UNDERSTANDING GeneSTAR MVP RESULTS

GeneSTAR® MVPs™ represent a new DNA era for genetic improvement in beef cattle. Incorporating a 56-marker panel for three economically important traits, GeneSTAR MVPs are the most useful DNA-marker tools for genetic improvement to date. The product provides Molecular Value Predictions for the core traits of feed efficiency, marbling[1] and tenderness.

Molecular Value Predictions (MVPs)

GeneSTAR MVPs are by definition a "molecular breeding value" based on the effects of the specific markers in the current panel. Thus, they represent a portion of the expected underlying genes affecting the traits. By definition, an MVP is similar to an estimated breeding value (EBV) from a genetic evaluation in how it is expressed. The difference is that an EBV is based on phenotypic records of the animal and its relatives, whereas an MVP is derived from an animal's genotype only.

From Stars to MVPs

The reporting format of GeneSTAR MVPs has evolved from the original star-based system. The star system reported a result based on the number of favourable alleles present for a particular trait, with a maximum of eight stars for each of the three traits reported. GeneSTAR MVPs incorporate information from many more markers, which may not all have equal effects and can affect multiple traits simultaneously. The MVP for a trait is predicted from the overall sum of allelic effects in the animal's genotype for the entire 56-marker panel for that specific trait.

GeneSTAR MVP Traits

The GeneSTAR platform currently produces MVPs for the traits of feed efficiency, marbling and tenderness. As GeneSTAR MVPs are reported in trait units, it is important to understand how each of the traits assessed is defined and measured. (See table below.)

Feed efficiency is predicted on the basis of net feed intake (NFI), which measures the difference between an animal's actual and expected feed intake based on its body weight and growth rate. The GeneSTAR MVP for feed efficiency is reported in kilograms of feed consumed per day compared to the predicted required feed intake in kilograms with a **negative feed efficiency MVP value being favourable** (i.e., more feed efficient).

Marbling is a visual assessment of the degree of intramuscular fatness in the *longissimus dorsi* (ribeye) muscle and is a predictor of overall eating quality. The GeneSTAR MVP for marbling is reported as AUS-MEAT Marble Score with a **positive marbling MVP value being favourable** (i.e., higher marbling score).

Tenderness is predicted on the basis of the peak force required to shear cooked steak after 14 days of postmortem aging. The GeneSTAR MVP for tenderness is reported in kilograms of Warner-Bratzler shear force with a **negative tenderness MVP value being favourable** (i.e., more tender).

Trait	Definition	Units	MVP Range*
Feed Efficiency	Difference between an animal's actual and expected feed intake based on its body weight and growth rate	kgs/day	**Min: -1.44** Max: 1.08
Marbling[1]	Degree of intramuscular fatness in the *longissimus dorsi* (ribeye) muscle	AUS-MEAT Marble Score 0 – 9	Min: -1.00 **Max: 1.11**
Tenderness	Force required to shear a cooked steak after postmortem aging	W-B Shear Force (kgs)	**Min: -0.47** Max: 0.86

*The closer the MVP value is to the highlighted Minimum or Maximum in each row, the more favourable the result.

GeneSTAR MVP Range and % Reliability Described

	MVP Range	% Reliability
Feed Efficiency (kgs)	★ 2.52 ★	30%
Marbling (0 – 9)	★ 2.11 ★	26%
Tenderness (kgs)	★ 1.33 ★	49%

MVP

GeneSTAR MVP Applications

GeneSTAR® MVPs™ are a prediction of phenotypic performance of the animal tested, based on the genetic potential that can be expressed by that animal in the production environment. MVPs quantify an animal's ability to perform for a particular trait. As such, they provide the background genetic profile information that can be employed to make breeding decisions or decisions about how the animal should be managed and what specific supply-chain endpoints will maximise the animal's ultimate value.

GeneSTAR MVPs are powerful tools for making genetic improvement in both seedstock and commercial cow-calf operations through improved bull selection. Additionally, by having GeneSTAR MVPs available on the cow herd, producers can make improvements in the reliability of their selection of replacement females.

GeneSTAR MVPs are also ideally suited to sorting animals based on their MVPs into feeding regimens to more consistently achieve end-product specifications more efficiently. Additionally, application of tenderness and marbling MVPs has high value within supply chains seeking to differentiate product based on eating quality.

GeneSTAR MVP Reliability Value

Reliability value is the standard for assessing the accuracy and predictive power of the MVP for a trait. Reliability is based on the correlation between the MVP and the animal's genetic breeding value if all information were known.

The reliability value is expressed as a percentage of the maximum accuracy attainable and is a useful indication of how much additional information may be added in the future as greater numbers of markers are added to the panels used to calculate the MVP.

GeneSTAR MVP Summary Statistics

A new inclusion to the GeneSTAR reporting and results system is the generation of breed-specific percentile ranks. Every animal tested in the GeneSTAR MVP system is benchmarked against all other animals tested for its respective breed and assigned a percentile ranking. Animals are ranked from 1 percent to 100 percent, with 1 percent being the best possible rank and 100 percent being the worst. A summary table is also included on the final page of the report showing maximum, minimum and average MVP and reliability values for each of the traits. A breakdown of how the MVPs for the group of animals tested are distributed across the breed is also provided in the form of a breed quartile summary table for each of the three traits.

For more information please contact Pfizer Animal Genetics on 1300 768 400 or visit our Web site, www.pfizeranimalgenetics.com.au.

GeneSTAR® MVP

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GST09026