

Understanding Genomic Predictions

OFFICIAL HOLSTEIN PEDIGREE

U.S. Registered Holsteins FOR MAXIMUM PROFIT
Holstein Association USA, Inc.
www.holsteinusa.com

100% Registered Holstein Ancestry (RHA-NA)
P9 GTPI +1958
10/15/2008 FEMALE

HOLSTEINACRES ABC SALLY-ET
USA 12345678 100%RHA-NA

PTA	+672M	+61F	+37P	72%R	4/2009
PTA	+533NM	+15%F	+0.07%P		
PTA	+4.1PL	3.04SCS	+0.2DPR	7%DCE	
PTA	+3.3T	+3.2UDC	+1.98FLC	68%R	4/2009

OUT-JOCK CHOICE AMEL-ET
USA 2231596 100%RHA-NA
5-02 85 +++E GM 8/0

MACE YIELD EVALUATION
PTA +1080M +10F
PTA +240NM -.11NF
PTA +2.2PL 2.96SCS
MACE TYPE EVALUATION
PTA +2.5UDC

END-RO
USA 15
4-0

PTA
PTA
PTA
PTA

TPI DHR
+1891M 1-10
*** 2-10
*** 4-06

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Genomics has become a popular buzz word in the dairy industry and the technology will likely play a significant role in helping dairymen breed a better Holstein cow. Genomics is defined as the sequencing of genetic material in cattle DNA, and using that information to better understand how genes are expressed, controlled, what relationships they have with each other, and where they are physically located on the chromosome.


Holstein Association USA is working to stay at the forefront of this technology and provide the most up-to-date genomic information, products and services. This brochure is intended to answer questions and outline some of the biggest changes that breeders will notice, with the public release of genomic information, including how to determine if an animal has been genomically tested, how it will affect genetic evaluations and animal rankings, and information on ordering testing materials.

Genomic Information on Your Pedigrees


It is easy to tell whether or not an animal has been genomically tested on pedigrees, fact sheets, and other performance records. A GTPI signifies that genomic information was used in the calculation of the individual PTAs and overall index. Genomic information will not appear on pedigrees until after USDA's National Genetic Update (in January, April, or August) following an animal's genomic test.

Labeling of Pedigrees and Reliabilities	
TPI	<ul style="list-style-type: none"> Bull has at least 10 daughters in his PTAs Reliability depends on number of offspring
PTPI	<ul style="list-style-type: none"> Parent Average - no production and/or type information available Reliability = 36%
CTPI	<ul style="list-style-type: none"> Cow has production record and classification score Reliability = 55%
GTPI	<ul style="list-style-type: none"> An animal has been genomically tested and: Does not have a production or type record and no progeny, reliability = 65% Has a production or type record and no progeny, reliability = 70% Has progeny, reliability depends on number of offspring

Pedigree before genomic information is added



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HOLSTEINACRES ABC SALLY-ET P9 **PTPI** 775
 USA 12345678 100%RHA-NA **+1897** 10/15/2008 FEMALE

PTA +1174M# +64F# +36P# 39%R 1/2009
 PTA +4.9PL# 2.98SCS# +.0DPR 7%DCE#
 PTA +2.65T#+2.40UDC#+1.63FLC# 39%R 1/2009

Pedigree after genomic information is updated



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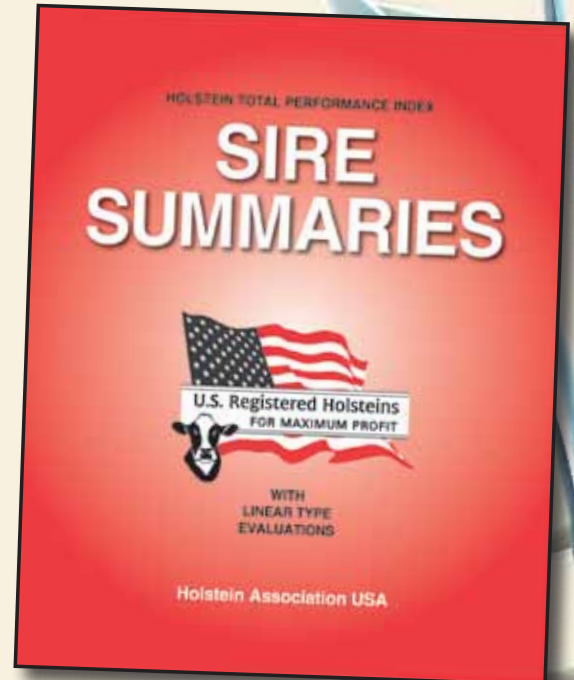
HOLSTEINACRES ABC SALLY-ET P9 **GTPI** 775
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PTA +672M +61F +37P 72%R 4/2009
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 PTA +3.3T +3.2UDC +1.98FLC 68%R 4/2009

How Genomics Will Affect Animal Rankings

* changes to the lists starting in January 2009 are underlined>.

- **Top 100 TPI List** - Bulls must have a minimum 80% U.S. reliability for production and type OR 85% Genomic reliability
- **Top 400 TPI List** - Bulls must have at least 10 daughters or more and a reliability of 70% for production and type
- **Active, Limited or Foreign Bulls** - Bulls must have 10 or more daughters and an official production and type proof
- **Top 250 Active Young Sires** - Ranks the top 250 bulls based on GTPI or PTPI. Bulls have no daughters in their production or type proofs.
- **Locator List** - Animals are required to have an official lactation record and required classification score to be eligible for this list
- **A separate list** is being developed for females that meet the minimum CTPI cutoff, but are not eligible for the Locator List
- **All Top Bull lists** - will be labeled as follows to indicate the source of the data



LABEL	INTERPRETATION	INFORMATION INCLUDED
BLANK	US daughters only	Only US daughter information is included. No genomic data.
M	MACE	Foreign daughter information is included, may or may not contain US daughters. No genomic data.
G	Genomic	Contains genomic data, may have US daughters, foreign daughters or no daughters.



Top 100 TPI™ Bulls AUGUST 2009

(Semen Status is ACTIVE or LIMITED with a minimum of 80% traditional US reliability OR 85% Genomic reliability for production and type)

Rank	Name	% RHA	NAAB	CD	SP		PROTEIN		FAT		MILK		PL		TYPE				
					PTA	PTA%	PTA	PTA%	PTA	%R	Hrds	SCS	PTA	%R	PTA	%R	UDC	FLC	TPI™
1	PICSTON SHOTTLE-ET	TV TL 100-NA	29HO12209		67	-.01	102	.07	2315	99	3409	2.64	3.2	87	4.20	99	3.33	3.16	2251M
2	ENSENADA TABOO PLANET-ET	TR TV 100-NA	7HO08081	S	75	-.01	83	-.05	2630	89	55	2.88	5.8	73	2.40	89	2.67	-0.14	2170G
3	BRAEDALE GOLDWYN	TV TL 100-NA	200HO03205		42	.05	73	.15	929	99	6544	2.69	3.6	88	3.86	99	3.58	3.44	2045M
4	O-BEE MANFRED JUSTICE-ET	TR TV 100-NA	7HO06417	S	60	.10	79	.15	1118	99	7391	2.69	6.1	99	0.78	99	0.63	1.58	2039M
5	WA-DEL JUNCTION-ET	TV TL 100-NA	29HO11942	S	58	.05	71	.06	1480	87	59	2.94	4.9	56	1.85	81	1.52	2.50	2018
6	ENGLAND-AMMON MILLION-ET	TR TV 100-NA	7HO08165	S	40	-.01	80	.10	1429	91	65	2.88	3.6	72	3.20	89	3.48	2.19	2016G
7	RAMOS	TV TL 98-I	11HO08046		30	.05	33	.05	535	99	9448	2.58	8.2	94	2.06	97	2.03	2.22	1992M
8	KED OUTSIDE JEEVES-ET	100-NA	29HO11614	S	36	-.02	60	.04	1361	92	66	2.89	6.5	74	2.50	90	2.37	2.42	1971G
9	REGANCREST-HHF MAC-ET	TV TL 100-NA	11HO08342	S	23	.00	35	.02	807	98	183	2.87	4.3	88	3.20	95	3.82	2.36	1939G
10	LUTZ-BROOKVIEW MICHAEL-ET	TR TV 100-NA	7HO07853	S	20	.02	62	.17	506	92	67	2.77	5.7	78	2.10	90	2.44	1.73	1934G
11	PROBSTLAND ERNESTO	TV TL 100-NA	203HO00376	O	50	.05	39	-.02	1230	87	21	2.92	2.9	63	2.72	81	3.52	1.74	1925

Testing Your Animals

Just like pedigree and actual performance data, genomic predictions are an additional piece of information to help predict an animal's performance.

Potential applications for genomic testing:

- Screen potential herd replacements for genetic merit
- Identify genetically superior individuals in the herd for flushing
- Identify carriers of undesirable recessives for culling or mating decisions
- Verify and/or correct parentage records
- Add value to a sale consignment
- Use estimates of genetic merit to aid in corrective mating

To order a DNA sampling form for your animals, simply call Holstein Association USA at 800.952.5200. The cost is \$250 per animal. After the hair sample is taken, it should be sent to the laboratory in the pre-addressed envelope provided with the testing form.

Frequently Asked Questions

- **How much of an impact does genomics have on an animal's numbers?**
Genomic information will have approximately the same impact on an animal's information as adding 15 daughters to a bull's proof, or adding three lactations worth of production information.
- **Will we be able to view genomic information on any animal that has been tested?**
Yes. Simply visit the Holstein Association USA Web site (www.holsteinusa.com), and type the animal's name or registration number into the Animal Search box on the homepage. When the animal's name and information appear, you will be able to see whether or not she has been genomic tested, and if so, the option to purchase a pedigree or Animal Fact Sheet including genomic information will be available.
- **Is there a more economical testing option available?**
A lower priced test is currently being researched. Current estimates indicate that a new test may be available sometime in 2010. If so, Holstein Association USA plans on marketing the test. The goal is to have parentage verification, genetic merit, and recessive testing done, all with one hair sample.
- **What if I would like to genomically test one of my bull calves?**
Please contact your AI organization to arrange for your bull calf to be tested.
- **Will a cow's genomic information affect that of her descendants?**
Yes. After the Genetic Update that includes the animal's genomic information, this information will also be incorporated into the PTAs of her descendants.

Individual Animal Genomic Prediction

Example: Holstein Heifer - Birth year: 2007

Trait	Genomic PTA	Official PA/PTA	Genomic REL %	Official REL %
HEALTH				
Net Merit (\$)	542	384	65	33
Daughter Pregnancy Rate (%)	1.2	-0.4	56	25
Productive Life (months)	4.3	1.8	57	27
Somatic Cell Score	2.80	2.88	63	30
YIELD				
Milk (lbs)	821	1107	69	36
Fat (lbs)	65	54	69	36
Fat (%)	0.14	0.06	69	36
Protein (lbs)	34	35	69	36
CALVING				
Daughter Calving Ease	7	8	55	26
Daughter Still Birth	NA	8.6	NA	24
TYPE				
Final Score (PTAT)	2.4	1.99	64	33
Stature	2.0	1.95	.	.
Strength	0.7	1.10	.	.
Feet/Legs Composite	1.59	1.72	NA	NA
Udder Composite	2.39	1.50	NA	NA
TPI	1910	1677	NA	NA

Example of Individual Genomic Prediction



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For more information call
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