



Star Search

Scientific DNA testing for cattle through GeneStar® suite of tests for tenderness, quality and feed efficiency offers opportunities for genetic progress.

by Kindra Gordon

Since being introduced in 2001, GeneStar® — the cattle industry's first commercial DNA-testing process for identifying genes related to specific beef cattle traits — is continuing to gain appeal among producers as an important tool in the genetic selection process. Proponents advocate that DNA testing offers producers a way to get information sooner and for less expense than progeny testing for specific traits.

"No set of markers is a 'good bull' or 'bad bull' test. They are [each] one more tool to help producers become more profitable," explains Calvin Gunter, director of corporate development for Bovigen LLC, the Louisiana-based company that offers the GeneStar products in the U.S.

Likewise, Bill Davis of Rollin' Rock Angus near Sidney, Mont., calls DNA testing "a tool that is evolving," and says, "I believe more

emphasis will be placed on these tests as we go along."

For several years Davis has tested a few individual cattle. Now, for the last two years, both Rollin' Rock and Hinman Angus have tested several females and the nearly 550 bulls they offer through their annual Performance Breeders' production sale.

Gaining appeal

Initially, GeneStar was a DNA-marker test for marbling. Today, it offers three available tests, including quality grade, tenderness and feed efficiency, the latter of which was made available in 2007.

The GeneStar DNA-testing process is possible through genomics research that has

identified genes that influence production traits. DNA tests can be conducted by using hair or blood samples from an animal to determine the presence or absence of those

genes. (For details about each specific test, see "Testing for traits.")

"The markers do account for a percentage of the trait that is expressed,"

Davis explains. He and Dave and Yvonne Hinman conduct all three tests on their animals. The process is done by submitting a tail hair follicle from each animal.

Test pricing starts at \$65 per animal for all three tests (parentage verification can be

CONTINUED ON PAGE 104



Testing for traits

Since being unveiled seven years ago, the GeneStar® tests have evolved to include more markers and new tests. For each gene marker that the animal has one copy of, the animal gets one star. Animals can be awarded two stars if they have two copies of each gene (i.e. homozygous).

Here's a glimpse at what information each test provides:

GeneStar Quality Grade is a DNA-marker panel test that identifies the presence of four major genes associated with quality grade and marbling. This panel test includes TG5, which was the first gene-marker test available to the beef industry. The third and fourth markers in this panel were released in February 2007.

Each of the four gene markers in this panel has been found to be highly associated with quality grade in multiple evaluations across multiple breeds of cattle. For example, a zero-star animal would be expected to make no improvement in the percentage of animals grading choice, compared to a four-star animal, which would dramatically increase the percentage of animals grading choice.

GeneStar Tenderness is a multi-marker single-trait test that identifies animals that are more likely to produce tender cuts of beef. It combines three markers from two different and independent genes, calpastatin and calpain, which are involved in the postmortem tenderization process of beef. Animals carrying the favorable forms of the genes have been found to significantly reduce the proportion of "tough" eating experiences.

The GeneStar Feed Efficiency test is designed to identify an animal's genetic ability to efficiently convert feed. The test consists of four markers that together reportedly identify as much as a 15% difference in daily feed consumption with no effect on other

measures such as average daily gain (ADG), carcass weight, or quality and yield grade.

Reading the stars

Bovigen's Calvin Gunter reports that most cattlemen understand GeneStar's one- and two-star rating system. "It's relatively easy to use the stars for mating decisions and match sires to cows for genetic improvement."

However, Gunter says not all stars are equal in terms of genetic effect. Thus, about a year and half ago Bovigen developed Genetic Progeny Differences™ (GPDs™), which put the GeneStar results in trait terms so the genetic effect between animals could be compared specifically. For example, if a sire has a -3.95 GPD for feed efficiency that means he will consume 3.95 pounds (lb.) less feed per day on a high-concentrate diet. "The GPD really allows for specific comparisons of animals so your genetic progress can be moved forward that much more quickly," Gunter says.

As for the future, Gunter says Bovigen has a number of research and development projects under way. Among those are research on additional carcass traits utilizing the National Cattlemen's Beef Association (NCBA) Carcass Merit Project as well as work on disease resistance, maternal and reproductive traits, and additional markers for feed efficiency.

Editor's Note: In addition to these tests, Bovigen LLC offers a coat color test, DNA-based cattle parentage identification and a genetic testing system to trace a carcass or retail cut back to the source animal. For more information visit www.bovigen.com.

Star Search CONTINUED FROM PAGE 102

included for \$5 per animal more); the price for the triple test decreases with the number of animals being tested. Results are typically received in 10-14 days.

In his own operation, Davis sees GeneStar as a means to benchmark the current genetics in the herd.

"We are doing the tests to establish where we are and then use the information to help us determine where we want to go with our herd's genetics," Davis says. "It's like the saying, 'You can't manage what you don't measure.'"

He says some bull-buying customers are focused on the tenderness-marker traits for their herds, and he anticipates that many customers will be interested in the feed efficiency traits. Thus, despite the cost, the testing adds value to the Performance Breeders' sale offering.

Interest in feed efficiency

Gunter reports that with the recent release of the feed efficiency marker, interest has skyrocketed among producers. Previously, breeders were testing primarily bulls or a handful of cows for the quality grade and tenderness markers, then using that information to guide mating and culling decisions, he explains. The availability of the feed efficiency test has prompted a significant uptick in the number of producers testing their entire herds or entire sale offerings.

"With the price of corn and other feeds, the ability to test for feed efficiency and reduce feed costs immediately by identifying those animals that are going to be more profitable makes it worthwhile," Gunter says of the feed efficiency test.

Feed efficiency was what prompted Norman Foos of Foos Angus Ranch near Belle Fourche, S.D., to test his entire bull sale offering for 2008. Foos began with GeneStar by testing some of his herd sires a few years

ago. He liked having the additional information on the cattle, so when the feed efficiency marker was released, he saw value in getting more information on his herd.

Of the results, he was pleased with the feed efficiency and tenderness rankings for his cattle. "It proved to me that I've been doing the right things. I've watched my cattle and selected bulls to use back in the herd based on the dam's ability to produce a heavy calf plus breed back and maintain her body condition, so the results seem to match up with what I would have expected," Foos says.

As far as a marketing tool, Foos doesn't know if customers will pay that much more for the added information. But, he especially sees it as a great tool for new breeders. "You could sift out a lot of sires that you wouldn't need to use."

Foos says he wishes more people would use the testing. "To me, it looks like it's definitely the future for making selection decisions. I think great strides in our industry will be made with it."

He adds, "I'll look for DNA-marker test results in the AI (artificial insemination) sires I use. If they haven't been tested, I won't use them. I want a six-star or better for feed efficiency to keep my herd going forward from where we are currently at."

Moving forward

Gunter echoes Foos' sentiment that GeneStar should be a tool to help keep the genetic progress of herds moving in a positive direction.

"This is a tool to build on," Gunter says. "It will get more powerful with the identification of more markers. There is no faster way to make genetic progress than by using DNA testing for genetic markers."

But with that said, he reiterates, "This is not a 'bad bull/good bull' test. It's just one of the tools good breeders should be using."

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— Calvin Gunter

Davis agrees, saying, "We are not going to use this for single-trait selection or as a strict culling tool; it's just an additional tool for selection."

His advice to other breeders regarding use of DNA testing is to determine the specific needs for their own operation. "Genetic testing is progressing constantly; we are going to see more of it in the future, and producers need to stay abreast of it," Davis concludes.

At Stevenson-Basin Angus Ranch near Hobson, Mont., Darrell Stevenson shares that they are testing all replacement females as well as the front-end offering of each of their bull and registered female sales.

"I would like to test every animal, but in our situation [with such large numbers of cattle] that is currently cost-prohibitive," Stevenson says.

"I am not using the DNA testing information as an all-out culling tool for individuals, as much as concentrating — or more importantly eliminating — sire groups with fewer markers."

Stevenson recognizes that there is still a gap in the adoption of DNA technology within the industry. "We have a small percentage of our customer base that analyzes the data, and an even smaller percentage that utilize the information in purchasing decisions," he says. "This, however, is not much different than the introduction of new EPDs (expected progeny differences), or before that, performance indexes."

Like Davis and Foos, Stevenson believes it will simply take time for the industry to integrate gene-marker information.

"Progressive cattlemen are always on the lookout for additional data," Stevenson concludes.

