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New Zealand

Pfizer Animal Genetics Releases an Expanded DNA-marker Panel

DNA-marker technology continues to evolve at breakneck speed, and the latest advance is a more reliable genetic test for beef producers who are looking to make more informed management decisions. Pfizer Animal Genetics recently released GeneSTAR® Molecular Value Predictions (MVPs™), based on an expanded panel of 56 DNA markers, that identify traits for feed efficiency, marbling and tenderness and improve the reliability and value of GeneSTAR as a decision-making tool.

GeneSTAR MVP technology provides:

- A measure of molecular breeding value expressed in units of the trait, similar to estimated breeding values (EBVs).
- Average MVP reliability values for the herd.
- A state-of-the-art molecular tool which, when combined with traditional genetic principles, can promote accelerated rates of genetic improvement.

GeneSTAR MVPs are a result of Pfizer Animal Genetics' significant investment in research, development and independent validation of new genomic technologies in cattle.

"As new discoveries in molecular genetics become available, beef producers must be able to trust that

these innovations will benefit their operations," says Pfizer Animal Genetics Senior Director of Global Technical Services Dr Ronnie Green. "For this reason, it is crucial that each new technology is rigorously and independently validated."

DNA-marker Technology Validation

The process from discovery to validation includes four steps:

- 1) Discovery. Markers, or panels of markers, are identified that are significantly correlated with expression of a commercially relevant trait in one or more accurately phenotyped cattle populations. These panels are developed from a variety of sources and combine markers and detailed predictions across multiple cattle groups.
- 2) Development of statistical methodology for calculating MVPs from the marker panels.
- 3) Internal evaluation and validation. Once a marker panel for a trait is identified, it is evaluated in populations that were not included in the discovery cattle groups.
- 4) Independent validation. In Australia, the CRC for Beef Genetic Technologies and their partner, Animal Genetics and Breeding Unit (AGBU), conducted the independent analysis and validation for

[continued on back page](#)

In this issue ...

- Pfizer Animal Genetics Releases an Expanded DNA-marker Panel
- Understanding the New GeneSTAR Reporting System
- Genes Are No Mystery at St Leger

Producer Profile



As one of the largest Poll Dorset stud herds in Australia, Hillcroft Farms uses DNA-marker technology to

provide the information needed to make the most accurate breeding and selection decisions. Read more inside.

From the Expert

DR RONNIE GREEN
PFIZER ANIMAL GENETICS



What are GeneSTAR 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.

Understanding the New GeneSTAR Reporting System

The release of GeneSTAR® MVP™ makes available more genetic information than ever before about economically relevant traits. In order to provide beef producers with the best representation of the true genetic value of an individual animal, this new system has been developed to deliver more relevant and reliable information about an animal's genetic potential.

Understanding the new report

GeneSTAR results were previously reported as a number of stars based on the total number of favourable alleles—or alternate forms of a gene—affecting the trait, with a maximum of eight stars per trait. GeneSTAR MVPs are based on many more markers, which do not necessarily have equal effects, and that may affect more than one trait simultaneously. When moving to a larger number of markers, the more appropriate method to capture the greatest value from DNA testing is to move to an MVP format. GeneSTAR MVPs are produced for each trait to appropriately account for the sum total of the marker effects on that trait.

New GeneSTAR MVPs account for a 56 DNA-marker panel which includes the previous 12 and an additional 44 newly identified markers. MVPs are produced for feed efficiency, marbling and tenderness.

A single MVP is calculated on each animal and is expressed in units of the trait. Also provided is a reliability value, which 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.

GeneSTAR®



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GENESTAR CUSTOMER JOB RESULTS FINAL REPORT

Job Number:	12345	Customer ID:	BovineCattle
Date Requested:	12/11/2007	Password:	ssstocker
Customer name:	Bovine Cattle Company	Contact:	Sammy Stocker
Customer phone:	5555 555 555	Customer fax:	5555 555 556
Customer address:	123 Anywhere St Yourtown AAA 123 NEW ZEALAND		

Molecular Value Prediction

		FE	Marb	Tend	
Name: Amazing Bull Wonder 1536	Ear Tag:	MVP	-0.13	-0.25	-0.45
Barcode: 752 000040922684	Breed: Angus	% Rank	20%	90%	10%
An. ID: B202	Publish to Website: <input type="checkbox"/>				
Gender: M	Reg #:				

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.

The GeneSTAR MVP produces more information on an individual animal than the previous GeneSTAR test.

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Producers will receive individual animal GeneSTAR MVP information in a format similar to the example shown. In addition, overall breed distribution, average herd reliability values and individual animal percentile rankings are also reported.

Applying the new GeneSTAR information

As a full-service genomics provider, Pfizer Animal Genetics offers consultative technical services to ensure that maximal value can be achieved from the application of results in your production-marketing system. This includes working with you to understand and apply the test information results to your own management and marketing programmes.

For specific questions regarding the new GeneSTAR MVP system, please contact Pfizer Animal Genetics on 0880 228 278 or visit our Web site, www.pfizeranimalgenetics.co.nz.

Genes Are No Mystery at St Leger

Rick Spence of St Leger Superior Genetics in Poverty Bay has kept the breeding priorities for his stud flock relatively unchanged since he started the stud back in 1979.

His vision then and now is for hardy, fertile Romneys that have a high wool weight, exhibit excellent lamb growth and good carcase yield. Rick has recognised a need to improve genetic gain in his flock of 3800 recorded ewes by making the most of new technology as it becomes available.

“We can multiple mate in mobs of 500 ewes, and put a group of rams to a mob of ewes, knowing Shepherd® will identify the sires.”
Rick Spence

Four years ago, the Spence’s opted into Pfizer Animal Genetics’ (formerly Catapult Genetics) Shepherd® programme. The traditional method of identifying dams and offspring over lambing had proven itself over the years, but Rick was always conscious of the vulnerability in a system relying heavily on having enough staff to do the tagging daily for several consecutive weeks.

Shepherd DNA identification generates pedigree and family information from DNA samples extracted from each sire, dam and their lambs. The system eliminates the intensity of staffing at lambing time. However, Rick says good record keeping remains critical, particularly at docking time when a blood sample

from tailed lambs is collected and lambs are tagged.

Direct management benefits came with opting into Shepherd that have helped St Leger achieve scale and better stock and pasture management.

“When it comes to mating we can multiple mate in mobs of 500 ewes, and put a group of rams to a mob of ewes, knowing Shepherd will identify the sires.” The risk of ram failure is minimised with multiple rams in the mobs, while late lambing ewes and empties are reduced. Poor and optimal performing rams will soon reveal themselves in the percent of offspring they sire.

Shepherd has meant that, at lambing time, Rick can view the whole farm as a lambing platform, stocking ewes knowing they are not going to be disturbed by staff. This allows more of the steeper hill country of St Leger to be used at lambing time. Running the operation more akin to a commercial breeding operation means the stock and their records fall far closer to commercial operators’ conditions and expectations.

Shepherd is also a springboard for further DNA-marker tests and St Leger is already in the second season using Pfizer Animal Genetics’ WormSTAR® technology. WormSTAR identifies animals with elevated worm resistance that also deliver higher meat and wool yields. Research data shows with 100 percent of WormSTAR gene inheritance in a flock the reduction in Faecal Egg Counts (FEC) can be between 7 – 12 percent, and from 2 – 9 percent when through 50 percent of the progeny.

WormSTAR identifies those sheep exhibiting good levels of resilience or the ability to live with worm burdens, a trait that sits well alongside resistance, providing a refugium population of worms in the host animal.



Using WormSTAR data, St Leger can manage the data into FEC and production index estimates, including weaning weight carcase yield and fleece weight. These can be combined with Sheep Improvement Ltd. (SIL) data to calculate the value for every ram, adding to their marketability.

WormSTAR is another tool Rick has seized to help reduce the need for drenching at St Leger. All last year’s crop of lambs had their DNA scanned using WormSTAR, with 23 percent already exhibiting the double gene for worm resistance.

“We would have reduced drench dose frequency in the younger flock by 30 – 40 percent. Lambs get a weaning dose just prior to Christmas and we can push that out as far as 9 – 12 weeks before their next one now,” says Rick. Mixed-age ewes are also on a nil dosing policy, and FEC testing shows very low parasite infestation.

Rick and Heather Spence look forward to building on the huge resource of genetic information they already have, knowing they can sell rams with the genetics commercial customers demand.



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continued from front page

GeneSTAR MVPs. In the U.S. the National Beef Cattle Evaluation Consortium (NBCEC) receives federal funding to act as an independent agency validating DNA-marker technology.

More markers and increased reliability make GeneSTAR MVPs powerful tools for seedstock and commercial cow-calf operations, as well as feedlot operations. For cow-calf operators, GeneSTAR MVPs provide more genetic profile information to improve

bull selection and improve the selection of replacement females. In feedlot systems, producers can sort animals into feeding regimens to more consistently and efficiently achieve end-product specifications. Additionally, tenderness and marbling MVPs have high values within supply chains seeking to differentiate product based on eating quality. Simply put, GeneSTAR MVPs enable precision animal management for seedstock and commercial beef producers.



**Please visit our Web site at www.pfizeranimalgenetics.co.nz
for more information on GeneSTAR MVPs.**