B+LNZ GENETICS **BEEF BREEDER UPDATE**

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B+LNZ Genetics and Meat and Livestock Australia are in the final stages of formalising an agreement to work together on major beef projects across both countries.

This is significant. It means sharing data and resources, thereby enhancing the work of both New Zealand and Australian researchers – for the benefit of both countries' bull breeders and buyers. The agreement extends to both existing and new projects. For New Zealand – given how far we have progressed in the beef genetics space in the past three years – this arrangement will see our progress steam ahead at an even greater rate. Expect to see new tools, as well as enhancements in how Breedplan works for us.

This update includes several items of interest from the B+LNZ Genetics beef breeders' breakfast, hosted in Feilding mid year, as well as an update on the B+LNZ Genetics beef progeny test.

As always, we welcome and value your feedback.

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B+LNZ Genetics beef progeny test involves five large commercial properties across New Zealand. Each property held a field day earlier this year, where people had the chance to check out the first year's progeny.

BEEF PROGENY TEST: WHAT WE'VE LEARNT SO FAR

The B+LNZ Genetics beef progeny test is gaining momentum. Initial results are rolling in and the second cohort of calves is due on the ground in coming weeks.

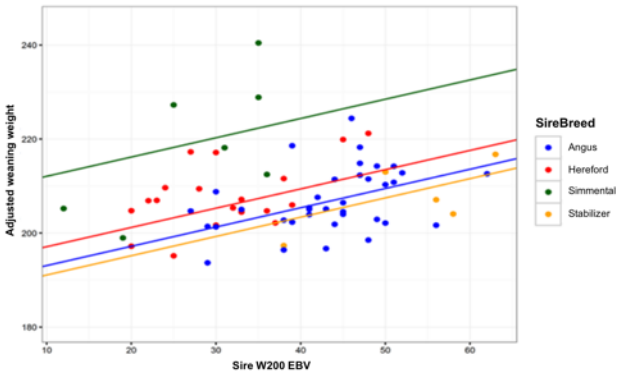
The beef progeny test aims to put a dollar value on the worth of superior genetics to commercial farmers – from both the perspective of breeding cow performance and finishing stock's carcase attributes. It also provides a platform to demonstrate genetic tools and how they can be used in real-farm situations. On going, test progeny will provide a recorded population to trial the impact of new technology and research.

So where are we at? The test's first calves were born in spring last year and are now weaned, while the cows are back in calf and pregnancy scanned.

KEY RESULTS:

1 Bull EBVs for calf weaning weights work

Half a calf's genes come from the cow and half from the bull. We therefore expect that half the benefit of a bull's EBV will be passed on to the calf. The beef progeny test results showed that, for every 1kg more in 200 Day Weight EBV, 0.41kg was gained in average weaning weight. I.e. Effectively, more than 80% of the expected weaning weight advantage predicted by EBVs (0.5kg being half of 1kg) is being realised on New Zealand commercial farms.



The graph shows bulls' 200 Day Weight (weaning) EBVs and shows how they matched on-farm weaning weights in their calves. It clearly shows that, when EBV goes up, so does average weaning weight – and this was the case for all bulls, across all breeds.

Beef progeny test lead scientist Dr Jason Archer of AbacusBio says commercial farmers should be very reassured by the results. "They were achieved across the country on five large-scale commercial farms, across different breeds and with both highly-proven bulls and bulls that could be purchased by commercial farmers at most bull sales. The key point is the calf weaning weight EBV will largely deliver what you expect. So, if you want heavier calves, choose bulls with heavier 200 Day Weight EBVs."

2 AI results improved with experience

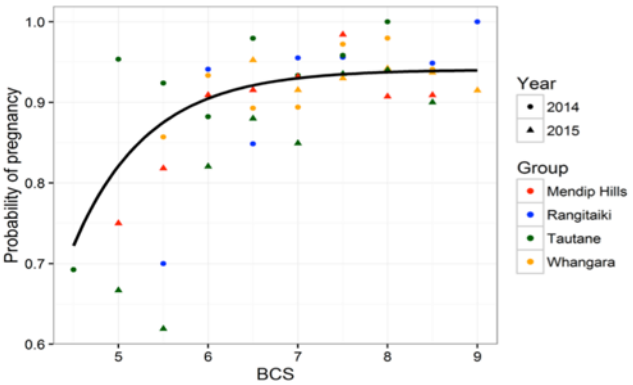
AI success improved markedly between Year 1 and 2 of the test – likely due to improved cow body condition scores (BCS), more feed handy to yards, quieter cattle, and a tighter calving period resulting from the success of the year 1 AI programme.

Dr Archer says all five commercial farmers involved in the test have remarked that AI was a lot easier than they expected and that there is a noticeable impact on temperament of the calves at foot – simply due to two extra yardings (NB: one yarding coincides with calf marking). "However, this doesn't make it any cheaper from a bull buying perspective, as just as many sires are needed to backup AI as with all-natural mating."

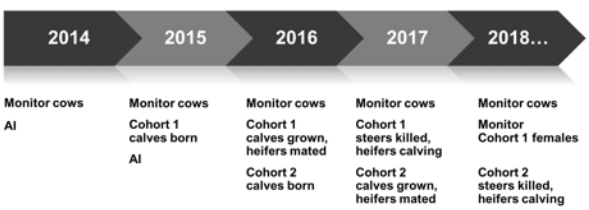
FARM	2014/15	2015/16
Whangara	44%	56%
Rangitaiki	56% R2 heifers, 64% MA cows	64%
Tautane	49%	58%
Mendip Hills	42%	49%
Caberfeidh	56% R2 heifers	62% R3s

3 BCS at mating is crucial: Minimum of 6; target of 7

BCS is becoming a common management tool on farm in sheep, but B+LNZ Genetics believes it could be used to a greater extent to manage feed and improve reproduction in cattle. "Analysis of the project's pregnancy data against BCS reinforces what we already know – that better condition score is important for re-breeding. But, more importantly, it quantifies the improvements against the scores and gives some target condition scores to aim for. For reproductive success, a minimum score of 6 at mating is recommended, but greater than 7 is optimal.



PROJECT TIMELINE



To find out more about the tests and for bull lists, visit www.blnzgenetics.com/progeny-tests

FOCUS ON GENETIC IMPROVEMENT, NOT GENETIC CHANGE

Professor Dorian Garrick warned bull breeders that significant changes were needed to their genetic measuring and selection, if they wanted to improve beef farming profitability as a result of selection.

The genetics specialist will return to New Zealand in January 2017, after five years at Colorado State University and almost 10 years at Iowa State University.

Genetic change vs. genetic improvement

At this year's B+LNZ Genetics beef breeders' breakfast, Professor Garrick described the performance of animals for several traits being represented in three dimensions as a "cloud" of points. He described how breeders move the cloud by selection – causing genetic change – but the cloud needed to move in a profitable direction for it to be genetic improvement.

"Genetic change is easy to achieve – simply choose parents that are above average for a trait. Genetic improvement is much harder, as it requires the right balance. The best way to make genetic improvement is to use an index and also consider the EBVs for all traits that matter to your production system."

Professor Garrick used the US change in carcase weights – 30kg over a 12-year period – to illustrate his point.

While carcase weight increased significantly, there was also an increase in cow mature size and milk production, which led to an increase in feed requirements.

American Angus data shows that the daughter of an average 2015 sire eats $130 more feed per year than the daughter of an average 1980 sire. And the steer offspring of an average 2015 sire earns $143 more profit than the steer offspring of its 1980 counterpart sire.

"Yes, they have achieved higher marbling and growth rates, but they have also increased the cow weight and feed costs, so the net effect on profit is minimal. Huge genetic change, but not huge genetic improvement."

Warning to New Zealand

Professor Garrick said people tend to not notice incremental change – but it is still change which can accumulate to bad effect. "You have to measure the things that matter."

He pointed out that the average weight of the New Zealand beef cow had increased by about 150kg over the past 35 years.

"I would challenge anybody to notice that the heifers they introduced into their herd were going to be 5kg heavier at mature weight. It doesn't sound like much, but over 30 years, that's 150kg.

"If you predict out to 2030, do you want your cows to be another 100-150kg, because that's exactly what's going to happen – if you keep moving the cloud the way you have been doing at the moment.

"If you want to move the cloud in a way to get improvement, rather than a lot of change, you're going to have to start measuring more things that you haven't been doing in the past and using them in indexes.

"If you keep doing what you've been doing before, you're going to get the same result as you've got before. That's much much bigger cows, which if that's what you want, that's fine."

What needs to happen?

Professor Garrick says there is more than enough genetic potential within New Zealand's beef herd to make the improvement needed. "There is plenty of resource in terms of genomic variation here, without having to rely on other countries. The problem is more of a market failure."

Fully utilising existing technology – such as EID and scales – will help collect measurements on the additional traits that breeders need to begin recording, such as mature cow weights and reproductive performance. New technologies – genetic sequencing, genomics, marker panels and gene editing – will help further still.

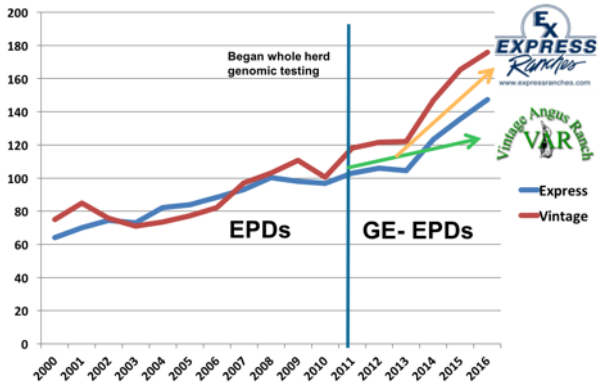
Comparative Responses in NZ

Species	Change	Improvement	Nucleus
Maize	Huge	Huge	US
Trees (Pinus Radiata)	Moderate	Moderate	Rotorua
Broiler Chickens	Huge	Huge	US/Europe
Layer Hens	Huge	Huge	US/Europe
Pigs	Huge	Huge	US/Europe
Grazed Pasture	Small	**Negligible**	NZ
Dairy Cattle	Moderate	Moderate	Hamilton
Sheep	Huge	Moderate	NZ
Beef Cattle	Huge	**Negligible**	NZ/US

"However, the value proposition does not typically allow bull breeders to recoup investment in these new approaches. For example, the costs to a bull breeder to collect a meaningful number of performance records to rank his animals for feed efficiency or for meat quality is more than can be funded by the profit on selling his sires. But, collectively, the national benefit from using improved sires would more than pay for the costs of running an improvement programme.

"Market failure means that adoption of these new technologies will require collaborative funding for collecting additional performance records, including funding for research from tax payer or levy funds."

www.blnzgenetics.com/news/video-clips for a video of Professor Dorian Garrick's full presentation.



www.blnzgenetics.com/news/video-clips for a video of Jim Johnson's full presentation.

EARLY ADOPTERS SEE GREATEST BENEFITS

Taking advantage of genomic tools gives breeders the chance to race ahead of their competition – and to remain ahead.

That was the key message from Jim Johnson, Zoetis Beef Genetics General Manager based in the US. He said that an early adopter breeder using genomic-enhanced EBVs versus a breeder using traditional EBVs would make genetic progress 56% faster.

He compared the statistic to a running race. The early adopter runner with a 56% advantage would cross the finish line first – but, more significantly, he would continue to draw away from the other runner, because he's 56% faster. Furthermore, if the second runner decided to also take up the genomic technology and could therefore also run 56% faster, he would still never catch up with the early adopter runner. Why? Because of the head start the early adopter got. See graph.

Three steps

Jim described the three steps to successfully using genomics.

1. Selection – using the technology to make the best decisions
2. Marketing – letting your customers know you have this significant advantage
3. Education – ensuring your customers understand how real and significant this advantage is.

In the US, breeders us the "i50k" logo in sale catalogues to alert buyers to their genomic investment.

THE ECONOMICS OF HIGH-FAT VS LOW-FAT COWS

University of Adelaide Professor of Animal Breeding and Genetics Wayne Pitchford presented findings from Australia's maternal productivity project and the results were not what you would expect. The low-fat cows came out on top, essentially because they performed better at lower nutrition levels.

The trial

Two lines of Angus heifers were purchased – half in the top 10% for Rib Fat EBV and half in the bottom 10%. It is noteworthy that, despite attempts to buy heifers with the same mature cow size, the low-fat heifers did have a mature cow size 14kg heavier than the high-fat heifers.
The trial was duplicated at two different sites and involved two nutrition levels – high and low.

Results

Over the four years of the trial, the genetically fatter cows were always fatter – regardless of whether they were on the low or high nutrition diet.

When the profitability of the two lines was compared under a low-nutrition scenario, the low-fat cows came out on top. This was partially because the trial was run in such a way that, if any animal fell below condition score 2, this triggered supplementary feeding for all animals.

Professor Pitchford acknowledged that the high-fat cows did not need the additional feed, but it had to be fed, to keep the trial comparative. He said the reality was, however, that there would be savings in supplementary feed costs for the high-fat cows.

As young heifers, 66% of low-fat heifers got in calf, raised a calf and got back in calf; compared to 77% of the high-fat heifers. Thereafter, the reproductive rates for both lines were the same.

However, because the value of prime beef versus manufacturing beef is not that great, the cost of a heifer not raising a calf and getting back in calf is not as significant as you might assume.

The scientists re-ran the economics on a model farm, based on a fixed pasture resource. In this scenario, significantly more low-fat cows could be run and they "had their working clothes on", grazing in a low-nutrition situation. Again, they came out on top, economically.

What now?

Part of the collaboration between New Zealand and Australian progeny tests will involve teasing these differences out across a greater number of scenarios that better represent reality.

See www.blnzgenetics.com/news/video-clips for a video of Professor Pitchford speaking at the breeders breakfast.

WHAT'S DRIVING MATERNAL PERFORMANCE?

At the B+LNZ Genetics beef breeders' breakfast, specialist beef geneticist Dr Steve Miller used the format of a Trade Me job advertisement to illustrate his points relating to beef cow "must haves".

Your Station Ltd is a 10,000 SU property running sheep and cattle. We are looking for mother cows to join our herd. We are looking for cows that will cover the ruggedest country and clean up the roughest feed. Applicants must work well within the herd, or when calving alone and MUST calve every year. Cows who's calves meet customer specifications preferred.

"Cows with the ability to have higher appetite potential when there's a lot of feed available, have higher reproductive potential when fed is limited, because they are cows that put condition on. The moment reproduction starts to fall off, it's all over."

The reality is that bigger cows eat more.
The question is: Do those bigger cows generate enough calves to justify the extra feed?

Maternal Production Project

The Maternal Production Project will result in a significant data resource, including DNA to link performance in a commercial environment – ultimately influencing stud breeding values, longterm. The project will go some way to addressing concerns raised by Professor Dorian Garrick (see story, this newsletter).

Involving 10,000 cows – a mix of stud and commercial, Angus and Hereford – the Maternal Production Project runs from 2014 to 2018 across four South Island properties: Mount Linton, Haldon Station, Orari Gorge Station and Long Spur.

Cows were EID tagged and body condition scored at pre-calving, calf marking and weaning. Results shows that low body condition – scores below 6 – affect fertility negatively. It is also known that body condition is moderately heritable and measurements taken at various time points are relatively consistent. However, preliminary analyses of data collected to date indicates the most variation in condition is seen at weaning time, so – if you are only condition scoring at one point in time – weaning is the most informative time.

IN BRIEF

Dr Steve Miller appointed to US Angus role

Dr Steve Miller has been appointed American Angus Association and Angus Genetics Inc director of genetic research. Dr Miller has helped lead B+LNZ Genetics' beef research activity for the past three years, since the organisation was established.

Highlights of his time in the role include ramping up research in the New Zealand beef genetics space, after many years of low investment. "When I first arrived there was not much happening in beef. Now, we have a very aggressive and vibrant research programme that has culminated with the pending collaboration on major projects with our Australian counterparts. This application really sets New Zealand up now for the foreseeable future." Dr Miller began his new role on 1 September.

Introducing BTech and BAG

In the past six months, B+LNZ Genetics has established two groups of stakeholders to help keep it on track. "BTech" draws on key scientists and technology leaders, while "BAG" (Beef Advisory Group) is made up of commercial and stud farmers and industry representatives and serves to advice on programme direction.

If you would like to raise anything with either group, email max.tweedie@blnzgenetics.com

B+LNZ progeny tests: Bull nominations

We are currently reviewing nominations for bulls to be included in the 2016 B+LNZ Genetics beef and dairy progeny tests. Nominations were lodged with breed societies (Angus, Hereford, Simmental and Charolais) last month and the list of 2016 sires will be released this month.

visit www.blnzgenetics.com/progeny-tests to learn more about the progeny tests (including viewing year 1 and 2 bull lists),

Bull buying workshops

Nine Bull Buying workshops have been facilitated by B+LNZ Genetics across New Zealand so far this year. Feedback has been positive, with farmers especially valuing the simplified approach to what has traditionally been a daunting process.

If you want a workshop in your area or copies of "Five steps to finding the best bull for your operation" for your commercial clients, email Max Tweedie on max.tweedie@blnzgenetics.com

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