

Bovigen GeneSTAR®

Definitions

GeneSTAR® Quality Grade Genetic Progeny Difference

QG 1	QG 2	GPD Percent Choice
☆☆	☆☆	22.9 %
☆☆	☆	20.0 %
	0	17.1 %
☆	☆☆	14.4 %
☆	☆	11.5 %
	0	8.6 %
0	☆☆	5.8 %
	☆	2.9 %
	0	0.0 %

GeneSTAR® Quality Grade is a DNA genetic marker panel test, which identifies the presence of four major genes associated with Quality Grade and marbling. Each of the four gene markers in this panel have been found to be highly associated with quality grade in multiple evaluations across multiple breeds of cattle. Moreover, this panel of markers is the only marbling or quality grade test to have passed an independent validation by the National Beef Cattle Evaluation Consortium (NBCEC).

On average, the T1 marker for Calpastatin accounts for about one pound of shear force and is completely independent of the other two markers currently making up the GeneSTAR® Tenderness test. T2 and T3, both markers in the Calpain gene, also account for about one pound each, though they are not independent of each other. As a result they account for about one and a half pounds in total. So, on average, the entire Tenderness test accounts for about two and a half pounds of WBSF.

GeneSTAR® Feed Efficiency consists of four markers which together identify as much as a 15% difference in daily feed consumption with no affect on other traits like average daily gain, carcass weight, quality grade or yield grade. Producers can use the GeneSTAR Feed Efficiency test to identify up to a \$50 difference in feed cost between animals when ration costs are at \$165/ton. This panel is based on discovery and validation work on thousands of cattle utilizing the trait of Net Feed Intake (NFI). NFI is the difference between an animal's actual feed intake and the amount of feed an animal is expected to eat based on its size, composition and growth rate.

GeneSTAR® Tenderness Genetic Progeny Difference™

T1	T2	T3	GPD Lbs. Shear Force
	☆☆	☆☆	-2.2
	☆☆	☆	-1.8
	☆☆	0	-1.4
☆☆	☆☆	☆☆	-1.8
☆☆	☆☆	☆	-1.4
☆☆	☆☆	0	-1.0
	0	☆☆	-1.5
	0	☆	-1.1
	0	0	-0.7
☆	☆☆	☆☆	-1.8
☆	☆☆	☆	-1.4
☆	☆☆	0	-1.0
	0	☆☆	-1.5
	0	☆	-1.1
	0	0	-0.7
0	☆☆	☆☆	-1.1
0	☆☆	☆	-0.7
0	☆☆	0	-0.3
	0	☆☆	-1.5
	0	☆	-1.1
	0	0	-0.7
0	☆	☆☆	-1.2
0	☆	☆	-0.8
0	☆	0	-0.3
	0	☆☆	-0.8
	0	☆	-0.4
	0	0	-0.0

GeneSTAR® Tenderness identifies animals that are more likely to produce tender cuts of beef. GeneSTAR Tenderness is a DNA marker test for two important genes, Calpastatin & Calpain, involved in the post-mortem tenderization process of beef. Calpain is a naturally occurring enzyme that weakens muscle fibers during the post mortem aging process and plays a major role in the overall tenderness equation.

Calpastatin is a naturally occurring enzyme that inhibits the normal

tenderization process of meat during post mortem aging by acting as an antagonist to the effect of Calpain. Animals carrying the favorable forms of the genes have been found to significantly reduce the proportion of "tough" eating experiences. The impact of these two genes on tenderness has been well documented for quite some time. However, through the use of DNA tests first available from Bovigen, there is now an effective and efficient tool available to use this knowledge in making breeding and management decisions.

Genetic Progeny Differences™

Since the first DNA test for the beef industry was released, the industry has struggled with an accurate way to communicate the effects of markers for a given trait. The answer to that dilemma is the Genetic Progeny Difference™ (GPD™).

GPDs are used to describe the actual genetic makeup of animals and the true effect of each allele, or combination of alleles within a trait. GPDs are designed to accommodate an infinite number of genetic combinations, interactions and genes yet to be discovered.

Because every marker can affect its related trait differently, each allele (0, 1 or 2 Stars) is assigned a numerical value based on the proven difference of its affect on the trait. The numerical value for GeneSTAR Tenderness, for example, is reported in pounds of shear force and is derived from independent third party validation results, including the NBCEC. An animal with one STAR for T1, one STAR for T2 and two STARS for T3 shows a difference in shear force of -1.5 pounds, as compared to an animal with no markers for Tenderness. Thus, the Tenderness GPD would be -1.5.

For Quality Grade markers, a GPD is reported as the increased likelihood that a carcass will grade Choice or better, and is also derived from independent third party validation results including the NBCEC. An animal with two STARS for QG1 and one STAR for QG2 would be 20% more likely to have a Choice or better Quality Grade over an animal with no Quality Grade markers. For this animal the Quality Grade GPD would be +20.0.

GeneSTAR®

GeneSTAR® Results

	QG1	QG2	QG3	QG4	QG GPD	T1	T2	T3	T GPD	FE1	FE2	FE3	FE4	FE GPD
ANGUS														
1AN1106 349M	0	0				★★	0	★	-1.1					
1AN1078 ADMIRAL	0					★★	★							
1AN0791 ALLIANCE 6595	0	0	0	★	5.0	★★	★	★★	-1.8	★★	★★	★	★★	-3.72
1AN1018 BANDO 9074	0	0	0	★	5.0	★★	★	★	-1.4	★★	★★	★	★★	-3.37
1AN1138 BANDWAGON	★	0	0	0	5.29	★★	★★	★★	-2.2	★★	★★	0	★	-3.26
1AN1043 BENNET TOTAL	0	0	0	0	0.0	★	★★	★★	-1.8	★★	★★	★	★★	-3.72
1AN1075 BLUE MOON	0	0	★	0	5.2	★★	★	★	-1.4	★★	★★	★	0	-3.28
1AN1107 BRUSHPOPPER	0	0				★★	0	★	-1.1					
1AN1099 DENSITY	★	0	0	★	10.29	★★	0	★★	-1.5	★★	★★	★	★★	-3.72
1AN1104 EXTRA 4X13	★★	★	0	★	17.02	0	★	★★	-1.2	★★	★★	0	★★	-3.48
1AN1044 FINAL ANSWER	0	0	0	★	5.0	★★	★	★★	-1.8	★★	★★	★	★	-3.74
1AN1100 GAME DAY	0	0	0	★	5.0	★★	★	★★	-1.5	★★	★	★	0	-2.35
1AN1109 GRIDIRON	0	0	0	0	0.0	★★	★	★	-1.4	★★	★	★	★	-2.57
1AN1094 INDEX	★	0				★	★	★	-1.1					
1AN1130 JUSTICE	0	0	0	0	0.0	★★	★	★	-1.4	★★	★★	★	0	-3.28
1AN1050 KRUGERRAND 410H	0	★				★★	★	★★	-1.8					
1AN1129 LOOKOUT	0	0	★	0	5.2	★★	★	★	-1.4	★★	★★	★★	0	-3.52
1AN1122 MARATON	0	0	0	★	5.0	★★	★	★	-1.4	★★	★★	★	0	-3.28
1AN1105 MATRIX	0	★	0	0	1.44	★	★	★★	-1.1	★★	★★	★★	0	-3.52
1AN1119 NET WORTH	0	0	0	★★	10	★	★	★★	-1.5	★	★★	★	★★	-3.13
1AN1030 NEW FRONTIER	0					★★	0							
1AN1089 OAK HOLLOW 7709	★★	0	0	0	10.58	★★	★	★	-1.4	★★	★★	0	★★	-3.48
1AN1095 OBJECTIVE 3J15	★	0	0	★	10.29	★★	0	★	-1.1	★	★	★★	0	-2.0
1AN1112 REGULATOR	0	0				★★	0	★	-1.1					
1AN1115 RITO 4S5	0	0				★★	0	★	-1.1					
1AN1128 ROCKET 44	0	0	0	★	5.0	★★	★★	★★	-2.2	★★	★★	★	0	-3.28
1AN1077 SPECIAL DESIGN	★					★★	★							
1AN1117 THUNDER	★	0	0	0	5.29	★★	★	★★	-2.2	★★	★★	★★	0	-3.52
1AN1118 TIMBERWOLF	★	★				★★	0	★★	-1.5					
1AN1064 TRAVELER 004	0	0	0	★	5.0	★★	0	★★	-1.5	★★	★★	★	★★	-3.72
1AN1103 UP THE LIMIT	★	0				★★	★	★	-1.1					
1AN1116 UPWARD	★	★	0	0	6.73	★★	★	★★	-1.8	★★	★★	★★	★	-3.74
1AN1108 VIGILANCE	★	★				★	0	★	-0.7					
1AN1102 WHITMAN	0	0	0	0	0.0	0	0	★	-0.4	★★	★★	0	0	-3.04
1AN1123 WINDY 702	★	0	0	★	10.29	★★	0	0	-0.7	★★	★★	0	0	-3.04
RED ANGUS														
1AR0885 ALL BEEF	0	0				★★	★	★	-1.4					
1AR0908 ADVANCE	★	0				★	★	★★	-1.5					
1AR0907 BIG SKY	★★	0	0	0	10.58	★	★	★	-1.1	★★	★★	★★	★★	-3.96
1AR0910 CAPITAL	★★	★	0	★	17.02	0	★	★	-0.8	★★	★	★★	★★	-3.04
1AR0902 CANYON 2222	★★	★				★	0	0	-0.3					
1AR0900 DOC HOLLIDAY	★	0	0	0	5.29	★★	0	0	-0.7	0	★	0	★	-1.14
1AR0915 HUSTLER	0	0	0	0	0.0	★★	★	★	-1.4	★	★★	★★	0	-2.93
1AR0909 JAVELIN	★	0	0	★	10.29	★★	★	★★	-1.8	★★	★★	★	★	-3.5
1AR0896 MAJOR LEAGUE	★	0	0	0	5.29	★★	★	★★	-1.8	★★	★★	★	★★	-3.72
1AR0904 MISSION STATEMENT	0	0	0	0	0.0	★★	★	★★	-1.8	★★	★★	★	★	-3.5
1AR0906 SUPER VISION	0	0				★★	★	★★	-1.8					
SIMMENTAL														
1SM0095 600UNIQUE	0	0	0	0	0.0	★	0	★★	-1.1	★★	★★	0	★	-3.26
1SM0066 BODYBUILDER	★													
1SM0096 CROCKETT	★	0	0	0	5.29	★	0	0	-0.3	★★	★★	★★	★	-3.74
1SM0097 GUNNER	★★	0	0	0	10.58	0	0	★	-0.7	★★	★★	★	★	-3.5
1SM0093 HUMMER H3	★	0				★★	0	★	-1.1					
1SM0094 IN DEW TIME	★	0	0	0	5.29	★	0	0	-0.3	★★	★★	0	0	-3.04
1SM0051 LUCKY BREAK	★					★★	★							
1SM0084 LUCKY CHARM	★	0	0	0	5.29	★★	0	★	-1.1	★	★★	★	★★	-3.13
1SM0059 LUCKY DICE	★	0				★	0	★★	-1.1					
1SM0090 MO BETTER	★	0	0	★	10.29	★★	0	0	-0.7	★	★★	★★	★	-3.15
1SM0061 POWERLINE	★★					★	0							
1SM0086 REMINGTON "RED LABEL"	★	0	0	0	5.29	★	0	★★	-1.1	★★	★	★	0	-2.35
1SM0098 SHEAR FORCE	0	0	0	0	0.0	★	★	★★	-1.5	★★	★★	★	0	-3.28
1SM0091 TRADEMARK	0	0	0	0	0.0	★★	0	0	-0.7	★★	★★	★★	0	-3.52
1SM0087 WINCHESTER	★	0	0	0	5.29	★	0	★	-0.7	★★	★	★	★	-2.57
CHAROLAIS														
1CH0947 LT BLUEGRASS	0	★	0	0	1.44	★★	0	0	-0.7	★★	★	★★	0	-2.6
1CH0945 NO DOUBT	0	0	0	0	0.0	★★	0	★	-1.1	★	★	★★	0	-2.0
1CH0944 WESTERN SPUR	0	0	★	★	10.19	★★	★	★	-1.4	★★	★★	★★	★★	-3.96
HEREFORD														
1HP0820 FIRST CLASS	★	0	0	★	10.29	★★	0	★★	-1.5	★★	★★	★	0	-3.28
1HP0816 LEGEND	★					★	0							
1HP0819 SCHU-LAR 5N	0	0	0	★	5.0	★	0	★★	-1.1	★	★★	★	0	-2.68
1HP0816 VIC K16	0	0	0	★	5.0	★	0	★	-0.7	★★	★★	★	★	-3.5