



Your Link to

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How and why to use GMX™

The *Certified Angus Beef*® (CAB®) brand has been able to add millions of dollars to the value of Angus cattle because of the data and predictive tools that empower producers to hit the premium target.

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 has been an Angus-specific DNA tool for commercial cattle called GeneMax that can help profitably increase the supply of cattle qualifying for CAB. It comes from a Certified Angus Beef LLC (CAB) and Angus Genetics Inc. (AGI) effort to work with Pfizer Animal Genetics to develop a test to evaluate marbling and postweaning 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, 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 dollar value indexes (\$Values) in bull selection. And it would be pointless without a focus on fertility and maternal traits.

At \$17, no DNA test for economically important traits in cattle costs less, but multiplied across a herd or calf crop, it still represents a significant investment. With the knowledge gained 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 arterial 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 an hour to more than two hours to sample 50 cows. It is important to record individual animal identification (ID) 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.

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. 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 with 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. Results can be marketed as showing the feedlot and carcass potential of steers or market heifers; it just takes another 3¢ 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 cow herd, already helping to select needed traits in breeding bulls.

A representative sample of one-quarter to one-half of the calves could be tested, with average results used to infer feeding and carcass value for the group or to help guide your decisions on retained ownership options. 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 postweaning gain. As you know, if you have read the announcement articles or the Q&A beginning on page 98, results will come back in the form of a GMX score. 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 (see animal ID 1102 in the example table).

Staying with that table and the 88 GMX score mentioned as an example, that means only 12% of cattle in the GeneMax database have higher scores. Keep in mind the test is not a comparison of all genetics in U.S. cow herds, 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. 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.

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To order CAB merchandise, visit
www.angussalebarn.com.

Table 1: Example GeneMax Score report on a set of calves

Animal ID	GMX™ Score	GMX™ Marbling	GMX™ Gain
1108	99	5	5
1106	96	5	5
1137	96	5	5
1118	95	5	4
1119	94	4	5
1129	94	3	5
1101	92	4	5
1102	89	5	2
1131	88	4	5
1104	87	4	5
1124	87	4	5
1123	86	4	5
1130	83	5	4
1120	80	4	4
1128	79	3	5
1107	77	3	5
1133	74	4	4
1114	70	5	2
1117	68	3	5
1127	66	4	3
1136	66	4	4
1113	64	2	5
1139	62	4	3
1111	61	3	4
1105	56	3	4
1122	53	3	2
1132	53	3	3
1116	48	2	4
1110	42	3	3
1109	36	3	1
1121	32	2	3
1134	31	2	3
1103	25	2	1
1138	23	2	2
1115	21	3	1