

inSire
Genomic Selection by AmBreed



inSire 08

**INTERNATIONAL
INSIRE TEAMS**

What is Genomic Selection?

The shift to Genomic Selection has been described as the biggest event in breeding technology in the New Zealand Dairy Industry since the advent of artificial breeding. Some have gone as far as saying it will change dairy farming forever. They may be right, but it is probably more accurate to say it will change dairy breeding forever.

The release of New Zealand's first Genomically Selected Bull Teams by AmBreed is the first stage in the continual development of breeding innovations AmBreed has brought to the New Zealand Dairy Industry over the past 40 years.

For farmers, Genomic Selection means a faster rate of genetic gain. Farming will stay the same, farmers will face the same issues they are facing now – if they embrace the opportunities Genomic Selection brings, they will make significantly faster gains in production, type and other traits that are significant to the farmer.

Genomic Selection also means that a far more diverse range of genetics can be assessed before entry into our breeding programs, providing opportunities for farmers to breed animals better suited to their individual environments.

Corrective trait management – a particular problem in New Zealand following 12 years of BW – can happen faster, allowing more aggressive breeding plans to build cumulative genetic gains into your herd.



Genetic Technology Boosts Genetic Gains

Knowing the potential of a bull's progeny today, and not having to wait for that progeny to grow and be proven years out is now a reality for AmBreed clients.

Thanks to huge advances in genetic research, genomic selection technology provides an immediate window to the potential of a bull's future progeny, identifying animals that have the positive traits and eliminating those that can cause breed problems in the future.

The technology provides a means of measuring an animal's genetic makeup, and in turn identifying traits like fertility that have been difficult to identify with existing genetic methods.

Traditional sire proving programmes have relied upon time and observation to determine the potential of a bull's progeny, and even then some traits including fertility are not so easily determined.

The new technology effectively puts the accelerator on the rate of genetic gain for productive traits in dairy herds, boosting genetic gain by 50%, and halving the time taken to prove top sires.

In the past the gain in milk solids production attributable to genetic gain has been 2kgMS/year for the average cow.

AmBreed's Genetic Strategist Phil Beatson says with genomic selection bringing top sires onto the market in two years rather than five, that rate of gain will be lifted by 50% across the national herd.

The use of sophisticated genetic mapping software and powerful computers enables AmBreed geneticists to compare the DNA patterns of selected bulls to the genetic pattern of known desirable traits, including fitness, health, fertility and longevity.

The greatest advantage for farmer clients is the significant lift in the reliability of predicted breeding values from an average of 35% to 50-65%.

"This closes the gap, reducing a lot of the risk for farmer clients who may have chosen an unproven bull," says Phil.

Proven AmBreed sires have a reliability index often of at least 80%, and AmBreed recommends clients use a team of bulls to spread the risk inherent in using new genomic technology.

"We look forward to being at the forefront of delivering such technology, with it we can deliver even greater accuracy to our clients, and even better, help speed up the rate that superior genetics become part of the national herd," says Phil.



Leading scientist welcomes genomic selection

AgResearch genetics scientist Dr Chris Morris is among many in the scientific community welcoming the genetic advances genomic selection will bring.

With funding from DairyNZ he and his colleagues at Ruakura are searching the cattle genome for genetic markers relating to facial eczema, with the aim of breeding greater resistance using genomic selection.

He says progress with genomic selection in the dairy industry offers a template for beef

industry genetics in the near future.

Research work on genomic selection for certain production traits in the dairy industry records a high correlation between what the genomic selection identifies as a positive trait in a sire, and the actual outcome of that trait based on traditional progeny testing.

Adding in other new reproductive technologies like sexed semen opens up a myriad of possibilities for farmers wanting to fast track their herd's potential.

How does Genomic Selection work?

Analysis of the bovine genome used in genomic selection can be likened to taking a snapshot of sections of the genome and comparing it to snapshots taken from the same position in the genome of proven sires.

Using “reference” populations made up of 100s of proven sires develops the accuracy of the reference snapshot to a point where their individual trait Genomic Breeding Values (gBVs) can be predicted with around 50% reliability.

Just How Accurate is Genomic Selection?

New sires and dams can be chosen based on their DNA makeup instead of waiting on the performance of their progeny. At present some traits vital to NZ dairy farmers, such as fertility, are difficult to identify using current genetic technology. Genomic selection greatly increases the accuracy and reliability of selection by successfully identifying animals that do not have poor traits, thus reducing specific problems within breeds.

Whether the reliabilities are 50% or 70%, they are still too low to be used as a single sire, in the manner of AmBreeds Proven Sires might be. With our tradition of Rock Solid genetics – particularly in comparison to other genetics companies in New Zealand, we make sure your risk is as low as possible.

How Do You Manage Risk With Genomically Selected Products?

The only way to manage the risk associated with using sires with reliabilities below 75% (the minimum reliability level required to make AEU’s RAS List), is to use the bulls in teams.

Breeding is a long-term, forward-looking process, and one that must be managed carefully to make sure that genetic merit in the areas you need progresses upwards.

The Team approach can be likened to accessing a “bundle of genes”. inSire Bull Teams are sold in teams of six and eight to achieve a minimum reliability of 91%. By using a set inSire Team with a minimum recommended number of doses per sire, your risk is minimised.

Current technology (using only pedigree information) can predict the Breeding Values (BVs) of young bulls at a reliability of around 35%. Genomic Selection increases the reliability of that predicted BV to around 50%. Given the rapid development of the technology, reliability should increase rapidly to around 65% or better very soon. The BV that is used in association with Genomic Selection is known as a Genetic Breeding Value or gBV.

If you cannot be sure of the number of bulls used in a genomically selected product then you cannot be sure of the reliability – at best it would be indicative. National averages work on a national basis, NOT on an individual basis. Remember, it is your risk - not that of the industry - that you need to manage.

inSire – Genomic Selection by AmBreed

1 JUNE 2008 saw the global launch of inSire, CRV Group's ground-breaking Genomic Selection technology that allows CRV and its daughter companies to bring advanced genetics to the market far earlier than ever before.

New Zealand was chosen to be the first country in the world to launch inSire, and thus the first to have available a genomically selected team of young sires.

In traditional progeny testing programs, young bulls are unproven until daughter proofs are available to determine the genetic merit of those bulls. It takes around 5 years before a bull can be considered "proven" and marketed as such. Genomic selection technology greatly enhances the reliability of a young bull's genetic information. Bulls selected using this information will be known as inSire bulls to distinguish them from proven and unproven bulls.

Here in New Zealand, inSire Packs are available in teams of six and eight. The Teams focus on key trait "packages" designed to address the needs of farmers operating under particular sets of conditions.



inSire

| HF Team | J Team |
|---|--|
| <ul style="list-style-type: none">• Moderate size• Great production• Good type• Pasture dominant• To breed cows that look after themselves• Good production• Highly fertile with great calving ease• Outstanding longevity | <ul style="list-style-type: none">• Good production• Well liked• Fertile• Good capacity• Good longevity• Very good type• Low somatic cells |

The days of a one-cow suits all herd are long gone – differences in production systems, geography and climate mean that farmers' need different cows for different situations. It is impossible for a single objective to fulfill the needs of 11,630 dairy farmers spread from Cape Reinga to the Bluff.

Whatever your farming system, whatever your breeding objectives, AmBreed gives you the choice to suit your needs.

*Disclaimer:

AmBreed reserves the right to change individual bulls within inSire Teams. Production issues or re-ranking from the addition of further information may necessitate using bulls not listed here. Clients will not be disadvantaged by any changes made

Holstein-Friesian inSire Pasture Plus

For pasture dominant farming systems this pack features a team of bulls that scores high on both indexes. Analysis of genomic information on these bulls reveals an outstanding gNZMI team average of 237 AND gBW of 190. Progeny from this pack will be robust, strong and solid producers.

These bulls will breed moderate sized animals, well suited to New Zealand's pasture dominant diets, for farmers looking to maximize the efficiency of their pastoral grazing systems.

As well as high production you also get very good type and longevity.

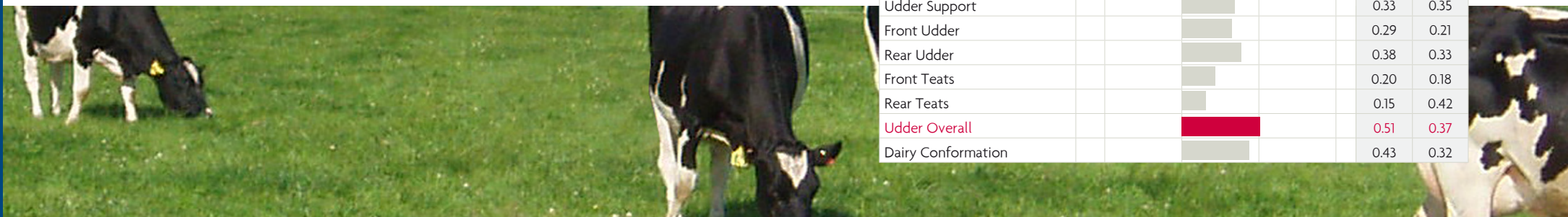
With an Udder Overall BV of 0.51 and Dairy Conformation BV of 0.43, these are sound, well structured animals that will stand up to the heavy demands of modern farming systems.

Key points:

- For pasture-dominated diets producing up to 400kgMS/cow
- Moderate size
- Great production
- Well-liked
- Good type
- High indexes
- Good fertility

inSire

| Production | | | | | | | |
|----------------------|-----------------|-----------|--------------|-------------------|-----------------|--------------------|----------------------|
| | gNZMI | gBW | Protein (kg) | Protein % | Fat (kg) | Fat % | Milk |
| | 237 | 190 | 40 | 3.62 | 33 | 4.33 | 1101 |
| Breed Average | 57 | 29/- | 20 | 3.57 | 14 | 4.36 | 686 |
| Management | | | | | | | |
| | Liveweight (kg) | Fertility | Somatic Cell | Residual Survival | Total Longevity | Calving Difficulty | Body Condition Score |
| | 60 | 3.0 | -0.03 | -60 | 301 | 3.36 | 0.02 |
| Breed Average | 56 | -3.9 | 0.13 | -28 | -32 | 5.95 | -0.04 |
| Shed Traits | | | | | | | |
| | | -0.5 | 0 | 0.5 | 1.0 | BV | Breed Average |
| Adaptability Milking | | | | | | 0.16 | 0.05 |
| Shed Temperament | | | | | | 0.17 | 0.05 |
| Milking Speed | | | | | | 0.21 | -0.05 |
| Overall Opinion | | | | | | 0.37 | 0.15 |
| Type Traits | | | | | | | |
| | | | | | | | |
| Stature | | | | | | 1.07 | 1.10 |
| Capacity | | | | | | 0.30 | 0.12 |
| Rump Angle | | | | | | -0.05 | -0.04 |
| Rump Width | | | | | | 0.49 | 0.43 |
| Legs | | | | | | -0.01 | -0.05 |
| Udder Support | | | | | | 0.33 | 0.35 |
| Front Udder | | | | | | 0.29 | 0.21 |
| Rear Udder | | | | | | 0.38 | 0.33 |
| Front Teats | | | | | | 0.20 | 0.18 |
| Rear Teats | | | | | | 0.15 | 0.42 |
| Udder Overall | | | | | | 0.51 | 0.37 |
| Dairy Conformation | | | | | | 0.43 | 0.32 |



| Name* | Shortname | Bullcode | Sire | MGSire | MGGSire |
|---------------------------|-----------|----------|---------------------------|-------------------------|-------------------------|
| Hallville L Federa ET A1F | Federa | 106512 | SRB Corboys Lightening | Bartons Bickford | SR Nicholass Storm |
| HSS Oman Megabuck | Megabuck | 106545 | O-Bee Manfred Justice ET | Hazael Fatals Duke ET | Elite Mountain Donor |
| Hazael Renegade Driver ET | Driver | 107519 | Glenmead FR Renegade | Athol Murrays Eminence | Imperial CNB Curious ET |
| Brkel Dauntless Proxy S3F | Proxy | 107562 | Macfarlanes Dauntless | Valden Curious Paladium | Pajak Sheik Atlas |
| Muritai Elsto Wyatt | Wyatt | 107574 | Whinlea Paladium Elsto ET | Top Deck KO Pierre | Etazon US Dalton Et |
| HSS Favour Peer ET S3F | Peer | 107588 | Aurora Donor Favour | Top Deck KO Pierre | Whinlea Magley Extasy |
| Valden Elsto Eager ET S3F | Eager | 107597 | SRB Corboys Lightening | Delta NLD Gerris ET | SR Nicholass Storm |

*See page 5

Jersey inSire Pasture Plus

This is a bigger, open framed Jersey that will produce till the cows come home.

You not only get great production, this Team will also gain back stature and capacity lost in recent decades of breeding. The Team will go a long way to getting the breed back on track while adding fantastic index to any herd in the country.

Cows bred will look after themselves.

Use this team to improve your production, improve your type and breed some strength and robustness back into your herd. Jerseys like they used to be.

If you are looking for a type-improver, you no longer have to trade-off BW value against real cow quality.

This will give you moderate sized cows with gains in key structural elements desperately needed by the Jersey breed.

Key Points:

- High indexes
- Good production
- Well liked
- Fertile
- Good type
- Good capacity
- SCC and longevity

| Production | | | | | | | |
|----------------------|-----------------|-----------|--------------|-------------------|-----------------|--------------------|----------------------|
| | gNZMI | gBW | Protein (kg) | Protein % | Fat (kg) | Fat % | Milk |
| | 202 | 233 | 13 | 4.11 | 25 | 5.52 | -187 |
| Breed Average | 43 | 67 | -9 | 4.30 | -1 | 6.02 | -673 |
| Management | | | | | | | |
| | Liveweight (kg) | Fertility | Somatic Cell | Residual Survival | Total Longevity | Calving Difficulty | Body Condition Score |
| | -60 | 2.03 | -0.27 | -101 | 217 | -3.43 | -0.09 |
| Breed Average | -66 | 1.57 | 0.14 | -9 | 36 | -5.26 | -0.15 |
| Shed Traits | | | | | | | |
| | -0.5 | 0 | 0.5 | 1.0 | BV | Breed Average | |
| Adaptability Milking | | | | | 0.00 | 0.05 | |
| Shed Temperament | | | | | 0.02 | 0.08 | |
| Milking Speed | | | | | 0.52 | 0.10 | |
| Overall Opinion | | | | | 0.13 | 0.03 | |
| Type Traits | | | | | | | |
| Stature | | | | | -1.07 | -1.12 | |
| Capacity | | | | | 0.21 | -0.05 | |
| Rump Angle | | | | | -0.16 | -0.12 | |
| Rump Width | | | | | -0.24 | -0.39 | |
| Legs | | | | | 0.14 | 0.10 | |
| Udder Support | | | | | 0.02 | 0.02 | |
| Front Udder | | | | | 0.34 | 0.22 | |
| Rear Udder | | | | | 0.17 | 0.19 | |
| Front Teats | | | | | 0.18 | 0.15 | |
| Rear Teats | | | | | -0.12 | -0.06 | |
| Udder Overall | | | | | 0.37 | 0.19 | |
| Dairy Conformation | | | | | 0.22 | -0.02 | |



| Name* | Shortname | Bullcode | Sire | MGSire | MGGSire |
|---------------------------|-----------|----------|--------------------------|------------------------|---------------------------|
| Mullins Maunga Orion S2J | Orion | 306511 | Tawa Grove Maunga ET SJ3 | Lynskeys Doyle SJ3 | |
| Merridowns Mans Sting | Sting | 306526 | Okura Manhattan ET SJ3 | Homestead Ernest | Crescent Royal Charles ET |
| Lynbrook Expose Treat ET | Treat | 307510 | Tahau Northern Exposure | Rivers Imperial SJ3 | Comfort Pal Adonis ET |
| Okura Maunga Kawakawa ET | Kawakawa | 306500 | Tawa Grove Maunga ET SJ3 | Okura Manhattan ET SJ3 | Silver Falls Quick Fame |
| Okura Nevy Kelvin ET | Kelvin | 307547 | Noakes Nevy SJ3 | Okura Manhattan SJ3 | Silver Falls Quck Fame |
| Greenmile Maun Impish SJ3 | Impish | 307517 | Tawa Grove Maunga ET SJ3 | Rivers Imperial SJ3 | Judds Admiral |
| Hillstart Maungas Jono | Jono | 307537 | Tawa Grove Maunga ET SJ3 | Crescent Senator Sam | Santis Fair Ensign |

*See page 5



www.AmBreed.co.nz

Your Choice, Your Profit



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