

GENERATION NEXT.

B+LNZ GENETICS – GENETICS MODULE

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History:

- Opoho Station, East Coast, Northern HB
- Sheep Breeding Coordinator Innovis Breeding Sheep, Wales
- Breeding Programme Coordinator Focus Genetics Australia



B+LNZ GENETICS

R&D Beef SIL / **Sheep Progeny Genetics** projects nProve **Tests** A of In the marking man - man o A0.09 76-D

Exercise One: Genetics Knowledge





Why Genetics?

- Makes and saves \$\$\$\$
- Cheap, low risk investment for potentially significant gain
- Enables efficiency, more with less
- New "technology", every year sustainability
- You CAN control your genetics
- Permanent and cumulative









47TH EDITION

beef+lamb

LIVESTOCK OVERVIEW



Livestock numbers at 30 June (million)

i de la companya de la		2012		2022	% CHANGE	
	No.	SU	No.	SU	No.	SU
Sheep	31.3	28.0	25.3	22.4	-19%	-20%
Beef Cattle	3.7	18.1	3.9	18.8	+5%	+4%
Dairy Cattle	6.4	41.1	6.1	39.0	-5%	-5%
Deer	1.1	1.9	0.8	1.4	-27%	-26%
TOTAL STOCK UNITS ¹	-	89.1		81.6		-8%

1 Includes goats. Source: Beef + Lamb New Zealand Economic Service, Statistics New Zealand





beef+lamb

- In 30 years:
- 56% less sheep
- only 13% loss in production



Source: Beef + Lamb New Zealand Economic Service

Livestock productivity

	Unit	1990-91	2021-22	change
Lambing Performance	lambs/100 ewes	102	127	+24%
Lamb Weight	kg/head	13.9	19.0	+37%
Lamb Production	kg/ewe	9.8	20.9	+114%
Wool Production	kg/head	5.3	5.0	-6%
Steer Weight	kg/head	297	309	+4%
Milk Production	kgMS/cow	259 [±]	386	+49%

1 Figure is from 1992-93.

Source: Beef + Lamb New Zealand Economic Service, Livestock Improvement Corporation Ltd, DairyNZ



How have we achieved this?



What influences the way and animal looks and performs







Phenotype = Genotype + Environment

Breeding



More influence by **genetics More Heritable**

Feeding



More influence by **feeding** or environment = **Less Heritable**



"Sires are an investment in on-farm productivity and profitability - choose wisely"





The Impact of a sire





The Impact of a sire



A single ram can have up to 10 years of influence on your flock's performance.



Timeline of Beef Breeding







Key points

- Genetics is a long term investment
- **Sires** have much more influence over your herd or flock than females each mating as individuals
- Opportunity for improvement in breeding as well as feeding – BALANCE (GxE)



Better Sire Selection - Process



Your on farm goals

- Everyone is different
- Your farming system is individual to you
- What makes you, costs you or saves you money?







More lambs = more dags ?



Exercise Two: How do you choose?



Know your breeding objective



Better Sire Selection - Process



The most important decision you make, is the driveway you drive up...





Who can help me achieve my goals?



Finding the right breeder

nProve

Step 2: Choose a ram breeder.

Now you know which traits are most important to your goal, **go to nprove.nz**. Within minutes, you can have a list of breeders with genetics that meet your specific objectives.





Don't be afraid to ask your breeder questions...

- Do their objectives match yours?
- Are they performance recording? SIL/Breedplan
- Do they structurally assess animals?
- Are they utilising genomics?
- Are they recording all traits accurately?

ARE THEY MAKING GENETIC GAIN IN TRAITS IN YOUR OBJECTIVE?



Find aligned breeders

Lets talk figures

What's on the outside might keep us happy, but it's what's on the **inside** that **makes us money!**





Separating the G and E Environmental influence vs genetic potential

PERFORMANCE = GENETICS + ENVIRONMENT





July Born





October Born





Separating the G and E Environmental influence vs genetic potential







Remember, you are buying what can be <u>passed on</u>, NOT an individual performer



Group Discussion:

What happens if we don't take the environmental noise out of the equation?

What about unrecorded sires?





Breeding Values

The best estimate of the animal's genetic merit, as a parent, for particular traits.





Estimated Breeding Values (EBVs)

- An animal's **estimated** genetic merit for each trait
 - Difference between animal's genetics and a set historical genetic level (base year).
- Reported in the **units of the measurement** taken.
- A "good" value can be **+ve** OR **-ve** depending on the trait.
- Takes in to account **all information** possible (unbiased).

WWT – Weaning Weight



- Bigger is better
- Higher BV, higher kg WWT

FEC1 - Faecal egg counts in lambs pre March

- Negative is better
- Lower number of eggs per gram

PACCH4 – PAC methane emission

- Negative is better
- Lower emissions /kg feed eaten



Estimated Breeding Values (EBVs)

- An animal's **estimated** genetic merit for each trait
 - Difference between animal's genetics and a set historical genetic level (base year).
- Reported in the **units of the measurement** taken.
- A "good" value can be **+ve** OR **-ve** depending on the trait.
- Takes in to account **all information** possible (unbiased).

EXAMPLES:



Calving Ease (DIR)

= The ability of a sire's calves to be born unassisted from 2 year old heifers.

Reported as a %

Bigger is better

= Higher eBV, higher % unassisted calves born

Gestation Length

= The number of days from date of conception to calf birth date.

Reported in days

Lower is better

= Lower, or more -ve eBVs, lower number of days to calve



Indexes

- Describes a different production/market scenario or breeding objective
- Relates to a typical commercial herd/flock
- Relative Economic Value
 - Determined by what economic value one unit change of each breeding value would be
- Multiple eBVs contribute to the value
- Animals with the same index value may have different eBVs for individual traits
- BIGGER IS BETTER





Indexes

 Describes a different production/market scenario or breeding objective

EXAMPLE DPS (Dual Purpose Survival)

Cents per ewe lambing =

(16049 x SUReBV) + (15008 x SURMeBV)





Sheep Indexes



Self replacing (SRI) and Angus Pure (API) Cattle Indexes

Self Replacing Index - EBV Weightings





AngusPure Index - EBV Weightings



Using Indexes

It is important to use indexes as part of a selection strategy – alongside other tools such as BVs and visual/structural assessment!!!



1. **Pick the index** that best relates to the system you are running (e.g. target market) and the role you will use the sire in. 2. Identify the top % of rams/bulls (rank) based on the chosen index (use it to identify your breeder too).Use the index like an EBV (it is an EBV for profit). 3. Then **look at the ram/bull's EBVs**, to make sure that the animal gets a top index by being strong in the attributes/traits that are important to you.



Better Sire Selection - Process



Finding the right breeder



nProve helps you find the right fit for your objective



Finding the right breeder





Scenario #1

- Self replacing system
- North Island
- Good all rounder
- FE tolerance is a must
- Internal Parasite Resistance is important



Questions to ask your breeder

- Share animals you found on nProve
- Genetic Trend Graphs
- Additional traits not on nProve
- How are animals structurally assessed prior to sale
- Animal health records





Questions to ask your breeder

Step 3: Choose your ram.

In a nutshell, breeding values (BVs) and indexes indicate the merit of a ram as a parent. Talk to your breeder about using these tools to understand what the rams on offer can do for you.

SALES PROCESS

- Auction or Private selection
- Selection pecking order
- Purchase price ranges
- How do they price their sires
- Catalogue or sire lists available before sale
- What information will be available to you on sale day



Exercise Three: Sire Selection





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		-		ID APRIL 202	TRANSTA	SMAN ANG	GUS CAT	TLE EVA	LUATION	EBVS	REG	SISTER: HB	R
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1229	99 ^{sv}		_	55% 55%	75%	76%	76%	74%	76%	74%	69%	77%	41%
WSONS ANGUS	S NZ 09397 *		C	ARCASE					FEED	INDEX		LEACHM/	AN
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AND DAM PERF	FORMANCE:	Grand dam 1	2 calves Ge	netic Conditio	ns: AMFU,C	AFU,DDFU,M	NHFU	STRUC	TURAL ASS	SESSMEN	IT - 07/04	/2022	
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chaser:			00		Price:	omea		5	6 6	6	7	5 5	1
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	19-17	1.0						win.			
ZGE Oct 2021	PERCENTILE	*NZMW	*MW+M	*DPCR	*DPS	*DPG	*DPA	*DPM	*DPW	*DPF	
020 born rams	50%	1920	2229	357	456	1305	-483	279	140	86	



Bull Selection Exercise

BULL	CALVING EASE DIR (%)	200 DAY WEIGHT (kg)	400 DAY WEIGHT (kg)	600 DAY WEIGHT (kg)	DAY TO CALVING (days)
А	+10.5	+37	+61	+86	-4.4
В	-0.2	+40	+69	+104	+1.0
С	+1.9	+44	+54	+78	-6.7
BREED AV	+2.5	+33	+55	+78	-3.1

BUYER 1: Sells cattle as weaners. Is not happy with the dry rate (fertility) in their cow herd.

BUYER 2: Is experiencing calving difficulties. Increasing growth rates are a focus.

BUYER 3: Intends to use bull as a terminal cross over mixed-age cows and finish all progeny. Sells both the heifers and steers as finished 2 year olds.



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Sells cattle as weaners. Is not happy with the dry rate (fertility) in their cow herd.

BUYER 2:

BUYER 1:

Is experiencing calving difficulties. Increasing growth rates are a focus.

BUYER 3: B Intends to use bull as a terminal cross over mixed-age cows and finish all progeny. Sells both the heifers and steers as finished 2 year olds.



Ram Selection Exercise

1	ANIM	AL ID 2	21109	Bir	th Rank	2/2	COLOUR:	RED	
SIRE: 19	941.2014	44.2020	DAN	1: 19180)8			5K	
SIL	NZMW	MW+X	DPCR	DPS	DPG	DPW	DPM	DPF	
Index	2594	4216	563	870	1796	2	375	506	
Rank	32	33	81	51	81	222	26	43	

2	ANIM	ALID	221287	Bir	th Rank	2/2	COLOUR	YELLO
SIRE: 19	941. <mark>1</mark> 9102	29/19	DAN	1: 19139	95			5K
SIL	NZMW	MW+X	DPCR	DPS	DPG	DPW	DPM	DPF
Index	2033	4277	626	9 <mark>0</mark> 5	1736	15	3	-492
Rank	143	29	65	37	100	204	216	250

3	ANIM	AL ID 2	221636	Bir	th Rank	1/1	COLOUR:	GREEN
SIRE: 19	941.2007	92.2020	DAN	1: 20240)7			5K
SIL	NZMW	MW+X	DPCR	DPS	DPG	DPW	DPM	DPF
Index	2314	4417	198	876	1612	-29	338	498

4	ANIM	AL ID	221705	Bir	th Rank	1/1	COLOUR	BLUE
nalik	00	20	225	40	140	240	40	50
Donk	88	20	225	40	146	246	40	50
					_			

SIL	NZMW	MW+X	DPCR	DPS	DPG	DPW	DPM	DPF
Index	2936	4500	412	1150	1976	69	663	348
Rank	6	13	1 <u>5</u> 9	6	37	112	1	81

5	ANIM	AL ID 2	21785	Bir	th Rank	3/2	COLOUR:	ORANGE
SIRE: 19	941.1919	2 <mark>8/1</mark> 9	DAN	1: 19225	58			5K
SIL	NZMW	MW+X	DPCR	DPS	DPG	DPW	DPM	DPF
Index	2644	4986	437	741	1825	109	157	-55
Rank	28	3	146	107	69	55	138	203

6	ANIM	AL ID 2	22129	Bir	th Rank	2/2	COLOUR:	RED
SIRE: 1	941.1919	29/19	DAM	A: 17151	6			5K
SIL	NZMW	MW+X	DPCR	DPS	DPG	DPW	DPM	DPF
Index	2401	3982	214	1243	1613	42	-76	756
Rank	69	54	220	2	145	162	235	10

7	ANIM	AL ID	222274	Bir	th Rank	2/2	COLOUR:	YELLOW
SIRE: 1	941.2007	34.2020	DAN	1: 20117	71			5K
SIL	NZMW	MW+X	DPCR	DPS	DPG	DPW	DPM	DPF
Index	21 <mark>57</mark>	5099	297	499	1969	139	107	151
Rank	123	2	202	218	39	23	170	144

8	ANIM	AL ID	222331	Bir	Birth Rank 2/2		COLOUR: GREEN	
SIRE: 1	941.1808	46/18	DAN	1: 20141	3		353	56
SIL	NZMW	MW+X	DPCR	DPS	DPG	DPW	DPM	DPF
Index	2735	4945	693	564	2193	32	295	-90
Donk	10	4	37	108	10	181	61	21/

9	ANIM	AL ID 2	22364	Bir	th Rank	2/2	COLOUR:	BLUE
SIRE: 1941.180846/18 DAM: 201413								5K
SIL	NZMW	MW+X	DPCR	DPS	DPG	DPW	DPM	DPF
Index	2425	4550	684	573	1773	90	49	-47
Rank	64	12	43	194	85	78	191	200

10	ANIM	AL ID 2	22425	Bir	h Rank	2/2	COLOUR:	ORANG
SIRE: 19	941.2016	78 <mark>.202</mark> 0	DAN	1: 20139	19			5K
SIL	NZMW	MW+X	DPCR	DPS	DPG	DPW	DPM	DPF
Index	2926	4091	825	1039	2112	4	206	-241
Rank	7	41	6	17	17	217	108	232

Octobe	r 2023		50%
NZGE Dual Purpose	NZMW	Maternal Worth	+1990
Indexes	MW +X	Maternal Worth + Facial Eczema	+3175
NZGE Dual	DPCR	Capped Reproduction	+344
Purpose	DPS	Survival	+492
Sub-	DPG	Growth	+1527
indexes	DPW	Wool	+81
	DPM	Meat	+390
	DPF	WormFEC	+90

Find 2 rams for a buyer with the following

traits in his breeding objective:

- 1. FE tolerance is top priority
- 2. WormFEC is important
- 3. Looking to maintain **reproduction** and

growth rates



Ram Selection Exercise

1	ANIM	AL ID 2	221109	Bir	th Rank	2/2	COLOUR	RED
SIRE: 19	941.2014	44.2020	DAN	1: 1918	08			5K
SIL	NZMW	MW+X	OPCH	DPS	DPG	DPW	DPM	DPF
Index	2594	4216	563	870	1796	2	375	506
Rank	32	33	81	51	81	222	26	43
	2010							
2	ANIM	AL ID 2	221287	Bir	th Rank	2/2	COLOUR	YELLO
SIRE: 1	941.1910	29/19	DAN	A: 1913	95			5
SIL	NZMW	MW+X	DPCH	DPS	DPG	DPW	DPM	DPF
Index	2033	4277	626	9 <mark>0</mark> 5	1736	15	3	-492
Rank	143	29	65	37	100	204	216	250
	7,1/2			1				<u> </u>
3	ANIM	AL ID 2	221636	Bir	th Rank	1/1	COLOUR	GREEN
SIRE: 19	941.2007	92.2020	DAN	1: 20240	07		a	5
SIL	NZMW	MW+X	DPCR	DPS	DPG	DPW	DPM	DPF
Index	2314	4417	198	876	1612	-29	338	498
Rank	88	20	225	49	146	246	40	50
				21222		1		
4	ANIM	AL ID 2	221705	Bir	th Rank	1/1	COLOUR	BLUE
SIRE: 1	941.1920	31/19	DAN	A: 20214	49			51
SIL	NZMW	MW+λ	DPCR	DPS	DPG	DPW	DPM	DPF
Index	2936	4500	412	1150	1976	69	663	348
Rank	6	13	159	6	37	112	1	81
5	ANIM		01705	Die	th Dank	2/2	COLOUR	ORAN
		00/10	21700		CO DE	012	COLOOK	-ontail
SIKE: 1	941.1919	28/19	UAN	1: 1922:	58			51
SIL	NZMW	MW+X	OPCR	DPS	DPG	DPW	DPM	DPF
Index	2644	4986	437	/41	1825	109	15/	-55
Hank	28	3	146	107	69	55	138	203

6	ANIM	AL ID	222129	Bir	th Rank	2/2	COLOUR	RED
SIRE: 1	941.1919	2 <mark>9/1</mark> 9	DAN	1: 17151	16			5K
SIL	NZMW	MW+3	OPCH	DPS	DPG	DPW	DPM	DPF
Index	2401	3982	214	1243	1613	42	-76	756
Rank	69	54	220	2	145	162	235	10
7	ANIM		000074	Rir	th Rank	2/2	COLOUR	VELLOW
SIRE: 1	941.2007	34.2020	DAN	1: 20117	71	L/L	002000	5K
SIL	NZMW	MW+X	DPCR	DPS	DPG	DPW	DPM	DPF
Index	2157	5099	297	499	1969	139	107	151
Rank	123	2	202	218	39	23	170	144
8	ANIM	AL ID	222331	Bir	th Rank	2/2	COLOUR	GREEN
SIRE: 19	941. <mark>1808</mark>	46/18	DAN	1: 20141	13		S23	5K
SIL	NZMW	MW+X	OPCR	DPS	DPG	DPW	DPM	DPF
Index	2735	4945	693	564	2193	32	295	-90
Rank	19	4	37	198	10	<mark>181</mark>	61	214
9	ANIM	AL ID	222364	Bir	th Rank	2/2	COLOUR	BLUE
SIRE: 19	941.1808	46/18	DAN	1: 2014	13		1913	5K
SIL	NZMW	MW+λ	DPCR	DPS	DPG	DPW	DPM	DPF
Index	2425	4550	684	573	1773	90	49	-47
Rank	64	12	43	194	85	78	191	200
10	ANIM	AL ID	222425	Bir	th Rank	2/2	COLOUR	ORANGE
SIRE: 19	9 <mark>41.20</mark> 16	7 <mark>8.202</mark> 0	DAN	1: 20139	99			5K
SIL	NZMW	MW+X	DPCR	DPS	DPG	DPW	DPM	DPF
Index	2926	4091	825	1039	2112	4	206	-241
Rank	7	41	6	17	17	217	108	232

Octobe	er 2023		50%
NZGE Dual Purpose	NZMW	Maternal Worth	+1990
Indexes	MW +X	Maternal Worth + Facial Eczema	+3175
N7GE Dual	DPCR	Capped Reproduction	+344
Purpose	DPS	Survival	+492
Sub-	DPG	Growth	+1527
indexes	DPW	Wool	+81
	DPM	Meat	+390
	DPF	WormFEC	+90

Find 2 rams for a buyer with the following traits in his breeding objective:

- 1. FE tolerance is top priority
- 2. WormFEC is important
- **3.** Looking to maintain **reproduction** and

growth rates



On Sale Day



- Be prepared
- Take your percentile bands with you
- Talk to your breeder
- Don't be afraid to ask questions
- Structure is still important



After Sale Day



Step 4: Make the most of your ram.

Settle your ram into his new home with care, so he is in the best condition to serve you well. Sperm production takes 6-7 weeks, so take special care of rams 10 weeks prior to mating.

Look after your investment!



Happy Sire Buying!

www.blnzgenetics.com

www.sil.co.nz/tools/nzge/percentile-bands

Sarah Powdrell, Genetics Operations Specialist - Sheep Mob <u>027 457 0480</u> Email <u>sarah.powdrell@blnzgenetics.com</u>

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nProve

Commercial farmer tool to find and compare ram breeders



Ram breeder tool to report from and load data for NZGE

Visit nprove.nz



Central Progeny Test (CPT) – HUB Sites

Create genetic linkages (or connections) across breeds that would not happen naturally in industry.

This allows connected rams to be objectively compared with each other regardless of breed.





CPT – HUB Sites

North Island – Wairarapa, NI Hill Country Paul Crick & Dayanne Almeida





South Island – Otago, SI Lowland/Rolling Hill AgResearch Invermay





CPT – Next Generation Site Low Input PT, Orari Gorge Geraldine



- MPI SFF co-funded project Dec 2022
 - Ethically and sustainably produced high value lamb
- Minimal external inputs (e.g. drenches, treatments, and labour) Welfare traits (tail traits, bareness)
 - More robust to **combat disease** (worm resistance, pneumonia)
 - Environmentally efficient (reduced methane emissions through feed efficiency)



BEEF Genetics

Beef Progeny Test

- ➡ First AI mating 2014, 5 properties
- 3 properties still measuring
- Quantify value, demonstrate tools & improve the commercial farmer tool kit

Dairy-Beef Progeny Test

- Started in 2015 at Limestone Downs, Hereford & Angus bulls
- Now at Pāmu's Renown Farm, bulls accepted on eBV merit for diary beef systems - suitable for widespread use in the dairy industry via AB
 - short gestation
 - 🖷 easy calving
 - excellent growth rates
 - superior carcase traits







INFORMING NEW ZEALAND BEEF

INZB is a future focused seven-year programme (2021–2027) designed to generate more income for beef producers and the economy while protecting the environment.



INFORMING NZ BEEF



