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IGENITY® Profile

**R&D MISSOURI RFI HEREFORDS-DVORAK
XX, ND**

**Date 4/27/09
Customer ID USA11504**

Animal ID	M/F	Breed	Breed Reg.#	Sample Barcode#	Residual Feed Intake <i>Indicus Influenced</i>	Residual Feed Intake <i>Bos Taurus</i>	Average Daily Gain	Tenderness	Marbling Score	Percent Choice	Yield Grade	Fat Thickness	Ribeye Area	Heifer Pregnancy Rate	Stayability	Maternal Calving Ease	Docility	Homozygous Black?	Horn-Polled	Myostatin	BVD-PI
8115		HF	42895970	AA102916			3	6	3	3	4	5	4	4	4	5	6				
8133		HF	42896015	AA102908			4	6	3	3	4	5	3	2	5	5	6				
8146		HF	42896065	AA102915			6	6	4	4	7	6	4	5	5	8	6				
8152		HF	42895996	AA102909			3	9	3	3	5	4	3	4	5	5	5				
8161		HF	42896076	AA102914			5	7	4	4	5	5	3	6	5	5	6				
8172		HF	42895956	AA102911			4	7	3	3	6	5	4	6	5	6	5				
8175		HF	42895975	AA102942			5	6	4	4	5	6	2	4	6	6	5				
8181		HF	42896121	AA102912			5	4	3	3	7	5	4	7	5	7	5				
8193		HF	42895976	AA102965			5	7	4	4	5	5	3	5	7	6	5				
8195		HF	42895981	AA102929			5	9	5	5	5	5	2	5	6	7	5				
8210		HF	42896026	AA102917			3	7	3	3	3	4	3	5	6	4	5				
823		HF	42895982	AA102923			3	6	5	5	3	4	5	3	2	5	7				
833		HF	42895979	AA102967			4	7	3	3	6	5	4	4	5	5	8				
840		HF	42896010	AA102991			5	7	3	3	4	3	3	6	6	5	5				
855		HF	42895967	AA102941			5	6	4	4	6	5	4	6	5	7	5				
865		HF	42896014	AA102987			6	9	3	3	6	5	4	7	5	5	7				
880		HF	42895965	AA102918			4	7	4	4	6	5	4	5	5	6	5				
893		HF	42895998	AA102910			3	8	3	3	6	5	4	4	6	6	5				

We invite you to learn more about applying your test results, and viewing your personal online results database, by visiting www.igenity.com. Order more collection kits, review research and gain management advice at this website.

This report describes results of our analysis of the sample or samples of biological materials described herein. Merial warrants that it has applied its best efforts to determination of the presence and identification of specific alleles of bovine genes in DNA from the samples provided herein to us from you. Merial provides no other warrant including, but not limited to, that any other allele is or is not present in any sample or any animal. Results of analysis are predicated on the assumption that each sample was obtained from a single cattle beast. Results of analysis are reported herein in association with the sample designations provided by you. We assume no responsibility for correctly identifying a particular animal as the source of any sample.

IGENITY[®] Results Key

for beef

Using the power of DNA, IGENITY helps you understand and manage the potential for animals to perform and transmit traits of economic importance. The comprehensive profile includes:

Carcass Composition

The IGENITY profile scores for Yield Grade, Ribeye Area, and Backfat Thickness are calculated using multiple DNA markers that reflect the animal's genetic potential for these traits. For example, animals with an IGENITY profile score of 10 for Ribeye Area will have a 2.56 in² larger ribeye than animals which score a one. Ribeye Area is scored in square inches, Backfat in inches, and Yield Grade in Yield Grade scores (1-5). These IGENITY results provide a more complete picture of the Carcass Composition potential for an animal.

Carcass Quality

The IGENITY profile scores for Quality Grade and Marbling reflect extremely powerful multiple marker analyses which are indicative of an animal's potential for intramuscular fat deposition and Choice or better Quality Grade carcasses. The IGENITY profile score for Marbling Scores translate to the 100 to 999 scale, where 400 represents low Choice. Marbling score is particularly useful in deciding between animals with similar marbling EPDs or ultrasound data. The IGENITY profile for Quality Grade reflects the percent Choice or higher – so 64.4% more animals with an IGENITY Quality Grade score of 10 will grade Choice or higher than animals with a score of 1.

The IGENITY profile score for Tenderness score represents animals' genetic potential for tenderness as measured by the Warner Bratzler shear force test, with 10 being the most tender and 1 the least tender.

Maternal and Reproductive Traits

Reproduction is arguably the most economically important trait for Cow/Calf producers.¹ Heifer Pregnancy Rate is a heifer's chance at becoming pregnant over a normal breeding season, relative to other heifers. Stayability is the chance a heifer will remain in the herd until at least six years old, relative to other animals. Maternal Calving Ease is measured as the percentage of unassisted births – a higher value is greater calving ease. These IGENITY profiles can be used to make replacement heifer decisions as well as be used to select future maternal sires.



Using the 1 to 10

The values listed in the chart on the back reflect the relative difference expected in animals compared to contemporaries with an IGENITY profile score of 1. Higher scores are not necessarily better – it just means that the animal has the potential for more of that trait. For the most informed decisions use IGENITY profiles in conjunction with other selection and management tools like conformation and EPDs. Select the scores which are best for your animals and your operation.



Average Daily Gain

A key profitability measurement for any operation, Average Daily Gain is measured in lbs of gain per day. The IGENITY profile results for Average Daily Gain identifies an animal's genetic potential for rate of gain, for both calves and post-weaning growth. Animals which score a 10 will gain an additional .81 lbs per day over animals which score a 1 – which means a 166 lb difference over 205 days.

Feed Efficiency

The IGENITY Feed Efficiency analysis predicts genetic potential for Residual Feed Intake (RFI). RFI describes an animal's feed intake above or below its predicted needs for maintenance and growth. An animal with a low RFI score will

- Eat less to achieve the same gains,
- Gain more on the same amount of feed,
- Require less feed to maintain body condition as a mature adult.

The results of Feed Efficiency combined with Average Daily Gain give you a powerful look at an animal's ability to grow efficiently, maintain body condition as a mature animal and have efficient offspring.

Results are specific to *Bos indicus* or *Bos taurus*.

Docility

Calm cattle are not just about handler safety – calm cattle eat more², have better response to vaccinations and pre-conditioning³, and are more tender⁴. The IGENITY profile for docility is the animal's genetic potential to be extremely calm, or to have calm offspring. Higher scores from IGENITY for this trait indicate a higher percentage of calves that possess acceptable behavior.

Coat Color

The IGENITY Coat Color analysis looks at the genes that determine red or black coat color. Results are reported as:

Y Homozygous Black
N Not Homozygous black

The black (ED) gene is dominant over red (e). Black animals may carry one or two copies of the black gene. Only homozygous black animals will have 100% black offspring.

Wild Type (E+) is neutral to red and black, and generally allows the expression of the other gene. The following results are available online:

E^DE^D	Homozygous Black	E^DE⁺	Black Carrier, Wild Type
E^De	Red Carrier	E⁺e	Red Carrier, Wild Type
ee	Red	E⁺E⁺	Wild Type, Any Color

Horned/Polled

The IGENITY Horned/Polled analysis uses multiple markers to identify horned and polled animals. The polled allele is dominant over the horned allele, so animals can appear polled despite carrying a horned gene. This analysis is breed specific for purebred animals and each breed has a different set of markers involved. The results do not reveal the presence or absence of scurs.

HH	Homozygous Horned	PP	Homozygous Polled
HP	Heterozygous Horned/Polled	I	Indeterminate
		IH	One Horned allele, one indeterminate allele

Arthrogyrosis Multiplex

Arthrogyrosis Multiplex (AM), commonly known as Curly Calf Syndrome, is a genetic defect with a simple recessive pattern of inheritance. Carriers of the defect appear normal. Two carriers must be mated to get an AM calf, which is stillborn with a twisted spine.

AM results are reported as:

AMC Animal is AM carrier
AMF Animal is free of AM

Myostatin

Myostatin, as part of the IGENITY Profile, analyses for nine different variants of the myostatin gene, even though some may not be found all breeds.

Six variants are classified as “disruptive;” these cause muscle hypertrophy (double-muscling), larger birth weights, increased dystocia and enhanced tenderness.

Three myostatin variants are referred to as “missense,” and will increase muscularity and reduce external and intramuscular fat, with no change in birth weight.

For all myostatin variants one copy is intermediate.

Disruptive variants are:

C313Y **nt419**
E226X **nt821**
E291X **Q204x**

Missence variants are:

D182N
F94L
S105C

Myostatin results are reported as:

0 None of the nine possible variants are present
1, Variant One copy of the listed variant is present
2, Variant two copies of the listed variant are present

Bovine Viral Diarrhea - Persistently Infected (BVD PI)

This is a test for the presence of the BVD virus. Negative animals are free of the BVD virus. Positive animals have the virus present. If there is a positive test result, first contact your veterinarian. To make sure that the calf is not transiently infected with BVD, wait 30 days and re-submit a new sample on the same animal. If that sample is also positive, it is likely that the calf is persistently infected with BVD.

SR (Sample Rejected)

Samples may be rejected for many reasons including insufficient follicles, fecal contamination, excessive dirt, evidence of tampering, mold or other foreign matter.

NR (No Result)

Some samples may look normal, but still are unable to produce acceptable results. This often occurs due to contaminants that are undetectable to the naked eye, dirt, mold or other foreign matter.

For both SR and NR results, a sample from the same animal can be resubmitted at no charge.

X

Results are not complete.

Validation Process

Analyses in the comprehensive IGENITY® profile begin with the discovery of DNA markers (most often single nucleotide polymorphisms or SNPs). All the markers behind the IGENITY profile were discovered by independent scientists at research institutions, including universities, research organizations, and government entities such as USDA.

Markers are then analyzed at IGENITY in validation populations. High quality validation is dependent on good quality resource populations. IGENITY uses multiple resource populations that represent various production environments and biological types, often working with industry partners from the seedstock, cow-calf, feedlot and/or packing segments of the beef industry to collect phenotypes that are not commonly available. To date, IGENITY has captured data from tens of thousands of animals with hundreds of phenotypes under many different types of environmental conditions for use in its validation efforts.

Once the phenotypic data is captured, geneticists at IGENITY carefully analyze marker associations, using analytical methods that are well documented in the scientific literature and reviewed with academic and government scientists to ensure their validity and acceptance. Markers are analyzed individually and in groups of markers to determine the most powerful combination for any given trait. Thousands of animal phenotypes are used to conduct these analyses, resulting in confidence that any significant associations discovered will have a high probability of truly occurring in various biological types and environments. Only after new markers pass this rigorous validation process does IGENITY make new markers available to the beef industry.

Visit www.IGENITY.com for additional information, to order additional kits and view your results online.

IGENITY profile results and associated effects *

IGENITY Result	Residual Feed Intake (Indicus)**	Residual Feed Intake (Taurus)**	Average Daily Gain***	Tenderness in lbs. of WBSF	USDA Marbling Score	% Choice & higher	Yield Grade	Back Fat Thickness (in)	Ribeye Area (in ²)	Heifer Pregnancy Rate (%)	Stayability (%)	Maternal Calving Ease (%)	Docility (%)
10	5.5	4.2	0.81	-2.3	161.4	64.4	1.35	.37	2.56	18.8	16.7	9.5	45.4
9	5.0	3.6	0.72	-2.0	141.3	57.2	1.21	.32	2.22	16.2	14.7	8.4	39.6
8	4.2	3.1	0.64	-1.9	123.6	50.1	1.07	.28	1.93	14.2	12.9	7.3	34.7
7	3.6	2.7	0.54	-1.5	106.4	42.9	0.92	.24	1.64	12.1	11.2	6.2	30.0
6	3.0	2.2	0.44	-1.2	88.4	35.8	0.76	.21	1.35	10.0	9.5	5.1	25.3
5	2.4	1.8	0.34	-1.1	70.6	28.6	0.61	.17	1.07	8.1	7.6	4.1	20.5
4	1.9	1.3	0.24	-0.8	53.3	21.5	0.46	.13	0.80	6.0	5.8	3.1	15.7
3	1.2	0.9	0.14	-0.4	35.5	14.3	0.31	.09	0.53	4.0	3.9	2.0	10.7
2	0.6	0.4	0.05	-0.2	17.7	7.2	0.15	.06	0.24	1.9	2.5	1.0	5.8
1	0	0	0	0	0	0	0	0	0	0	0	0	0
P-value	5.7E-13	8.04E-08	2.4E-19	1.9E-08	3.8E-18	1.0E-20	1.6E-16	3.9E-20	1.8E-14	2.6E-30	1.1E-34	4.2E-32	3.1E-19

*Data on file at Merial. Results expressed represent differences expected in animals compared to contemporaries with IGENITY Profile scores of 1.

**Lbs of feed per day.

*** Lbs of gain per day.

WBSF = Warner-Bratzler shear force

