

Genetic Melting Pot

The National Reference Sire Program is as powerful as it is unique.

by *Wes Ishmael*

Like the engine powering your pickup, the American Hereford Association (AHA) National Reference Sire Program (NRSP) is essential for driving forward and easily taken for granted.

Since its inception in 1999 the NRSP — industry-unique in size and scope — has enabled the Hereford breed to identify the genetic merit of young sires faster and more accurately. The program has been the cornerstone for developing new selection tools, validating the efficacy of genomic tools and more.

“The accuracy of the predictions is so much more powerful when you have multiple sire progeny observations in large contemporary groups in a true progeny test like this one, compared to one-time snapshots collected in a performance bull test,” explains Shane Bedwell, AHA director of breed improvement and chief operating officer.

Contemporary power

Contemporary groups are the foundation of robust, accurate genetic evaluation.

By way of common ground, according to the Beef Improvement Federation: “A contemporary group is a set of same-sex calves that were born within a relatively short window of time and have been managed the same since birth. Each calf in the group has received the same opportunity to express its genetic merit for traits of interest.”

Generally speaking, genetic prediction accuracy for each trait evaluated increases with the size of the contemporary group. In overly simple terms, it’s all about competition and comparison. If you were chosen for the 10-player varsity basketball squad from a pool of 11 candidates, good for you. If you emerged to the top 10 from a pool of 100, odds are more

likely that you’re superior to a broader swath of the population.

In the case of the foundation NRSP test herd at Olsen Ranches, Harrisburg, Neb., progeny from multiple sires randomly mated to cows comprise contemporary groups of 300 head or so. That’s competition.

NRSP in a nutshell

“With the Olsen herd, we have pedigree data going back to the first year. We have pedigree-identified the cow herd through multiple generations, and we use between 15 to 17 different sires each year,” Bedwell explains.

“NRSP sires are randomly mated to these cows and heifers. Cows and heifers are AI-bred one time to test sires. We end up with progeny groups of 30-50 head. All of the progeny information collected flows directly into the sire’s EPD analysis.”

All NRSP steer progeny are retained through the feedlot, so data is collected from birth to harvest.

“We’ve also collected feed intake data since 2010,” Bedwell says. “In 2022, we began collecting methane and nitrogen excretion data. In 2023, we’ll begin collecting water intake data.”

Typically, breeders nominate 30 bulls or more to the NRSP each year. Test herds select which bulls they want to utilize and then refine their choices with input from the AHA director of breed improvement. Keep in mind, test herds are progressive commercial cow-calf operations that agree to test bulls. The risk associated with genetic selection lies solely with them. In other words, they choose the bulls they believe will continue to move their herds in a desired direction.

In the case of the Olsen herd, Douglas Olsen says they look for bulls that will help their cows suit the

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— Douglas Olsen

environment more effectively. He and his father, Art, and their families own and manage the operation.

“In western Nebraska we have limited feed resources, especially with a June-July calving season, breeding cows in August,” Douglas says. “To get cows rebred and producing a calf again the next year I think we have to be careful about how much extra growth or especially how much



Douglas Olsen (right), of Olsen Ranches, Harrisburg, Neb., works closely with Shane Bedwell (left), AHA director of breed improvement to analyze both genetics and evaluation techniques used in the National Reference Sire program.

milk some of those cows have. So, we’ve tried to optimize that by not necessarily maximizing milk.” Over time they have also selected to lower birth weights and increased calving ease.

Unending progress

The notion of NRSP started when the Olsens approached the AHA about identifying bulls to use in their commercial Hereford herd.

Since then, more than 300 bulls have been tested through NRSP. All data has flowed directly into the breed’s genetic evaluation since 1999. NRSP sires influence 7% of the more than the 2 million AHA performance pedigrees.

“Because of the randomization and how the cows are bred, and her heifers are bred, we end up with an awesome contemporary group structure, usually three really nice big contemporary groups of the steers,” Bedwell explains. “Breeders can identify yearling bulls of interest that have all the bells and whistles. The bull gets used at Olsens that summer, and then by the next year they have a calf crop on the ground. The following year, while the bull is still relatively young, they have harvest data and carcass data to build upon the accuracy values of the traits and to validate him.”

Added benefit comes with the fact that the Olsen test cow herd today is comprised solely

by females sired by NRSP bulls, as well as the fact that all the cows are enrolled in whole-herd reporting. “So, we’re getting cow weights, body condition scores, udder and teat information and the reproductive status of those cows each and every year. That data flows into the backside of the genetic evaluation,” Bedwell says.

“When your bull gets used in the National Reference Sire Program, it ties your herd into this population as well when you go back and use that bull in your herd. This linkage aspect has tremendous value because of the NRSP population’s depth and reach,” Bedwell explains. “Even if you don’t have a bull selected for the program, using semen from a bull that has



Art Olsen (driving) owns and manages Olsen Ranches with his son, Douglas, and their families.

been tested through the National Reference Sire Program links your herd to the program and helps you build more accuracy and proof for hard-to-measure traits.”

It’s impossible to overestimate the value of the NRSP and the Olsen’s ongoing involvement when it comes to the breed’s rapid genetic progress in key traits. Credit also goes to other NRSP test herds over time, including Amana Farms in Iowa, Mershon Cattle LLC in Missouri, Simplot in Idaho and Stahly Ranch in South Dakota.

“This subset of cattle has proven invaluable to the breed in terms of genetic progress and the directions we’ve been able to go, such as the inclusion of feed intake, measuring efficiency and conversion,” Bedwell says. “It has definitely leveraged us with an unmatched data library to continue making progress.”

Although there is no way to know for certain, Olsen Ranches is likely the largest beef sire progeny birth-to-harvest test herd in the world.

continued on page 68...



...Genetic Melting Pot continued from page 67

“We’re passionate about making the Hereford breed better. We’re passionate about the product we produce and feed to consumers in the United States and abroad. It’s just exciting,” Douglas says.

Conducting such an extensive bull progeny test providing so much power requires fearless commitment, sophisticated management and plenty of moxie.

“NRSP has been instrumental not only in finding genetics that we need to move forward with, but also some that might give us a little pause and say, ‘OK, what do we need to adapt to and what do we need to change?’” Bedwell explains.

NRSP’s structural design enables tackling new traits and technology as they come along.

AHA’s collaborative research project with Colorado State University’s AgNext program serves as an apt example. Systems installed at Olsen Ranches collect methane emissions on individual cattle, from which nitrogen excretion data is also collected. Methane and nitrous oxide are key greenhouse gases. The project is examining sire differences for their production and their heritability. Like dry matter intake and other expected progeny difference

(EPD) traits before them, the project could lead to a new selection tool.

NRSP is breeder driven

“None of this happens if members don’t nominate bulls. I don’t think we can take lightly how important it is for AHA members to be interested in the data and to nominate bulls. It takes everybody,” Douglas says.

He believes the primary reason to participate in the program boils down to proving and documenting the genetic merit of potential new herd sires.

“Where are you going to test your bulls against so many different genetics?” Douglas wonders. “A lot of times I call this herd the melting pot of the Hereford breed because where else are you going to see a Line 1 bull, a homozygous polled bull, a bull from the Southeast and a bull from the Northeast all mated randomly to the same set of cows?” **HW**

Editor’s note: Listen to more insights about the NRSP and its history in episode 20 of the 1881 podcast. Find details about nominating bulls at [Hereford.org/genetics/breed-improvement/NRSP](https://www.hereford.org/genetics/breed-improvement/NRSP).