



Selection Indexes Increase Profitably

Rowan explains how using selection indexes correctly can increase breeder profitability.

“Breeding goals should be realistic, consistent but flexible, data-driven and profitable,” Troy Rowan, assistant professor of beef cattle genomics at the University of Tennessee, said. He explained the opportunity to increase profitability by using economic selection indexes during his presentation at the 2021 Beef Improvement Federation (BIF) Symposium.

Multi-trait selection is almost always necessary and multiple traits must work together to produce a profitable herd, according to Rowan. He explained economic selection indexes are the most effective tool for accurate multi-trait selection. Selection indexes allow breeders to select for aggregate economic merit by attaching an economic value to each expected progeny difference (EPD) trait and accounting for genetic correlations. The resulting indexes deliver a single value that directly quantifies profit differences between animals.

“Our breeding goals first and foremost need to be grounded in reality and aware of our production environment,” Rowan explained. “Making sure the cattle will work in your production environment with your level of management is above all the most important thing when it comes to realistic breeding goals.”

Hereford selection indexes

The following are economic selection indexes offered by the American Hereford Association (AHA).

Baldy Maternal Index (BMIS) — This maternally focused index is based on a production system that uses Hereford-Angus crossbred cows. Progeny of these cows are directed toward Certified Hereford Beef® (CHB). This index places significant weight on the Sustained Cow Fertility (SCF) EPD, which predicts fertility and longevity of females. Slight, positive weight is placed on the Weaning Weight (WW), Mature Cow Weight (MCW) and Maternal Milk (MM) EPDs, which account for enough growth but ensures

females do not increase inputs. There is some negative emphasis on the Dry Matter Intake (DMI) EPD. The Carcass Weight (CW) EPD is weighted positively, which is anticipated to provide profitability from finishing non-replacement females and castrated males. Marbling (MARB) and Rib-eye Area (REA) EPDs are also positively weighted to keep the harvested progeny successful for *Certified Hereford Beef*. This index is geared to identify Hereford bulls that will be profitable when used in a rotational cross with mature commercial Angus cows.

Brahman Influence Index (BIIS) — The BIIS is a maternally focused index based on a production system that uses Brahman-Hereford crossbred cows. Progeny of these cows are directed toward a commodity beef market since *Certified Hereford Beef* does not accept Brahman-influenced cattle. This index has significant weight on SCF. Like the BMIS index, there is a slightly positive weight on WW, MCW and MM, which account for growth while limiting increased cow inputs. There is some negative emphasis on DMI, but a positive weighting on CW, which is anticipated to provide profitability in finishing non-replacement females and



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castrated males. MARB and REA EPDs are also positively weighted to keep harvested progeny successful for a variety of commodity-based programs. This index targets producers that use Hereford bulls on Brahman-influenced cows.

Certified Hereford Beef Index (CHBS) — CHBS is a terminal sire index built on a production system where Hereford bulls are mated to mature commercial Angus cows, and all progeny will be targeted for Certified Hereford Beef after the finishing phase. This index has significant weight on CW and MARB to ensure profit on the rail. Gain is weighted positively, while DMI is weighted negatively to ensure efficient pounds of growth

in the finishing phase. In addition, there is a positive weighting for REA and the Rib Fat (FAT) EPD is weighted negatively to maintain desirable yield grades. This is the only AHA index that places no emphasis on fertility. It assumes that no replacement heifers will be retained. **HW**

Editor's note: To watch Rowan's full presentation, visit https://youtu.be/FDk5oNoZ_Ys. For more information about this year's Symposium and the Beef Improvement Federation, including additional presentations and award winners, visit BIFSymposium.com.

For more about Hereford EPDs and selection indexes, go to Hereford.org/genetics/breed-improvement.

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Beef Grand Challenge

USDA project evaluates breed-specific environmental interactions.

The USDA's Agricultural Research Service (ARS) is in the midst of a novel, comprehensive program to study and increase efficiency and adaptability in beef cattle. More specifically, the Beef Grand Challenge embodies large collaborative projects designed to meet multiple goals to improve production efficiency, reduce environmental impact, encourage sustainable production and optimize whole agricultural systems through integrated research programs.

Larry Kuehn, research geneticist at the U.S. Meat Animal Research Center (USMARC), provided an overview during the 2021 Beef Improvement Federation (BIF) Symposium.

Project overview

The Beef Grand Challenge is a highly integrated project, involving food animal production, human nutrition, food safety, water availability watershed management, and grass, forage and rangeland agro-ecosystems. The main project is a stocker program to evaluate genotypes in multiple management and environment systems. The project focuses on the progeny of bulls from the four beef breeds with the most registered cattle (Angus, Hereford, Simmental and Charolais) as well as progeny from Brahman composite bulls (Brangus and Beefmaster). These cattle breeds are mated to the base cows from the USMARC Germplasm Evaluation Program (GPE) with the aim of having enough progeny from each breed at each of the five different ARS locations to examine potential differences and interactions between breed, environment and management.

"The purpose of the Grand Challenge Project is to have breeds of sires and large sire families evaluated at multiple locations and management systems while utilizing females mated to GPE bulls to achieve this goal," Kuehn said.

Data collection at every step

A standard set of production efficiency measurements are collected at each location, including monthly weights to estimate stocker gain and finishing gain, feed usage, costs and days on feed. Each location is attempting to keep stocker energy and protein consistent, and all locations target finishing the calves at 1,350 lb. Carcass records are collected for hot carcass weight, marbling, yield, tenderness, color stability and dark cutting. Additional measurements will be collected on a subset of cattle including rumen fluid to look at rumen metagenome differences, cortisol to



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estimate stress, fatty acid profiles of the beef to emphasize the positive health benefits of beef, and screening for E. coli, Salmonella and antimicrobial resistant pathogens in fecal and pen surface samples to see if the different management or environments influence the shedding of different pathogens from these calves. Environmental impacts on the range also will be assessed at certain locations by measuring carbon sequestration through soil analysis and monitoring changes in the forage production, quality and plant composition.

"The key thing here is the systems are complicated with the interaction between the soil, forage, the animals themselves, and the end product of steaks that people are eventually eating," Kuehn explained.

So far, the Beef Grand Challenge has shipped three years of spring and fall calves to their respective locations, and the fall cows are bred with their fourth set of calves.

"We want to increase the use of these integrated systems and management to increase research utility and efficiency in the overall U.S. cow herd," Kuehn concluded. **HW**

Editor's note: To watch the full presentation, visit <https://youtu.be/g07ce6MRuYs>. For more information about this year's Symposium and the Beef Improvement Federation, including additional presentations and award winners, visit BIFSymposium.com.