New Zealand Sheep Evaluation: Reproduction and Meat
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B+LNZ GENETICS

SIL
Progeny Test Sites
R&D
Beef Genetics
SIL and the weekly NZGE evaluation

- 1100 flocks (includes reference flocks)
- 615 active performance recording flocks
- 365 Maternal flocks
- 190 Terminal flocks
- 60 Maternal and Terminal (mostly Texel)
- 350,000 new animals entered per year (80% are Maternal)
### Breeder flock size and number

<table>
<thead>
<tr>
<th></th>
<th>No Recorded Flocks</th>
<th>Average Size (no lambs/yr)</th>
<th>Std Dev</th>
<th>Largest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal</td>
<td>360</td>
<td>625</td>
<td>58.4</td>
<td>84 flocks &gt;1000</td>
</tr>
<tr>
<td>Terminal</td>
<td>190</td>
<td>225</td>
<td>38.1</td>
<td>7 flocks &gt;1000</td>
</tr>
<tr>
<td>Maternal &amp; Terminal</td>
<td>60</td>
<td>270</td>
<td>31.8</td>
<td>2 flocks &gt;1000</td>
</tr>
<tr>
<td>Fine Wool</td>
<td>(Australia)</td>
<td></td>
<td></td>
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</tbody>
</table>

Largest single flock 8800 lambs/year
## Goal Trait Groups in NZGE

<table>
<thead>
<tr>
<th>PRODUCTION</th>
<th>HEALTH / WELFARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reproduction <em>(Yearling &amp; Adult)</em></td>
<td>Facial eczema tolerance</td>
</tr>
<tr>
<td>Twinning</td>
<td>Parasite resistance</td>
</tr>
<tr>
<td>Survival</td>
<td>Parasite resilience</td>
</tr>
<tr>
<td>Facial Eczema</td>
<td>Carla (parasite immunity)</td>
</tr>
<tr>
<td>Lamb Growth</td>
<td>Bare points</td>
</tr>
<tr>
<td>Adult Size</td>
<td>Dag score</td>
</tr>
<tr>
<td>Meat Yield</td>
<td>Stayability</td>
</tr>
<tr>
<td>Wool</td>
<td></td>
</tr>
<tr>
<td>Fine Wool</td>
<td></td>
</tr>
<tr>
<td>Wool Quality</td>
<td></td>
</tr>
</tbody>
</table>
The NZMW can be tailored for additional traits of interest:

- NZMW + Meat
- NZMW + Parasite Resistance
- NZMW + Body Condition score
- NZMW + Facial Eczema
Central Progeny Test

HUB SITES

AI Sires

Link Sires

HUB SITES

Progressive Meats
Terminal Sires Meat Quality

Landcorp Duncraigen
Terminal Sires Eating Quality

Smedley Station
Maternal Sires Mat + Meat +FE

Otiwhiti Station
Maternal Sires FE

Maternal & Terminal
Low Input
Reproduction

> 95% of animals have full sire and dam pedigree, most tag at birth, about 60 flocks DNA parentage to some extent

BVs for
• Yearling fertility (HFER)
• Yearling number of lambs born (HNLB)

• Adult (2-7yrs) number of lambs born (NLB)

Survival to weaning is a separate trait (direct and maternal)
Gain in Reproduction (Maternal Breeds)

NLB increase is 0.125 over base year (12.5 lambs per 100 ewes)

Survival increase is 0.018 over base year or 1.8 lambs per 100 born

Key factors are full pedigree and for survival automatic data filters
Reproduction Index - maternal

Linear index – constant reward of 2954c for additional lambs

BUT in reality the reward of moving from a twin to a triplet is less than moving from a single to a twin.

The proportion of a flock having twins peaks at about 65%

Extra costs at high lambing %

Feed, health and ewe and lamb deaths
Index – linear reproduction

![Graph showing the relationship between economic weight (cents/ewe lambing) and population mean number of lambs born. The graph indicates a downward trend, with a red arrow pointing to a specific data point.]
Top 5% maternal sires for reproduction - progeny in last three years

Maternal average = 0.125 NLBgBV

Daughters have triplets and quads at first 2yr old lambing
A non linear approach to reproduction was introduced in 2017, recognizing that there are now animals with NLB BVs in excess of 60% above the base year (1995).

- Decreases the economic weight as NLB BV increases reflecting the diminishing value of more triplet and quad lambs.
- At 0.7 NLB BV the index reward is capped at 1024c for reproduction.
- The capped value equates to about 2.13 lambs born per ewe.
Capped Reproduction cf to linear approach

Currently fewer than 1% of sires are capped for Reproduction Index
Meat Yield - to date

1999
‘MEAT’
Live weights and ultrasound eye muscle data (data from late 1980s)

2003
‘CT MEAT’
LWs, ultrasound and carcass CT scan data

2006
‘INNERVALUE’
LWs, US and CT primal cut data

2008
‘VIASCAN’
LWs, US and VIAscan

2010 to present
‘MEAT (V2)’
- Uses all available data with the ability to exclude VIAscan and/or CT data
- One index
- Still largely based on late 1980s data

AbacusBio
Current measurement technologies

- Ultrasound
- Meat processor, eg VIAscan
- CT scanner
- a need to accept other measurements

Meat processor cuts

Dexa X-ray
3 year research program

- 75 to 80 sires that are representative of the industry at current carcass weights, and up to 10 progeny per sire
- Where possible, all progeny measured for all traits (live weight, ultrasound, CT and VIAscan)
- Additional measures of carcass merit (e.g. shape)
- Processor measurements
- Other technology sources
- Calibrate each system to Spiral CT
Meat Quality

- Colour
- pH
- Tenderness
- Marbling / IMF
- Eating quality
- Omega 3, etc

Measurement – hyperspectral imaging, NIR, chemistry
Calibration
Genomics
New Meat modules – R & D in progress

Meat Yield - carcass measurements
• Ability to accept a variety of measurements
• Calibrated against Spiral CT as the gold standard

Meat Quality
• Accept a range of measurements of meat quality
• Actual measurements – pH, colour, tenderness, IMF, eating quality, etc
• Genomic BVs for meat quality
Sheep Genomics

Currently

- Production Traits
- Some health traits

- Meat/Quality Traits 2018
- Methane 2018 (research BVs)

Some breed constraints
Genomics and Single Step

- Currently a two step process in NZGE and report gBVs
- Range of genotype information is expanding (Meat Q, Methane)
- Developing a Single Step evaluation – expected later this year