



Providing knowledge

St Peter's School/Lincoln University
Demonstration Dairy Farm



ST PETER'S • CAMBRIDGE
NEW ZEALAND



Lincoln University
Te Whare Wānaka o Aoraki
AOTEAROA • NEW ZEALAND

New Zealand's specialist land-based university

Farm Focus Day

Wednesday, 22 May 2019

PROVIDING KNOWLEDGE

Season Update

More milk from fewer cows, less homegrown feed in Autumn and the same bought in feed

Financial Forecast

Profit impact of cost changes, dry weather effects and paying off principal

Reproduction Review

Higher in-calf rate, lower not-in-calf rate and then Neospora

Research Snapshot

DairyNZ's animal model and research in the fertility BV



Balance



OWL FARM STRATEGY



St Peter's School/Lincoln University
Demonstration Dairy Farm

1. Vision

a. Dairy Farm

- To apply proven research, utilising good on farm practice and scientific monitoring for the farm to become an exemplar in dairy production, financial, environmental and people performance, while maintaining the highest standards of health and safety.

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.
- Optimise profit through identifying the appropriate dairy production system for Owl Farm.
- Achieving a farm 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.

3. Farm Development Stages

a. Stage 1 Objective (2015/16 – 2017/18)

Establish credibility by addressing current issues and performance, whilst setting up the farm for future development. During this stage, the farm will operate a pasture based system, with tactical supplementation strategies, based largely on existing infrastructure, to optimise profit while developing a resilient farm system.

b. Stage 2 Objective (2018/19 – onwards)

Testing and investigating in conjunction with partners, innovative strategies to lead sustainable profit. The farm system will be developed over years 1-3 and reflect demonstration requirements of industry that are relevant and appropriate at that time point.



NOTES





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HEALTH AND SAFETY



Welcome to Owl Farm. We are a fully operational, commercial dairy farm with a number of potential hazards to both visitors and staff. Many of these potential 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
- Other vehicle 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

- Louise Cook – Demonstration Manager 027 808 5777
- Tom Buckley – Farm Manager 021 058 4916

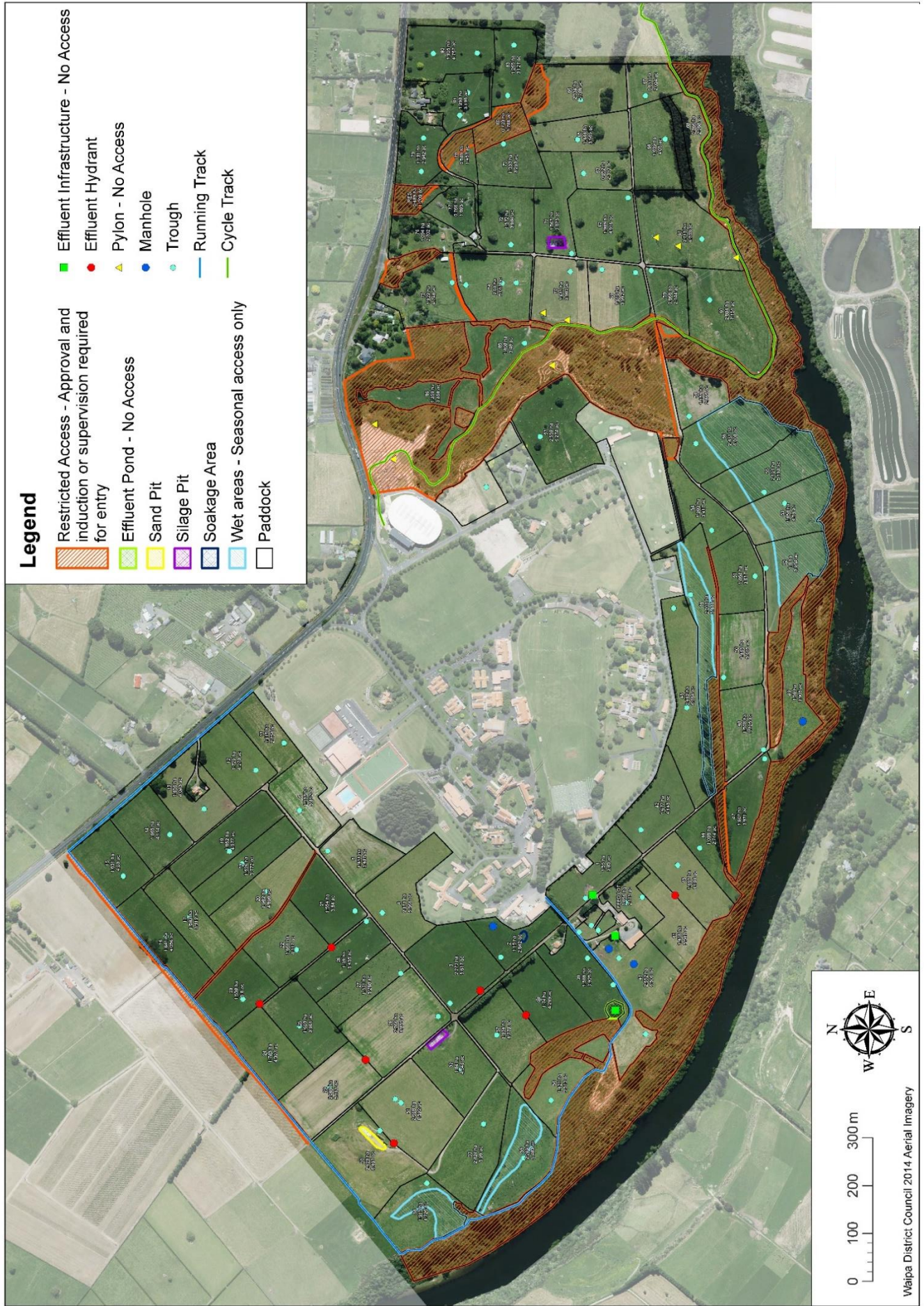
Safety Equipment Location

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

By entering Owl Farm and signing in at registration, you are acknowledging 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.

NOTES



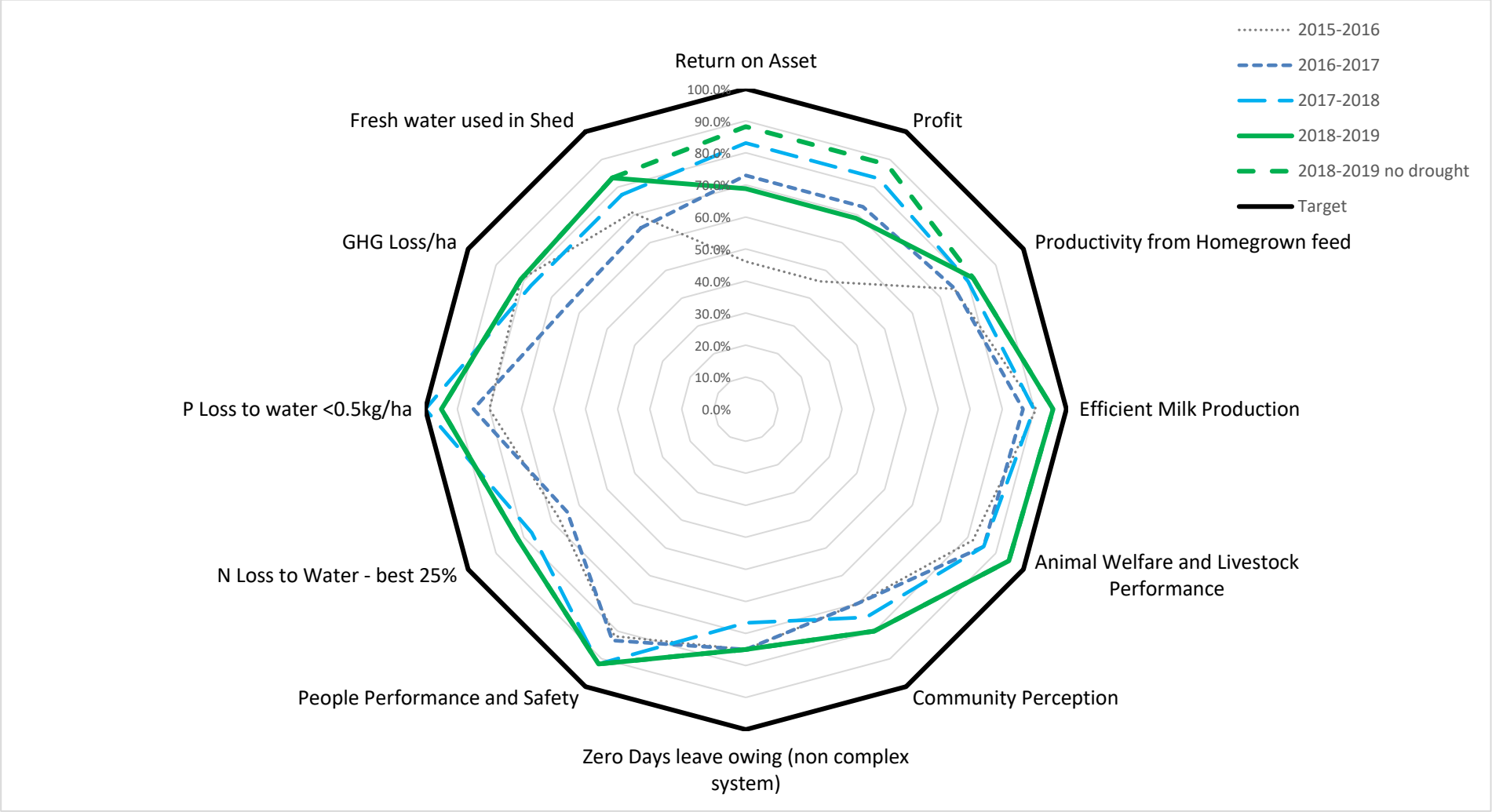


OWL FARM MULTI-YEAR SNAPSHOT

Year		2015-2016	2016-2017	2017-18	2018-19 F/cast
Physical Info	Total Farm Area	177	164	164	164
	Effective Area (ha)	157	146	148	147.3
	Effective area Leased (ha)	23	18	18	18
	Leased Run off (ha)	3	7	5	3
	Cows Wintered	470	453	441	419
	Peak Cows (1 Nov)	445	423	418	406
	Peak Stocking Rate Cows/ha	2.83	2.90	2.82	2.76
Production	Total kgMS	176,197	178,294	168,169	169,359
	MS/cow	396	421	402	417
	MS/ha	1,122	1,221	1,136	1,150
	MS/ha from homegrown feed	879	952	978	1,013
	MS AS % lwt	85.2%	90.6%	86.5%	89.7%
	Ave SCC	112,000	125,000	146,000	172,000
Feed and Inputs	Feed Grown TDM/ha	15.9	15.1	17.5	15.2
	Feed Harvested TDM/Ha (actual kgs)	11.9	12.5	13.1	11.8
	Feed harv TDM/ha (@11.0MJME/kgDM)	12.4	12.8	13.7	13.1
	Supplements Imported TDM/Ha	4.3	3.6	2.3	2.2
	Supplements Imported TDM	671	523	335	328
	% diet imported	21%	19%	11%	13%
	% of farm cropped & harvested (silages)	21%	35%	33%	85%
	Nitrogen Applied/effective ha	149kg	163kg	150kg	132kg
Financials	Gross Farm Rev/kgMS (inc stock/dividend)	\$4.78	\$7.00	\$7.56	\$6.86
	Cash Farmgate milk price /kgMS (dairybase)	\$3.46	\$5.52	\$6.39	\$6.43
	Accrued Farmgate milk price /kgMS	\$3.90	\$6.12	\$6.66	\$6.43
	Stock Sales /kgMS	\$0.48	\$0.43	\$0.54	\$0.43
	Dividend /kgMS	\$0.41	\$0.44	\$0.36	\$0.00
	FWE/kgMS	\$4.95	\$4.12	\$4.28	\$4.58
	OPEX/kgMS(inc depn & feed inv)	\$5.03	\$4.81	\$4.59	\$4.89
	EFS/ha actual payouts (cash milk rev) Dairybase	\$-723	\$1,925	\$3,096	
	EFS/ha actual payouts (accrued milk rev)	\$126	\$2,742	\$3,446	\$2,267
	EFS/ha @ \$6.00 farmgate milk price (no div)	\$1,189	\$1,807	\$2,102	\$1,771
	Opening Debt/kgMS held	\$20.00	\$23.02	\$21.23	\$21.00
Enviro	est Nitrogen loss kg/ha	44	40	41	35
	est P loss kg/ha	1.2	1.2	1.1	1.0
	GHG loss/ha Overseer FM kgCO ₂ e/ha	13,200	11,700	12,600	11,900
	Biological GHG/ha (meth + Nitrous)	10,960	9,744	10,340	9,824
	N conversion Efficiency		33%	39%	39%
Statistics	Cowshed	36 Rot	36 Rot	36 Rot	36 Rot
	Feed infrastructure	NIL	NIL	NIL	NIL
	Herd Figures	BW 162/189 PW	BW 107/128 PW	BW 112/135 PW	BW 119/153 PW
	Industry BW/PW	BW 110/122 PW	BW 64/73 PW	BW 72/93 PW	BW 64/73 PW
	Effluent Storage	Clay lined pond	Clay lined pond	Clay lined pond	New lined pond
	% farm effluent applied to	44Ha 29%	51Ha 35 %	51Ha 34%	51Ha 34%
	Soils are a mix of Clays and Sands, on largely flat terraced contour				
	Operational regrassing via crop and regrassing ~ 15% per year				
	NOTES 3 permanent staff members are employed - with no relief staff required to cover time off or calf rearing duties.				

OWL FARM SEASON PERFORMANCE ON OUR SCORECARD

Our wagon wheel works best when we have a round wheel. This year we have taken out some of the angles and made real progress in some areas. But we know there is more to work on. The closer to the black line we get, the closer we are to our goals. This tool allows us to evaluate performance in all the areas that are importance to us. With each item creating tension on the others on the wheel to keep our performance improvements balanced.



SEASON TO DATE

	Year to date 31/05/19	2015-2016	2016-2017	2017-2018	2018-2019	Notes
Stock	Milking Platform	157	146	148	147	
	Peak cows	445	423	418	406	
	Peak stocking rate	2.83	2.90	2.82	2.76	1
Production	Total kgMS Season to date to factory	176,141	177,744	168,169	169,351	2
	MS/cow Season to date	396	420	402	417	
	MS/ha Season to date	1,122	1,217	1,136	1,150	
	MS/ha from homegrown feed to date	894	944	1003	1014	3
Feed and Inputs	Pasture Cover at 20 March	2,905	2,272	2,370	2,380	
	Pasture growth rates total TDM/ha theoretical total grass on a hectare based on average growth rates	15.9	15.1	17.4	15.2	
	Pasture grown ave all ha TDM/ha accounts for areas in crop/during regrassing and not growing grass	13.8	13.0	15.8	14.4	
	Reduction in APC TDM/ha 16-17 only (mined cover from 2900 to 1900 pre-balance date)	0.0	1.0	0.0	0.0	
	Total pasture supply TDM/ha	13.8	14.0	15.8	14.4	4
	Yield of Crop grown per total farm /ha	1.0	1.4	0.8	0.9	
	Prior year home silage on hand fed spring/ha	0.0	0.1	0.3	0.8	
	Imported Supplements fed/ha	4.3	3.6	2.3	2.2	
	Total Feed supply TDM/ha	19.1	19.1	19.2	18.3	5
	Homegrown grass eaten TDM/Ha (grown this year)	10.8	9.7	11.4	10.1	
	Home silage grown & fed this year /ha	0.0	0.4	0.5	1.0	
	Crop eaten per total farm/ha	0.9	1.2	0.7	0.8	
	Reduction in APC TDM/ha	0.0	0.8	0.0	0.0	
	Total Homegrown feed eaten TDM/ha	11.7	12.1	12.6	11.8	6
	Feed Harvested TDM/ha (11.0MJME/kgDM)	12.5	12.7	13.9	13.4	7
	Prior year home silage on hand eaten/ha	0.0	0.1	0.3	0.6	
	Imported Supplements Eaten TDM/ha	3.0	2.5	1.7	1.7	
	Total Feed eaten this year TDM/ha	14.7	14.7	14.5	14.1	8
	% Feed eaten grown on farm	80%	83%	88%	88%	9
	Feed conversion Eff (kgDM/kgMS eaten)	13.1	12.1	12.8	12.3	10
	Nitrogen Applied/effective ha	122	142	139	125	11
Inventory feed T DM	Homegrown silage/hay	26	40	115	60	
	Crops available (estimate yield remaining)	0	0	0	0	
	PKE in budget for rest of year	0	0	0	25	
	Bought silage hay	62	49	34	55	
	Maize silage	227	17	0	0	
	Total TDM supplements on hand (/cow)	315 (0.71T/cow)	106 (0.25T/cow)	149 (0.35T/cow)	140 (0.34T/cow)	12

Owl Farm Numbers – Seasonal Update

“DONE”

Stocking Rate

1. We currently have 423 cows on farm, meaning we will have a comparable stocking rate again in the coming season.

Milk Matters

2. An aggressive early season approach saw more milk in the vat and more silage on hand. Despite autumn depression in the growth rates we sent more milk to the factory from fewer cows milked during the season, one of our most pleasing statistics this year. We're also proud of 417kgMS/cow from what was a tough Autumn.
3. With 88% of feed used this year coming from the farm, we have seen 1014kgMS/ha produced from homegrown feed our highest figure yet.

Summary of the pantry this year

4. Total pasture supply to date is lower than last year by 1.4TDM/ha (8.8% less feed). Principally this is due to less pasture grown from February – April, a whopping 2TDM/ha variance to last year in Summer/Autumn growth rates.
5. Total feed supply to date is lower than last year by only 0.9TDM/ha (4.6%) with more homegrown silage on hand this winter than last to eat, slightly higher crop yields and about the same imported feed.
6. The aggressive spring and high silage harvest means we have eaten/harvested a higher proportion of the feed we have grown this year = higher utilisation in effect, so our homegrown feed eaten is only 0.7TDM/ha (5.6%) lower than last year.
7. This figure reflects the standard dry matter/ha harvested comparable to Dairybase and industry benchmarks where the grass is converted to being 11.0MJME/kgDM/ha, meaning more tonnes of feed at lower quality are needed.
8. With all things considered similar imported supplement volumes and an efficiency improvement in harvesting the smaller amount of homegrown feed we see only a 2.6% decrease or 0.4TDM/ha reduction in total feed eaten this year.
9. 88% of this year's feed was homegrown, no change from last year, however a normal autumn would have seen approximately 2% more of our feed supply be homegrown.
10. All up this means we have achieved more milk/ha from a smaller total feed supply and a 4% increase in the efficiency of converting feed to milk.
11. Very high December growth saw us withhold our pre-summer Nitrogen as we had three cuts of silage made and were trying to control and manage our feed quality into summer. Clovers were highly active, and growth rates averaging nearly 80kgDM/day show that pasture was growing well enough without Nitrogen.

We looked at a window post autumn rains in our planning cycle and identified a window for some nitrogen for part of the farm to stimulate early autumn growth. This window never appeared this year as the autumn rains fell nearer the end than the middle of Autumn.

This meant that a large chunk of Nitrogen was skipped from our annual application, as there was no economic benefit from the use of it, so for the year we have used less Nitrogen than previous years.

12. We have approximately the same amount of supplement on hand this winter as we did last year, though some more of that is PKE than our preferred store of silages.

Ultimately this means we have to be more judicious with our winter supplement use, and need to ensure the strategies and levers we use to manage our winter pasture cover are very careful. Primarily this means ensuring we hold our long rotation to protect cover.

Having higher body condition score than last year at the same time means we have less work to do over winter, this will further enable us to spread our feed resources and ensure we're set up for spring.

FINANCIAL PERFORMANCE

CURRENT YEAR FINANCIALS – BUDGET CASHFLOW

Owl Farm - For Year Ended: May 2019



St Peter's School/Lincoln University
Demonstration Dairy Farm

INCOME	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Total	Budget YTD	Variance YTD	Budget Full Year	2017-2018 Full Year	Variance Full Year
Milk Solids KG	-	6,216	21,391	24,460	24,906	22,042	19,744	18,745	14,730	11,944	-	-	164,178	161,815	2,363	174,570	168,169	6,401
Milk	-	29,043	98,998	106,355	102,412	90,719	63,545	106,981	115,970	85,947	-	-	799,969	846,904	(46,935)	1,171,127	1,140,532	30,596
Dividends	-	5,364	-	-	-	-	1,356	-	-	-	-	-	6,720	9,300	(2,580)	46,500	54,932	(8,432)
Cattle	-	12,959	4,193	1,377	3,471	861	(97,119)	(26)	3,863	40,128	-	-	(30,293)	50,435	(80,728)	69,335	91,601	(22,266)
Other Income	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,070	(5,070)
Total Income	-	47,366	103,191	107,732	105,883	91,580	(32,218)	106,955	119,833	126,075	-	-	776,396	906,639	(130,243)	1,286,962	1,292,135	(5,172)
EXPENSES	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Total	Budget YTD	Variance YTD	Budget Full Year	2017-2018 Full Year	Variance Full Year
Wages	12,856	13,070	13,187	21,439	13,167	14,572	19,570	13,523	13,794	20,669	-	-	155,847	133,102	22,745	159,002	148,858	10,144
Animal Health	3,079	12,092	3,988	4,251	2,709	3,373	3,052	5,155	3,234	7,132	-	-	48,063	30,840	17,223	55,199	49,604	5,595
Breeding	554	742	196	5,193	8,401	11,820	4,899	3,174	2,705	1,079	-	-	38,765	35,226	3,539	39,265	38,692	573
Dairy Shed and Electricity	215	2,169	2,925	2,377	1,637	1,489	1,329	3,299	1,491	1,503	-	-	18,433	21,550	(3,117)	24,805	21,896	2,909
Purchased Feed	16,794	697	8,294	7,653	8,454	6,893	5,263	14,649	9,274	12,736	-	-	90,707	93,703	(2,996)	108,543	89,836	18,707
Grazing - Replacement Heifers & Calves	3,805	3,766	4,056	3,933	3,872	4,101	6,113	6,663	6,016	7,015	-	-	49,340	52,520	(3,181)	63,792	62,768	1,024
Fertiliser	-	9,605	7,450	3,266	22,524	20,769	6,544	-	-	-	-	-	70,157	78,224	(8,067)	87,304	70,143	17,161
Gibberellic Acid	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fertiliser Spreading	-	-	-	3,376	3,709	(1,101)	-	-	-	-	-	-	5,984	6,112	(128)	6,112	3,834	2,278
Freight	-	-	155	-	-	60	610	-	-	-	-	-	825	2,180	(1,355)	4,424	3,910	514
Cartage	-	555	350	2,095	2,679	760	360	575	200	-	-	-	7,574	8,374	(801)	9,274	7,848	1,426
Weeds and Pests	-	-	20	-	122	-	-	-	-	-	-	-	142	3,806	(3,664)	5,056	956	4,100
Consultancy	-	-	-	417	-	-	-	600	56	-	-	-	1,073	235	838	470	608	(138)
Silage	-	85	-	9,648	11,573	3,272	8,183	9,554	1,330	-	-	-	43,645	18,000	25,645	18,000	30,650	(12,650)
Cropping	-	-	-	1,252	7,639	1,856	380	-	-	1,496	-	-	12,623	29,705	(17,082)	29,705	17,137	12,568
Regrassing	-	-	-	800	1,316	721	-	-	227	10,677	-	-	13,741	21,899	(8,159)	21,899	31,541	(9,642)
R&M	3,511	7,200	2,028	804	1,452	3,241	4,067	3,829	4,495	3,099	-	-	33,726	43,535	(9,808)	47,649	47,210	439
Vehicle Expenses	1,166	1,284	1,156	2,217	2,756	988	1,594	466	400	774	-	-	12,801	15,922	(3,121)	18,469	12,704	5,765
General	1,332	1,801	1,864	2,160	1,867	1,602	2,142	(4,774)	4,647	1,525	-	-	14,166	18,305	(4,139)	20,521	22,475	(1,954)
Overheads	1,719	1,719	1,719	6,628	3,168	6,844	3,168	3,168	5,395	1,719	-	-	35,247	34,777	470	41,890	43,055	(1,165)
Total Farm Working Expenses	45,030	54,784	47,388	77,508	97,045	81,259	67,274	59,881	53,264	69,423	-	-	652,858	648,016	4,842	761,379	703,725	57,654
Net Surplus before Financial Charges	(45,030)	(7,418)	55,803	30,224	8,838	10,320	(99,492)	47,074	66,569	56,652	-	-	123,538	258,623	(135,086)	525,583	567,893	(62,826)
Financial Charges	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Total	Budget YTD	Variance YTD	Budget Full Year	2017-2018 Full Year	Variance Full Year
Interest Cost	14,106	14,106	14,106	14,106	14,106	14,106	14,106	14,106	14,106	14,106	-	-	141,060	155,844	(14,784)	186,162	183,378	2,784
Lease Land	2,882	2,911	2,911	2,911	4,619	4,619	4,619	4,619	4,619	4,619	-	-	39,327	29,270	10,057	35,124	34,964	160
Total Financial Charges	16,988	17,017	17,017	17,017	18,725	18,725	18,725	18,725	18,725	18,725	-	-	180,387	185,114	-4,727	221,286	218,342	2,944
Surplus (Deficit) after Financial Charges	(62,019)	(24,435)	38,786	13,207	(9,887)	(8,405)	(118,217)	28,350	47,844	37,927	-	-	(56,850)	73,509	(130,359)	304,297	349,551	(45,254)

NOTES



Compare your figures to ours in the table below. This shows our current season cost /ha /cow and /kgMS plus our three prior years /kgMS for reference as assessed to the end of May.



St Peter's School/Lincoln University
Demonstration Dairy Farm

FARM WORKING EXPENDITURE COMPARISON – TO END MAY								
Measure - To 31/05/2019	Total	/ha	/cow	\$/kgMS 2019	\$/kgMS 2018	\$/kgMS 2017	\$/kgMS 2016	Your figures
Total volume	Total	147	406	169,327	168,169	178,294	176,197	
Milksolids KG	169,327	1,152	417					
Total Labour Costs	163,153	1,110	402	0.96	0.89	0.94	1.15	
Animal Health	46,427	316	114	0.27	0.28	0.37	0.25	
Calf Rearing	3,136	21	8	0.02	0.01	0.00	0.02	
Breeding	41,537	283	102	0.25	0.23	0.25	0.16	
PKE	77,568	528	191	0.46	0.35	0.25	0.61	
Grass Silage Harvested	42,466	289	105	0.25	0.18	0.16	0.08	
Purchased silage	26,127	178	64	0.15	0.14	0.15	0.79	
Feed Inventory Adjustment	0	0	0	0.00	-0.06	0.40	-0.40	
Cropping	12,623	86	31	0.07	0.10	0.15	0.06	
Feed Sampling	0	0	0	0.00	0.01	0.00	0.00	
Calf Meal	10,663	73	26	0.06	0.03	0.03	0.02	
Fertiliser Spreading	7,480	51	18	0.04	0.02	0.02	0.11	
Fertiliser - Maintenance	50,818	346	125	0.30	0.17	0.19	0.23	
Fertiliser - Nitrogen	43,733	298	108	0.26	0.24	0.26	0.21	
Freight	8,855	60	22	0.05	0.05	0.06	0.02	
Re-grassing	16,961	115	42	0.10	0.19	0.20	0.25	
Heifer grazing costs	64,230	437	158	0.38	0.40	0.40	0.46	
Shed Expenses	8,310	57	20	0.05	0.05	0.10	0.07	
Electricity	13,125	89	32	0.08	0.08	0.08	0.07	
Water Charge	13,928	95	34	0.08	0.09	0.08	0.08	
R & M - Land & Buildings	20,530	140	51	0.12	0.17	0.13	0.12	
R & M - Plant & Equipment	24,497	167	60	0.14	0.09	0.07	0.06	
Vehicle Maintenance	7,983	54	20	0.05	0.05	0.05	0.05	
Petrol/Diesel	8,118	55	20	0.05	0.05	0.05	0.05	
Weed & Pest Control	1,998	14	5	0.01	0.01	0.00	0.01	
Other Expenses	4,226	29	10	0.02	0.04	0.08	0.08	
Rates/ACC/Insurance	41,890	285	103	0.25	0.26	0.23	0.27	
Total Farm Working Expenses	760,381	5,173	1,873	4.49	4.20	4.42	4.65	

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FORECAST SEASON BUDGET AND SENSITIVITY

	2,018	2,019	2020F	VARIANCE
CURRENT MILK PRICE/KGMS	6.66	6.43	6.30	7,313
MILKSOLIDS	168,169	169,327	176,640	7,313
TOTAL MILK	1,120,015	1,088,826	1,105,990	17,164
DIVIDENDS RECEIVED	60,002	0	55,800	55,800
CATTLE SALES	91,535	72,756	68,575	-4,181
TOTAL INCOME	1,271,618	1,180,182	1,230,365	50,183
ANIMAL HEALTH	46,159	46,427	42,181	-4,246
ZINC BOLUSES	0	0	11,000	11,000
BREEDING & HERD TESTING	39,752	41,537	38,403	-3,134
TOTAL COW COSTS	88,417	91,100	94,720	3,620
PKE	58,686	77,568	50,197	-27,371
GRASS SILAGE	30,650	42,466	36,349	-6,117
CALF MEAL	5,839	10,663	10,663	0
RUN-OFF & PURCHASED SILAGE	29,885	43,778	39,955	-3,823
CROPPING	17,137	12,623	14,337	1,714
FEED COSTS TOTAL	143,405	188,306	152,709	-35,597
NITROGEN	41,112	43,733	42,786	-947
MAINTENANCE FERTILISER	25,702	39,888	39,335	-553
CROPPING FERTILISER	3,329	10,930	11,345	415
CARTAGE	7,848	8,855	8,855	0
FERTILISER SPREADING	3,834	7,480	5,984	-1,496
FERTILISER & NITROGEN	81,825	110,886	108,305	-2,581
RE-GRASSING	31,541	16,961	20,549	3,588
HEIFER GRAZING	62,769	60,611	64,500	3,889
SHED EXPENSES	8,185	8,310	10,577	2,267
ELECTRICITY	13,711	13,125	12,400	-725
EFFLUENT	5,169	4,420	3,209	-1,211
R&M - LAND & BUILD	19,588	13,494	18,592	5,098
R&M - PLANT & EQUIP	14,485	24,497	14,000	-10,497
R&M TOTAL	56,031	57,539	51,429	-6,110
VEHICLE AND FUEL	32,880	32,901	36,494	3,593
WEED & PEST CONTROL	956	1,998	2,500	502
TOTAL GENERAL COSTS	118,948	118,907	118,434	-473
OVERHEAD	49,374	46,206	45,112	-1,094
TOTAL FARM WORKING EXPENSES	725,492	796,130	772,789	-23,342
NET SURPLUS BEFORE FINANCIAL CHARGES	546,126	384,051	457,576	73,525
TOTAL FINANCIAL CHARGES	265,957	260,722	260,722	0
TOTAL OPEX (FWE+DEPRECIATION)	778,471	849,109	825,768	-23,342
SURPLUS (DEFICIT) AFTER FINANCIAL CHARGES	280,169	123,329	196,854	73,525
EF\$	505,947	331,072	404,597	73,525
EF\$/HA	3,419	2,237	2,734	497
EF\$/HA AT \$6 NO DIV	2,030	1,630	2,134	504

Sensitivity table below shows payout and production impacts. Higher payout creates opportunity for debt reduction.

Production	Range of farmgate milk price \$/kgMS							
	5.50	5.75	6.00	6.25	6.50	6.75	7.00	7.25
160,000	-39,536	464	40,464	80,464	120,464	160,464	200,464	240,464
170,000	15,464	57,964	100,464	142,964	185,464	227,964	270,464	312,964
176,640	51,984	96,144	140,304	184,464	228,624	272,784	316,944	361,104
180,000	70,464	115,464	160,464	205,464	250,464	295,464	340,464	385,464

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REPRODUCTIVE REVIEW

9% LIFT IN 6WK IN RATE, 5% DROP IN MT RATE

The 2018 mating showed some very large progress in a large number of areas, with almost our highest in-calf rates at any benchmark point than any of the last 4 years. This is even more pleasing off the back of the worst mating results being last year, and a poor calving spread rolling into the 2018 spring mating as a consequence.

Summary data below shows the 3, 6 and 9 week in calf rates for the herd, plus total not in-calf rate.

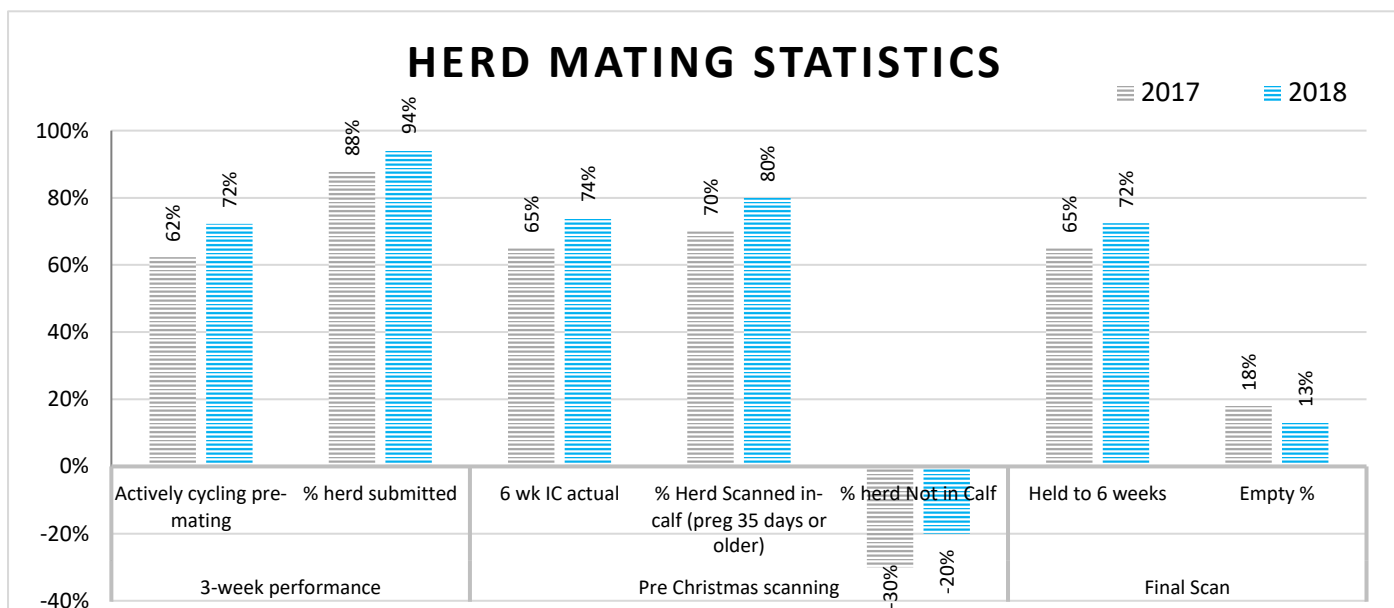
	In-calf rate				Not In-Calf Rate
	3 Weeks	6 Weeks	9 Weeks	9+ Weeks	
Spring 2018	53%	74%	83%	87%	13% 
Spring 2017	43%	65%	77%	82%	18%
Spring 2016	46%	73%	80%	87%	13% 
Spring 2015	50%	75%	83%	89%	11% 

Note – when you calculate your not in-calf rate, you take all the cows scanned empty plus any cows who disappeared between mating start and scanning. This includes deaths, culls for health reasons – unless these cows were confirmed pregnant from a scan.

The progress feels fantastic, but there are still a few things that have room for improvement. We'll keep working on them and see how much more progress we can make. We recovered all of the ground we lost last year, with the principle difference being more focus BCS on the herd and trying to get all cows at their target by the time they calve. Between years there was no change in feed types or volumes in the early spring period, but production was different.

Year	kgMS/cow Pre mating	kgMS/cow after mating	kgMS produced during mating
2018	131	260	129
2017	121	246	125

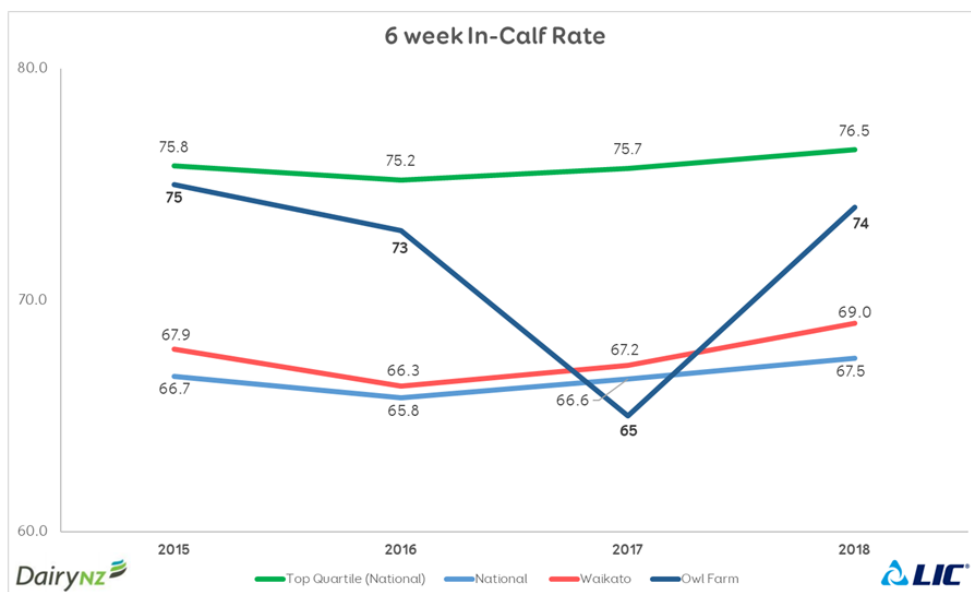
This means that pre-mating cows had produced an extra 10kgMS over the prior year and during mating they produced an additional 4kgMS/cow again, a total of 14kgMS/cow above the previous year. We mention this as there was some conjecture that last year cows didn't get in-calf well due to milking too well. This year they milked even better and reproductive performance also improved.



REGIONAL & NATIONAL COMPARISON

The data below is the interim summary of information collated by LIC regarding the 2018/2019 season. The final data will be released in June head to <https://www.lic.co.nz/tips-and-advice/reproduction/> for more info.

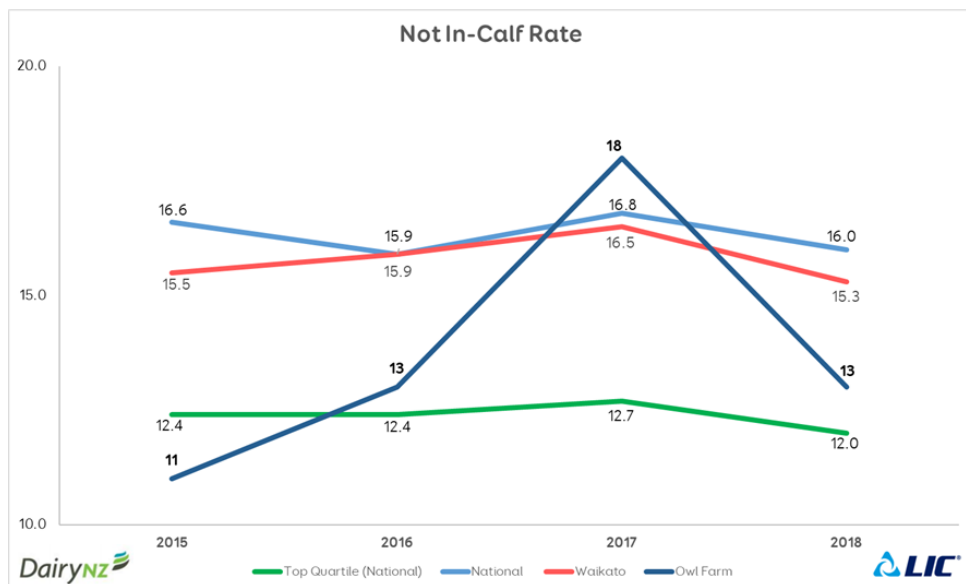
National and regional stats (interim)



There's always room for improvement



National and regional stats (interim)



There's always room for improvement

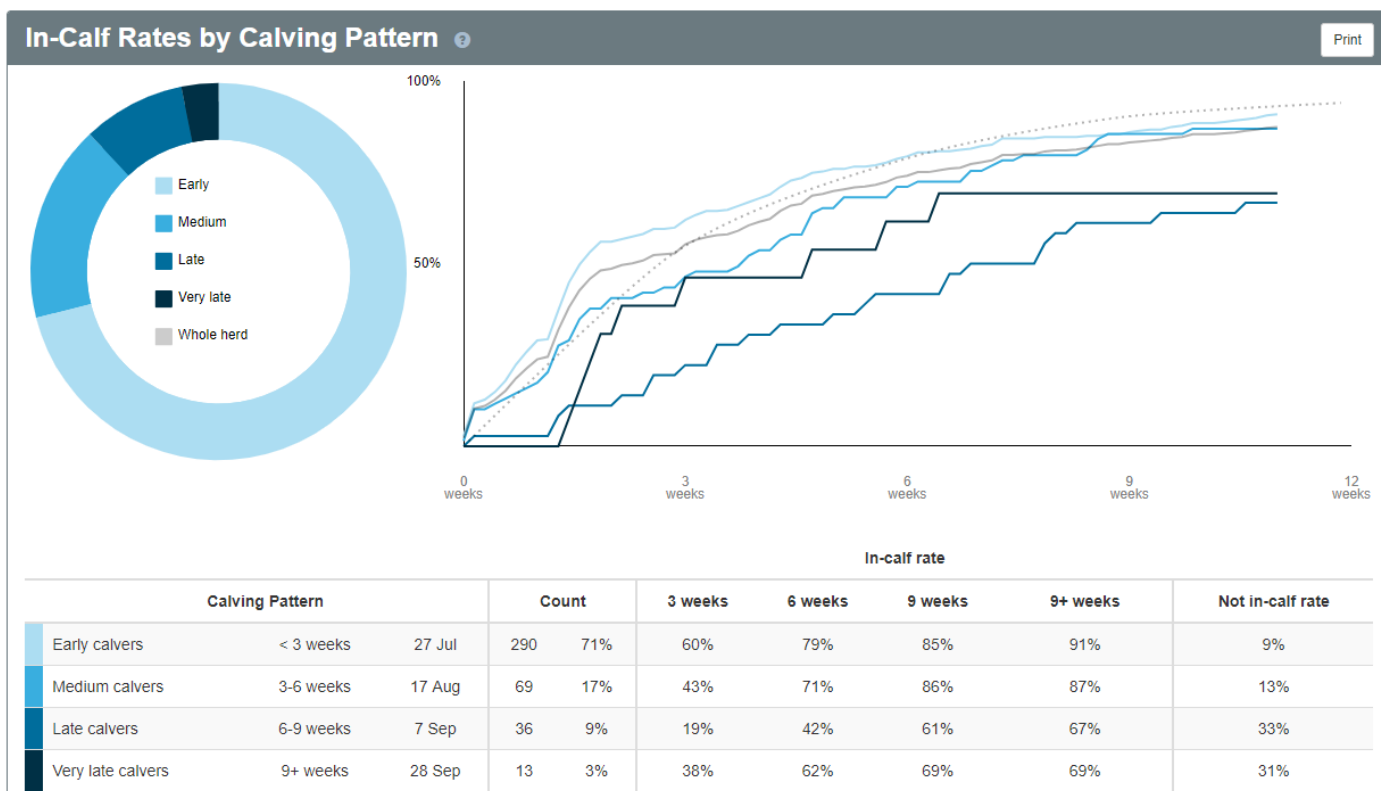
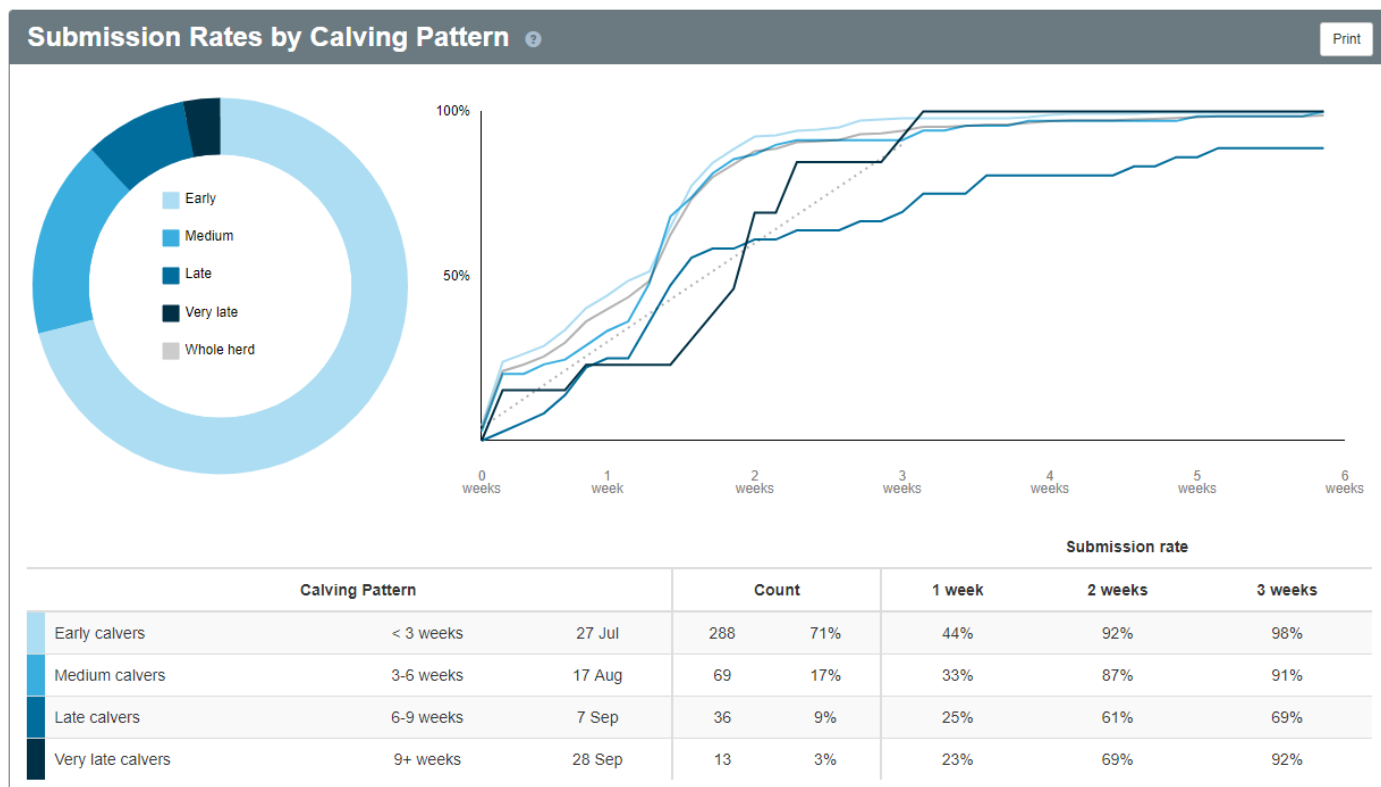


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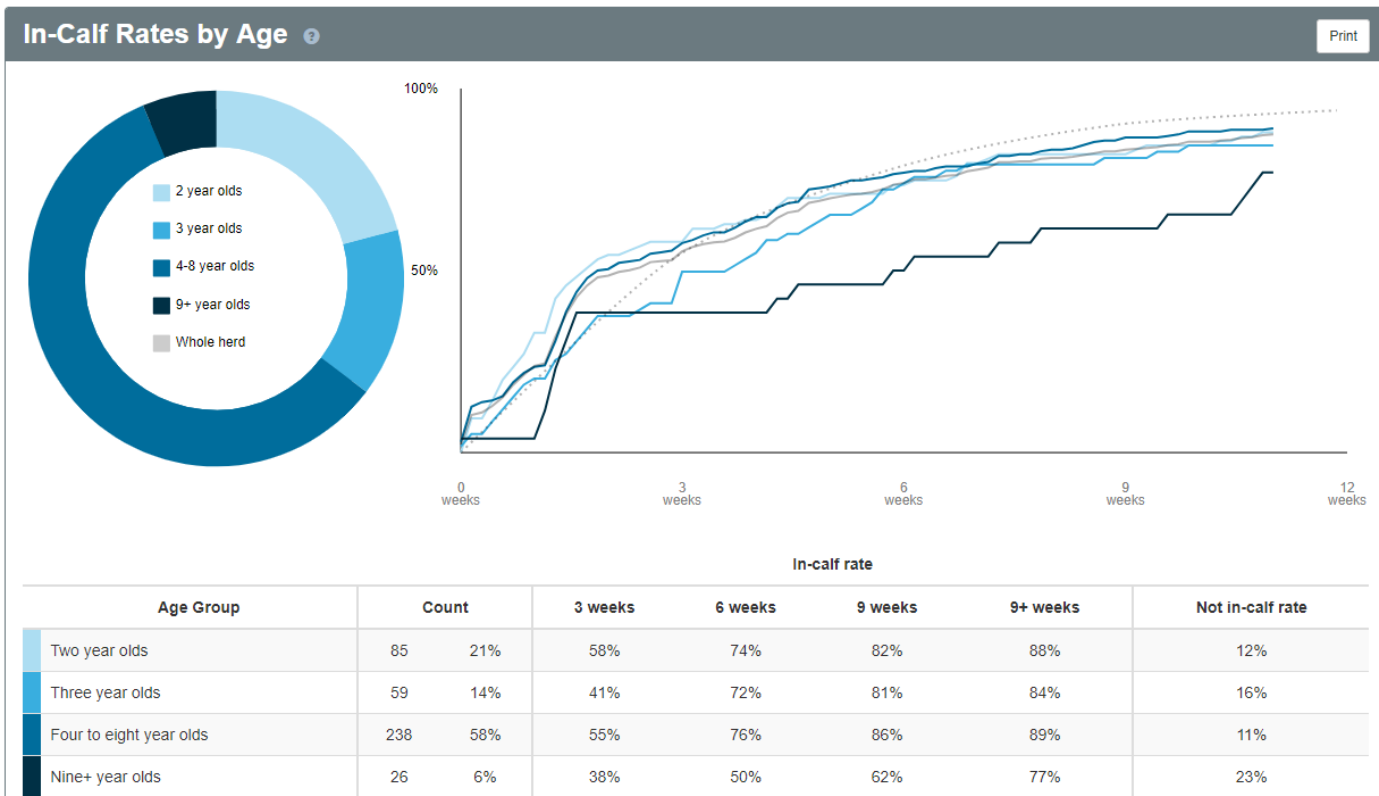
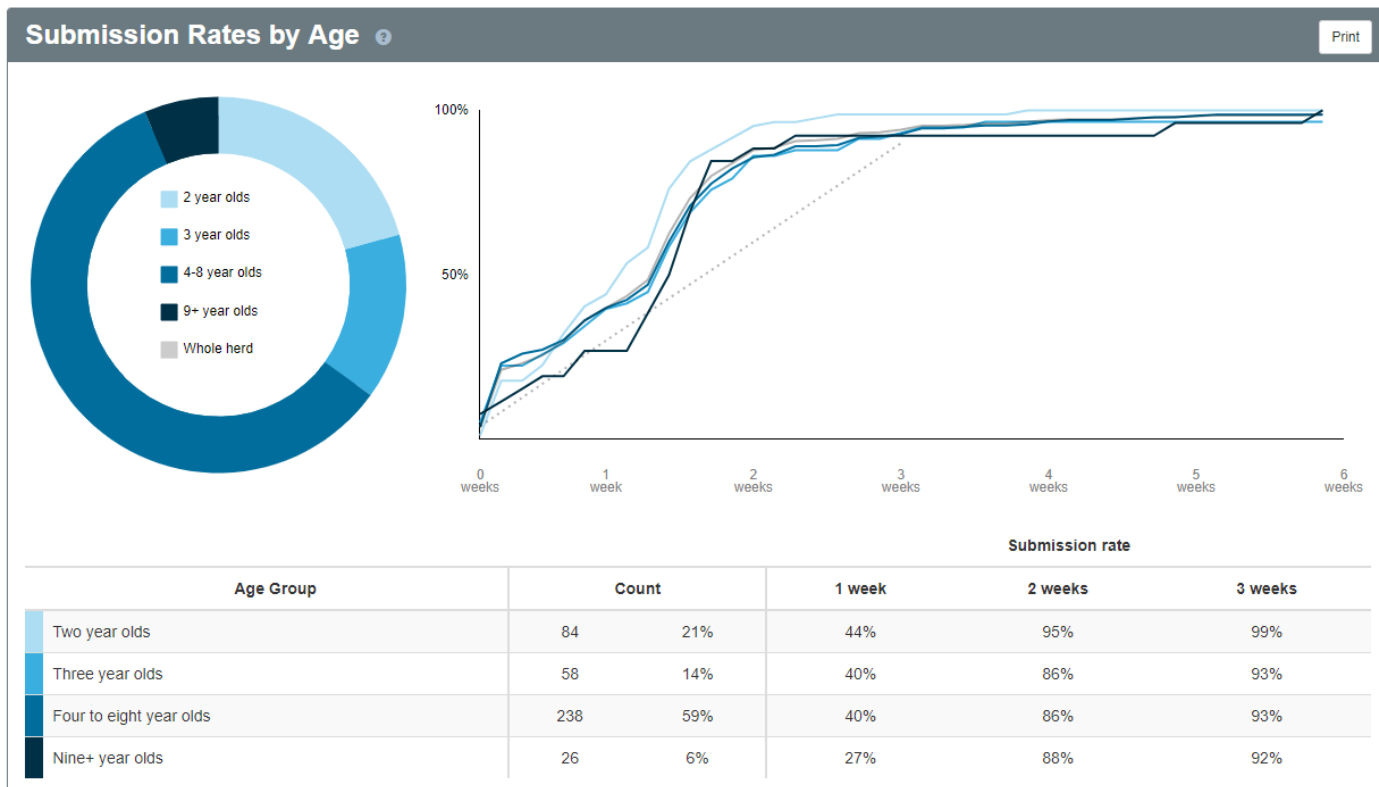
WHO DIDN'T GET IN-CALF?

One area is that the late calving cows – between weeks 6-9 have had a very poor in-calf rate. This may seem intuitive as they had less time to get in calf. However these 36 animals had a far worse early in-calf rate compared to the 13 cows who calved after them. This is evident in the tables and charts below showing submission rates and in-calf rates by calving pattern. We don't know why exactly and we're looking around a little more for a common thread, to see if we can fix it.



NOTES

Also, despite a big effort on BCS, the 3 year olds as a group were the lightest age group at the start of calving. Whilst many of them did gain weight after PSC in the later calving groups and one third had already calved, this group as an age bracket had the worst BCS at calving, particularly when you consider their target was a BCS 5.5 at calving. When we look at the results below these cows also have the worst performance (excluding the 9+ year old cows), with a comparable submission rate, but lower in-calf rate. Similar to the conception rate failure we saw herd-wide last year. 3yr olds must be fatter.



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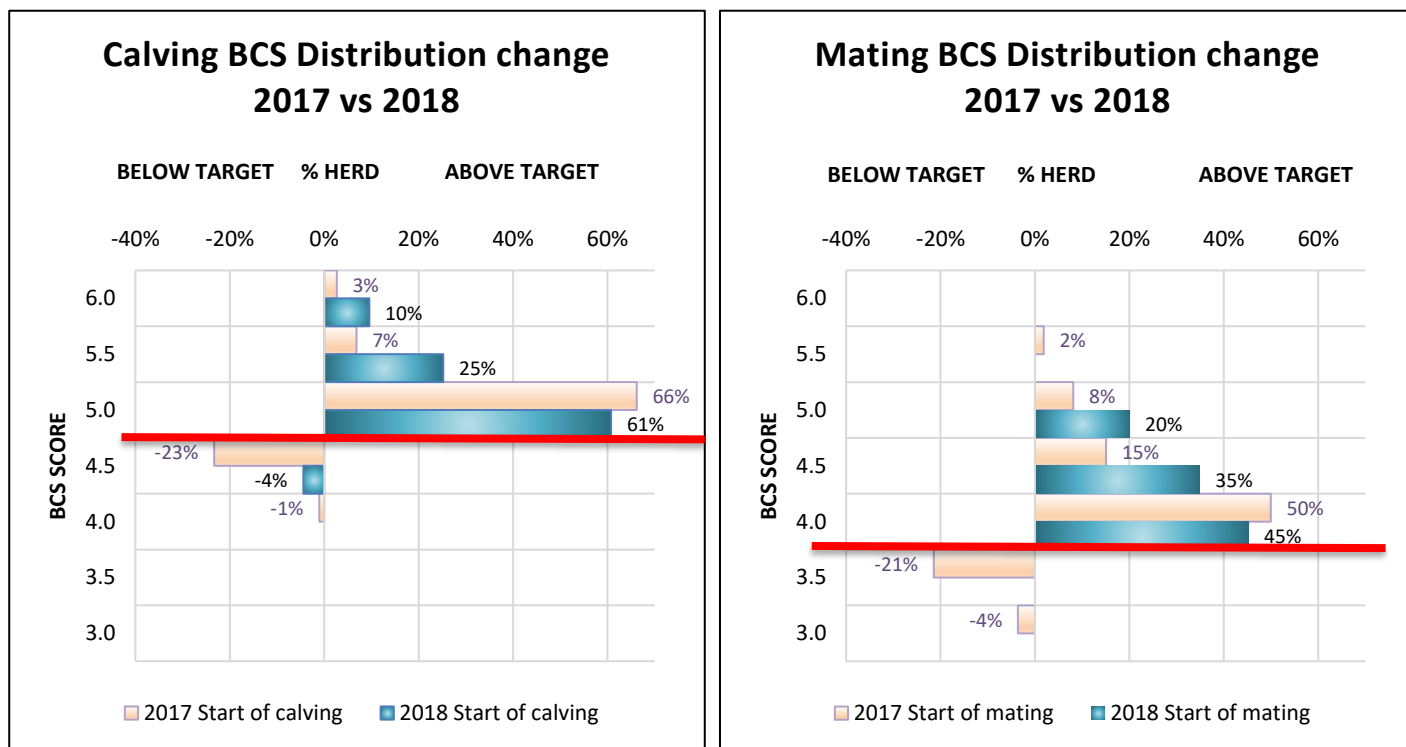
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WHAT WAS DIFFERENT?

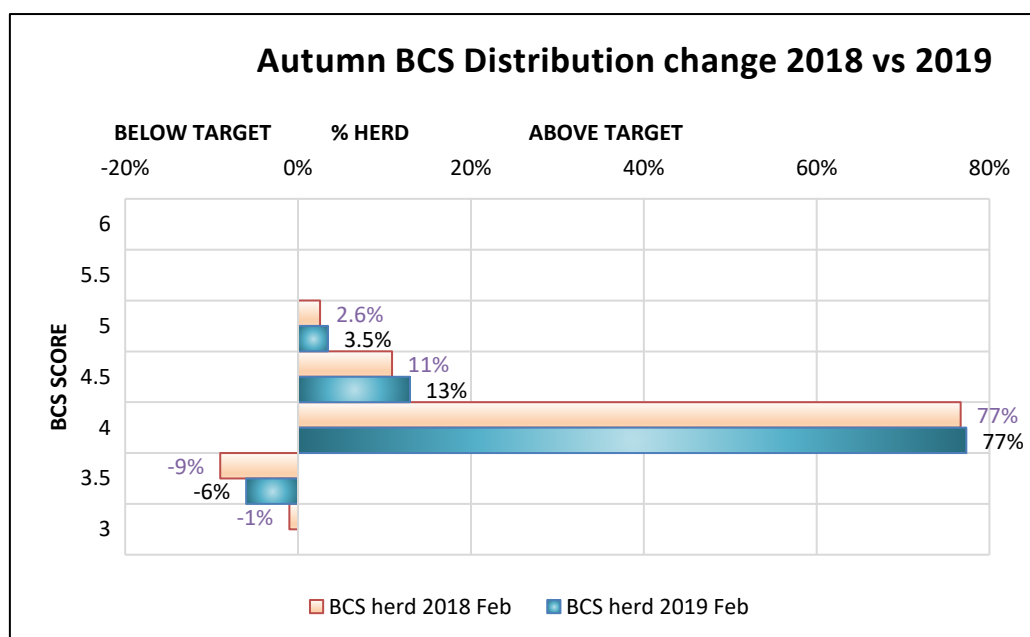
A year ago with disappointing figures we sat down and looked at the data. We had OK submission rates, good heat detection, some challenges with conception rate later in mating but overall low conception rate upfront. Research tells us cow BCS at calving is one risk area, and a herd level it looked like for us, that was causing issues.

We had herd level BCS distribution data from in-paddock scoring, but no data on which cows were or weren't at, below or over target. So for last 12 months we have individual scored monthly so we could track the info. Out of that individual tracking we've changed; how, who and when we act on individual cows based on the monthly BCS info. That has lead to a dramatic shift in herd BCS calving and mating between the last two years – and this year should be slightly better again.



When we looked at BCS in February this year we had a lower range of BCS, meaning there were fewer cows needing dried off as early to hit targets.

The Autumn drought then meant we couldn't create the weight gain we'd like while milking so an earlier dry off happened despite having better BCS.



NOTES

THE FERTILITY GENE RESEARCH

FINDING NEW TRAITS TO IMPROVE COW GENETIC MERIT FOR FERTILITY

Chris Burke, Susanne Meier and Claire Phyn

DairyNZ

Key messages

- Genetic selection for fertility can lead to big improvements in reproductive performance. Cows with a higher Fertility BV have a greater ability to get in-calf during the first 6 weeks of breeding due to their earlier resumption of cycling post-calving and high submission rates. This means they are more likely to calve early in the first 6 weeks of calving.
- Increasing the accuracy of the Fertility BV will accelerate the rate of genetic improvement in fertility. We are working towards this goal by identifying new measurable traits that give a stronger, earlier genetic signal than those currently being used (i.e. 3-week submission rate and re-calving within the first 6 weeks).
- Our results indicate that “age at puberty” is an early predictor trait of subsequent cow fertility that offers an exciting opportunity to improve the Fertility BV. Right now, we are working on confirming that an estimate of puberty will give a stronger genetic signal and will increase the rate of genetic gain in fertility.

Background

Herd reproductive performance is a cornerstone of seasonal-calving, pasture-first dairying systems. The introduction of the Fertility Breeding Value (BV) in the early 2000's has led to incremental improvements in the genetic merit for fertility, but the industry average 6-wk in-calf rate of 66% is still well below the target of 78%.

The “Pillars of New Dairy System” research programme aims to help address this issue by increasing the accuracy of the Fertility BV to accelerate the rate of genetic improvement in fertility. The accuracy can be improved by using new measurable traits that give a stronger genetic signal than those currently being used (i.e. 3-week submission rate and re-calving within the first 6 weeks).

To identify new traits, we worked with partners and farmers to generate a unique research herd of 550 heifers with high (+5) and low (-5) Fertility BV. The study herd were balanced for other traits such as live weight, milk production, and % North American ancestry. We have taken detailed measurements from these heifers to understand biological differences in their fertility as they have progressed through the rearing phase (2015-17) and during their first (2017-18) and second (2018-19) lactations.

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Key findings

A key finding during rearing was the discovery that high Fertility BV heifers reached puberty at an earlier age (+21 days), a lighter live weight (-25 kg), and at a lower % of estimated mature live weight (51% vs. 55%), compared with the low Fertility BV heifers (Figure 1). Their overall reproductive performance as maiden heifers was also superior. The 6-week in-calf rate was 90% vs. 81%, and the final non-pregnancy rate after 14 weeks of natural mating was 2% vs. 6%, respectively.

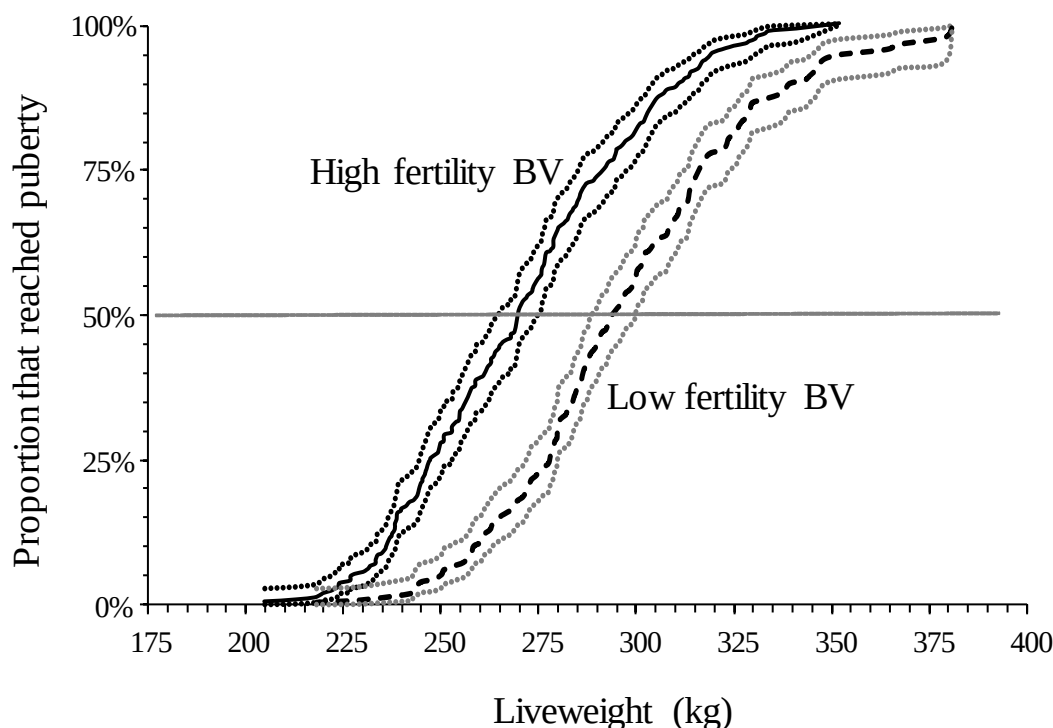


Figure 1. Cows with very high genetic merit for fertility achieve puberty at a lighter live weight than those with very low genetic merit for fertility (adapted from Meier et al., 2017).

The high vs. low Fertility BV herds have recently completed their second mating period as lactating cows. In both lactation 1 and 2, we used reproductive interventions for non-cycling only after 6 weeks of artificial breeding (AB) to enable animals to express their natural phenotype.

Lactation 1 consisted of 481 cows, with 257 high and 224 low Fertility BV animals, respectively. The 6-week in-calf rate was 34% greater in the high compared with the low Fertility BV cows. The key drivers for this difference were substantially greater submission rates and post-calving cycling rates in the high Fertility BV cows. Among these cows, 87% and 95% were submitted for breeding by 3 and 6-weeks of the AB period; a marked contrast to 48% and 56% submitted, respectively, for the low Fertility BV cows. Using milk progesterone profiling, we determined that an astonishing 44% of the low Fertility BV cows had still not resumed normal oestrous cycles by the end of the 6-week AB period. This meant that 42% of low Fertility BV cows were empty at the end of the 12-week mating period.

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Lactation 2 consisted of 325 cows, with 204 high and 121 low Fertility BV animals. The large reduction in cow numbers for the low Fertility BV group and their poor calving pattern (on average, they calved 12 days later than the high Fertility BV group) was a consequence of a high empty rate coupled with a low 6-week in-calf rate in lactation 1. However, even after accounting for the difference in calving pattern, the high Fertility BV cows still had significantly better reproductive performance during lactation 2. Among the high Fertility BV cows, 87% were submitted to AB in the first three-weeks of mating compared with 55% of the low Fertility BV cows. The 6-week in-calf rate was 35% greater in the high compared with the low Fertility BV cows. As with lactation 1, the poor 6-week in-calf rate of the low Fertility BV cows (39%) was largely driven by a poor submission rate (35% fewer animals mated over 6 weeks of AB).

The superior reproductive performance of high Fertility BV animals validates the relevance of the Fertility BV. The major difference between high and low Fertility BV cows was the ability to start cycling, particularly after calving. This points to inherent differences in their underlying reproductive biology that we are currently investigating to determine new fertility traits. With the high and low Fertility BV heifers reaching puberty at a very different age and live weight, we are also planning to conduct a “scale-up” study to estimate puberty and its genetic relationship to subsequent reproductive performance in thousands of cows within commercial herds. The purpose is to assess the value of recording and integrating a puberty trait into the Fertility BV to improve the genetic merit of fertility.

For more information:

The information on the animal model herd can be followed at <https://www.dairynz.co.nz/about-us/research/pillars-of-a-new-dairy-system/achieving-reproductive-targets/animal-model-research-herd>.

Meier, S., B. Fisher, K. Eketone, L. R. McNaughton, P. R. Amer, P. Beatson, J. R. Bryant, K. Dodds, R. Spelman, J. R. Roche, and C. R. Burke. 2017. Calf and heifer development and the onset of puberty in dairy cows with divergent genetic merit for fertility. In 77th Proceedings of the New Zealand Society of Animal Production. 28 - 30 June 2017. New Zealand.

Burke, C., C. Phyn, S. Meier, S-A. Turner, S. Edwards, A. Heiser, and J. Roche. 2018. Solutions to improve fertility and lifetime productivity in dairy herds. Proceedings of the South Island Dairy Event (SIDE). 25-26 June 2018. New Zealand.

Inside Dairy September 2018. Improving cow fertility and lifetime productivity. Page 18.
https://www.dairynz.co.nz/media/5790113/inside_dairy_september_2018_web_v2.pdf

Inside Dairy October 2018. Farmers play a pivotal role in fertility research success. Page 18.
https://www.dairynz.co.nz/media/5790250/inside_dairy_october_2018_web.pdf

NOTES

BODY CONDITION SCORING ALL COWS

Individually scoring all cows since March has had some really important outcomes that we think are worth sharing. In March 2018 at our Focus day when we discussed the autumn plan we said “no cow left behind”: we meant it. Summary: Individual BCS recording is something that we will now do every year. We think 3-4 critical times should be something all farms should do. As a Demonstration farm we will continue to do it monthly for another 6 months at least.

THE PROCESS

Peter Briston from Cambridge Vets is accredited in Body Condition Scoring and came out roughly monthly and scored all cows in the shed. Dries were run through the shed as well as milkers if possible. The first dry-off group were too close to dry off to come through the shed for the April reading. We weren't able to use the shed in June so there is no June score for individuals.

An important point to note is that cows are recorded at the last definitive score they passed. E.g. while we might go to the paddock and assess a cow as “more than 3.5 and less than 4.0”, and we might decide she is closer to a 4 than a 3.5 – we would round her score up and record her as a 4.0. The vet would say (and rightly so), she is not yet a 4, therefore she is recorded as a 3.5. This was difficult for us as it dragged our average down, and possibly skews the true BCS of the herd but it is an accurate reflection of the cows and helps create a risk portfolio for the herd.

THE RESULTS – ABSOLUTELY WORTH IT

Our average BCS has had a much healthier start to the season this year, which has helpfully carried on so far this year leading to no cows below BCS 4 heading into mating, compared to 25% of the herd last year.

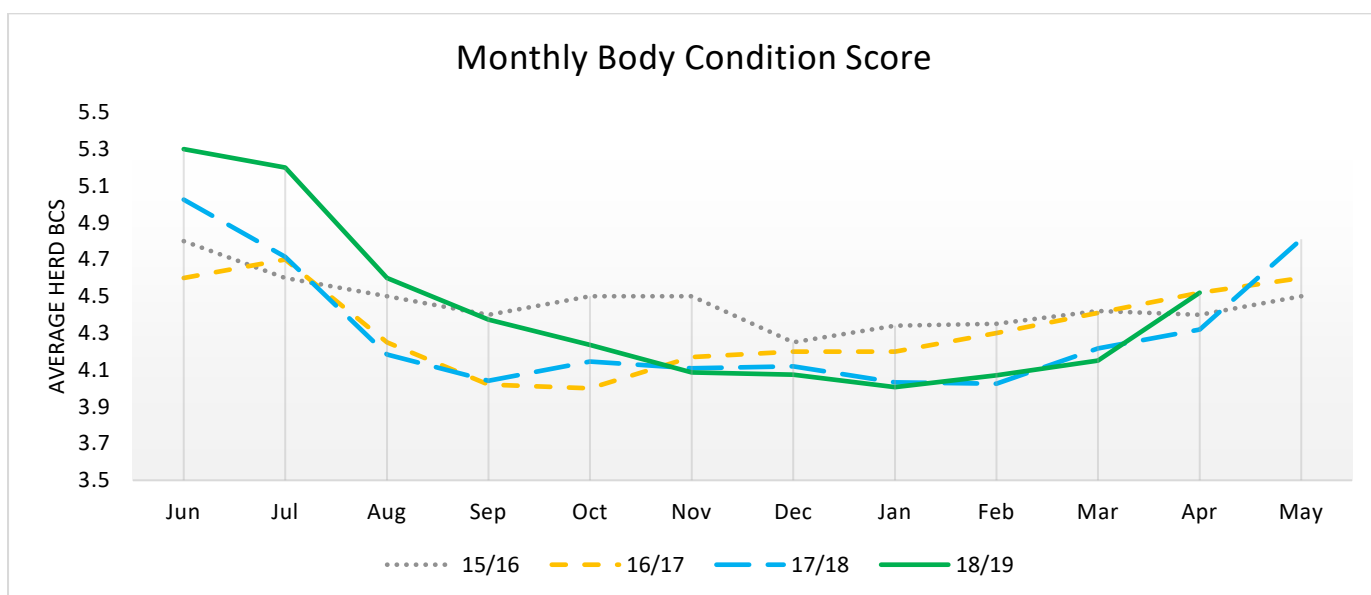
We're now looking at this as a capital investment in BCS that we intend to maintain year-on-year a little like feed Inventory. It's part of how our system works now and needs to be carefully maintained each year.

Individual BCS – benefits

Most importantly it gave us the independent list of individual cows in the herd most at risk – which removes any farmer bias when having to choose WHICH are the cows whose BCS at calving is most under threat.

- Reducing BCS range and the number of at risk cows.
- Historic data for any performance issues a cow has in the season (repro or low prod – we have a BCS reference).
- Ensure all animals are on a trajectory for their BCS target in line with their calving date.
- Impartial decision making about at-risk cows

Average Herd BCS last 4 years from paddock assessment.



NOTES

WINTER MANAGEMENT PLAN

Supplements

We set aside key feed throughout Autumn to ensure that we maintained the appropriate resources to make winter comfortable and sufficient for a profitable spring season.

We have a plan in place for winter that looks at using strict decision rules to manage a challenging time of year.

Spring rotation planner is key

We ensure that we set up and follow our spring rotation planner through calving to control our rotation increase. To really make this hum, our feed budget ensures that our planned supplement and average pasture cover allows the right amount of feed available to optimise cow feeding whilst staying on the planner.

We need 2400kgDM/ha cover at the start of calving so that we can minimise supplementary feed and maximise grass intake into calved cows.

Protecting future growth rates

Avoiding pugging is a non-negotiable on the farm.

Tom does two key things to protect our pastures, and when these are exhausted cows will come off.

1. Always juggle the grazing order to have 2-3 days of paddocks that we can graze in the wet near the top of the wedge. So on wet days we are in the free draining soils and pugging is less likely.
2. On wet days feed less supplement and offer at least 50% more grass area so cows can spread out and not do the high density damage around a silage line in the paddock.

To do this, we need to ensure we have sufficient pasture cover to allow good management, so ideally we have 2400kgDM/ha pasture cover by 1 June.

Get all cows to condition

Cows are managed in separate mobs over the winter in line with weight gain requirements.

- 14kg feed offered - High weight gain for cows who are furthest from their calving targets and have the least time to gain.
- 11kg feed offered - Low weight gain for cows who are near or at target.

Dry cow Feed

We purposely make and keep some lower quality silage and hay, both high in fibre, to help hold up the springer cows, and the heifers as we go through the calving period.

We also use this feed type over winter to ensure cows have a portion of their diet as high fibre food to help warm them up from the inside, in addition to the balance of their feed pas PKE and grass to provide energy.

Do your feed budget

We strongly recommend every farm have a feed budget all year, but particularly in times like this. Knowing where you are and where you want to be is always the first step to ensuring you make a plan to reach your goals.

See the following website for a range of simple, free, paper templates as a starting point:

<https://www.dairynz.co.nz/feed/pasture-management/assessing-farm-performance/feed-budgets/>

NOTES

NEW GRASS PLAN 2018-19

All permanent pastures will have Ecotain added in spring, to allow strong management post-emergence of broadleaf weeds in the autumn and winter e.g. hedge mustard. Broadcasting Ecotain at 4kg/ha into the swards will still see great establishment of the Plantain plants in the sward.

All permanent pastures will be sown with Quartz and Legacy white clover cultivars.

We continue to see advantageous use of Cocksfoot in many of our worst performing paddocks where soil compaction, free draining soil type, or historical cultivation has led to poorer soil structure and environment for ryegrass alone to persist. Where these issues aren't present we continue to preferentially use permanent ryegrass cultivars.

Autumn Regrassing	Area (ha)	Notes	Cultivars Rate/ha
Undersow Permanent Ryegrass	10.4	Stitch open permanent pastures, don't need crop	Platform Permanent Ryegrass 12kg/ha
Undersow Italian Ryegrass	7.0	Stitch for short term yield before crop 2020	Lush Italian Ryegrass 18kg/ha
Permanent pasture after crop	3.2	3ha into permanent ryegrass dominant pasture	Rely + clover 21kg/ha 4kg/ha
Permanent pasture after crop	6.9	8ha into cocksfoot dominant pasture	Platform + Savvy Cocksfoot +Clover 12kg/ha 8kg/ha 4kg/ha
Plantain paddock top up	1.5	Plantain paddocks into cocksfoot dominant	Platform + Savvy Cocksfoot +Clover 12kg/ha 8kg/ha 4kg/ha
Plantain paddock top up	2.6	Plantain paddocks into Cocksfoot clover only	Savvy Cocksfoot + Clover 12kg/ha 4kg/ha
Autumn Sown Annuals	6.5	Drive winter yield ahead of crop in Annual ryegrass	Winter Star II 30kg/ha
Total Area regrassed	32.1	22% of Farm	
Total Area drilled	38.6	26% of farm (including annuals ahead of crop)	



EcotainTM
ENVIRONMENTAL PLANTAIN



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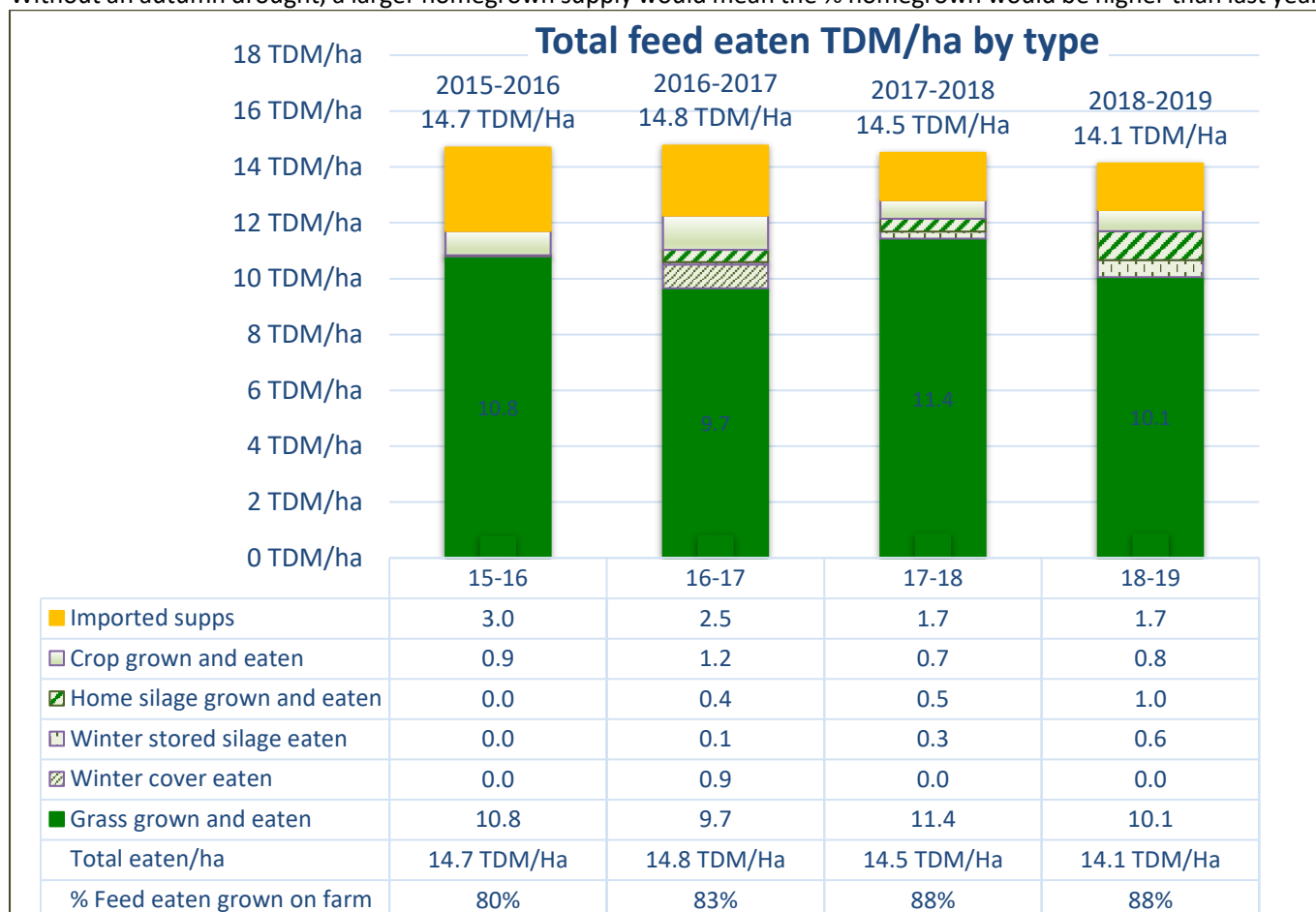
SUMMARY DATA

FEED INFORMATION

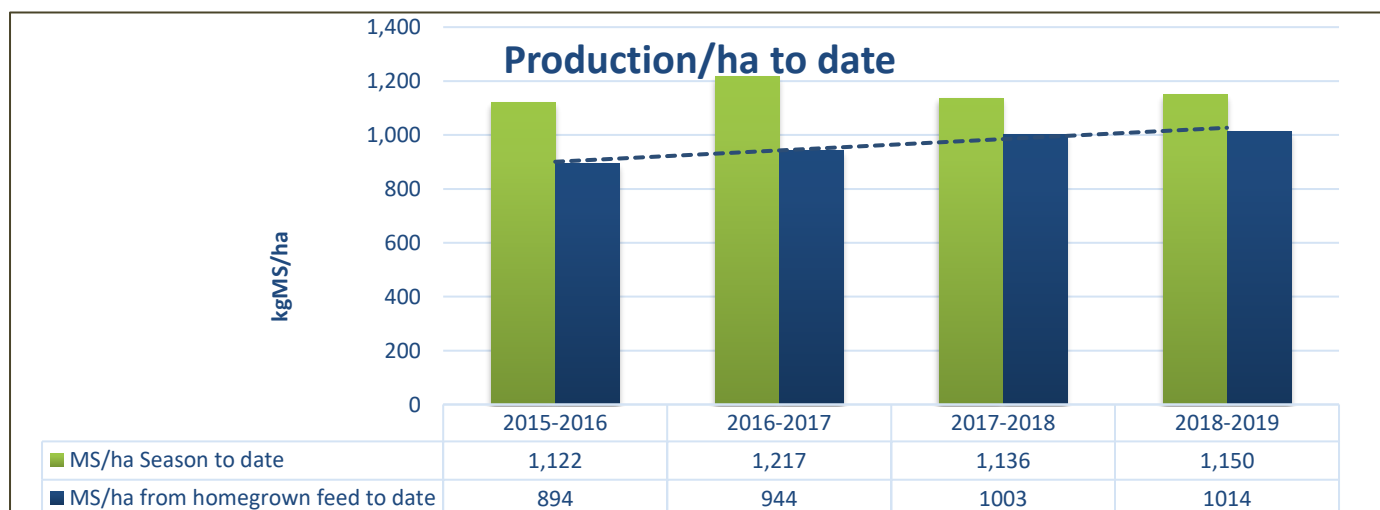
The dry intensity of Autumn had a resounding impact on pasture growth, with 2T/ha grown less than last year. Despite this, early season gains and aggressive feed utilisation means we are only 0.7T/ha less homegrown feed harvested/ha season to date.

With a strong emphasis on homegrown feed for 4 years, this season we rolled into 1 June with significant amounts of homegrown forage on hand meaning we are depending less on imported feeds to fill early season feed deficits.

88% of the feed used this season was produced on Owl Farm, compared to 88%, 83%, and 80% over the last 3 years. Without an autumn drought, a larger homegrown supply would mean the % homegrown would be higher than last year.



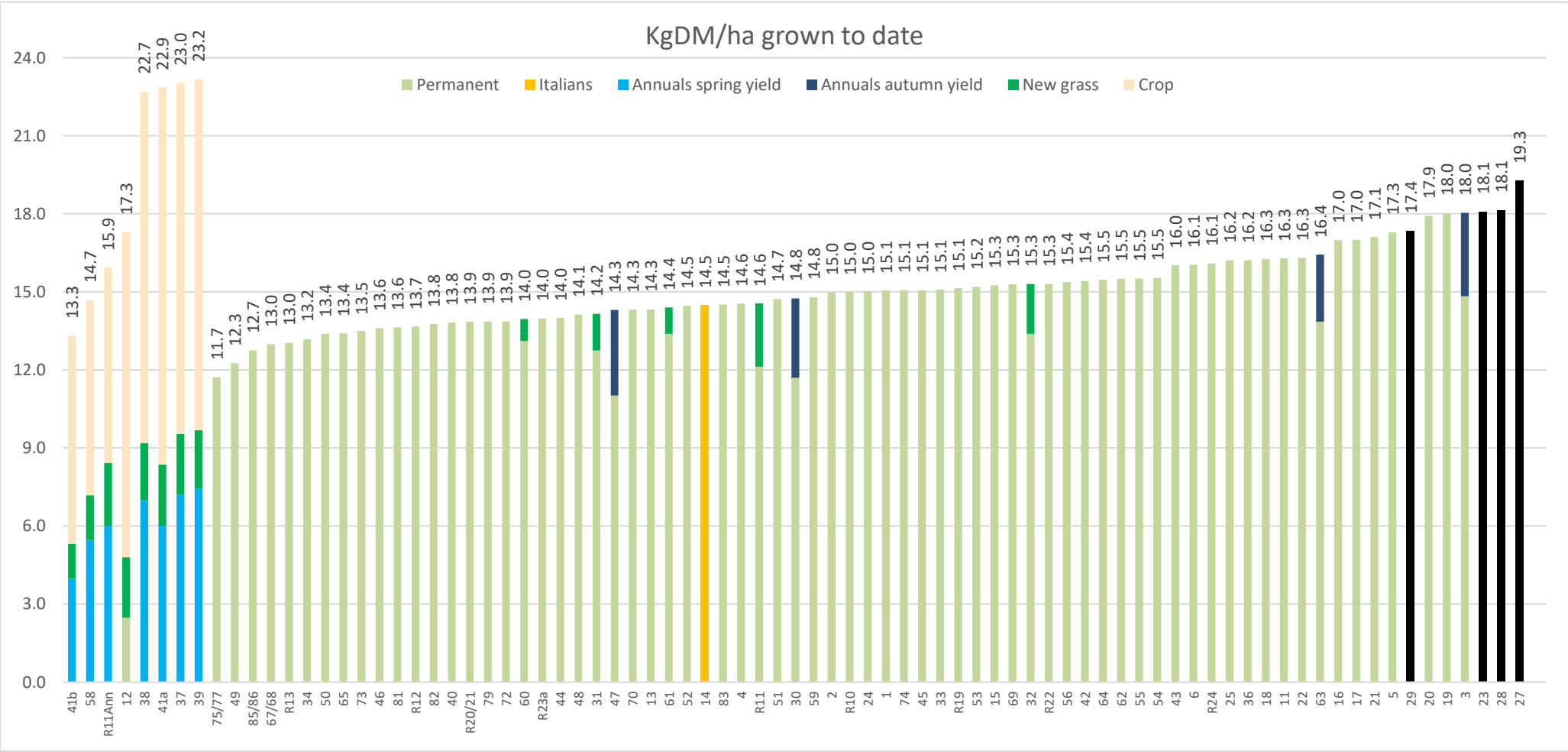
Despite lower feed used we have produced milk to date. The “more milk from less feed” scenario relates to both a more aggressive strategy on feed this year, but better cow condition at start of calving making its way into the vat.



NOTES

On a paddock by paddock basis we see a strong variation in yield to date – with the best paddocks outgrowing the worst by nearly 80%. The worst paddocks in order (excluding those used for crop); receive no fert or Nitrogen (75/77), are very dry river terrace paddocks (49, 85/86, 67/68) and are now sprayed out into annuals ahead of cropping next spring (30,47).

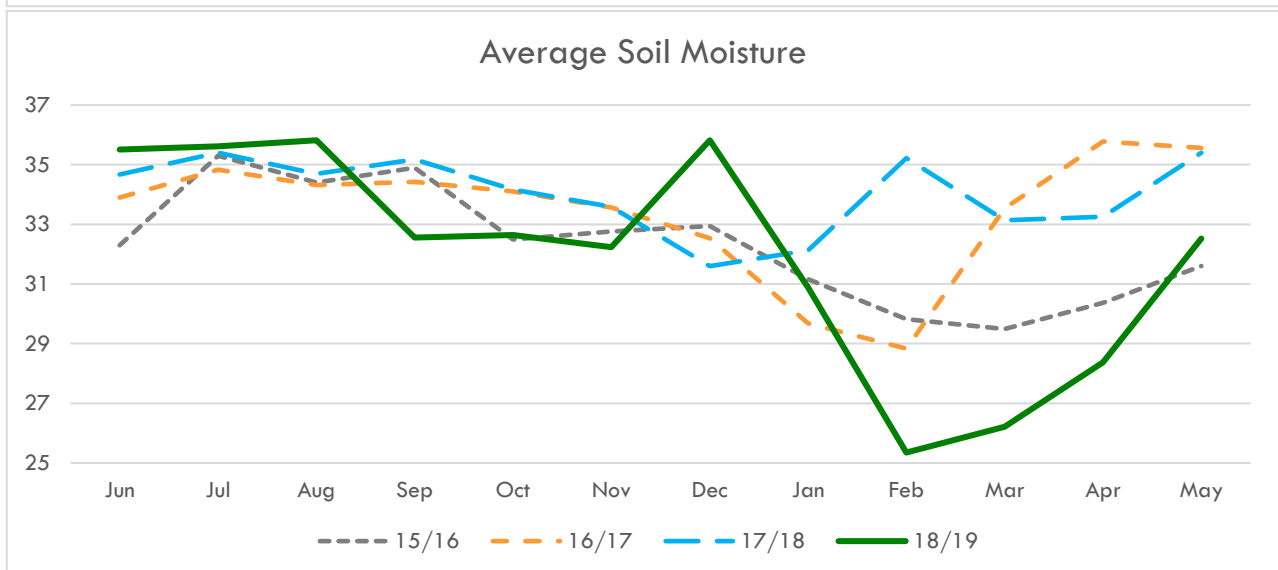
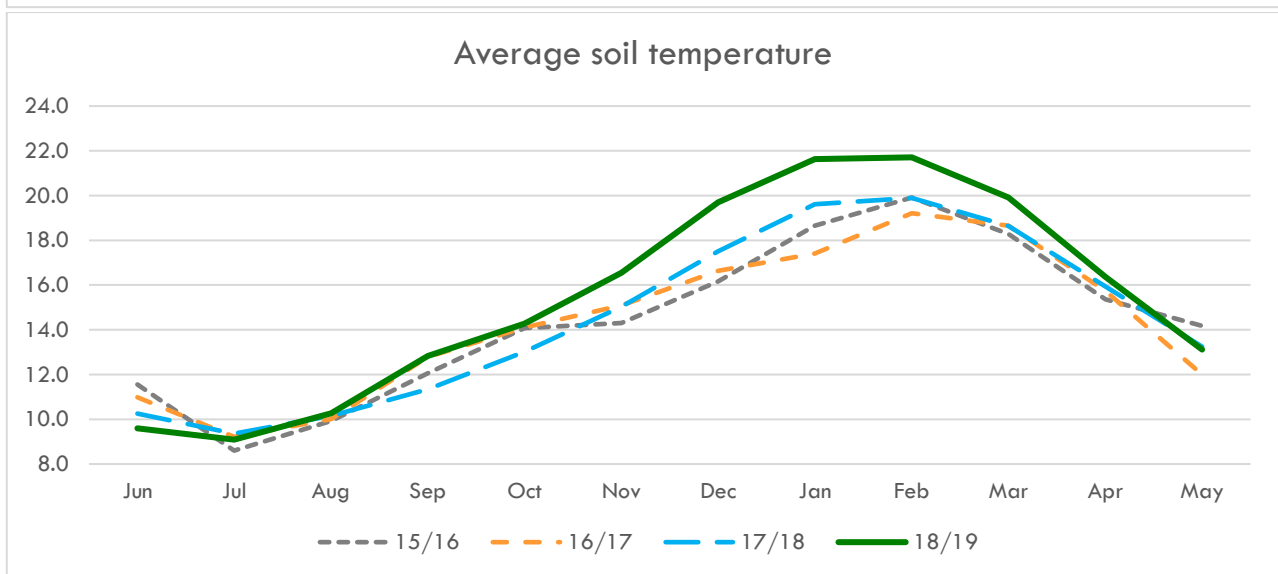
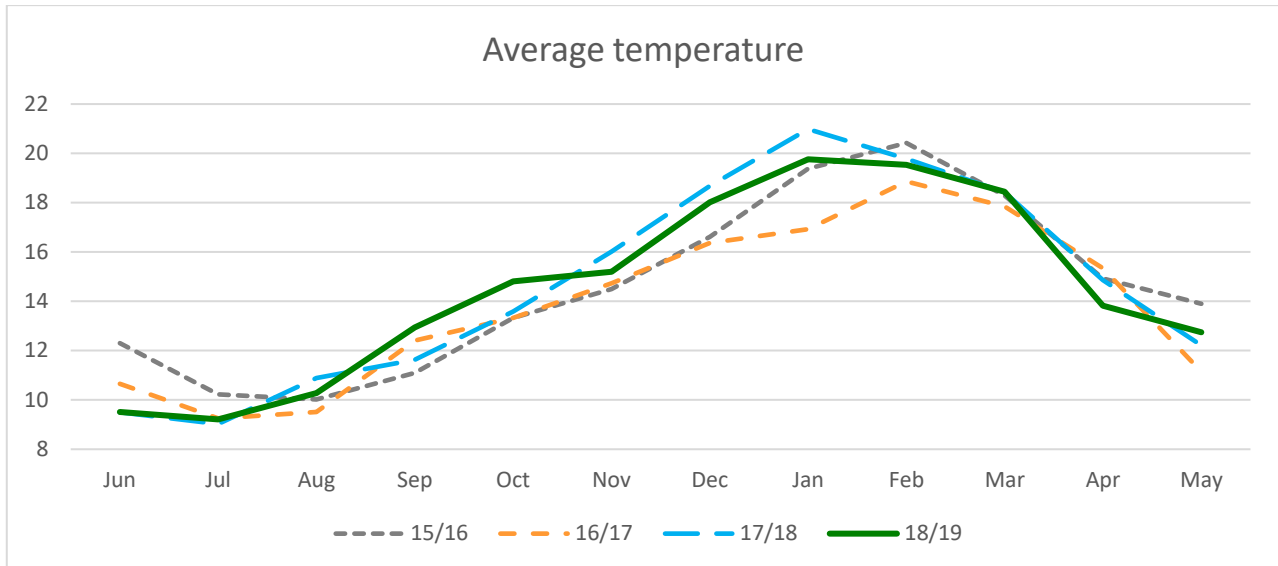
The top performing permanent grass paddocks are our autumn sown new grass cocksfoot paddocks in black. Of paddocks cropped, the relative permanent pasture yield this year before cropping, compared to the yield of annuals this year before cropping, explains why we use Annuals to bolster winter yield in poor performing paddocks (Compare paddock 12 to Paddock R11 Ann, 2.5T perm pasture winter spring, vs 6T annuals).



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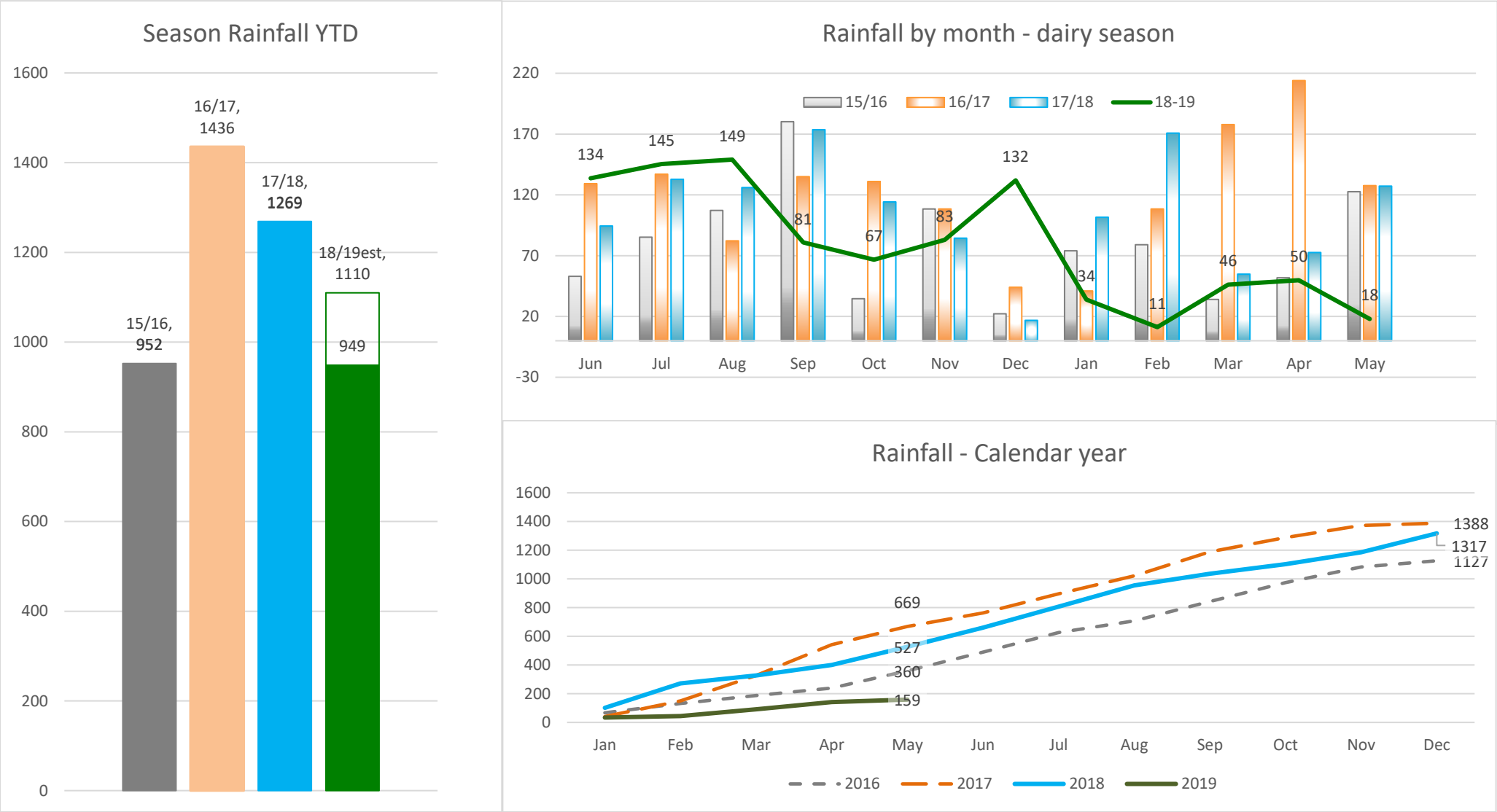


CLIMATE



NOTES

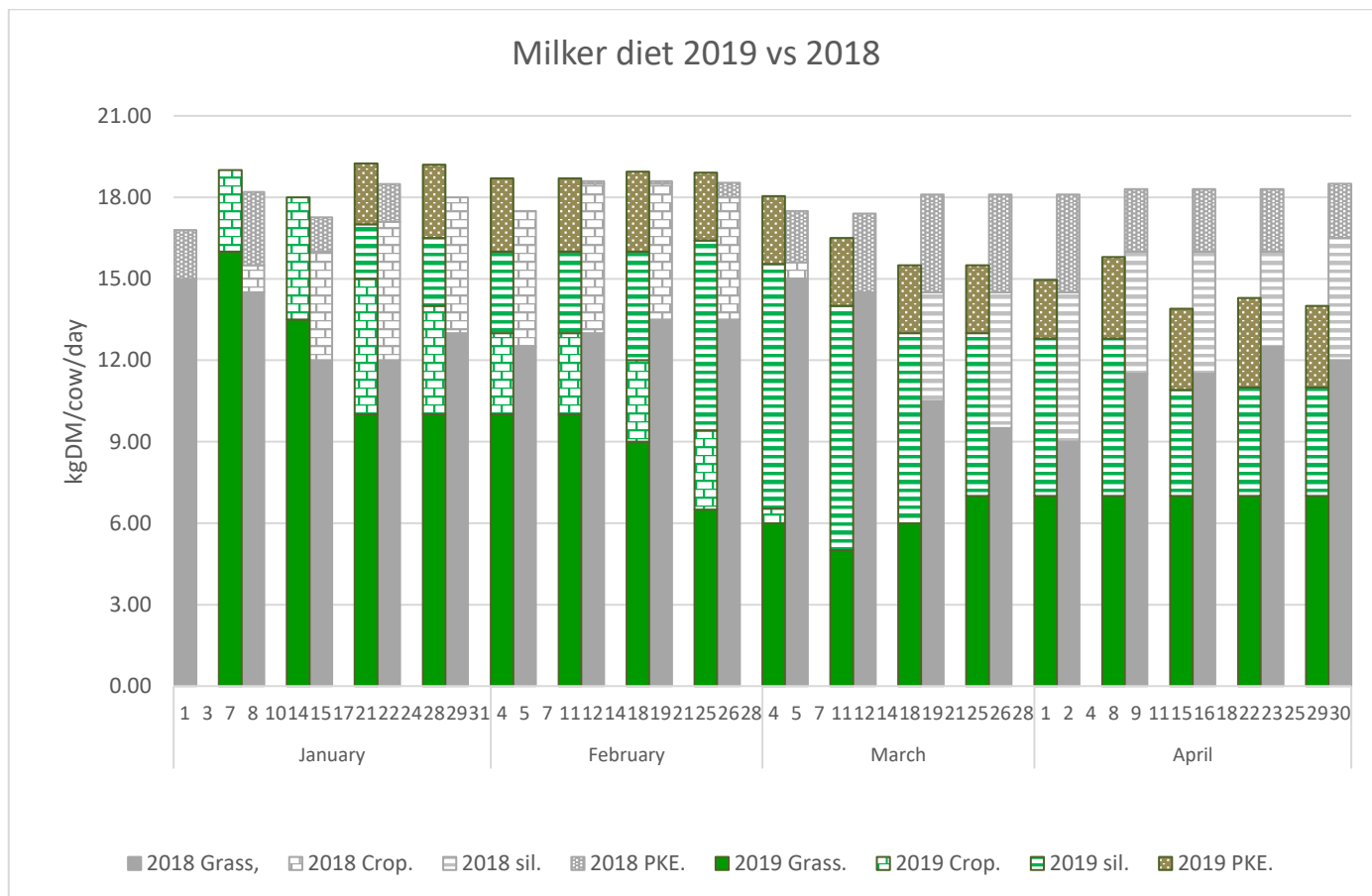
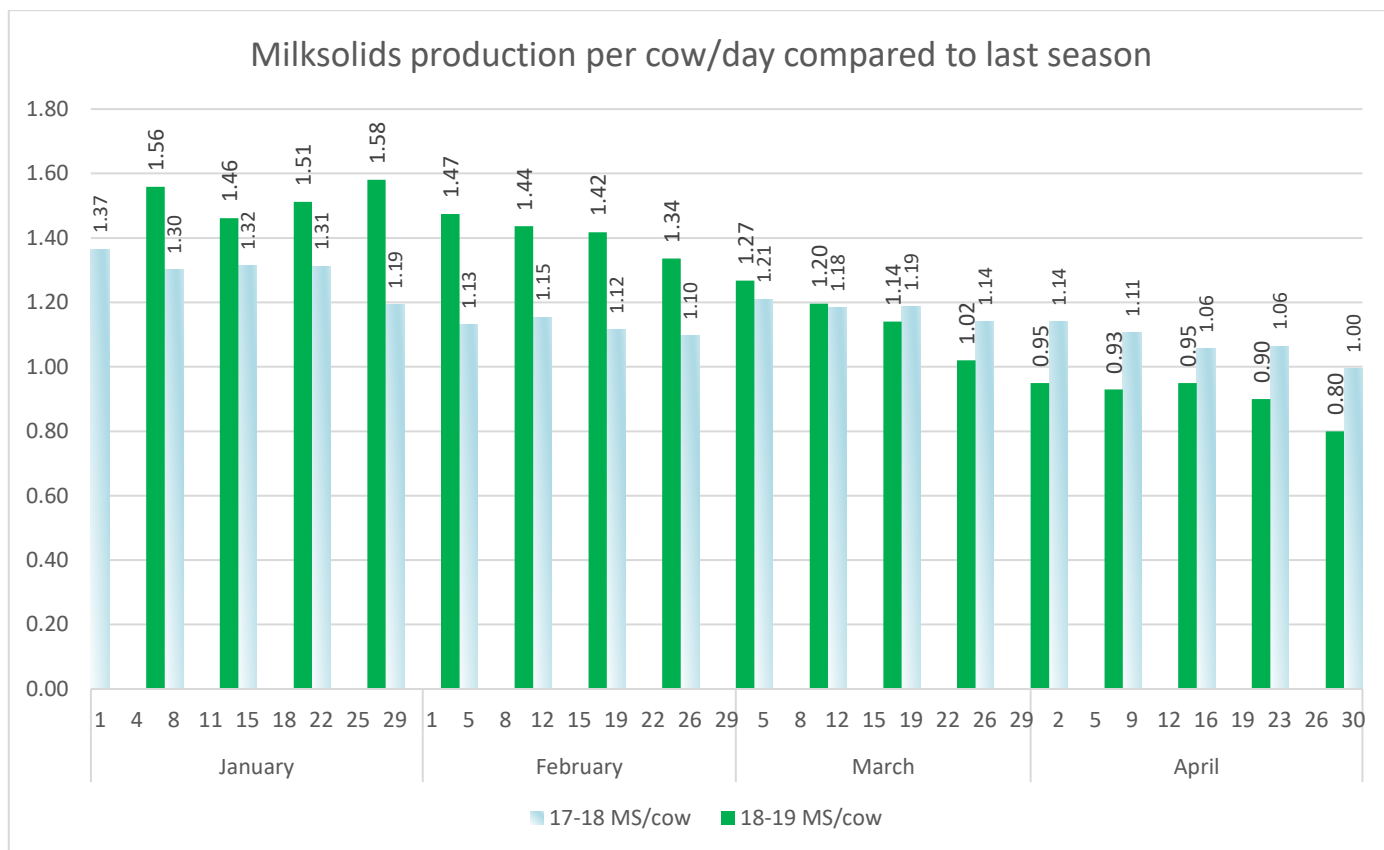
RAINFALL



NOTES

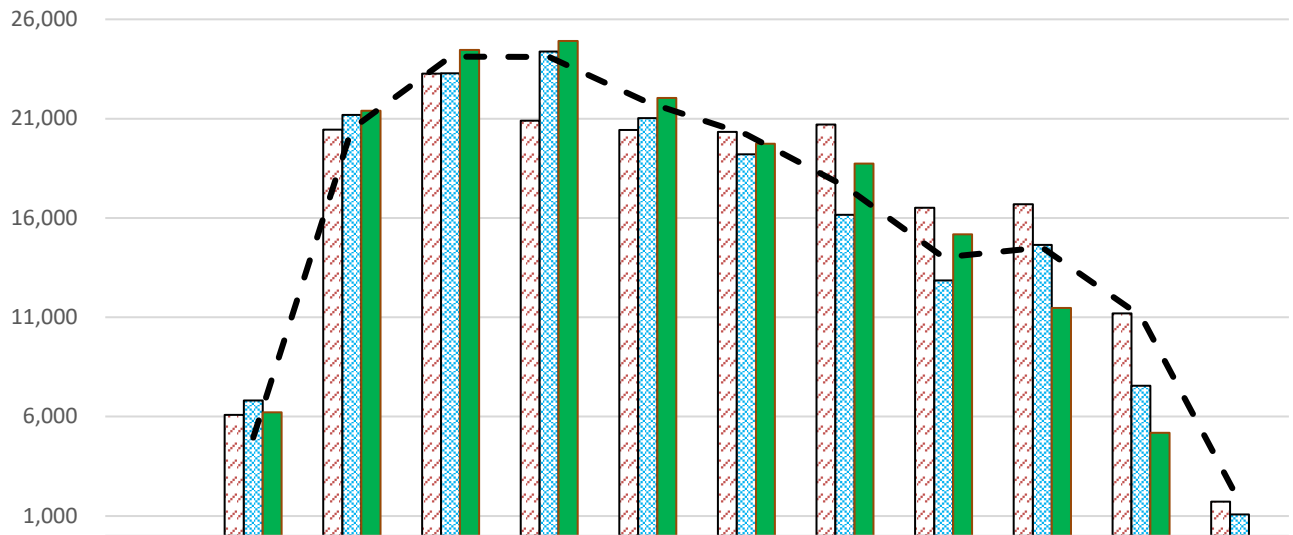


PRODUCTION



NOTES

Production: Monthly Performance

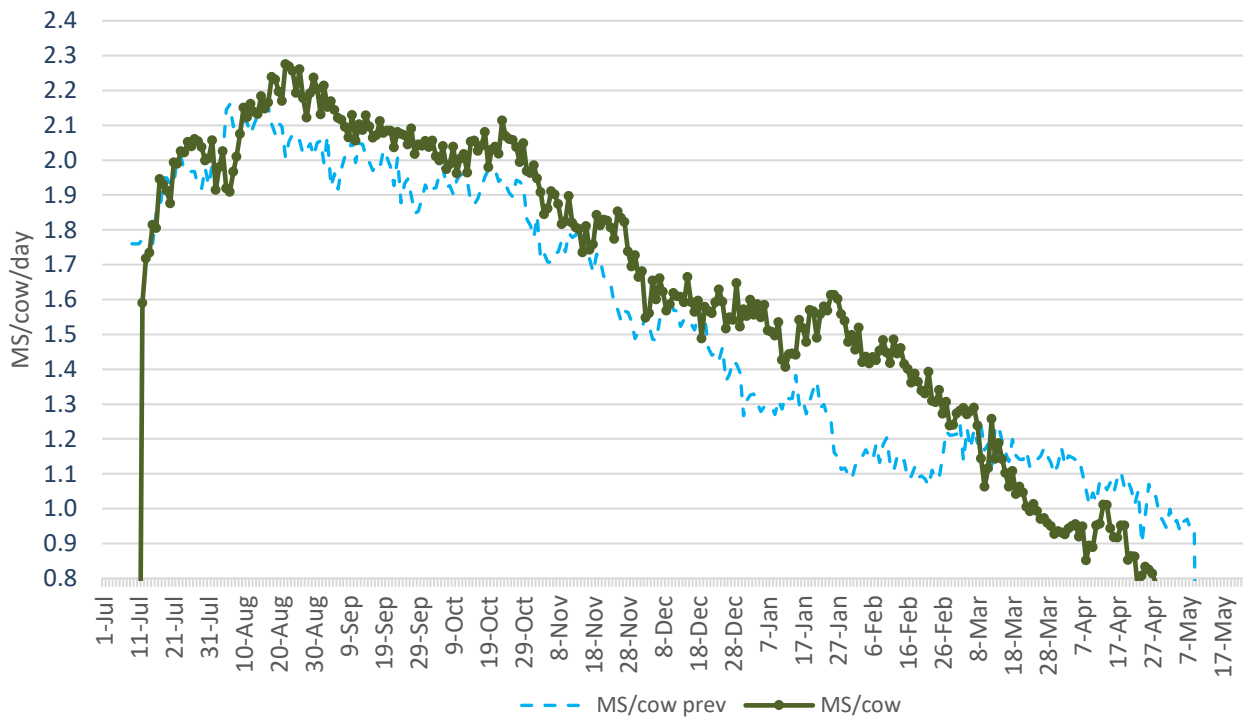


-4,000

	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
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	15,170	11,472	5,181	0
Budgeted 18/19		4,943	20,485	24,124	24,108	21,816	20,202	17,589	14,024	14,524	11,044	1,711

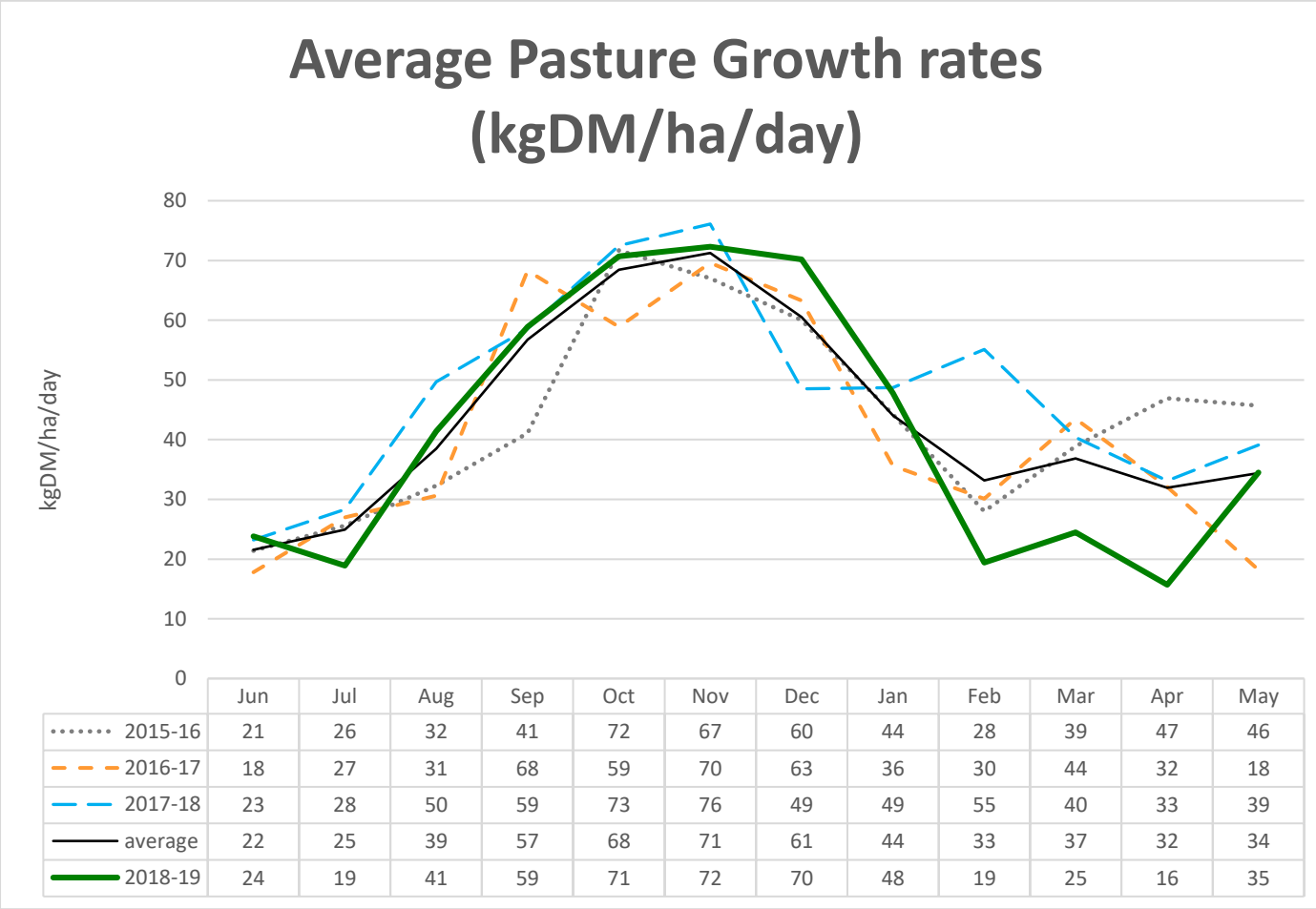
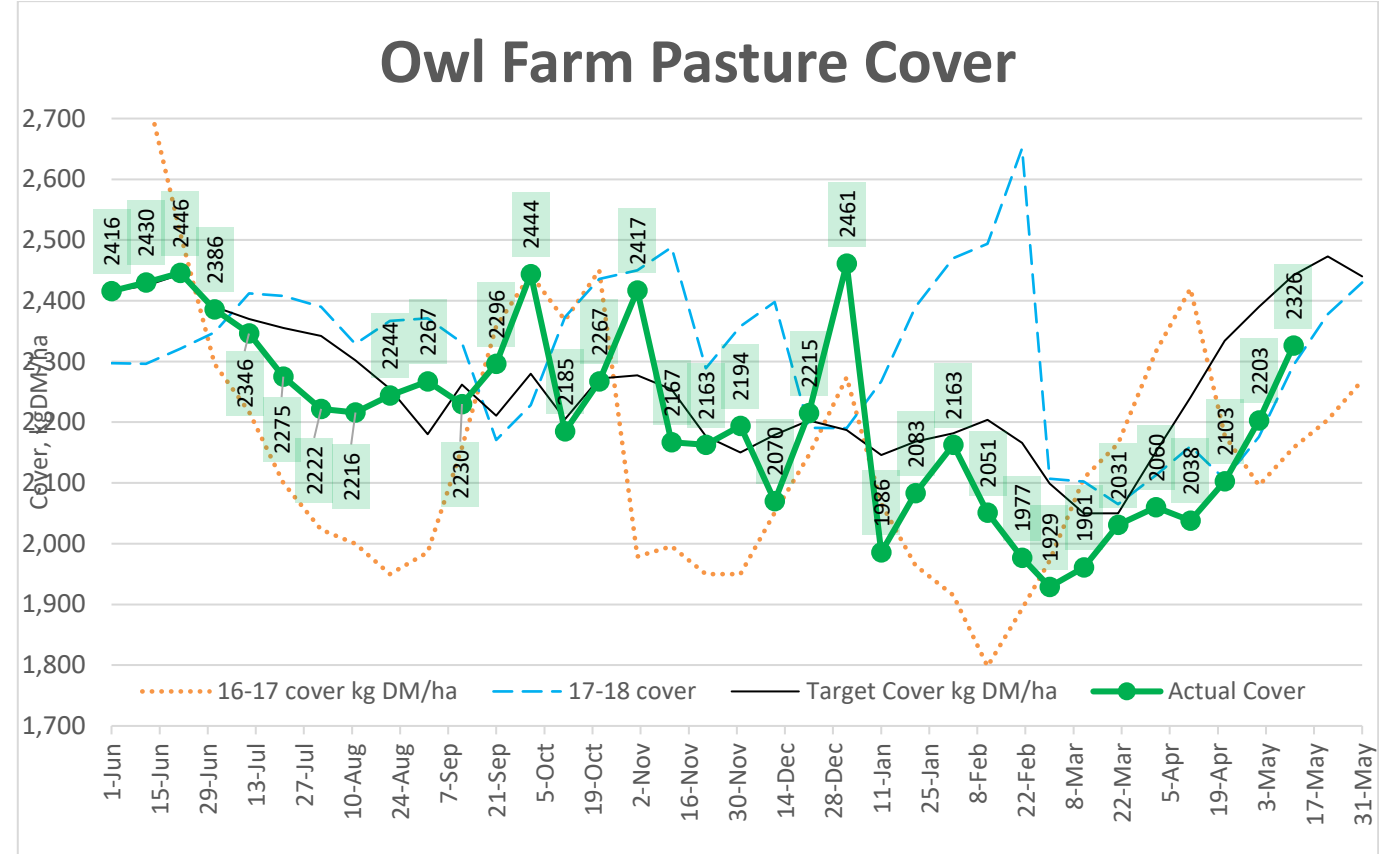
▨ 16/17 production
 ▨ 17/18 production
 ■ 18/19 Production
 - - - Budgeted 18/19

Daily Performance - per cow



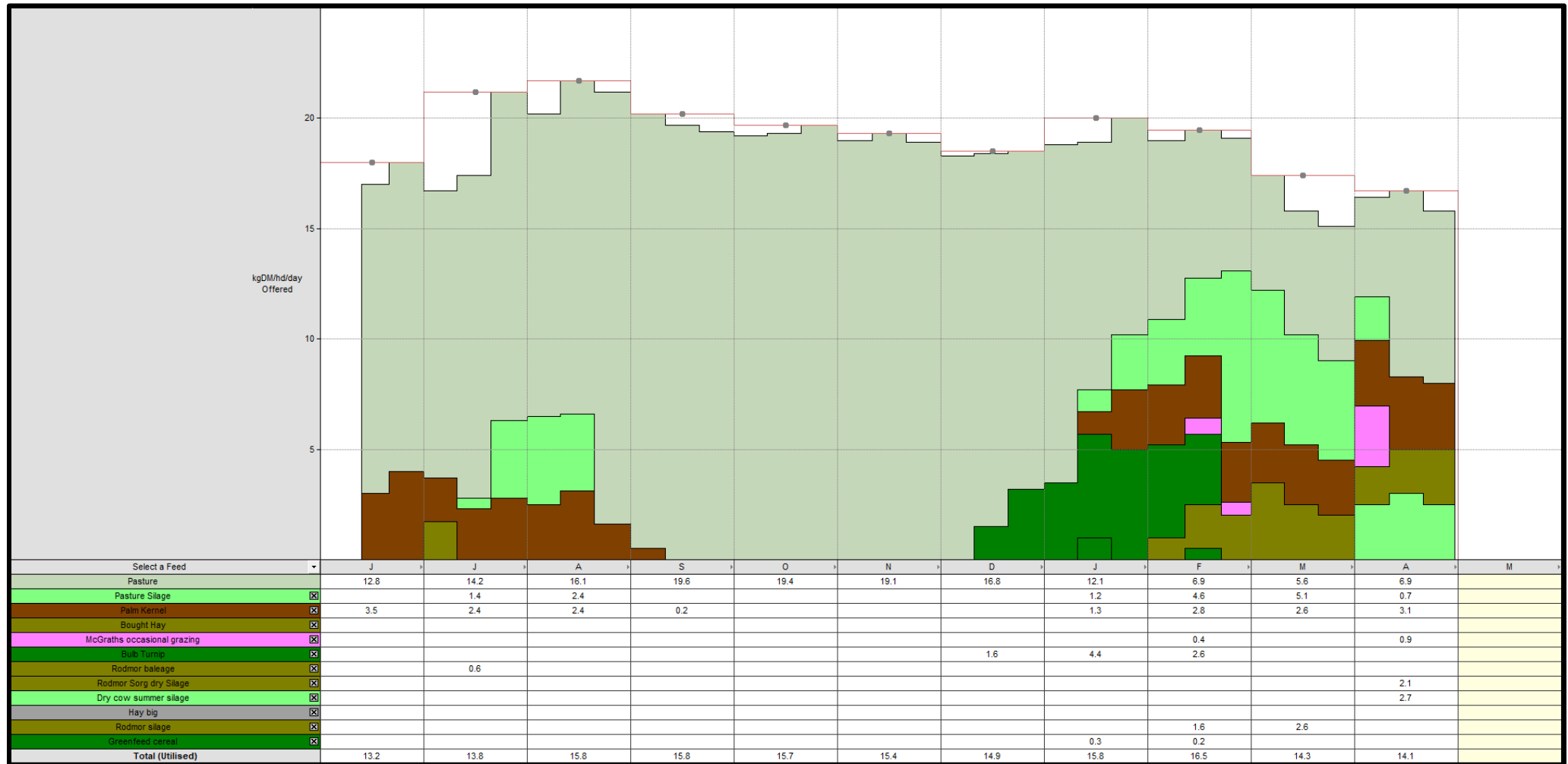
NOTES

PASTURE COVER AND GROWTH RATES

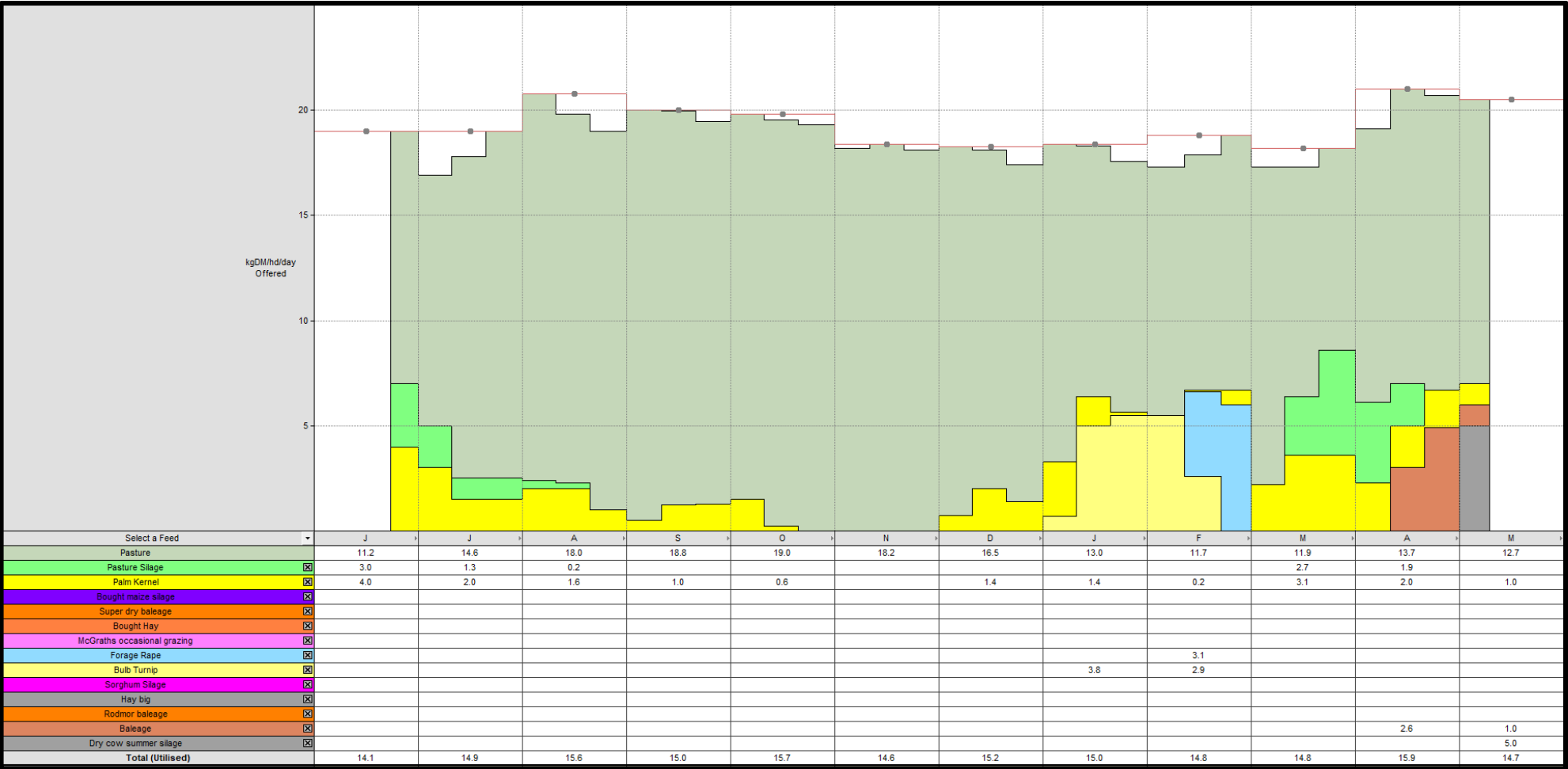


SEASONAL FEED BUDGET

Supplementary feed use throughout the 2018-2019 season – Actuals including dry off date change



Supplementary feed use throughout the 2017-2018 season





Owl Farm

Providing knowledge

St Peter's School/Lincoln University
Demonstration Dairy Farm



Next Farm Focus Day
Wednesday 18 September, 2019

Weekly Monitor Walk
Tuesdays, 11am



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