SIDDC
South Island Dairying Development Centre

LINCOLN UNIVERSITY DAIRY FARM

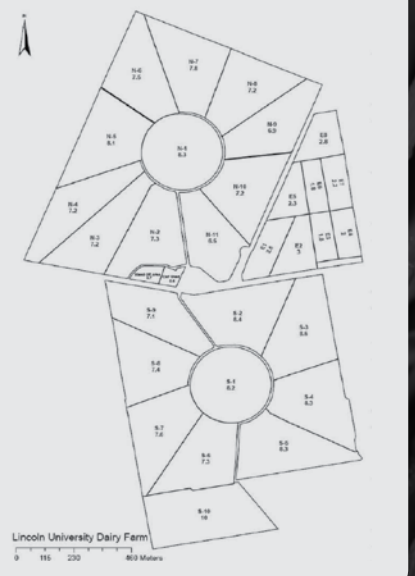
FOCUS DAY
OCTOBER 2017

STAFF

Peter Hancox	– Farm Manager
Sean Collins	– 2IC
Matthew Costello	– Dairy Assistant
Tom Chapman	– Dairy Assistant

LUDF HAZARDS NOTIFICATION

1. Children are the responsibility of their parent or guardian
2. Normal hazards associated with a dairy farm
3. Other vehicle traffic on farm roads and races
4. Crossing public roads
5. Underpass may be slippery



Partners Networking To Advance South Island Dairying

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INTRODUCTION

The LUDF is a progressive farming development facility that is committed to advancing dairy farming practice across the South Island, with particular consideration to productivity and environmental sustainability. Formerly the University sheep farm, the converted 186 hectare Dairy Farm is an excellent cross section of the various soil types evident across the Canterbury Plains. The property, of which 160 hectares is the milking platform, is irrigated using a spray system that includes two centre pivots, small portable lateral sprinklers and k-lines.

STAGE 1: 2001/2 AND 2002/3

The farm initially wintered approximately 630 cows, peak milking just over 600 and producing about 1400kgMS/ha from 200kgN/ha and up to 550kg DM/cow of imported feed. The milk payout (income) in 2002/3 was $4.10/kgMS.

STAGE 2: 2003/4 THROUGH TO 2010/11

During this period the primary development was the increase of the stocking rate to between 4 and 4.3 cows per ha. 654-683 cows peak milked and as a result production averaged 1700kgMS/ha and 411kgMS/cow. LUDF ran a single herd during stage two, to allow us to focus primarily on simple systems, and low and consistent grazing residuals.

STAGE 3: 2011/12 TO 2013/14

The further development of LUDF during stage 3 was a move into 'Precision Dairying', resulting from the implementation of the strategic objective (below). This stage focused on minimum standards, two herds were run to increase productivity and profitiability, from a similar environmental impact. Production lifted to 1878kgMS/ha or 477kgMS/cow (630 cows). A change in farm practice was initiated in 2013/14, with the temporary suspension of Eco-n (DCD), in an attempt to hold nitrogen losses without the mitigation effect of Eco-n.

STAGE 4: 2014/15

LUDF is adopting a 'Nil-Infrastructure, low input' farm system emerging from the P21 (Pastoral 21) research programme, in partial response to the tightening environmental requirements of some catchments across NZ. Targeted milk production is 1750kgMS/ha or 500kgMS/cow from 3.5 cows/ha with up to 150kgN/ha and 300kgDM/cow imported supplement.

LUDF STRATEGIC OBJECTIVE:

To maximise sustainable profit embracing the whole farm system through increasing productivity;

- without increasing the farm's total environmental footprint;
- while operating within definable and acceptable animal welfare targets; and
- remaining relevant to Canterbury (and South Island) dairy farmers by demonstrating practices achievable by leading and progressive farmers.
- LUDF is to accept a higher level of risk (than may be acceptable to many farmers) in the initial or transition phase of this project.

ADDITIONAL OBJECTIVES

1. To develop and demonstrate world-best practice pasture based dairy farming systems and to transfer them to dairy farms throughout the South Island.

2. To ensure optimal use of all nutrients on farm, including effluent, fertiliser, nutrients imported from supplements and atmospheric nitrogen; through storage where necessary, distribution according to plant needs and retention in the root zone.

3. To manage pastures and grazing so per hectare energy production is optimised and milkers consume as much metabolisable energy [ME] as practicable (within the constraints of the current system and the associated nutrient losses).

4. To optimize the use of the farm automation systems and demonstrate / document improved efficiencies and subsequent effect on the business.

5. To achieve industry targets for mating performance within a 10 week mating period, including a 6 week in-calf rate of 78% and 10 week in calf rate greater than 89% i.e. empty rate of less than 11%.

6. To actively seek labour productivity gains through adoption of technologies and practices that reduce labour requirements or makes the work environment more satisfying.

7. To assist Lincoln University to attract top quality domestic and international students into the New Zealand dairy industry.

ONGOING RESEARCH

- The effect of farm management on groundwater and nutrient losses. (includes 10 groundwater monitoring wells, 60 lysimeters and 6 drainage plots to monitor and manage the effect of fertiliser, grazing, irrigation and effluent inputs over a variety of contrasting soil types.
- Pasture growth rates, pests and weeds monitoring, including a Forage Value Index paddock scale cultivar trial.
- Winter cropping effects on subsequent cow and calf performance.
- Yield mapping of pastures across the season
- Native Plantings – biodiversity effects
- Resource Inventory and Greenhouse Gas Footprint

CLIMATE

Mean Annual Maximum Temperature **32° C**
Mean Annual Minimum Temperature **4° C**

Average Days of Screen Frost
36 Days per annum

Mean Average Bright Sunshine
2040 Hours per annum

Average Annual Rainfall **666 mm**

SOIL TYPES

Free-draining shallow stony soils (Eyre soils) **5**
Deep sandy soils (Paparua and Templeton soils) **45**
Imperfectly drained soils (Wakanui soils) **30**
Heavy, poorly-drained soils (Temuka soils) **20**

FARM AREA

Milking Platform **160 ha**
Runoff [East Block] **15 ha**
Unproductive land on platform **6.7ha**

SOIL TEST RESULTS AND FERTILISER APPLICATIONS

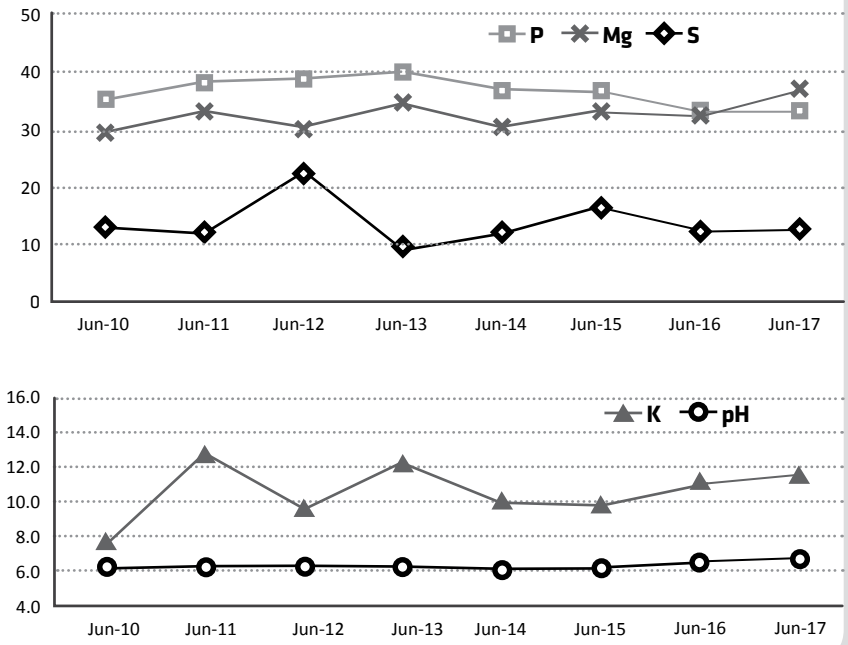
Target Soil Test Ranges:

pH: **5.8 – 6.2** P: **30 – 40** K: **5 – 8**
S: **10 – 12** Mg: **20+**

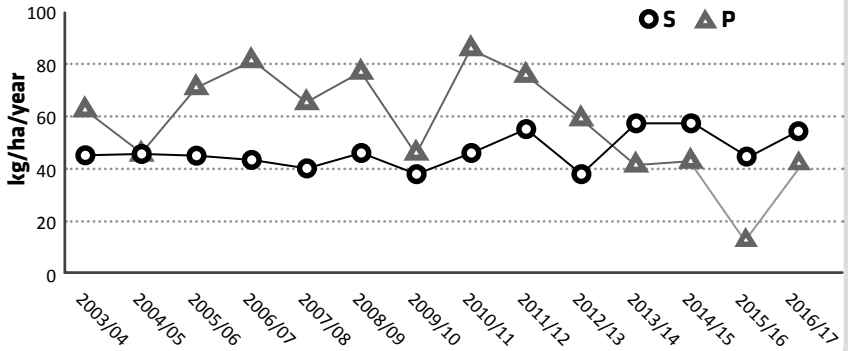
PASTURE

The milking platform was sown at conversion [March 2001] in a mix of 50/50 Bronsyn/ Impact ryegrasses with Aran and Sustain white clovers, and 1kg/ha of Timothy.

WHOLE FARM AVERAGE SOIL TEST RESULTS



WHOLE FARM AVERAGE P AND S APPLICATIONS 2003/04 - 2016/17



Paddock	Period Regrassed	Grass Cultivar
N1	Feb-01	Brons. Imp
N2	Feb-11	Trojan
N3	Nov-12/Sept-13	Shogun/Chicory/Plantain/Troj
N4	Feb-15	Base/Troj/Chicory/Plantain
N5	Dec-11/Aug-13	Shogun
N6	Apr-14/Sept-16	Shogun (spray/drill)
N7	Jan-14	Bealey/Troj/Chicory/Plantain
N8	Jan-13	Bealey/Troj/Chicory/Plantain
N9	Oct-13	Bealey/Troj/Chicory/Plantain
N10	Jan-12	Tetraploids (FVI trial)
N11	Nov-07	Bealey

Paddock	Period Regrassed	Grass Cultivar
S1	Dec-05	Bealey
S2	Dec-10	Troj. Bealey
S3	Feb-10	Bealey/Arrow
S4	Dec-13	Bealey/Troj/Chicory/Plantain
S5	Dec-16	Shogan/Bealey
S6	Dec-14	Shogan/Chi/Plant (spray/drill)
S7	Nov-15	Base/Troj/Plantain
S8	Oct-11	Troj. Bealey
S9	Dec-09	Bealey/Arrow
S10	Nov-14	Shogan/Chicory/Plantain
All paddocks also sown with clover		

STAFFING AND MANAGEMENT

Roster System – 8 days on 2 off, 8 days on 3 off
Milking Times – cups on 5.00am / 2.30pm

IRRIGATION AND EFFLUENT SYSTEM

Centre-pivots	127 ha
Long Laterals	24 ha
K-Lines	10 ha
Irrigation System Capacity	5.5 mm/day
Length of basic pivot	402
Well depth	90m

A full rotation completed in 20.8 hours for 5.5 mm [at 100% of maximum speed].

- Average Annual Rainfall = 666 mm. Average irrigation input applies an additional 450 mm.
- Average Evapotranspiration for Lincoln is 870 mm/year.

EFFLUENT

- Sump capable of holding 33,000 litres and a 300,000 litre enviro saucer.
- 100 mm PVC pipe to base of North Block centre pivot, distribution through pot spray applicators.

MATING PROGRAMME – SPRING 2017

Yearling heifers - AI mated for 10 days, then PG & continue AI. Daughter Proven Kiwi XX. Follow with bulls, total 9 weeks mating.

MA cows – sexed semen for 1 week prior to normal PSM. 3 weeks Forward Pack Premier Sires then Short Gestation Dairy and natural mating weeks 7-9.

Heifers to start calving 2 weeks prior normal start mating.

HERD DETAILS – OCT 2017

Breeding Worth (rel %) 101 / 46
Production Worth (rel%) 121 / 63
Recorded Ancestry 99%

Average weight / cow
Herd monitored walk over weighing
454 kg [Oct 2017]

Calving start date 2017
Heifers 14 July, Herd 1 August

Est. Median calving date
12 August 2017

Mating start date
25 October 2016 (heifers 15 days earlier)

Empty rate (nil induction policy) after 10 weeks mating - 15% (2016-17 mating). 6 week in-calf rate 63%.

	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Total kg/MS supplied	278,560	261,423	273,605	262,112	297,740	300,484	276,019	278,654	289,906	286,189
Average kg/MS/cow	409	384	415	391	471	477	440	498	522	516
Average kg/MS/ha	1,744	1,634	1,710	1,638	1,861	1,878	1,725	1742	1812	1789
Farm working expenses /kgMS	$3.37	$3.88	$3.38	$3.86	$3.91	$3.84	$4.28	$3.87	$3.47	3.76
Dairy operating profit/ha	$8,284	$2,004	$4,696	$6,721	$4,553	$4,665	$7,578	$1200	$1182	$4728
Payout (excl. levy) $/kg (Milk price + div)	$7.87	$5.25	$6.37	$7.80	$6.30	$6.12	$8.50	$4.60	$4.30	$6.52
Return on assets	14.6%	4.8%	7%	7%	6%	6%	10%	1.6%	1.6%	6.5%
1 July cow numbers	704	704	685	694	665	650	650	580	578	580
Max. cows milked	680	683	660	669	632	630	628	560	555	554
Days in milk	263	254	266	271	272	273	259	263	267	270
Stocking rate cow equiv./ha	4.2	4.3	4.13	4.18	3.95	3.94	3.92	3.5	3.47	3.62
Stocking rate Kg liveweight/ha	2,058	2,107	1,941	1914	1860	1878	1872	1680	1724	1700
Grazing off - Dry Cows (tDM/ha)	546/9	547/7	570/9	652/8.4	650/9.8	650/9.8	650/11.4	580/10.7	3.5	3.2
No. yearlings grazed - On/Off	0/171	0/200	0/160	0/166	0/141	0/138	0/140	0/126	0/126	0/133
No. calves grazed - On/Off	0/200	0/170	0/160	0/194	0/190	0/156	0/150	0/126	0/155	0/150
Past eaten (dairybase) (tDM/ha)	17.9	17.2	16.2	16.9	17.3	16.8	14.9	15.7	16.6	16.0
Purch. Suppl - fed (kgDM/cow)	415	342	259	463	359	434	506.8	300	126	397
Made on dairy/platform (kgDM/cow)	95	64	144	160	154	93	0	40	277	104
Applied N/160 eff. Ha	164	200	185	256	340	351	252	143	179	173

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Contents

LUDF Farm System Overview: 3
Strategic Objective 3
Results to date (to the end of September): 4
Farm Profitability: Milk Price 5
Notes to Budget and Expenses to date: 5
Budget and Expenses to date: 6
Expenses to date: 7
Season to date - Winter / Early Spring 2017-18 8
Weather and Environment 8
Fertiliser and growth 12
Calving Spread 14
Age Spread - calved cows in milk 15
Feed Management 15
Pasture Quality 20
Milk Production 21
Herd Test Comparison 23
Herd Liveweight 27
Winter management 27
Preparedness for calving 27
Body Condition Score 29
Animal Health 32
Macro-mineral Management - Winter/Spring 2017/18 season 34
LUDF Mating Plan - Spring 2017 - DRAFT as at end September 36
Lincoln University Dairy Farm - Farm Walk notes 41
LUDF MINDA Weights 48
Biosecurity - What are the real risks? 51
Background Material - Biosecurity in NZ (c/o MPI) 52
Protecting your Farm 55
DairyNZ – Protecting your farm feedback form 59


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LUDF Farm System Overview:

Strategic Objective

To maximise sustainable profit embracing the whole farm system through:

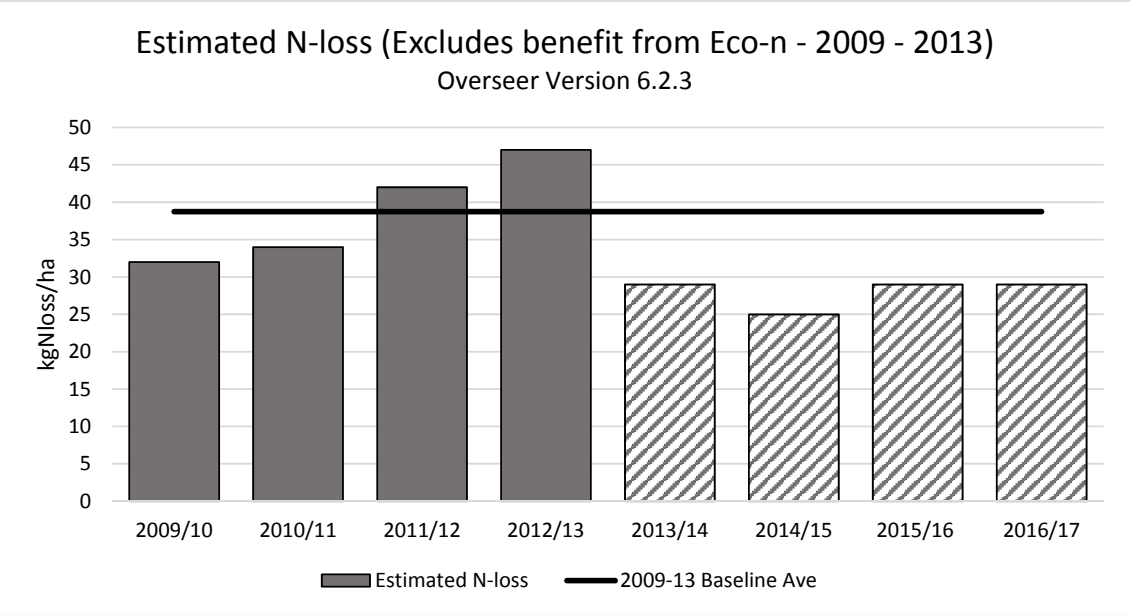
- *increasing productivity;*
- *without increasing the farm's total environmental footprint;*
- *while operating within definable and acceptable animal welfare targets; and*
- *remaining relevant to Canterbury (and South Island) dairy farmers by demonstrating practices achievable by leading and progressive farmers.*
- *LUDF is to accept a higher level of risk (than may be acceptable to many farmers) in the initial or transition phase of this project.*

To achieve the above objectives, and considering the changing environmental regulations to reduce nutrient losses, LUDF has since the beginning of the 2014/15 season adopted and scaled up research emerging from the P21 Phase 2 programme. This research (jointly funded by the Ministry of Business, Innovation and Employment, DairyNZ, Fonterra, Beef + Lamb New Zealand and the Dairy Companies Association of New Zealand) identified a "low input, highly productive farming system" that reduced nutrient losses while maintaining profitability when estimated against the LUDF data at the time.

Following three years implementing (and refining) this system, the farm has achieved over 25% less nitrogen leached (as estimated with Overseer) and largely has achieved the same profitability, if adjusted for payout, as the farm was previously generating.

	Ave 11/12 - 13/14	**Ave 14/15 - 16/17**
Peak cows milked	**631**	**557**
Stocking Rate	**3.9**	**3.5**
Total kgMS sold	291414	284916
Per Cow Milk Production	463	512
Milk Production /ha	1821	1781
Total N fert applied kgN/ha	313	165
Total Imported Silage Fed tDM	273	153
Total Imported Silage Fed / peak cows (kgDM/cow)	433	274
Dec Lwt	475	490
kgMS/kg LWT	97%	104%
Farm Working Expenses	4.01	3.70

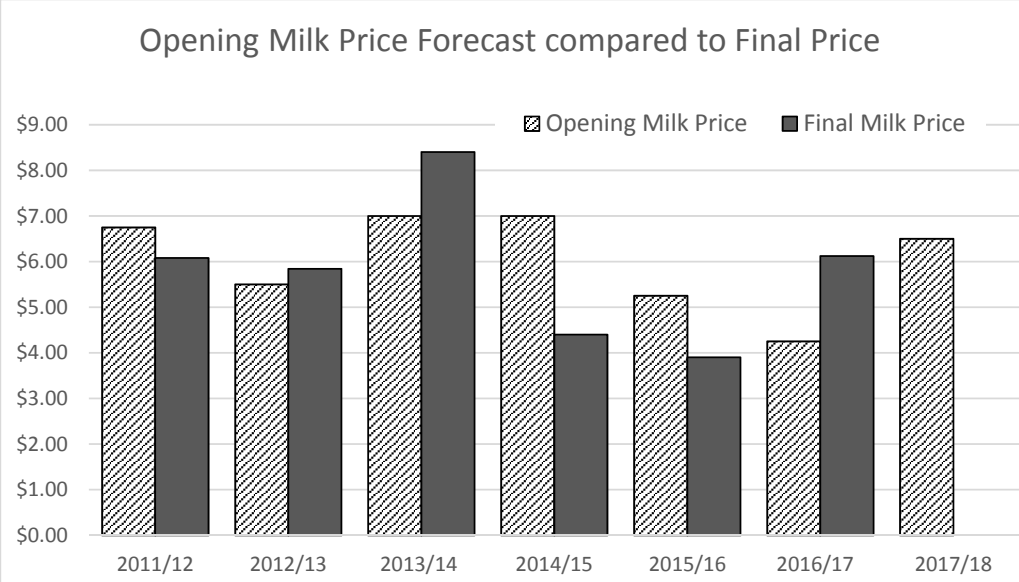
As seen in the summary of results above, LUDF has reduced its imported feed and N-fertiliser use, and through better matching of its stocking rate to feed supply, largely maintaining profitability. Estimated N-losses from Overseer® are shown below.



Results to date (to the end of September):

	2013/14	2014/15	2015/16	2016/17	2017/18
Total kgMS sold	46,877	46,059	46293	47386	37404
Ave kgMS /cow /day (peak cows)	2.15	2.37	2.5	2.45	2.1
Total Cows in Milk (vat)	583	536	523	516	506
Total N fert applied	48	28	32	29	16
Total Silage Fed tDM	85.7	38.1	52.1	0	41.1
Total Silage Fed / peak cows (kgDM/cow)	136	68	93	0	74
Whole Herd Average Liveweight (WOW)	468	480	490	485	470
Herd Ave CS	4.6	4.4	4.9	4.9	4.6

Farm Profitability: Milk Price



The Milk price (per kilogram milk solids) remains a key driver of farm profitability. Volatility in milk prices in recent years has reinforced the need to run an efficient farm system that can accommodate lower milk income while still capitalising on higher milk prices. It is useful to also keep in mind the variability that has occurred in recent years between the opening milk price and the final milk price.

Notes to Budget and Expenses to date:

Budget:

The budget was developed in Autumn 2017 with a conservative milk price (relative to the current forecast) of $6.00/kgMS + 30 cents /share dividend income. It was prepared on the basis of seeking to maintain the long term productivity of the farm in relation to soil fertility, herd quality and pasture performance. Similarly R&M was budgeted on the basis of maintaining the farms assets, noting the farm uses a calculated regular replacement policy for items like motorbikes that have been previously shown to incur little R&M in the first 2 years, but increasing costs and decreasing trade-in values in subsequent seasons.

Production was budgeted at just over 295,000kgMS, based on past production from 560 cows with limited bought in grass silage and nitrogen fertiliser, but with the addition of some fodderbeet to feed in the autumn.

Dividend income is calculated on the assumption the farm holds one share for each kilogram milk supplied for the season.

Budgeted expenses were $1,114,105, up $38,000 from last years actual expenses, while budgeted production was also up nearly 9000kgMS, based on increased use of fodderbeet and thus autumn milk production. This results in budgeted farm working expenses of $3.77/kgMS.

Budget and Expenses to date:

Year ending May 31	2015/16 Actual	2016/17 Actual	2017/18 Budget	Actual to end Sept	Budget to End Sept	Variance (Act-budg)	Notes
Milk production (kgMS)	289906	286,189	295,181	37,404	47,500	-10,096	1
Production /ha	1812	1789	1845				
Peak Cow Nos and Prod.	555	555	560			0	
Staff	3.70	3.7	3.7			0	
Income Milk Inc $/kgMS	$3.90	$6.12	$6.00	$6.75	$6.75	0	
Dividend /share	$0.40	$0.40	$0.30	$0.40	$0.40	0	
Milksolid Revenue	$1,130,633	$1,751,477	$1,771,086	$252,477	$320,625	-65,624	2
Dividend	$115,962	$114,476	$88,554	$14,962	$19,000	-4,038	2
Surplus dairy stock	129243	$127,290	$112,961	$17,556	$8,660	8,896	3
DairyNZ Levy	-$10,437	-$10,303	-$10,627	-$1,347	-$1,710	363	
Stock Purchases	-84960	-33,900	-24,000	-33,000	-24,000	-9,000	4
Gross Farm Revenue	**$1,280,442**	**$1,949,039**	**$1,937,975**	**$250,648**	**$322,575**	-$69,403	
Expenses						$0	
Cow Costs Animal Health	$57,851	$74,535	$62,304	$29,531	$27,173	$2,358	5
Breeding Expenses	$42,230	$43,546	$47,634	$10,711	$9,885	$826	
Replacement graz & meal	$135,151	$144,462	$143,504	$50,968	$51,688	-$720	
Winter graz incl. freight	$195,655	$152,769	$159,575	$149,212	$153,203	-$3,991	6
Feed Grass silage purch.	$24,668	$74,849	$74,928	$148	$21,010	-$20,862	7
Silage making & delivery	$20,088	$6,926	$18,240				
Giberillic Acid	$234	$0	$6,560		$6,560	-$6,560	8
Nitrogen	$45,093	$38,597	$48,470	$3,671	$11,371	-$7,700	9
Fertiliser & Lime	$14,853	$32,343	$26,240	$2,291	$16,240	-$13,949	10
Irrigation - All Costs	$76,030	$82,017	$83,600	$6,308	$10,536	-$4,228	11
Re-grassing	$8,654	$11,762	$20,215	$2,358	$4,335	-$1,977	12
Employment (net housing)	$228,413	$248,264	$255,429	$72,776	$81,488	-$8,712	13
Land Electricity-farm	$25,379	$28,011	$30,000	$7,002	$7,600	-$598	
Administration	$24,965	$25,035	$24,700	$6,332	$7,268	-$936	
Rates & Insurance	$21,020	$21,020	$21,020				
Repairs & Maintenance	$53,042	$61,297	$50,000	$14,799	$15,349	-$550	
Shed Expenses excl. power	$9,119	$8,685	$9,850	$2,557	$3,524	-$967	
Vehicle Expenses	$22,989	$21,184	$31,336	$7,328	$10,667	-$3,339	14
Weed & Pest	$1,174	$1,223	$500		$500	-$500	
Cash Farm Working Exps	**$1,006,608**	**$1,076,525**	**$1,114,105**	**$365,992**	**$438,397**	-$72,405	15
FWE/kgMS	**$3.47**	**$3.76**	**$3.77**				
Depreciation est.	$116,000	$116,000	$116,000				
Total Operating Expenses	$1,122,608	$1,192,525	$1,230,105	$365,992	$438,397	-$72,405	
Dairy Operating Profit	$157,834	$756,514	$707,870				
DOP/ha	**$986**	**$4,728**	**$4,424**				
Cash Operating Surplus	$273,834	$872,514	$823,870				
Cash Oper Surplus per ha	**$1,711**	**$5,453**	**$5,149**				

Expenses to date:

1. Milk production to the end of September is 10,096 kgMS below budget, the outcome of wet weather and slower calving. See below for more details.
2. Reported milk income includes advance payments and the forecast deferred payment (accrual basis). Note for simplicity of comparisons, budgeted milk price (to end September) has been adjusted to the current forecast milk price of $6.75/kgMS. Milk revenue and dividend are both below budget due to lower milk production.
3. Stock income is ahead of budget, due to conservative budgeting of cull cow prices. Also sold some calves sold as Friesian bull calves rather than bobby calves.
4. Bull purchase price incorrectly budgeted.
5. Higher vet costs resulting from more visits at the beginning of calving - first calvers had issues with retained membrane's.
6. Small saving in winter grazing compared to budgeted costs. Late calving cows were returned to the platform to graze behind the milkers - given the high winter growth rates and pregraze pasture covers.
7. Timing - had budgeted to purchase silage in late September - due to weather and growing conditions, this will occur in October.
8. Wet ground conditions and long periods grazing paddocks (using dry cows to achieve low and consistent residuals behind the milkers) negated any opportunity for using gibberellic acid this season.
9. Saturated soils also limited N-applications post grazing, particularly on the South Block. Budgeted N fertiliser is expected to be used later in the season.
10. Timing - again wet weather has prevented maintenance fertiliser application in September. This is now occurring in October.
11. No irrigation pumping costs (electricity) have been incurred as yet, however the corner arm was taken off last autumn and has been reattached this spring, along with ongoing maintenance.
12. Regrassing costs to date are for patching damage occurring during the winter. Have done about 8ha and anticipate another 1-2 ha if grazing / soil conditions allow.
13. No casual staff used thus far at LUDF. Small variance in timing of salaries in budget vs actual.
14. Under budget to date but some of this likely to reverse in October. Most of the farm has now been heavy rolled (incurring additional diesel). Some mowing will be required to tidy residuals in paddocks were saturated soils prevented grazing to target residual in the initial grazing round.
15. Overall the farm is $72,405 under budget to date (16%). While this is a valuable saving, it is similar to the reduction in milk income, and much of the above saving is deferred expenditure that is likely to occur during the season.

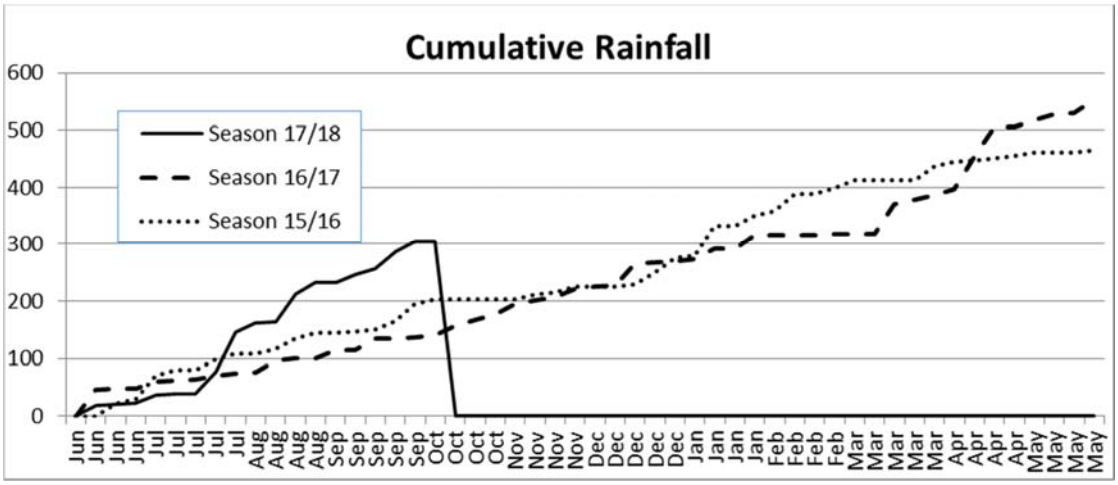
Note also the budget remains very sensitive to production:

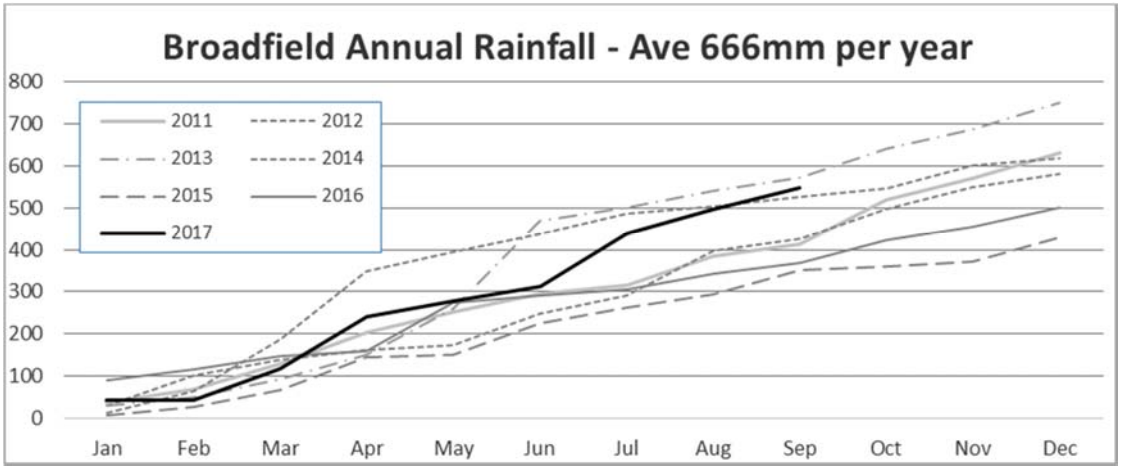
Total Milk Production	**265,663**	**280,422**	**295,181**	**309940.05**
Variance in production	-10%	-5%	(as budgeted)	+5%
Total Expenses	$1,114,105	$1,114,105	$1,114,105	$1,114,105
Milk Production /cow	474	501	527	553
Expenses /kgMS	$4.19	$3.97	$3.77	$3.59

Season to date - Winter / Early Spring 2017-18

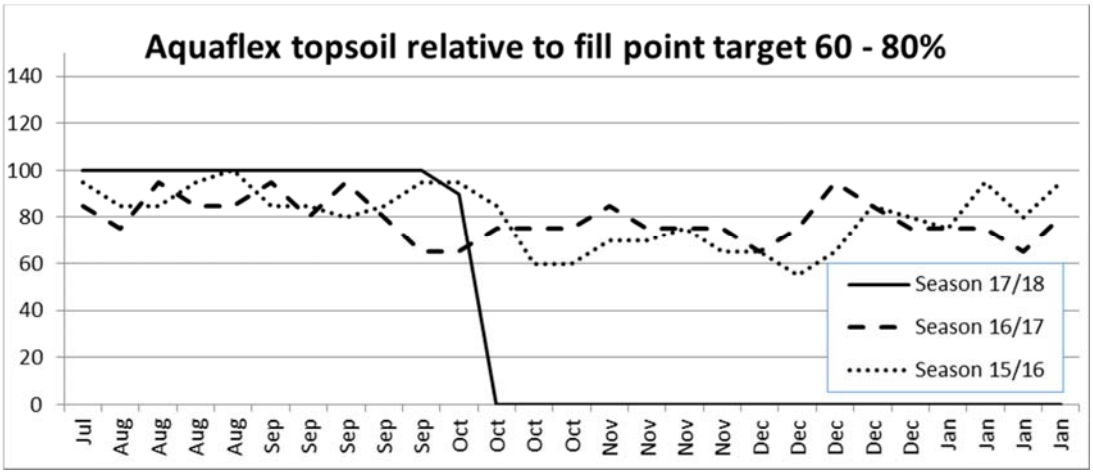
Weather and Environment

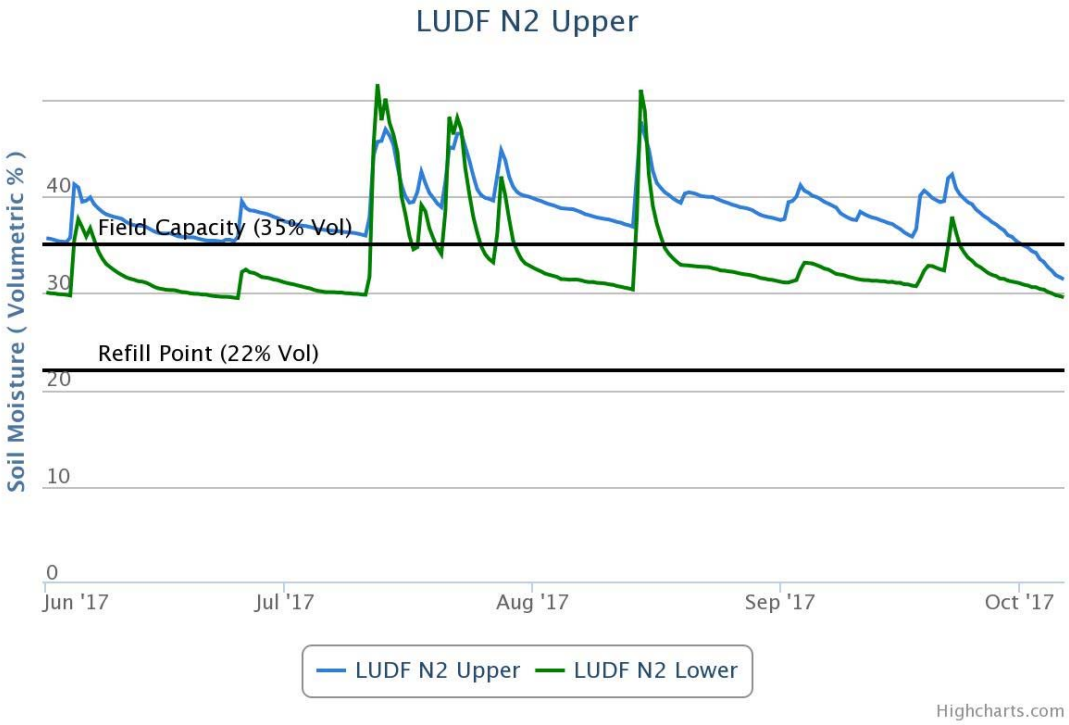
The graphs below show the weather conditions from the start of the 2017-18 season till now. Starting with mild temperatures and relatively dry conditions for the month of June and start of July, conditions drastically changed from the second half of July onwards. With large rainfall events happening, the farm received over half of its past 3 seasons annual rainfall between the 20th July and the end of September. Stock management was extra challenging - balancing the needs to avoid pugging and long term pasture damage - with feeding cows well post calving, and grazing high pregraze covers as the result of warmer winter weather. This has also impacted the actual vs planned area grazed (via the Spring Rotation Planner) and the ability to get to low and consistent grazing residuals in a timely manner with milking cows (see below).



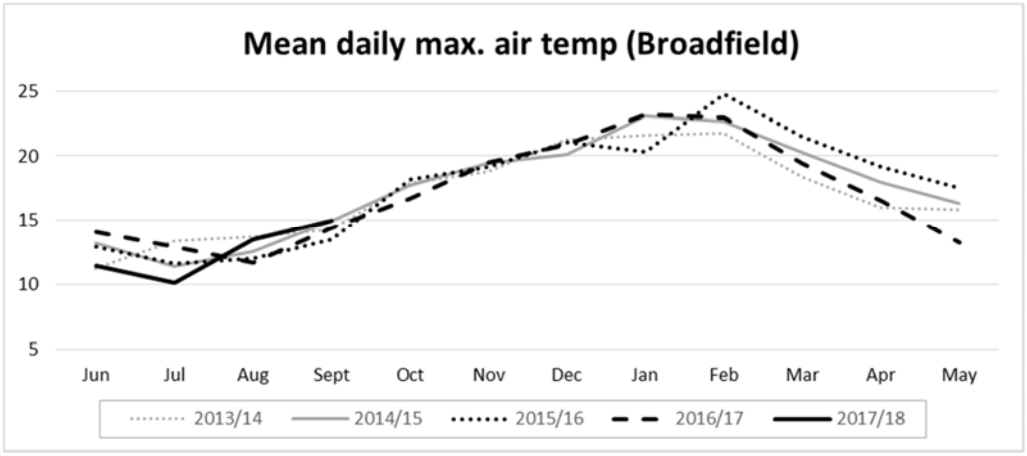


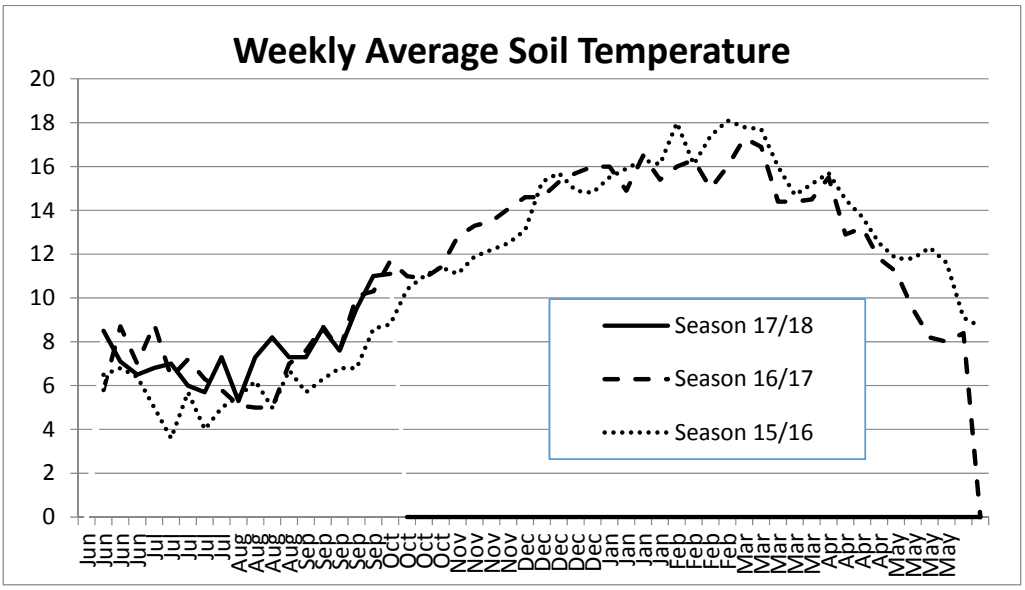
250mm rain over 10 weeks has resulted in the farm being at or above field capacity through the majority of calving, dropping only in the last couple of weeks.



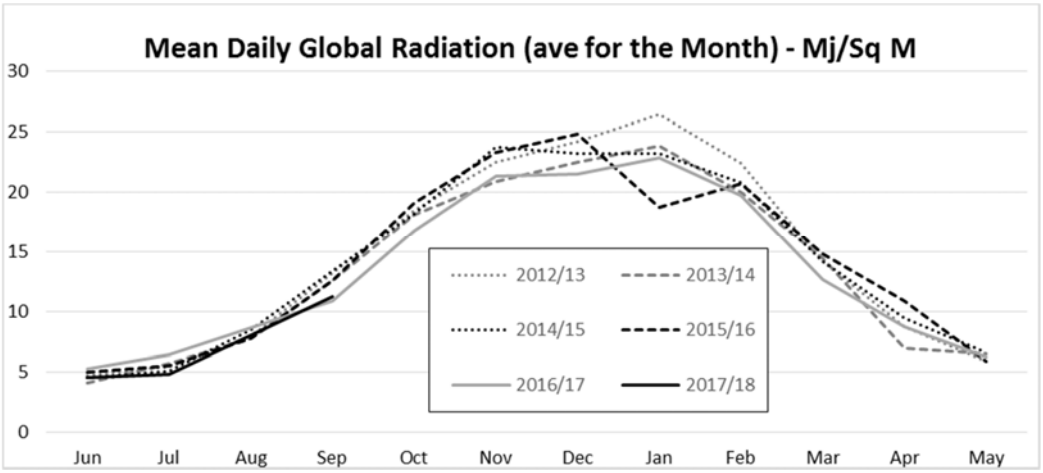


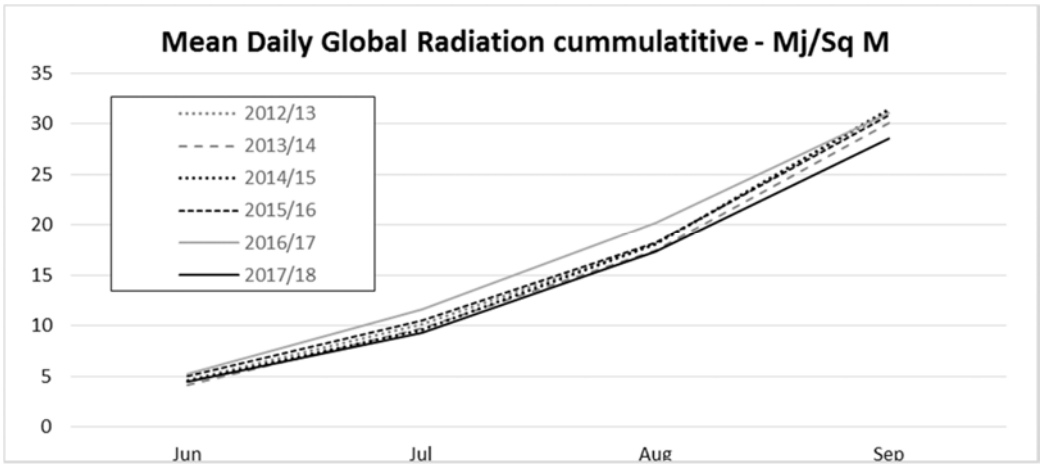
The wet weather, and absence of frosts has impacted soil and air temperatures compared to past seasons - maximum air temperatures were lower in June and July, then warmer in August - whereas soil temperatures were similar or warmer than the previous two years. The warmer soil temperatures contributed to higher winter growth rates.



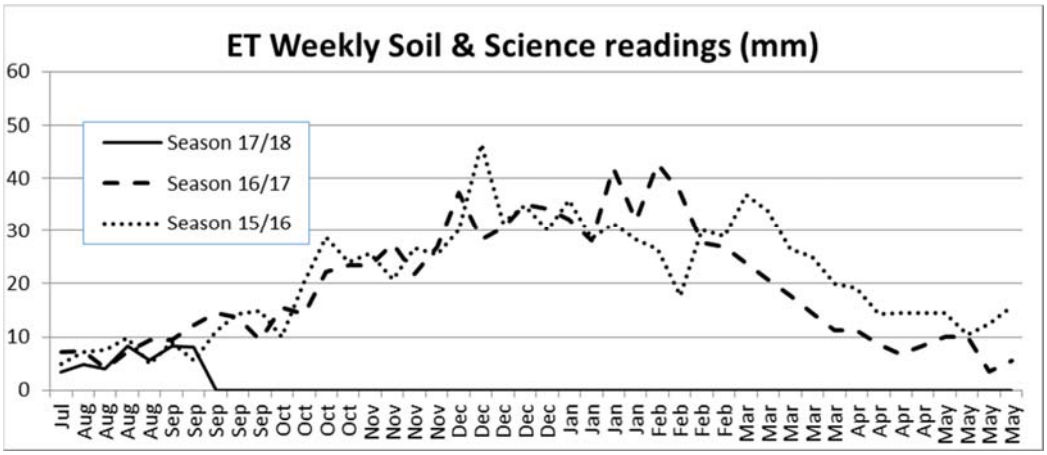


With the accompanying cloud cover, the monthly and cumulative amount of sunshine is noticeably below previous year's levels.

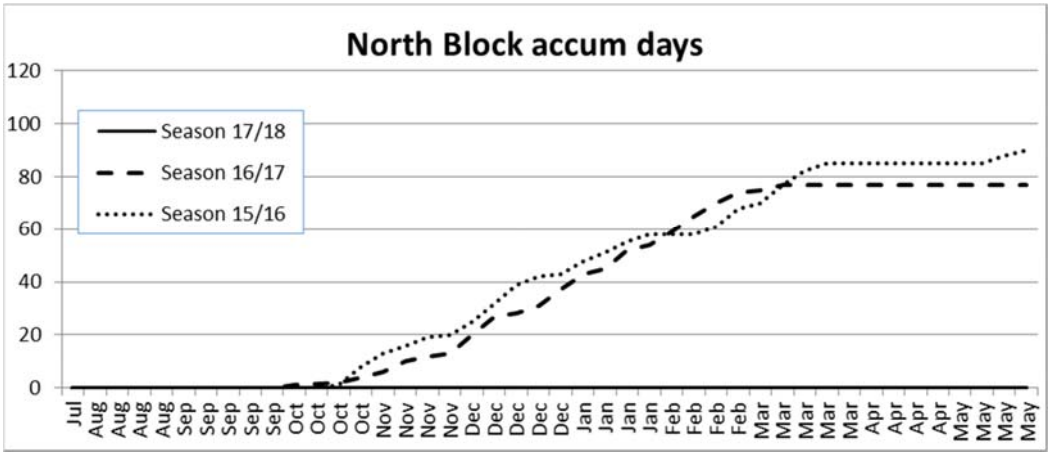




Similarly, Evapotranspiration (ET) is lower this year, and (hence) irrigation is yet to start.



Irrigation has typically begun in September with a few days irrigation depending on soil moisture and rainfall events. Cumulative irrigation days (as shown for the North Block below) show a delayed start to irrigation for 3 successive years. Recent wet weather (7-9th October) will further delay the start of irrigation this season.

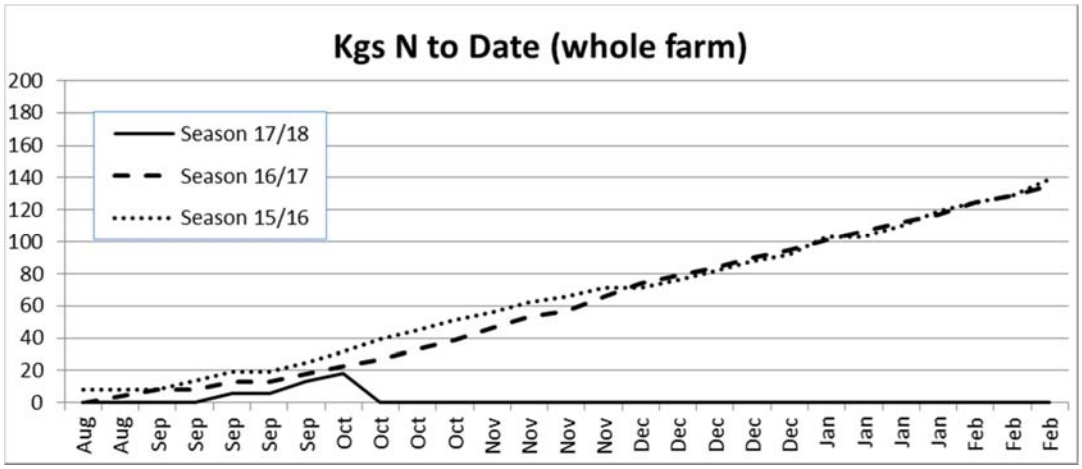


Fertiliser and growth

LUDF applies nitrogen when soil temperatures and ground conditions allow for efficient Nitrogen responses. The first round of nitrogen is normally in the form of AMMO to provide some additional sulphate sulphur which is typically low at the end of winter. As soil temperatures increase, plant available sulphur naturally increases and subsequent rounds of nitrogen are in the form of urea.

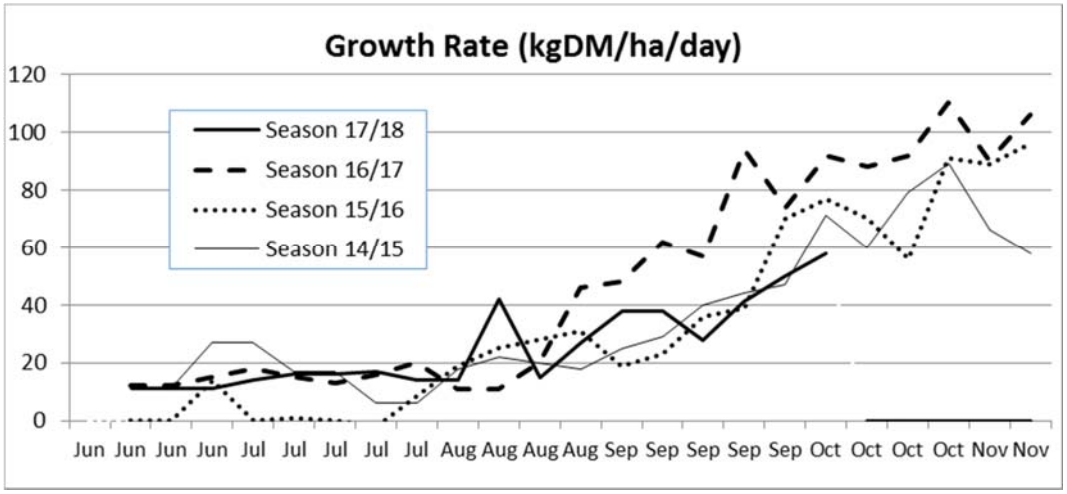
While soil temperatures in August and September were above minimum recommendations for N application (6°C and rising), excessive soil moisture was limiting both growth and the ability to apply nitrogen fertiliser. Total N applied to date is therefore less than previous years.

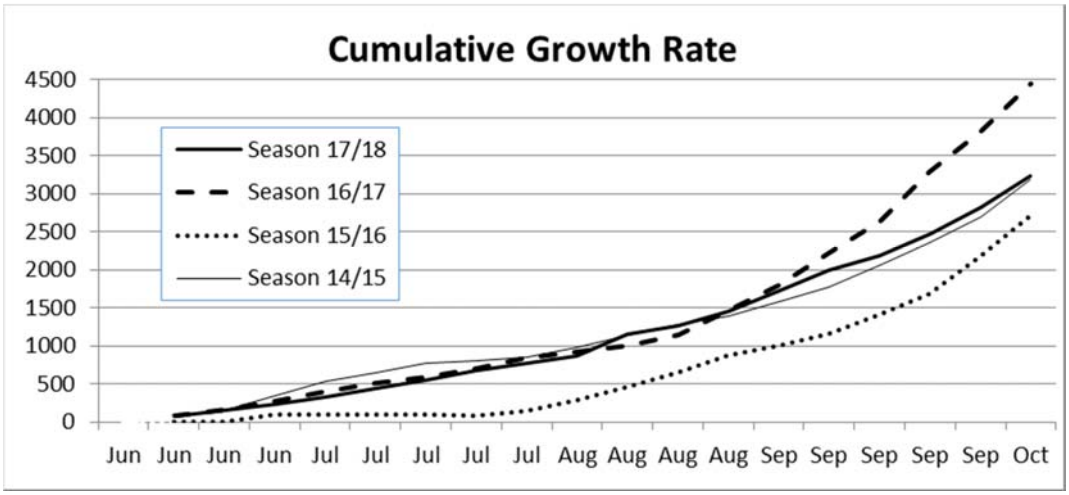
Aerial application of N was considered for paddocks too wet to get a fertiliser truck in without incurring pasture damage, however growth from paddocks this wet was deemed more likely to be limited by excessive moisture than lack of available nutrients. Applying additional N to saturated soils was unlikely to enhance growth, but increases risks of leaching from fertiliser, and removes the ability to use that nitrogen later in the season when higher agronomic responses are likely.



Growth rates for most of this winter, were, on reflection similar to three of the past four seasons, and better than 2015/16. Last season - 2016/17 - growth rates increased markedly in late August, whereas growth this season has remained more similar to 2014/15 (and 2015/16 in August-September). It is only in the latter part of September that this seasons growth is below the previous three seasons.

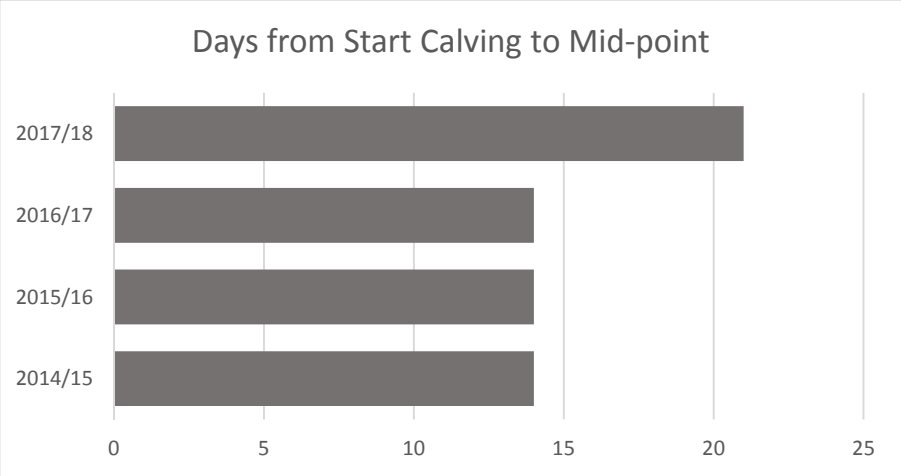
Lower growth rates at this point are the likely combination of cloudy, wet weather, saturated soils, high pregrazing covers and a long grazing period as dry cows followed the milkers to get post grazing residuals to a low and consistent height. In addition there is some pugging damage and a lack of sunshine.

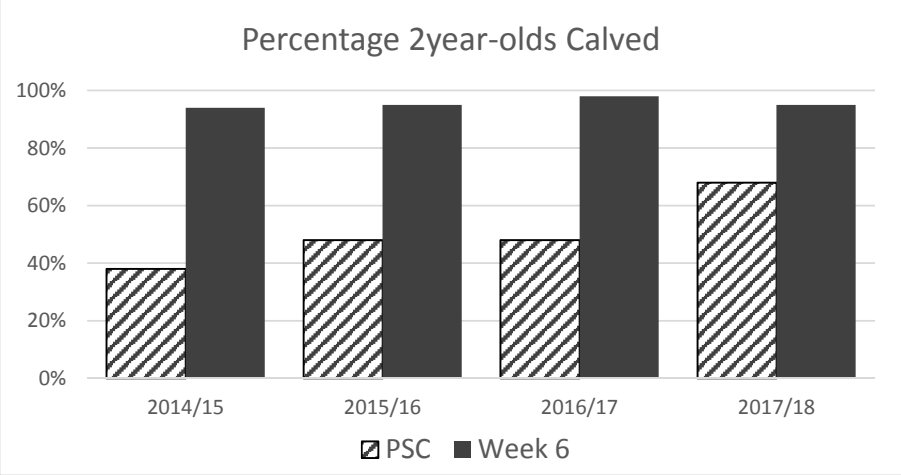


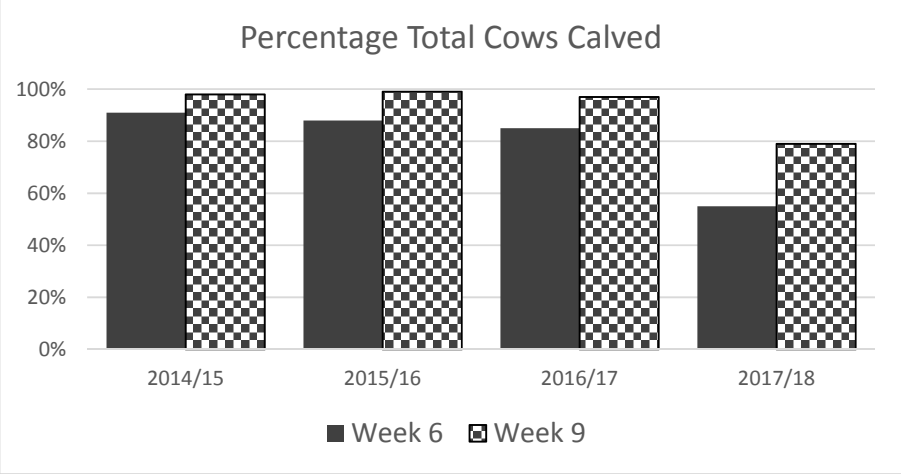


Calving Spread

Calving spread for the heifers was faster than planned, with 2/3 heifers calved at the planned start of mating, then slower than anticipated for the mixed age cows. The midpoint of calving was 3 weeks after planned start calving, compared to 2 weeks in recent years and only 55% total cows had calved by week 6 this year, compared to 85-90% previously.







Age Spread - calved cows in milk

	2014	2015	2016	2017
2 year olds	117	127	145	142
3 year olds	101	88	105	113
4-8 year olds	333	315	273	263
9+ year olds	10	26	36	39
	561	556	559	557 (to date)

Feed Management

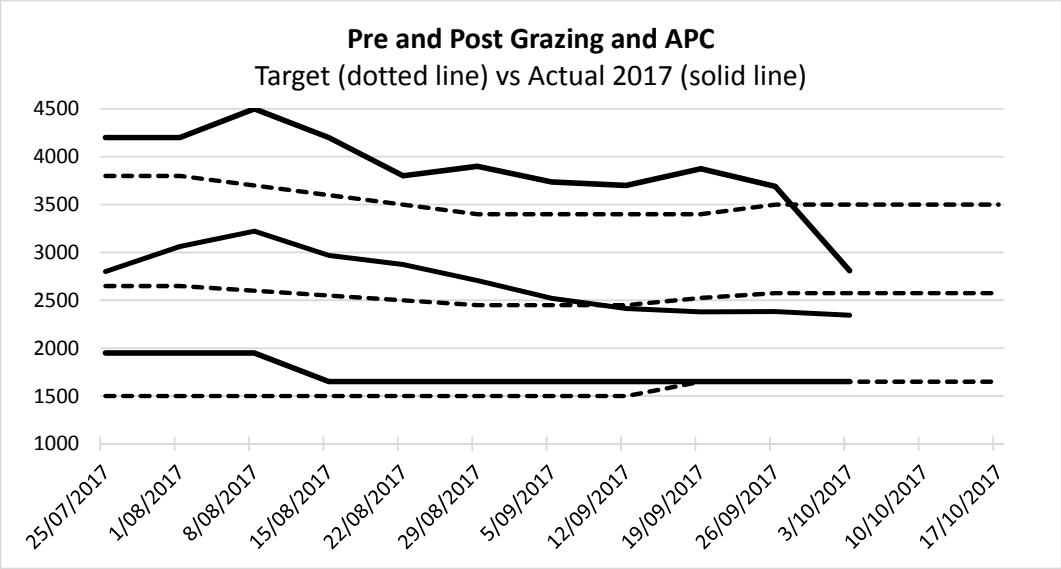
LUDF uses the Spring Rotation Planner (SRP) to manage the variability of actual winter growth rates, calving spread, feed demand, ground conditions and rate of regrowth. It is a plan, not a fixed immovable structure, with silage, actual calving spread and therefore feed demand, and ground conditions all impacting actual vs planned area grazed on a daily basis.

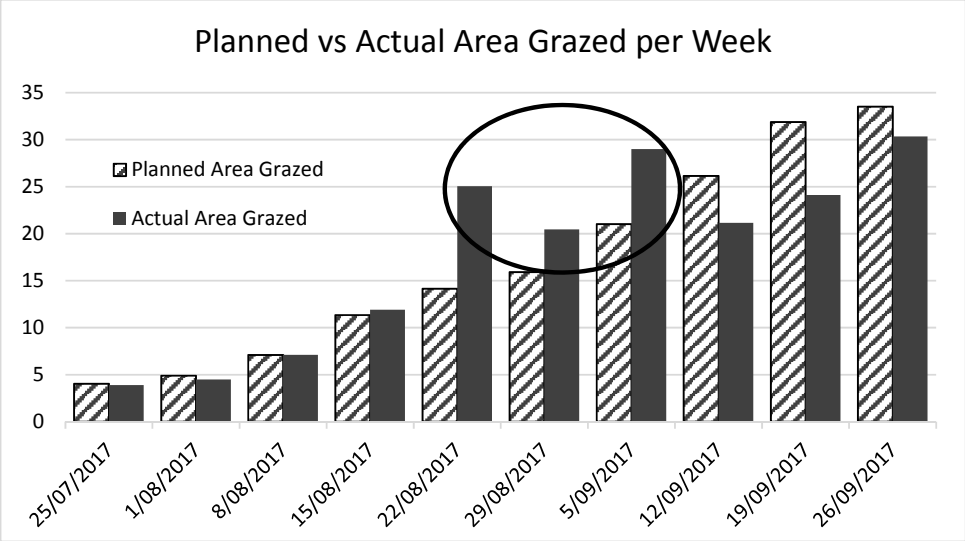
The plan anticipates feed demand on a weekly basis assuming milking cows are fed 'well' with silage topping up any daily deficit so that the first grazing round finishes at or about the 23-25th September.

With the good growth conditions of winter and the wet conditions of the start of the season, LUDF started the SRP at planned start of calving with an Average Pasture Cover (APC) around 400 kgDM above target. This allowed the farm to:

- Accumulate additional Average Pasture Cover (APC) during the early part of calving,
- Have the ability to graze more area than that allocated by the SRP on a daily basis to avoid pugging damage through the wet weather, with the confidence to not run into a feed deficit
- Avoid having to feed supplements until mid-September period
- Use dry late calving cows to graze down to residuals in paddocks previously grazed by milking cows ensuring cows were eating as much as they could.

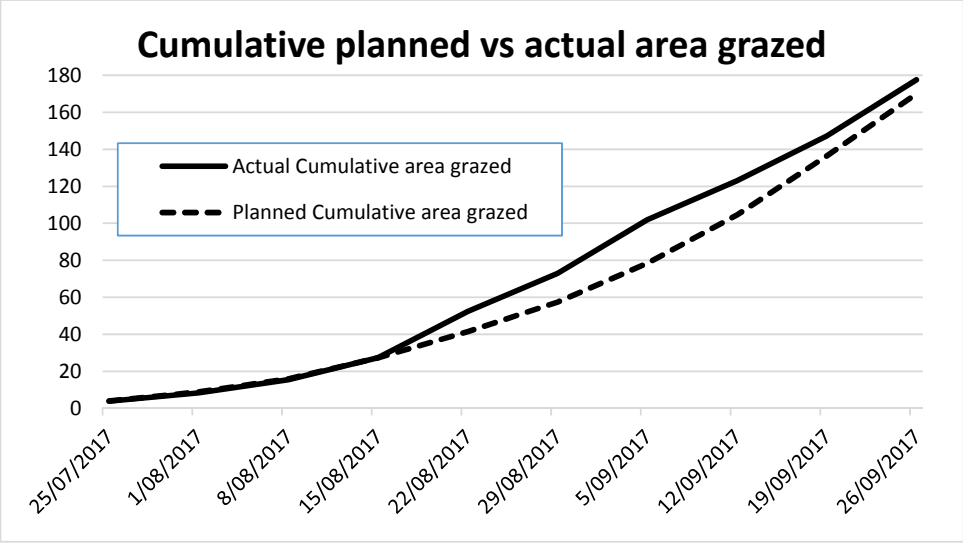
The graphs and table below show how the SRP worked through this period.





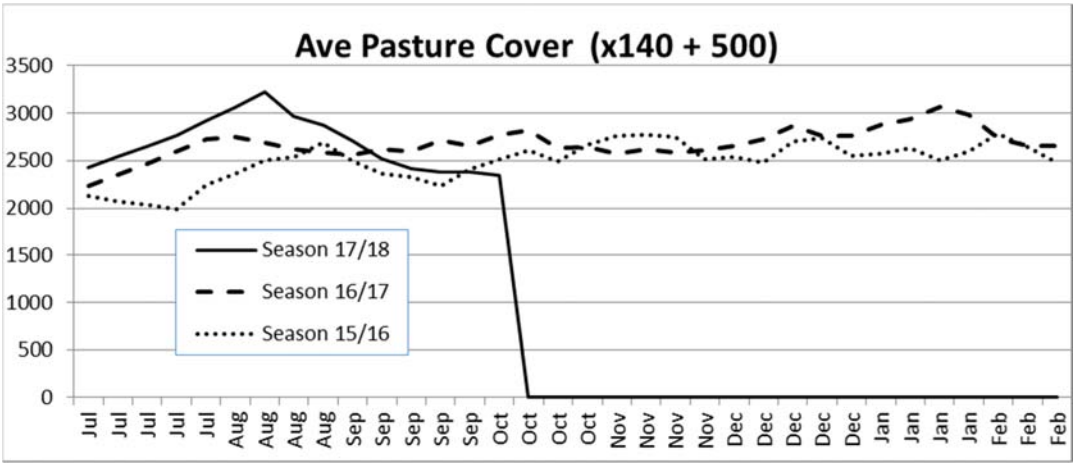
Note the area grazed was significantly ahead of planned area grazed for three consecutive weeks, (22 August to 5 September), resulting in a total of 23ha more grazed over this time. Continuing at this pace would have resulted in ending the first grazing round at least 1 week ahead of the plan. Pregraze covers in the second round would therefore have been well below target requiring large amounts of silage through the second round.

The additional area grazed was necessary at the time to limit pasture damage, and was supported by high pregrazing covers (3800kgDM/ha). To avoid pasture damage however, target grazing residuals could not be consistently achieved, and pasture utilisation with the milkers was less than desirable. Where possible, dry cows were subsequently used to graze out these paddocks however this is likely to have slowed regrowth as grazing occurred over an extended period of time.



Week Ending	Average Number Milking and colostrum Cows	Planned area grazed per week	Planned Cumulative area grazed	Planned Cumulative Supplements fed (kgDM/wk)	Actual area grazed per week	Actual Cumulative area grazed per week	Actual Supplements fed (kgDM/week)	Actual Cum. Suppl fed (tot kgDM)
18/07/2017	34							
25/07/2017	50	4.0	4.0	1006	3.89	3.89	0	0
1/08/2017	98	4.9	8.9	2844	4.5	8.39	0	0
8/08/2017	137	7.1	16.0	8173	7.11	15.5	0	0
15/08/2017	193	11.4	27.4	18498	11.91	27.41	0	0
22/08/2017	277	14.2	41.5	30293	25.06	52.47	0	0
29/08/2017	335	15.9	57.5	46874	20.47	72.94	0	0
5/09/2017	379	21.0	78.5	61889	29	101.94	0	0
12/09/2017	423	26.2	104.6	72104	21.15	123.09	9677	9677
19/09/2017	464	31.9	136.5	89548	24.11	147.2	10368	20045
26/09/2017	512	33.5	170.0	89548	30.34	177.54	16865	36910
3/10/2017	530	41.5	211.5	89548	44.23	221.77	9216	46126
10/10/2017		44.0	211.5	89548		221.77		46126
17/10/2017		44.4	255.5	89548		221.77		46126

Comparing with previous seasons, the farm started calving with the highest Average Pasture Cover (APC) for the last 3 seasons, while the slow regrowth has resulted in the lowest APC now.

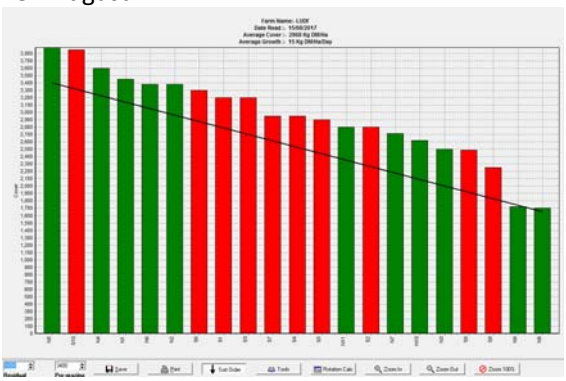


The following feedwedges - from 8th August to 26 September show the impact of slower regrowth coming through the farm as the area grazed and regrowing builds through this time.

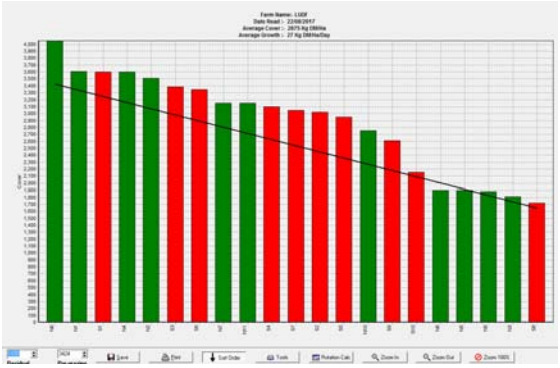
Note the last graph - 26th September - has a different scale with a smaller range from pre to post grazing residuals. Pregrazing covers in the majority of the first grazing round (8th August to 19th September) were 3700-4100kgDM/ha, vs 3100 at 26th September.

8th August

15th August



22nd August



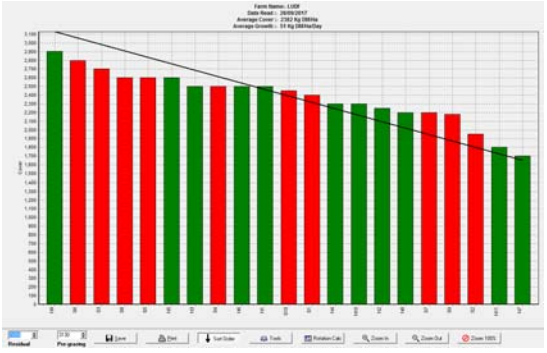
29th August

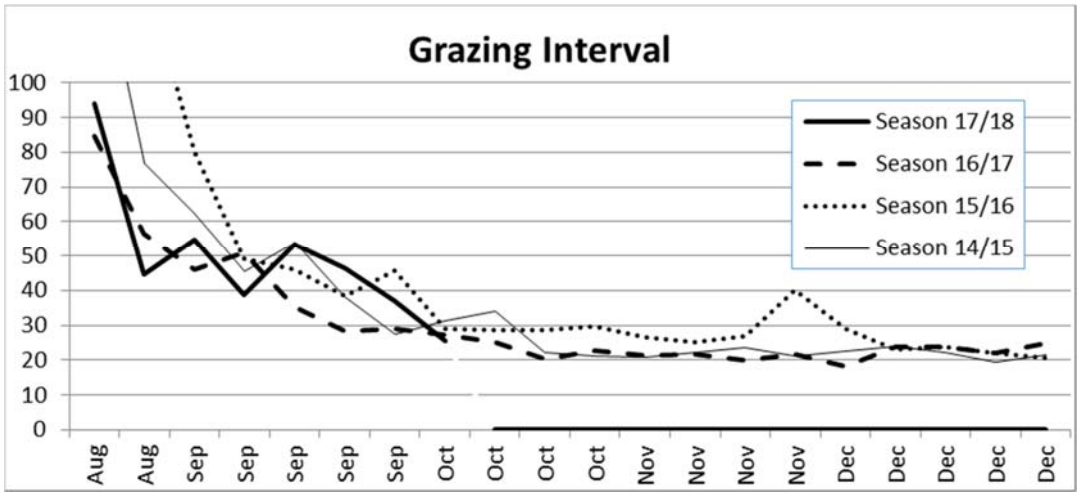
5th September 2017

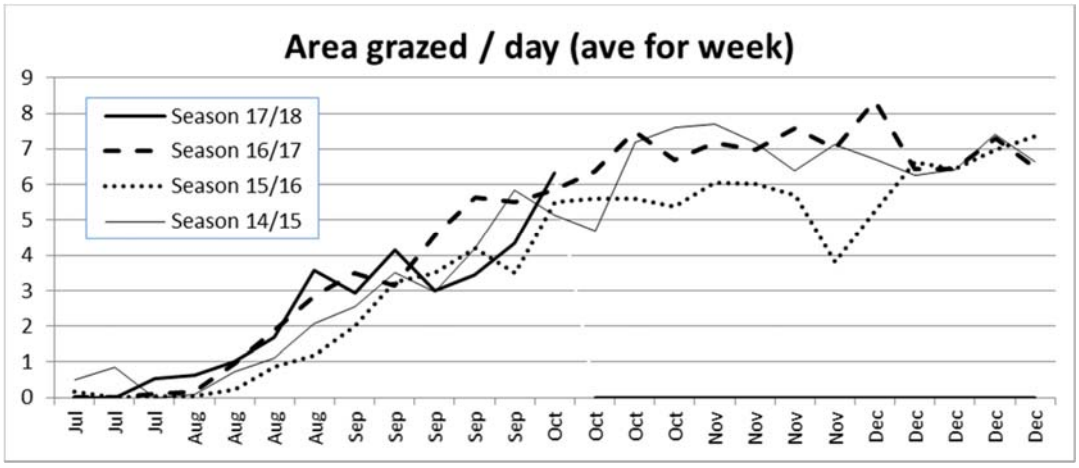
12th September

19th September

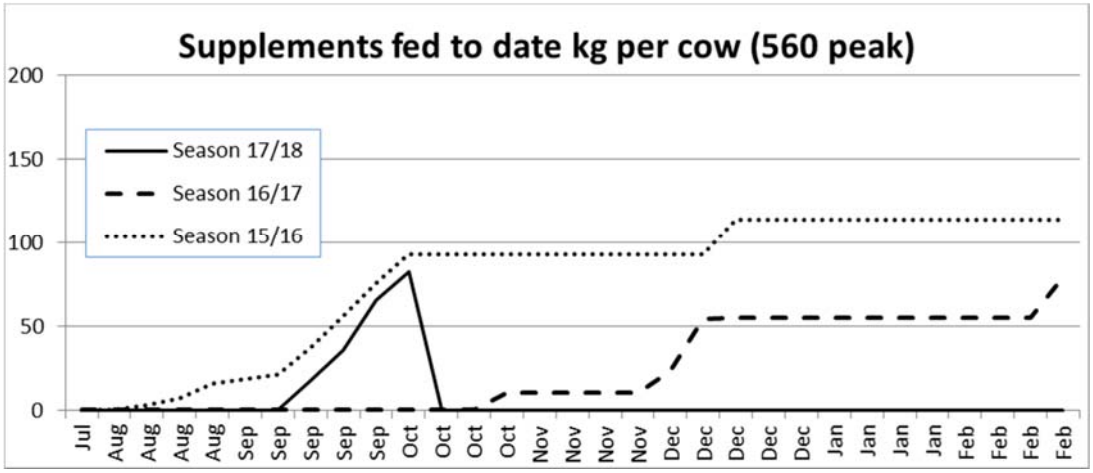
26th September



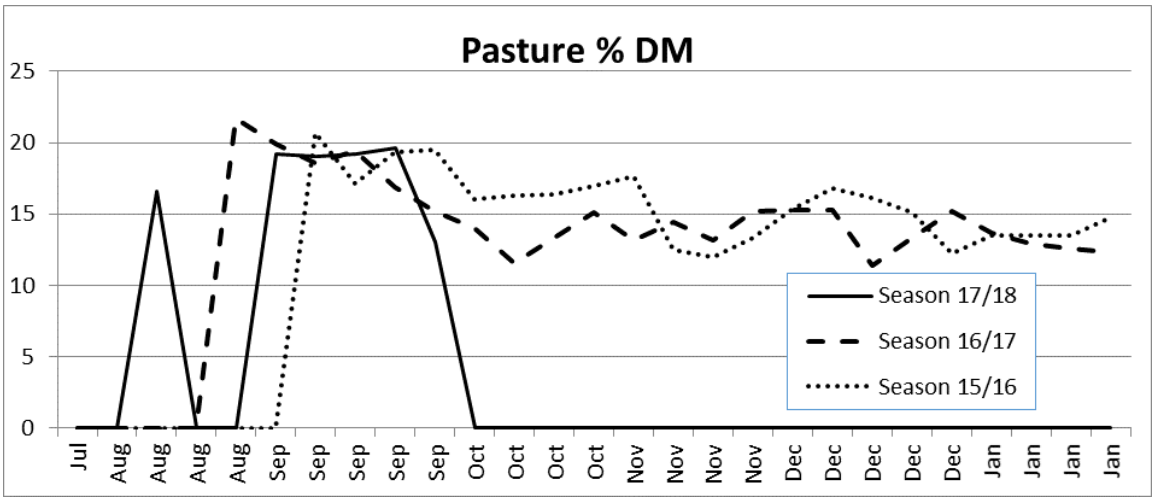


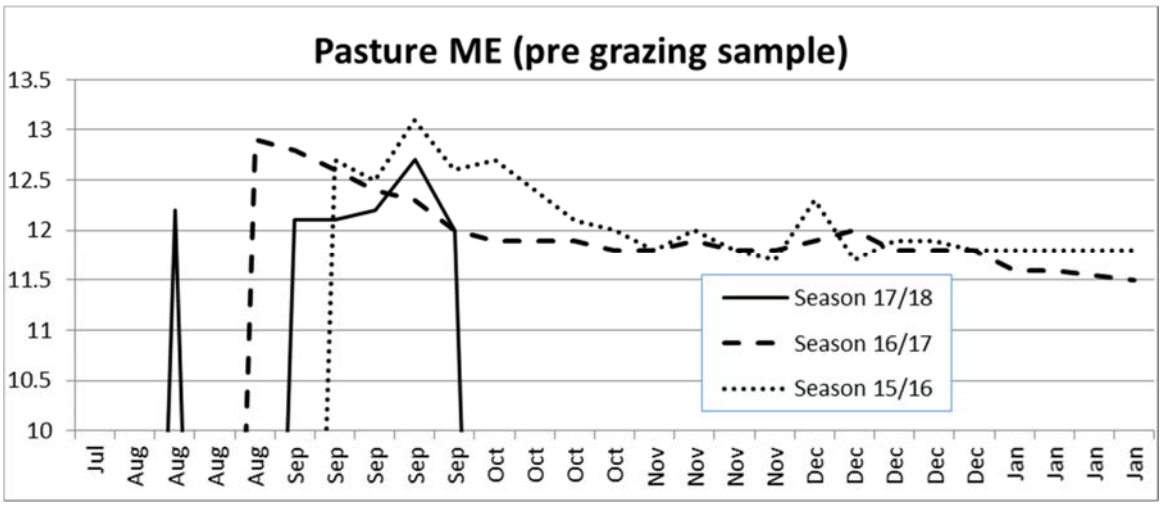


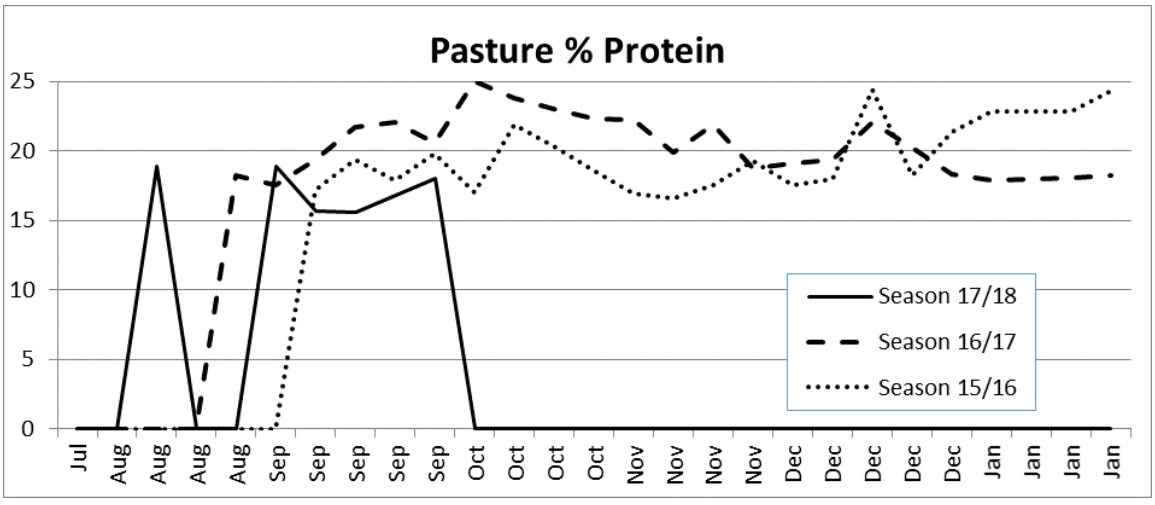
Total supplements fed to date remain approximately half that allocated in the spring rotation planner with an average of 82kgDM/cow fed as at the 3rd October.

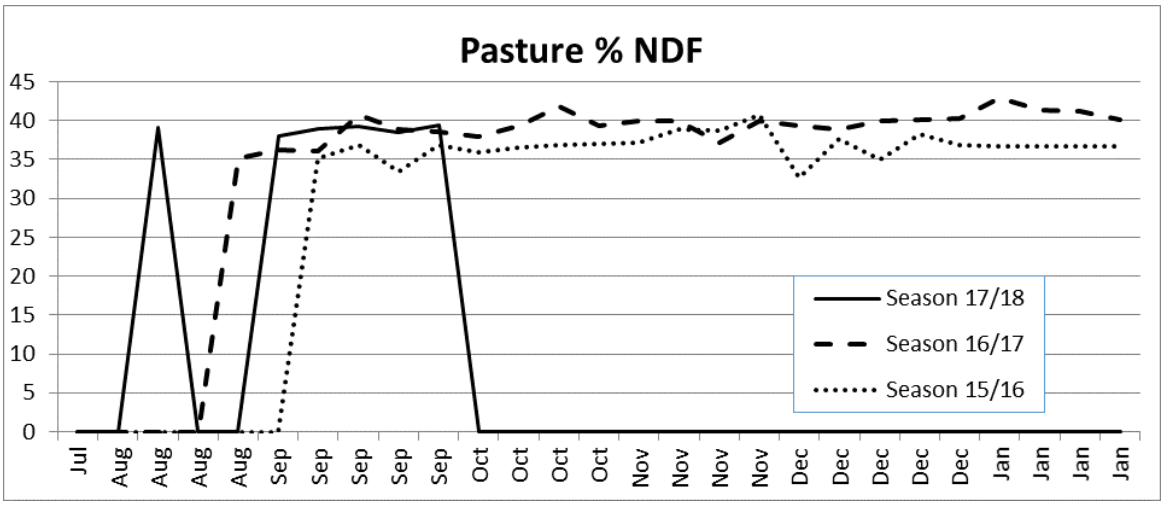


Pasture Quality









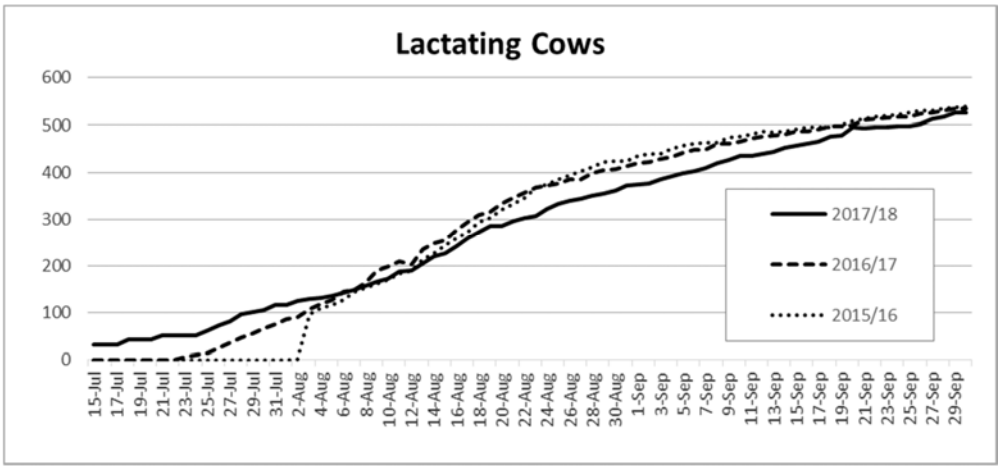
Comparing first and second round pasture quality results, DM% has dropped from around 20% down to 13% as is expected for good quality regrowth after grazing winter saved pasture.

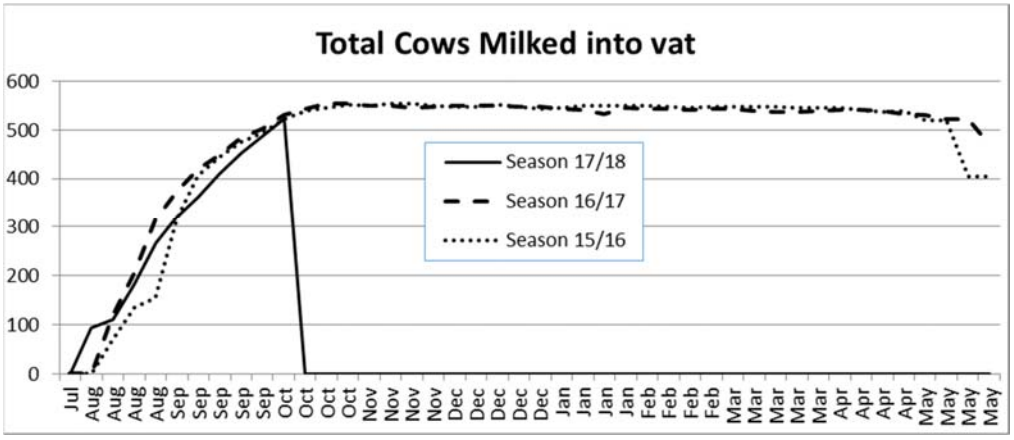
ME and ND have remained stable with no obvious changes between first and second round grasses.

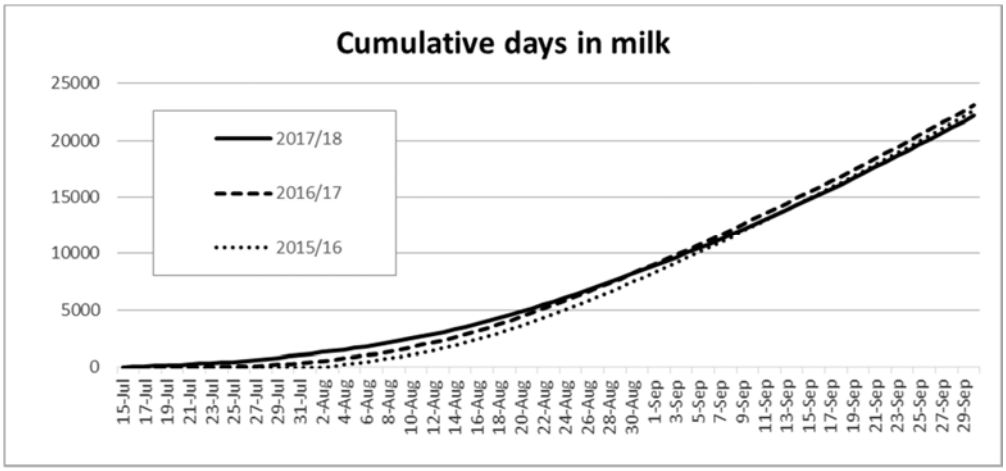
Interestingly, though, the protein % in the pasture seems to be consistently lower than in previous season for both winter saved and regrowth pasture samples. Given dairy cows require 18% protein in the diet, some of the pasture samples suggest the diet is potentially limiting in this manner.

Milk Production

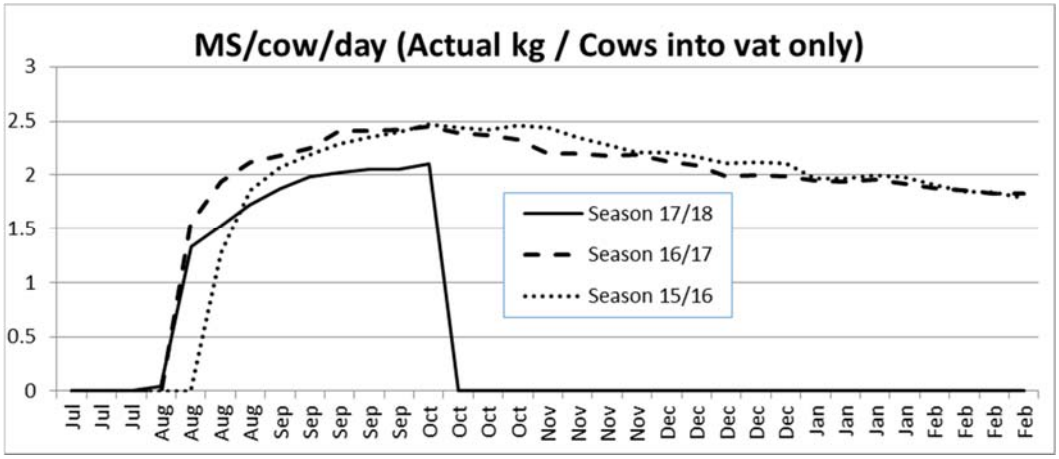
As noted above, this season's calving occurred slower than predicted by MINDA reports, with the exception of the heifers which calved early. This resulted in more lactating cows and more days in milk until early August when the trend reversed. Cumulative days in milk at the end of September therefore appear only marginally behind past years, masked by the extra 7-10 days in milk at the beginning of calving.

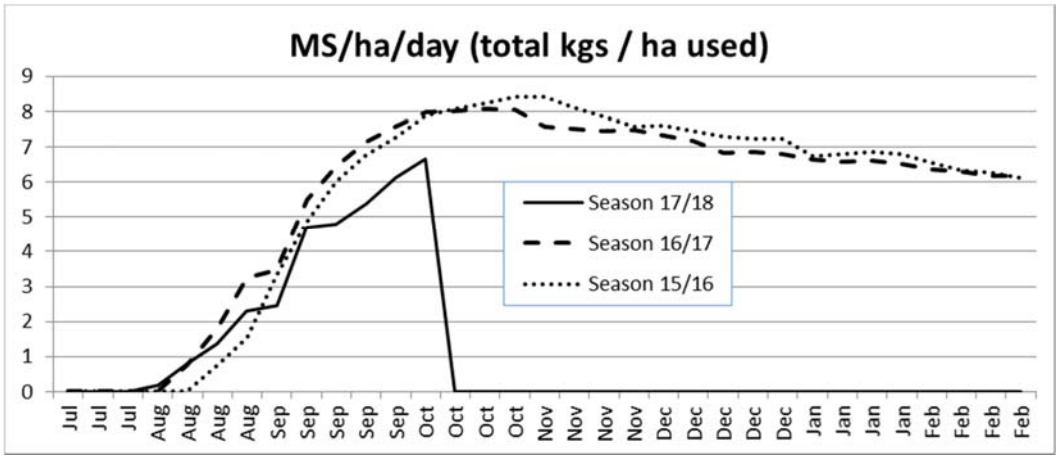






Year to date milk production per cow is the lowest of the past 4 springs, a combination of the wet weather, high pasture cover, slow calving spread etc noted above. Having less animals in milk has also impacted per hectare performance. As shown in the following graph, milk production had peaked around 2.4kgMS/cow in the past two seasons whereas per cow milk production at the same point this year is only a little over 2kgMS/cow/day. As some of this may still be impacted by the calving spread, there is a possibility the farm may still peak higher.





Herd Test Comparison - late September herd test:

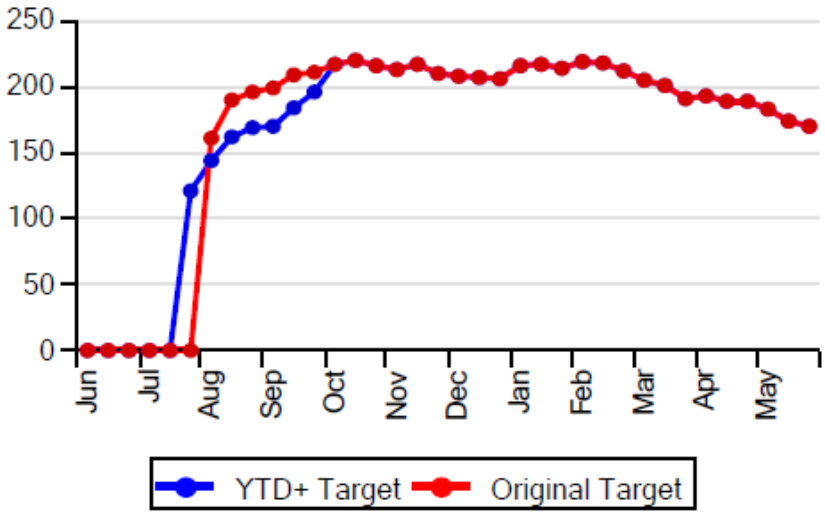
	2016	2017
2 year olds	1.99 kgMS/cow/day	1.69 kgMS/cow/day
Whole Herd	2.55 kgMS/cow/day	2.22 kgMS/cow/day

Regional Comparison:

All herds tested in same area in the last 14 days ending 27/09/2017

Region name	No. of herds	Herd size	Milk Volume	Fat (%)	Fat (kg)	Protein (%)	Protein (kg)	Milksolids (kg)
Canterbury	102	655	25.30	4.46	1.13	3.69	0.93	2.06
LUDF		488	25.50	4.74	1.21	3.96	1.01	2.22

Estimated ME Intake - Milking Cows

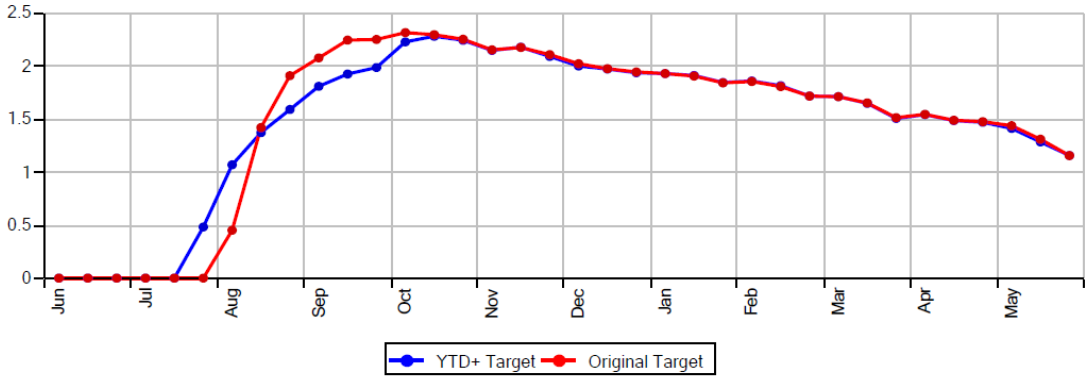


Note: in above graph, lower line is estimated ME intake - Year to Date - while upper line was original target. Similarly, in below graph, lower line is Year to Date, while upper line was original target.

Data courtesy of DSM.

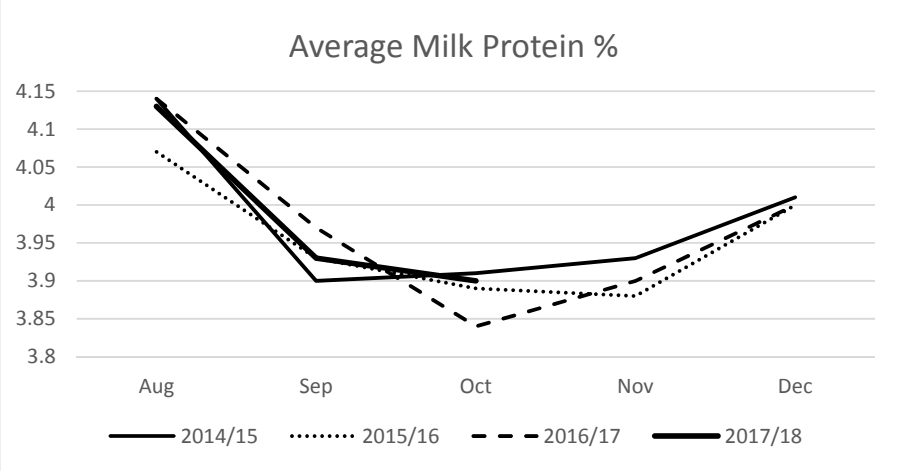
Daily Per Cow MS Actual vs. Expected

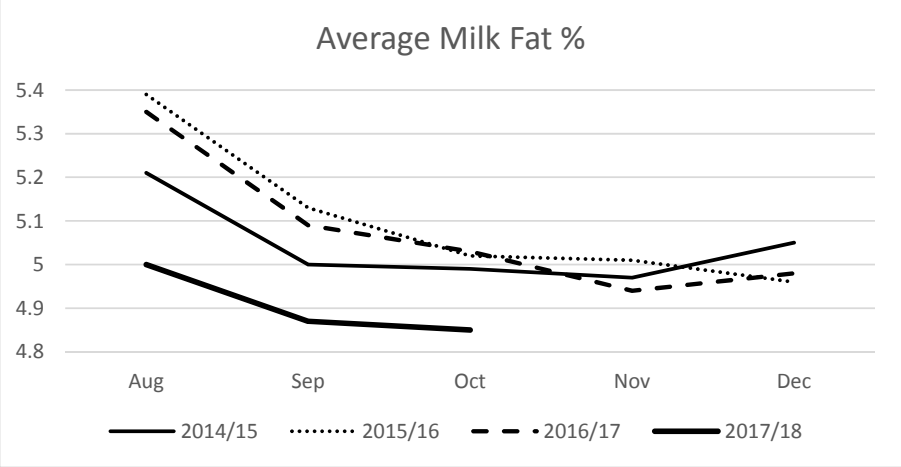
Total Solids (kg) 497 514

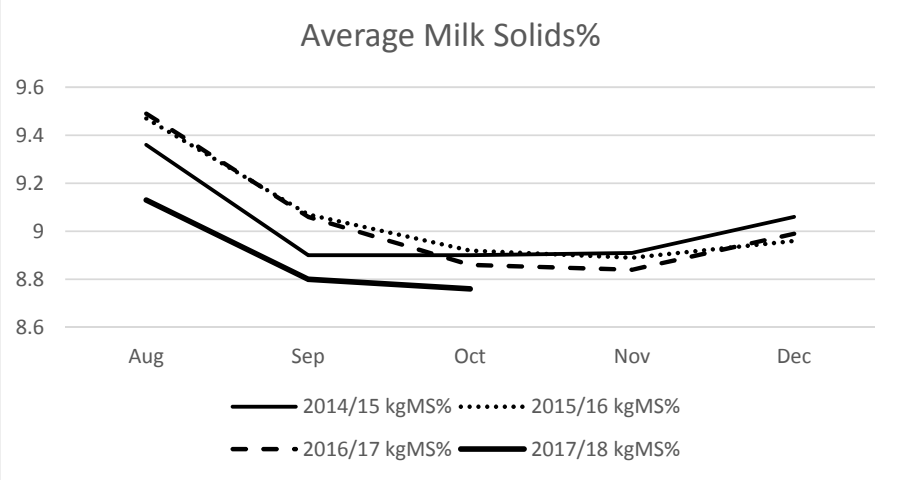


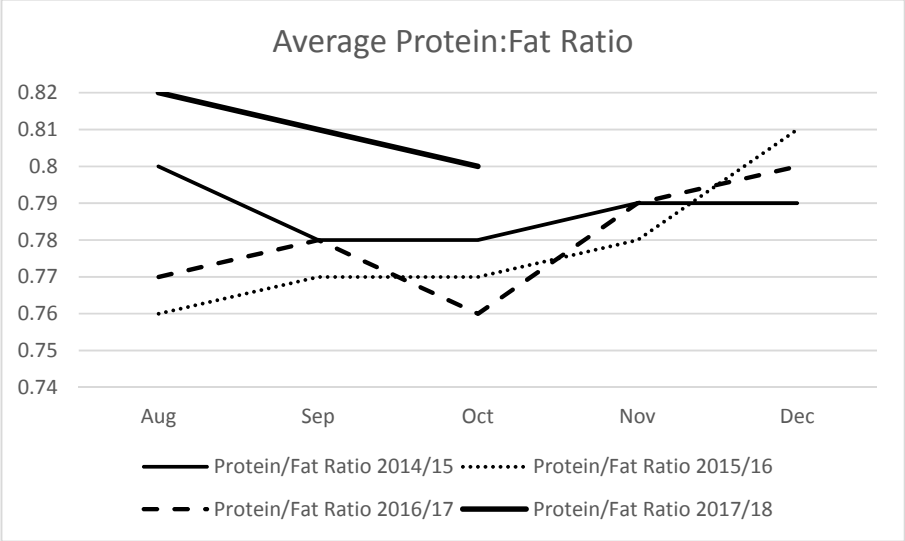
Milk Composition: (note October data for 2017/18 only includes 1-8 Oct)

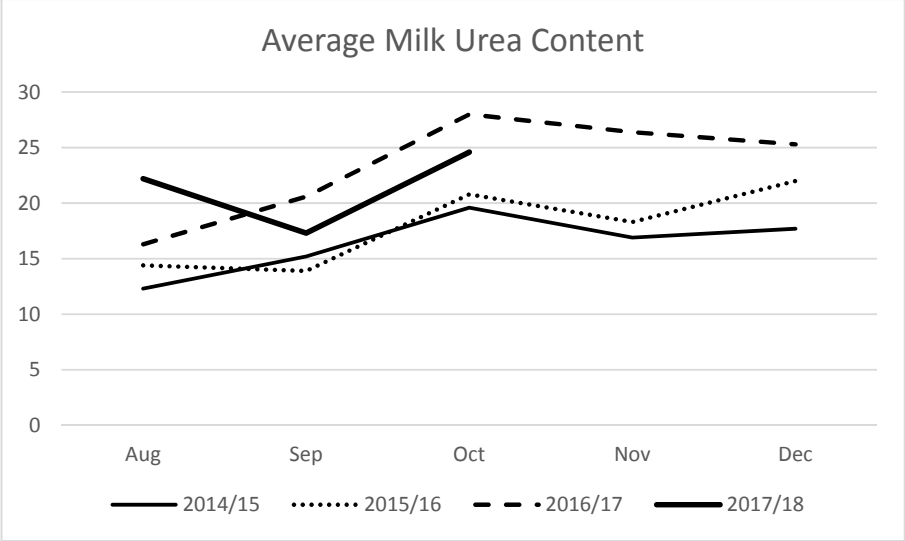
Average milk protein levels have been similar to past years, but milk fat% has been lower, leading to a lower milk-solids content and higher protein:fat ratio. Average milk urea levels are broadly similar to past years.



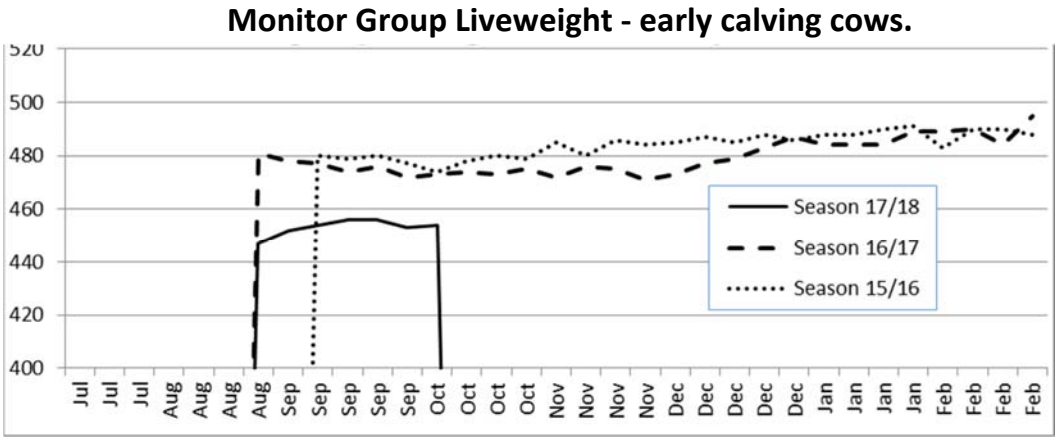





Average Protein:Fat Ratio
0.82
0.81
0.8
0.79
0.78
0.77
0.76
0.75
0.74
Aug
Sep
Oct
Nov
Dec
Protein/Fat Ratio 2014/15
Protein/Fat Ratio 2015/16
Protein/Fat Ratio 2016/17
Protein/Fat Ratio 2017/18


Average Milk Urea Content
30
25
20
15
10
5
0
Aug
Sep
Oct
Nov
Dec
2014/15
2015/16
2016/17
2017/18

Herd Liveweight



The graph above shows that on average, the liveweight of early calving cows is significantly lighter than previous years. It does appear to have a small positive trend in liveweight, rather than a flat or slightly negative trend as in past seasons. The monitor group comprises all cows (including first calvers) that have calved by the end of week 2 from planned start calving. This year it has 260 cows, compared to over 300 last year and has a higher percentage of heifers.

Winter management

All milking cows left the platform by end May and were trucked to Silverwood (Lincoln University support block in Hororata) to be wintered.

The feeding regime for these cows was as follows:

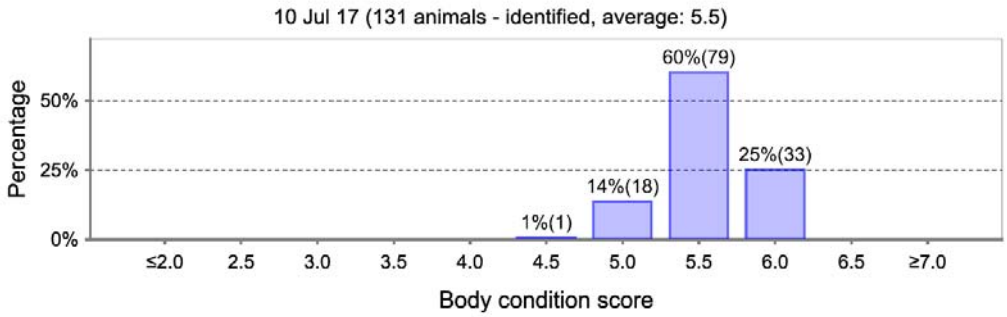
a. Light and early calving cows. Offered 11 kg FB/cow/day and 5 kgDM/cow/day silage
b. Middle BCS cows: 11 kg FB/cow/day and 3 kg DM/cow/day silage.
c. Fat cows: 7 kgDM FB/cow/day and 3 kgDM/cow/day low energy silage.

First calving heifers and rising yearlings were also on the same property and were fed a combination of fodder beet and silage through the winter.

Preparedness for calving

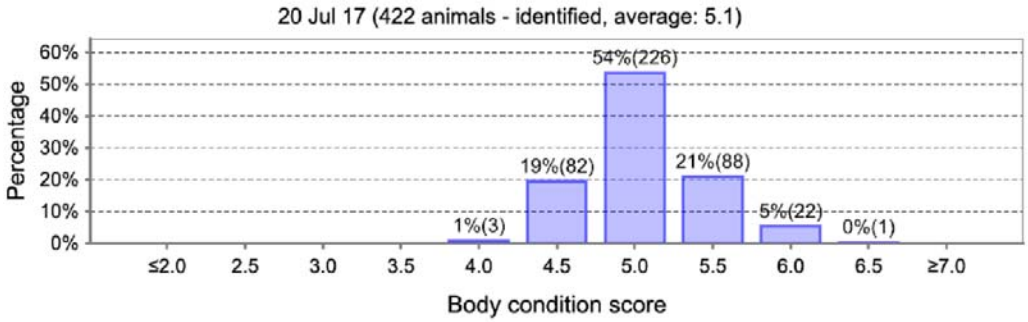
Heifers:

First calving heifers were brought back from the wintering block on the 8th July, condition scored on the 10th July and received a Selenium and B12 shot on the 13th July. They had received a second IBR booster vaccine on the 6th July.



Mixed age cows:

- 163 early calving cows were transported from Silverwood back to the East block on 21st July.
- At Silverwood, remaining cows were split in 2 mobs:
  - Cows below 5 BCS and 3 year olds below 5.5 BCS
  - Cows above 5 BCS.
- All remaining cows returned from winter grazing on the 11th August.



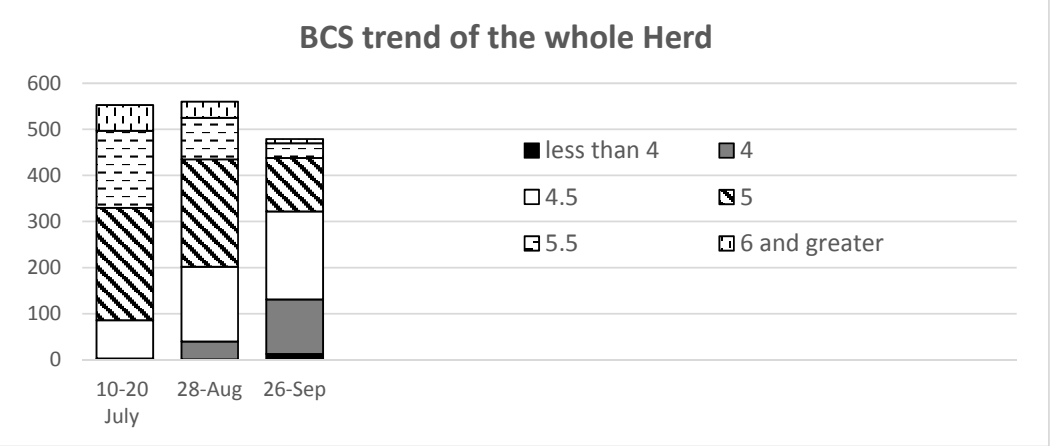
All cows and heifers returning from Silverwood were initially grazed on either the East block and or Jackie (nearby lease block) on a mixture of pasture and silage. Later in August, as ground conditions allowed, dry cows were brought onto the milking platform to graze behind the milking cows.

Body condition score changes from mid May to mid July (winter feeding);

- Light CS cows increased from 4.0 to 4.9
- Mid CS cows increased from 4.4 to 5.0
- Fat cows increased from 5.2 to 5.5
- Herd average was 5.1, with 21% of the herd calving still below their calving BCS target at that time.

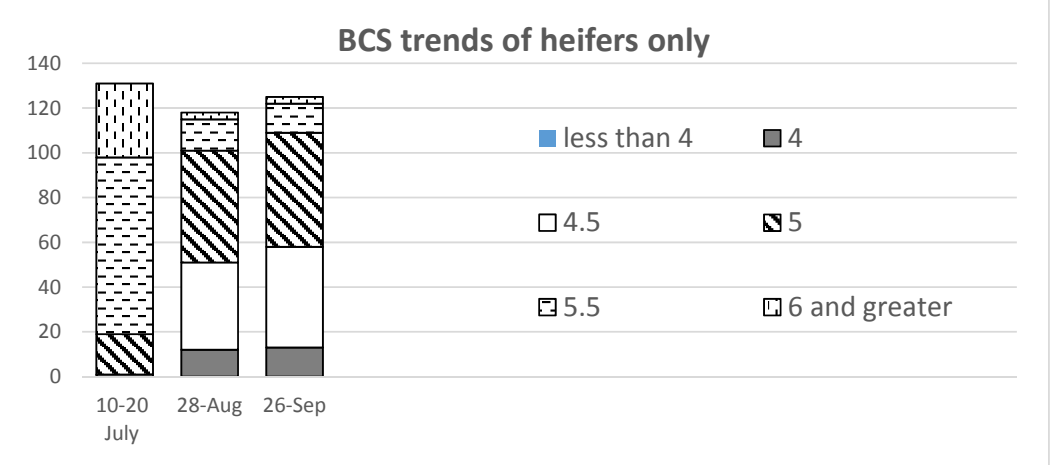
Body Condition Score

Below are the BCS trends for the whole herd, the heifers only and the mixed aged cows.



As a whole herd, around 80 animals were below the calving target of CS 5.0 at their last CS event precalving. No cows were below BCS 4.5 precalving. As is to be expected, the average CS of the herd has declined since calving started.

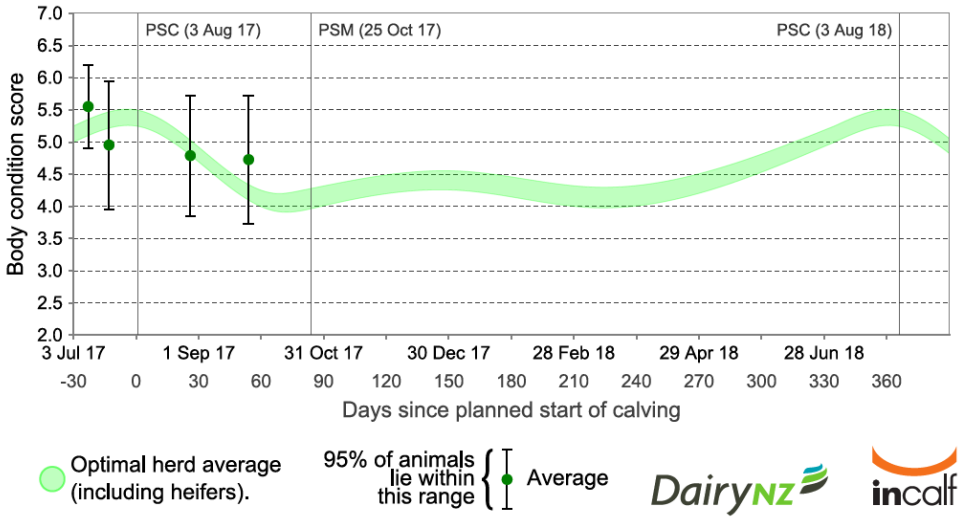
The graphs below show that as a group the heifers achieved their calving BCS targets of 5.5 in early July, but lost almost half a BCS unit during the wet weather in late July. Around 15% were below their target with a calvng BCS of 5. On average the BCS score of the first calvers has remained stable since late August, with 90% at or above CS 4.5.

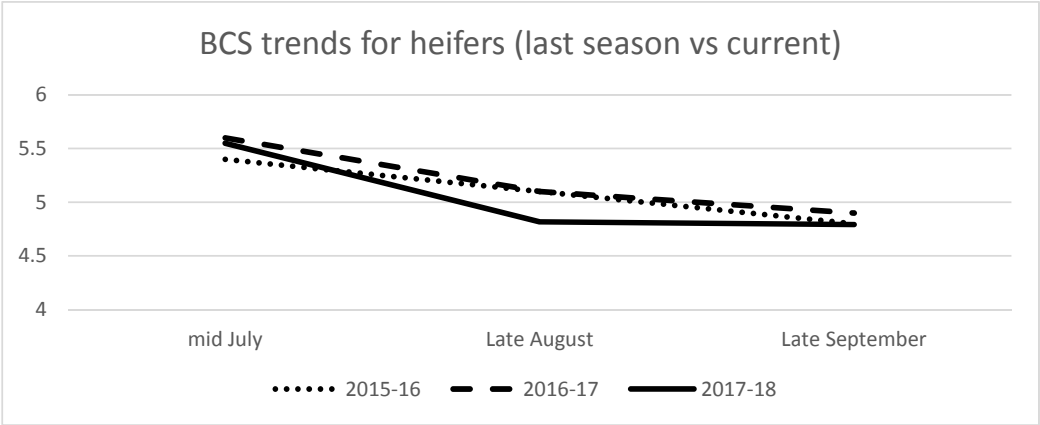


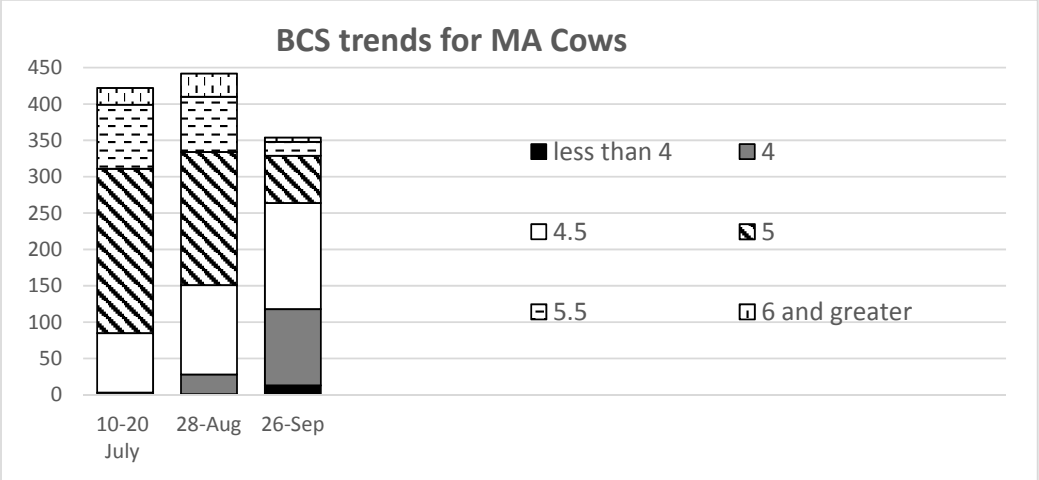
Animal group: 25.9.17 Young Cows and Light Mob

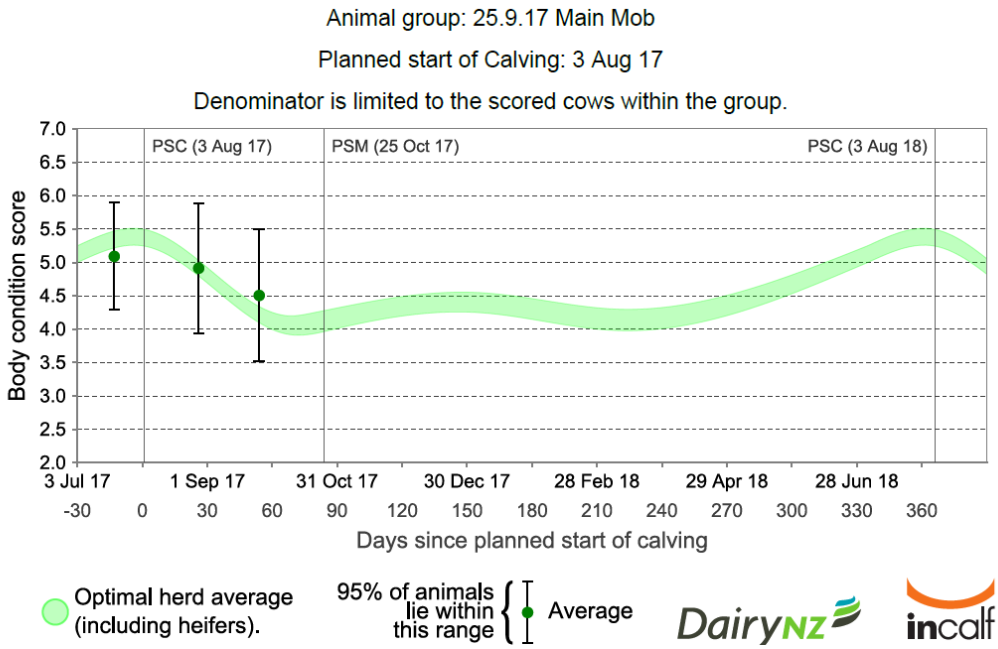
Planned start of Calving: 3 Aug 17

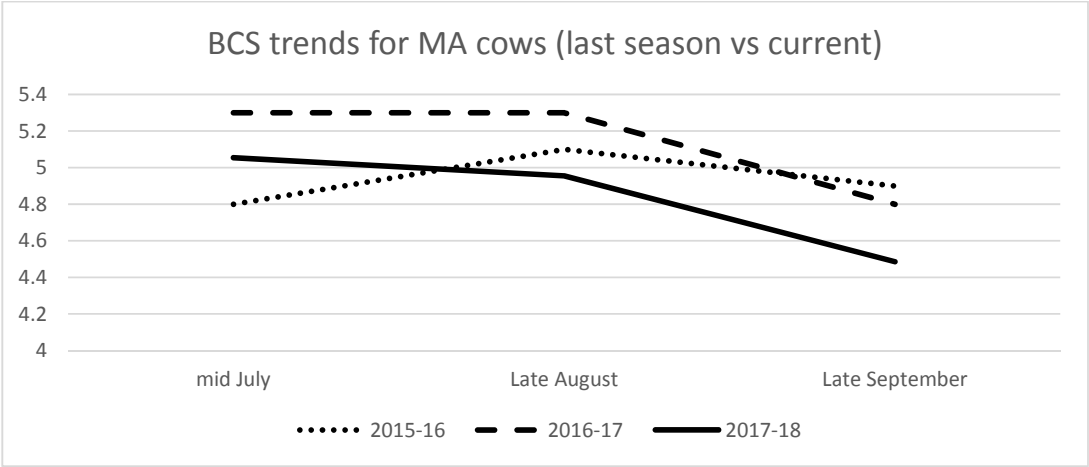
Denominator is limited to the scored cows within the group.











Within the mixed age cows, around 19% of the group were not at target CS for calving by mid-July, though note within these cows are the later calvers which have had more time to get to CS 5. The average BCS of the MA cows was just above 5 in mid-July, then dropped to just below 5 for late August, but by late September the herd average BCS of mixed age cows was down to 4.5.

The range in CS at the end of September this year compared to early October 2016 is as follows:

	6th October 2016	**26 September 2017**
BCS 4 or less	21% (112 cows)	27% (131 cows)
BCS 4.5	36% (193 cows)	40% (191 cows)
BCS 5 or greater	43% (237 cows)	33% (157 cows)
Total Cows individually scored	542 cows	479 cows

Animal Health

Cow losses through winter and calving:

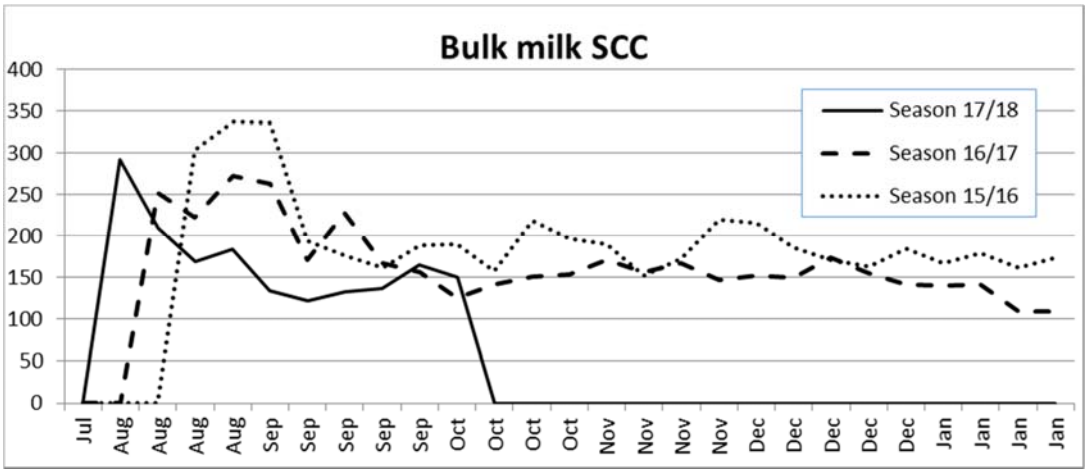
A numbers of slips happened during the wintering period, and 12 cows have died during winter and calving. Although an accurate diagnosis of the causes of death is not always achievable, some of contributing factors are as follows:

- 6 cows aborted while at the wintering block. 4 were culled as they did not come into milk and 2 came back to the platform and died of unknown reasons
- 1 cows died on fodder beet
- 4 cows died of milk fever and hypothermia
- 2 cows died cast
- 2 cows died following broken legs

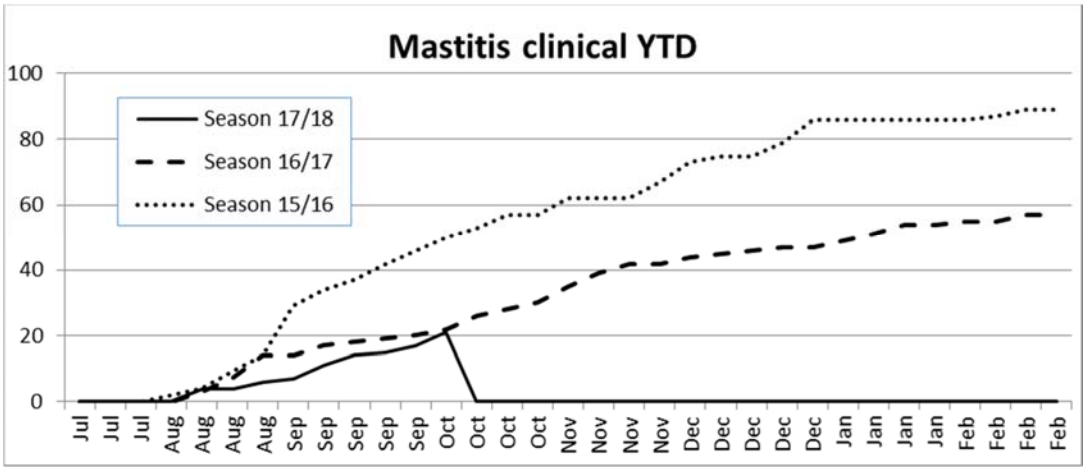
Other health issues:

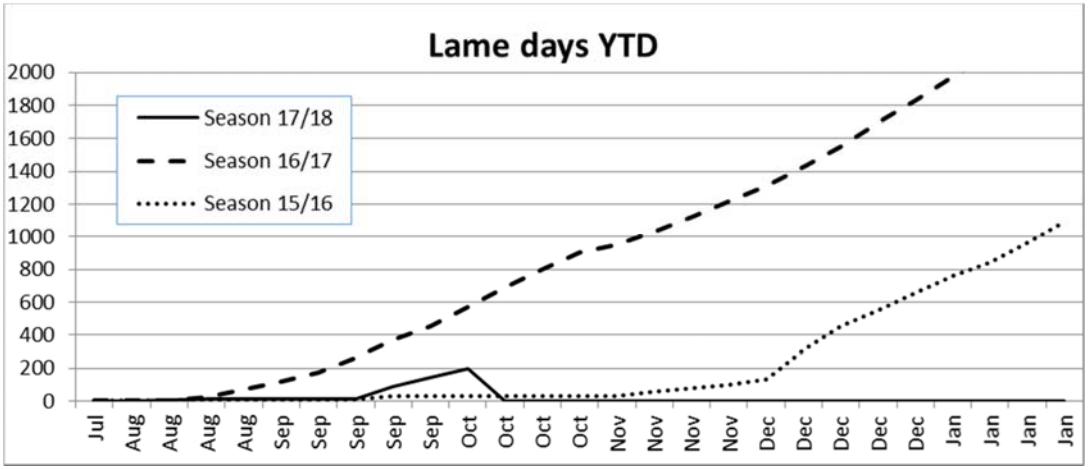
There were also approximately 3-5 cows treated for acidosis and around 10 animals treated with lameness while at Silverwood.

Bulk milk SCC was initially higher than last season and then dropped to the lowest levels experienced over the past 3 seasons.



The number of clinical mastitis remains at similar levels to last season and well below the 2015-16 season.





The cumulative lame days-to-date have remained above 2015-16 levels but well below 2016-17 levels even with the extremely wet weather conditions we had during this season.

Macro-mineral Management - Winter/Spring 2017/18 season

The objective of the herd mineral program was to maximise the animal health status of the herd. The program, thus far can be split into three seasonal blocks:

Winter

The primary animal health objective over this period was to increase the cow condition score. Cows were fed a diet of fodder beet and silage. Minerals (iodine/selenium/copper/zinc/cobalt) were added to the drinking water via a dosatron system. This system was limited by the cows' daily water intake which was minimal during wet weather events. Analysis of fodder beet and silage samples showed that the diet was deficient in phosphorus (actual 25g per cow vrs required 34g). Hence phosphorus was supplemented in the form of DCP (dicalcium phosphate) at a rate of 50g per cow per day mixed into the silage.

Condition score changes (19th May to the 20th July) were as follows:

- Light mob increased from 4.0 to 4.9
- Middle mob increased from 4.4 to 5.0
- Heavy mob increased from 5.2 to 5.5

Early spring

The objective was to minimise the incidence of down cows and RFM's (retained foetal membranes) over calving. The herd was given a short acting selenium injection prior to calving. Trace minerals and magnesium chloride (50g per cow per day) were added to the dosatron. Initially the springers and dries were given 100g of mag oxide daily. Colostrums were given 100g mag oxide and 200g of lime flour. We ended up with approximately six RFM cows so less than 1% which is an excellent animal health KPI.

Unfortunately, early on, the incidence of milk fever cows was high resulting in a number of associated deaths. This situation prompted blood testing of a sample of new mums (day 1. colostrum's) to check their macro mineral (calcium, magnesium, phosphorus) status. Calcium and phosphorus were both low. Magnesium was on the high side. There was no subclinical ketosis. These results lead to the addition of DCP to the springer diet at 100g per cow per day spread on the silage. This dietary modification appeared to make a difference as incidence of down cows dropped off.

In order to determine why blood calcium/phosphorus was low we submitted silage and grass samples for DCAD (dietary cation anion difference) analysis. The pasture sample had a DCAD of 453 and the silage 310 so the daily DCAD intake averaged about 400. **The target is less than 300** and **ideally below 200**. At this point we considered modifying the dietary DCAD by either introducing hay/ryegrass straw or an anionic salt (eg mag sulphate). In the meantime, as the incidence had dropped off, none of these modifications were actioned. To date we have had approximately forty milk fever cows compared to sixty last season. For next season there is discussion around introducing low DCAD silage or hay/ ryegrass straw into the springer mix. We are also planning on replacing some of our mag oxide with mag sulphate pre calving.

Mid spring

Six early calving high producing cows and four early calving heifers were blood sampled in early September. Results showed that selenium (678mmol/L) and Iodine (62 ug/L) were both on the low side. Calcium, magnesium, phosphorus and copper levels were all within normal ranges. Following this finding extra iodine and selenium were added to the daily dosatron mineral mix.

Yearling mineral program

Blood samples were collected on the 1st September to check micro mineral levels. Selenium was on the low side. All animals were given a 20g copper bullet and short acting selenium injection. They are currently receiving daily minerals with extra iodine added through the dosatron.

LUDF Mating Plan - Spring 2017 - DRAFT as at end September:

Primary breeding objective: increase number of cows calving early while breeding high quality replacement calves. Secondary objective is breeding suitable calves for sale as either replacement calves or high quality dairybeef animals.

Yearlings - 15 days prior to PSM of main herd - ie planned start mating for Yearlings **10th October**

Period	Bull Details	Notes
The Day Prior (9th October)	*Tail paint and apply K-mars ready for daily observation and AI*	
Day 1-6 10-15 Oct	Daughter Proven Kiwi XX (easy calving sires only)	24hrs after heifers are AI'd, they are moved to a new paddock and run with the bulls
Day 7 16th Oct	Daughter Proven Kiwi XX (easy calving sires only), *PG all yearlings not yet mated*	
Day 8-12 17-21 Oct	Daughter Proven Kiwi XX (easy calving sires only)	
Day 13- Day 63 22 Oct - 12 Dec	Natural mating with 2 year old Jersey Bulls.	

Note: 146 yearlings expected to be mated. At 99% submission rate = 131 submitted, 7/day.

Main Herd - Planned Start Mating - **25th October**
(Cows are tail painted 5 weeks prior to planned start of mating, with tail paint touched up and heats recorded weekly - to identify non-cycling cows)

	Bull details	Cow Selection
The Day prior	Ensure all remaining pre-mating heats recorded and cows have fresh / updated tail paint. Apply K-mars.	
Week minus 1 18-24 Oct	LIC trial - Kiwi XX Frozen Sexed Semen or Forward Pack LLL (every other cow). Expect 60-80 Sexed semen matings	All cows on heat, SGL Hereford to any first cycle low BW cows with lower probability of holding in calf
Week 1 25-31 Oct	Forward Pack Premier Sires (mix HF & Kiwi XX to breed F10-12)	All cows on heat (including low BW, with surplus lower BW heifer calves sold next calving)
Week 2 1-7 Nov		
Week 3 8-14 Nov		
Week 4 15-21 Nov	SGL Dairy or Forward pack depending on numbers mated and non-return rate to date.	
Week 5 22-28 Nov	SGL Dairy or Forward pack depending on numbers mated and non-return rate to date.	
Week 6 29 Nov - 5 Dec	SGL Dairy	All cows on heat

Week 7, 8, 9 6-27 Dec	Natural Bull Mating	All cows on heat
Week 10 28 Dec - 2 Jan	To be confirmed based on non-return rate - either continue bull mating - week 10 only - or tail paint and revert to AI and SGL Dairy.	All cows on heat
Week 11 3-10 Jan		

Reproductive Outcome:

Assuming 90% Submission rate (all animals) and the following conception rates, 4 weeks AI for replacements followed by a further 3 weeks SGL Dairy should result in:

	Total Yearlings and Cows in calf to AI	Replacement Heifers born	Heifers reared (95% survival)	SGL Calves born	Bull calves born
Sexed Semen 44% / Fresh 52%	474 (85%)	193	184	106	175
Sexed Semen 44% / Fresh 60%	516 (92%)	215	205	99	202

Note conception rates assume average across all matings, week minus 1 may be less for some cows as it may be the first heat for some later calving cows.

Alternative Options:

1. Selectively mate low BW cows to SGL Hereford or similar beef breed with easy calving and similar or shorter gestation length than forward pack dairy options. This may require mating into week 4-5 with forward pack to generate sufficient replacements. In future years this may be considered if incalf rate improves sufficiently.
2. Revert back to AI Mating in week 10, and extend into week 11 with SGL Dairy to tighten calving pattern of late calvers
3. Replace bulls with AI mating weeks 7-9 and use only AI across the whole herd.
4. Continue AI for a further week (week 7), with SGL Dairy and only use bulls weeks 8-10 to further reduce calving spread of the majority of cows. But this requires 8 weeks continuous AI (in terms of heat detection fatigue).

Estimated breeding outcomes assuming 90% of the herd cycling at the start of mating, and 52% conception rate from Fresh semen / 44% from sexed semen:

Herd Size	**560**		*cows*	PSM -1 week	week 1	week 2	week 3	week 4	week 5	week 6	
Cows available to AI		***Herd %***	*cows*	168	168	168	87	81	81	42	
FWD Pack				84	168	168	87				
Sexed LLL				84							
SGL Dairy								81	81	42	
Yearlings to Mate	**146**	*26%*		131				0	0	0	
											Total
# Pregnant to Fwd Pack				44	87	87	45	0	0	0	263
# Pregnant to Sexed LLL				37	0	0	0	0	0	0	37
# Pregnant Yearlings				68	0	0	0	0	0	0	68
# Pregnant SGL Dairy				0	0	0	0	42	42	22	106
Total In Calf (incl yearlings)				149	87	87	45	42	42	22	474
Heifers to rear											Total
Premier Sires			**48%**	21	42	42	22	0	0	0	127
Sexed Cows			**90%**	33	0	0	0	0	0	0	33
Yearlings			**48%**	33	0	0	0	0	0	0	33
SGL Dairy			**0%**	0	0	0	0	0	0	0	
Total Heifers to Rear @	**95%**	***survival***	**184**	**83**	**40**	**40**	**21**	**0**	**0**	**0**	

Estimated breeding outcomes assuming 90% of the herd cycling at the start of mating, and 60% conception rate from Fresh semen / 44% from sexed semen:

				PSM -1 week	week 1	week 2	week 3	week 4	week 5	week 6	
Herd Size	**560**		*cows*								
Cows Available to AI		***Herd %***	*cows*	168	168	168	81	67	67	32	
FWD Pack				84	168	168	81				
Sexed LLL				84							
SGL Dairy								67	67	32	
Yearlings to Mate	**146**	*26%*		131				0	0	0	
											Total
# Pregnant to Fwd Pack				50	101	101	49	0	0	0	301
# Pregnant to Sexed LLL				37	0	0	0	0	0	0	37
# Pregnant Yearlings				79	0	0	0	0	0	0	79
# Pregnant SGL Dairy				0	0	0	0	40	40	19	99
Total In Calf (incl yearlings)				166	101	101	49	40	40	19	516
Heifers to rear											Total
Premier Sires			**48%**	24	48	48	24	0	0	0	144
Sexed Cows			**90%**	33	0	0	0	0	0	0	33
Yearlings			**48%**	38	0	0	0	0	0	0	38
SGL Dairy			**0%**	0	0	0	0	0	0	0	
Total Heifers to Rear @	**95%**	***survival***	**205**	**90**	**46**	**46**	**23**	**0**	**0**	**0**	

Breed 16th Selection Tool

Lincoln University

LIC

Participant Code

bqcy

Get Herd Details

Current Herd Display

- (•) Cows by F16th
- ( ) Cows by F16th & Year Born
- ( ) PW by F16th & Year Born

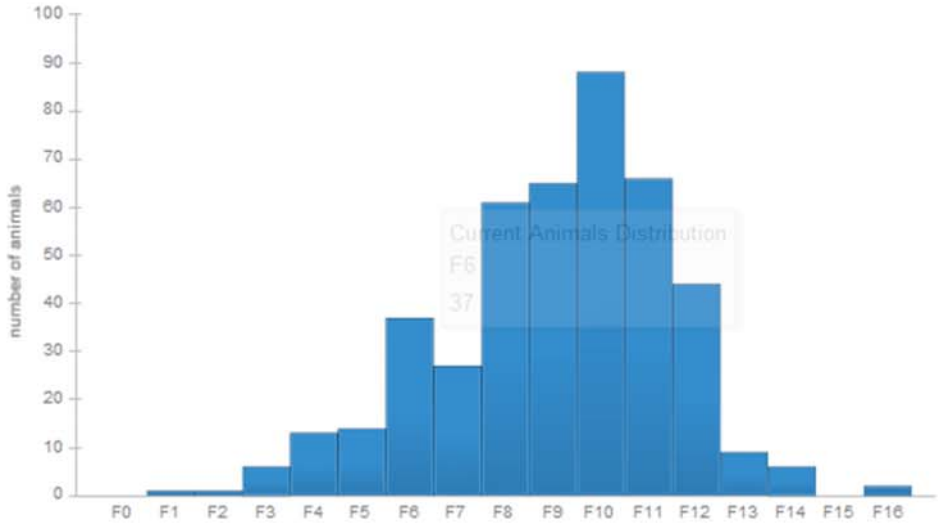
Current Bull Teams selection

HF Yearling Team		0
Daughter Proven Fri		0
Forward Pack Fri		99
Daughter Proven KX		0
Forward Pack KX		341
Forward Pack Jer		0

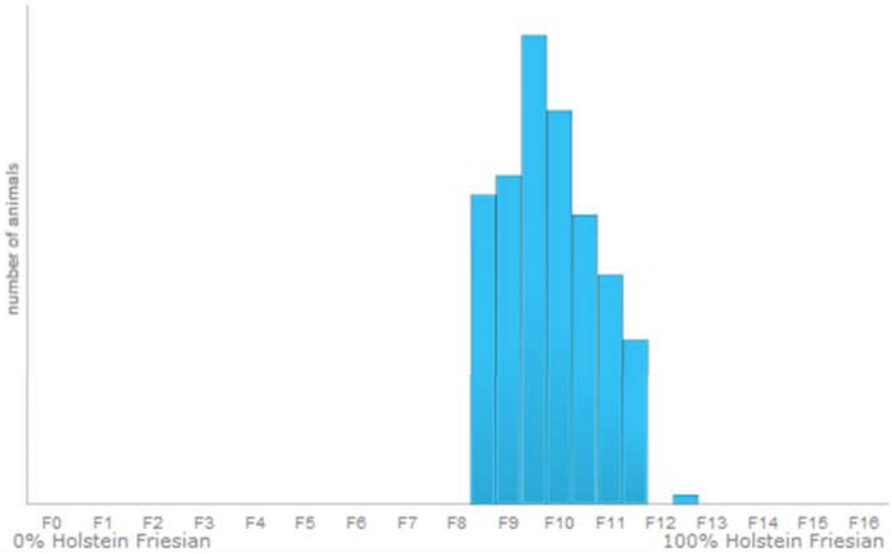
Mating Plans Comparison

Bull Team	F16th	BW	Vigour
KX Alpha High Jer	8.5	150	50.0%
KX Year Team	8.4	150	51.2%
HF Year Team	12.4	138	41.9%
HF Dtr Proven	12.6	139	40.8%
HF Forward Pack	12.5	138	40.8%
KX Dtr Proven	8.7	147	50.0%
KX Forward Pack	8.9	147	50.0%
Jer Dtr Proven	4.8	152	59.2%
Jer Forward Pack	4.8	148	59.2%
Your Selection	9.5	140	52.6%

Cows by F16th



Expected Herd Distribution



Bull Team Selection

J16	Forward Pack Fri
J15 F1	Forward Pack Fri
J14 F2	Forward Pack Fri
J13 F3	Forward Pack Fri
J12 F4	Forward Pack Fri
J11 F5	Forward Pack Fri
J10 F6	Forward Pack Fri
J9 F7	Forward Pack Fri
J8 F8	Forward Pack KX
J7 F9	Forward Pack KX
J6 F10	Forward Pack KX
J5 F11	Forward Pack KX
J4 F12	Forward Pack KX
J3 F13	Forward Pack KX
J2 F14	Forward Pack KX
J1 F15	Forward Pack KX
F16	Forward Pack KX

Lincoln University Dairy Farm - Farm Walk notes

Tuesday 10th October 2017

LUDF – focus for 2017/18 Season: Nil-Infrastructure, low input, low N-loss, maximise profit.

Farm system comprises 3.5 cows/ha (peak milked), Target up to 170kgN/ha, 300kgDM/cow imported supplement, plus winter most cows off farm. FWE of less than $1.1 million and Target production of over 500kgMS/cow (>100% liveweight in milk production).

Critical issues for the short term

1. **Turn attention to mating management (monitoring pre-mating heats).**
2. **Monitor average pasture cover and shape of the wedge on the milking platform as the farm now transitions into the second grazing round.**
3. **Prepare for mating - due to start 25th October.**

Key Numbers - week ending Tuesday 10th October 2017

Ave Past Cover	2272 kgDM/ha (Rising Plate Meter)	Past Growth Rate	58 kgDM (Rising Plate Meter)
Round length	25.6 days (for 160 ha)	Ave Supplement used (Milking cows)	1.2kgDM/cow/day
No Cows on farm	566 (total cows)	Ave Soil Temp (week)	11.6 °C
SCC	172,000	Ave kgMS/cow/day (cows in vat)	2.11 kgMS
Protein / Fat	0.81	Milk Fat - 4.83%	Milk Protein - 3.91%

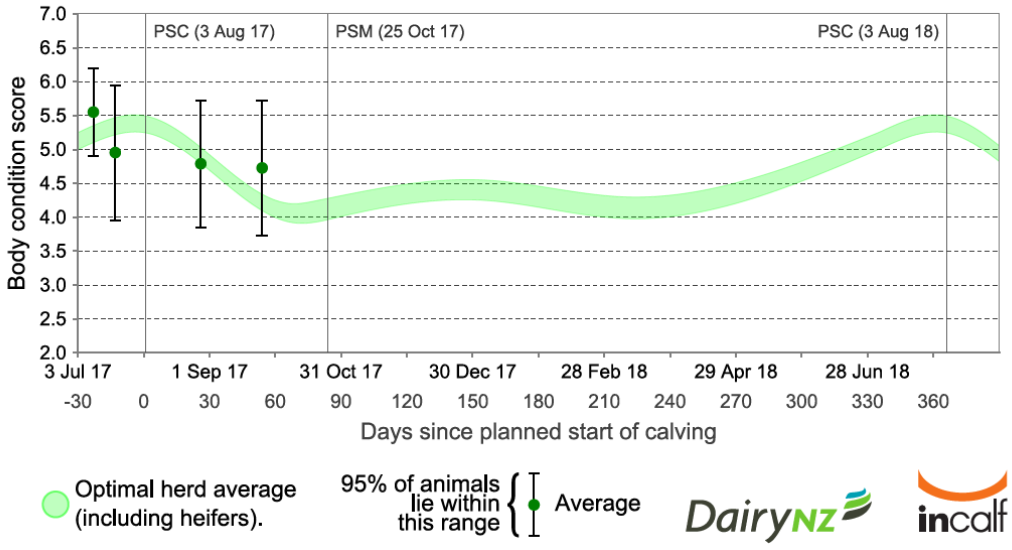
Herd Management

4. A total of 553 cows have calved and are grazing on farm. 511 twice-a-day milkers, and 32 once-a-day milkers (lames, sick and a small number (20) that were BCS 3.5 at 26th September).
5. There are also 11 dry cows left to calve. They have grazed paddock N1 and have not been cleaning residuals behind the cows any more.
6. Trace minerals, including magnesium chloride are supplemented through the stock water to all cows on the milking platform. Extra Iodine and Selenium is being added to the mix. The soluphos has now been stopped.
7. There has been no cow deaths this week, but there are 4 new lame cow and 2 new mastitis cases.
8. 164 heifer replacements have been tagged so far, and all of them are outside. All have been debudded and have had a DNA sample taken.
9. The most recent Body condition score was done on the 26th September. Average BCS was stable at 4.7 for the small herd but declined from nearly 5 to 4.5 for the large herd. See graphs below:

Animal group: 25.9.17 Young Cows and Light Mob

Planned start of Calving: 3 Aug 17

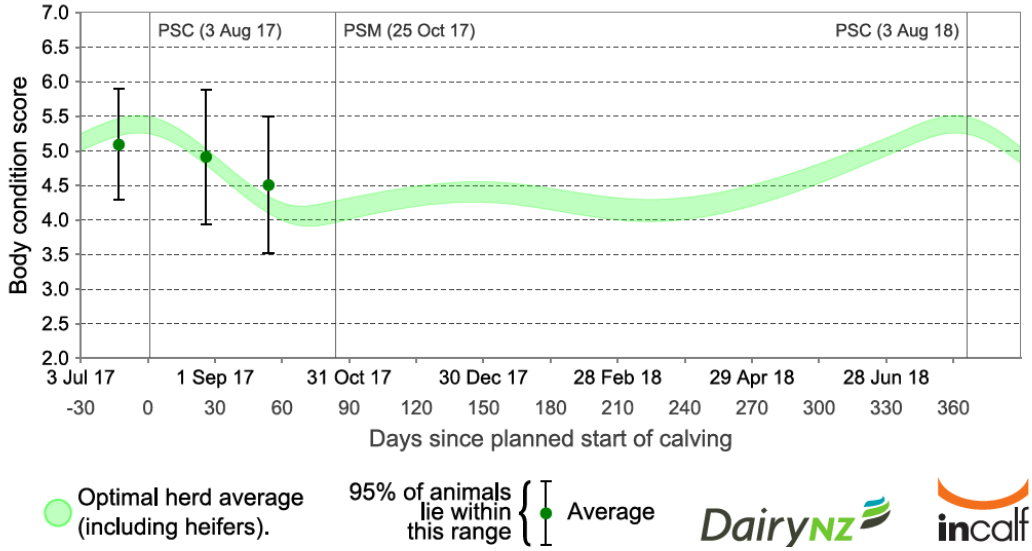
Denominator is limited to the scored cows within the group.



Animal group: 25.9.17 Main Mob

Planned start of Calving: 3 Aug 17

Denominator is limited to the scored cows within the group.



Mating preparedness

10. The herd was split on Monday 28th August. The small herd has around 139 first calving heifers and a few low BCS cows. The remaining animals are all in the large herd.
11. 20 cows with BCS of 3.5 at 26th September have been moved to the sick mob and are getting milked once-a-day.

12. Yearling heifers were bled on the 31st August for pre-mating checks on mineral status. Levels came back as adequate. They have received B-12 plus selenium and copper bullet plus drench and BVD vaccine in preparedness for mating.
13. Milkers were Metrichecked 6th September, 10 were treated for metritis and bloods were taken. Results show that calcium, magnesium, phosphate and copper levels are okay. However selenium and iodine levels are on the low side.
14. All milking cows were tail painted on Tuesday 19th September and observation of Pre-mating heats began on Wednesday the 20th September. 59 cows have shown signs of heat during week 1, 87 cows during week 2 and 107 during week 3 (target for 90% cows on heat pre PSM = 168/week). Based on a total of 560 cows able to be mated by Planned Start of Calving this represents a 57% 3-week submission rate at this point in time. This KPI is changing weekly as more animals come in heat.

Growing Conditions

15. The average 9 am soil temperature for the past week was 11.6°C (11.1°C last week). Temperature is trending the right way. However, sunshine hours for the past week have decrease with mainly cloudy and wet weather since Friday.
16. The farm received 48.8 ml of rain this week. This was, on one hand, welcome as the start of the irrigation season can be delayed further, however, on the other hand, the south block of the farm is again very wet and even though pugging damage is not obvious, the hoof marks are noticeable while walking through paddocks. Heavy rolling will still be required in some paddocks.
17. As previously identified, there are still some paddocks that will require the aid of the mower to achieve low and consistent residuals following their next grazing.

Figure 1: Soil temperature history for the last 2 weeks

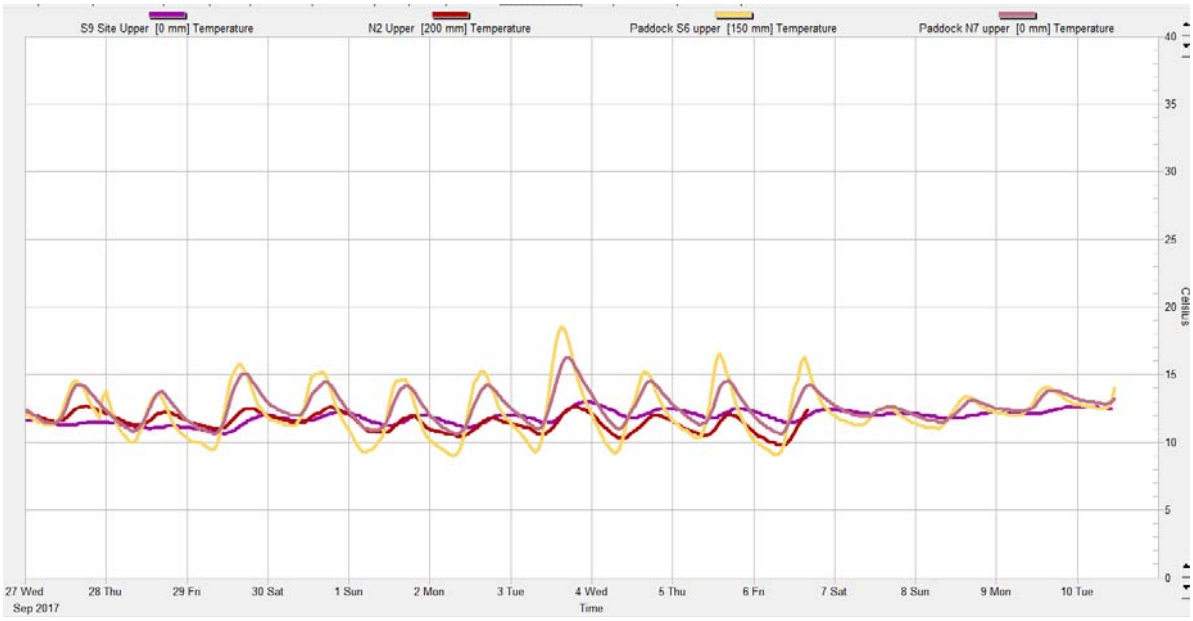
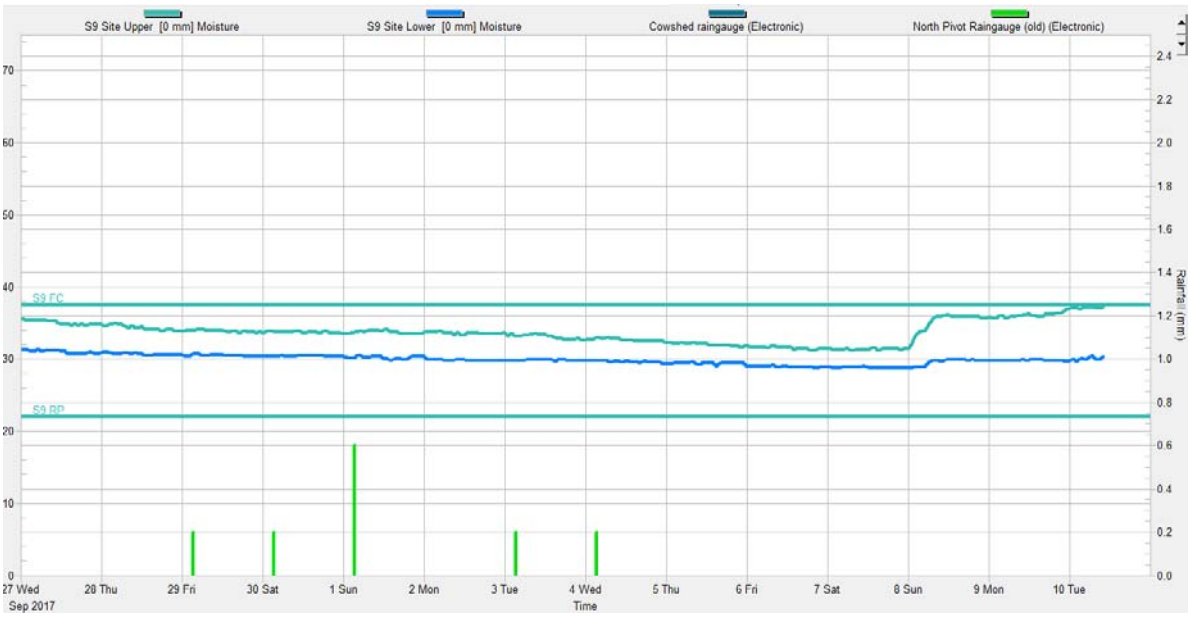


Figure 2: Soil moisture history for the last 2 weeks (Paddock S9).

18. The soil moisture monitoring system on the North Block has malfunctioned and is the one usually shown in the farm walk notes. This week's graph therefore represents the reading from the South Block moisture meters.



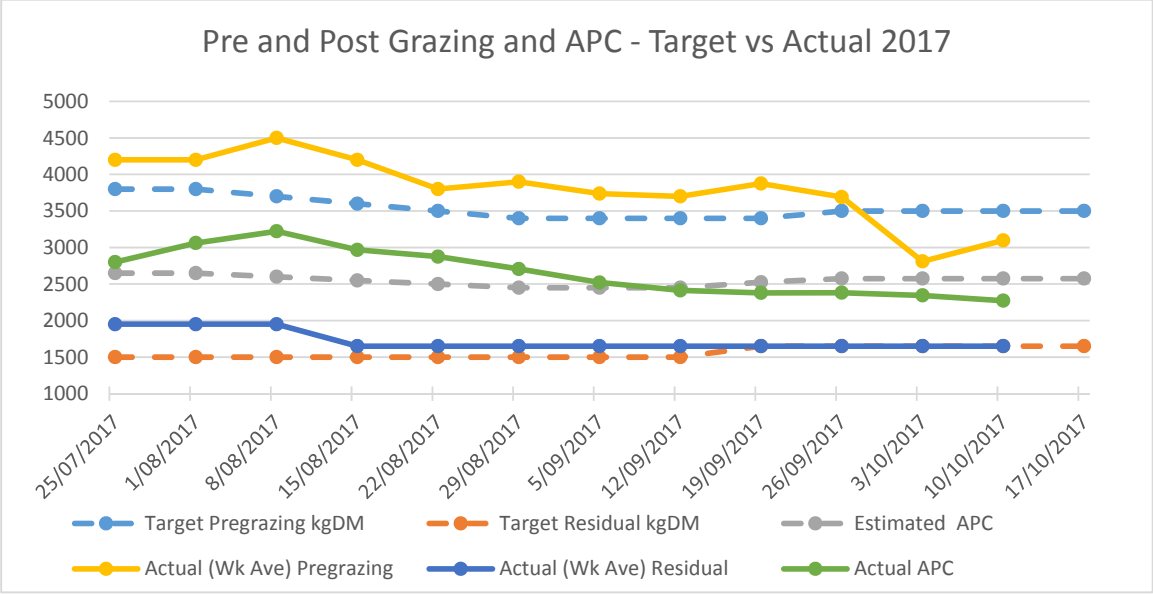
19. Based on the above soil moisture levels, and considering the lack of excessively drying weather in the forecast, irrigation is unlikely for at least a further week.

Pasture and Feed Management

20. 28.4 ha of the platform have received AMMO 31 through the week at a rate of 24kgN/ha.
21. To date the farm has applied AMMO 31 to 20 of the 21 grazed paddocks to provide additional sulphur with the initial nitrogen application. The remaining paddock will also receive AMMO 31 when dry enough to get its first nitrogen application.
22. Nitrogen fertilizer in the form of urea has also started to be applied in second grazing round paddocks at a rate of 40 kgN/ha (except in the effluent area where no further fertiliser N will be applied). A total of 21.3 ha has received Urea this week, so approximately 30% of the farm has received N this week.
23. The total average Nitrogen application to date to across the whole farm is 31kgN/ha.
24. Both milking herds were fed grass silage this week (average 1.2kgDM/cow/day) to support the planned minimum grazing round of 25 days.
25. Calved cows are now achieving targeted low and consistent residuals in all paddocks grazed so far in this second round.

Figure 3: This week's feed wedge

26. The pregrazing required for the demand line is calculated as follows:
    a. 550 cows eating 19 kgDM/cow/day = 10,450 kgDM/day or 65 kgDM/cow/day)
    b. We will be grazing the farm on a 25 day round = 6.4 ha grazed/day
    c. 10,450 kgDM/day / 6.4 ha/day = 1,632 kgDM
    d. Pre-graze cover = 1,632 + 1,650 = 3,282 kgDM/ha.
27. Dry cows are not taken into account in terms of calculating demand as there is only 11 of them left.
28. This week's feed wedge is now showing a 29 tDM deficit (3 days' worth of feed)
29. Below is our plan vs actual SRP



30. The farm is around 200 kgDM/ha below the target average pasture cover for this date.
31. Our Spring Rotation Planner started on the 25th July and the first round finished 23rd September.
32. Growth remains below demand (58kgDM/ha/day growth vs 65 kgDM/ha/day demand) hence balance date has not yet been reached. This represents a gap of 7kgDM/ha/day.
33. The use of silage at 1.2 kg/cow/day (4.2kgDM/ha/day) fills most of the gap between demand and supply, though as APC has dropped 72 kgDM/ha this suggests a deficit of approximately 10 kgDM/ha/day, after the feeding of silage, meaning growth is overstated at 58kgDM/ha/day and or demand is higher than 19 kgDM/ha/day.

Feeding Management for the coming month:

34. Milkers will continue to be fed on grass and grass silage as required for the next week, with an increased amount of grass silage used (as required) to hold the rotation length to a minimum 25 days.
35. Nitrogen (as urea except for the remaining paddock needing AMMO)) will continue to be applied through the week following grazing.

LUDF Weekly report	12-Sep-17	19-Sep-17	26-Sep-17	3-Oct-17	10-Oct-17
Farm grazing ha (available to milkers)	160	160	160	160	160
Dry Cows on farm / East blk /Jackies/other	104/35/0	89/0/0/0	55/0/0/0	30/0/0/0	11/0/0/0
Culls (Includes culls put down & empties)	0	5	0	0	0
Culls total to date	5	10	10	10	10
Deaths (Includes cows put down)	0	1	1	0	0
Deaths total to date	10	11	12	12	12
Calved Cows available (Peak No 560…)	437	478	512	536	553
Treatment / Sick mob total	3	1	3	4	2
Mastitis clinical treatment	3	1	2	4	2
Mastitis clinical YTD (tgt below 64 yr end)	14	15	17	21	23
Bulk milk SCC (tgt Avg below 150)	133	137	165	150	174
Lame new cases	10	1	1	3	4
Lame ytd	22	23	24	27	31
Lame days YTD (Tgt below 1000 yr end)	10	85	141	197	267
Other/Colostrum	23	25	12	11	3
Milking twice a day into vat	411	440	479	497	511
Milking once a day into vat	0	12	9	27	32
Small herd	132	135	153	139	139
Main Herd	279	305	326	358	374
MS/cow/day (Actual kg / Cows into vat only)	2.03	2.05	2.06	2.11	2.11
Milk Protein/Fat ratio			0.79	0.81	0.81
Milk Fat %			4.94	4.91	4.83
Milk Protein %			3.89	3.90	3.91
MS/cow to date (total kgs / Peak Cows 560	33	47	57	71	83
MS/ha/day (total kgs / ha used	4.78	5.38	6.14	6.66	6.99
Herd Average Cond'n Score			4.60	4.6	0.00

Monitor group LW kg WOW 281 early calvers	456	456	453	454	457
Soil Temp Avg Aquaflex	7.6	9.5	11.0	11.1	11.6
Growth Rate (kgDM/ha/day)	28	41	50	58	58
Plate meter height - ave half-cms	13.7	13.4	13.4	13.2	12.7
Ave Pasture Cover (x140 + 500)	2413	2379	2382	2344	2272
Surplus/[defict] on feed wedge- tonnes				20	-29
Pre Grazing cover (ave for week)	3700	3875	3691	2810	3098
Post Grazing cover (ave for week)	1650	1650	1650	1650	1650
Highest pregrazing cover	4000	4000	4100	3026	3150
Area grazed / day (ave for week)	3.00	3.44	4.33	6.31	6.25
Grazing Interval	53	47	37	25	26
Milkers Offered/grazed kg DM pasture					
Estimated intake pasture MJME					
Milkers offered kg DM Grass silage					
Silage MJME/cow offered					
Estimated intake Silage MJME					
Estimated total intake MJME					
Target total MJME Offered/eaten (includes 6% waste)					
Pasture ME (pre grazing sample)	12.2	12.7	12.0		
Pasture % Protein	15.6	16.8	18.0		
Pasture % DM - Concern below 16%	19.2	19.6	13.0		
Pasture % NDF Concern < 33	39.2	38.5	39.4		
Mowed pre or post grazing YTD	0.0	0.0	0.0		0.0
Total area mowed YTD	0.0	0.0	0.0		0.0
Supplements fed to date kg per cow (555peak)	17.3	35.8	65.9	82.4	90.8
Supplements Made Kg DM / ha cumulative	0	0	0	0	0
Units N applied/ha and % of farm	25units/20.5 %	0	25units/20.5 %	25units/14.6 %	25units/31%
Kgs N to Date (whole farm)	6	6	13	18	31
Rainfall (mm)	11.6	28.8	19.6	0	48.8
Aquaflex topsoil relative to fill point target 60 - 80%	100-100	100-100	100-100	90-90	90-100

Next farm walk**: Tuesday 17th October**. Farmers or their managers and staff are always welcome to walk with us. Please call to notify us of your intention and bring your plate meter and gumboots. Phone SIDDC – 03 423 0022.

Peter Hancox, Farm Manager, Natalia Benquet, Chris Norton.

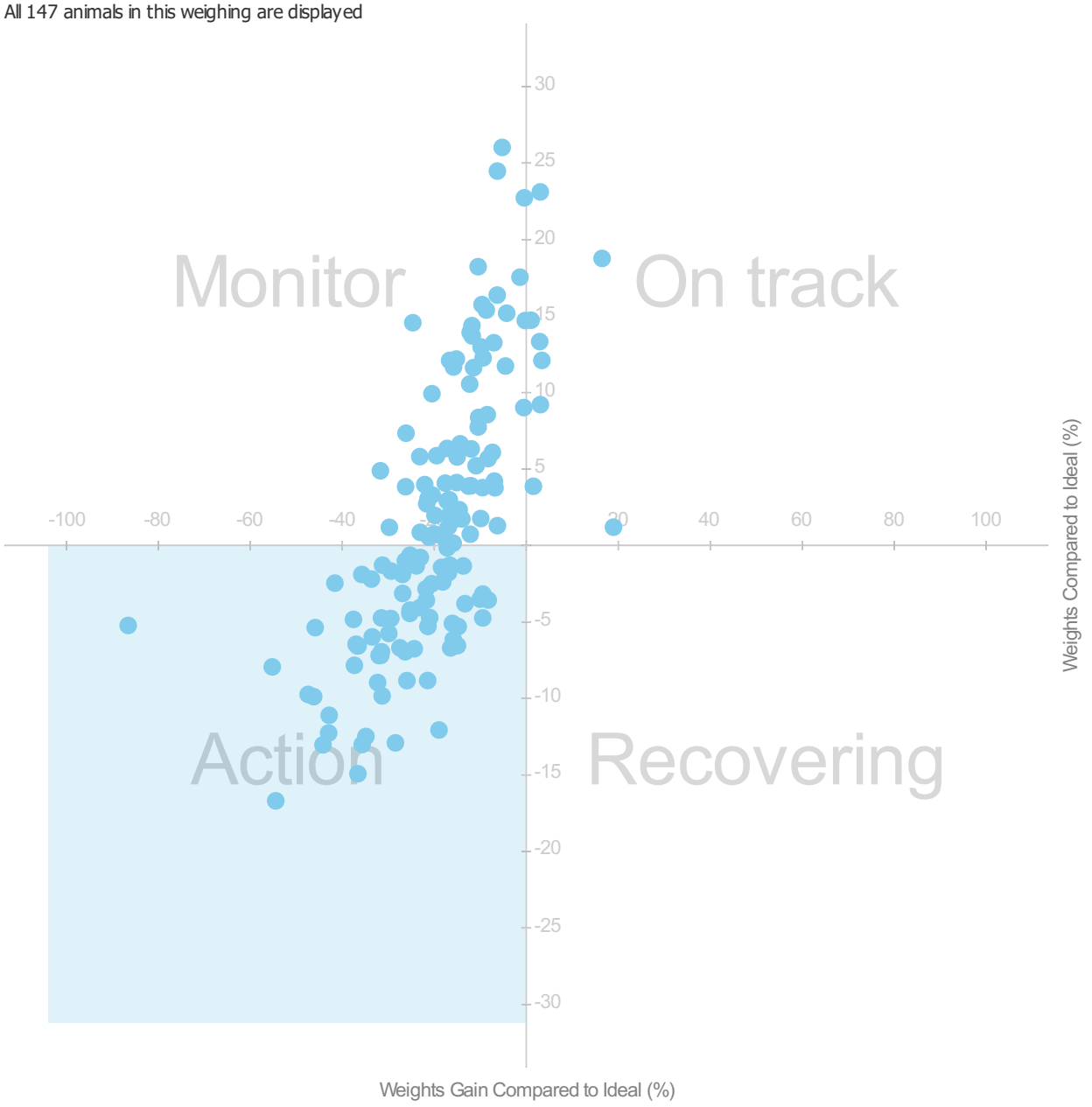
2016 Spring Born

10/08/2017

BQCY

Animal performance

All 147 animals in this weighing are displayed



Take action with these animals

Official Id	AE Breed	Current Weight (Kg)	Weight Gain (Kg/day)	Gain Required by PSM (Kg/day)	Variation from Ideal (%)	Previous Category
BQCY-16-11	HF x J	250	-0.52	0.73	-5.23	On Track
BQCY-16-16	HF x J	232	0.06	0.87	-9.88	Monitor
BQCY-16-21	HF x J	241	0.17	0.81	-7.83	Monitor
BQCY-16-22	HF x J	250	0.21	0.76	-5.97	Monitor
BQCY-16-26	HF x J	256	0.38	0.53	-0.15	Monitor

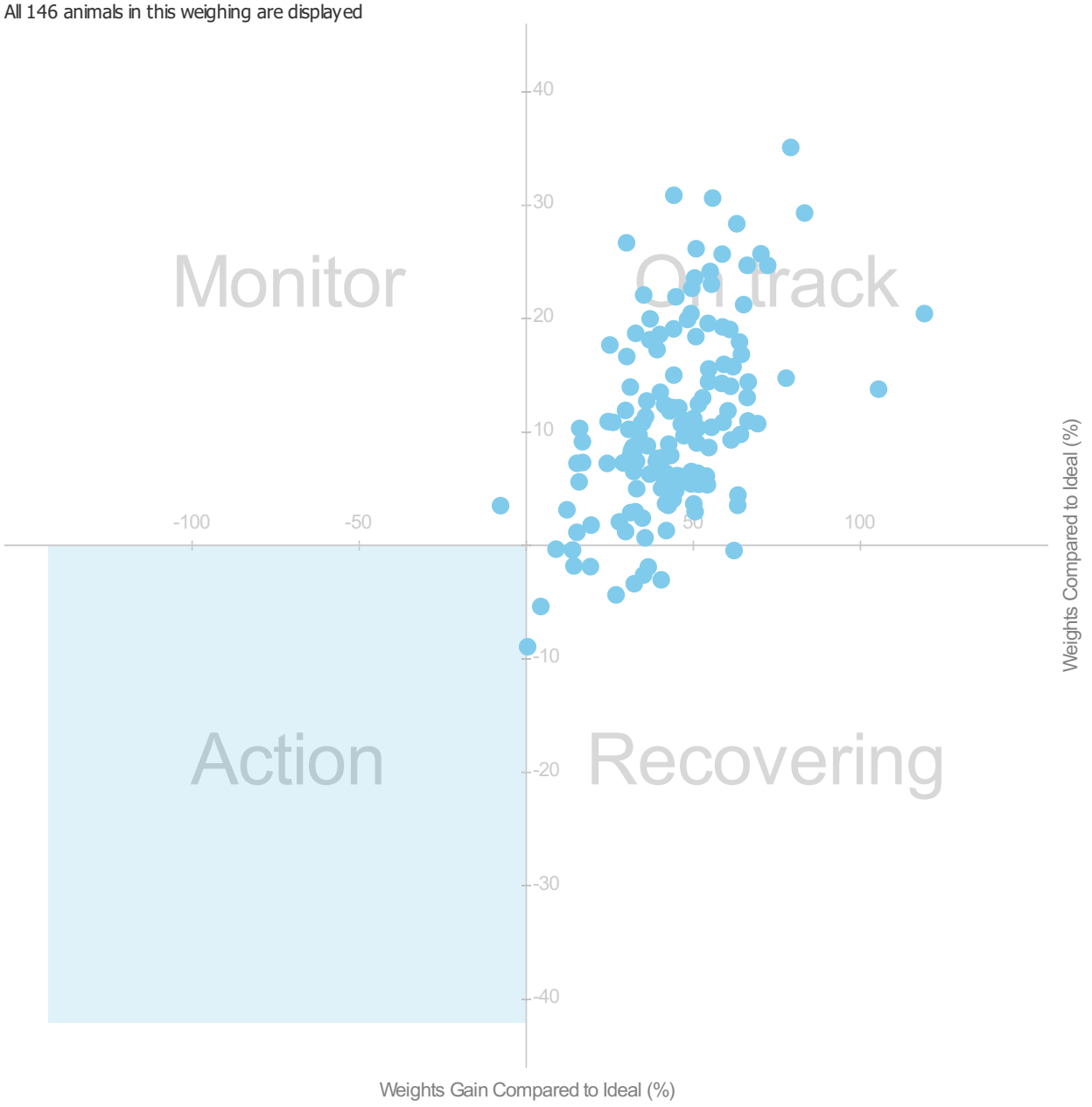
2016 Spring Born

21/09/2017

BQCY

Animal performance

All 146 animals in this weighing are displayed



Take action with these animals

Official Id	AE Breed	Current Weight (Kg)	Weight Gain (Kg/day)	Gain Required by PSM (Kg/day)	Variation from Ideal (%)	Previous Category

Showing 0 to 0 of 0 entries

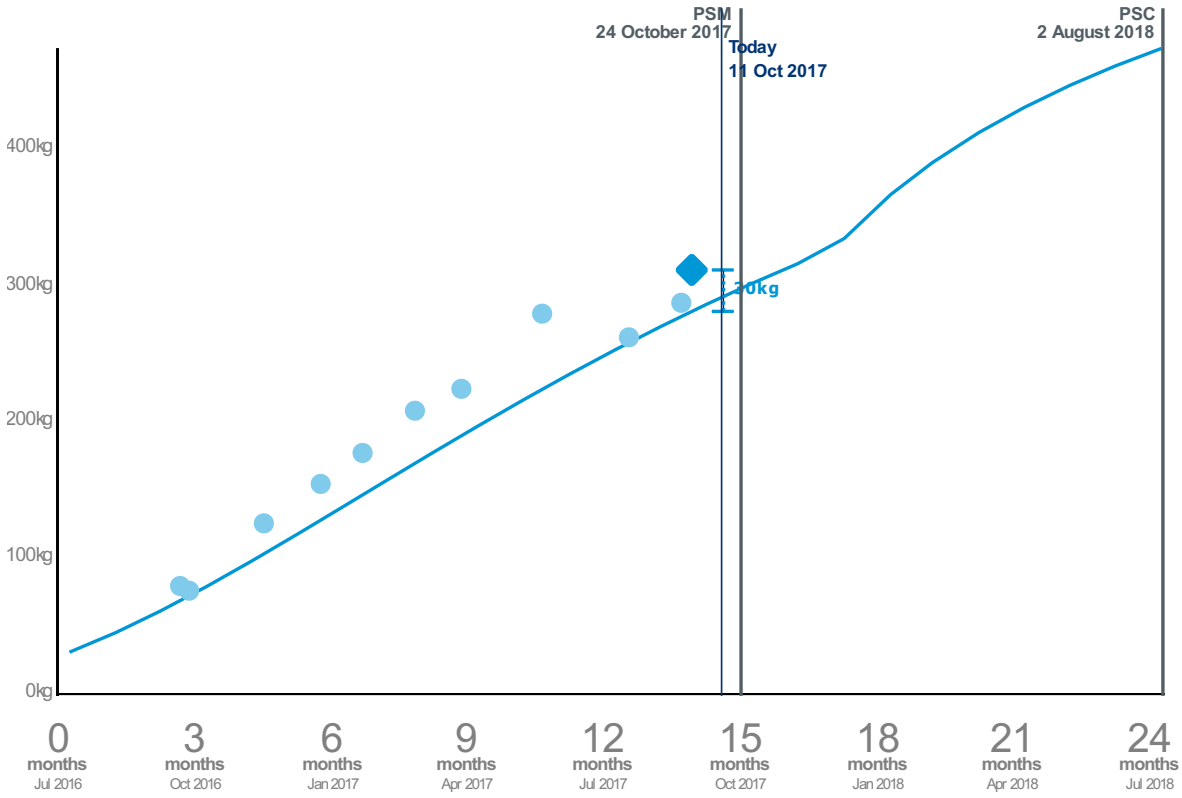
2016 Spring Born

21/09/2017

BQCY

Young stock trend

All 146 animals in this weighing are displayed



Biosecurity - What are the real risks?

Some Definitions:

- Risk: a situation involving exposure to danger
- Probability: the extent to which an event is likely to occur
- Impact: Measure of the tangible and intangible effects (consequences) of one thing's or entity's action or influence upon another

Risk = Probability x Impact

Typical risk Matrix:

		Impact				
		Trivial	**Minor**	**Moderate**	**Major**	**Extreme**
Probability	**Rare**	Low	Low	Low	Medium	Medium
	Unlikely	Low	Low	Medium	Medium	Medium
	Moderate	Low	Medium	Medium	Medium	**High**
	Likely	Medium	Medium	Medium	**High**	**High**
	Very Likely	Medium	Medium	**High**	**High**	**High**

The farm is vulnerable to unwanted pests and diseases from a wide variety of sources - including - but not limited to the following:

1. Farm visitors, service people and professionals, including transmission via vehicles, footwear and clothing.
2. Imported farm supplies - including semen, but also general supplies via delivery vehicles and products including calf bedding.
3. Imported feed - grass silage, fodderbeet (and soil contamination with beet)
4. Contractor vehicles - fertiliser spreading trucks, service vehicles for irrigation and other equipment
5. Stock trucks
6. Stock movement - bulls and incalf heifers / cows returning to LUDF
7. Birds
8. Malicious intent to introduce unwanted organisms.

NZ's international border regulations remain a key part of the biosecurity protection for the farm. This does not however take away the farms need to minimise / eliminate the risks associated with the entry or spread of weeds / pests / diseases currently in NZ but not common at LUDF.

Background Material - Biosecurity in NZ (c/o MPI)

See also: https://www.mpi.govt.nz/protection-and-response/biosecurity/

MPI works within a robust legislative framework to lead New Zealand's biosecurity system.

Purpose of the biosecurity system

The biosecurity system prevents or manages risks from harmful organisms, like pests and diseases. The biosecurity system helps protect New Zealand's economy, environment, human health, and a range of social and cultural values. It does this by:

- stopping pests and diseases before they arrive
- dealing with any if they do enter the country.

The biosecurity system

Biosecurity is the exclusion, eradication or management of pests and diseases that pose a risk to the economy, environment, cultural and social values, including human health.

Biosecurity is implemented through a risk management system that involves many participants. The system spans activities offshore, at the border and within New Zealand, which together contribute to the protection of four interlinked values:

- **Environmental** – including indigenous biodiversity, ecosystems and landscapes, taonga species and valued exotic species
- **Economic** – including primary industries, trade and tourism
- **Cultural** – including Māori cultural and spiritual values
- **Social** – including New Zealanders' lifestyles, health and wellbeing, our national identity, and recreational and historical values.

Who participates?

There are many agencies, organisations, businesses and individuals that together make up the biosecurity system. These include:

- The Ministry for Primary Industries (MPI) who is charged with overall leadership of the biosecurity system, and has a substantial operational role.
- Other government agencies, including the Ministry of Health, the Department of Conservation, and the Environmental Protection Authority, who have a range of statutory roles and responsibilities for decision making and operations.
- Regional councils who lead pest management in their regions.
- Industry organisations under the Government Industry Agreement who enter into a formal partnership with MPI to share responsibility for decision-making and funding of agreed readiness and response activities, and are involved in wider engagement across the system.
- Māori/iwi who are partners with the Crown through Te Tiriti o Waitangi, kaitiaki (guardians) of New Zealand's taonga, and increasingly have statutory roles in the management of natural resources.
- Organisations who implement national plans to manage significant pests.

- Industry and businesses who have a role and a responsibility to manage the biosecurity risks to, and caused by, their business.
- Scientists, and research organisations and collaborations, who develop knowledge and tools for managing biosecurity risks.
- Landowners and occupiers, including agencies that manage public lands, who have a responsibility to manage pests on their land.
- Community groups, non-governmental organisations, and other groups of people who come together to protect what they value.
- Every individual, including in their capacities as travellers, educators, and consumers.

New Zealand's biosecurity system

The biosecurity system involves government, industry, Māori and all New Zealanders working together to manage risks posed by pests and diseases to the economy, environment and human health.

The biosecurity system is based on risk management activities undertaken across a range of inter-related areas – internationally, at the border and within New Zealand. Some of the activities and outcomes are described below.

	Layer of the system	Outcomes
International	**International Plant and Animal Health Standards** Developing international standards and rules under the World Trade Organization Sanitary and Phytosanitary Agreements.	Science and risk-based standards lead to an easier environment to trade in while protecting our biosecurity.
	Trade Agreements and Bilateral Arrangements Negotiation, agreements and processes for future biosecurity cooperation and trade.	Biosecurity requirements for New Zealand businesses are reasonable and create commercial certainty when trading overseas.
	Risk Assessment and Import Health Standards Identification of risk and specification of requirements for people and goods coming into the country, including assessment of applications to import organisms new to New Zealand.	The majority of biosecurity risks are managed offshore so that compliant passengers and cargo arrive at our border. Biosecurity risks that arrive onshore are managed effectively.

Border	**Border Intervention** Educating and auditing to encourage compliance. Inspecting to verify compliance and taking action to manage non-compliance.	Trade and travel are facilitated for people and goods complying with New Zealand regulation. The accidental or illegal import of pests is prevented from creating biosecurity risk.
Within NZ	**Surveillance** General and targeted programmes to detect harmful pests and diseases.	Harmful pests and diseases are detected promptly. New Zealand's pest freedom status is known. The spread of established pests into new areas, or changes in a pest's risk profile, are detected promptly.
	Readiness and Response Regular testing of the biosecurity system's capability to respond. Responding to detected harmful pests and diseases.	The biosecurity system is ready to respond to new organism incursions. Harm from detected new pests and diseases is minimised.

Long-term Pest and Disease Management

National scale management – eradication, containment or management of a pest across New Zealand.

Regional management – primarily led by regional councils through regional pest management plans and pathway plans.

Local scale management – to protect values in places. Pests within a site are managed to the extent necessary to protect the place's values.

Harm caused by established pests and diseases is reduced or contained, through exclusion, eradication, progressive containment, or sustained control at the most appropriate scale (national, regional or local).

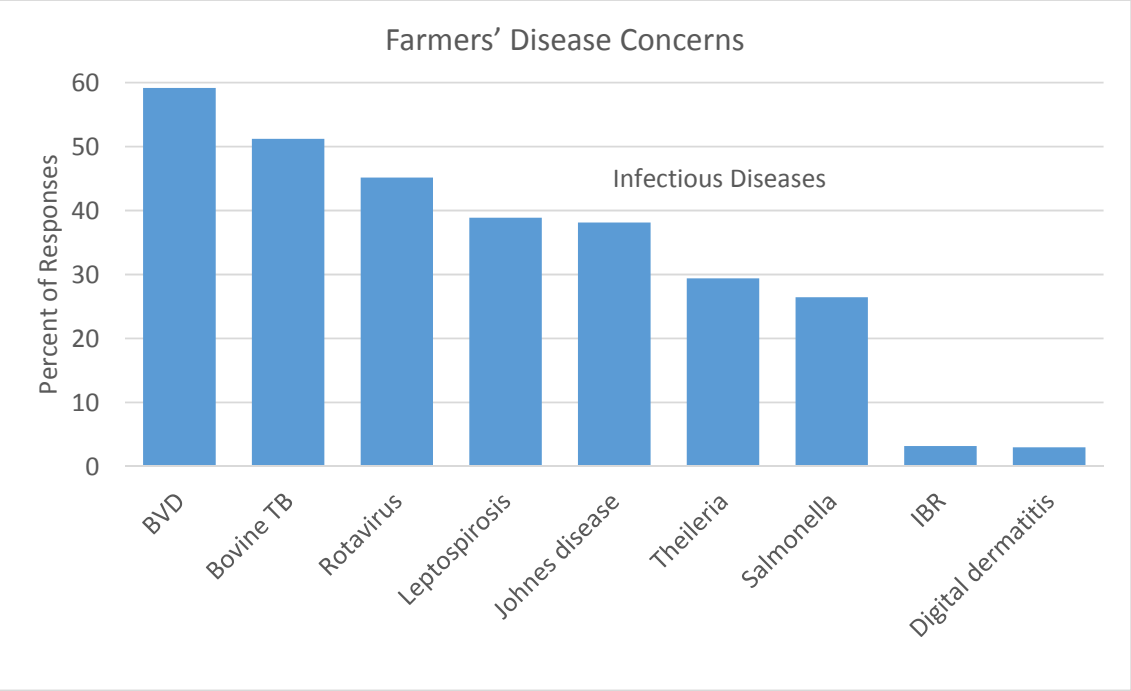
Protecting your Farm

Chris Morley - Biosecurity, Readiness and Response Manager, ***DairyNZ***

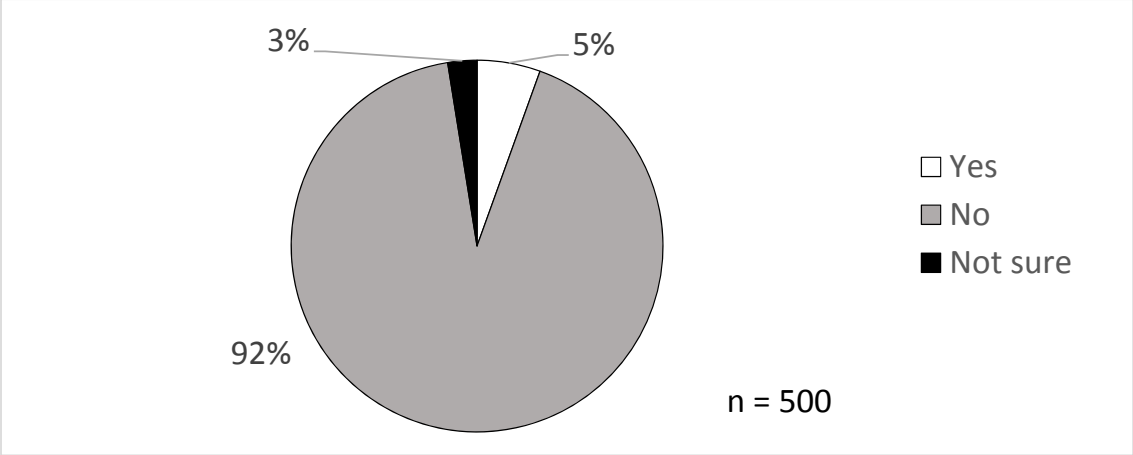
Chris.Morley@dairynz.co.nz

DairyNZ Farmer Survey 2016-17 Biosecurity responses:

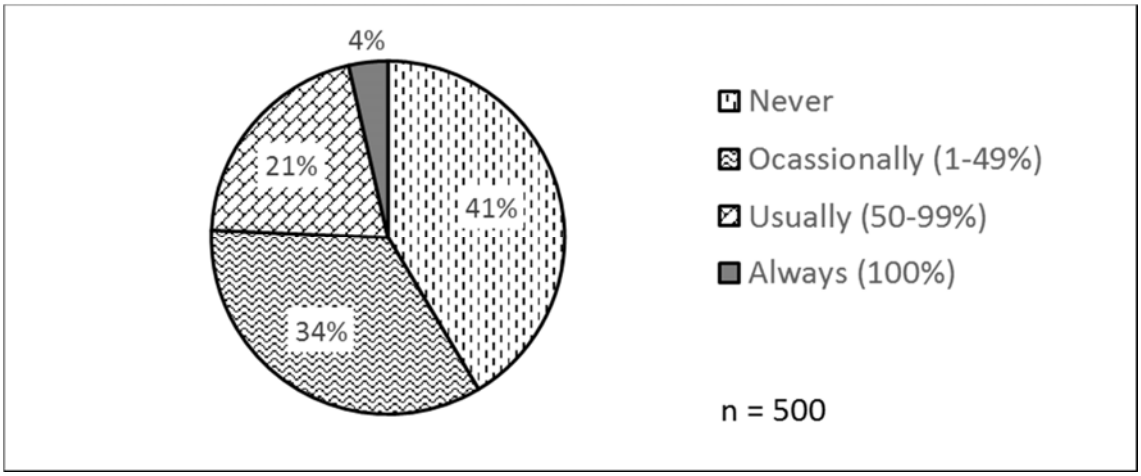
Of the following, can you rank top 3 in order of greatest risk to your farming operation?



Do you have a documented biosecurity risk management plan?



Do visitors to animal areas clean and disinfect their boots before leaving your farm?



PROTECTING YOUR FARM

Biosecurity is about reducing the risk of diseases, weeds or pests entering, spreading, or leaving your farm.

Protecting profits

Disease outbreaks, new pasture pests and weeds can have serious long-term financial impacts.

Protecting health

Some diseases can be passed from animals to humans. Biosecurity planning helps protect the health of your stock, family, farm team, and visitors.

Disease status of new stock is considered carefully before animals are bought or moved

Ask questions about animal health, TB status, vaccinations, disease and treatment history.

Biosecurity signs are clearly visible and easy to follow

Include the name and contact phone number of the farm owner/manager to make it easy for visitors to contact the right person.

Visitors arrive with clean equipment, clothing and footwear and disinfect upon arrival

Provide a scrubbing brush and water and a disinfectant spray or footbath for visitors.

Boundary fences are secure and prevent nose-to-nose contact with neighbouring stock

Avoid grazing boundary paddocks when neighbour's cows are grazing the adjacent paddock - or create double fencing or outrigger fences.

Young calves are given special protection

Only allow essential people into the calf shed.
Have a separate set of farm clothing and boots to use around calves - clean these regularly.

Potential weeds and pasture pests are identified and prevented

Check with your regional council and the agpest website for advice and information.
Check that feed sourced from off-farm doesn't contain seeds of weeds new to your farm.

Animal pests are controlled

Keep areas around buildings free from clutter and long grass.
Store feed securely.

We welcome your feedback. Please contact Katherine DeWitt on 021 244 5905 or **Katherine.DeWitt@dairynz.co.nz** with any comments or suggestions.

DairyNZ

How one idea fertilised an industry.

Every year, LIC's bulls sire approximately three out of four of New Zealand's AB calves. That they can do this, is down to something known as Long Last® Liquid semen.

This unique development by LIC keeps the sperm viable for three days so that it can get to over 8,000 herds around the country.

It also allows a much higher utilisation - with approximately one tenth the sperm dose of conventional frozen straws - while maintaining optimal conception rates.

It means every dairy farmer has access to the top LIC bulls and top LIC genetics, helping to improve their productivity and that of the national herd.

It's improvement that counts.

LIC®

DairyNZ – Protecting your farm feedback form

Are you currently implementing any of the following biosecurity tips listed on the information sheet? (Please tick all that apply)

- ☐ Disease status of new stock is considered carefully before animals are bought or moved
- ☐ Biosecurity signs are clearly visible and easy to follow
- ☐ Visitors arrive with clean equipment, clothing and footwear and disinfect upon arrival
- ☐ Boundary fences are secure and prevent nose-to-nose contact with neighbouring stock
- ☐ Young calves are given special protection
- ☐ Potential weeds and pasture pests are identified and prevented
- ☐ Animal pests are controlled

What are the biggest challenges to implementing on farm biosecurity for your farm?

How useful did you find the tips on the 'protecting your farm' biosecurity information sheet?

- ☐ Very useful
- ☐ Somewhat useful
- ☐ Not useful

Are there any on-farm biosecurity practices you would like to learn more about or have support with?

_____

_____

Please let us know any further feedback on the 'protecting your farm' biosecurity information sheet or how we can support you with biosecurity.

_____

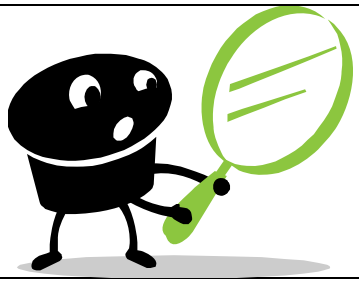
_____

Welcome to Lincoln University Dairy Farm (LUDF).

The farm is a fully operational, commercial dairy farm with a number of potential hazards for both visitors and staff. Many of the 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.

Hazard Summary: Look, think, act.

The following chart provides a reminder of the types of hazards at LUDF. Watch for these and any other hazards that may be on farm today.

People: • Uninformed / ill prepared visitors may be the greatest risk	**Animals:** • **You are in their space**	**Milking shed:** • Moving rotary platform • Confined animals • Chemicals
Eyes / Ears: • Water / oil / milk / chemical splashes • Welding flashes • Loud machinery		**Touch:** • Hot / cold surfaces, hot water, chemical burns • Electric fences – treat them as high voltage power sources
On farm machinery and tools • Chainsaws, hand tools etc. generate noise, fragments	**Potential slips / trips:** • Uneven surfaces occur across the farm • Fences • Drains • Underpass • Effluent pond	**Vehicles:** • Contractors and farm equipment – **act as though they can't see you** – keep out of their way • Centre Pivot takes precedence over your plan

ARE YOU TRAINED FOR WHAT YOU ARE ABOUT TO DO? If not, STOP.

If you are uncertain how you should act or proceed, stop and contact the farm manager, other farm staff or your host.

By entering this farm, you are acknowledging your receipt of this hazard summary, and your agreement to take personal responsibility to watch out for potential hazards, and act in such a manner as to protect yourself and any others also on-farm.