

# Finding Genes That Fit Part 2

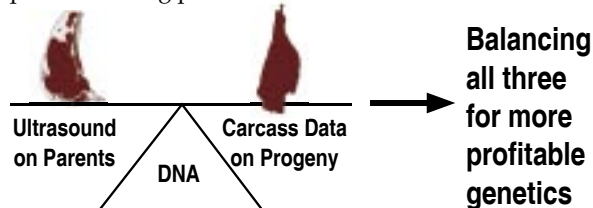
## Exploring Quality Grade DNA Markers

By Susan Willmon,  
AGA Director of Breed Improvement

**A**s a follow-up to the feature in the February, 2006 *Gelbvieh World* on the Tenderness DNA markers, this article will focus on a discussion of the two DNA markers associated with selecting for an improvement in Quality Grade. Included as well in this month's article is the presentation of GeneSTAR DNA Marker results on additional Gelbvieh and Balancer bulls. These bulls were tested either as part of the first call for young sires to be tested with the original group of Top 25 sires or by AGA members that have forwarded the data on to the association for inclusion in this listing.

### Improving Quality Grade

Increasing the number of animals that grade Choice over Select can be directly translated to increased carcass value for the producer depending on the value of the choice/select spread. Predicting a bull's genetic potential for marbling is a combination of the ultrasound value on the individual and the Quality Grade/Marbling Score of the bull's progeny from a structured carcass test. Expression of this trait is ultimately controlled by the animal's DNA for the genes that influence the deposition of fat, and in this case specifically, marbling as measured by intramuscular fat. The challenge is to build the foundation of genetics through all these evaluation methods and then manage the expression of those genetics through proven feeding practices.



Reg #	Registered Name Breed	Quality Grade		Tenderness		
		TG5	M2	CAST	Calp <sub>316</sub>	Calp <sub>4751</sub>
488923	CTR Echo 575E Gelbvieh	0	0	1	0	0
518506	KCF Bennett Hallmark E208 Gelbvieh	1	0	2	0	1
527692	CKR Rippey 1F ET Gelbvieh	1	0	1	1	1
656407	JCGR Bar GT Louie 2J Gelbvieh	0	0	2	1	1
656554	MLH Goldrush Visa J40 Gelbvieh	2	0	1	0	1
660177	DLW Heart Throb 103 H Gelbvieh	0	0	2	0	1
743983	JOB Danell Diamond Six 41L Gelbvieh	1	0	2	0	1
745160	XXB Titus 880K Gelbvieh	0	1	2	0	0
765030	DPWG Will Gelbvieh	0	0	1	0	1
801713	Flying H MSH Full Season Gelbvieh	0	0	2	0	0
805323	MAC Mr Valhalla 539MET Gelbvieh	0	0	2	0	1
825857	CTR Highlight 2509M Balancer	1	0	2	1	1
826207	CTR Vision 2483M Balancer	0	0	1	1	1
833222	KLBF Black Reign 38N Gelbvieh	0	0	2	0	0
840675	J-BOB 4665M ET Gelbvieh	0	0	0	1	1
842199	JCGR BAR GT Flashback 410M ET Gelbvieh	0	1	1	0	1
842229	JCGR BAR GT R Cinemaz 701M ET Gelbvieh	1	0	0	0	1
846221	DAR National 302N Gelbvieh	0	0	2	0	1
847077	AHL Trailblazer ET Gelbvieh	0	0	2	0	1
848137	BTBR Mr Black Cross 3002N ET Gelbvieh	0	0	2	0	0
848284	DKCB Buford 07N ET Gelbvieh	0	0	1	0	0
850450	OZZ EXT Governor 3N Gelbvieh	0	0	1	0	2
854851	GMCC Ruppel Gunnison N31 Gelbvieh	0	0	2	0	0
855307	EGL Tenderloin N407 Balancer	0	0	2	1	1
865240	RTX Onstar 416N ET Gelbvieh	0	1	2	0	1
866825	WFA Flying H Atlas 101N Gelbvieh	0	0	2	0	0
880418	JBOB Carolina 5003 N Gelbvieh	0	0	2	0	0
888058	DMGC Power Drive 143N9 Gelbvieh	0	2	2	0	0
888059	RMMG Black Light 50N2 Gelbvieh	0	1	2	0	1
888814	PMG Pegasus 01P Gelbvieh	0	0	2	0	1
892249	JBOB Carolina 5241P ET Gelbvieh	1	0	2	1	1
892258	JBOB Carolina 5261P ET Gelbvieh	1	0	1	0	0
892264	JBOB Carolina 5281P Gelbvieh	0	1	2	0	0
892520	GHGF Mate 47P Gelbvieh	0	0	1	0	0
894575	DLW Natural 862N Gelbvieh	0	1	2	0	0
897658	LDJ Flying H F Direct P518 Balancer	0	0	1	0	2
898929	RID R Corbin 3P ET Gelbvieh	0	1	1	0	1

Reg #	Registered Name Breed	Quality Grade		Tenderness		
		TG5	M2	CAST	Calp <sub>316</sub>	Calp <sub>4751</sub>
907602	Post Rock Blk Bal 18P8	1	0	2	1	1
	Balancer	CT	GG	AA	CG	CT
920084	GHGF Triton 03MP	0	0	2	0	0
	Gelbvieh	CC	GG	AA	GG	TT
929387	XXB Big N' Rich 911P ET	0	1	2	0	0
	Gelbvieh	CC	GA	AA	GG	TT
929403	XXB Paradise 003P	1	0	2	0	1
	Balancer	CT	GG	AA	GG	CT
930220	BNRK Hot Shot 04R	0	0	2	0	1
	Gelbvieh	CC	GG	AA	GG	CT
931137	JBOB Carolina 5793R ET	0	0	2	0	0
	Gelbvieh	CC	GG	AA	GG	TT
934316	RTRD Ruff-N- Ready	0	0	2	0	0
	Gelbvieh	CC	GG	AA	GG	TT
935583	Mr Goldrush R95	2	0	1	0	2
	Gelbvieh	TT	GG	GA	GG	CC
935597	Mr Goldrush R108	1	0	2	0	1
	Gelbvieh	CT	GG	AA	GG	CT
935615	Mr Goldrush R64	0	0	2	0	1
	Gelbvieh	CC	GG	AA	GG	CT
935629	Goldrush Balancer R25	1	1	1	0	1
	Balancer	CT	GA	GA	GG	CT
935630	MLH Goldrush Balancer R21	0	0	2	0	1
	Balancer	CC	GG	AA	GG	CT
935634	Mr Goldrush R96	0	0	2	0	0
	Gelbvieh	CC	GG	AA	GG	TT
938083	BCFG Butlers Ole Hickory 359R	0	0	2	0	0
	Gelbvieh	CC	GG	AA	GG	TT
938431	RID R Collateral 2R	0	1	2	1	2
	Gelbvieh	CC	GA	AA	CG	CC
941090	DMC Extra 143R1	0	1	2	0	0
	Gelbvieh	CC	GA	AA	GG	TT
941979	SINK Ricarde 05R	0	1	1	0	0
	Balancer	CC	GA	GA	GG	TT
941984	SINK Wonderful 303R	0	0	1	1	1
	Balancer	CC	GG	GA	CG	CT
941988	SINK Black Nugget 312R	0	0	1	0	0
	Balancer	CC	GG	GA	GG	TT
942002	SINK Rampage 83R	0	1	2	0	0
	Gelbvieh	CC	GA	AA	GG	TT
942004	SINK 04R	0	0	2	0	0
	Gelbvieh	CC	GG	AA	GG	TT
945038	PMG Ramsis 32R	0	0	2	0	1
	Gelbvieh	CC	GG	AA	GG	CT
948020	RBS R2	0	0	2	0	1
	Balancer	CC	GG	AA	GG	CT
955701	JOB Danell Mixer	0	0	1	0	1
	Balancer	CC	GG	GA	GG	CT
955703	JOB Danell Cash 4R	0	0	1	0	0
	Gelbvieh	CC	GG	GA	GG	TT
955704	JOB Danell Blockbuster 6R ET	1	1	1	0	0
	Gelbvieh	CT	GA	GA	GG	TT
955705	JOB Montana Infusion	1	1	2	1	1
	Gelbvieh	CT	GA	AA	CG	CT
955706	JOB Danell Bushwacker 7R ET	1	0	1	0	1
	Gelbvieh	CT	GG	GA	GG	CT
965210	DMC Extra 50R1	0	0	2	1	1
	Gelbvieh	CC	GG	AA	CG	CT
965212	DMC Extra 4R1	0	0	2	1	1
	Gelbvieh	CC	GG	AA	CG	CT

### DNA Quality Grade Marker Reference Guide

While this trait is ultimately influenced by a combination of several genes, two specific markers have been identified that, when present, lead to an increase in Quality Grade. These two markers are a part of the Quality Grade panel marketed by Bovigen and have been independently validated by the National Beef Cattle Evaluation Consortium (NBCEC). Data on these markers for the Top 25 Most Frequently Used sires was presented along with the Tenderness markers in the February 2006 issue of *Gelbvieh World*.

In the same fashion as the Tenderness markers the Quality Grade markers are represented in the form of favorable and unfavorable alleles, presented below.

**Table A**

STARS	FORM	TG5	M2
2	Favorable	TT	AA
1	Intermediate	CT	GA
0	Un-Favorable	CC	GG

Data on research populations showed an increase in quality grade equal to approximately 24 percent more carcasses grading Choice for a group of animals possessing both Quality Grade Markers (TG5=2, M2=2) than in a population that consists of animals not possessing either of these two markers (TG5=0, M2=0)



It is interesting to note that in the population that was used in the validation of these markers by NBCEC, 100 percent of the animals with a marker value of 4, containing the favorable form of both Quality Grade markers, graded Choice. There has not been enough research to date to see if that trend would hold through for Gelbvieh influenced feedlot animals but the potential is intriguing.

It is fairly easy to translate the value of the increase in Choice carcasses by comparing the value of two lots of steers.

### Report Legend

Quality Grade		Tenderness		
TG5	M2	CAST	Calp 316	Calp 4751
0	1	2	RP	1
CC	GA	AA		CT

**First line of listing**

0, 1, 2 value—corresponds to the marker value provided on GeneSTAR results report. RP indicates a Results Pending.

**Second line of listing**

Corresponds to actual Genotype of Marker, see **Table A**.

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# Finding Genes that Fit



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Lot 1	Lot 2
100 Steers	100 Steers
Average Carcass Weight	Average Carcass Weight
750 lbs	750 lbs
50% Select 50% Choice	38% Select – 62% Choice

If we made improvement halfway (Lot 2), a 12 percent increase in Choice carcasses, at a \$8 Choice/Select spread this would translate into \$720 increased value of Lot 2.

Can you recover the cost of initially testing animals based on this value? Look at it from the perspective of the value of a bull that causes an increase in % Choice by as little as 10 percent. If that bull produces 25 calves per year, at 750 lbs. average carcass weight with a 5-year useful life and a \$8 Choice/Select spread the value of that bull increases by \$750 (See Table B).

**Table B**

Improvement in Percent Choice	Per Year	Over Bull's Life
5%	\$75	\$375
10%	\$150	\$750
20%	\$300	\$1,500

Source: Bovigen Web Page

How do we accomplish this? Increase frequencies of animals from predominantly 0's to a higher proportion of animals with 1's and 2's. The frequencies of Gelbvieh and Balancer animals tested to date are listed below. Over time, with planned matings, we can increase these genes in the population of Gelbvieh influenced cattle. Is our goal realistically to change our breed, greater percentage of high Choice to Prime carcasses, to compete with the higher marbling breeds? The answer is probably not. But some small changes in the marbling potential of our cattle can translate into a measurable increase in carcass value. ■

## Frequencies of Quality Grade Markers

	TG5			M2		
	2(TT)	1(CT)	0(CC)	2(AA)	1(GA)	0(GG)
<b>Gelbvieh</b>	1%	17%	82%	1%	19%	80%
<b>Balancer</b>	3%	21%	76%	0%	6%	94%
<b>British</b>	10%	41%	49%	2%	21%	77%
<b>Continental</b>	7%	35%	59%	1%	18%	81%
<b>Brahman Infl.</b>	.3%	25%	71%	37%	38%	25%

(Source: Bovigen animals tested through December 2005)