



Genetics Behind the Fed Steer Shootout

Genomics added another level of accuracy when predicting fed cattle performance.

by **Jamie T. Courter, Ph.D.**

For the past six years, the National Junior Hereford Association (NJHA) Fed Steer Shootout has provided NJHA members an opportunity to learn about the cattle feeding and packing industries through a comprehensive educational contest. Participants place their cattle on feed, receive real-world performance data and also learn about these sectors via online educational opportunities and an in-depth field day.

In addition to phenotypic data, NEOGEN partners with the American Hereford Association (AHA) to provide genomic testing on all cattle participating in the contest. This year, we highlighted two different ways genomics impacted the genomic predictions of the purebred steers.

Parentage corrections

Estimates suggest 10% of all pedigrees within a genetic evaluation are misreported. This could be incorrect assignment of either the sire or dam. The pedigrees reported for the 94 purebred steers submitted for 2022 were no exception, as 11% of the reported pedigrees were corrected after genomic testing. But why is this so important?

Referring back to the September 2021 issue of *Hereford World*, we discussed how expected progeny differences (EPDs) were calculated for non-genomically tested progeny without phenotype records. When there is no additional information to differentiate cattle, those EPDs are reported back as simple parent averages, just like the bull calves

in Table 1. Therefore, when parentage is mistakenly reported, it directly impacts the accuracy of parent average EPDs, as the correct parents are not being used in the calculation.

While simple parent verification is the first benefit of genomic testing, it certainly isn't the last.

Genomic-enhanced expected progeny differences

The addition of DNA information into a pedigree-based EPD results in genomic-enhanced expected progeny differences (GE-EPDs). This adds a plethora of information to the performance prediction resulting in increased accuracy of EPDs, especially for carcass traits with high heritability.

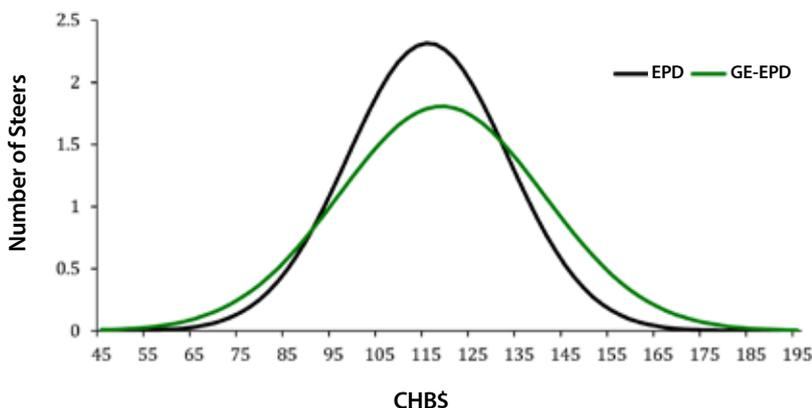
For this exercise, we looked at the change in the Certified Hereford Beef® (CHB\$) Index before and after the DNA samples were submitted for the Fed Steer Shootout entries.

The CHB\$ is an economic index that includes traits such as carcass weight, marbling, average daily gain, ribeye area and other traits that have a significant impact on the profitability of a carcass. Specifically, this index is also the key criteria for enrollment into the Hereford Advantage program, as those commercial feeder cattle must be sired by bulls in the top 50% of the breed for CHB\$.

Figure 1 shows the change in overall distribution of CHB\$ among the purebred steers. The black line represents the index values when based only on parent-average EPDs, which ranged from \$67 to \$162 and averaged \$115. The green line represents the distribution of values for the same animals when the indexes are powered by GE-EPDs. They ranged from \$68 to \$180, with an average of \$118.

The figure illustrates that the genomic information increased the accuracy of the EPDs within CHB\$ while also increasing the ‘spread’ among the steers in the contest, which allowed for better ranking among the cattle. The increased information allowed the evaluation to better differentiate, or pull apart, the predicted performance among the cattle, allowing producers to

Figure 1: Distribution of CHB\$ in the Fed Steer Shootout purebred steers before (EPD) and after (GE-EPD) genomic testing.



better identify the top and bottom performing cattle.

Finally, we grouped the Fed Steer Shootout steers based on whether their CHB\$ value ranked them in the upper 50% of the breed or the bottom 50% (Table 2). Individual

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CHB\$ values placed 62% of the steers in the upper half and 38% in the bottom half. GE-EPDs behind the index and the CHB\$ index itself, accurately predict the trend in phenotypic outcomes — a \$60.49 average per head difference for steers with CHB\$ values reflecting the top 50% of the breed.

The Fed Steer Shootout has been a wonderful opportunity for NJHA and NEOGEN to educate the next generation and highlight the value of genomics and the CHB\$ index designed by AHA. We at NEOGEN look forward to the continued partnership in the future. **HW**

Editor’s Note: Jamie T. Courter, Ph.D., is the bovine technical services manager for NEOGEN Genomics.

Table 1: Expected progeny differences for calving ease direct, birth weight and ribeye area for a sire and dam, along with six full sibling progeny resulting from said mating¹.

Animal	CED	BW	REA	AHA GE-EPDs
Sire	+2.3	+2.9	+0.67	Yes
Dam	-4.7	+5.5	+0.35	Yes
Heifer 1	-3.9	+5.8	+0.46	Yes
Heifer 2	-9.2	+8.1	+0.55	Yes
Heifer 3	-5.7	+7.4	+0.60	Yes
Bull 1	-1.3	+4.2	+0.51	No
Bull 2	-1.3	+4.2	+0.51	No
Bull 3	-1.3	+4.2	+0.51	No

¹Data reported are real EPDs and GE-EPDs for AHA, pulled July 9, 2021.

Table 2: Comparison of CHB\$ and carcass value of steers in the top 50% of the breed for CHB\$ to those in the bottom 50% of the breed

	Headcount GE-EPDs	CHB\$ GE-EPDs	CHB\$ EPDs	Carcass Value Avg. - \$/hd.
Top 50% \$CHB Avg.	58	132	122	\$1,883.79
Bottom 50% \$CHB Avg.	36	97	105	\$1,823.30
Difference		\$35	\$17	\$60.49