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Illustration: <http://www.cabpartners.com/news/photos/GMXSampleReport.pdf>

Gene-Max™: DNA test for commercial Angus

The most productive, high-quality commercial cowherds are often managed like purebreds, with individual animal records and calf performance and carcass data brought to bear on each cow. Progeny are increasingly predictable and accurate in hitting gain and grade targets.

“If that sounds like you, get ready for GeneMax™, a new DNA tool, Angus-specific and designed for commercial herds using registered Angus sires,” says Mark McCully, Certified Angus Beef LLC (CAB) assistant vice president for production.

In the decade since the bovine genome was mapped, the search for practical applications has been one of the boom industries in bioscience. The most recent result can help profitably increase the supply of cattle qualifying for the *Certified Angus Beef*® (CAB®) brand. It comes from a CAB and Angus Genetics Inc. (AGI) effort to work with Pfizer Animal Genetics to develop a test to evaluate marbling and post-weaning gain on high-percentage Angus cattle sired by registered Angus bulls.

“GeneMax opens another tray in the genetic toolbox that commercial Angus cattlemen have never known,” McCully says. “But rather than replacing other options, it makes them more effective.”

The new DNA test for marbling and gain would be hard to use without such tools as individual cow-calf weight records. It would be hard to apply without using expected progeny differences (EPDs) and the dollar value (\$V) index in bull selection. And it would be pointless without a focus on fertility and maternal traits.

“No DNA test for economically important traits in cattle costs less, at \$17, but multiplied across a herd or calf crop, it still represents a significant investment,” McCully notes. The knowledge from GMX™ Scores, marbling and gain can pay for the test in short order if you make use of a few strategies.

How to get samples

Some may be more concerned about how to draw samples. A blood spot on individual cards is the preferred method at this time, though other samples such as hair follicles are workable. Test kits may be ordered through CAB’s website, www.CABpartners.com/GeneMax, and there’s also an instructional video.

Those who have drawn blood samples during the on-farm validation stage have noted the ear seems accessible but there may be problems with excessive head tossing or difficulty finding blood flow against which to press the sample card.

Solutions have included extenders on the headgate, removing a notch from the ear and getting a spot of blood from where the notch was removed, or working from the other end near the tailhead. A series of one-time-use 16-gauge needles have done the job, but plans call for simpler, pin-prick devices to be included in kits.

A frequent change of surgical gloves helps eliminate cross contamination, and individual samples should dry before being placed in plastic sleeves or pockets such as those for photos or slides. Depending on labor and facilities, it could take little more than an hour to most of the day to sample 100 cows. It is important to record individual animal identification for each card used.

Testing strategies

“The more Angus genetics in your cattle, the more accurate the GMX results, so only test those with 75% or more Angus from registered bulls,” McCully advises.

Of course, this is not a test for breeding bulls, but there are reasons to test all other types of commercial Angus cattle.

“You could test most of your mature cows to characterize their contribution to progeny genetics,” he suggests.” Sure, the bull supplies half of the genetics of each calf, but now you can index your cows for the quality of their contribution. Those with the lowest GMX Scores can go into the “on deck” virtual pen for culling, with that ding against them carried on to any pending replacement heifers.

Some of those with below-average GMX Scores, but above-average gain or marbling component results could be strategically bred to bulls stronger in marbling or growth, to complement the gaps for a more balanced calf crop.

The same strategies would apply to replacement heifers, after culling all that fail to meet other criteria such as structure, disposition and size.

“Except for the few obvious culls that show up even in well-managed herds for various reasons, a producer might consider testing all calves,” McCully says. Results can be marketed as showing the feedlot and carcass potential of steers or market heifers; it just takes another 3 cents per pound on 600-weight calves to beat the cost of the test.

You may be able to partner with a custom feedlot on testing, or retain ownership on the top half for GMX Score. In either case, the DNA test can form the basis for realistic expectations. Even if you don’t feed or track phenotypic data after weaning, those scores can be entered into your herd records and begin to characterize the cowherd, already helping to select needed traits in breeding bulls.

Some strategies are mainly feedlot oriented. “A representative sample of one-quarter to half of the calves could be tested, with average results used to infer feeding and carcass value for the group or help guide your decisions on retained ownership options,” McCully says. “A feedlot could implement any of these testing strategies at the yard, too.”

Interpreting results

Samples are analyzed for the presence of DNA markers known to be associated with marbling and post-weaning gain. Results will come back in the form of a GMX Score, and that will take less than four weeks. The economically weighted score is based on historical averages and trends for the value contributions of gain and marbling. As an example, if that genomic prediction puts an animal in the top 12% of the GMX database, its GMX Score will show as 88.

“The genomic prediction for each animal’s gain and marbling is also ranked against the GMX database so that animals in the top 20% earn a ‘5’ and the lowest 20% earn a ‘1.’ These are not economically weighted and the overall GMX Score could be relatively high even though one of the component rankings seems low,” McCully says. (See animal ID 1102 in the example table).

Keep in mind the test is not a comparison of all genetics in the U.S. cowherds, only high-percentage Angus cattle. Looking at animal ID 1131, you can see that its 88 Score breaks down to a fairly balanced 5 for gain—in the top 20%—and a 4 for marbling, in the second 20% group.

The broader commercial cattle industry will soon become familiar with GMX Scores, and you may choose to list results by individual or by group in marketing replacement heifers. Seedstock Angus producers may organize or feature sales with groups of GMX-evaluated cattle for their customers.

“For all tested cattle that remain in your herd, strategic breeding is perhaps the best option to make the test pay,” McCully says. “Those who have retained ownership may have seen a significant spread from top gainers to the bottom, and the same in terms of marbling. By mating to complement known gaps in their DNA profiles, you can even out subsequent progeny groups.”

END

NOTE to Editors: Above the story is a link to example GMX Score report. If you do not publish the example report, strike the sections highlighted in yellow.