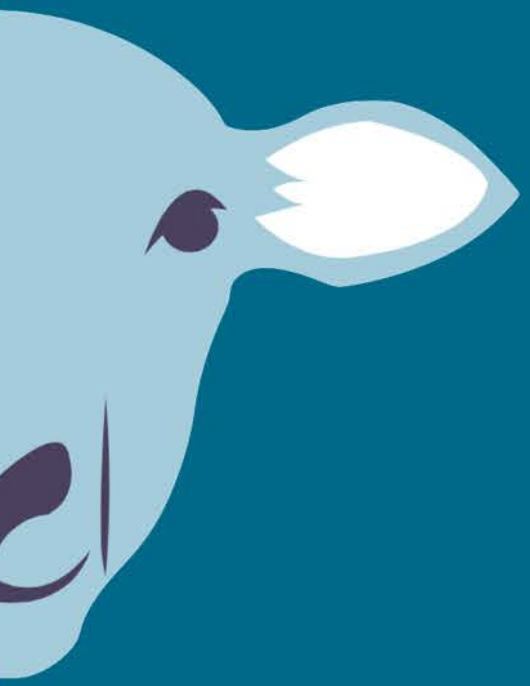


Value of Next Generation CPT flocks

Dr Annie O'Connell, B+LNZ Genetics

beef+lamb new zealand GENETICS

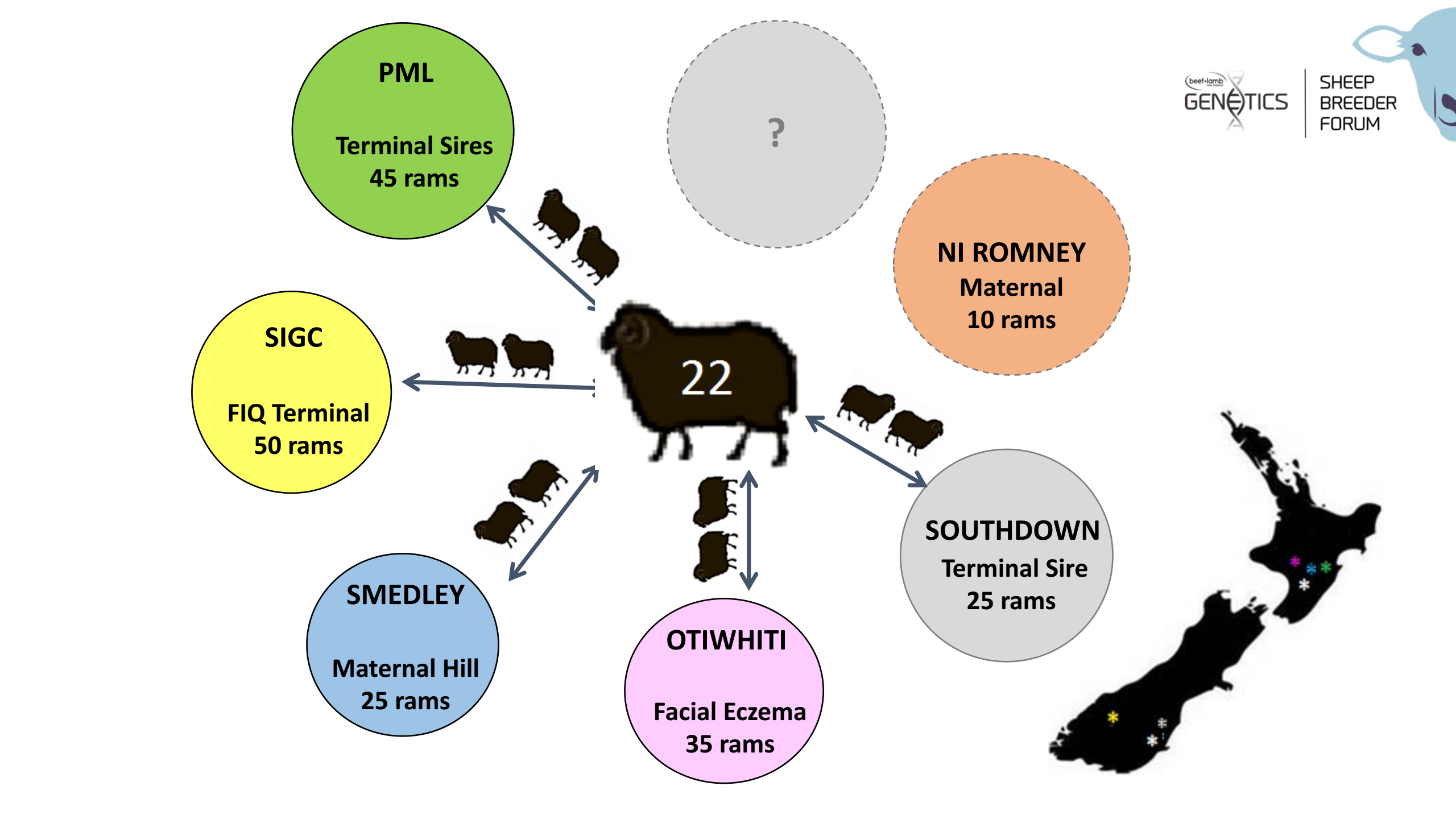
CPT Review

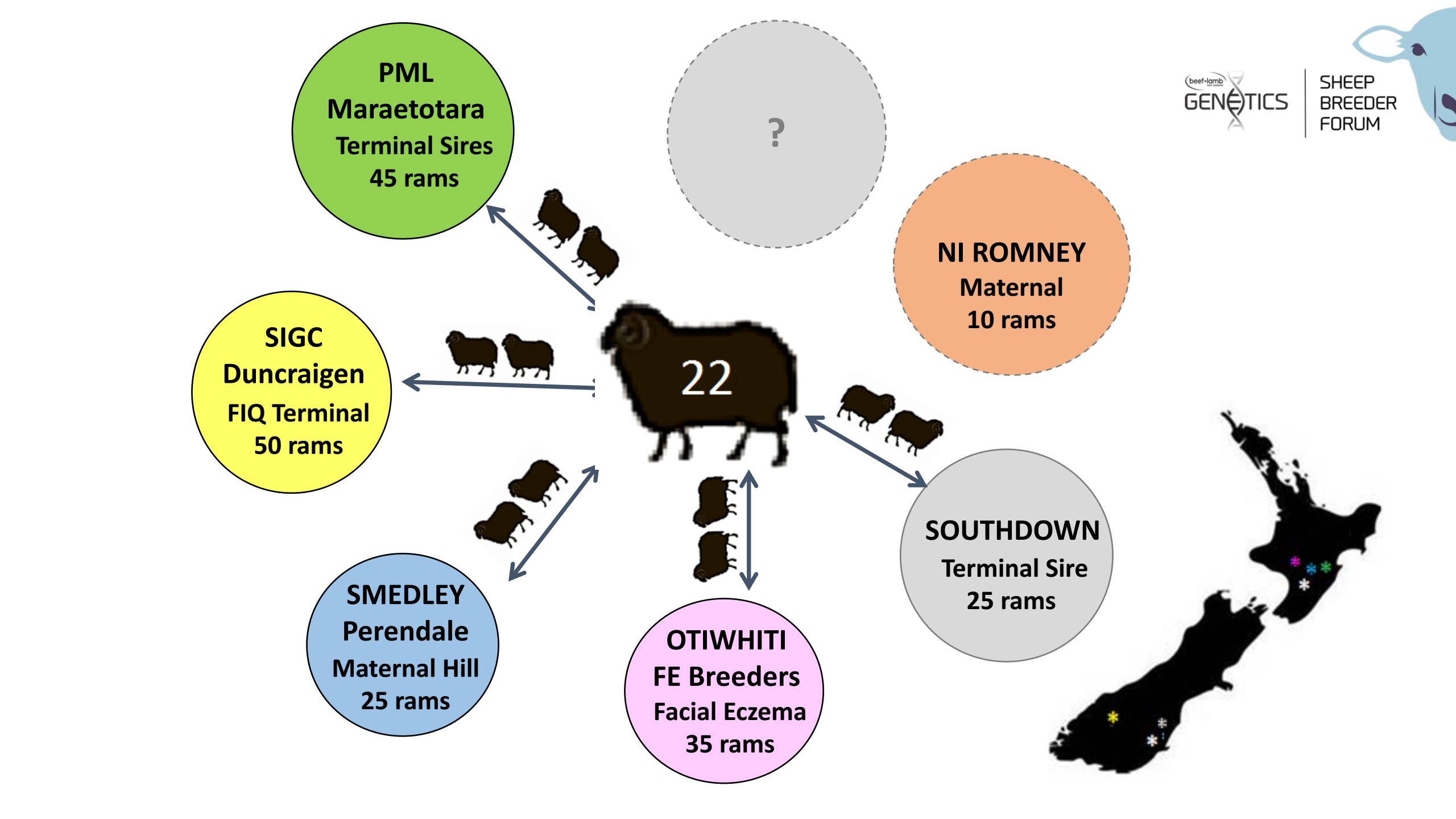
Test more rams

Test younger unproven rams

Use more commercially relevant environments

Partnership with industry


PML
Terminal Sires
45 rams
?
NI ROMNEY
Maternal
10 rams
SIGC
FIQ Terminal
50 rams
22
SOUTHDOWN
Terminal Sire
25 rams
SMEDLEY
Maternal Hill
25 rams
OTIWHITI
Facial Eczema
35 rams
beef+lamb GENETICS
SHEEP BREEDER FORUM


PML
Maraetotara
Terminal Sires
45 rams
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NI ROMNEY
Maternal
10 rams
SIGC
Duncraigen
FIQ Terminal
50 rams
22
SOUTHDOWN
Terminal Sire
25 rams
SMEDLEY
Perendale
Maternal Hill
25 rams
OTIWHITI
FE Breeders
Facial Eczema
35 rams
beef+lamb GENETICS
SHEEP BREEDER FORUM

SOIURCE of RAM	INVERMAY DP & TS	HILL Taratahi DP only	HILL Onslow exiting	POUKAWA exiting	PML TS only	SIGC TS only	Maternal Hill DP only	Facial Eczema FE >3*	Southdown TS	Romney NZ NI
HFL	2773.7/15	2773.7/15			2773.7/15	105.234/07	489.362/15	3001.2904/15	4448.119/14	
HFL	4588.734/15	4588.734/15			4588.734/15	2191.200/10	1072.866/15	1425.1/14	2595.384/15	
Link sire (S+Y)	105.234/07	105.234/07			1101.88/16	2595.383/15	1177.501/16	1766.6051	2488.15507/16	
Link sire (S+Y)	2191.200/10	2191.200/10			20.18/16	2595.395/15	1177.502/16	1766.6102	2998.157/16	
Newhaven Perendale	1072.866/15	1072.866/15			20.22/15	2638.1132/13	1177.551/16	1766.6382	2998.222/16	
Rangiora Trust	489.362/15	489.362/15			20.28/16	2638.1328/13	1941.160788/16	184.16081/16	3651.38/16	
Focus Genetics	3001.2904/15	3001.2904/15			20.83/16	2638.1676/11	1941.161171/16	184.16455/16	4407.110/16	
Coopworth Society	1425.1/14	1425.1/14			2554.672/16	2747.5037/16	1941.161385/16	184.16560/16	4409.42/16	
Premier Suftex	2595.384/15	2595.384/15			2554.689/16	2747.567/16	1941.161404/16	1881.72/16	4409.86/16	
Southdown	4448.119/14	4448.119/14			2661.647/16	3003.2047/16	2.541/16	1881.95/16	4414.32/16	
ARDG	1023.371/12	1023.371/12			2773.47/16	3003.2121/16	2.688/16	1941.160688	4448.284/16	
Charollais Sheep NZ	1446.1026/15	1446.1026/15			2773.7/15	3003.2196/16	2.710/16	1941.161144	4448.56/16	
Ile de France NZ Ltd	20.22/15	20.22/15			2784.86/15	3004.1075/16	2.713/16	1941.161366	4449.15/16	
Alpha Sheep Genetic	2054.474/13	2054.474/13			2835.622/16	3004.1464/16	2.726/16	2629.204/16	4781.26/16	
Poll Dorset NZ	3414.135/15	3414.135/15			3003.1124/16	3004.2210/16	2239.169/16	2629.2244	4980.1536/16	
Suffolk NZ	3519.456/14	3519.456/14			3003.1431/16	3004.LS1295/14	2239.341/16	2984.433/16	4998.209/16	
Poll Dorset NZ	3855.1250/15	3855.1250/15			3007.5028/16	3004.LS1370/14	2239.530/16	2984.604/16	4999.63/16	
Suffolk NZ	4502.106/14	4502.106/14			3007.5487/16	3004.LS1443/15	2239.597/16	2984.694/16	5003.15/16	
Focus Genetics	4772.41/15	4772.41/15			3421.294/16	3004.LS1880/15	2239.729/16	3001.2659/16	5003.35/16	
Corriedale Goldmark	50.38/14	50.38/14			3421.445/16	3004.LS1948/14	3895.50/16	3001.2701/16	tbc.396/16	
Pure Taste NZ	630.415/15	630.415/15			3499.107/16	3004.LS2200/15	3895.58/16	3666.504/16	tbc.462/16	
Romney NZ	719.142/12	719.142/12			3499.176/16	3004.LS5069/15	3895.77/16	403.360/16		
1990's Sires	2638.1199/00	2638.1199/00			3499.190/16	3007.5153/16	845.232/16	403.514/16		
1990's Sires	2638.1243/01	2638.1243/01			3508.497/15	3007.5196/16	845.261/16	406.308/16		
1990's Sires	2774.XA2/99	2774.XA2/99			353.351/16	3007.5263/16	845.392/16	406.476/16		
1990's Sires	829.59/92	829.59/92			353.431/16	3658.1747/16		4591.9176/16		
1990's Sires	2658.400/00	2658.400/00			353.438/16	3658.1997/16		4591.9178/16		
					4448.126/15	3658.2166/16		4591.9308/16		
					4448.42/15	4588.1131/16		480.352/16		
					4462.121/15	4588.229/16		480.520/16		
					4588.279/16	4588.544/16		4851.105/16		
					4588.338/16	4701.20980/13		712.240/16		
					4588.734/15	4701.642/14		712.349/16		
					4765.140/16	4705.2222/15		712.67/16		
					4765.165/16	4705.3551/16				
					4765.77/16	4705.3645/16				
					4767.600/16	4772.30/13				
					4880.60165/16	4795.202/16				
					4880.60183/16	4795.74/16				
					4880.60960/16	4875.3048/16				
					4880.60981/16	4875.3101/16				
					4881.141/16	4880.60050/15				
					4881.66/16	4880.60126/15				
					699.48/16	4880.60689/17				
					916.1542/16	5001.S1/16				
					916.1547/16	5001.S68/16				
						746.270/16				
						746.93/16				

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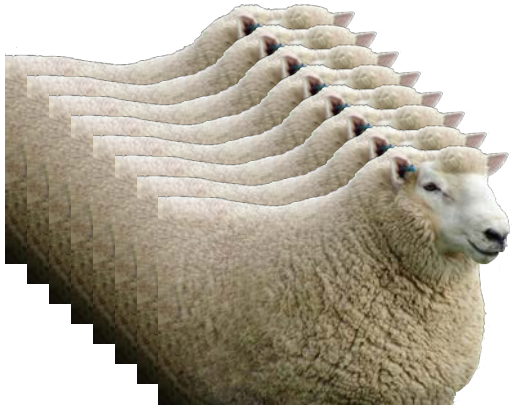
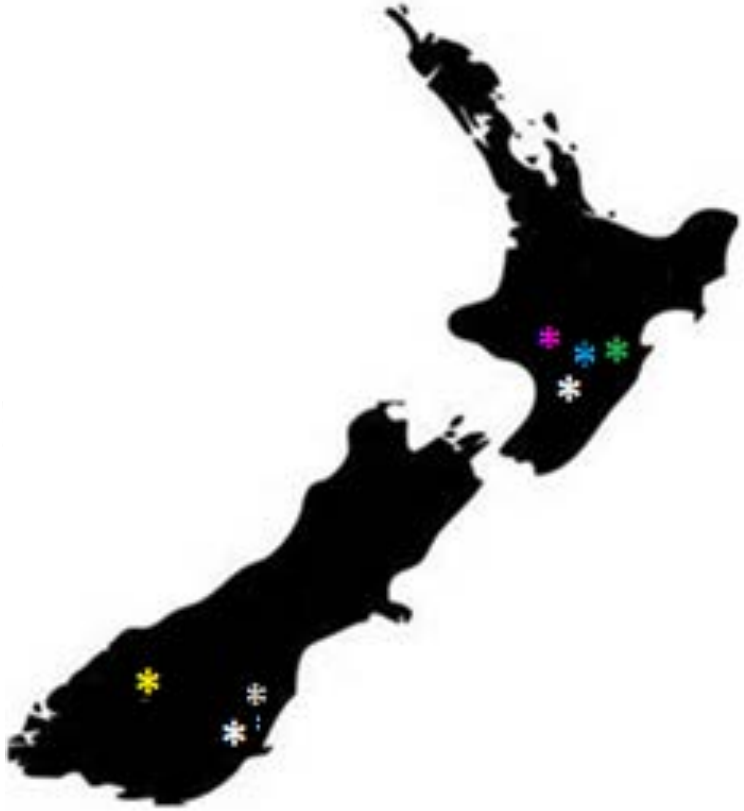
Summary of CPT 2017

186 X





On 7 sites

1 Research farm

6 Commercial farms

including 3 cadet training farms

CPT connecting SIL flocks

CPT measuring performance of 186 rams from 81 flocks representing 65,000 lambs born on SIL in 2015

= 20% of SIL lambs added annually!

Use a CPT ram at home
to connect to
more flocks ……

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Best use of NG and HUB CPT

Mate by AI at CPT site and use AI rams at home and as group sire reference

Mate naturally and use at home prior to CPT

Mate naturally and use at home after CPT

Best use of NG and HUB CPT

Mate by AI at CPT site and use AI rams at home and as group sire reference — **HUB**

Mate naturally and use at home prior to CPT — **Otiwhiti**

Mate naturally and use at home after CPT — **Smedley, Southdown**

Best use of NG and HUB CPT

Use best/optimal two rams from the NG CPT in the following year to be the ***link sires*** used in both sites***;***

- Year to year at the NG site
- NG site to the HUB

Should semen from these link sires be made available to the wider industry?

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CENTRAL PROGENY TEST

In 2017, B+LNZ Genetics Central Progeny Test (CPT) involves 186 rams, across seven sites, including six commercial properties, of which three are cadet-training bases.

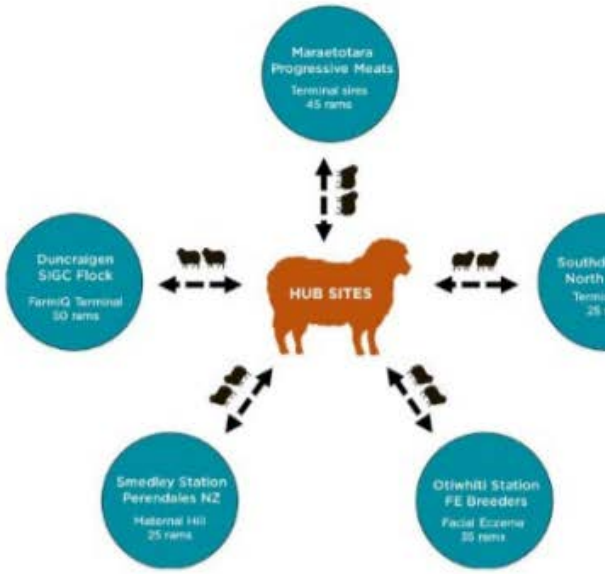
The test's focus has been adjusted further towards more commercial hill country environments and in partnership with industry, "Next Generation" flocks have been introduced.

These changes allowed:

- Testing of more rams of a younger age
- Rams of high genetic merit to be identified in time to be used more widely, while still alive
- The test to be carried out under more commercially-relevant environments
- Partnership with industry

Contributors: Alliance Group Limited, Neville Jopson (AbacusBio), Annie O'Connell, (B+LNZ Genetics)

The benchmarks created by this test underpin NZGE – the weekly large-scale across-flock and across-breed evaluation



2 Hub sites
focus on flock connectedness between the Next Generation flocks.

5 Next Generation sites
build stronger connections with ram breeding flocks in the industry.

Helping breeders and commercial farmers identify top genetics that will perform best in their environment

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Central Progeny Test: HUB SITES

Hub sites focus on flock connectedness between the Next Generation flocks.

This connectedness underpins across-industry genetic evaluation. Hub flocks also provide a resource for add-on innovative projects.

The two CPT Hub sites are:

- **AgResearch's Invermay Farm (Otago)**
- **Taratahi's Mangarata Farm (Wairarapa)**

Annually, 25-30 rams produced progeny at both sites (via AI). Many research traits are measured at these sites, including Reproduction, Growth, Meat, Wool, WormFec, Facial Eczema, Stayability, DagScore and Hogget Fertility. With AI and dam + sire parentage, lamb survival is also captured.

Entry of rams by expression of interest are called for in late November.

Contributors: AgResearch, Taratahi Agricultural Training Centre

SHEEP
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HUB CPT / Invermay & Taratahi

BLNZ Genetics/ Anna Boyd & Nadia McLean

- 22 new rams
- 1000 ewes, re-use ewes and progeny to become dams
- AI all rams, Link sires and mature rams accepted
- Dam & Sire parentage (DNA and tag at birth)
- Connectedness across flocks (Dual Purpose and Terminal Sire)
- Underpin BLNZ Genetics Research
- Ram entry EOI annually, strategic selection to represent industry

- **Repro, Survival, Growth, Adult Size, Wool, Meat, WormFEC, FE, Dag, Stayability, BCS**

beef+lamb GENETICS

Next Generation Site: MARAETOTARA

The 400ha Hawkes Bay farm is one of Horizon Farming's six properties and as a terminal-only operation is deemed ideal for this study.

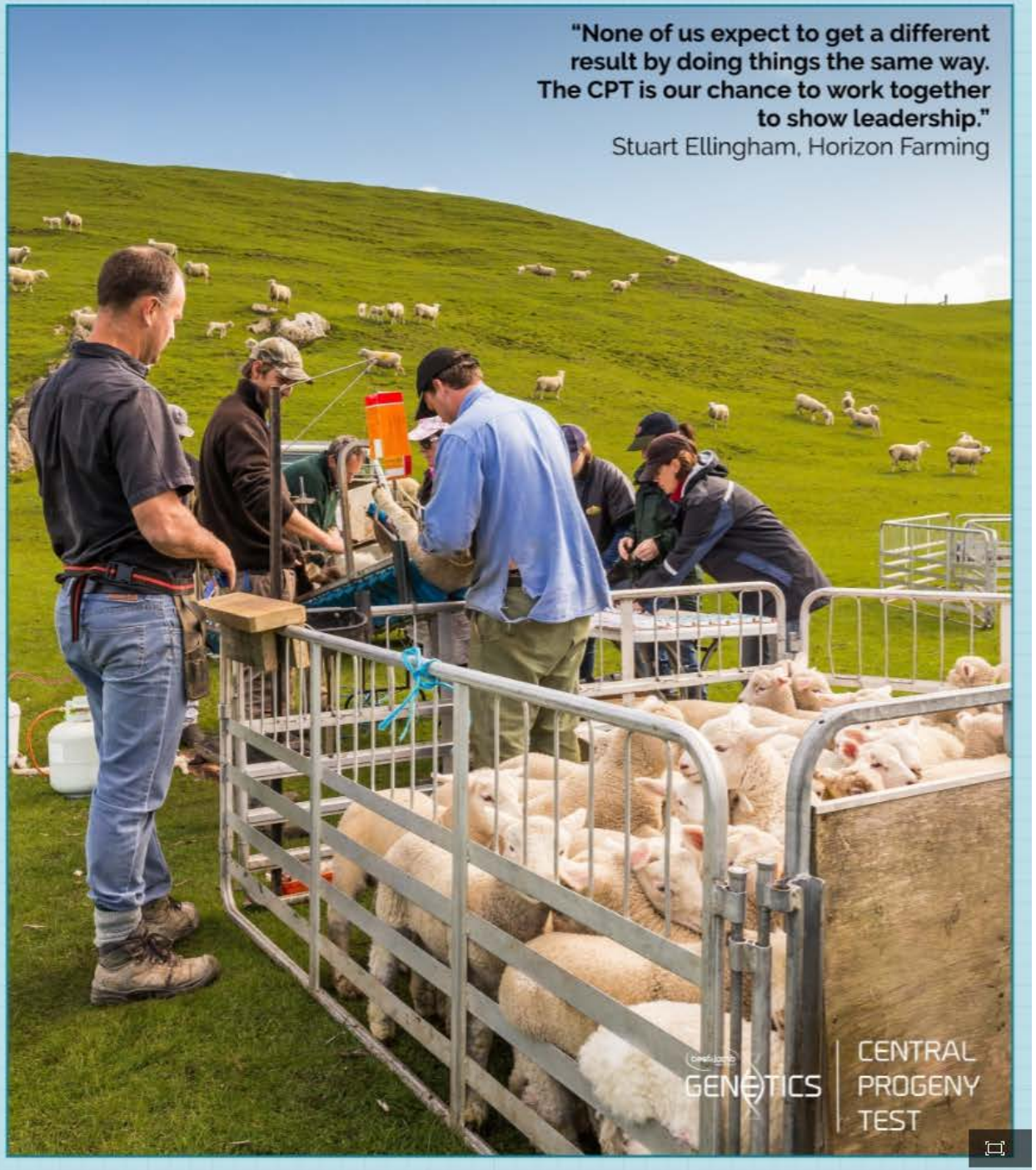
45 sires are brought to the farm from terminal ram breeders, including 2 link sires that are also artificially mated with ewes at the HUB CPT sites. Lambs born on the property in 2016, have sires from 11 different breeds.

Progeny are monitored for growth rate, before being processed and measured for eating quality and yield through Progressive Meats' grading system.

Once the meat module is fully implemented, results will feed into NZGE.

Horizon Farming

Contributors: Craig Hickson (Progressive Meats Ltd), Stuart Ellingham (Horizon Farming), Aimee Charteris (Aimee Charteris Genetics)



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PML : MARAETOTARA

Progressive Meats Ltd / Aimee Charteris

- 45 rams
- 1600 ewes, different ewes annually
- Natural mating of ram hoggets / two tooths
- Sire only parentage
- Meat Module
- Ram entry EOI annually

- **Growth, Meat***

Next Generation Site:
DUNCRAIGEN

While still part of the progeny test family, the Landcorp Duncraigen arrangement is slightly different. The Te Anau property is home to the **South Island Genomic Calibration (SIGC) flock.**

The calibration flock was established in 2011, as part of Farm^{IQ}, a Primary Growth Partnership (PGP) programme investigating in genetic selection for eating quality in sheep. Today, 800 mixed-age Romney ewes are mated to 40 mixed-age and hogget rams from 14 breeding flocks.

With a focus on evaluating composite terminal breed rams, the flock currently incorporates Suftex, Suffolk, ANZCO, Kelso and Focus Genetics (FocusPrime and Texel) sires.

FARM IQ

Contributors: Jim Inglis, Richard Lee (Landcorp), Natalie Pickering (Focus Genetics), John McEwan (AgResearch),

SHEEP BREEDER FORUM

SIGC : DUNCRAIGEN

FarmIQ-Agresearch / Natalie Pickering

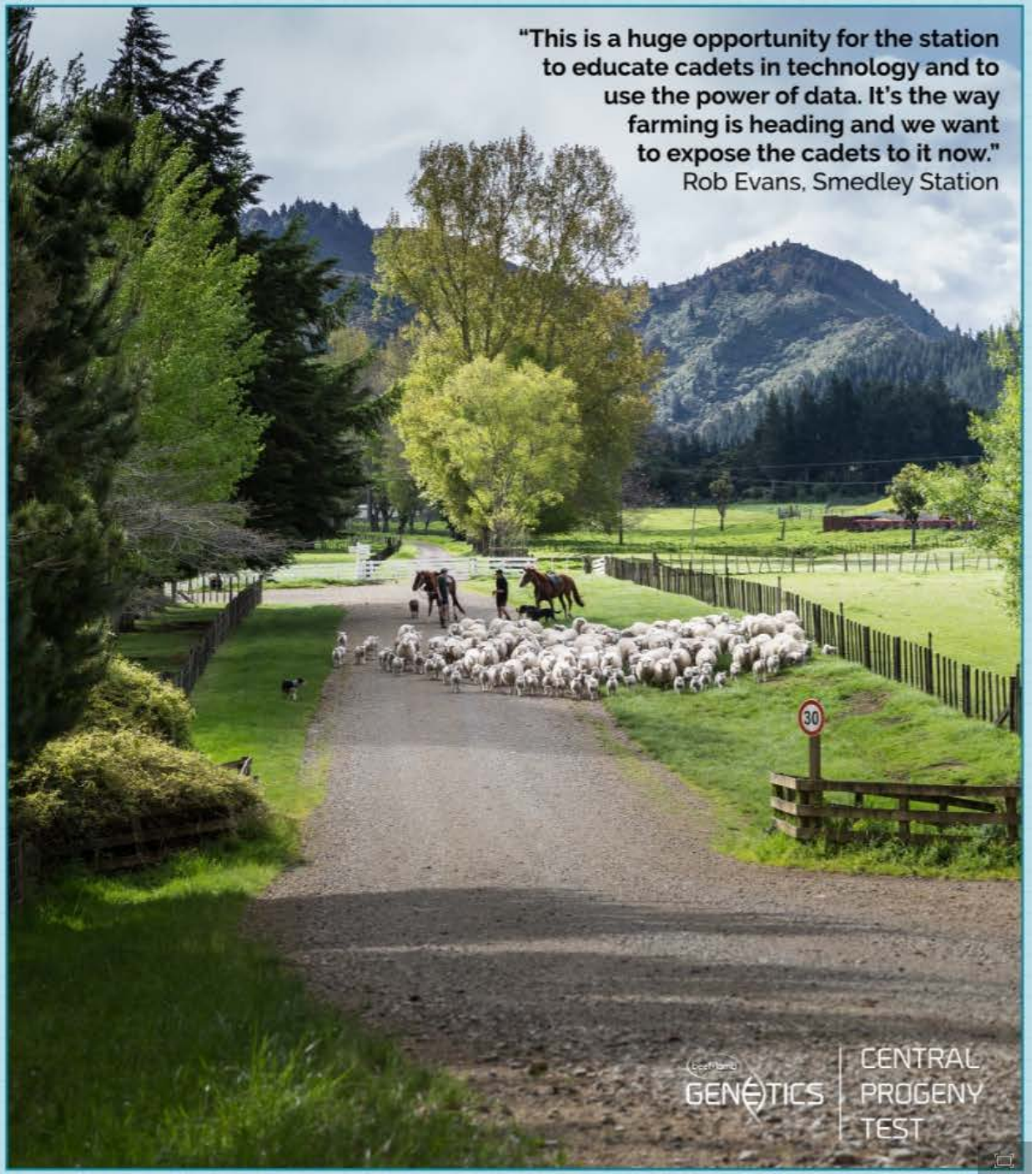
- 45 rams
- 800 ewes, different ewes annually
- Natural mating & some AI
- Sire only parentage
- Genomic Calibration
- Ram entry chosen by FarmIQ

- **Growth, Meat***

Next Generation Site: SMEDLEY STATION

Since March 2016, the Hawkes Bay training farm has been working with B+LNZ Genetics and the Perendale Society of New Zealand to test the genetic potential of 25 up-and-coming Perendale rams across 1000 of its young ewes.

In late October 2016, the progeny was EID tagged and DNA tested. The lambs' performance is now being monitored and assessed across a range of production and health traits.



SHEEP BREEDER FORUM

Contributors: Mike McElrea, Russell Proffit, Graeme Maxwell, Paul Evans (Perendale Society of New Zealand), Rob Evans, Tom Goodger (Smedley Station and Cadet Training Farm), Annie O'Connell (B+LNZ Genetics)

MATERNAL HILL : SMEDLEY

Perendale Society/ Annie O'Connell

- 25 rams
- 1000 ewes, re-use ewes and progeny to become dams
- Natural mating hogget rams, AI link sires
- Dam & Sire parentage (DNA)
- Connectedness Perendale flocks
- Ram entry negotiated Perendale Society and BLNZ Genetics

- **Repro, Survival, Growth, Adult Size, Wool, Meat, HogFert FE, Stayability, BCS**

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Next Generation Site: OTIWHITI STATION

Otiwhiti Station is large-scale sheep and cattle breeding property in the Hunterville district, Rangitikei. It also operates a cadet-training farm.

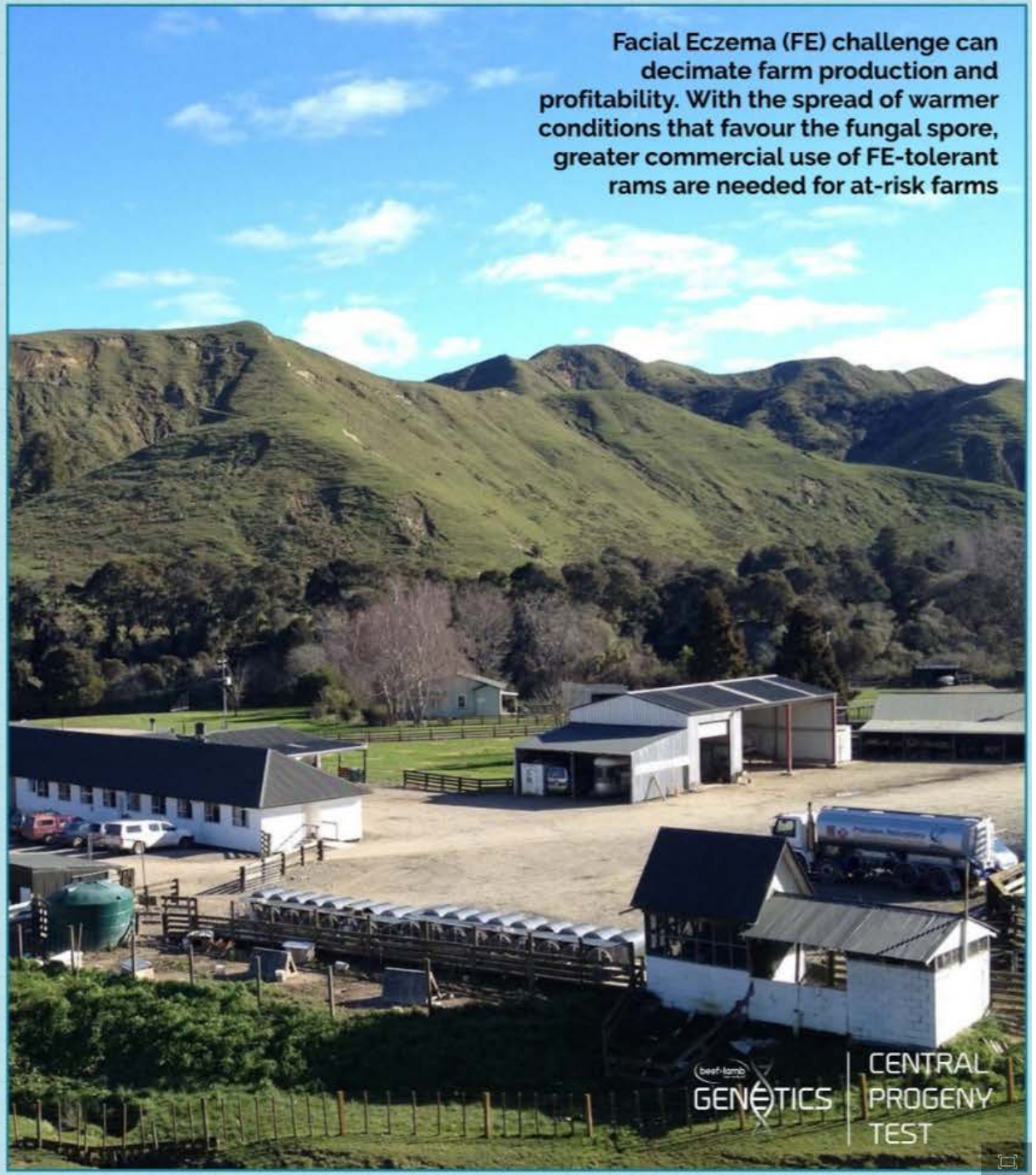
In partnership with Facial Eczema (FE) Breeders, the progeny test site focuses on best practice use of existing genomic and RamGuard™ tools to identify rams that produce FE-tolerant progeny.

In 2017, the site will use ewe hoggets as dams, so prior use of submitted rams at the home stud farm can occur for best practice connectedness.

Annually, 40 FE-tolerant rams will be assessed for their ability to produce FE-tolerant progeny. This will be determined through genomic testing of parents and progeny as well as FE dosing of progeny.

Otiwhiti Station

Contributors: Jed McAlly, Charlie Duncan (Otiwhiti Station Land Based Training Agricultural School), FE Breeders, Max Tweedie, Sharl Liebergreen, Annie O'Connell (B+LNZ Genetics)



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FACIAL ECZEMA : OTIWHITI

FE Breeders/ Max Tweedie

- 34 rams
- 1000 ewes hoggets, re-use ewes *and progeny to become dams*
- Natural mate hogget rams, AI link sires
- Dam & Sire parentage (DNA)
- Connectedness & Genomic tools & RamGuard predict FE tolerance – demonstrate to commercial farmers
- Ram entry EOI with FE breeders annually

- **Growth, FE**

Next Generation Site: SOUTHDOWN NZ

In a new partnership with the Southdown Sheep Society, this Next Generation site is based at a commercial sheep farm near Palmerston, North Otago.

The site activities are managed by Southdown breeder Dave Robertson, from The Vetinerary Centre, Oamaru. Each year, 25 terminal rams will be assessed for growth and meat production/quality (measured by VIAscan).

With natural mating and sire only parentage, lamb survival is not measured at this site.

Entry of rams is negotiated by the Southdown Society.

Contributors: Todd Anderson and Dave Robertson (Southdown Sheep Society NZ), Simon Engelbrecht (Farm owner), Annie O'Connell (B+LNZ Genetics)

SHEEP
BREEDER
FORUM

SOUTHDOWN : ENGELBRECHT

Southdown Society / Dave Robertson

- 25 rams
- 800 ewes, may re-use ewes
- Sire only parentage (DNA and tag at birth)
- Connectedness across Southdown flocks and with industry
- Explore meat quality
- Ram entry chosen by Southdown Society

- **Growth, Meat**

Value from Next Generation CPT

REPORTING FROM CPT
Discussion

Reporting from CPT in general

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USE of CPT reports by breeders

- Inform where flock ranks relative other flocks
- Inform where new genetics could be sought
- Inform ram selection at mating

Results currently available

- Data collected in all CPT sites are loaded promptly into SIL and immediately inform NZGE eBVs and indexes
  - In the weekly NZGE run
  - In RamFinder (updated bi-monthly)

- Research eBVs and Indexes need time and can only report on rams within CPT
  - Release in Autumn eg PML meat traits in 2017
  - Results are considered confidential to breeders submitting rams

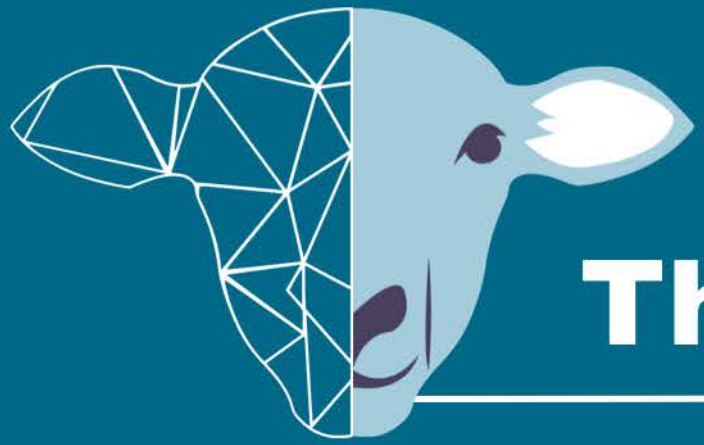
- NZGE Sire Leader lists on SIL website - updated bi-monthly

What more do we need ?

- Site updates on progress (delivered on a site by site basis)
  - Summary data

- Time line of events at each site being drafted
  - Provide to ram suppliers to inform when to expect genetic merit updates
  - Provide alerts to ram suppliers when new data entered

- Summary of results could be released annually with rams presented as NZGE percentile band range
  - Ram list will better reflect national ranking rather than CPT ranking
  - Booklet or simply on website?



Thank you.