

DNA test soars to 56 markers



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AT A GLANCE

- New GeneStar marker panel jumps from 12 to 56 markers.
- Delivers increased reliability and power to breeding decisions.
- New reporting format, including breed-wide comparisons.

THE use of DNA testing to provide genetic selection and commercial sorting tools for important beef cattle traits took a major step forward last week with the launch of a new 56-marker panel for Pfizer's GeneStar test.

The new marker panel replaces the previous test, which assessed only 12 genes contributing to three important beef traits – tenderness, marbling and feed efficiency.

Importantly, the expanded marker panel explains a significantly larger proportion of the genetic variation seen in animals for each trait, ranging in reliability from 26 percent in the example of marbling to 30pc for feed efficiency to 49pc for tenderness.

Put simply, more markers and increased reliability will add power to breeding decisions made by commercial and stud cattle producers using DNA tools.

The launch of the greatly expanded marker panel also heralds a range of other changes to the previous GeneStar system, described during the launch as a "significant generational shift" in DNA marker information, designed to allow users to make better informed decisions.

Among the important changes is a new assessment process designed to improve both the reliability and utility of GeneStar test results.

This will see a shift from the familiar number of stars (representing the favourable forms of the gene present in each animal) to a process called molecular value predictions (MVPs).

This is a number on a continuous scale quantifying each animal's ability to perform for each trait simultaneously.

For example, an animal might have an MVP for feed efficiency of 0.33 (representing kg/day of feed, where a 'negative' score is favourable); an MVP of 0.05 for marbling (positive AusMeat marbling score is favourable); and an MVP for tenderness of -0.42 (measured in shear force, where negative is favourable).

A percentage rank is also provided for each trait. A 78pc rank means an animal lies in the top 78pc of its breed for that trait.

While an MVP is similar to an Estimated Breeding Value (EBV) in Breedplan work from a genetic evaluation in how it is expressed, the difference is that an EBV is based on

		FE	Marb	Tend	
Animal A	MVP	-0.33	0.01	-0.42	kgs W-B Shear Force – negative is favourable
	% Rank	26%	49%	7%	Marbling Score – positive is favourable
Animal B	MVP	0.27	-0.03	-0.26	kgs/day – negative is favourable
	% Rank	78%	66%	11%	

% Rank shows where an animal ranks against others within the breed

A 78% rank means an animal lies in the top 78% of its breed for that trait



phenotypic records of the animal and its relatives, whereas an MVP is derived from an animal's genetic make-up only.

Direct comparisons cannot be made between the MVP reliability figure and Breedplan EBV accuracy figure, however.

Under former GeneStar models, each marker was treated as an equal effect, whereas the new MVP model accounts for varying individual marker effects.

The new format, for the first time, also provides benchmarks against breed averages, and breed maximums and minimums (this applies for breeds with more than 500 animal entries on the GeneStar database. For breeds with fewer entries, comparisons are made with broader Indicus or Taurus types).

This function allows for comparison of all animals, both within the herd or management group, and across an entire breed.

Pfizer Animal Genetics' Jason Strong said the 56 markers in the new product were chosen from several thousand candidates in an exhaustive screening process.

The new markers have gone through a rigorous internal and external validation process across extensive cattle populations, both within Australia and overseas.



The original 12 markers are still included in the new panel, and they still contribute significantly.

still contribute significantly to the results. All the information users have recorded on the earlier markers still stands – we are simply adding more data and more reliability to the picture," he said.

Following last year's SmartGene project, where debate emerged about the value of some DNA markers based on the relatively low percentage of genetic variation that they explained, Mr Strong said it was important to keep this aspect in context.

"The tenderness markers analysed in the SmartGene work are a perfect example.

"For Brahman cattle, the markers only explained about 15pc of the genetic variation, but that represents about 1.5kg of shear force in Brahman cattle, so it is highly valuable for that group.

"In contrast, in Angus cattle, these same markers explained 60pc of genetic variation, but that represented only 200 grams of variation in shear force."

The important consideration was the combination of the amount of genetic variation explained for a trait, plus the range of results within that trait.

Under the new 56-marker panel, even though the test might explain only 26pc of genetic reliability in the case of marbling,

the MVP range represented greater than two marbling scores.

"If any producer went to a processor and said they could increase their average marbling performance by a half-score, they would be welcomed with open arms," Mr Strong said.

Asked about the prospect of inclusion of other traits in the latest model, he said Pfizer would have "loved" to have included daily intake and average daily gain markers in the new panel, but the company was determined not to release traits until it had clear statistical evidence to support their introduction.

Such work was not yet far enough advanced for inclusion of new traits; however, GeneStar's next generation product was likely to have a mind-boggling "several thousand" markers included, and would include several important new production traits.

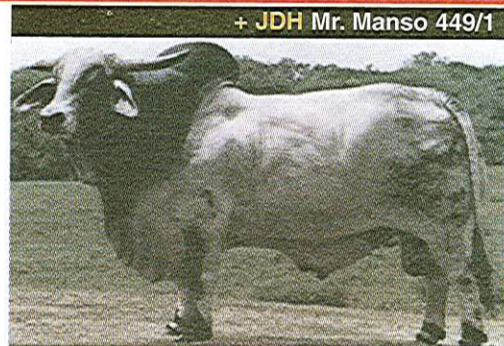
The new GeneStar MVPs represent a big step ahead both in genetic improvement in seedstock herds, as well as in commercial breeding operations through improved bull selection, and in feedlots where the process can be used to pre-sort animals based on likely performance for a range of economic criteria.

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