BY THE NUMBERS

by Stephen Miller, Angus Genetics Inc.

Do young cows live up to their EPD expectations?

Research explains the relationship between genetic age and calf weaning weight.

With positive genetic trends in Angus for both growth and maternal milk, it can be expected on average, younger cows will have an expected progeny difference (EPD) profile for heavier calves than older cows. Some breeders are questioning if this difference is justified. Are these young genetics really that much better than the older genetics?

To investigate this question, the Angus Genetics Inc. (AGI) team dug into the Angus database to see what the data would reveal.

First, herds were identified where old and young genetics were compared in the same contemporary groups (CG) where they experienced the same management and environment. Second, genetic age was considered rather than chronological age. Where chronological age is measured in years, months and days, based on an animal's birth date, genetic age was determined as the average birth year of an animal's parents.

For example, consider the following two cows both born in 2017, who weaned calves in the same contemporary group. Cow A has a sire born in 1986 and a dam born in 2003 for a "genetic birth year" of 1995 (average of parents' birth year). Cow B has a sire born in 2015 and a dam born in 2015 for a "genetic birth year" of 2015. These two cows are 20 years apart in genetic age but competing head to head, weaning a calf in the same contemporary group.

The discovery

To draw a conclusive relationship between genetic age and calf weaning weight, we needed to find a lot of animals that fit this scenario. In total, 787 CG (minimum of 10 calves in original group) were found where cows had a minimum difference in genetic age of 20 years and natural calves born from 2015-2019.

Differences between the oldest and youngest cow in each group were examined, including genetic age (minimum of 20 years by design), weaning weight direct (WW) EPD, maternal milk (Milk) EPD and the adjusted 205-day weaning weight of their calves. Total maternal value for these cows was also determined. Total maternal is the WW EPD + (2 x Milk EPD), which represents the expected difference in weight of weaned calf from a female considering both her contribution to the calf's growth genetics as well as her milk influence on that calf's weaning weight.

Table 1 outlines the average difference between the genetically oldest and youngest cow in each group, with the average difference in genetic age being 24.7 years. When the genetically oldest cows were compared to the genetically youngest within these 787 groups, the genetically younger cows had a higher average WW EPD (18.5 pounds [lb.]) and Milk EPD (1.6 lb.), which translated into a higher Total Maternal value (21.7 lb.). The adjusted weaning weight of the calves from the genetically younger dams was also heavier on average (17.8 lb.).

So, the genetically younger females are weaning bigger calves and they have higher EPD performance potential, but are these 17.8 and 21.7 lb. differences really significant? Statistically, no, because the differences are small compared to the variation that is seen within the data.

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Table 1: ***Calculating genetic birth year for two females***

	Sire Birth Year	Dam Birth Year	Genetic Birth Year (Average of Parents' Birth Years)
Cow A	1986	2003	(1986 +2015)/2 = 1995
Cow B	2015	2015	(2015 + 2015)/2 = 2015

Genetic age difference 20 years

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Table 2 includes both the standard deviation as well as the minimum and maximum values for each trait. The standard deviation can be used to understand the range in the data, considering 95% of the observations will fall within +/- 2 standard deviations of the mean. Take adjusted weaning weight as an example. With a mean difference of 17.8 lb. and a standard deviation of 81.7 lb., 95% of the 787 groups can be expected to fall between -146 lb. (17.8 – (2 x 81.7)) and +181 lb.

In some groups this is a positive relationship, where a higher genetic birth year (genetically younger) is related to heavier calves, and in some cases it is the opposite, where the genetically older cows are weaning heavier calves. Given all the factors and circumstances from herd to herd, this discrepancy can be expected. It is no wonder some breeders notice their older genetics are outperforming the younger genetics, because this is what is happening in some herds.

However, the EPD always reflects what is happening on average and in the herds used in this analysis, the genetically younger cows have an EPD profile that indicates they will wean calves that average 21.7 lb. heavier. Given the variability in the data, the average increase in adjusted weights of their calves (17.8 lb.) aligns with the expected difference projected by EPDs.

These results show just how much herd to herd variation exists and illustrates how individual producers who only see the data from their herd will have a hard time drawing conclusive results from their observations. However, though not statistically significant, an overall analysis of these 787 contemporary groups reveals that the younger cows do have higher EPD performance potential and wean more pounds of calf, on average.

Feedback from producers is welcomed and warranted in order for the Association and AGI to actively pursue proof of concept analyses and to understand if best practices are still being employed. Ensuring that the EPD trends from the weekly Angus evaluation are as accurate as possible is important for AGI, and will remain an active part of the research program as new methods are evaluated and existing procedures are reviewed. AJ

Table 2: ***Summary+ of differences between the genetically* oldest and youngest cows weaning a calf born from 2015-2019 in the same contemporary group.***

Difference metric	Mean	Standard Deviation	Min.	Max.
Dam genetic age	24.7	3.5	21	40
Dam Weaning Weight EPD	18.5	20.5	-73	100
Dam Maternal Milk EPD	1.6	11.5	-49	38
Dam Total Maternal^	21.7	32.6	-129	130
Calf Adjusted Weaning Weight	17.8	81.7	-227	326

+ average over 787 contemporary groups
*Genetic birth year was determined as average of parents' birth years
^Total Maternal = Dam Weaning Weight EPD + (2 x Dam Maternal Milk EPD)

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Editor's note: If you have questions, please contact the AGI team at 816-383-5100.