

Demonstrating the Value of HD 50K MVPs



Pfizer Animal Genetics has conducted testing on 10 influential Angus sires with High-Density 50K, the first and only Molecular Value Predictions (MVP[®]s) from the High-Density (HD) panel, where more than 50,000 markers are genotyped for each animal.

The tables below display the EPDs for each sire along with the HD 50K MVPs and % ranking for each. HD 50K results reinforce the power of this technology, as the MVPs closely reflect each sire's high-accuracy EPDs. HD 50K MVPs can help to more accurately predict genetic merit in young, unproven animals as early as four months of age, as compared to moderate or high-accuracy EPDs that require years of data.

G A R Predestined															13395344
	CED	BW	WW	YW	ADG	DMI	NFI	CEM	MA	CW	FAT	REA	MS	TND	\$B/\$MVP ^{FL}
EPD	7	4.1	53	99	-	-	-	6	28	26	0.046	0.59	1.07	-	69.78
ACC	0.84	0.97	0.96	0.94	-	-	-	0.8	0.85	0.82	0.81	0.82	0.84	-	-
EPD % Rank	30	85	15	15	-	-	-	55	10	4	90	2	1	-	1
MVP	13	1.0	37	-	0.45	0.97	0.04	8	33	55	0.07	0.92	1.52	-0.43	243
MVP % Rank	3	70	10	-	30	90	90	4	1	1	90	1	1	80	1

G A R Retail Product															13395329
	CED	BW	WW	YW	ADG	DMI	NFI	CEM	MA	CW	FAT	REA	MS	TND	\$B/\$MVP ^{FL}
EPD	6	2.6	47	93	-	-	-	7	25	16	0.003	0.47	0.42	-	55.08
ACC	0.92	0.98	0.96	0.95	-	-	-	0.87	0.91	0.7	0.7	0.73	0.74	-	-
EPD % Rank	45	60	35	20	-	-	-	40	25	30	35	5	30	-	10
MVP	8	1.1	26	-	0.43	0.44	-0.37	4	25	34	0.02	0.54	0.71	-0.43	167
MVP % Rank	20	70	40	-	40	80	10	20	9	6	80	2	10	80	15

H S A F Bando 1961															13896250
	CED	BW	WW	YW	ADG	DMI	NFI	CEM	MA	CW	FAT	REA	MS	TND	\$B/\$MVP ^{FL}
EPD	2	2.4	55	97	-	-	-	7	27	20	0.037	0.08	0.25	-	41.51
ACC	0.89	0.96	0.94		-	-	-	0.59	0.71	0.42	0.44	0.53	0.49	-	-
EPD % Rank	80	55	15	15	-	-	-	40	15	15	85	60	55	-	45
MVP	-2.0	2.4	43	-	0.37	0.32	-0.28	4.5	29	40	0.03	-0.08	0.24	-0.54	105
MVP % Rank	90	90	5	-	70	70	30	20	3	2	80	90	70	60	60

Mytty In Focus															13880818
	CED	BW	WW	YW	ADG	DMI	NFI	CEM	MA	CW	FAT	REA	MS	TND	\$B/\$MVP ^{FL}
EPD	14	-1.3	54	100	-	-	-	12	25	5	0.029	0.02	0.59	-	45.65
ACC	0.96	0.98	0.97	0.96	-	-	-	0.86	0.90	0.68	0.67	0.71	0.72	-	-
EPD % Rank	1	4	15	10	-	-	-	1	25	75	80	75	10	-	30
MVP	19	-6	42	-	0.25	0.29	0.09	12	26	11	0.03	-0.21	0.91	-0.47	135
MVP % Rank	1	1	5	-	90	70	90	1	7	90	80	90	2	70	30

S A V 8180 Traveler 004															13512009
	CED	BW	WW	YW	ADG	DMI	NFI	CEM	MA	CW	FAT	REA	MS	TND	\$B/\$MVP ^{FL}
EPD	4	3.5	57	104	-	-	-	7	24	24	0.109	0.13	0.14	-	26.49
ACC	0.92	0.98	0.97	0.96	-	-	-	0.9	0.93	0.59	0.59	0.65	0.64	-	-
EPD % Rank	65	80	10	10	-	-	-	40	30	10	95	50	75	-	85
MVP	1	3.6	37	-	1.02	0.52	-0.67	5	23	44	0.17	0.11	0.00	-0.68	167
MVP % Rank	80	90	10	-	1	80	1	20	10	1	90	60	90	20	2

S A V Final Answer 0035															13592905
	CED	BW	WW	YW	ADG	DMI	NFI	CEM	MA	CW	FAT	REA	MS	TND	\$B/\$MVP ^{FL}
EPD	11	-1.0	61	105	-	-	-	11	20	18	0.042	0.42	0.17	-	43.25
ACC	0.92	0.96	0.95	0.90	-	-	-	0.61	0.71	0.24	0.32	0.44	0.35	-	-
EPD % Rank	5	5	4	10	-	-	-	3	55	20	90	10	70	-	40
MVP	10.3	-3.3	45	-	0.77	0.43	-0.54	8.3	13	29	0.05	0.30	0.21	-0.69	163
MVP % Rank	9	3	4	-	1	80	3	3	70	10	90	20	80	15	6

S A V Net Worth 4200															14739204
	CED	BW	WW	YW	ADG	DMI	NFI	CEM	MA	CW	FAT	REA	MS	TND	\$B/\$MVP ^{FL}
EPD	2	4.8	59	112	-	-	-	5	32	27	0.066	0.39	0.40	-	52.86
ACC	0.67	0.96	0.94	0.90	-	-	-	0.52	0.61	0.29	0.35	0.47	0.39	-	-
EPD % Rank	80	90	10	3	-	-	-	70	3	4	95	10	30	-	15
MVP	0.7	3.8	49	-	0.82	0.88	-0.03	4.4	41	51	0.10	0.32	0.38	-0.65	197
MVP % Rank	80	90	2	-	1	90	80	20	1	1	90	15	50	20	1

S S Objective T510 OT26															13776378
	CED	BW	WW	YW	ADG	DMI	NFI	CEM	MA	CW	FAT	REA	MS	TND	\$B/\$MVP ^{FL}
EPD	11	1.1	71	125	-	-	-	8	29	10	-0.03	0.49	0.69	-	68.73
ACC	0.93	0.97	0.96	0.95	-	-	-	0.77	0.83	0.67	0.67	0.7	0.71	-	-
EPD % Rank	5	25	1	1	-	-	-	30	10	55	4	5	5	-	1
MVP	15	-1.8	73	-	0.53	0.87	-0.11	6	32	20	-0.07	0.68	1.14	-0.44	245
MVP % Rank	1	10	1	-	15	90	70	10	1	50	1	1	1	80	1

TC Total 410															14844711
	CED	BW	WW	YW	ADG	DMI	NFI	CEM	MA	CW	FAT	REA	MS	TND	\$B/\$MVP ^{FL}
EPD	2	3.6	71	129	-	-	-	8	30	27	-0.004	0.56	0.64	-	74.8
ACC	0.83	0.96	0.94	0.91	-	-	-	0.6	0.68	0.5	0.51	0.59	0.57	-	-
EPD % Rank	80	80	1	1	-	-	-	30	5	4	25	3	10	-	1
MVP	-3	3.0	65	-	0.24	-0.47	-0.61	6	32	44	-0.04	0.62	0.88	-0.45	205
MVP % Rank	90	90	1	-	80	10	1	10	1	1	4	1	3	80	1

Woodhill Foresight															13936986
	CED	BW	WW	YW	ADG	DMI	NFI	CEM	MA	CW	FAT	REA	MS	TND	\$B/\$MVP ^{FL}
EPD	2	3.9	61	107	-	-	-	5	26	25	-0.009	0.30	0.43	-	60.61
ACC	0.80	0.97	0.95	0.93	-	-	-	0.78	0.85	0.51	0.52	0.60	0.58	-	-
EPD % Rank	80	85	4	4	-	-	-	70	20	5	15	20	25	-	3
MVP	-0.2	2.3	49	-	0.32	0.46	-0.11	1.1	27	44	-0.03	0.34	0.61	-0.66	145
MVP % Rank	90	90	2	-	80	80	70	80	5	1	8	10	20	20	15

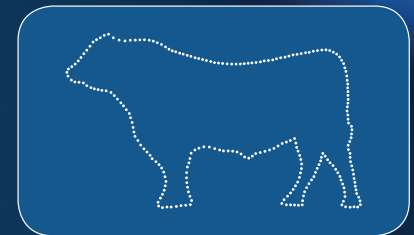
To take advantage of our HD 50K special introductory offer that ends March 31, 2010, go to www.pfizeranimalgenetics.com, contact your Pfizer Animal Genetics representative or call our Customer Service team at 1-877-BEEF-DNA for more details.

High-Density 50K for Angus Molecular Value Predictions

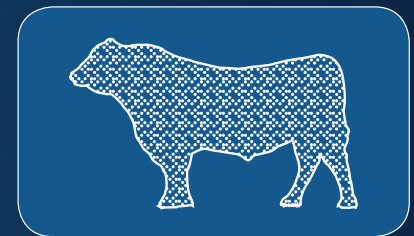
Pfizer Animal Genetics is pleased to present HD 50K, the first and only Molecular Value Predictions (MVP[®]s) from the High-Density (HD) panel where more than 50,000 markers are genotyped for each animal. The HD 50K platform provides the most comprehensive and flexible coverage of the bovine genome commercially available for beef cattle, delivering more accurate genetic predictions for 13 traits and a genomics index.

- **Changes the game** – HD 50K MVPs expand the accuracy and scope of selection, giving you more comprehensive and reliable information for young animals to enhance their relatively low-accuracy, nonparent EPDs.
- **Coverage for today and expandable for tomorrow** – HD 50K, where all 50,000+ markers are genotyped for each animal, represents nearly a thousand-fold expansion over previous technology, delivering the most reliable genomic predictions today. Utilizing archived 50K genotypes, genetic predictions are readily updated as technology continues to advance and as more traits become available.
- **Connects cattle producers** – Commercial producers purchasing from breeders utilizing HD 50K technology and EPDs versus utilizing EPDs alone can earn \$420 added value per bull from a single calf crop, based on improved feedlot and carcass performance!

Molecular Value Predictions (MVPs) quantify each animal's breeding value and allow easy ranking and selection of animals for a series of economically important traits and, for the first time, are incorporated into a comprehensive DNA-based feedlot and carcass profitability performance index. The MVPs are reported both in units of the trait (like EPDs) and in percentile rank. Different from EPDs, MVPs are expressed as breeding values (one-half of a breeding value equals an EPD). The following table shows the MVP and 50% rank (breed average) for each trait.



Lower-density options include fewer markers.



HD 50K delivers more reliability and expands selection opportunities.

Molecular Value Predictions (MVPs)*

	Calving		Growth		Efficiency		Maternal		Carcass			Quality		Index
	CED	BW	WW	ADG	DMI	NFI	CEM	MA	CW	FAT	REA	MS	TND	\$MVP ^{PL}
MVP	4.7	0.1	26	0.33	-0.02	-0.21	3.1	16	21	0.00	0.16	0.42	-0.58	115
% Rank	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%

*MVP values associated with 50% Rank for each trait.

The 13 traits and economic index for which HD 50K MVPs are available include:

CED: Calving Ease Direct MVP (%)

BW: Birth Weight MVP (lbs.)

WW: Weaning Weight MVP (lbs.)

ADG: Average Daily Gain MVP (lbs.)

DMI: Dry Matter Intake MVP (lbs.)

NFI: Net Feed Intake MVP (lbs.)

CEM: Calving Ease Maternal (%)

MA: Milking Ability (lbs.)

CW: Carcass Weight (lbs.)

FAT: Fat Thickness (in.)

REA: Ribeye Area (in²)

MS: Marbling Score (USDA units)

TND: Tenderness (lbs.)

\$MVP^{PL}: Molecular Value Prediction – Feedlot (dollars) – Index of net dollars returned due to combined genetic merit for dry matter intake, average daily gain, carcass weight, ribeye area and fat thickness (yield grade), and marbling score (quality grade), when sold on CAB-like grid



Some animals in this sale offering may have had samples submitted for HD 50K MVPs for which results are not yet available. Once tests are completed they will be provided to buyers from the seller for use in their breeding and marketing programs. Such animals are denoted with the HD 50K symbol.

For more information, please go to www.pfizeranimalgenetics.com, contact your Pfizer Animal Genetics representative or call our Customer Service team at 1-877-BEEF-DNA.

Reading Pfizer Animal Genetics High-Density 50K Angus MVP Reports



Pfizer Animal Genetics is pleased to present HD 50K for Angus, the first commercially available Molecular Value Predictions (MVPs) derived from a High-Density panel with more than 50,000 markers. The suite of 14 genomic trait predictions, including the beef industry's first DNA-based economic index, provides MVPs for some economically important traits not available as EPDs, like average daily gain, dry matter intake, net feed intake and tenderness, as well as many traits that complement EPDs, as described below.

Animals are listed on the report in default sort order—alphabetically by breed (if other than purebred Angus) and sex—and in ascending order by tattoo, tag and registration number. Following is a brief explanation of elements of the HD 50K for Angus MVP Report:

Molecular Value Predictions (MVPs)*														
	Calving		Growth		Efficiency		Maternal		Carcass			Quality		Index
	CED	BW	WW	ADG	DMI	NFI	CEM	MA	CW	FAT	REA	MS	TND	SMVP ^{PL}
MVP	4.7	0.1	26	0.33	-0.02	-0.21	3.1	16	21	0.00	0.16	0.42	-0.58	115
% Rank	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%

*MVP values associated with 50% Rank for each trait.

Molecular Value Predictions (MVPs) - Predicted genomic breeding values for animals are based on the sum of the effects of the associated markers from the HD 50K platform, and are expressed in units of measure for the trait. Similar to EPDs, MVPs are expressed as deviations from a set base-point and rank animals for genetic merit. To understand how to interpret MVPs, consider the following two sires and their weaning weight (WW) MVPs:

If Sires A and B are bred to similar groups of cows, Sire A is expected to pass on genes to his calves which result in weights that average 10 lbs. more at

	WW MVP
Sire A	+20 lbs.
Sire B	0 lbs.
Difference	20 lbs.
1/2 to offspring	10 lbs.

weaning as compared to the average of calves sired by bull B, due to these transmitted marker effects.

% Rank - Percentile rankings are based on the animal's MVP for each trait as compared to the overall population of Angus animals with HD 50K MVPs in the Pfizer Animal Genetics database. Rank values indicate the "top" position of the animal in the population, with lower values indicating higher and generally more favorable rank for most traits. An abbreviated percentile ranking table is provided on the bottom of the next page.

HD 50K / Angus / 01 - This notation designates the genotyping platform (HD 50K), breed (Angus), and version number (01) for the prediction equations applied to the markers used to compute the reported MVPs, percentile ranks and reliability values. As our database of HD 50K genotypes and performance information grows, more advanced versions of prediction equations are anticipated.

Animal Identification - Tattoo, tag and registration numbers, as well as animals' names, as provided on

sample submission forms from customers, and associated barcode on the sampler provided by Pfizer Animal Genetics.

Breed - Breed or breed cross of animal as reported by the customer.

Sex - The letter F is used for females and the letter M is used to identify males.

CED - Calving Ease Direct MVP (% probability of unassisted births, evaluated as a trait of the calf) communicates differences in genetic merit for the likelihood of unassisted births in first-calf heifers, with higher values preferred, especially when selecting sires for use on replacement heifers for easier calving.

BW - Birth Weight MVP (lbs.) indicates variation in breeding value for calf birth weight based on the marker effects, with moderate and lower values generally desired.

WW - Weaning Weight MVP (lbs.) measures diversity in breeding value for weaning weight, with higher values generally preferred.

ADG - Average Daily Gain MVP (lbs./day) evaluates differences in breeding value for postweaning gain per day, with higher values equating to genes for added growth from weaning to yearling age.

DMI - Dry Matter Intake MVP (lbs./day) is an input trait that indicates genetic differences among animals in pounds of dry matter consumed per day, in the feedyard on finishing rations, and should be evaluated in relation to genetic merit for output traits, including MVPs for ADG and carcass weight (CW).

NFI - Net Feed Intake MVP (lbs. dry matter/day) indicates genetic variation in pounds of dry matter consumed per day, as compared to the animal's expected feed consumption based on its body weight and growth rate. Lower values are preferred and point to breeding value for greater feed efficiency based on the marker effects.

CEM - Calving Ease Maternal (% probability of unassisted births, evaluated as a trait of the dam) quantifies genetic difference in the likelihood of unassisted births in first-calf heifers, with higher values preferred when selecting sires for daughters which are retained as replacements.

MA - Milking Ability (lbs. of weaning weight from daughters) evaluates differences in breeding value for the maternal component of weaning weight and is expressed as pounds of calf weaning weight, primarily due to the genes for milking ability possessed by the dam. The genetic potential for MA should be matched to available feed resources.

CW - Carcass Weight (lbs.) measures genetic variation in pounds of carcass weight at a constant level of outside fat thickness. Higher values indicate genes for more carcass weight.

FAT - Fat Thickness (in.) communicates differences in breeding value for fat thickness measured adjacent to the ribeye between the 12th and 13th rib, at a constant carcass weight. Higher values adversely affect USDA yield grade, but may be desired for maternal adaptability.

REA - Ribeye Area (in²) indicates differences in genetic merit for muscularity as measured by square inches of ribeye area between the 12th and 13th rib, at a constant fat thickness.

MS - Marbling Score (USDA units) quantifies genetic variation in USDA marbling scores at a constant fat thickness, with higher values indicating genetics for more marbling and generally more desirable quality grade.

TND - Tenderness (lbs.) indicates differences in genetic merit for tenderness based on the amount of shear force required for slicing cooked steak samples. Lower values are desired.

\$MVP^{FL} - Molecular Value Prediction – Feedlot (dollars) is an index which gives an estimate of differences in the profitability of animals based on genetic merit (MVPs) to produce valuable carcasses when sold on a Certified Angus Beef (CAB) grid, in relation to how much feed the animal is likely to consume. The value of the animal is based on an estimate of carcass weight and grade after approximately 160 days on feed. MVPs for the following traits are included

in the calculation: weaning weight (WW), average daily gain (ADG), dry matter intake (DMI), carcass weight (CW), ribeye area (REA), fat thickness (FAT), and marbling score (MS).

QG1, QG2, QG3, QG4 - Original GeneSTAR[®] Quality Grade (QG) markers reported as 0, 1 or 2 copies of the favored allele. Available for an additional fee.

T1, T2, T3 - Original GeneSTAR Tenderness (T) markers reported as 0, 1 or 2 copies of the favored allele. Available for an additional fee.

Summary Benchmark Statistics - Average, minimum and maximum MVPs for Angus animals included in the Pfizer Animal Genetics database, benchmarked against Angus animals included in this job.

Reliability - Reliability is the standard for assessing the predictive power of the MVP for a trait. It is derived solely from an animal's genotype and is based on the correlation between the MVP and the animal's breeding value if all information were known. Reliability values range from zero to one, with higher values indicating a stronger association between the predicted and actual breeding value.

In addition to these current traits, animals with HD 50K genotypes qualify for ongoing access to future genetic predictions for unique traits related to animal health, reproduction and the healthfulness of beef—all of which are under development as part of the Pfizer Animal Genetics research pipeline.

For more information, a more detailed technical summary of HD 50K MVPs for Angus is available on our Web site at pfizeranimalgenetics.com, or you may contact your Pfizer Animal Genetics representative or call our Customer Service team at 1-877-BEEF-DNA.

MVP Values by Percent Ranking (based on 5,101 animals)

	CED	BW	WW	ADG	DMI	NFI	CEM	MA	CW	FAT	REA	MS	TND	\$MVP ^{FL}
Top 5%	12.3	-3.0	43	0.54	-0.71	-0.49	7.7	27	35	-0.04	0.48	0.83	-0.81	169
Top 10%	10.2	-2.2	39	0.47	-0.55	-0.41	6.3	25	32	-0.03	0.39	0.73	-0.75	154
Top 20%	8.0	-1.3	34	0.42	-0.38	-0.34	5.0	21	28	-0.02	0.30	0.62	-0.68	139
Top 30%	6.8	-0.7	31	0.38	-0.24	-0.29	4.2	19	25	-0.01	0.24	0.54	-0.64	129
Top 40%	5.7	-0.3	28	0.36	-0.13	-0.25	3.6	18	23	-0.01	0.20	0.48	-0.61	122
Top 50%	4.7	0.1	26	0.33	-0.02	-0.21	3.1	16	21	0.00	0.16	0.42	-0.58	115
Top 80%	1.7	1.4	20	0.26	0.38	-0.06	1.2	12	16	0.02	0.01	0.21	-0.46	90