OWL FARM

Providing knowledge.

St Peter's · Cambridge
NEW ZEALAND

LINCOLN UNIVERSITY
TE WHARE WĀNAKA O AORAKI

St Peter's School/Lincoln University
Demonstration Dairy Farm

FARM FOCUS DAY

Thursday, 29 February 2024

Pathway to plantain

Preparing cows for transport

Autumn management plan

Disclaimer:

While every effort has been made to ensure information provided in this handout was true and correct and the time of going to print, Owl Farm takes no responsibility for the use of data outside of the purpose to inform readers of the current situation at Owl Farm on the Focus Day.

Ballance agri-nutrients

DairyNZ

New Zealand Farm Source

PGG Wrightson Seeds

OWL FARM

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CONTENTS

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HEALTH AND SAFETY

Welcome to Owl Farm. We are a fully operational, commercial dairy farm with several potential hazards to both visitors and staff. Many of these hazards cannot be eliminated while also providing access to visitors, therefore all staff and visitors MUST watch for potential hazards and act with caution.

St Peter's School / Owl Farm Hazard Notifications

- Children are the responsibility of their parent or guardian
- Normal hazards associated with a dairy farm
- Vehicular traffic on farm roads and races
- Races may be slippery

ARE YOU TRAINED FOR WHAT YOU ARE ABOUT TO DO? IF NOT, STOP.

Emergency Contact Information

In the event of an emergency, ensure the scene is safe and raise the alarm to get Owl Farm staff and emergency services to assist.

Emergency Services

- **Fire, Police and Ambulance** **111**
  1716 Cambridge Road, follow Hanlin Road through the school to the farm

Farm Staff

- Jo Sheridan – Demonstration Manager 021 712 680
- Tony Alarca – Farm Manager 027 244 7817

Safety Equipment Location

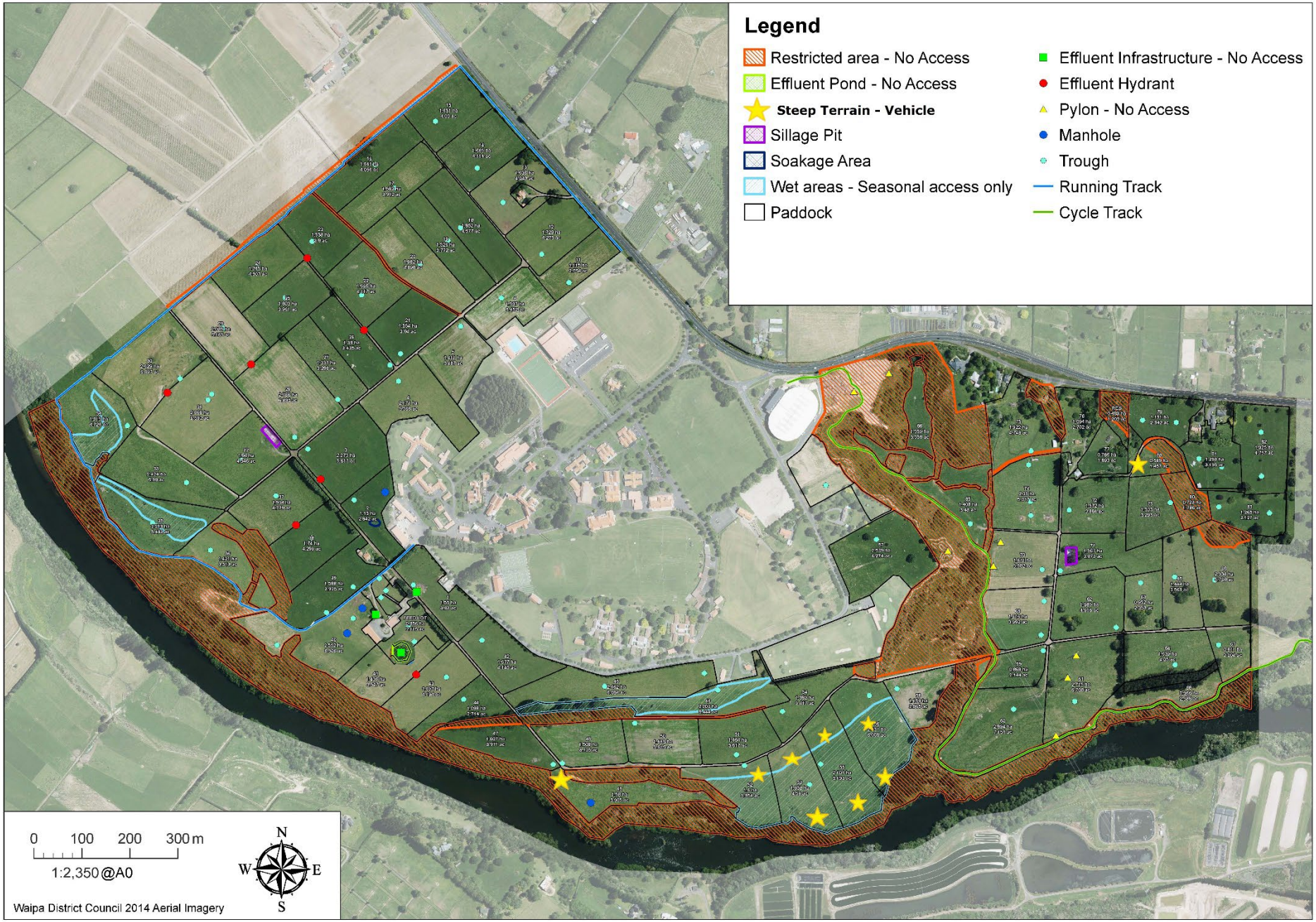
- First Aid Kits Dairy Shed and Vehicles
- Fire Extinguishers Dairy Shed and Tractor
- Defibrillator St Peter's Main Office and Medical Centre

By entering Owl Farm and signing in at registration, you acknowledge your understanding of any potential hazards and agree to take personal responsibility and act in such a manner as to protect yourselves and others also on-farm.

OWL FARM STRATEGY

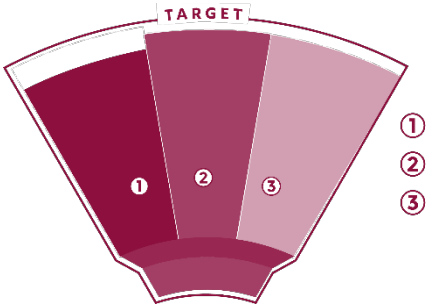
1. **Vision**
   a. **Dairy Farm**
      - Demonstrating excellence in farm performance to create a sustainable future.
   b. **Students**
      - To encourage more young people into the dairy industry.

2. **Strategic Objectives**
   a. **Dairy Farm**
      - Providing leadership to dairy farmers and the wider community by demonstrating progressive practices that can be achieved on farm.
      - Optimising profit through identifying the appropriate dairy production system for Owl Farm.
      - Achieving a sustainable environmental footprint based on industry good management practice.
      - To attract, train and retain quality employees.
   b. **Students**
      - To provide educational opportunities and exposure to the dairy industry which demonstrates career opportunities to students.

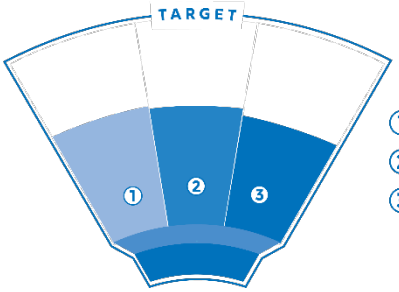

Legend
Restricted area - No Access
Effluent Pond - No Access
Steep Terrain - Vehicle
Sillage Pit
Soakage Area
Wet areas - Seasonal access only
Paddock
Effluent Infrastructure - No Access
Effluent Hydrant
Pylon - No Access
Manhole
Trough
Running Track
Cycle Track
0 100 200 300 m
1:2,350 @A0
N
W
E
S
Waipa District Council 2014 Aerial Imagery

WAGON WHEEL KPIS 2022/23

	PRIMARY KPI	OWL FARM TARGET	2022/23	2021/22	2020/21	2019/20	2018/19	2017/18
1	Healthy cows	15% or less involuntary culls	22%	12%	19%	20%	-	-
2	Purposeful lives for calves	100% reared past 4 days on farm	61%	70%	60%	39%	34%	
3	Replacements reared	21% - at weaning	19.4%	19.4%	22.9%	23.4%	23.1%	
4	Healthy calves	100% adequate total protein	83%	83%	80%	-	-	-

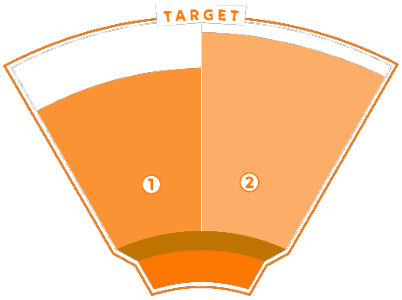


	PRIMARY KPI	OWL FARM TARGET	2022/23	2021/22	2020/21	2019/20	2018/19	2017/18
1	Social and economic wealth	100% - survey participants agree	97	90	90	-	-	-
2	Taking care of stock and environment	100% - survey participants agree	97	100	100	-	-	-
3	Providing educational opportunities	100% - survey participants agree	97	100	100	-	-	-

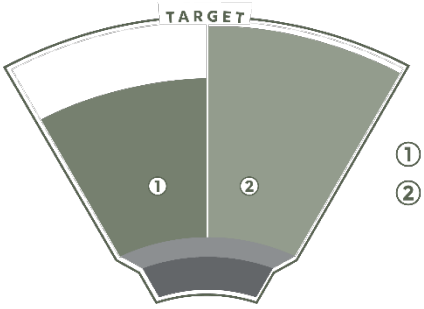


	PRIMARY KPI	OWL FARM TARGET	2022/23	2021/22	2020/21	2019/20	2018/19	2017/18
1	Farm Working Expenses	$4/kgMS - via DairyBase	$6.81	$6.30	$4.60	$4.96	$4.66	$4.20
2	Op proft/ha (eff dairy)	> top 20% - via DairyBase	$2362 vs $1940	$3886 vs $6950	$3482 vs $N/A	$2405 vs $4395	$2147 vs $3533	$3096 vs $4379
3	ROA	6% - via DairyBase	3%	5.50%	5.00%	3.40%	3.10%	4.40%

	PRIMARY KPI	OWL FARM TARGET	2022/23	2021/22	2020/21	2019/20	2018/19	2017/18
1	Biological GHG/ha CO2 equiv	3 yr average trending down	9633	10411	9945	9074	9192	9548
2	Modelled N loss kg/ha/yr	3 yr average trending down	28	35	34	32	33	33



	PRIMARY KPI	OWL FARM TARGET	2022/23	2021/22	2020/21	2019/20	2018/19	2017/18
1	P&C harvested/ha	15t DM/ha - measured via DairyBase	11.2	13.2	13.7	13.1	13.1	13.8
2	MS/ha to 31st Dec	850 kgMS/ha	766.5	808	810	816	819	794



	PRIMARY KPI	OWL FARM TARGET	2022/23	2021/22	2020/21	2019/20	2018/19	2017/18
1	Workplace 360	100%/100%/100%	100/68/53	100/79/63	100/79/63	-	-	-
2	Average hours worked/ week	45 hours/week/person	40.4	44.8	46.4	45	49	50

OWL FARM MULTI-YEAR SNAPSHOT

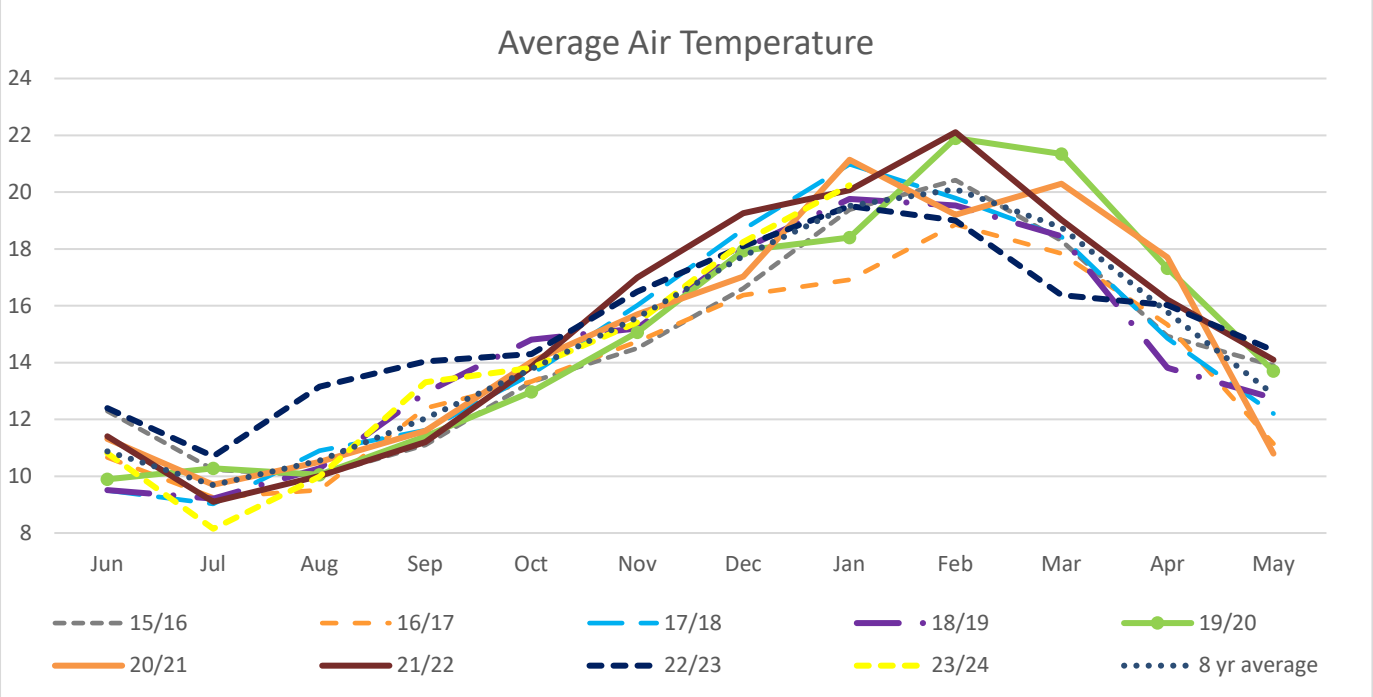
	Year	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Physical Info	Total farm area	164	164	164	160	160	150
	Effective area (ha)	148	147.3	147.5	144	144	140
	Location of calves	Off Farm	Off Farm	Off farm	Leased runoff	Dairy platform	Dairy platform
	Leased run off (ha)	5	15	10	4.7	0	0
	Cows wintered	441	419	421	416	418	394
	Peak cows (1 Nov)	418	406	405	405	410	355
	Peak stocking rate cows/ha	2.82	2.76	2.75	2.81	2.84	2.5
Production	Total kg MS	168,169	169,359	167,185	178,125	164,163	154,394
	MS/cow	402	417	413	440	400	431
	MS/ha	1,136	1,150	1,133	1,237	1,142	1072
	MS as % liveweight	86.5%	89.7%	86%	92%	83%	89%
	Average SCC	146,000	172,000	162,000	144,000	121,000	151,385
Feed and Inputs	Pasture & Crop harvested t DM/ha (Farmax)	13.8	13.7	11.4	11.7	11.3	11.2
	Supplements imported t DM/ha	2.3	2.3	2.7	2.6	2.9	1.8
	Supplements imported t DM	339	337	400	368	398	250
	Silage harvested on farm t DM	169	238	143	115	94	80
	Crops grown on farm t DM	98	99	73	126	79	145
	Nitrogen fertiliser applied on pasture (kg/ha)	161kg	149kg	140kg	138kg	126kg	116kg
Financials	Gross farm revenue/kg MS (including stock/dividend)	$7.56	$6.86	$7.58	$7.94	$10.26	$9.65
	Net milk sales/kg MS (Dairybase)	$6.39	$6.43	$7.11	$7.47	$9.36	$8.92
	Stock sales/kg MS	$0.54	$0.43	$0.37	$0.52	$0.98	$0.84
	FWE/kg MS	$4.28	$4.66	$4.96	$4.60	$6.30	$6.81
	Operating Expenses/kg MS	$4.59	$4.97	$5.46	$5.10	$6.86	$7.45
	Operating Profit/ha (Dairybase)	$3,096	$2,147	$2,405	$3,482	$3,886	$2,362
Enviro	Estimated N loss kg/ha	35	35	32	34	35	28
	Estimated P loss kg/ha	0.8	0.9	0.8	1.0	1.0	1.0
	GHG loss/ha Overseer FM kg CO_2e/ha	11,801	11,728	11,304	11,623	12,350	11,096
	Biological GHG/ha (methane + nitrous oxide)	9,548	9,192	9,074	9,945	10,411	9,633
	Emissions Intensity kg CO_2e/kg MS	12	11.8	11.5	11.1	12.1	11.5
	N conversion efficiency	24%	25%	25%	27%	28%	29%
Infrastructure	Cowshed	36 Rot	36 Rot	36 Rot	36 Rot	36 Rot	36 Rot
	Feed infrastructure	NIL	NIL	NIL	NIL	NIL	NIL
	Herd BW/PW	112/135	119/153	159/186	171/197	215/255	253/306
	Effluent storage	*New lined pond*	*3000m³*	*3000m³*	*3000m³*	*3000m³*	*3000m³*
	Amount of farm effluent is applied to	51 ha 34%	51 ha 34%	51 ha 34%	41 ha 28%	52 ha 36%	52 ha 37%

1.0 FARM PERFORMANCE

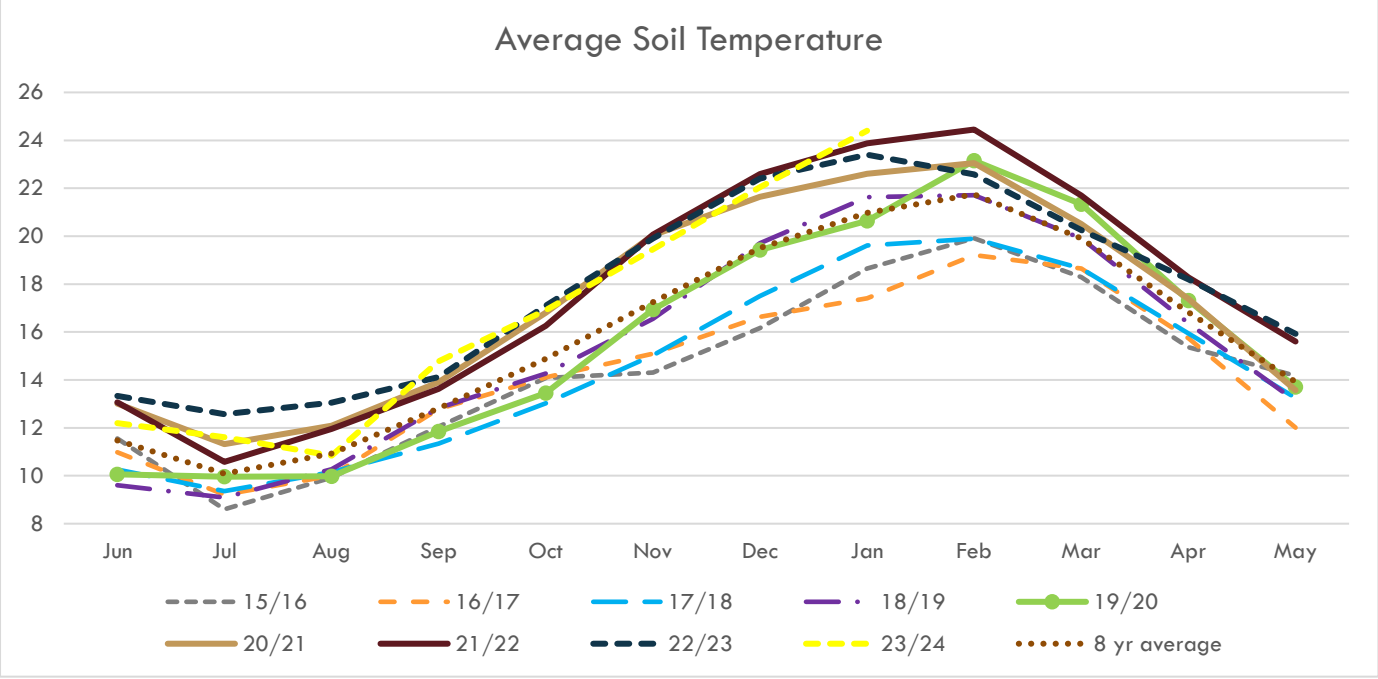
CLIMATE

Climate is recorded from one weather station on the farm, collecting rainfall, air temperature, humidity and wind data. We also have a 600mm soil probe that measures soil moisture and temperature at 100mm depths. Graphs show readings at 100mm depth over time.

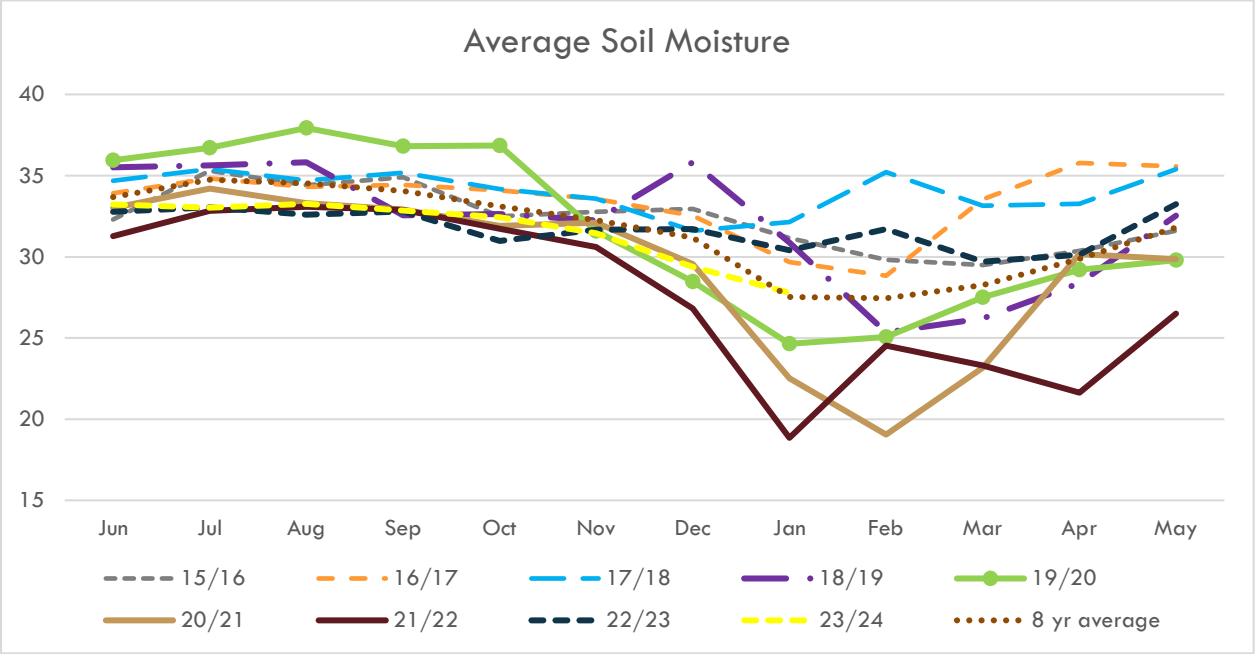
Graphic 1.1: Average air temperature over years



Graphic 1.2: Average soil temperature over years

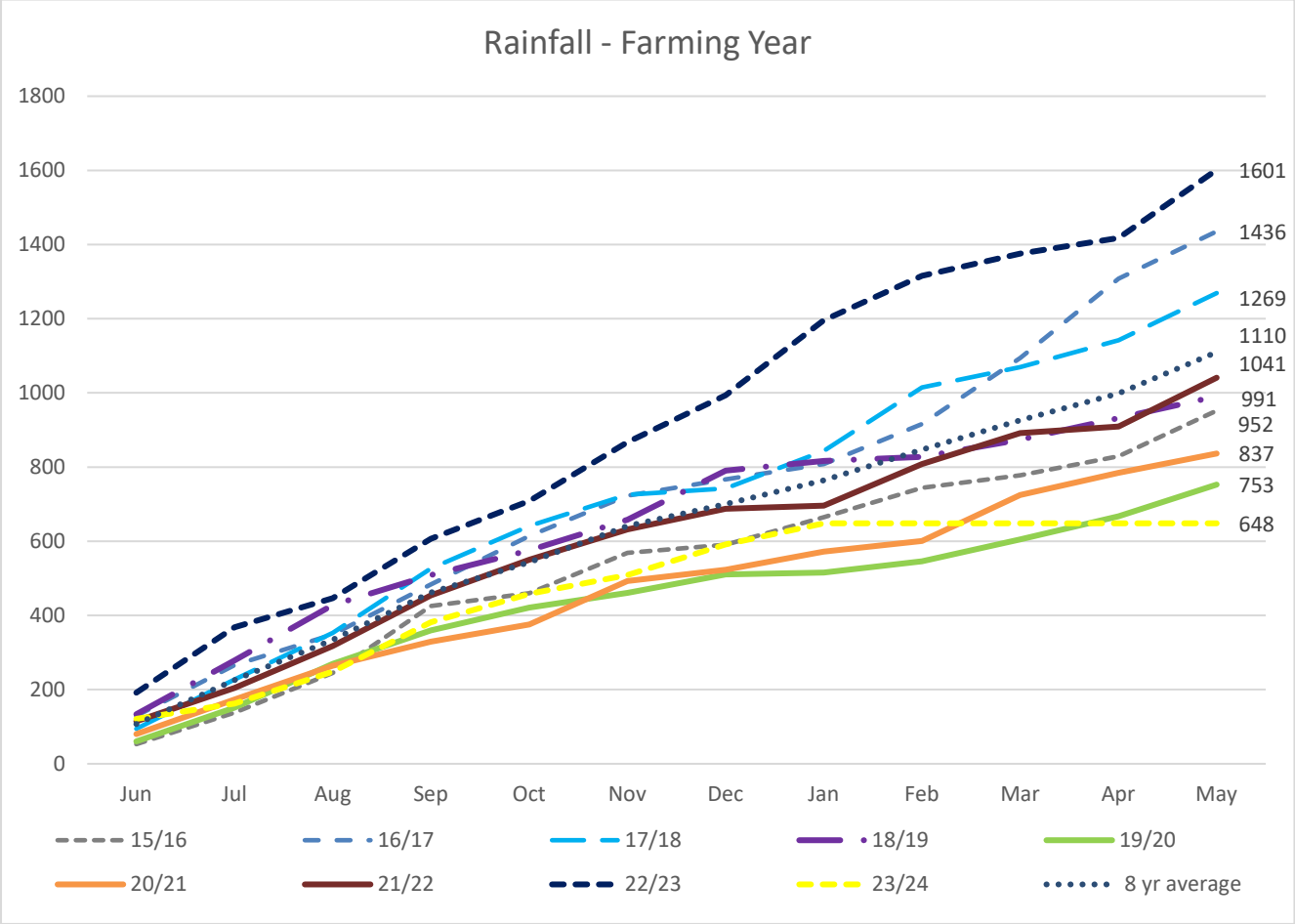


Graphic 1.3: Average soil moisture over years

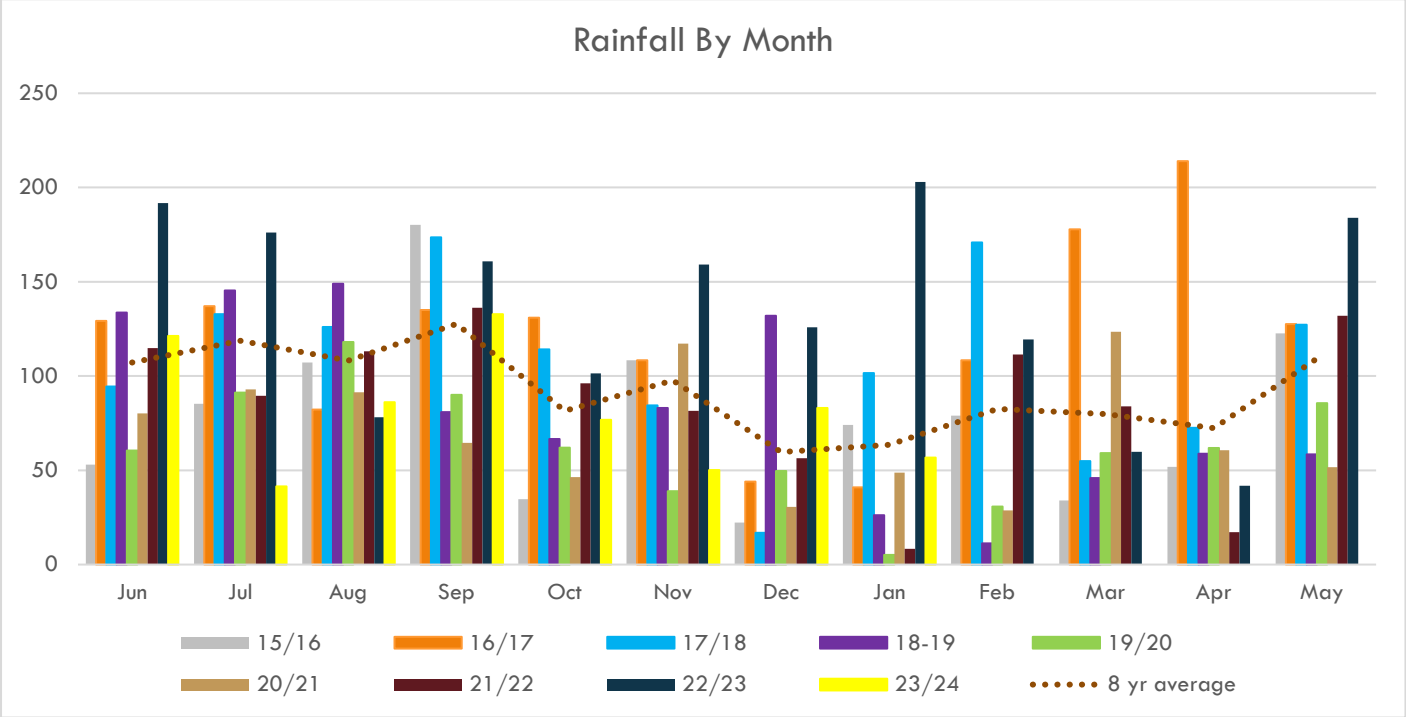


RAINFALL

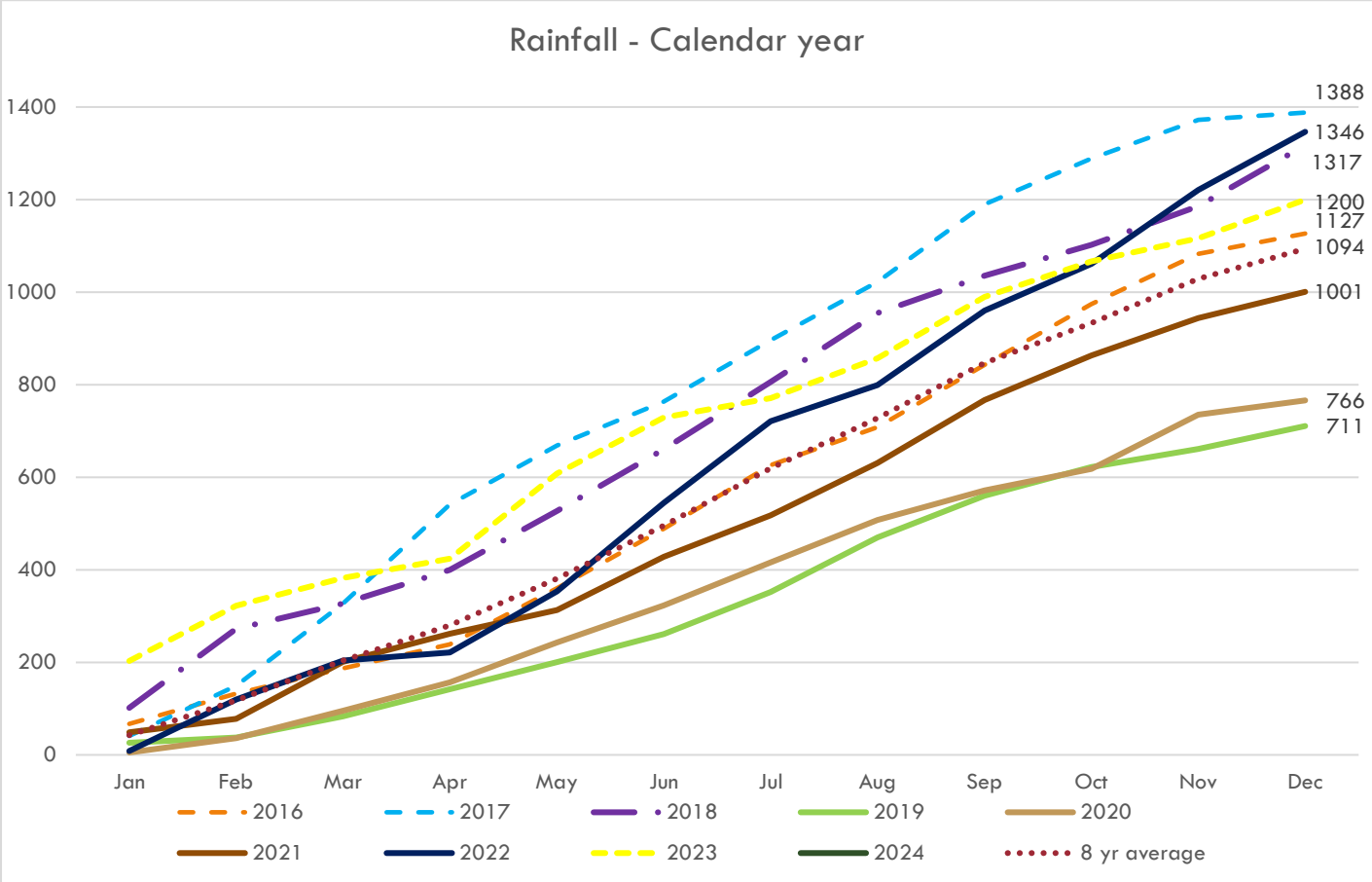
Graphic 1.4: Cumulative monthly rainfall over seasons



Graphic 1.5: Monthly rainfall over years

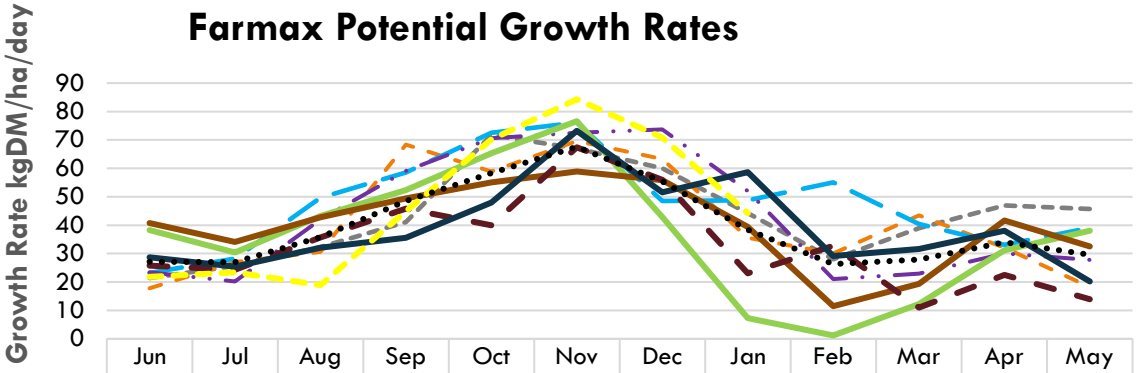


Graphic 1.6: Cumulative monthly rainfall over years



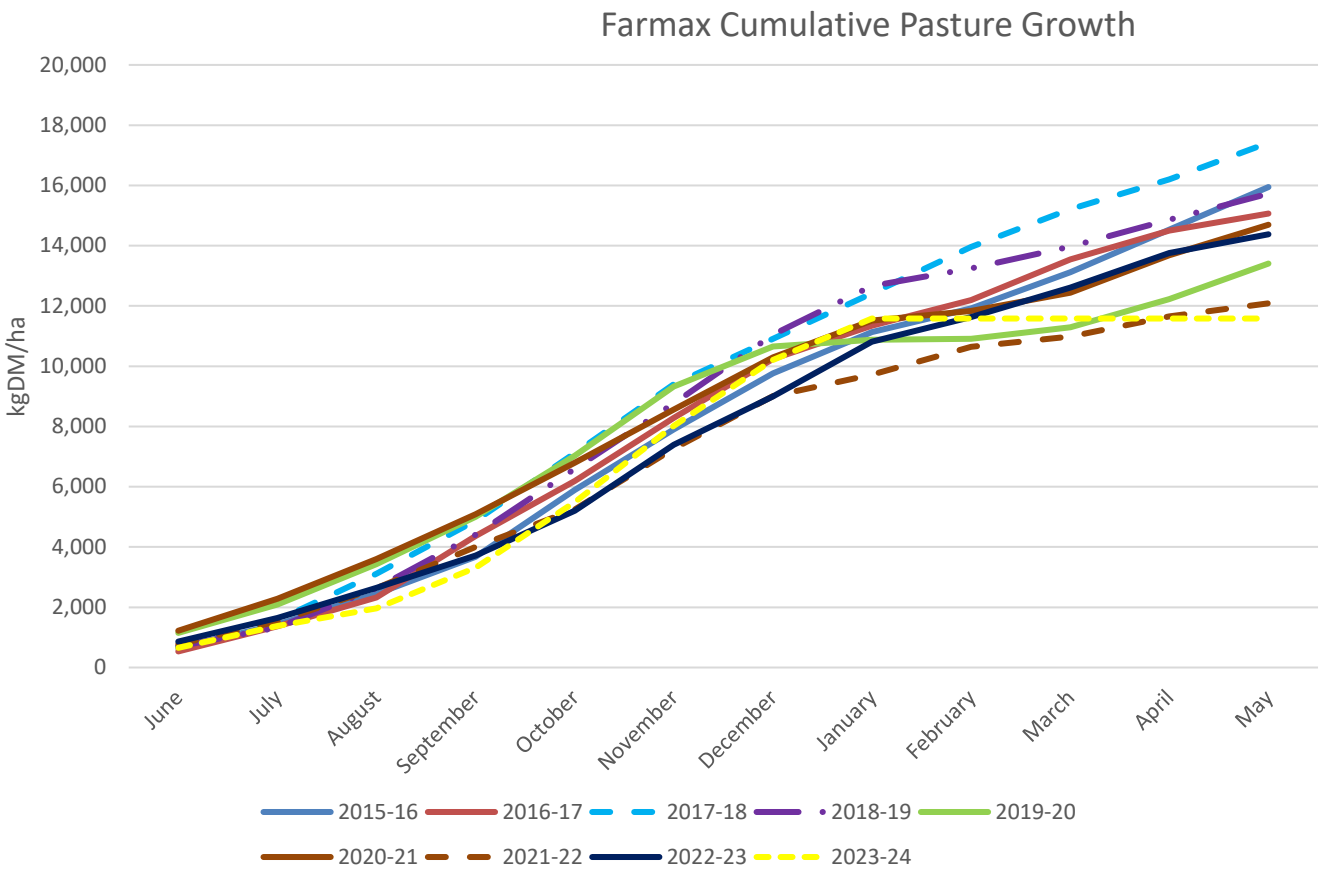
PASTURE GROWTH RATES

Graphic 1.7: Pasture Growth Rates from Farmax



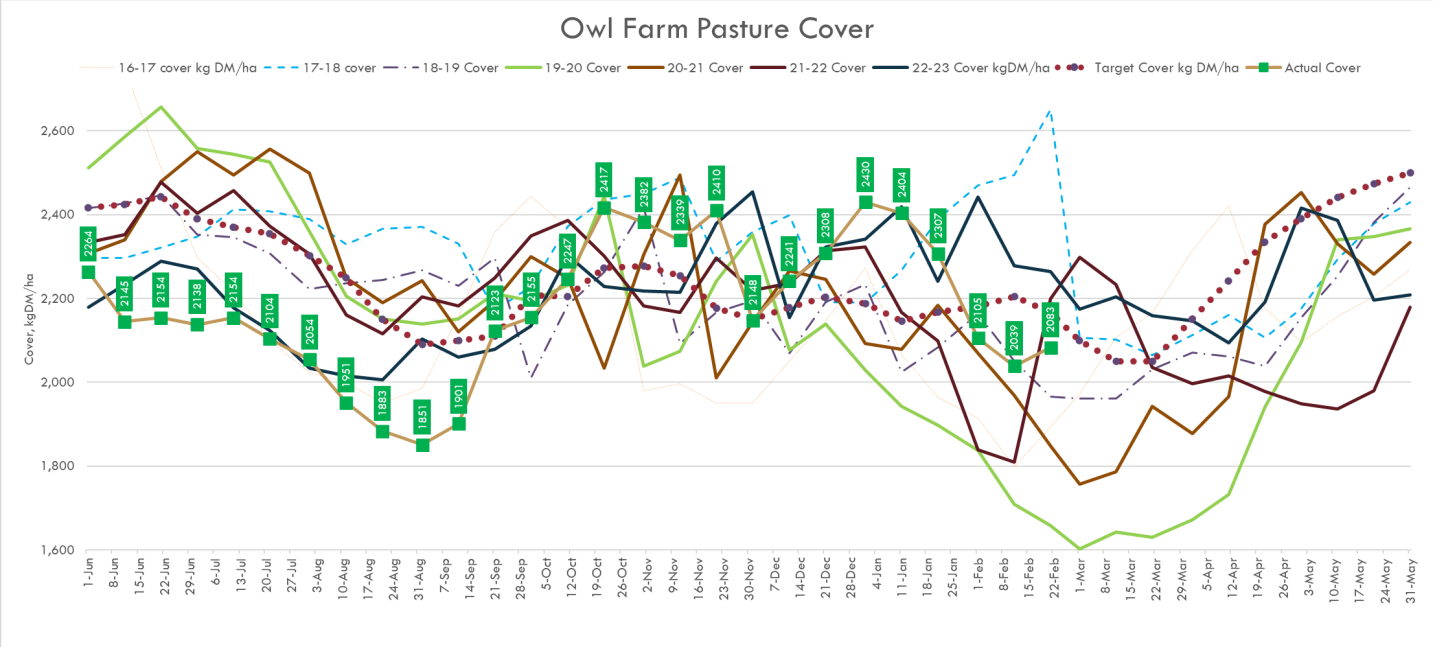
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-16	21	26	32	41	72	67	60	44	28	39	47	46
2016-17	18	27	31	68	59	70	63	36	30	44	32	18
2017-18	23	28	50	59	73	76	49	49	55	40	33	39
2018-19	23	20	42	59	71	73	74	52	21	23	30	28
2019-20	38	30	43	52	65	77	43	7	1	12	31	38
2020-21	41	34	43	49	55	59	56	39	12	19	42	33
2021-22	26	24	36	46	40	67	56	23	33	11	23	14
2022-23	29	25	32	36	48	73	52	59	29	32	38	20
2023-24	22	23	19	45	70	84	71	44				
Long term average	27	27	36	49	58	68	55	38	26	28	34	30

Graphic 1.8: Cumulative Pasture Growth Rates from Farmax

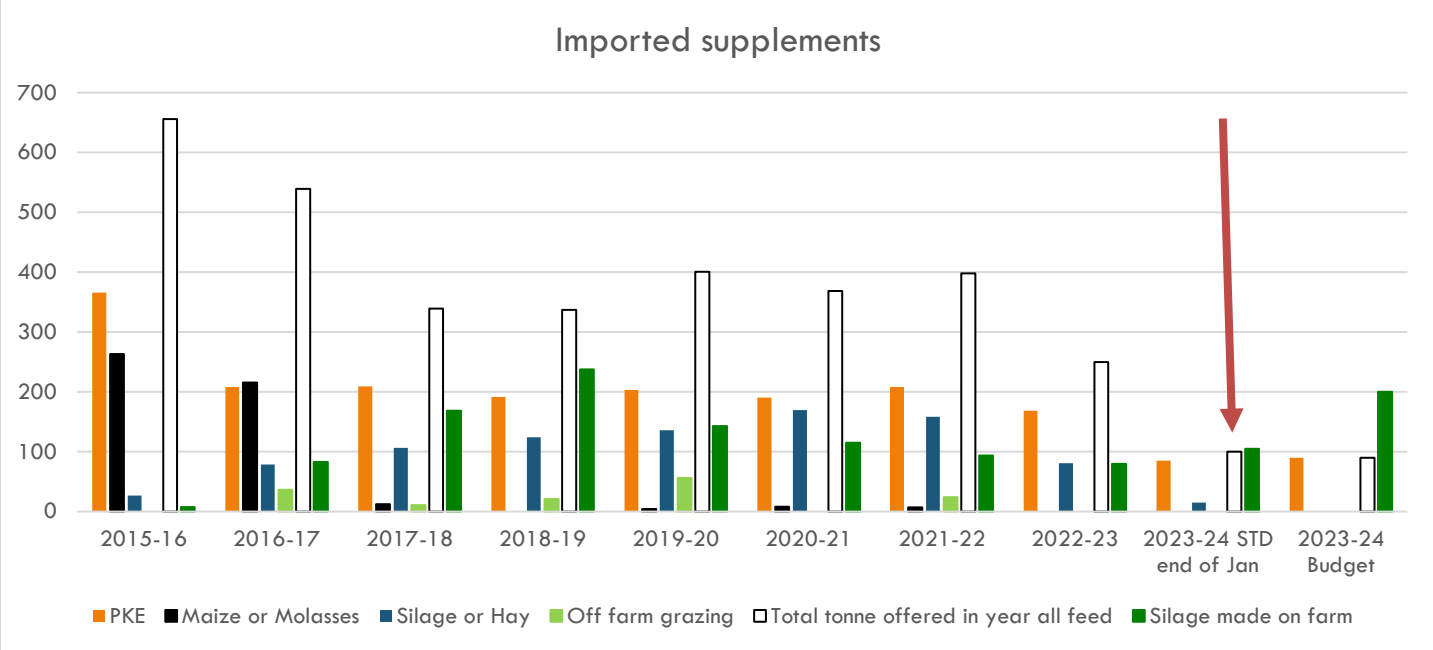


PASTURES & SUPPLEMENTS

Graphic 1.9: Pasture Cover from weekly farm walk



Graphic 1.10: Supplements offered/made; comparison between years



Notes:

AUTUMN FEED BUDGETS

Planning for a predicted El Nino summer started with updates to our Farmax feed budgets assuming a 25% reduction in Pasture Growth Rates from January to March. This reduction has not eventuated, with soils only just reaching stress point in mid February 2024.

While we modelled five scenarios via Farmax and selected a mixed model, our trigger levels have not been met to activate the plan below.

1. Removal of 39 cows, instead of 14, on 16th December - **Not done**
2. Culling of the rest of the cows remains at 20th February – **Not done**
3. Another round of nitrogen has been used (along with cutting silage to help use later in February) – **Not needed**
4. 44t PKE purchased at $400/tonne (vs 97t in the main PKE model) – **Not needed**
5. First dry-off date has been brought forward 10 days, second dry-off date remains the same – **Not needed**

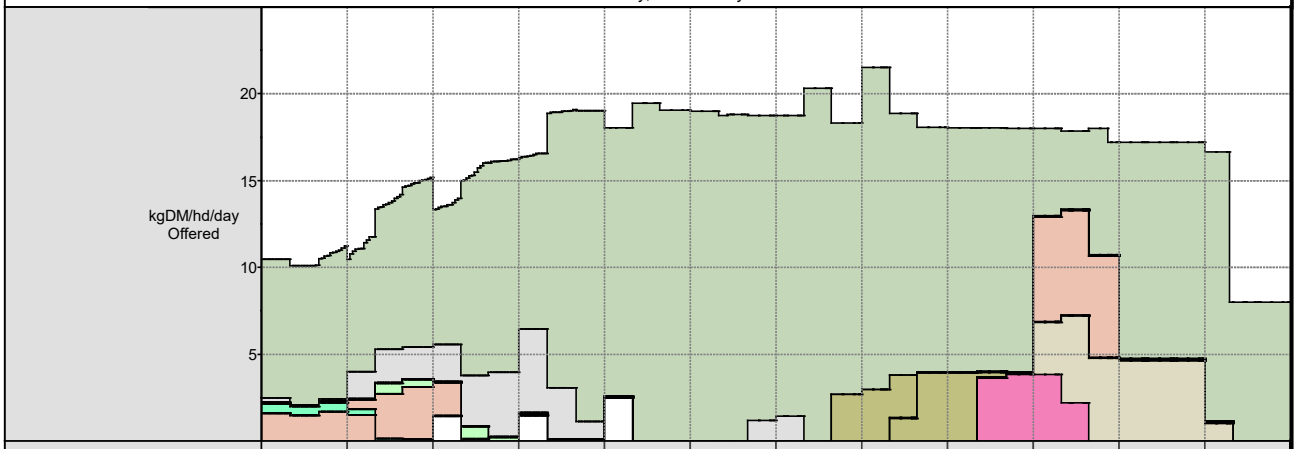
Our revised Autumn plan is as follows:

- 20 culls leave the farm early March before maize feeding starts
- 33 culls leave the farm mid March
- 20-25 cows dried off March
- 70 calves leave the farm 1st May and 63 in-calf heifers return home.
- Remaining 250 cows dried off 10th May

FARMAX

Feed Offered for Cows

Owl Farm : Dairy, Jun 23 - May 24



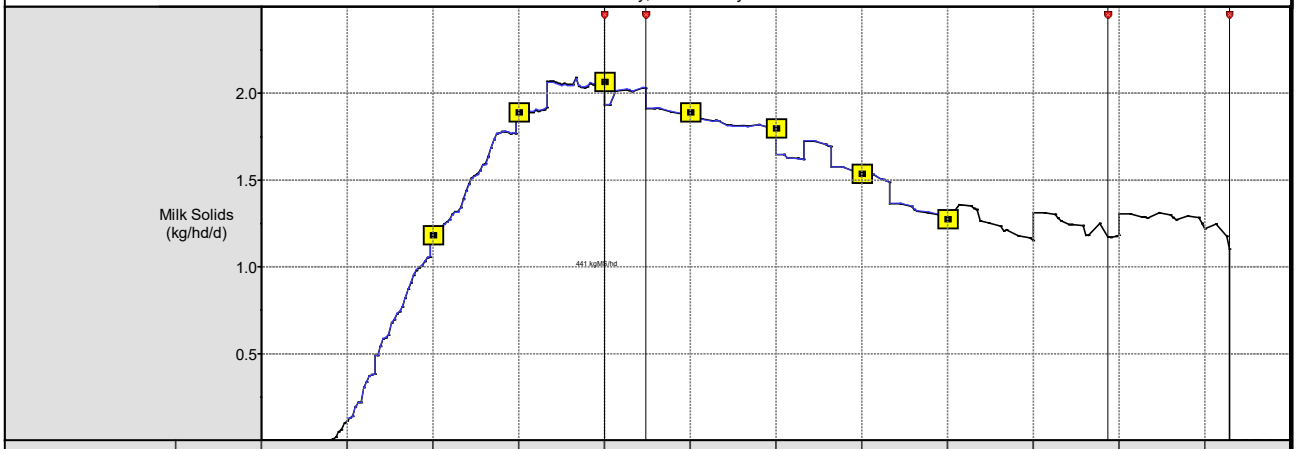
Select a Feed	J	J	A	S	O	N	D	J	F	M	A	M
Pasture	8.2	8.4	10.7	14.6	18.0	18.4	17.7	15.8	14.0	5.6	12.5	9.5
Palm Kernel F5	0.1	1.7	2.9	2.9		0.4	0.5					
Bulb Turnip Toto C4							1.0	1.8				
Bought baleage F2		0.4	0.3	0.1								
Bulb Turnip C4								1.9	1.5			
Pasture Silage F2		2.2	0.6							5.9		
Hay big F4 Bought	0.5	0.3										
Baleage	1.7	0.4										
New Pasture			0.6	0.5	0.8							
Maize Silage										4.3	4.8	0.1
Kale									2.6	2.0		
Total (Utilised)	8.4	9.9	11.4	13.0	13.5	13.8	14.1	15.1	15.0	14.4	14.4	8.9

Farmax Dairy 8.2.0.36

FARMAX

Production for Cows

Owl Farm : Dairy, Jun 23 - May 24



	Start	J	J	A	S	O	N	D	J	F	M	A	M
Model MS (kg/hd/d)		0.01	0.64	1.53	2.00	1.95	1.82	1.63	1.38	1.25	1.23	1.29	0.35
Actual MS (kg/hd/d)			0.65	1.53	2.00	1.95	1.82	1.63	1.38	1.25			
Actual/Forecast BCS	4.8	4.7	4.9	4.8	4.7	4.6	4.6	4.5	4.5	4.4	4.6	4.8	5.0
Model Lwt (kg)	550	555	514	474	454	445	441	441	448	456	465	479	495

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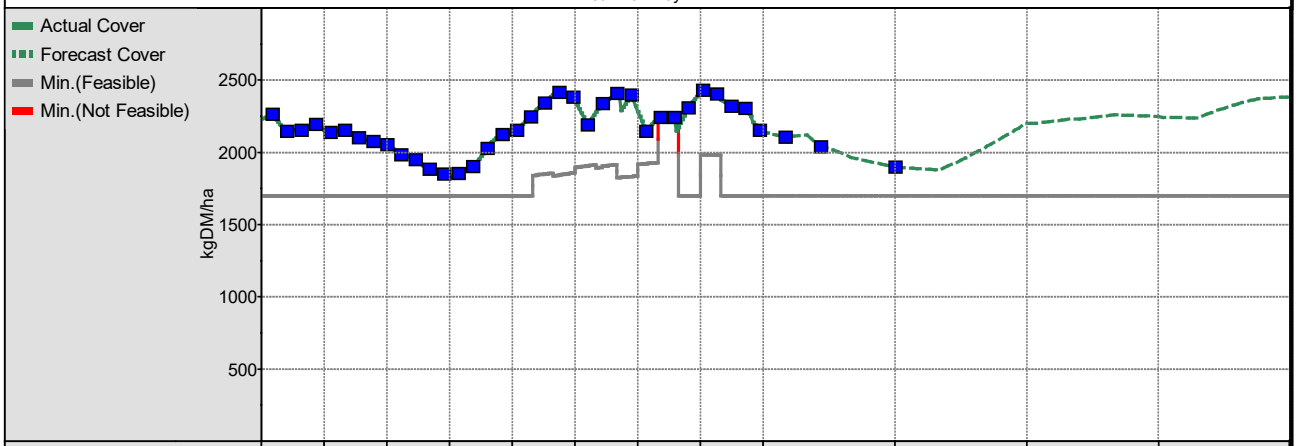
FARMAX

Pasture Cover for Owl Farm

Jun 23 - May 24



(kgDM/ha)	Start	J	J	A	S	O	N	D	J	F			M			A			M		
Forecast/Actual	2,229	2,153	2,054	1,826	2,139	2,354	2,285	2,428	2,142	2,122	1,967	1,900	1,880	2,026	2,203	2,233	2,261	2,251	2,254	2,354	2,384
Minimum	1,024	939	804	1,092	1,661	1,859	1,836	1,599	1,413	1,449	1,559	1,586	502	470	727	1,331	1,312	1,335	1,099	1,070	1,033
Potential Growth (kgDM/ha/d)		21.8	23.4	19.2	44.9	70.2	84.3	70.8	44.2	41.7	31.8	43.1	15.0	28.3	35.9	34.6	29.2	32.3	34.0	28.2	24.3

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FARMAX

Physical Summary for Owl Farm

Jun 23 - May 24

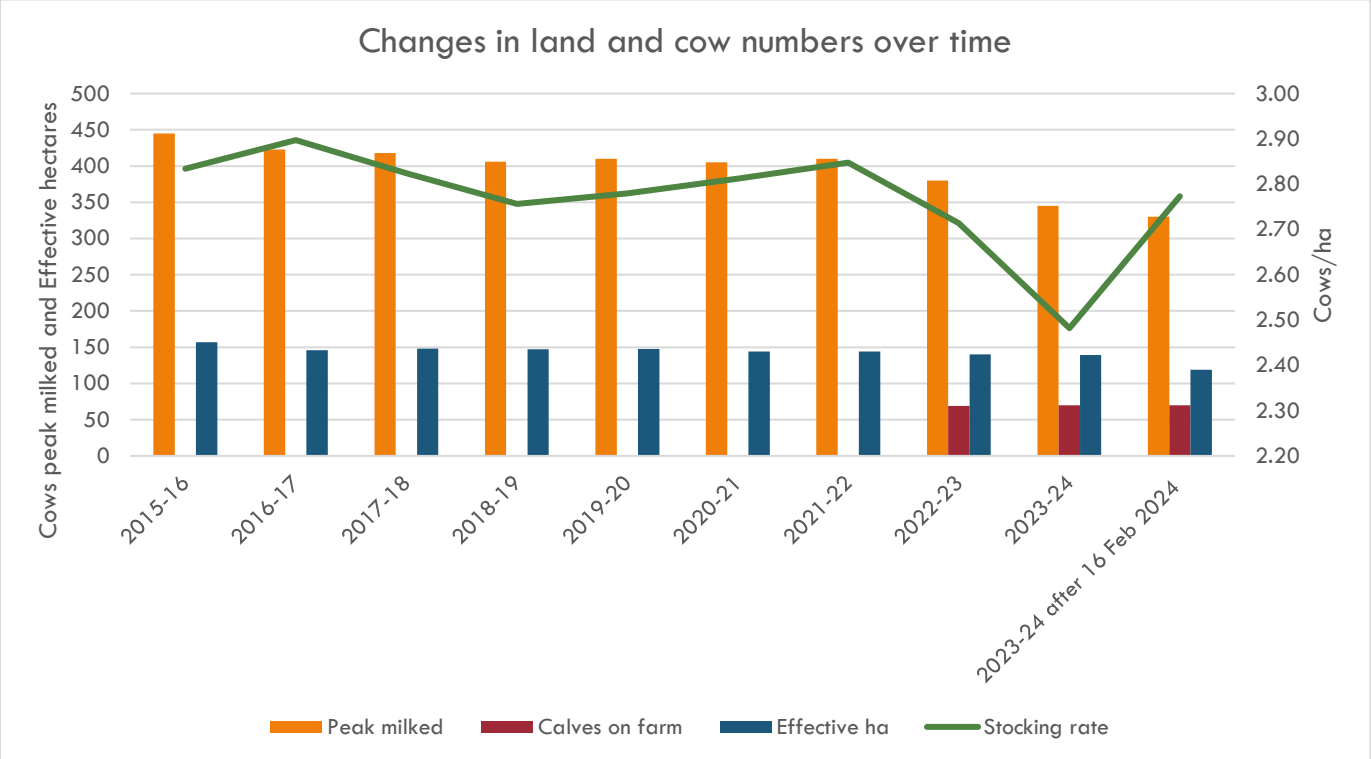
Category	Description	Value	Units
Farm	Effective Area	138	ha
	Stocking Rate	2.5	cows/ha
	Comparative Stocking Rate	74.5	kg Lwt/t DM offered
	Potential Pasture Growth	15.4	t DM/ha
	Nitrogen Use per total ha	119	kg N/ha
	Feed Conversion Efficiency (offered)	13.5	kg DM offered/kg MS
Herd	Cow Numbers (1st July)	354	cows
	Peak Cows Milked	345	cows
	Days in Milk	270	days
	Avg. BCS at calving	4.8	BCS
	Liveweight per total ha	1,063	kg/ha
Production	Milk Solids total	150,217	kg
(to Factory)	Milk Solids per total ha	1,058	kg/ha
	Milk Solids per cow	435	kg/cow
	Peak Milk Solids production	2.09	kg/cow/day
	Milk Solids as % of live weight	99.5	%
Feeding	Pasture Offered per cow *	4.6	t DM/cow
	Supplements Offered per cow *	1.2	t DM/cow
	Off-farm Grazing Offered per cow *	0.1	t DM/cow
	Total Feed Offered per cow *	5.9	t DM/cow
	Pasture Offered per total ha	11.2	t DM/ha
	Supplements Offered per total ha	3.8	t DM/ha
	Off-farm Grazing Offered per total ha	1.4	t DM/ha
	Total Feed Offered per total ha	16.3	t DM/ha
	Supplements and Grazing / Feed Offered *	22.2	%
	Bought Feed / Feed Offered *	5.3	%

(*) feed offered to females > 20 months old / peak cows milked

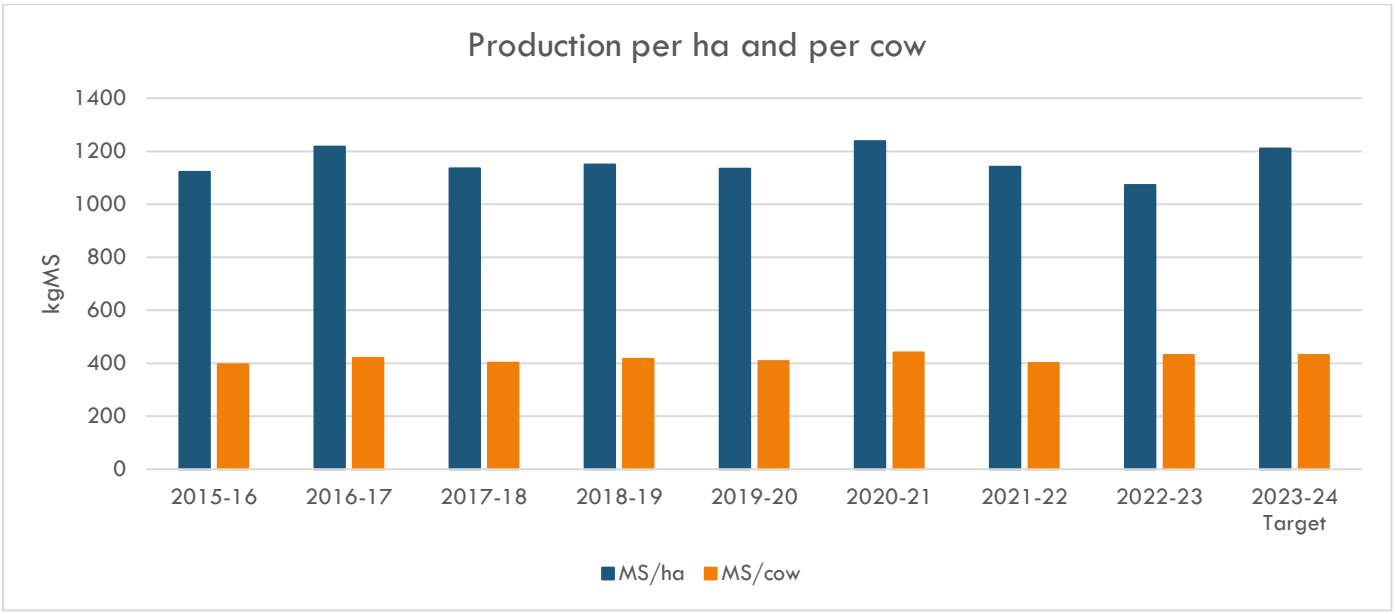
Farmax Dairy 8.2.0.36

MILK PRODUCTION

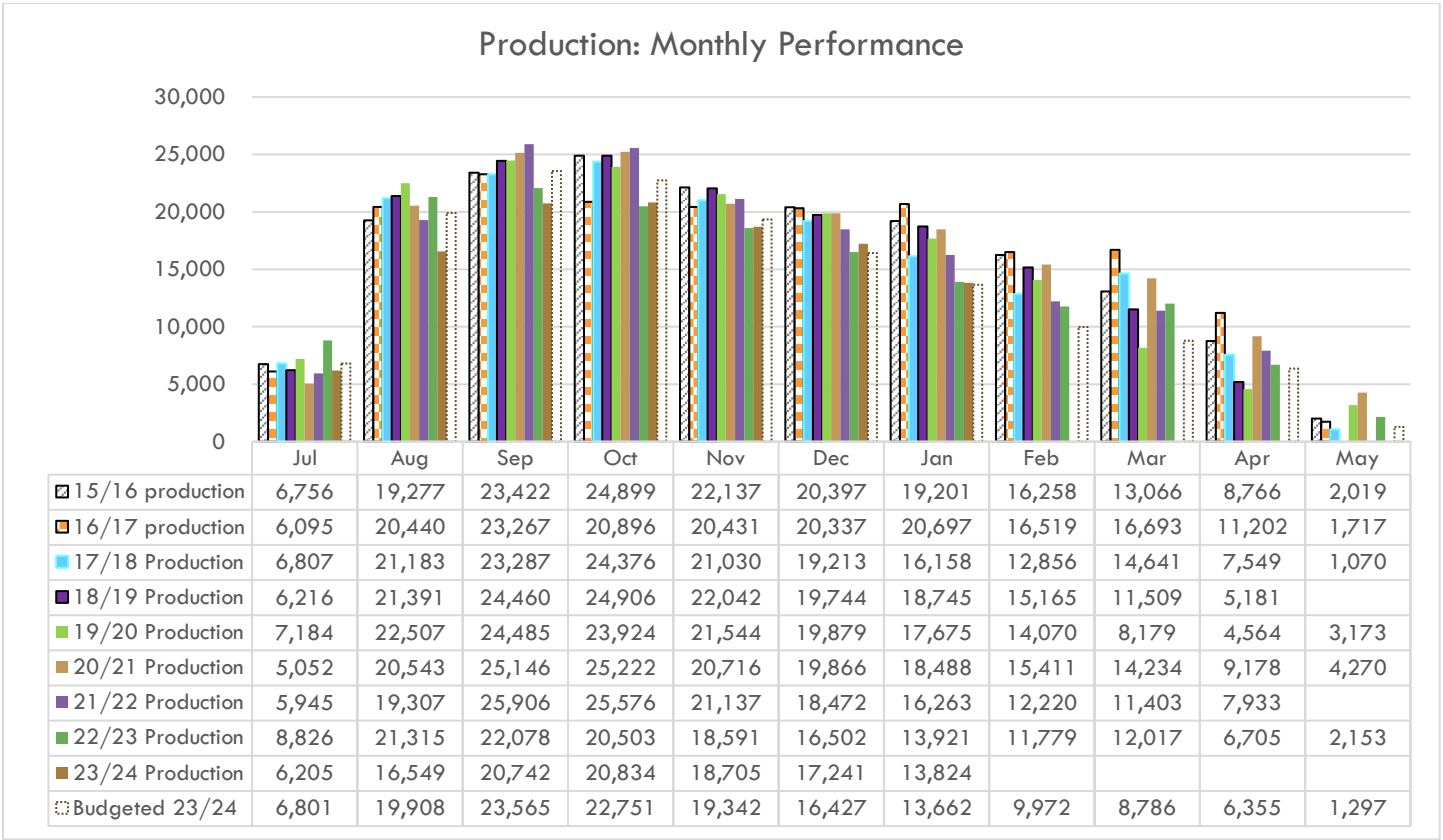
Graphic 1.11: Changing land area and cow numbers



Graphic 1.12: Annual milk production per hectare and per cow

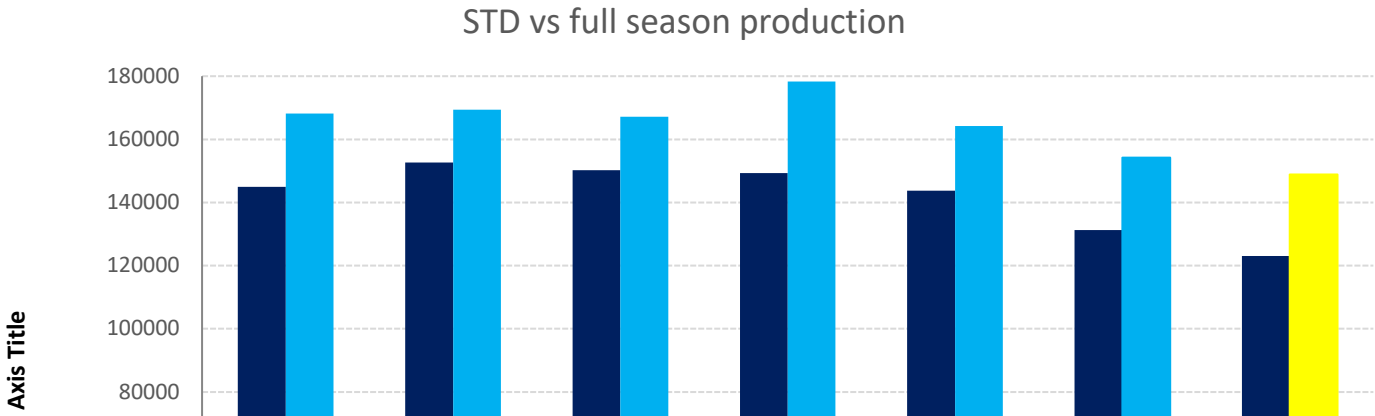


Graphic 1.13: Monthly milk production



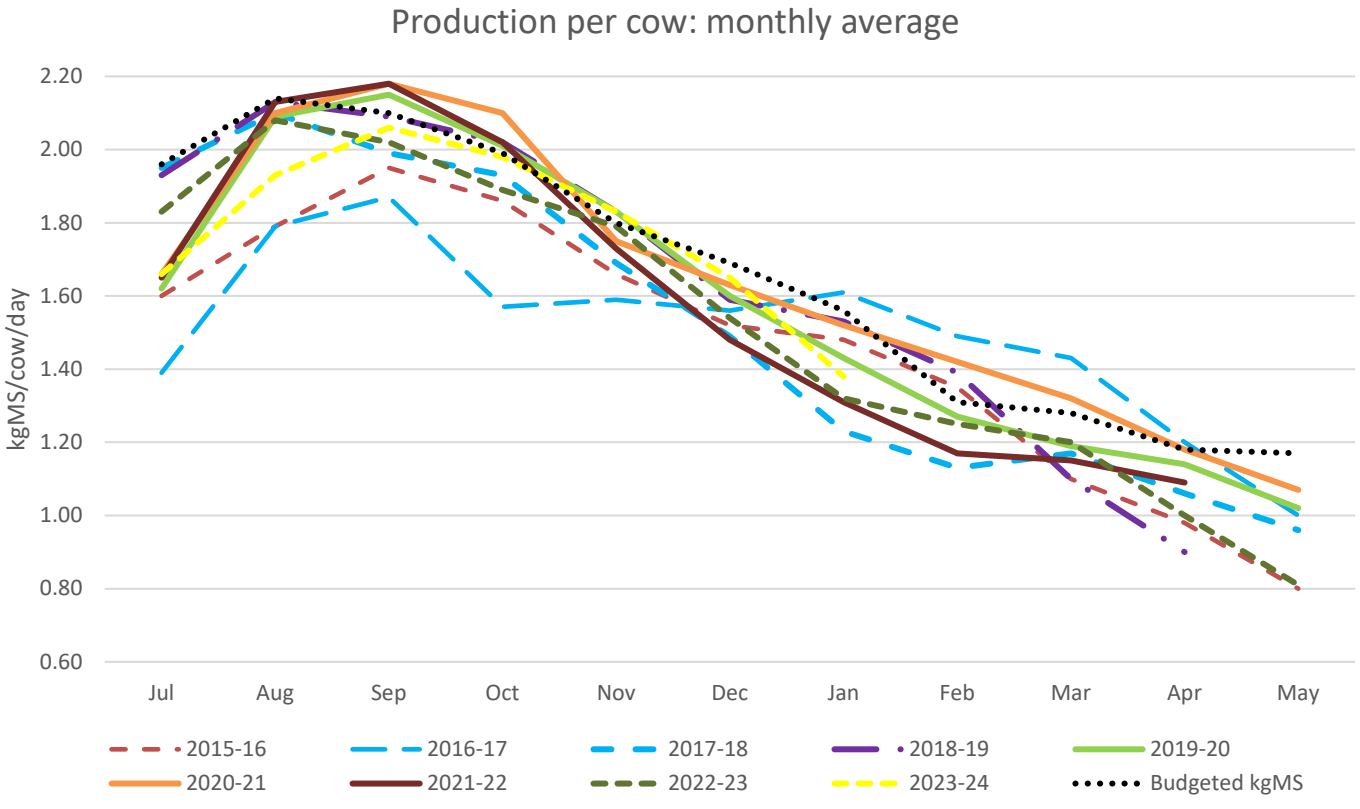
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
15/16 production	6,756	19,277	23,422	24,899	22,137	20,397	19,201	16,258	13,066	8,766	2,019
16/17 production	6,095	20,440	23,267	20,896	20,431	20,337	20,697	16,519	16,693	11,202	1,717
17/18 Production	6,807	21,183	23,287	24,376	21,030	19,213	16,158	12,856	14,641	7,549	1,070
18/19 Production	6,216	21,391	24,460	24,906	22,042	19,744	18,745	15,165	11,509	5,181	
19/20 Production	7,184	22,507	24,485	23,924	21,544	19,879	17,675	14,070	8,179	4,564	3,173
20/21 Production	5,052	20,543	25,146	25,222	20,716	19,866	18,488	15,411	14,234	9,178	4,270
21/22 Production	5,945	19,307	25,906	25,576	21,137	18,472	16,263	12,220	11,403	7,933	
22/23 Production	8,826	21,315	22,078	20,503	18,591	16,502	13,921	11,779	12,017	6,705	2,153
23/24 Production	6,205	16,549	20,742	20,834	18,705	17,241	13,824				
Budgeted 23/24	6,801	19,908	23,565	22,751	19,342	16,427	13,662	9,972	8,786	6,355	1,297

Graphic 1.14: Production season to date compared to year end actual or 2023/24 target



	17/18	18/19	19/20	20/21	21/22	22/23	23/24
23rd February	144911	152673	150197	149276	143780	131274	123008
31st May	168169	169362	167185	178291	164246	154204	148866
% as total	86%	90%	90%	84%	88%	85%	83%

Graphic 1.15: Production per cow



MILK QUALITY

Our target this season is to provide the highest quality milk for Fonterra by achieving Te Tihi status in the Co-operative Difference framework. This represents Excellence in milk quality for 90% of our milk supply days.

To unlock the 7c/kg MS we have worked on the following:

Co-operative and Prosperity

- We will have full and accurate farm dairy records by 30th June 2024

Environment

- A Farm Environment Plan meeting all four key practices
- Purchased N surplus will be at or lower than the target kg N/ha
- We participate in a product stewardship scheme for plastics
- No discharge of farm dairy effluent to water
- 80% of our feed used for the season will be farm-grown
- We have completed the Winter Grazing Checklist

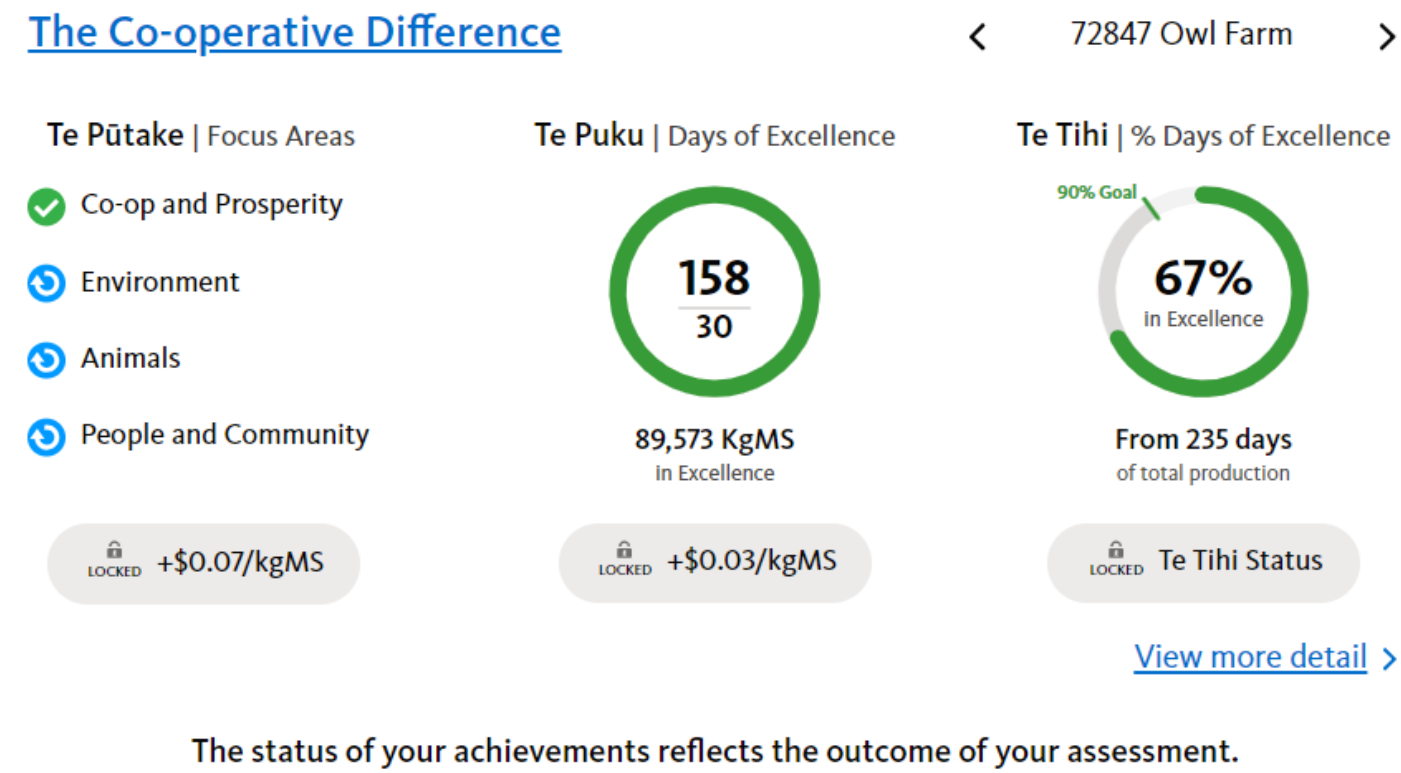
Animals

- An Animal Wellbeing Plan that addresses nutrition, health, environment, and behavioural issues

People and Community

- The 360 Workplace Assessment achieving 100% on the foundation section

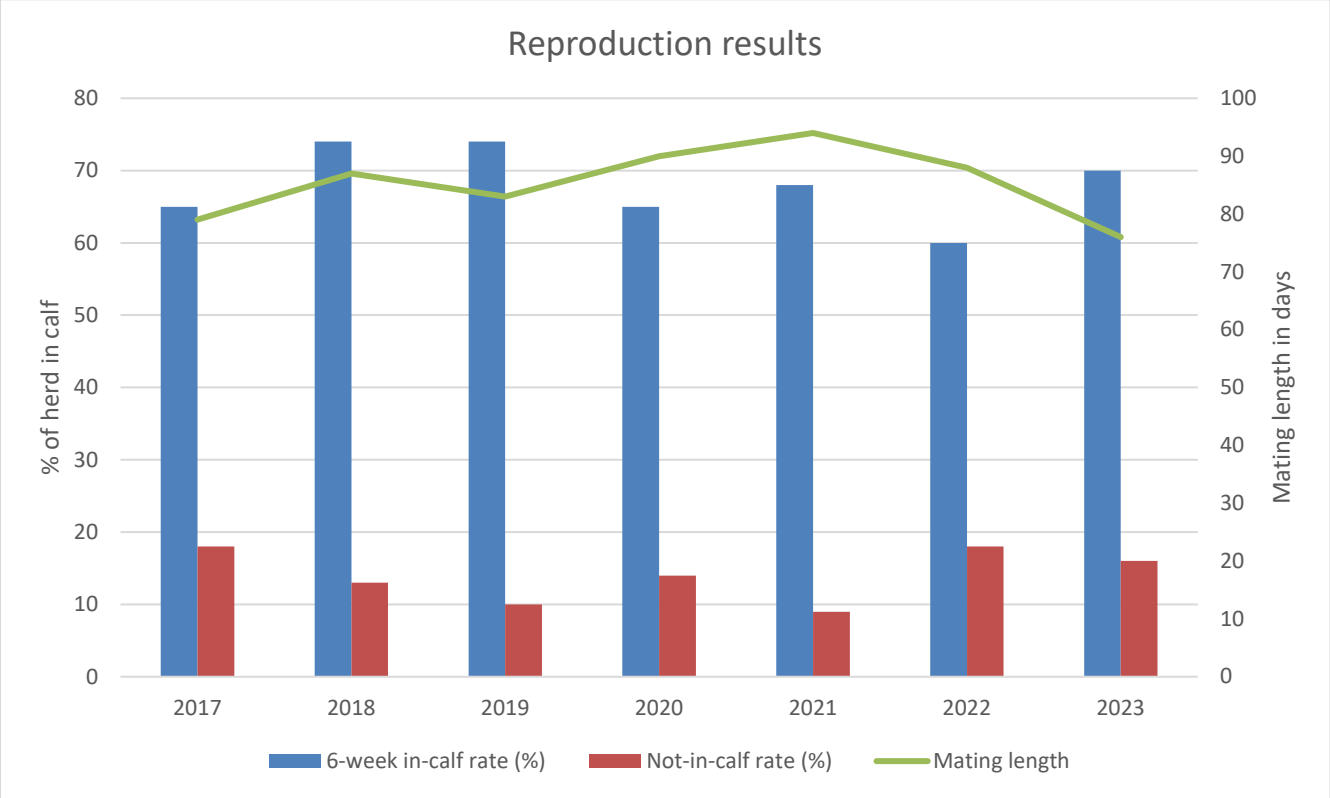
Graphic 1.16: The Co-operative Difference summary at 27/2/2024



REPRODUCTION

Graphic 1.17: Reproduction comparison between years

	6-week in-calf rate (%)	Not-in-calf rate (%)	Mating length
2023	70	16	76 days
2022	60	18	88 days
2021	68	9	94 days
2020	65	14	90 days
2019	74	10	83 days
2018	74	13	87 days
2017	65	18	79 days



Graphic 1.18: Fertility Focus Report 2023

Fertility Focus 2023: Seasonal

Owl Farm
Tony Alarca

Report date:	19/02/24
PTPT:	HPTT
Herd Code:	2/1884
No of cows included:	345
These cows calved between:	18/05/23 and 23/11/23
Mating start & end date: (based on AB or pregnancy test data)	25/09/23 - 09/12/23
Next planned start of calving:	03/07/24
Duration of mating:	76 days
Duration of AB period:	76 days

incalf FERTILITY FOCUS Version 3.01

DairyNZ

LIC

1 Overall herd reproductive performance

6-week in-calf rate
Percentage of cows pregnant in the first 6 weeks of mating

Your herd	70% (70-71%)
Aim above	78%

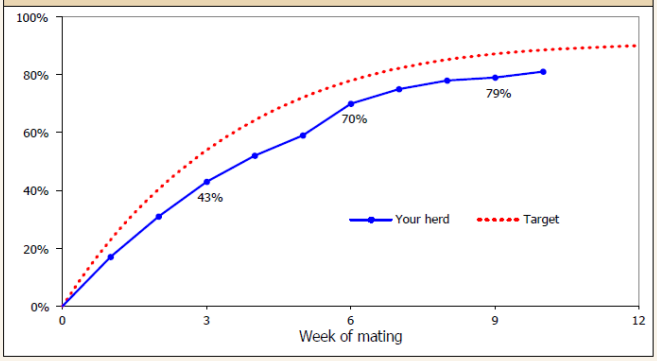
☆☆☆

Not-in-calf rate
Percentage of cows not pregnant after 76 days of mating

Your herd	16% (14-16%)
Aim for	11%

☆☆☆

% of herd in calf
Cumulative by week of mating



2 Drivers of the 6-week in-calf rate

3-week submission rate
% of cows that were inseminated in the first 3 weeks of mating

Your herd	88%
Aim above	90%

☆☆☆☆☆

Non-return rate
% of inseminations that were not followed by a return to heat

Your herd	
Aim above	

Conception rate
% of inseminations that resulted in a confirmed pregnancy

Your herd	48%
Aim above	60%

☆

3 Key indicators to areas for improvement

Calving pattern of first calvers
Well managed heifers get in calf quickly and calve early.

Calved by	Week 3	Week 6
Your herd	78%	90%
Aim above	80%	95%
	☆☆☆	☆

Calving pattern of whole herd
Did late calvers reduce in-calf rates?

Calved by	Week 3	Week 6	Week 9
Your herd	59%	82%	95%
Aim above	67%	88%	98%
	☆	☆	☆

Pre-mating heats
A high % of well managed cows will cycle before the start of mating.

Your herd	33%
Aim above	85%

☆

3-week submission rate of first calvers
Well managed heifers cycle early

Your herd	91%
Aim above	90%

☆☆☆☆☆

Heat detection
A high % of early-calved mature cows should be inseminated in the first 3 weeks of mating.

Your herd	94%
Aim above	95%

☆☆☆☆☆

Non-cycling cows
Treated non-cyclers get in calf earlier.

Treated	By MSD	Wks 1-3	Wks 4-6
Your herd	9%	5%	2%

Rating	What does it tell me?	What should I do?
☆☆☆☆☆	Top result	Ideal - keep up the good work!
☆☆☆	Above average	Getting there - focus on getting the details right.
☆	Below average	Plenty of room to improve - seek professional advice.
	No result	Not enough information provided - seek help with records.

Performance after week 6
Expected not-in-calf rate helps assess management affecting performance after week 6 (including bull management and herd nutrition).

Not-in-calf rate	
Your herd	16%
Expected	16%

OK

Behind Your Detailed Fertility Focus Report

Report period: Cows calved between 18/05/23 and 23/11/23.
This was the most recent period with sufficient herd records that enabled an analysis to be completed.

Calving system: Seasonal
Your herd has been classified as seasonal calving because most calvings occurred in a single batch lasting less than 21 weeks.

Level of analysis: Detailed.
Your good record keeping means a detailed analysis was possible for your herd.

Report date:	19/02/24
PTPT:	HPTT
Herd Code:	2/1884
Calvings up to this date requested for analysis:	18/02/24
No of cows included:	345
These cows calved between:	18/05/23 and 23/11/23
Mating start & end date: (based on AB or pregnancy test data)	25/09/23 - 09/12/23

Version 3.01

Part A) Herd records cross check

Check that the herd records in the table are complete and correct.

2023/24	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total
No. of calvings		47	183	95	20								345
No. of AB matings					116	328	115	29					588
No. of preg tests								340	98				438
No. of non-aged/late aged positive preg tests													0
No. of cows culled or died						1	2		7				10

Part B) Notes on the calculations

Use the following notes to see how your results were calculated.

1 Overall herd reproductive performance

6-week in-calf rate

Your report has been based on the mating and pregnancy test results you supplied. The ACTUAL 6 week in-calf rate is shown for your herd.

Records available for not-in-calf rate

Recorded pregnant	288
Recorded empty	42
Doubtful/recheck*	11
Culled without pregnancy test	3
No record of cull or pregnancy test	1
Cows analysed	345

*Includes cows whose most recent empty diagnosis was less than 35 days after mating end date.

2 Drivers of the 6-week in-calf rate

3-week submission rate

344 cows had calving dates in the required range and were not culled before day 21 of mating and 88% of these were submitted during the first 21 days of mating.

Non-return rate

Non-return rate is not calculated when pregnancy test results provide an accurate estimate of conception rate.

Conception rate

The conception rate was calculated for 560 AB inseminations on and between 25.09.23 and 09.12.23.

3 Key indicators to areas for improvement

Calving pattern of first calvers

69 cows with eligible calving dates were recorded as calving at less than 34 months of age. The calving pattern of first calvers was calculated from their records.

Calving pattern of whole herd

345 cows had calving dates that were eligible for this report.

3-week submission rate of first calvers

69 first calvers had calving dates in the required range and were not culled before day 21 of mating and 91% of these were submitted during the first 21 days of mating.

Heat detection

115 cows at least 4 years old at calving had calved at least 8 weeks before mating start date and were not culled before day 21 of mating and 94% of these were submitted during the first 21 days of mating.

Pre-mating heats

344 cows had calving dates in the required range and were not culled before day 21 of mating and 114 of these had a pre-mating heat recorded.

Non-cycling cows

344 cows had calving dates in the required range and were not culled before day 21 of mating and 57 of these were identified as being treated for non-cycling.

Performance after week 6

Your herd's not-in-calf rate and 6-week in-calf rate were used to determine the success of your herd's mating program after the first six weeks. If bulls were used after week 6 of mating, this gives an assessment of how well they got cows in calf.

Induced cows

No cows were identified as having induced calvings. If cows were induced, ensure all inductions are recorded.

Graphic 1.19: Mating Plan for 2023/24

Planned Start of Mating: 25th September 2023

Replacement AB – 25th September to 19th October – 25 days

- 25th September to 15th October – 21 days @ 9 straws sexed per day (189 straws)
- 16th October to 19th October – 4 days @ 7 straws sexed per day (28 straws)
- Beef - Charolais Milestone into anything else on the day (low BW/late/ intervention cows)

Marker – Charolais- Milestone

- 20th October to 24th October – 5 days

Performance Beef – week 4.5 to week 9

- 25th October to 26th November – 34 days (Profit Maker, Angus & Charolais – No Choice Packs)

Short Gestation Length (SGL) Angus – Week 10

- 27th November to 3rd December - 7 days

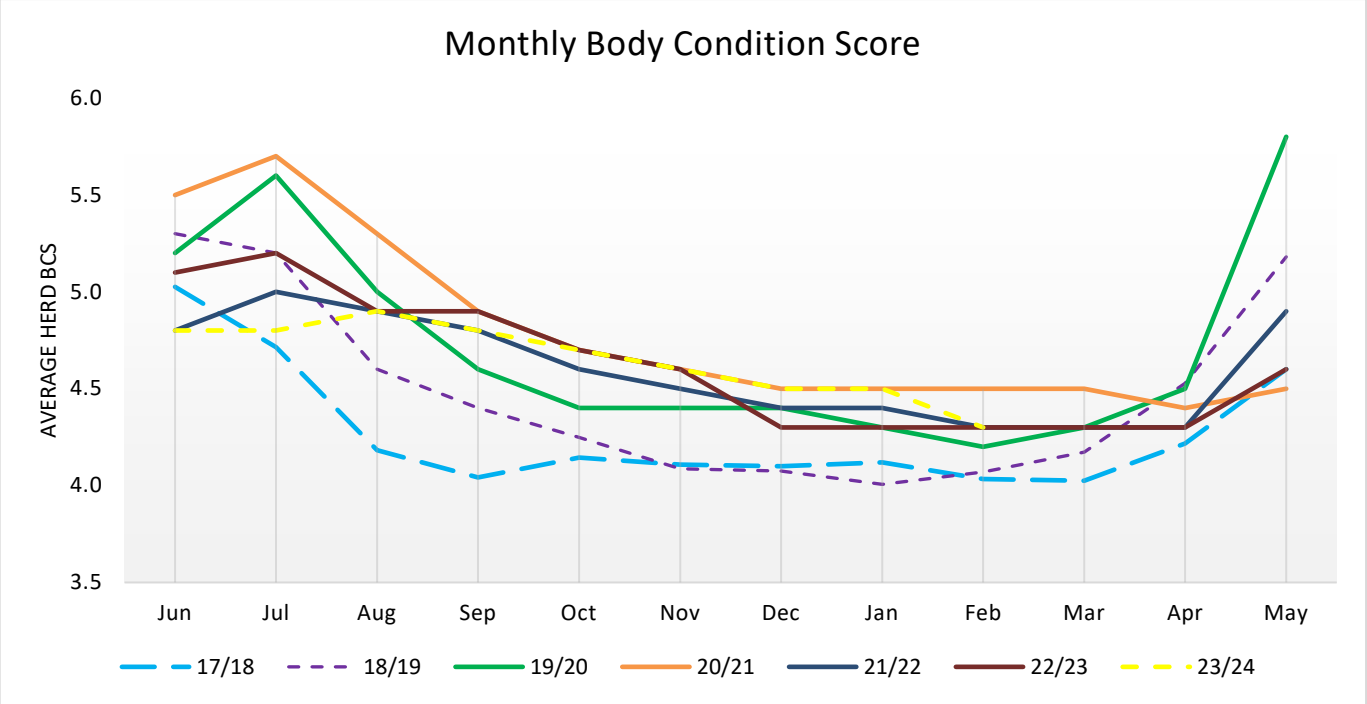
SGL Kiwicross – Week 11

- 4th December to 10th December

2.0 ANIMAL WELLBEING

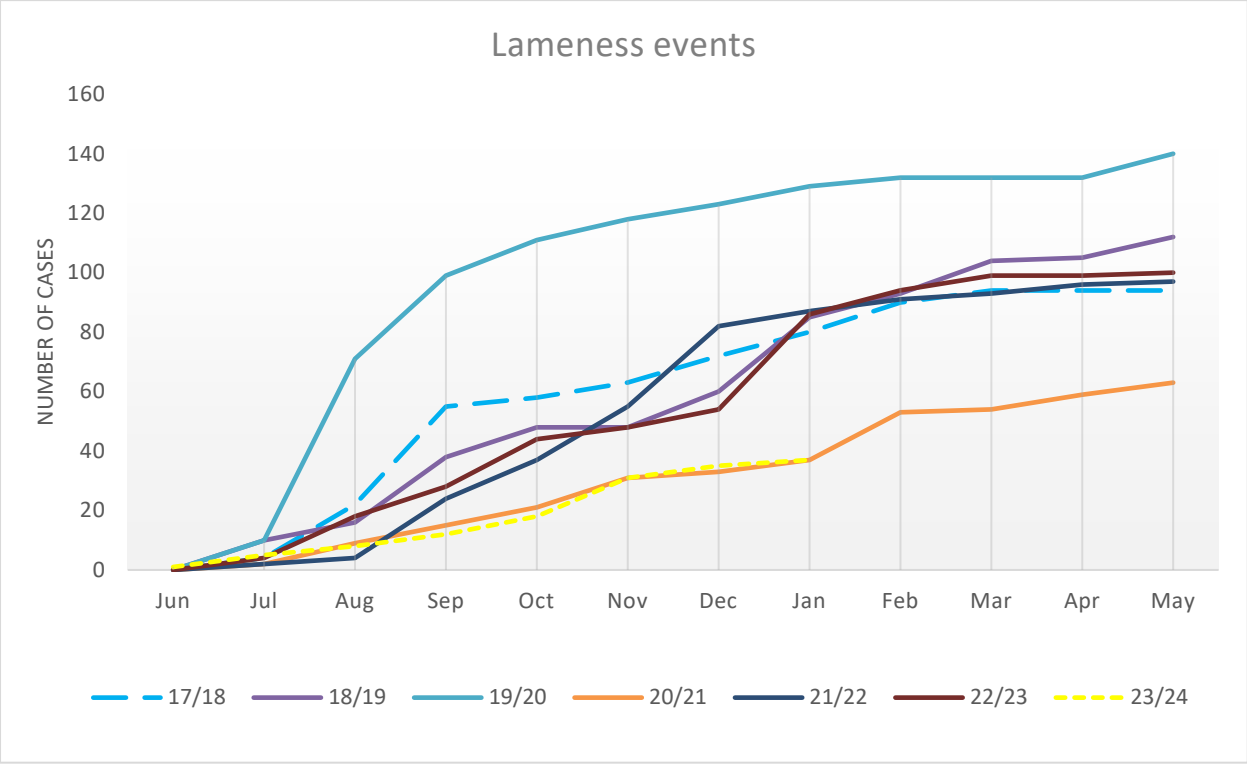
BODY CONDITION SCORE

Graphic 2.1: Monthly Body Condition Score



LAMENESS

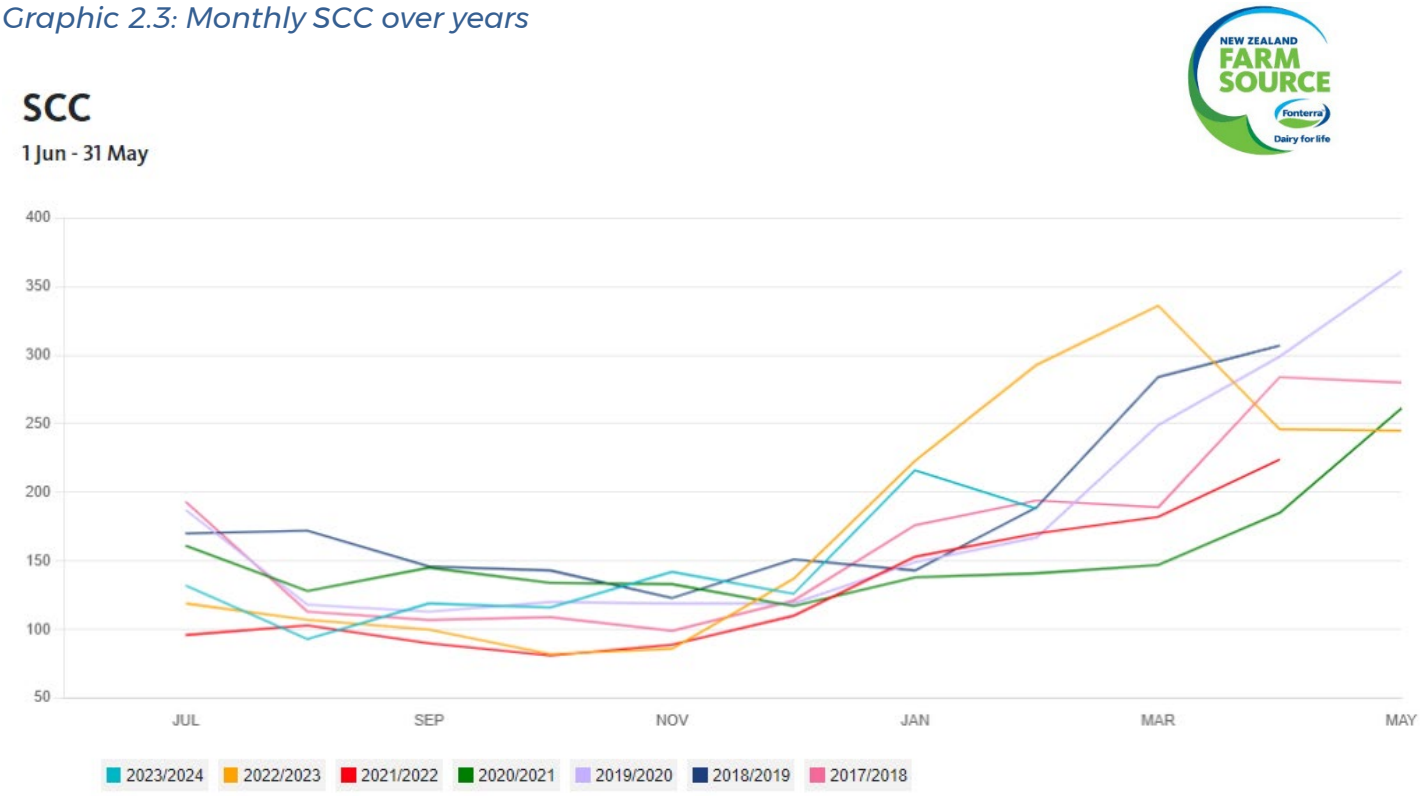
Graphic 2.2: Lameness events between years



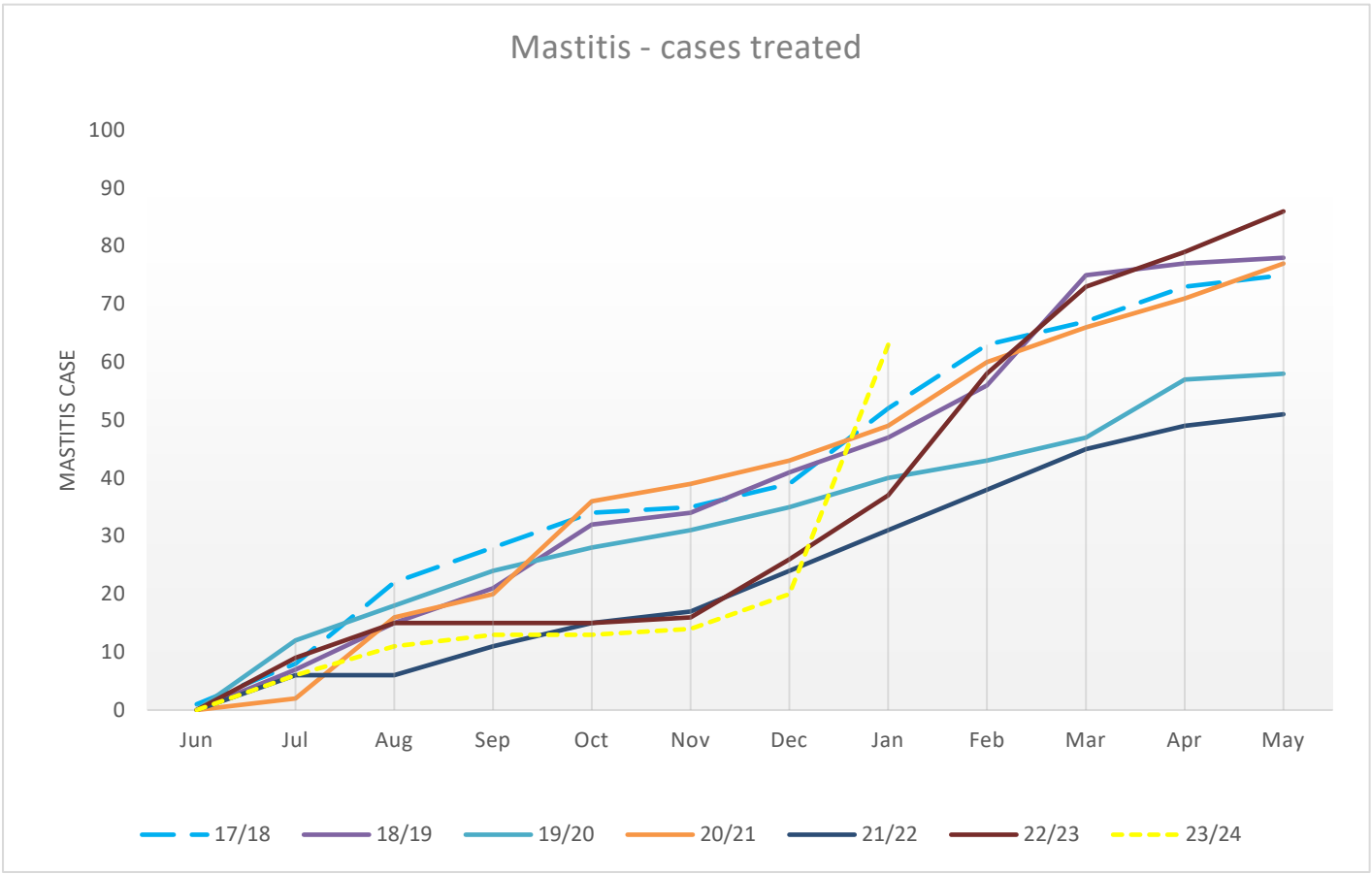
Notes:

SCC (SOMATIC CELL COUNT)

Graphic 2.3: Monthly SCC over years



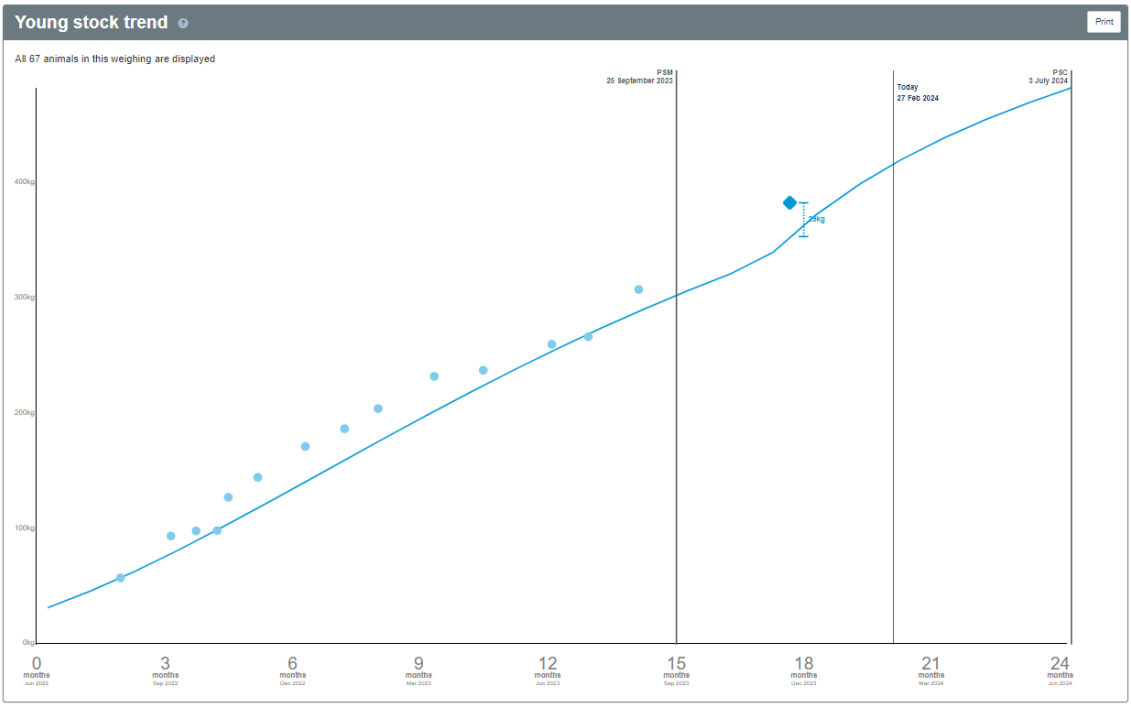
Graphic 2.4: Mastitis Cases Treated



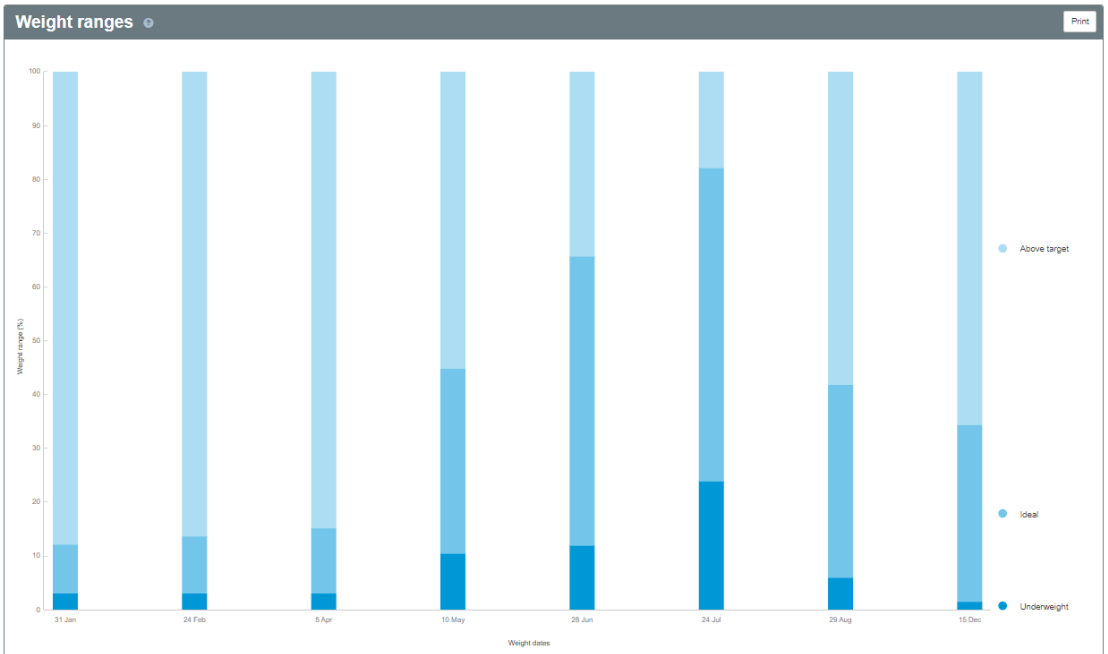
LIVESTOCK GROWTH

2022-born calves left the farm on 1st May to commence grazing at Waikato Heifer Growers. They weighed over 232 kg when they left the farm and suffered low weight gains through the slow autumn and winter, but are back on track weighing 383 kg (29 kg above target) on 15th Dec 2023.

Graphic 2.7: 2022-born calves - weight trend

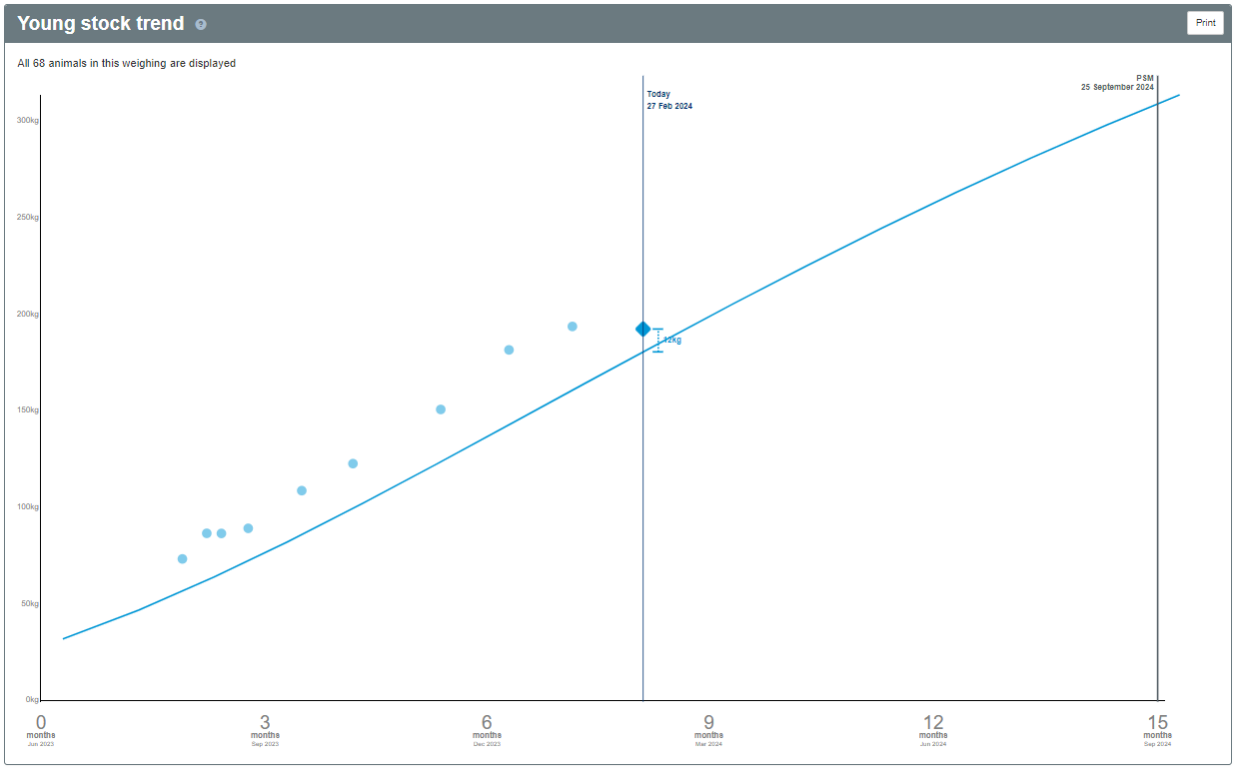


Graphic 2.8: 2022-born calves - weight ranges

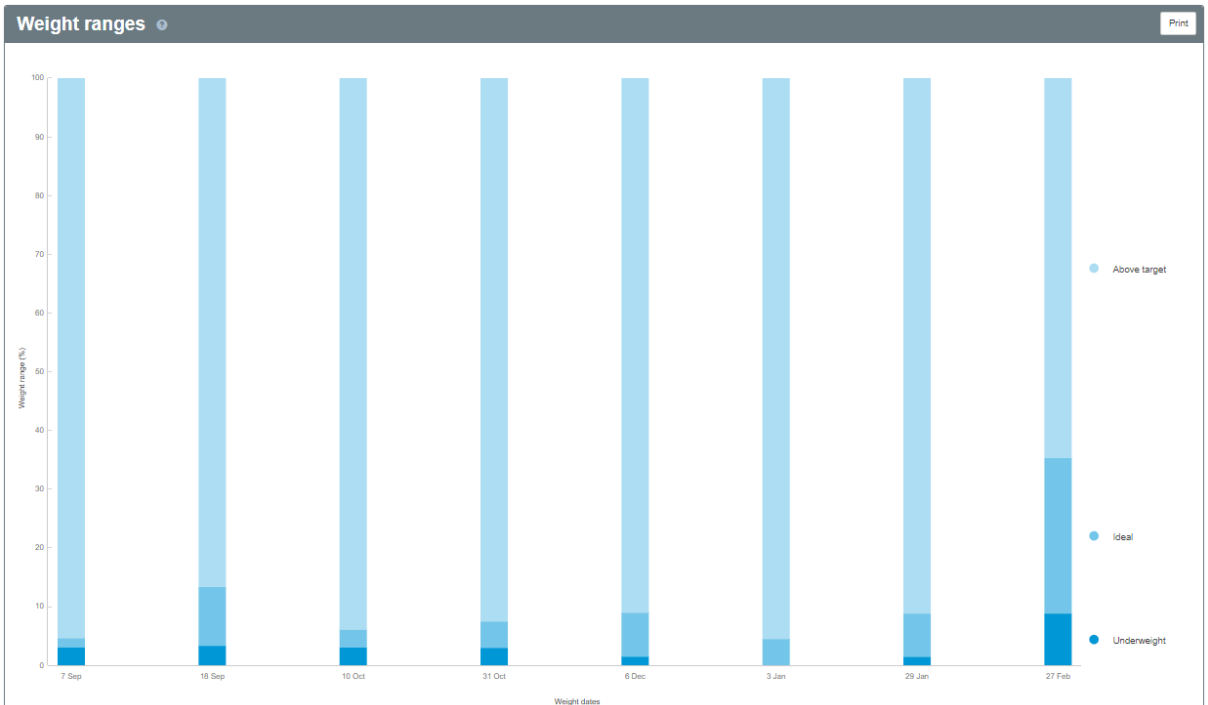


Range	January 2023		February 2023		April 2023		May 2023		June 2023		July 2023		August 2023		December 2023	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Above target	58	87.9	57	86.4	56	84.8	37	55.2	23	34.3	12	17.9	39	58.2	44	65.7
Ideal	6	9.1	7	10.6	8	12.1	23	34.3	36	53.7	39	58.2	24	35.8	22	32.8
Underweight	2	3	2	3	2	3	7	10.4	8	11.9	16	23.9	4	6	1	1.5
Total Animals	66		66		66		67		67		67		67		67	

Graphic 2.9: 2023-born calves - weight trend



Graphic 2.10: 2023-born calves - weight ranges



Range	September 2023		September 2023		October 2023		October 2023		December 2023		January 2024		January 2024		February 2024	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Above target	62	95.4	26	86.7	62	93.9	62	92.5	61	91	64	95.5	62	91.2	44	64.7
Ideal	1	1.5	3	10	2	3	3	4.5	5	7.5	3	4.5	5	7.4	18	26.5
Underweight	2	3.1	1	3.3	2	3	2	3	1	1.5	0	0	1	1.5	6	8.8
Total Animals	65		30		66		67		67		67		68		68	

GROWING WEANED CALVES

In 2020 we made the decision to grow our replacement heifer calves at home. For the summers of 2020 (4.7ha), 2021 (7.1ha) and 2022 (7.89ha) the calves were grazed on spring-sown chicory crops.

To dilute the cost of establishment we carried over the 2022-sown chicory and, after a weed spray we undersowed on 18th May with Manta Italian ryegrass (12 kg/ha) and Relish red clover (5 kg/ha). This allowed the calves to start grazing six weeks earlier on 11th October after four grazings by the cows.

The calves are behind a single wire and have water troughs in each break, with shifts every 2-3 days to reduce labour required.

Calves gain on average 0.7-0.78 kg lwt/day, leaving the farm well above target weight on 1st May.

Graphic 2.11: Comparison of calves at home between 2020-2023

	2020	2021	2022	2023
Number of calves	96 on leased dairy runoff	79 On dairy platform	69 On dairy platform	70 On dairy platform
Area of chicory	4.7 ha	7.1 ha	7.89 ha	7.89 ha + Italian + Red Clover
Supplements	19.1 t DM grass silage 11.1 tDM PKE 3 t DM pasture	20.3 t DM grass silage 17.8 t DM PKE 4.6 t DM pasture	4.7 t DM grass silage 6.7 t DM PKE	Started feeding PK and silage mid February. Calves removed from crop 22nd Feb.
Supplements per calf	345 kg DM/calf	540 kg DM/calf	165 kg DM/calf	
Approximate cost/head/week	$9.30	$14.09	Est. $11.15	Est < $5.00
Weight	224 kg on 15th April	235 kg on 30th March	232 kg on 5th April	

.

Caring for cows in transit

Transport can be stressful for livestock. How can farmers and others along the way make sure cows are comfortable during transport and at their destination?

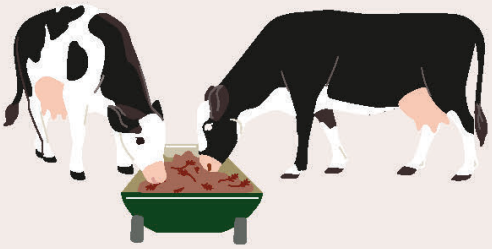
With good preparation on-farm, and everyone in the supply chain playing their part, we can ensure cattle arrive at their destination fit and healthy. We've put together some tips on key steps and talked to the people who handle each stage of the journey. You can also get further useful information at **dairynz.co.nz/transport**

2-7 *days before transport*

Select cull cows

Ask your vet about how best to prepare your animals, based on your herd's health and productivity. Check if you need a transport certificate for any cows you have concerns about.

"Ask to send your cows to a nearby meat processor to minimise transport distance. If space is tight, and the distance is longer than normal, keep older or lighter cows back."
– Kylie, veterinarian at MVP Vets



24 *hours before transport*

Prepare cows for transport

Lactating cows have a higher risk of metabolic issues during transport. They need roughage, extra calcium, and constant access to water until the time of loading. Take them off lush pasture for 4-6 hours before the trip to reduce effluent. Always double-check their destination on the day.

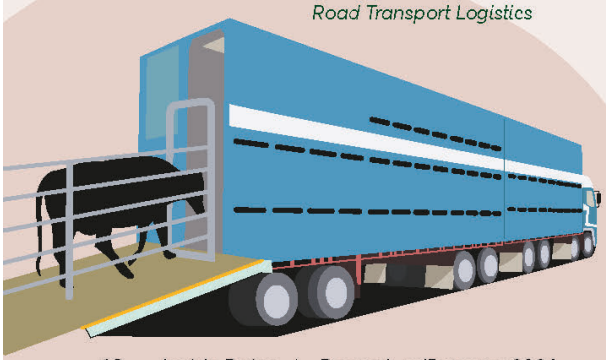
"The cows that are leaving are kept in a small, grazed out paddock with ad-lib hay, so they can lie down and rest. Shortly before the truck arrives, I put them on the yard with a cutdown 200L drum. It's easy to fill with the pressure hose and the cows have access to water until they are loaded."
– Ann, Waikato farmer

up to **12** *hours*

On the truck

Transporters look after cows by loading them calmly into certified crates and driving to the conditions. Farmers need to maintain the loading facilities so they're safe for both people and animals to use, and they should also clearly mark and yard special animals separately.

"Let our dispatch team know if there will be tall animals or cows with vet certificates, so the driver knows to keep the larger pen free or to plan a short route for the certified cow."
– Bruce, Operations Manager at Road Transport Logistics



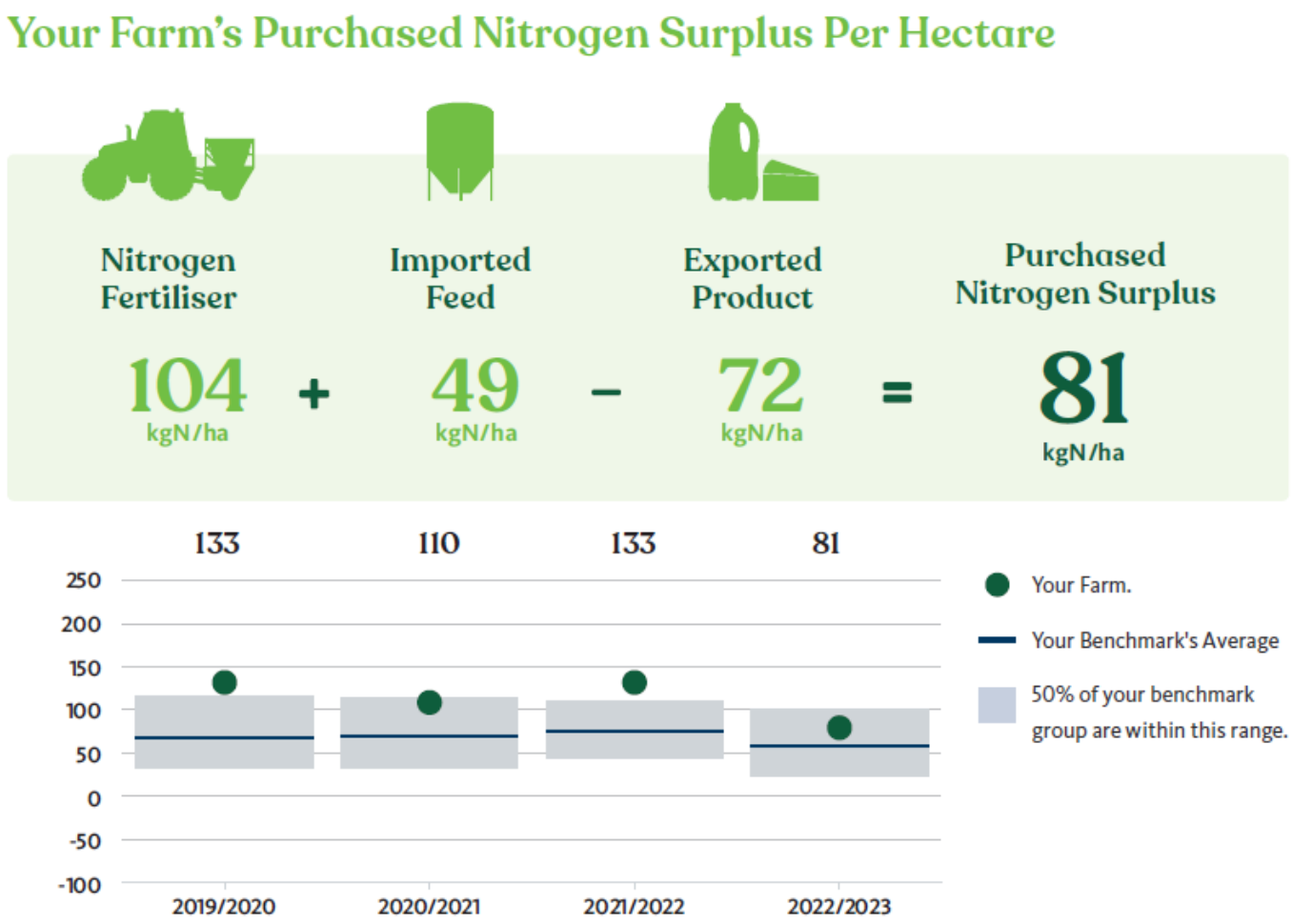
up to **12** *hours*

At the meat processing plant

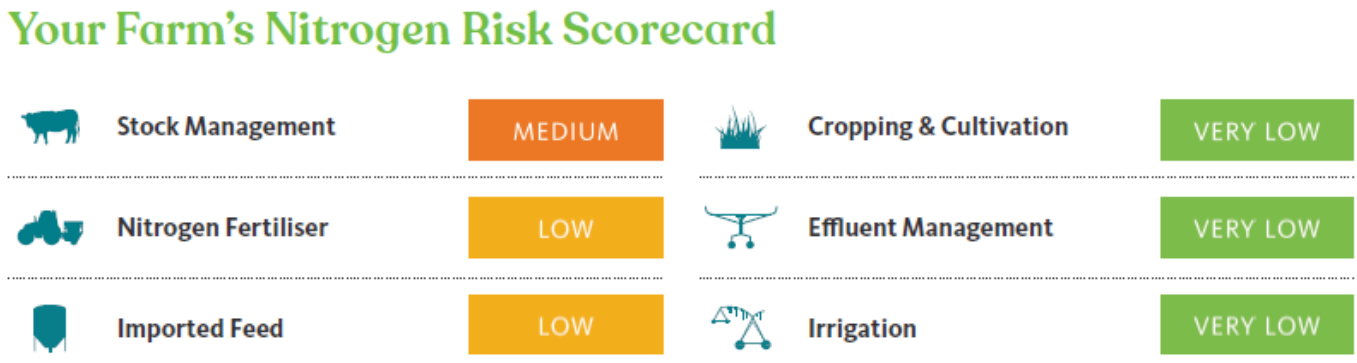
Once your cows arrive at the processing plant, they'll be held in the yards until needed. The wait time can vary, so prepare your cows for waiting beyond the truck journey. Farmers/transporters need to let processors know if a vulnerable animal is coming in. This way, they can adjust the schedule to minimise the cow's wait time in the yards.

3.0 ENVIRONMENT

Graphic 3.1: Fonterra Farm Insights report: Purchased N



Your farm is benchmarked against other farms in the Waikato region with production **between 1001-1200 kgMS/ha.**



Graphic 3.2: Overseer summary trends over time

Plantain Potency and Practice Programme

Owl Farm Field Day

29-2-24

Kate Fransen, Programme Lead, DairyNZ

Funding partners

Ministry for Primary Industries
Manatū Ahu Matua

DairyNZ

Fonterra
Dairy for life

PGG Wrightson Seeds

Delivery partners

agresearch

AGRICOM

Massey University

Manaaki Whenua
Landcare Research

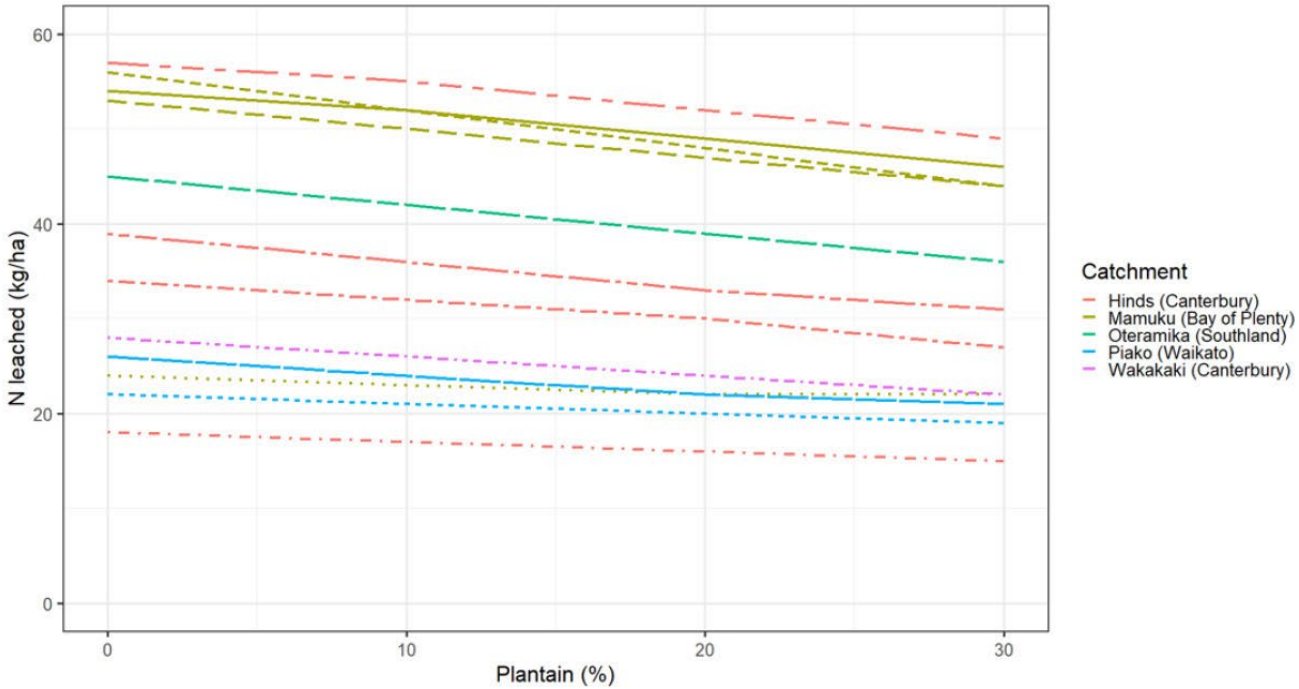
Lincoln AgriTech

Lincoln University

Plant & Food Research

Plantain in Overseer

- 12 partner farms, 5 catchments
- Urinary N effect only
- Avg. 6% (3-8%) reduction in N leaching for every 10% plantain
- Further reduction expected due to soil effects
- Aim to reflect in Overseer by 2027

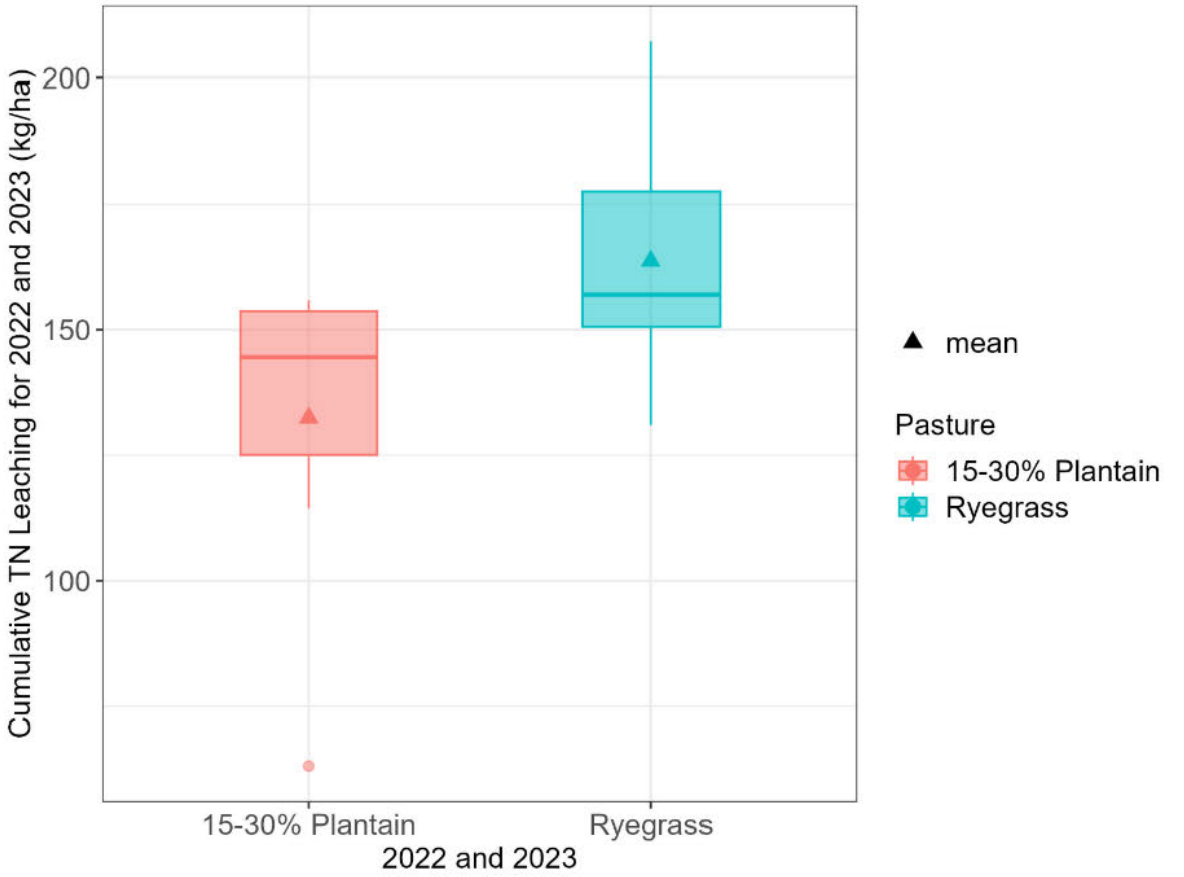


DairyNZ

Nitrate leaching at Lincoln

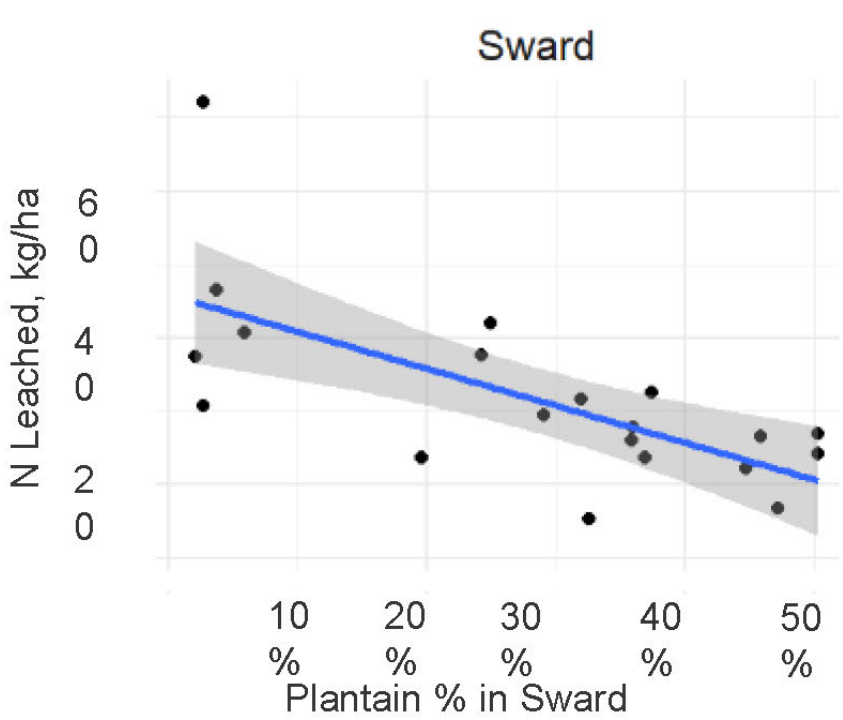
20% reduction in N leaching - on average around 1% reduction for 1% plantain

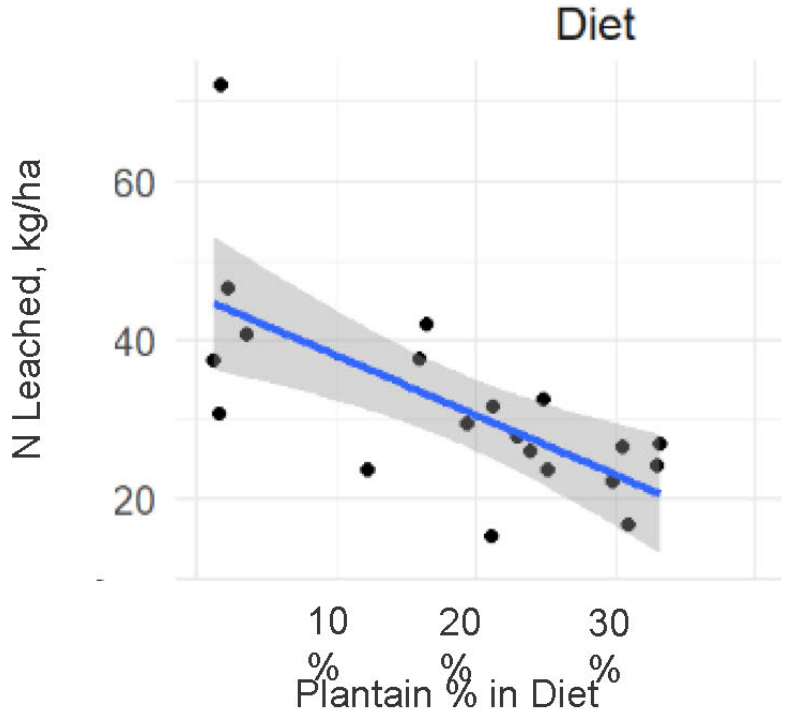
Two years of data P = 0.048



SFFF Plantain Potency and Practice Programme - funded by DairyNZ, MPI, Fonterra and PGGW Seeds

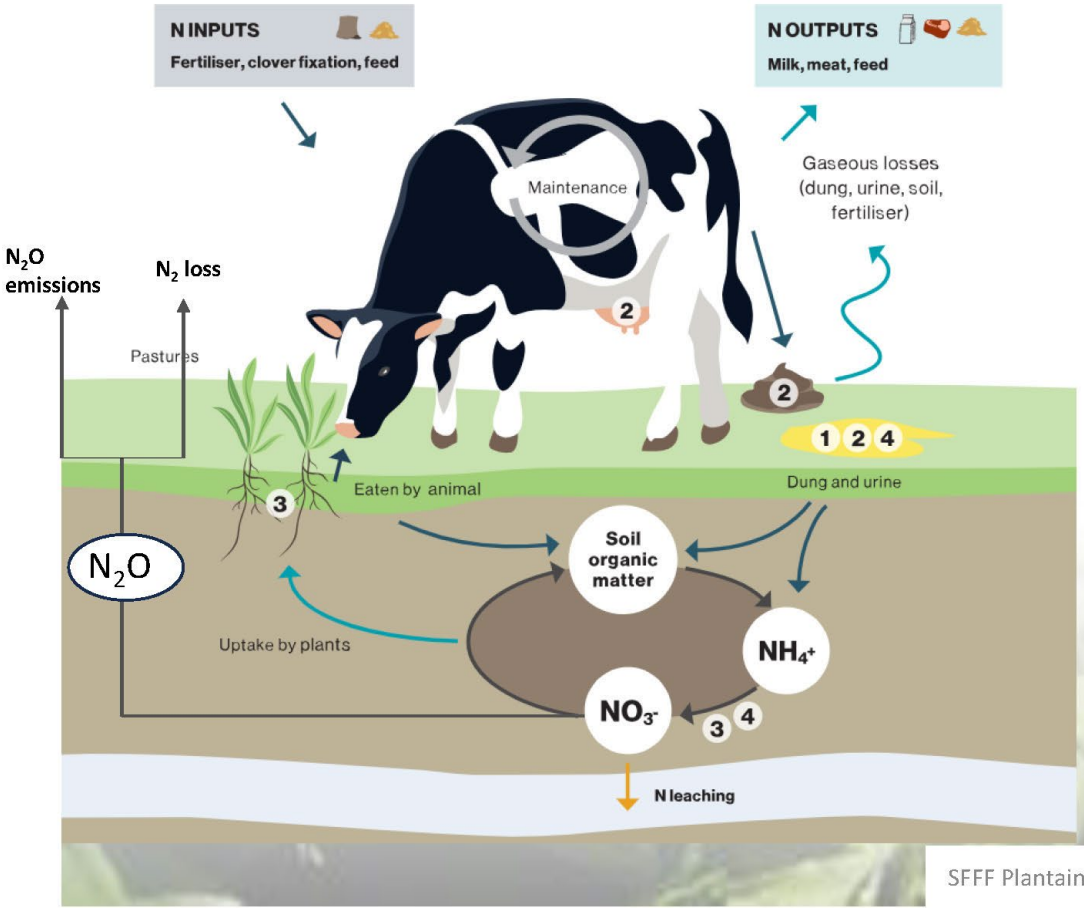
Nitrate leaching at Massey





On average around 1% reduction in N leaching for every 1% plantain in the sward; 1.6% reduction in N leaching for 1% in the diet

How Ecotain plantain works



1. **Dilution effect**: Higher urination frequency & volume (lower DM%)

2. **Partitioning effect:** More N partitioned to dung vs. urine

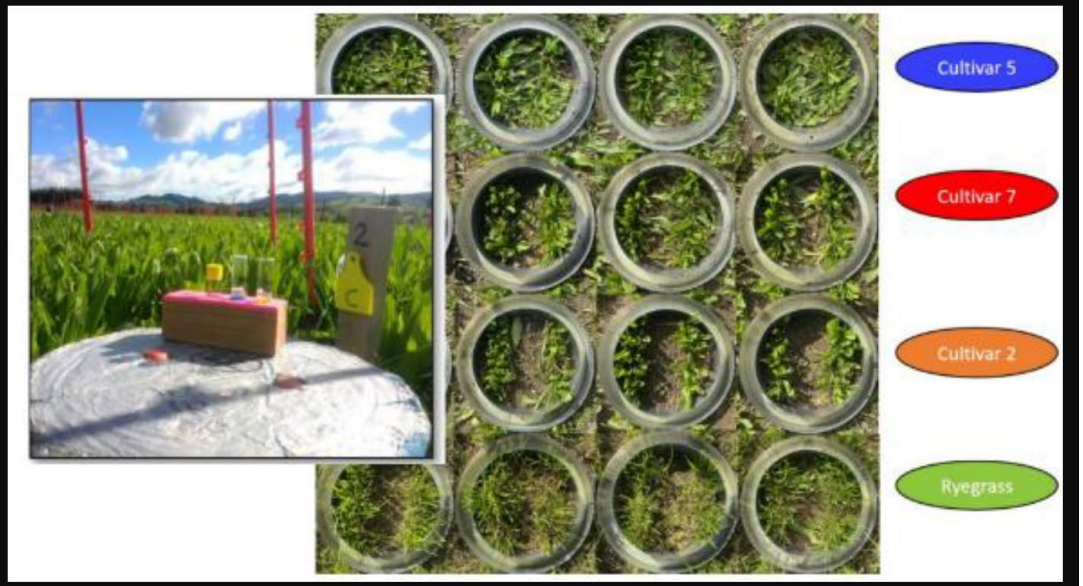
3. **Direct N retention effect:** Biological Nitrification Inhibition and/or decreased drainage

4. **Indirect N retention effect:** Biological Nitrification Inhibition in the urine patch

SFFF Plantain Potency and Practice Programme - funded by DairyNZ, MPI, Fonterra and PGGW Seeds

Nitrous oxide emissions (Supported by NZAGRC)

- All trials compared to Perennial Ryegrass/White Clover
- Dunedin: 53% reduction from 30% plantain
- Massey: 39% reduction from 30% plantain
- Cultivar evaluation (preliminary data)
  - 3 cultivars compared to PRG
  - Urine from ryegrass used on plantain
  - Southern Dairy Hub (dry autumn):
    - 39, 57 and 63% reduction
  - Waikato (wet autumn):
    - 12, 15 and 3% reduction



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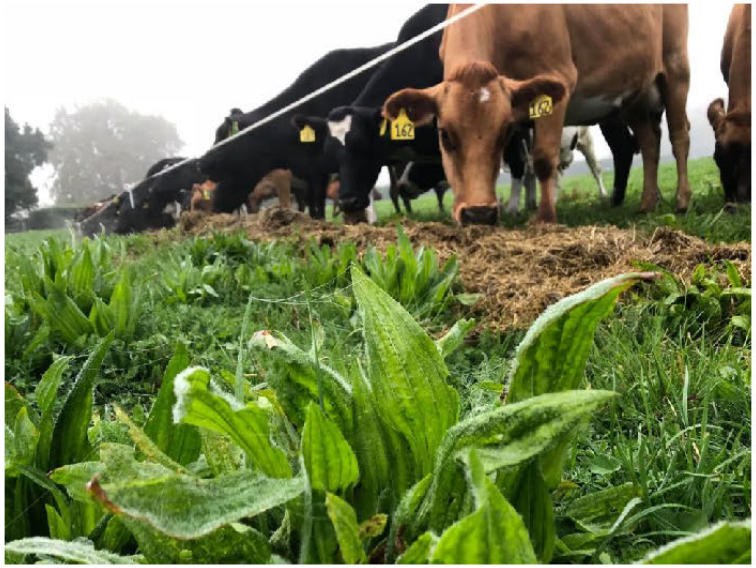
Owl Farm Plantain Journey

- ✓ Owl Farm has been incorporating plantain since 2021.
- ✓ All paddocks sown into new grass in the autumn are sown with 4kg of Ecotain plantain in the mix.
- ✓ In addition, the farm also incorporates plantain through broadcasting Ecotain prill coated seed at 8kg/ha (4kg/ha seed).
- ✓ Plantain/clover swards are also part of the farm which attempts to maintain 10-15% plantain across the whole farm to reduce nitrogen loss and nitrous oxide emissions (and potentially reduce methane emissions).



Farm map


0
0.325
0.65
1.3 Kilometres
R24
R22
R23
R19
R20/21
R16
R11
R17
R11Wet
R13
R9
R7
R12
15
14
R10
17
13
R8
23
18
12
R2
20
19
25
R1
21
6
29
26
5
30
28
4
34
31
86
75/77 DEER SHED
79
81
82
85
74
72
73
83
32
3
33
57
70
2
38
36
SHED
1
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53
49
56 Hill

N loss mitigation scenarios – Owl Farm

	Base (2022/23 season)	Plantain 15%	No N fert autumn	N fert reduced 143 to 80kg/ha/y. Apply spring, early summer, autumn
Production (kg MS/year)	157,115	157,115	154,539	154,863
Stocking rate (cows/ha)	2.70	2.70	2.70	2.70
N fertiliser to pasture (kg/ha)	143	143	116	80
Pasture conserved (tDM)	69	69	69	29
Total N loss (kg N/year)	4,342	3,993	3,981	3,984
N leached (kg/ha/year)	**27**	**25**	**25**	**25**
N surplus (kg/ha/year)	155	154	141	143
Purchased N surplus (kg/ha/year)	82	82	59	33
Operating profit ($/ha)[2]	**2,265**	**2,197** (-3%)	**2,192** (-3%)	**2,321** (+2.4%)
Methane (t CO_2 eq./ha)	7.05	7.05	6.94	6.97
Nitrous oxide (t CO_2 eq./ha)	1.94	1.89	1.82	1.73

DairyNZ

- Sown on 11th October 2023
- 2.8ha of plantain/clover crop
- Seed rate:
  - 10 kg/ha Ecotain plantain,
  - 4 kg/ha Relish Red Clover,
  - 4 kg/ha Klondike White Clover
- 180 kg/ha DAP and slug bait 10kg/ha.
- This paddock will be drilled with ryegrass and cocksfoot next year.

DairyNZ

Paddock 28

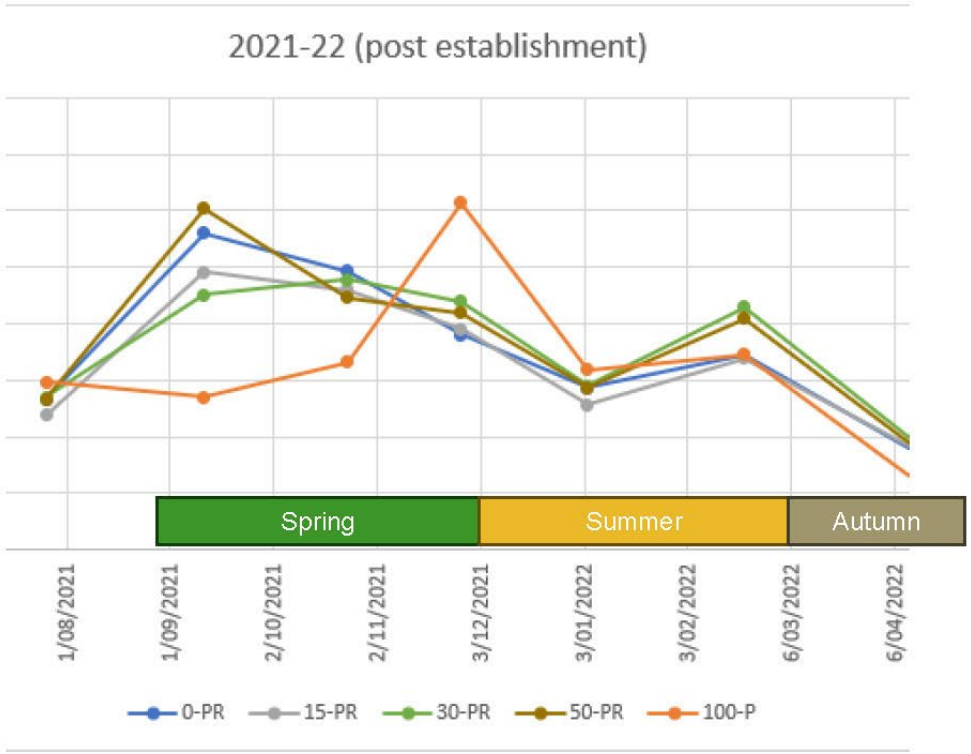
- Visual assessment done on 25-Jan-24, with covers @ 2,400
  - 75% Plantain
  - 15% Clover
  - Weeds were mostly nightshade
- Hill labs results
  - Dry Matter (%) = 12.6
  - Crude protein (%DM) = 22.9
  - ME (MJ/kgDM) = 11.2

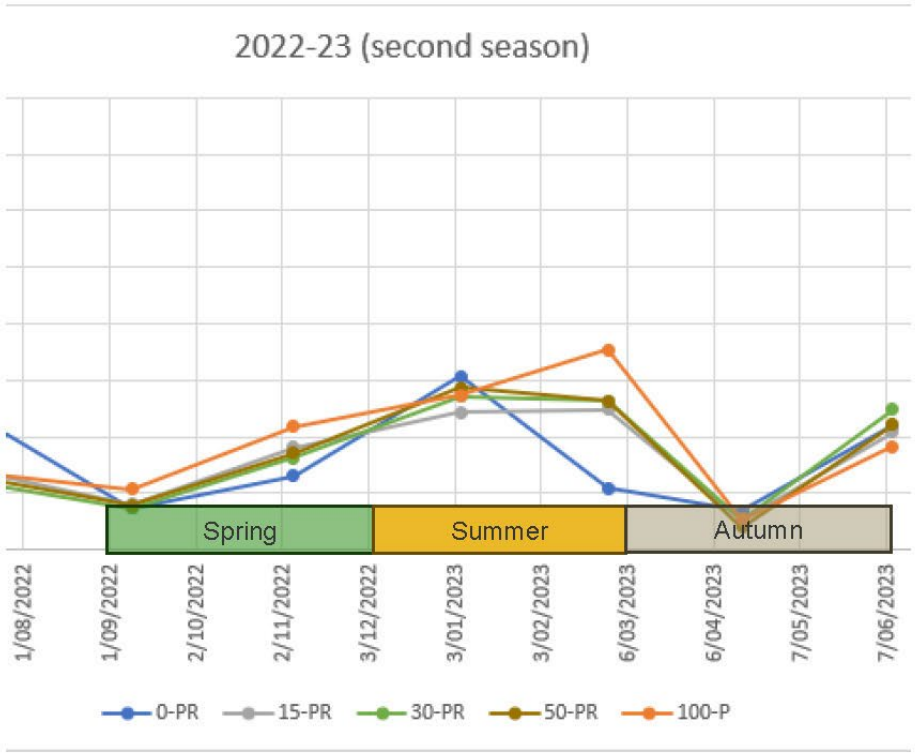
DairyNZ

Quality comparison with a mix sward

**Results from January-24 sampling*	**Paddock 28** Plantain/clover	**Paddock 20** Ryegrass/clover/plantain
Plantain Visual assessment %	75%	10%
Clover Visual assessment %	15%	20%
Dry Matter %	12.6	25.8
Crude Protein %DM	22.9	17.3
Nitrogen %DM	3.7	2.8
Metabolisable Energy MJ/kgDM	11.2	10.4
Acid Detergent Fibre %DM	21.4	25.8
Neutral Detergent Fibre* %DM	32.3	46.1
Lignin %DM	8.7	5.9
Ash %DM	13.7	10.3
Organic Matter %DM	86.3	89.7
Soluble Sugars %DM	9.4	6.9
Starch %DM	0.6	0.6
Crude Fat %DM	3.1	3.2
Digestibility of Organic Matter in %DM	69.8	64.9
Non Structural Carbohydrate %DM	28.0	23.0
OMD in-vivo %DM	80.9	72.3

Pasture growth at Nahinapouri





Grazing management

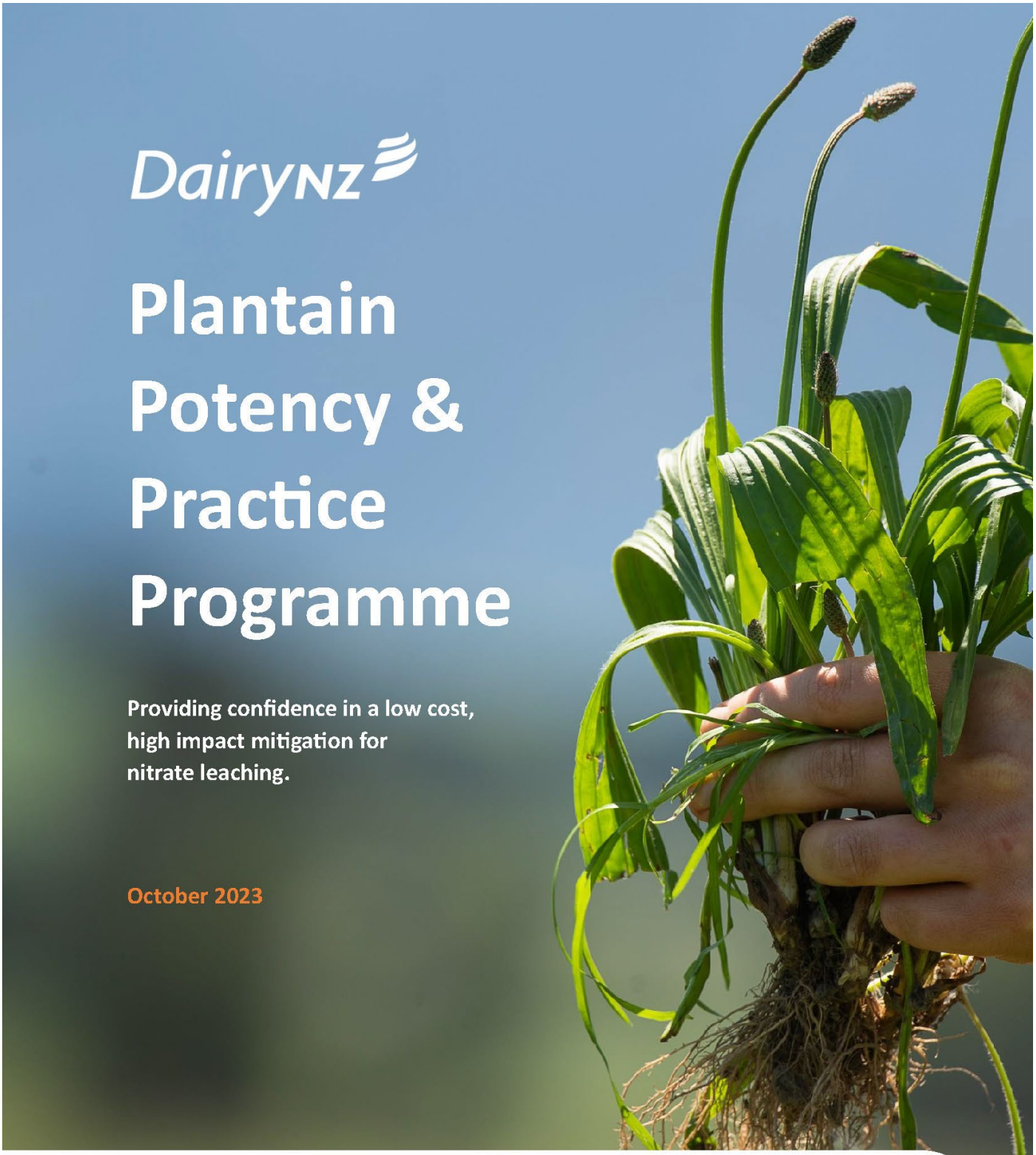
- New pastures get grazed before the 2-leaf stage – to prevent canopy closure and ensure plantain and clover survive, along with daughter tillers.
- Summer-24 – Plantain/clover paddock was grazed for 3-4 hours for two days and then topped to control stinging nettle and nightshade weeds.

Weed & pests management

- Starts with paddock selection – condition score 2-4, slightly open with minimal weeds and not due for crop/regrassing in the next 3 years.
- All new grass containing Plantain gets sprayed with Dynamo for weed control. Dynamo is safe for Plantain and Clovers.
- Topping
- Plantain moths
  - Damage is done on old leaves, particularly during a prolonged dry period
  - Caterpillar populations usually peaking in mid February.
  - Leaf damage is best controlled by resetting with a good grazing and strategic nitrogen.
  - Not economical to spray for plantain moth control.

Next steps

- 8 paddocks have been selected and are being monitored by the tech team for seasonal persistence – spring, summer and autumn visual assessments
- There will be a whole farm assessment performed in Autumn-24 – will provide with the % of plantain across the whole farm (Aut-23 = 5%)



DairyNZ

Plantain Potency & Practice Programme

Providing confidence in a low cost, high impact mitigation for nitrate leaching.

October 2023

The SFFF Plantain programme is a seven-year Aotearoa New Zealand-wide collaborative research and development initiative. The aim is to substantially reduce nitrogen lost to freshwater and in greenhouse gases from the pasture-based food exporting sectors by using plantain (Ecotain®).

Funding partners

Ministry for Primary Industries Manatū Ahu Matua

DairyNZ

Fonterra Dairy for life

PGG WrightsonSeeds

Delivery partners

agresearch AGRICOM Massey University Manaaki Whenua Landcare Research Lincoln AgriTech Lincoln University Plant & Food Research

Key results and messages

The biggest contributor to nitrate leaching from dairy farms is the urine patch. The concentration of nitrogen (N) in the urine patch is too high for a plant to utilise, so some of the urea in urine is converted to nitrate through a process called nitrification, and is lost to ground water. There are four mechanisms explain how Ecotain plantain reduces nitrate leaching.

1. **Dilution effect:** Higher urination frequency and volume due to the lower DM% of plantain.
2. **Partitioning effect:** More of the N consumed (as protein) is partitioned to dung and milk instead of urine, meaning there is less N in the urine patch to be leached.
3. **Direct N retention effect:** There is evidence of Ecotain plantain reducing nitrate leaching in lysimeters, even when the urine used is from ryegrass. The Plantain programme is investigating the possible effects of plant secondary compounds driving this effect through slowing the rate of nitrification.
4. **Indirect N retention effect:** When animals consume the plant secondary compounds in plantain, they are then excreted in the urine. There is evidence of these compounds slowing nitrification in the urine patch.

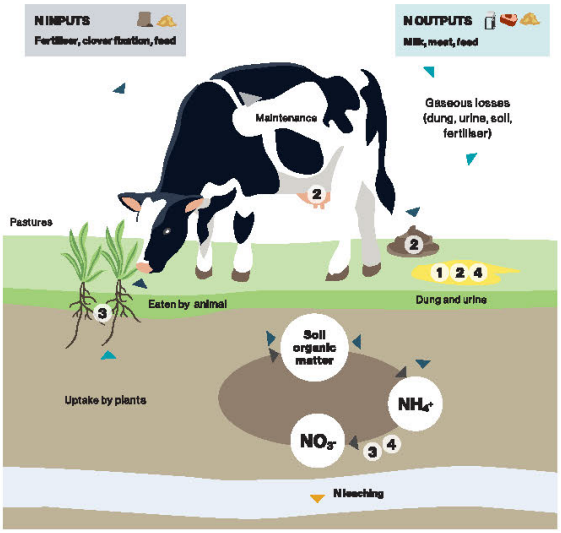


Figure 1. Diagram illustrating the mechanisms for reducing nitrate leaching of Ecotain plantain.

How plantain works

A big part of the Plantain Potency and Practice Programme is understanding how plantain works so that its full effect in different soils and climates can be modelled and cultivars can be tested for their effectiveness for reducing nitrate leaching.

Plant & Food Research are conducting hydroponic and pot experiments in glasshouses to understand the makeup of chemical compounds in different cultivars of plantain, how they influence nitrogen cycling, and how they behave in different soils. At AgResearch, the team is tracing nitrogen and carbon through lysimeters and measuring the leaching through the lysimeters under different proportions of plantain. Manaaki-Whenua Landcare Research are measuring nitrogen and carbon cycling under different proportions of plantain in field trial experiments in different climates and soils from Northland to Southland.

So far, it appears that the effect of plantain on retaining soil nitrogen varies with soil type. We are getting closer to explaining the mechanisms behind this effect.

Reductions in nitrate leaching at paddock scale

Nitrate leaching is being measured in farmlet studies at Massey and Lincoln Universities:

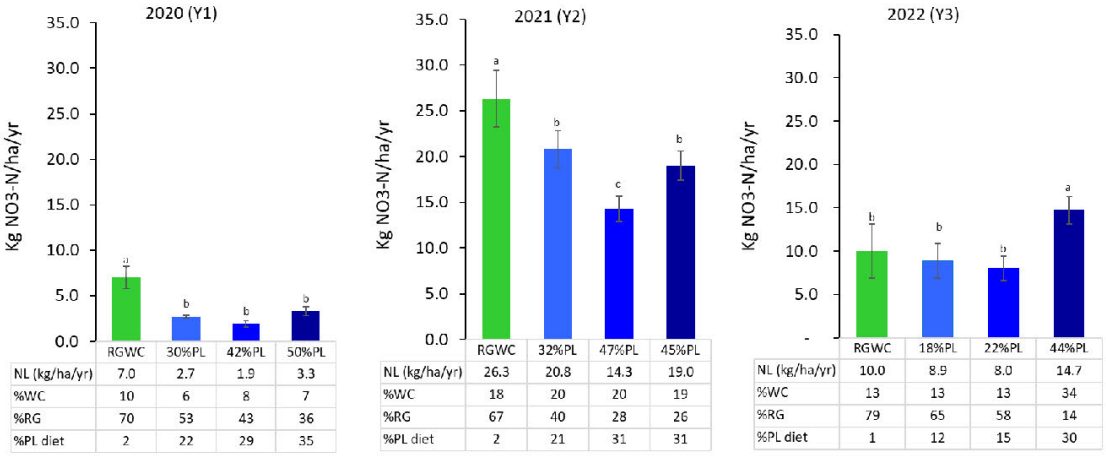
- The Massey University trial is on poor draining soils with a hard pan. Each replicate plot is hydrologically isolated with a mole-pipe drain system that allows the drainage water to be sub sampled for total N and nitrate analysis.
- The Lincoln University trial site is on well-drained soil under irrigation. Nitrate leaching is measured through a network of suction cups at 600 mm depth (to measure nitrate concentration) and lysimeters (to measure amount of drainage).

Swards containing over 20% clover increased the risk of nitrate leaching (as seen in the 2022 graph in Figure 2). This is due to the high protein in the clover (increasing N concentration in the urine patch), and higher N fixation from the legume.

Three years of data from the Massey University farmlet trial has shown that nitrogen leaching can be reduced by 20-60% from swards containing 20-50% Ecotain plantain (equivalent to 15-30% in the diet; Figure 2).

- Year 1 of the trial had a low rainfall, meaning the overall leaching was low, however all plantain treatments (30-50% plantain) reduced N leaching by 53-73%.
- With 250 mm more rain in Year 2 compared to Year 1, more leaching occurred. Leaching was reduced by 21% when there was 32% plantain in the sward, and 46% when there was 47% plantain in the sward.
- In Year 3 the amount of plantain in the sward and diet decreased, but there was still a 20% reduction in nitrate leaching from the sward with 20% plantain.

Two years of data from Lincoln University has shown swards with 15-30% Ecotain plantain had approximately 20% lower total N leaching than ryegrass-white clover paddocks (P=0.048; Figure 3).



	RGWC	30%PL	42%PL	50%PL
NL (kg/ha/yr)	7.0	2.7	1.9	3.3
%WC	10	6	8	7
%RG	70	53	43	36
%PL diet	2	22	29	35

	RGWC	32%PL	47%PL	45%PL
NL (kg/ha/yr)	26.3	20.8	14.3	19.0
%WC	18	20	20	19
%RG	67	40	28	26
%PL diet	2	21	31	31

	RGWC	18%PL	22%PL	44%PL
NL (kg/ha/yr)	10.0	8.9	8.0	14.7
%WC	13	13	13	34
%RG	79	65	58	14
%PL diet	1	12	15	30

Figure 2. Cumulative nitrate leaching measured in the Massey University farm systems trial from ryegrass-white clover pastures (RGWC) and mixed swards containing three levels of plantain (%PL) during the 2020, 2021 and 2022 drainage seasons. The tables below each graph show nitrate leaching (NL; kg/ha/year), amount of white clover in the sward (%WC), amount of ryegrass in the sward (%RG) and amount of plantain in the diet (%PL diet). Error bars represent the SEM for nitrate leaching. Bars with different letters within the same year indicate a significant difference between treatments.

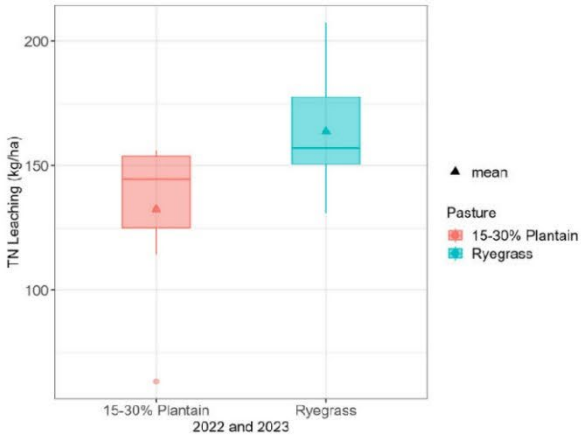


Figure 3. Total N Leaching (kg/ha) for the plantain and ryegrass pastures at Lincoln University research Dairy Farm. Data is cumulative total N leached per ha from Feb 2022 to April 2023.

Notes

Pasture & milk production

- Anecdotal evidence from programme partner farms suggests that summer dry environments generally have increased summer/autumn growth from plantain pastures.
- This is supported by data from Massey University, which indicates a higher growth rate of plantain pastures in December to February (Figure 4).
- There has been no change in feed quality by including plantain in grass-based pastures – measured across the partner farm network and in farmlet trials.
- A meta-analysis of studies conducted prior to the plantain programme showed a slight milk production advantage to plantain compared with perennial ryegrass.
- When grown in mixed swards at Massey and Lincoln University farmlet trials, plantain has not affected annual milk production.

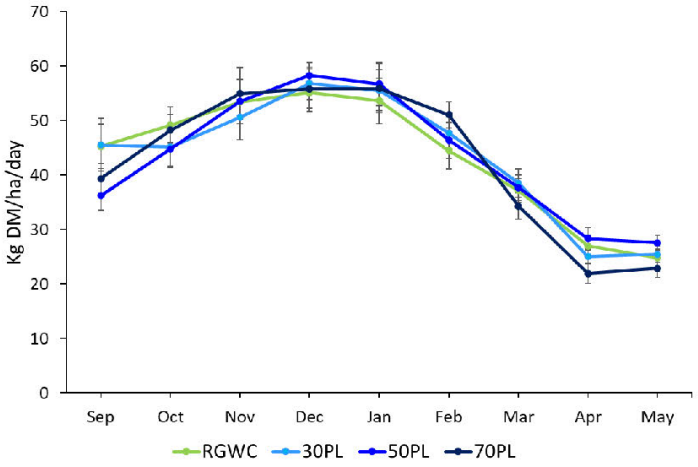


Figure 4. Average daily herbage accumulation rate for each month of pastures containing varying levels of plantain (ryegrass/white clover only, 30%, 50% and 70% plantain) measured at Massey University. Data are mean of four years.

A study at the Lincoln site conducted calibrations for rising plate meter (RPM) at 0%, around 30% and 45% plantain.

At plantain levels less than 30%, the same equation as ryegrass/white clover can be used. At higher proportions of plantain, a different regression is needed due to plantain having a lower DM% than ryegrass. More work is required to confirm what the equation should be.

Evidence is building that plantain also reduces nitrous oxide emissions

Data from AgResearch[1] (Figure 5) shows the soil mechanisms (#3 and #4) at work. Similar work from Massey University showed a 39% reduction in nitrous oxide emissions from pastures with 30% plantain.

The graph on the left from AgResearch shows reduced nitrous oxide emissions when urine from cows grazing pure plantain was applied to pastures with varying levels of plantain. The graph on the right shows reduced nitrous oxide emissions when urine from cows grazing pure ryegrass was applied to pastures with varying levels of plantain. This shows both the diet effect and the effect of plantain interacting with soil

.

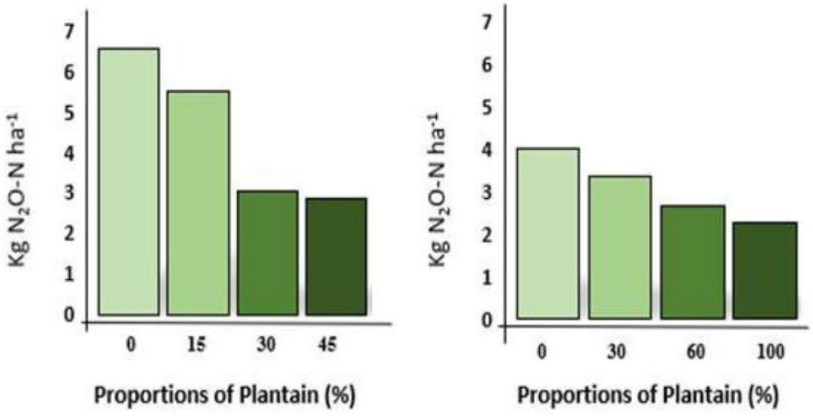


Figure 5. Nitrous oxide emissions from swards containing varying levels of plantain when urine from cows grazing plantain (left) or ryegrass (right) was applied between March and June[1].

[1] Simon, L.P., de Klein, C.A.M., Worth, W., Rutherford, A.J., & Dieckow, J. 2019. The efficacy of *Plantago lanceolata* for mitigating nitrous oxide emissions from cattle urine patches. *Science of the Total Environment, 691*, 430-441.

Plantain in Overseer

There are 23 programme research and partner farms around New Zealand (Figure 6).

Data from 16 of these farms has been used in Overseer to model the urinary nitrogen mechanisms currently in the model (#1 and #2) and the expected reduction in nitrate leaching.

The soil mechanisms (#3 and #4) are not yet included in Overseer. We expect these to be included after 2027 when we have a fuller understanding of how they work in different soils and climates.

Modelling has shown an average 6% reduction (range 3-8%) in nitrate leaching for every 10% of plantain on the farm. The extent of reduction is largely dependent on the amount of pasture in the diet.

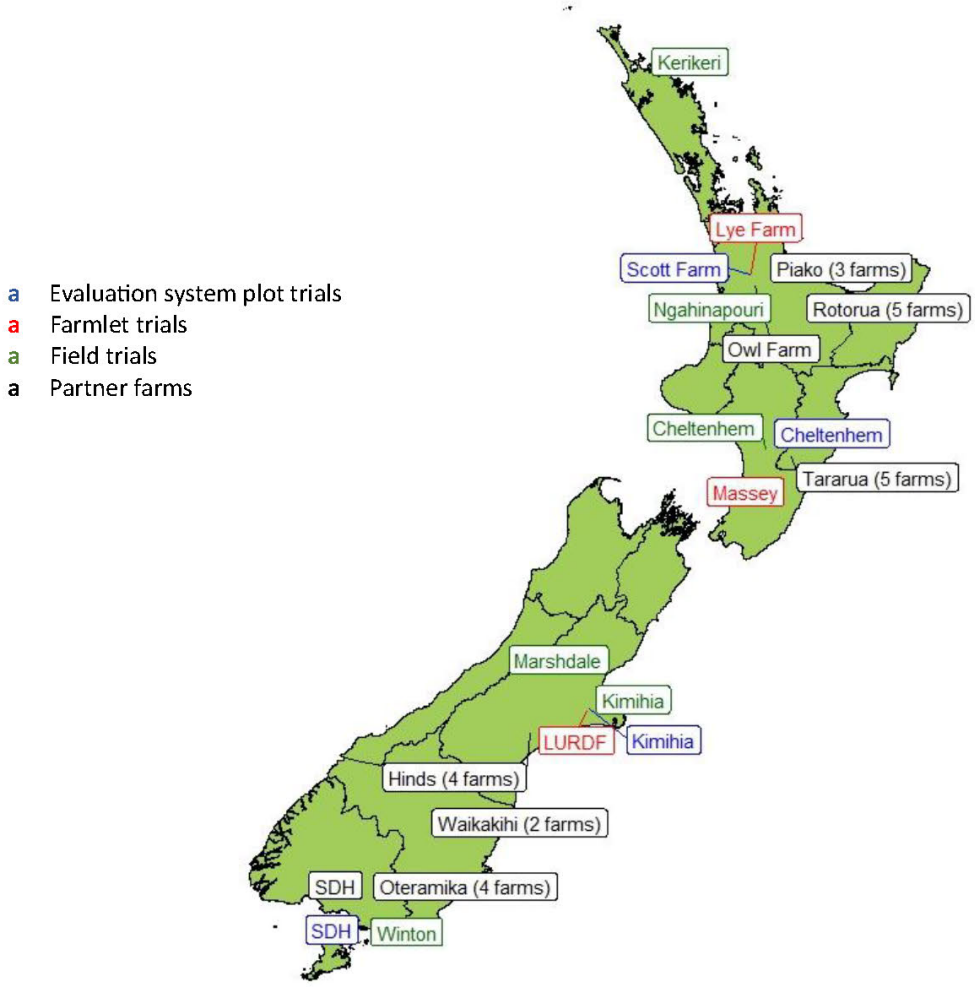


Figure 6. Location of programme research & partner farms

Economic case studies

Modelling using Farmax and Overseer shows that for 10 farms who use plantain, operating profit was reduced by average 2% (primarily due to sowing costs). Implementing the alternative mitigations mentioned in Table 1 resulted in a 1-37% reduction in operating profit to achieve the same level of N leaching reduction. Table 1 shows results for three of these farms.

Table 1. Economic case studies for three partner farms showing mitigation scenarios to reduce N leaching to the required levels.

Rotorua – 31% reduction in N leaching (59 kg N down to 41 kg N)				
	30% Plantain +	**Fewer cows**	**Stand-off pad & 30 ha trees**	Plantain broadcast at 2 kg/ha every year
Stocking rate	**-7%**	-31%	-5%	
Operating profit	**-4%**	-10%	-17%	
Southland – 20% reduction in N leaching (45 kg N down to 36 kg N)				
	30% Plantain +	**Fewer cows**	**No crops**	Plantain included in seed mix and broadcast at 4 kg/ha/year
Stocking rate	-	-24%	-	
Operating profit	**-2%**	-37%	-11%	
Mid Canterbury – 14% reduction in N leaching (57 kg N down to 48 kg N)				
	30% Plantain +	**Fewer cows**	**No barley crop**	Plantain included in seed mix at 3 kg/ha and broadcast at 3 kg/ha
Stocking rate	-	-20%	-	
Operating profit	**-1%**	-30%	-1%	

Plantain establishment & grazing management

A plantain cultivar evaluation system has been developed for evaluating effectiveness of plantain cultivars for reduced nitrate leaching.

The system currently assesses for animal effects (urinary nitrogen) and in future will also assess for soil effects. Currently only Agritonic (marketed as Ecotain) has enough evidence to be classed as effective. Clarification of other cultivars is expected within next 1-2 years.

Plantain ryegrass-based swards reach peak abundance at 12-18 months, before declining over the next 12-18 months (lasting approximately three years in total).

There are four methods for getting plantain established on farm:

New pasture: 3-4 kg/ha Ecotain with 8-20 kg/ha ryegrass + 5 kg/ha clover.

Pure crop: 12 kg/ha Ecotain (+ optional ~5 kg/ha clover).

Broadcast: 2-5 kg/ha with or without fertiliser. Prillcote for improved spreading (double sowing rate required).

Undersow: into existing pastures at 2-5 kg/ha.

A plantain visual assessment guide has been developed to determine the plantain levels on farm – visit dairynz.co.nz/plantain to find out more.

Manage grazing rotations the same as perennial ryegrass/white clover pastures.

- Low palatability can result from long rotations (>25 days), especially in autumn, but this can be corrected with topping.
- Avoid seedhead production to extend the life of the plant.

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Pest & weed management

- Control weeds well prior to sowing as options are fewer post-establishment.
- Dictate (Bentazone) is now on-label for controlling seedling broadleaf weeds in plantain/grass/clover mixed swards.
- Pests include plantain moth and grass grub. They typically peak 2-3 years after sowing.
- Plantain moth mostly an issue in pure swards – can be sprayed with broad spectrum insecticide at larval stage from December to May.

Plantain safety

Plantain & animal health:

- Plantain pastures have lower facial eczema spores than ryegrass pastures.
- Potential risk of milk fever if plantain in diet varies around calving.
- Potential issues of mineral intake via dosatron due to less drinking.
- Potential risk of bloat on pastures high in plantain.

Milk from plantain fed cows shows:

- No risk to human health
- No impact on milk composition.
- No impact on processability of milk.
- Small increase in fat evaluation index.
- Higher Omega-3.

For more information on the plantain research programme visit dairynz.co.nz/plantain

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4.0 BUSINESS HEALTH

Our budget is developed in March and adopted for the year ahead, usually before the final payout is announced. We update cashflow monthly to discuss at our monthly Farm Management meetings.

Graphic 4.1: Cashflow for 2023/24 season to end of January

OWL FARM
Providing knowledge.
ST PETER'S SCHOOL & LINCOLN UNIVERSITY DEMONSTRATION DAIRY FARM

St Peters Cambridge

LINCOLN UNIVERSITY

	June	July	August	September	October	November	December	January	YTD Total	*YTD Budget*	YTD Variance	Actual to Jan + Updated Feb-May	Original Full Year Budget	Notes	
Milksolids KG	-	6,205	16,549	20,742	20,834	18,705	17,241	13,824	114,101	*124,037*	9,936	*146,364*	148,866	1	Updated Farmax files predict 146,000 kgMS
Total Milk Receipts	(38,879)	(99,538)	(144,473)	(105,111)	(125,462)	(123,987)	(98,234)	(76,639)	(812,323)	*(883,882)*	(71,558)	*(1,098,476)*	(1,257,752)	2	Updated 27/2/24 to $6.45 advance rate
Dividends Received	-	-	(103,816)	-	(74,466)	-	-	-	(178,282)	*(122,867)*	55,415	*(196,898)*	(141,483)	3	$93k Fonterra, $10k LIC, $74k Fonterra received
All Cattle Sales	-	(3,668)	(14,609)	(9,481)	(171)	(2,527)	-	(4,507)	(34,963)	*(61,860)*	(26,897)	*(80,463)*	(107,360)	4	25 capital stock budgeted for Sept will now be sold as culls due to delays in subdivision progress
All other Income	(3,433)	(3,433)	(3,433)	(3,433)	(3,433)	(3,433)	(4,149)	(3,433)	(28,182)	*(31,200)*	(3,018)	*(43,782)*	(46,800)	5	
Total Income	**(42,312)**	**(106,639)**	**(266,331)**	**(118,025)**	**(203,533)**	**(129,948)**	**(102,383)**	**(84,580)**	**(1,053,751)**	***(1,099,808)***	**(46,057)**	***(1,419,620)***	**(1,553,395)**	6	
Wages	16,456	31,486	22,813	22,142	40,209	14,750	24,818	16,560	189,233	*153,376*	(35,857)	*248,971*	213,114	7	Salaries $48k over budget. Relief to support the farm team for Tony's days off. Tractor training $1.3k. 3 weeks leave for Tom covered by Bevan + 4 weeks to catchup on work and support Tony. 1 week AL paid out to Tony
Animal Health	7,568	2,635	4,327	657	7,549	1,452	2,282	7,423	33,892	*26,680*	(7,212)	*46,862*	39,650	8	Stock health is $5.8k over budget
Breeding & Herd Improvement	4,366	3,783	7,023	14,693	3,430	16,773	6,958	4,745	61,771	*69,181*	7,410	*75,773*	83,183	9	Saving $5k without heifer sexed semen, saving on wearables $8k
Farm dairy	1,750	188	95	53	257	147	1,141	1,835	5,465	*4,860*	(605)	*6,245*	5,640	10	
Electricity	633	1,561	2,687	2,887	2,889	2,513	2,446	2,003	17,619	*17,700*	81	*22,819*	22,900	11	
Silage made	-	-	-	-	-	12,735	5,717	7,338	25,790	*33,100*	7,310	*25,790*	23,250	12	Waiting on Feb invoice for maize harvest
Supplements purchased	11,473	14,530	8,683	8,843	-	-	-	-	43,529	*32,000*	(11,529)	*43,529*	36,800	13	Contract PK 90t @ $293/t budgeted to start in July. 15t PK purchased spot price of $383/t non budgeted. No forage budgeted $11k spent on purchased hay and silage bales for spring.
Calf rearing	538	13,257	19,164	6,011	245	-	1,080	-	40,295	*21,100*	(19,195)	*40,295*	21,100	14	Calves have required more formula due to more replacements kept earlier in the season. Mismatched to stored colostrum. $3.6k overspent in health the rest in CMR
Young & dry stock grazing	5,171	5,171	8,494	5,171	5,171	5,171	5,171	5,171	44,690	*46,448*	1,758	*67,914*	69,672	15	
Fertiliser (incl. N)	(521)	5,046	6,512	5,241	25,284	11,279	-	-	52,842	*44,496*	(8,346)	*74,658*	66,312	16	
Regrassing & cropping	-	-	-	299	6,882	7,663	-	-	14,844	*26,701*	11,857	*33,094*	44,951	17	Seed cost not accounted for yet
Weed and pest	-	-	-	-	1,980	2,397	321	-	4,697	*6,400*	1,703	*6,897*	8,600	18	
Planting	-	-	585	-	-	617	-	-	1,202	*8,200*	6,998	*3,202*	10,200	19	Delayed expenditure for the year
Effluent spreading	6,667	-	2,045	364	847	3,309	-	-	13,232	*3,000*	(10,232)	*14,232*	4,000	20	Unbudgeted. Effluent spreading required due to rainfall and pond levels. AgFirst effluent specialist $1.8k
Vehicles - Fuel and R&M	2,593	846	682	911	716	5,055	2,487	739	14,030	*10,800*	(3,230)	*19,430*	16,200	21	Windowscreeen and puncture repairs to side by side.
R&M (land,buildings, plant, machinery)	40,504	4,327	5,837	3,500	1,518	4,105	5,030	218	65,038	*71,500*	6,463	*74,238*	80,700	22	Yard entrance and races completed $32k vs $30k budget. Water $4.2k to relocate water line from under the shed due to leaks - unbudgeted.
Freight and general farm expenses	4,591	3,879	5,088	4,554	5,583	4,565	2,153	4,777	35,190	*34,820*	(370)	*51,730*	51,360	23	Freight, cartage, water, uniform all over budget
Administration	2,151	1,334	2,348	1,394	1,421	1,394	1,444	1,365	12,850	*13,858*	1,008	*18,346*	19,354	24	
Rates, Insurance, ACC	-	18,056	1,457	1,457	1,457	1,457	1,457	1,457	26,800	*23,996*	(2,804)	*39,300*	36,496	25	
CASH Farm Working Expenses	**103,941**	**106,099**	**97,839**	**78,176**	**105,437**	**95,383**	**62,503**	**53,630**	**703,009**	***648,216***	**(54,793)**	***913,325***	**853,482**	26	
Surplus before Finance charges	61,629	(540)	(168,492)	(39,849)	(98,095)	(34,564)	(39,880)	(30,950)	**(350,742)**	*(451,592)*	(100,850)	*(506,295)*	**(699,913)**	27	
Lease Land on Milking Platform	4,485	4,485	4,485	4,485	4,485	4,485	4,485	4,485	35,878	*41,008*	5,130	*56,382*	61,512	28	
Interest - Farm Loan	15,440	18,435	18,457	17,883	17,883	17,883	17,883	17,883	141,746	*95,032*	(46,714)	*209,746*	118,564	29	Interest has been charged on 90 day bill rate and adjusted for farm land area changes.
Depreciation	8,496	8,784	8,752	8,475	8,259	7,852	7,732	7,732	66,083	*61,160*	(4,923)	*96,663*	91,740	30	Depreciation estimate for Jan
Total Financial Charges	28,421	31,704	31,693	30,843	30,627	30,219	30,100	30,100	**243,707**	*197,200*	(46,507)	*362,791*	**271,816**	31	
Principal	-	-	-	-	-	-	-	-	-	-	-	*100,000*	180,000	32	
Capital Expenditure	8,070	-	-	-	3,544	87	1,200	-	12,900	*17,000*	4,100	*50,400*	17,000	33	2 new farmbikes in June.Budget includes tractor trailer ($17.5k), side by side replacement ($10k) and calf trailer ($10k)
Surplus After Finance charges, Principal and CAPEX	98,120	31,164	(136,799)	(9,006)	(63,925)	(4,258)	(8,580)	(850)	**(94,135)**	*(237,392)*	(143,257)	*6,896*	**(231,097)**	34	

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