



# GENETICS

## B+LNZ GENETICS SHEEP BREEDER FORUM DUNEDIN, JULY 2016

About 150 breeders and industry representatives attended the third annual Beef + Lamb New Zealand (B+LNZ) Genetics sheep breeder forum in Dunedin.

This post-conference newsletter summarises many of the presentations covered over the two days (14-15 July). Most presentations were also videoed and can be viewed on the B+LNZ Genetics website's "news" page

[www.blznzgenetics.com/news](http://www.blznzgenetics.com/news)

Click on "Video Clips".

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## A focus on best practice

B+LNZ Genetics general manager Graham Alder opened the forum and talked about the organisation's focus on best practice guidelines in the short to medium term. The guidelines for sheep breeders have been drafted and circulated already. They will be ever evolving, reflecting the dynamic nature of animal breeding. Ultimately, the guidelines itemise the finer details of how genetic value is determined and demonstrate exactly how breeders can lift their accuracy and performance over time.

### Technical/Extension Manager appointed

Sharl Liebergreen has been appointed as B+LNZ Genetics' Technical/Extension Manager.

Sharl is a Massey University graduate and worked with AbacusBio, before moving to Zoetis Genetics (formerly Pfizer Animal Genetics) 10 years ago, where he was New Zealand Technical Services Manager.

B+LNZ Genetics General Manager Graham Alder says Sharl is highly regarded within the sheep and beef sector. "He has an in-depth knowledge of animal breeding and genomics and a great ability to translate this commercially."

Sharl begins his new role on 7 November, based out of the B+LNZ Genetics Dunedin office.

## SIL developments: past, present and future

### Delivered over past year:

- B+LNZ Genetics extension officers Dr Annie O'Connell (South Island) and Max Tweedie (North Island) appointed
- SIL Industry Advisory Group established
- Standard Indexes launched: New Zealand Maternal Worth and New Zealand Terminal Worth
- New Zealand Genetic Evaluation launched
- Lamb Survival evaluation revised to exclude extreme data.

### Under development:

- Integrating DNA data into single-step analysis
- SIL genotype database: automate parentage verification
- Next Generation Indexes
  - To cope with traits that are optimal (e.g. NLB)
  - Add in more economically important traits
- CPT revision
- Annual Report on New Zealand Sheep Genetics.

### Will be delivered soon:

- Stage 2 of SIL Genetic Evaluation upgrade
- Rules for using connectedness to guide reporting - to be finalised
- Best Practice guidelines
- Economic weightings for ewe body condition score and stayability.

### Developments planned:

- Upgrade FlockFinder app
  - More traits
  - Report on genetic variation in flocks
  - Possibly show flock genetic trends
- Rebuild RamFinder app, so easier to use
- Automatically generate summary of NZGE runs for QA and to support user query resolution
- Revise feed costs in economic objectives and BV indicators
- What ram buying tools need to be built?
- SIL Meat Yield revision:
  - Carcase shape
  - Muscularity
  - IMF%
  - Align with commercial carcase assessment systems
  - BCS and stayability.

Go to the "news" page of B+LNZ Genetics website [www.blznzgenetics.com/news](http://www.blznzgenetics.com/news) and click on "Video Clips" to watch forum presentations.

# NZGE: Delivering a more powerful and timely evaluation

With the upgrade of both software and computing power, the recently released New Zealand Genetic Evaluation takes hours, not days, to run - and, critically, includes all 18 goal trait groups. Furthermore, because flocks that were not previously included are now incorporated into the run, the levels of connectedness have increased overall.

## SIL Genetic Engine: Pre April 2016 vs. Now

Analysis	Flocks	Animals	Old SIL	New SIL
Perendale	57	653,826	33 hours	1½ hours
Texel	79	491,988	15 hours (48 hours 1988-2015)	0.5 hours
Coopworth	101	1,612,649	48 hours	4 hours
NGE 2-weekly	154	3,563,609	4 days • multiple computers	9½ hours
ACE	456	5,348,205	>1 week • multiple computers • simplified models	26 hours
NZGE *	830	7,387,346	Not Possible	31.5 hours

\*NZGE: NZ Genetic Evaluation

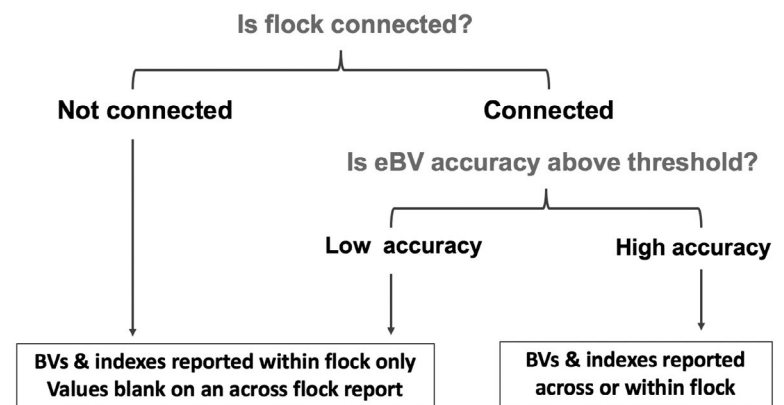
## Connectedness remains central to reporting

AgResearch's Dr Sheryl-Anne Newman has been involved with SIL since its inception. At the forum, she posed the question: Should connectedness and accuracy of reporting be factored into whether a flock appears in the NZGE reports. Her recommendation was that, if a flock is not connected, it should not appear in the Maternal and Terminal Worth tables. Equally, if it is connected, but the accuracy of its BVs is low, it also needs to be left out of the tables.



## NZGE generates BVs for all animals

### PROPOSED NZGE REPORTING



*“Should connectedness and accuracy of reporting be factored into whether a flock appears in the NZGE reports.”*

# Light shed on controversial adult ewe size penalty

The hot topic at last year's B+LNZ Genetics Sheep Breeder Forum was adult ewe weight and its impact on Dual Purpose (maternal) sheep indexes – specifically, the economic cost of feeding heavier ewes on commercial farms. Worryingly, some breeders were choosing to drop adult ewe weight from their indexes so the cost of heavier ewes, that comes with faster-growing sheep, was ignored.

AbacusBio's Dr Tim Byrne fronted the discussion in 2015 and was up for it again this year. In the 12 months between forums, he and his colleagues at AbacusBio had analysed how accurately adult ewe weight eBVs of young ewe lambs were predicting their actual adult ewe weights. AbacusBio used 250,000 records across 41 flocks, crunched the numbers based on adult ewe weight eBVs predicted when only weaning weight data was available, and then re-crunched them based on adult ewe weight eBVs predicted with weaning weight and liveweight at eight month records.

Dr Byrne presented plots of the eBVs against actual performance and found the adult ewe weight eBVs were over predicting adult ewe weight by 7-15%, depending whether the eBV was estimated based on weaning weight alone (15.2%) or both weaning weight and liveweight at eight months (7.0%).

"Adult ewe weight eBVs are predicting more of a liveweight difference than we actually see in adult sheep."

He says adjustments need to be made and suggests an interim measure would be to reduce the adult ewe weight penalty by 20% to account for the over prediction.

"Ultimately, though, it would be best to re-estimate the genetic correlations between growth and adult ewe weight to actually see what is causing the over prediction."

## Update

Since the forum, B+LNZ Genetics has acted on the recommendation and implemented a 20% reduction on adult ewe size. It is also investigating the reasons behind the over-estimation of eBVs that is seen when there are only early growth predictor traits. This investigation will focus on re-estimation of the genetic parameters used in the SIL Growth modules (Lamb Growth and Adult Size).

# Changes to CPT, so more valuable to commercial farmers

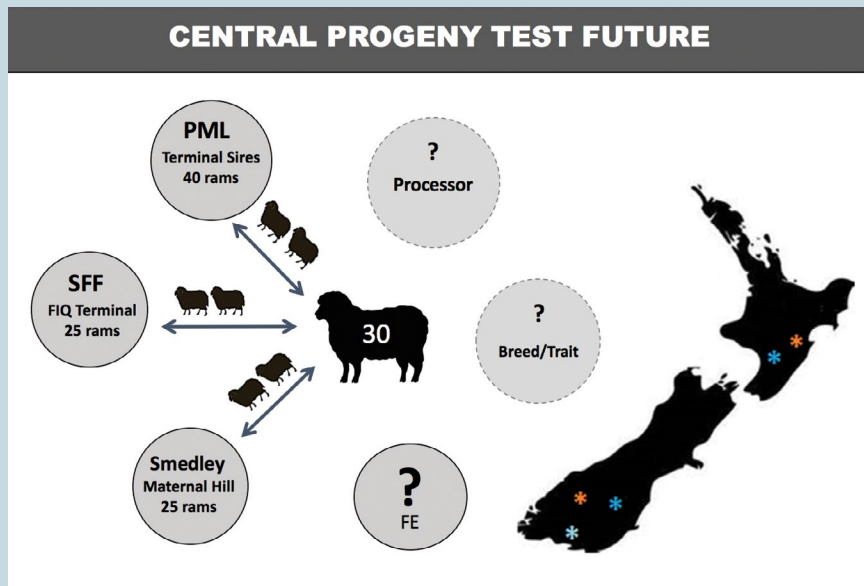
Over the past two seasons, a series of major changes have been made to the B+LNZ Genetics Central Progeny Test (CPT).

Fundamentally, the test exists to benchmark genetics across sheep breeds, with the results fed into the SIL system to inform evaluations and develop new traits. Historically, rams in the CPT have not necessarily been "the best in breed", but they have needed to be well linked with flocks in that breed – i.e. widely used – which generally means that they have been of high genetic merit.

Up to 2015, the CPT was made up of three lowland research farm sites and two hill country, commercially-run sites.

B+LNZ Genetics extension officer Dr O'Connell says the timing is ideal. "No longer restricted to the realm of the research, it is now practical to carry out performance recording on commercial farms. Electronic equipment and genomic parentage tools are more reliable and more intuitive, so quality progeny test measurements can be achieved on commercial farms."

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In response to a constructive review of the sheep CPT programme, B+LNZ Genetics has begun implementing a series of bold initiatives in time for mating in 2016. The CPT review recommended;

- More rams assessed
- At a younger age
- Located on commercially-relevant environments and
- With increased partnership with industry.

To accommodate the changes, B+LNZ Genetics is exiting two of its lowland sites (Ashley Dene and Poukawa) and retaining only one – but relocating it closer to researchers in Dunedin (Woodlands shifts to Invermay).

This has made room for three commercially-run hill country sites – each with a specialist focus – to be added as Next Generation (NG) Flock CPT sites:

- 1 Progressive Meats Ltd hosts one site (Horizon Farms) with a terminal sire focus and meat evaluation calibration for PML.
- 2 Focus Genetics hosts a second site (Duncraigen) with a terminal sire focus and genomics calibration.
- 3 Smedley Station hosts the third site with a maternal focus. As partners in the establishment of this site, the Perendale Society is the first to have rams assessed.

Commercial farmers can have confidence in the results, knowing rams have been tested in truly challenging environments. Dr Annie O’Connell says B+LNZ Genetics plans to run field days highlighting activity and understanding genetic merit, alongside these new sites. There is also a focus on best practice performance recording.

She says the changes mean more rams will be tested annually and, notably, more young rams will be tested.

“Ultimately, results will be tailored to commercial farmers, so there is greater industry engagement in seeing the New Zealand flock’s genetic merit improve.

“SIL estimates of genetic merit will be enhanced by having more young rams benchmarked in commercially-relevant conditions and more progeny at an early age from these young rams.

“Furthermore, rams of high genetic merit will be identified in time to be used more widely, while they are still alive.”

She says the highly-valued achievements of the CPT programme to date have provided the spring board that

allows for this evolution in assessing genetic merit to be possible. “The contribution of Ashley Dene, Poukawa, Onslow and Woodlands CPT sites to the sheep industry should be applauded and will forever be a valued part of our history.”

**Note:** Breeders have an opportunity to submit unproven rams for progeny testing, with results received via SIL data evaluations. Please contact Annie O’Connell for more information ([annie.oconnell@blnzgenetics.com](mailto:annie.oconnell@blnzgenetics.com)).

### Why the changes?

AbacusBio consultant Dr Peter Amer has a long history with the CPT. He says the test in its original form made an important contribution to New Zealand’s sheep industry, by providing connectedness so rams could be compared accurately. However, the time had come for a re-focus.

Dr Amer reviewed international livestock-based sectors that used genetics effectively and the common theme was that they made optimal use of elite animals – that is, individual animals had a massive impact on the whole sector.

The nature of the old CPT was that it could only handle 30 or 40 rams and it encouraged breeders to put forward older sires, which were a sure bet. The problem was that they’d already made their contribution to the sector.

He says that, instead, many and young rams need to be tested, to identify the elite individuals. “Young sires are the future.”

These young rams need to be found and the CPT will be the mechanism to do that.

“We need scale, but the budget is limited, so we need partnerships.”

Dr Amer says the focus must move away from growth and numbers of lambs born, because the future of sheep will be around other traits.

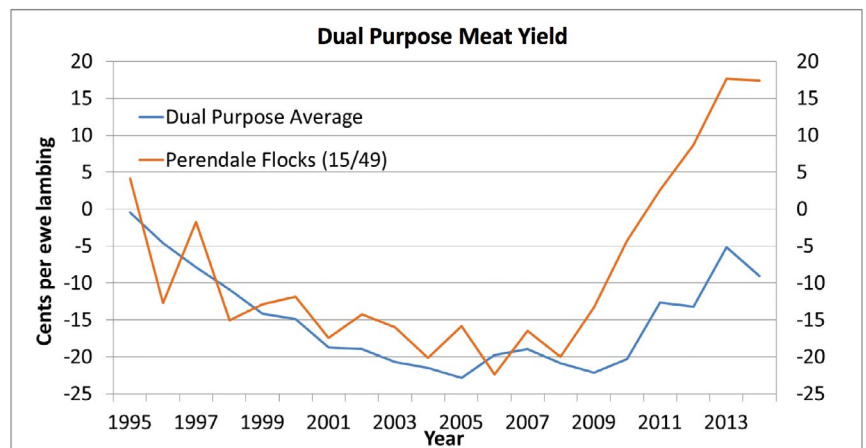
### Perendales NZ involvement

Perendale NZ initiated its own progeny test in 2010, with the main objective of improving the breed’s meat traits and a secondary focus of addressing FE resistance across the breed.

Their success has been significant (see graph) and put down to the simplicity of the system and the quality of recording.

After being approached by B+LNZ Genetics, Perendale NZ is now transitioning its test into the Central Progeny Test, as one of the Next Generation Flocks. Based at Smedley Station – a cadet training farm – this flock will have a focus on maternal traits for hill country.

It is noteworthy that Perendale genetics accounted for all three finalists in this year’s B+LNZ Sheep Industry Awards’ “Maternal Trait Leader for Lamb Survival” category.



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# The changing customer

The forum's final presentation was around the customer and their future expectations. It comes down to:

**Curiosity:** Customers expect to know more

**Choice:** They are becoming more active in choosing products

**Customisation:** They want your breeding objectives to head in their direction

**Commitment:** Customers need more reasons to remain loyal.

From the perspective of a commercial farmer, how is B+LNZ Genetics addressing these requirements?

- 1) FlockFinder (version 2 on the way)
- 2) Ram value indicator
- 3) New Zealand Genetic Evaluation
- 4) Performance recording - Star system
- 5) Standard Indexes - New Zealand Maternal and Terminal Worth.

## Initial results from feed efficiency trial

First-year results from the feed efficiency trial at Invermay confirmed what researchers suspected: that there is a significant difference in the amount of feed individual animals need to produce similar outputs.

Lead researcher Dr Tricia Johnson from AgResearch says low efficiency animals needed 24% more feed, compared to their high efficiency contemporaries.

The B+LNZ Genetics funded trial used 200 ewes sourced from the CPT and the Coopworth progeny test. Animals were fed lucerne pellets (ME of 10.4MJ) from feeders that were triggered by individual animals' EID tags. The length of time

they grazed and their intakes were recorded, as well as two liveweight measures each week.

The team also looked at the feed efficiency of lambs. They found animals that were efficient as growing lambs retained their weight when moved onto meadow hay pellets - i.e. mimicking a feed transition situation.

Because feed efficiency is unlikely to ever be measurable in an on-farm situation, the team is also looking at "biological predictor traits". The hypothesis being that more efficient animals will potentially have a lower heart rate and be better at reducing their thermal temperature. Early results show evidence of this correlation being the case, but it will only ever be a rough guide.



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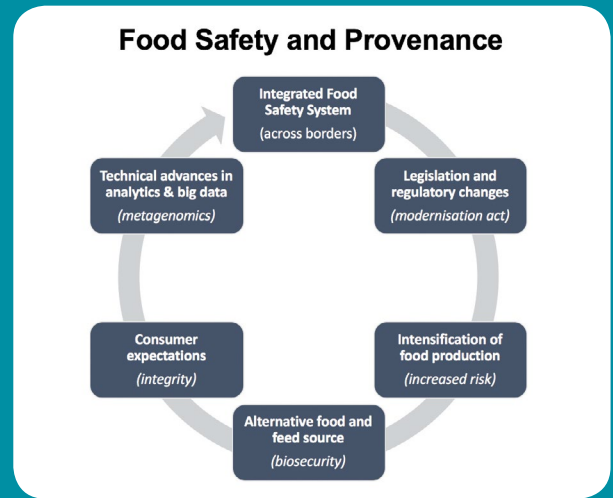
# Meat quality: A global view

AgResearch meat quality expert Dr Cameron Craigie spoke about where meat quality trends are heading.

A boom in eating out is anticipated over the next five years, which has implications for New Zealand's meat industry – specifically the expectation for quality, authenticity and food safety. (See diagram.)

Dr Craigie says that, with more than 120 markets for New Zealand meat, the reality is that each market has its own set of preferences, so there is no single steer on quality. However, a general move away from meat as a commodity is needed.

He says to look ahead and drill deeper, especially in with regard to using existing and new data. “New Zealand is ahead of the curve – and we need to stay there.”



## Redefining carcass merit

Work is underway to update carcass merit traits to better reflect the future requirements of meat companies.

B+LNZ Genetics is redeveloping its carcass merit evaluation to include ultrasound, CT scan and meat companies' assessment systems for the animal of today. The inclusion of the meat companies' indicators of superior yield and meat quality means that breeders, B+LNZ Genetics' BVs and the meat companies are all on the same page.

Once this work is complete, other measures of merit will be investigated, including carcass shape. Characterising carcass “shape” may be as simple as muscle volume divided by carcass length, or liveweight of animal divided by length of animal, but is yet to be determined.

### Breeder feedback is needed:

What shape or conformation measures do you assess in the live animal and where do you take that measurement?

Please email your feedback to [info@blnzgenetics.com](mailto:info@blnzgenetics.com)

## In-plant measurement of intramuscular fat (IMF)

Australian experience and indicators from New Zealand meat companies are telling us that selection for lean meat yield is reducing intramuscular fat (IMF) and that will ultimately have a negative impact on the consumer's eating experience.

AgResearch meat quality expert Dr Cameron Craigie presented results to date from the 18-month-old B+LNZ Genetics project – being run in conjunction with Alliance Group – focused on addressing this concern.

The project aims to investigate the feasibility for real-time non-destructive prediction of meat tenderness, pH, colour and IMF content of lamb loins at 24 hours post mortem.

### There are three stages to the project:

1. Proof-of-concept for a new technology Hyperspectral Imaging (HSI) and an existing technology Visible-Near Infrared Spectroscopy (NIRS).
2. Test the performance and suitability of HSI and NIRS for developing a meat-quality based decision support system.
3. Develop prediction equations to convert spectral data into meat quality information – specifically tenderness, IMF%, colour stability and pH.

Where is the project at? Initial indications are that HSI and NIRS work for predicting IMF and pH. The concept is proven: We can measure IMF objectively and accurately.

What next? There are technical challenges related to implementing these technologies and integrating predicted meat quality results into the value chain (e.g. SIL and other databases). “So we are not there yet with in-plant measures, but it will happen.”

# Research updates: 2016 poster series

Visit the B+LNZ Genetics website's "news" page [www.blznzgenetics.com/news](http://www.blznzgenetics.com/news) and click on "Breeder Forums" to see all 20 posters summarising B+LNZ Genetics-related research underway:

- |   |  |                                     |
|---|--|-------------------------------------|
| 1. Maternal ewe traits                      | 9. Supercharging SIL genetic evaluation            | 16. Sheep genomics                  |
| 2. Economic indexes                         | 10. SIL single step genetic evaluation             | 17. Farm genetic plan               |
| 3. SIL meat module                          | 11. Beef cows: What's driving maternal performance | 18. Breeding for disease resistance |
| 4. Genotype by environment                  | 12. Sheep5K  | 19. Pneumonia                       |
| 5. Farm records to economic indexes         | 13. Central Progeny Test                           | 20. Data drives dollars project     |
| 6. On-farm recording powered by pureFarming | 14. Feed efficiency in sheep                       | 21. Maternal hill focus             |
| 7. Facial eczema                            | 15. Hyperspectral imaging                          | 22. Methane selection flock         |
| 8. New Zealand Standard Indexes             |  |                                     |



## Facial eczema

Using RamGuard tested animals, the heritability of facial eczema (FE) has been re-estimated as 0.44. The high cost of RamGuard testing and this level of heritability means it makes sense to use genomic selection for this trait.

Prior to 2016, more areas were reporting FE as an issue in autumn. In 2016, the affected areas were the most extensive ever observed - equivalent to those predicted with 3°C climate change.

Genetic gain for FE resistance can be helped by genomic selection for Romney, Perendale, Coopworth and some Composites, but depends on the animals in your flock being part of the genomic selection training dataset i.e. animals measured for RamGuard that also have genotypes.

**Contributors:** Tricia Johnson and Neville Amyes (AgResearch)

### USING GENOMICS TO IMPROVE GENETIC PROGRESS

Genomics is not a one hit solution for facial eczema  
Once genomic accuracy acceptable (based on breed and relatedness)





Breeding for increased FE tolerance should be considered if its prevalence continues to increase in sheep



RESEARCH & DEVELOPMENT



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