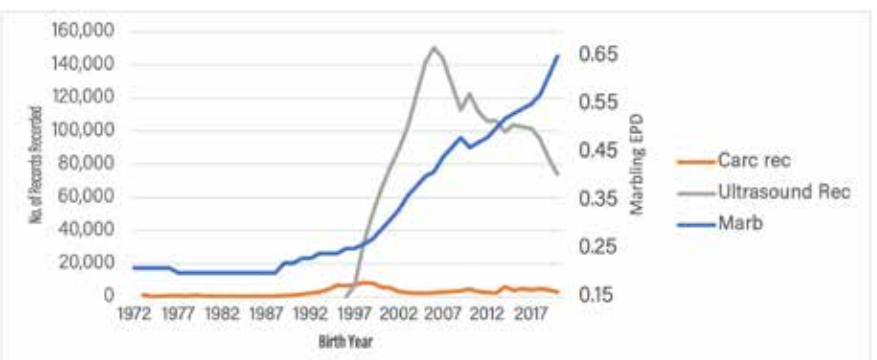
The American Angus Association and Angus breeders have a long-honored history with the use of carcass ultrasound data to drive the genetic improvement in meat quality traits. In 1998, the collection of real-time ultrasound images began through a research agreement with Iowa State University and the Association. Through this project, nearly 100,000 carcass ultrasound scans on yearling bulls, heifers and steers were collected.

In 2001, a set of carcass ultrasound expected progeny differences (EPDs) including percent intramuscular fat (%IMF), ribeye area, fat thickness, rump fat and percent retail product were released. These EPDs were in addition to the carcass EPDs already being published. Carcass ultrasound EPDs allowed members who did not have access to real kill data to begin collecting carcass quality attributes on their breeding stock. It enabled earlier prediction for traits affecting meat quality and opened the door for the inclusion of thousands of animals for meat quality selection.

The Association reported both EPD sets until 2007. At this time, Association staff took the step to combine all records into a single evaluation resulting in one set of meat quality EPDs. Now, these EPDs, including carcass weight (CW), ribeye area (RE), fat thickness (FAT) and marbling (MARB), are still published in Angus's weekly genetic evaluation. Over the decades, Angus members and users of registered Angus genetics have seen considerable genetic progress. Figure 1 depicts the genetic trend for marbling EPD and subsequent phenotypes. Carcass (kill) data recording has been significant, with nearly 129,000 carcass records now being included in the weekly genetic evaluation. Yet the number of carcass ultrasound records collected has been far greater. Since the mid-1990s, Angus breeders have submitted approximately 2.5 million %IMF records, which supported the rapid progress in carcass quality taking place during this time.

With the advent of genomics, a question often asked by breeders surrounds the need to continue to collect carcass ultrasound records, or if the data can be replaced by the genomics. The AGI team was keen to gain more insight on what a world without carcass ultrasound data would look like.

Figure 1: ***Genetic Trend for Marbling EPD on the secondary axis and number of carcass and ultrasound records submitted over time.***



A world without performance data

To do this, the team turned back time and eliminated carcass ultrasound records submitted from 2010 to present day. This eliminated more than 4 million records from the carcass evaluation. The truncated evaluation was performed side-by-side with Angus's weekly genetic evaluation, which includes the full data set, to determine how the missing data affected EPD accuracy and genetic trend. Analyses focused on two groups, "Proven Sires" and

Continued on page 46

By the Numbers *continued from page 45*

"Young Sires". Proven Sires (n=174) were described as males born 2010 or later who were included in the Top 500 most recorded sires for carcass ultrasound progeny. They represented approximately 211,000 carcass ultrasounds and approximately 4,800 carcass progeny records. Young Sires (n=4,479) were genotyped and born after 2017. This group represented 176 carcass progeny records in total, and had no individual ultrasound measurements or progeny data included in the analysis.

The two groups were assessed for change in EPD accuracy, and the entire population was evaluated for changes in genetic trend. If both were negatively affected, then the question of "Is genomic testing enough?" would have a clearer answer.

Figures 2 and 3 depict the average differences in carcass EPD accuracy with and without the removal of carcass ultrasound information. As one would expect, EPD accuracy among both groups decreased with ultrasound phenotypes removed. Proven Sires experienced an average EPD accuracy decrease of 14% across all traits. Young Sires saw an even larger average accuracy decrease of 17%, dropping average EPD accuracies below 0.35 for all traits.

In a world where Angus breeders strive to make progress every day, lower EPD accuracies have negative consequences. One is slower genetic improvement. This slowed improvement is depicted in Figure 4. It outlines the genetic trend of marbling EPD by birth year. As records are removed, the gap between the full and truncated trends widens. Without ultrasound informing the evaluation, the marbling trend slowed. A similar trend was seen across all carcass traits.

Figure 2: ***Average carcass EPD accuracies on Proven sires (n=174) with and without the full set of carcass ultrasound records submitted after 2010.***

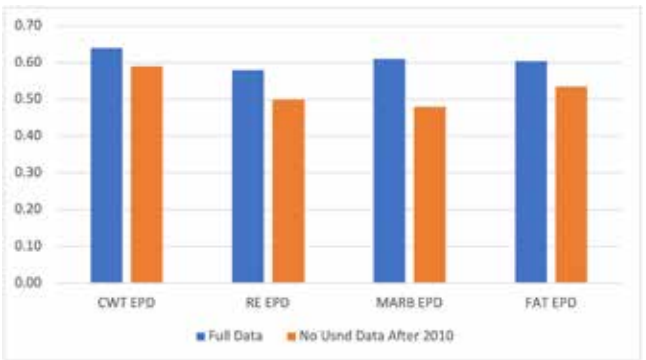
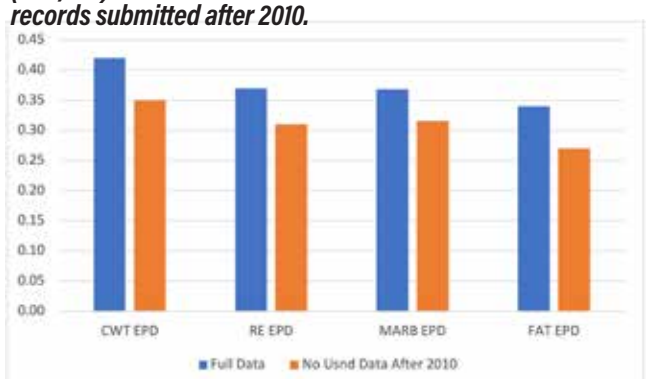


Figure 3: ***Average carcass EPD accuracies on Young Sires (n=4,479) with and without the full set of carcass ultrasound records submitted after 2010.***



It's important

Elimination of the last 10 years of data has effects on both EPD accuracy and genetic progress, reconfirming beliefs that carcass ultrasound data is important. It also promotes the necessity to continue to collect this information to facilitate the most genetic change possible. While this analysis is solely focused on carcass ultrasound data, a similar investigation could be done with other traits. In those instances, there is no doubt results like these would be witnessed.

Remember, genomic testing is like a credit card, and actual phenotypes (performance data) are like cash. Members can pay for goods up front with a credit card, but at the end of the month, they must pay their bill off with cash. If they don't, the credit card loses its value. The same is true with the genetic evaluation. Members can pay for up front EPD accuracy with genomics, but if they don't pay off their genetic evaluation bill with phenotypes, genomics lose their value. Worse yet, so does the entire genetic evaluation. AJ

Editor's note: For questions regarding updates to AHIR®, please contact the Association at (816) 383-5100 or by emailing kretallick@angus.org.

Figure 4: ***Marbling EPD trend by birth year with and without the full set of carcass ultrasound phenotypic records.***