SIDDC
South Island Dairying Development Centre

Partners Networking To Advance South Island Dairying

Lincoln University
Te Whare Wānaka o Aoraki
CHRISTCHURCH•NEW ZEALAND

DairyNZ

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Plant & Food RESEARCH
RANGAHAU AHUMĀRA KAI

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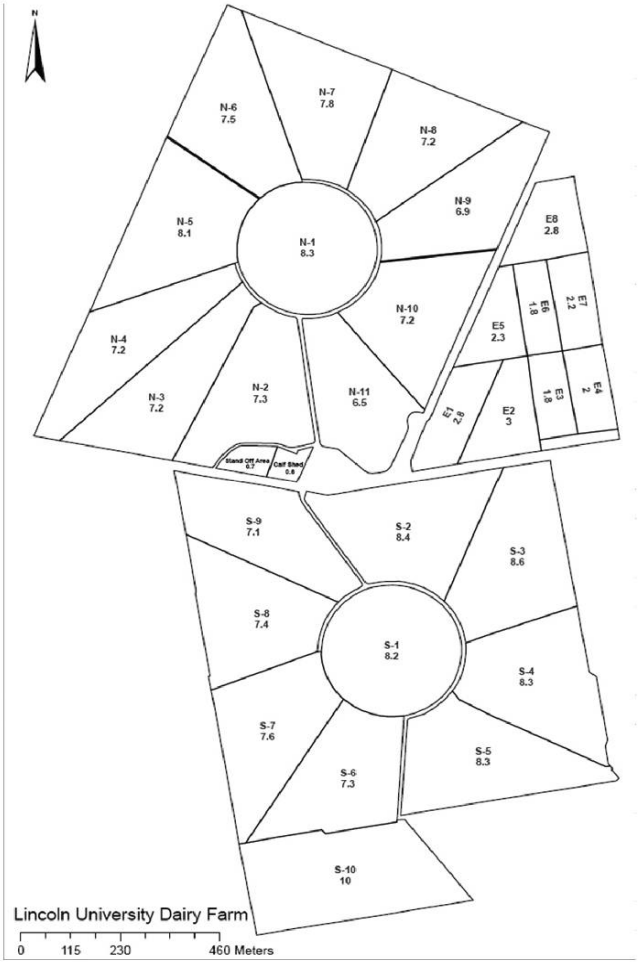
Lincoln University Dairy Farm Focus Day

7th May 2015



Staff

Peter Hancox – Farm Manager
Matt Weatherhead – 2IC
Alistair Linfoot – Dairy Assistant
Appt Pending – 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

Please follow instructions given by event organisers or farm staff

Introduction

The 186 hectare irrigated property, of which 160 hectares is the milking platform, was a former University sheep farm until conversion in 2001. The spray irrigation system includes two centre pivots, small hand shifted lateral sprinklers, and k-lines. The different soil types on the farm represent most of the common soil types in Canterbury.

LUDF Strategic objective 2011-2015:

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

- To develop and demonstrate world-best practice pasture based dairy farming systems and to transfer them to dairy farms throughout the South Island.
- To consider the farms full environmental footprint, land requirement, resource use and efficiency in system decision making and reporting
- To use the best environmental monitoring and irrigation management systems in the development and implementation of practices, that achieve sustainable growth in profit from productivity and protection of the wider environment.
- 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.
- To continue the environmental monitoring programme and demonstrate technologies and farming practices that will ensure the average annual concentration of nitrate-N in drainage water from below the plant root zone remains below the critical value [16 mg N/L] specified in ECan's proposed regional rule in order for LUDF to remain a 'permitted activity' [Rule WQL20].
- To store and apply effluent such that there is no significant microbial contamination of the shallow aquifers.
- To manage pastures and grazing so per hectare energy production is optimised and milkers consume as much metabolisable energy [ME] from pasture as practicable.
- To optimize the use of the farm automation systems and demonstrate / document improved efficiencies and subsequent effect on the business.
- To achieve industry targets for mating performance within a 10 week mating period, including a 6 week in-calf rate of 79% and 10 week in calf rate greater than 89% i.e. empty rate of less than 11%.
- To continue to document and measure LUDF's influence on changes to defined management practices on other dairy farms.
- To ensure specific training is adequate and appropriate to enable staff members to contribute effectively in meeting the objectives of the farm.
- To operate an efficient and well organised business unit.
- To generate profit through tight cost control with appropriate re-investment and maintenance of the resources.
- To create and maintain an effective team environment at policy, management and operational levels.
- To actively seek labour productivity gains through adoption of technologies and practices that reduces labour requirements or makes the work environment more satisfying.
- To assist Lincoln University to attract top quality domestic and international students into the New Zealand dairy industry.

Ongoing research

- The effect of fertilisers & other farm inputs on groundwater. 10 groundwater monitoring wells sunk to monitor and manage the effect of fertiliser, grazing, irrigation and effluent inputs over a variety of contrasting soil types.
- Effects of eco-n on nitrate leaching and pasture production.
- Pasture growth rates, pests and weeds monitoring.
- The role of nutrition in lameness in Canterbury.
- 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

Farm area

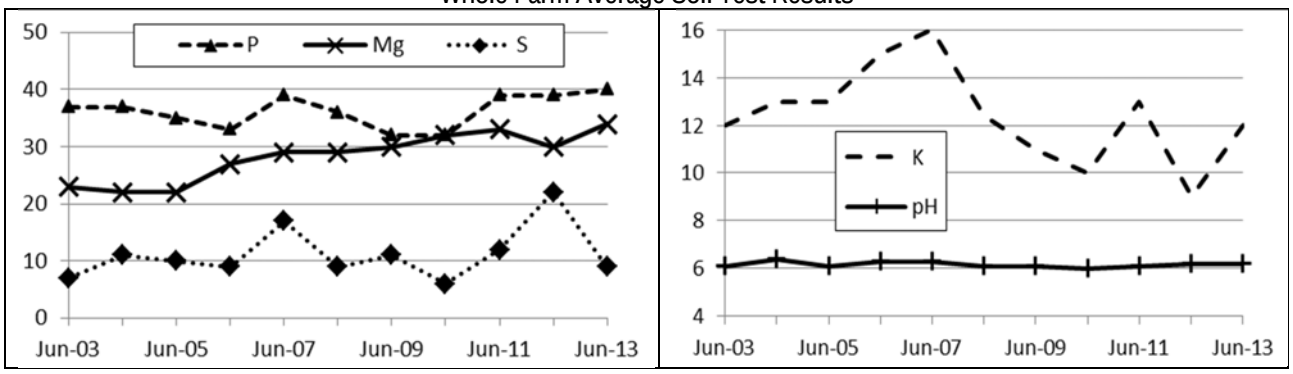
Milking Platform	160 ha
Support land [East Block]	15 ha
Unproductive land on platform	6.7 ha

Soil types	% Milking Platform		% Milking Platform
Free-draining shallow stony soils (Eyre soils)	5	Imperfectly drained soils (Wakanui soils)	30
Deep sandy soils (Paparua & Templeton soils)	45	Heavy, poorly-drained soils (Temuka soils)	20

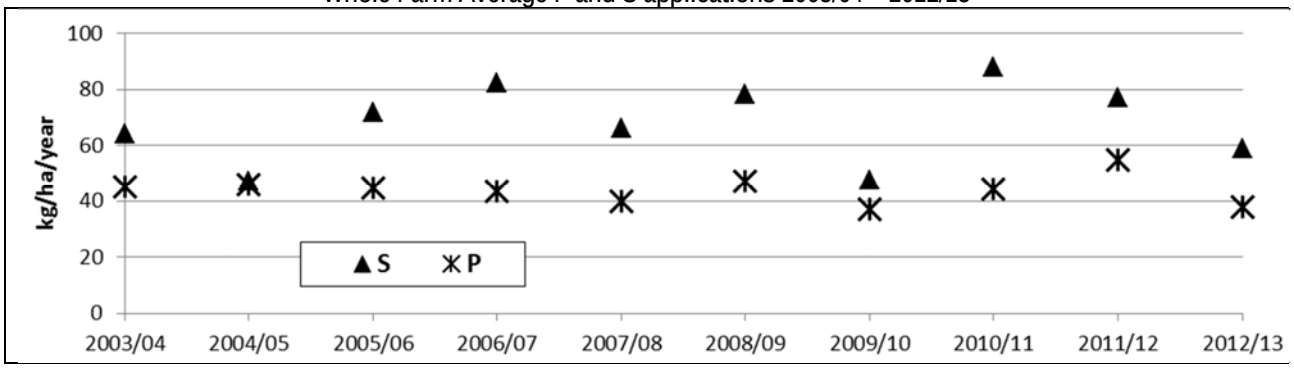
Soil test results and Fertiliser Applications

Target Soil Test Ranges: pH: 5.8 – 6.2, P: 30 – 40, K: 5 – 8, S: 10 – 12, Mg: 20+

Whole Farm Average Soil Test Results



Whole Farm Average P and S applications 2003/04 – 2012/13



Pasture

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

Paddock	Period Regrassed	Grass Cultivar	Paddock	Period Regrassed	Grass Cultivar
N1	Feb-01	Brons. Imp	S1	Dec-05	Bealey
N2	Feb-11	Trojan	S2	Dec-10	Troj. Bealey
N3	Nov-12 / Sept 13	Shogun + Chicory /Plantain	S3	Feb-10	Bealey
N4	Jan 15	Base/Troj/Chicory/Plantain	S4	Dec-13	Bealey/Chicory/Plantain/Troj
N5	Dec-11 / Aug 13	Shogun	S5	Dec-08	Arrow - Alto
N6	April 14	Shogan (spray/drill)	S6	Dec-14	Shogan/Chicory/Plantain
N7	Jan -14	Bealey/Troj/Chicory/Plantain	S7	Sep-06	Arrow - Alto
N8	Jan -13	Bealey/Chicory/Plantain	S8	Oct-11	Troj. Bealey
N9	Oct-13	Bealey/Troj/Chicory/Plantain	S9	Dec-09	Bealey
N10	Jan-12	Tetraploids (FVI trial)	S10	Nov -14	Shogun/Chicory/Plantain
N11	Nov-07	Bealey	All paddocks also sown with clover		

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 2014

KiwiX DNA for 365 cows (F8-F16); Holstein Friesian Daughter Proven for 280 cows (F0-F7); KiwiX Premier Sires Daughter proven for yearling Heifers. AI mate for 3 weeks in heifers and 6 weeks in main herd then follow with Jersey bulls. Heifers start mating 10 days early. 10 weeks mating for milking herd. Expect to rear 150 heifers.

Herd details – October 2014

Breeding Worth (rel%) / Production Worth (rel%)	146 / 48% 191 / 70%
Recorded Ancestry	99%
Average weight / cow (Dec) – Herd monitored walk over weighing	475 kg [Dec 2013]
Calving start date	Heifers – 23 July, Herd 3 August 2014
Est Median calving date	15 August 2014
Mating start date	25 October 2014

Empty rate (nil induction policy) after 10 weeks mating - 12% (2013-14 mating). 6 week in-calf rate 78%.

	2002/03	Average 03/04 - 06/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Total kg/MS supplied	228,420	277,204	278,560	261,423	273,605	264,460	297,740	300,484	276,019
Average kg/MS/cow	381	425	409	384	415	395	471	477	440
Average kg/MS/ha	1414	1720	1744	1634	1710	1653	1861	1878	1725
Farm Working Expenses / kgMS	$2.98	$2.68	$3.37	$3.88	$3.38	$3.86	$3.91	$3.84	$4.28
Dairy Operating Profit/ha	$1,164	$2,534	$8,284	$2,004	$4,696	$6,721	$4,553	$4665	$7578
Payout [excl. levy] $/kg [Milk price + div.]	$4.10	$4.33	$7.87	$5.25	$6.37	$7.80	$6.30	$6.12	$8.50 F
Return on Assets	4.4%	6.18%	14.6%	4.8%	7%	7%	6%	6%	10%

Stock numbers	2002/03	Average 03/04 - 06/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
1 July cow numbers	631	675	704	704	685	694	665	650	650
Max. cows milked	604	654	680	683	660	669	632	630	628
Days in milk			263	254	266	271	272	273	259
Stocking rate Cow equiv. / ha	3.75	4.05	4.2	4.3	4.13	4.18	3.95	3.94	3.92
Stocking rate Kg liveweight / ha	1,838	1964	2,058	2,107	1,941	1914	1860	1878	1872
Cows wintered off No. Cows / Weeks	500 / 8	515 / 7.8	546 / 9	547 / 7	570 / 9	652 / 8.4	650 / 9.8	650/9.8	650/11.4
No. Yearlings grazed On / Off	0/118	0/157	0/171	0/200	0/160	0/166	0/141	0/138	0/140
No. Calves grazed On / Off	0/141	0/163	0/200	0/170	0/160	0/194	0/190	0/156	0/150
Est. Pasture Eaten (Dairybase) (tDM/ha)			17.9	17.2	16.2	16.9	17.3	16.8	14.9
Purch. Suppl - fed [kgDM/cow]	550	317	415	342	259	463	359	434	506.8
Made on dairy/platform [kgDM/cow]	0	194	95	64	144	160	154	93	0
Applied N / 160 eff. Ha			164	200	185	260	340	350	250

Staffing & Management

Roster System – 8 days on 2 off , 8 days on 3 off

Milking Times - Morning: cups on 5.00am
- Afternoon: cups on 2.30pm

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LUDF Strategic objective 2011-2015

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2011/12 to 2013/14

The strategic objective (above) was implemented in a move into 'Precision Dairying' in the 2011/12 season. This focused on minimum standards not averages, two herds, higher productivity and initially higher profitability from a similar environmental impact. Production lifted to 1878kgMS/ha or 477kgMS/cow from 630 cows.

The temporary suspension of Eco-n (DCD) in 2013 required a change in farm practice in 2013/14 in the attempt to hold nitrogen losses without the mitigation effect of Eco-n. The farm had to cull its of surplus cows early in Autumn 2014 to meet the farms N-loss target (at a cost of $84,000 in loss profit).

2014/15

LUDF is adopting a 'Nil-Infrastructure, low input' farm system emerging from the P21 (Pastoral 21) research programme, in response to the tightening environmental requirements of some catchments across NZ, and to meet its historical N-loss (as above). The system comprises:

- 3.5 cows/ha,
- 150kgN/ha,
- 300kgDM/cow imported supplement, plus winter most cows off farm.
- FWE of less than $1.12million and
- Target production of 500kgMS/cow.
- To deliver a target profitability of $4000/ha at long-term average milk payout of $6.30/kgMS. ($1238/ha at $4.75/kgMS (milk price + dividend))

In Essence LUDF is upscaling results from P21 – LSE herd where 3 years of data have shown similar total production and profit was achieved with less total N-leaching than had occurred at LUDF.

Summary of Performance to the End of April:

Results to End April	2012/13	2013/14	2014/15	P21 – LSE (2014/15)
Total kgMS sold	285,707	270,423	261,570	n/a
kgMS /peak cows	454	431	467	493
Total Cows in Milk	552 (88% peak)	472 (75% peak)	468 (84% peak)	24 (80% peak)
Total N fert applied	350 kgN/ha	250 kgN/ha	143 kgN/ha	147 kgN/ha
Total Silage Fed tDM	235	319	165	n/a
Total Silage Fed / peak cows (kgDM/cow)	373 kgDM	507 kgDM	295 kgDM	95 kgDM
Whole Herd Average Liveweight (WOW)	501 kg	501 kg	512 kg	567 kg
Herd Ave CS	4.3	4	4.35	4.4
Estimated N leaching (full year – Overseer 6.2)	56	43	37	n/a

Note: *Estimate N-losses are indicative only**.** 2012/13 results shown with the effect of Eco-n (as used)*

Comparing LUDF results between 2013/14 and 2014/15, to the end of April:

LUDF has produced

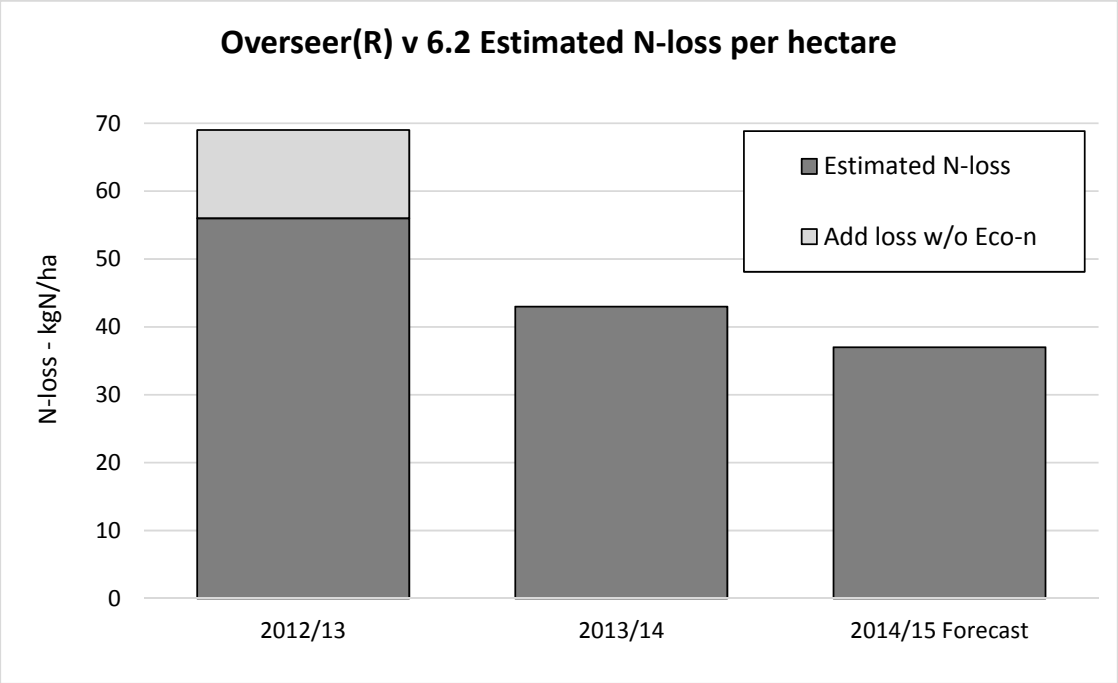
- 3.3% less milk this season,
- from 11% fewer cows with the use of
- 43% less nitrogen fertiliser and
- consuming 48% less imported silage.
- Body Condition score and liveweight is now better than last year.
- Farm Working Expenses to the end of March are below budget and below past years total expenses to date for the end of March.

By comparison to the Research Dairy Farm, P21 LSE farmlet trial, LUDF has produced 5% less milk, for the same use of N-fertiliser. LUDF has used more imported silage BUT has regrassed 3 paddocks (15% of the farm) whereas the Research Farmlet has not undertaken any regrassing.

SUMMARY:

Its possible to reduce bought in feed and bought in N-fertiliser, if the stocking rate is also reduced appropriately to balance feed supply with feed demand.

Reducing N-fertiliser, bought in silage and stocking rate reduces costs: - total milk production (from pasture) remains important to maintain profitability.



Note: N-losses are indicative only.

Financial Results to date:

The 2014/15 budget was set last autumn with the expectation of holding expenditure only to that require to maintain the long term productivity of the farm (ie no discretionary expenses). This produced a forecast total cash farm working expenses of $4.00/kgMS if production of 280,000kgMS could be achieved. Farm working expenses were very sensitive to production as below:

Farm Working Expenses - Sensitivity to Production

Production level relative to budget	**100%**	**95%**	**90%**
Total Milk Production (kgMS)	280,000	266,000	252,000 kgMS
Milk production kgMS /cow	500	475	450 kgMS/cow
Cash Farm Working Expenses	$1,120,335	$1,120,335	$1,120,335
FWE/kgMS	**$4.00/kgMS**	**$4.21/kgMS**	**$4.45/kgMS**

Subsequent revisions of the budget in light of the downward movement in forecast milk payout identified little room for reduced expenditure, without impacting the longterm productivity of the farm – such as deferring maintenance, fertiliser, regrassing or animal breeding.

Actual vs Budgeted Expenses to end March 2015:

Year ending May 31		2014/15 Budget	Actual to end Mar	Budget to End Mar	Variance (Act—budg)
Milk production (kgMS)		280,000	237,957	245,387	-7,430
160 ha		1,750 kgMS/ha	1,487 kgMS/ha	1,534 kgMS/ha	-46
Peak Cow Nos and Prod.		560	560	560	
Staff		3.7	3.7	3.7	
Income	Milksolid Payout $/kgMS	$4.50	$4.50	$4.50	
	Dividend /share	$0.25 /share	$0.25 /share	$0.25 /share	
	Milksolid Revenue	$1,260,000	$1,070,807	$1,104,242	-$33,435
	Dividend	$70,000	$59,489	$61,347	-$1,858
	Surplus dairy stock	$138,511	$102,443	$76,098	$26,345
Stock Purchases		-$23,200	-$25,280	-$23,165	-$2,115
Gross Farm Revenue		**$1,445,311**	**$1,207,459**	**$1,218,521**	-$11,063
Expenses					
Cow Costs	Animal Health	$54,200	$44,980	$40,015	$4,965
	Breeding Expenses	$42,340	$48,325	$38,418	$9,907
	Replacement grazing & meal	$119,744	$123,563	$103,772	$19,791
	Winter grazing - Herd incl. freight	$191,364	$172,365	$173,414	-$1,049
Feed	Grass silage purchased	$70,502	$64,780	$70,502	-$5,722
	Silage making & delivery	$9,728	$2,622	$9,728	-$7,106
	Giberillin	$13,120	$5,596	$9,120	-$3,524
	Nitrogen	$49,237	$36,068	$49,237	-$13,169
	Fertiliser & Lime	$34,387	$31,100	$34,013	-$2,913
	Irrigation - All Costs	$70,600	$76,878	$61,248	$15,630
	Re-grassing	$36,985	$24,083	$36,985	-$12,902
Staff	Employment	$259,884	$189,927	$199,574	-$9,647
Land	Electricity-farm	$37,200	$22,389	$30,200	-$7,811
	Administration	$24,700	$20,744	$20,815	-$71
	Freight & Cartage	$0	$5,206	$2,513	$2,693
	Rates & Insurance	$21,020	$21,020	$21,020	$0
	Repairs & Maintenance	$54,500	$32,961	$43,692	-$10,731
	Shed Expenses excl. power	$9,850	$7,180	$9,846	-$2,666
	Vehicle Expenses	$31,336	$19,889	$30,784	-$10,895
	Weed & Pest	$500	$1,350	$450	$900
Cash Farm Working Expenses		$1,131,197	**$951,026**	**$985,346**	-$34,320
FWE/kgMS		**$4.04**			
Depreciation est.		$116,000			
Total Operating Expenses		$1,247,197			
Dairy Operating Profit		$198,114			
DOP /ha		**$1,238**			
Cash Operating Surplus		$314,114			
Cash Operating Surplus per ha		**$1,963**			

Initial Budget vs Forecast Year End Expenses and Profit (at $4.50/kgMS)

Year ending May 31		2014/15 Budget	Forecast Year End	Variance (Budget – Forecast)	Notes
Milk production (kgMS)		280,000	272,500	7,500	1
160 ha		1,750 kgMS/ha	1,703 kgMS/ha	47	
Peak Cow Nos and Prod.		560	560	0	
Staff		3.7	3.7	0	
Income	Milksolid Payout $/kgMS	$4.50	$4.50		
	Dividend /share	$0.25 /share	$0.25 /share		
	Milksolid Revenue	$1,260,000	$1,226,250	$33,750	1
	Dividend	$70,000	$68,125	$1,875	1
Surplus dairy stock		$138,511	$138,511	$0	
Stock Purchases		-$23,200	-$25,280	$2,080	
Gross Farm Revenue		**$1,445,311**	**$1,407,606**	$37,705	
Expenses					
Cow Costs	Animal Health	$54,200	$59,165	-$4,965	2
	Breeding Expenses	$42,340	$52,247	-$9,907	**3**
	Replacement grazing & meal	$119,744	$139,535	-$19,791	**4**
	Winter grazing - Herd incl. freight	$191,364	$190,315	$1,049	
Feed	Grass silage purchased	$70,502	$64,780	$5,722	**5**
	Silage making & delivery	$9,728	$2,622	$7,106	**6**
	Giberillin	$13,120	$9,596	$3,524	**7**
	Nitrogen	$49,237	$36,068	$13,169	**8**
	Fertiliser & Lime	$34,387	$31,100	$3,287	**9**
	Irrigation - All Costs	$70,600	$76,878	-$6,278	**10**
	Re-grassing	$36,985	$24,083	$12,902	**11**
Staff	Employment	$259,884	$250,237	$9,647	**12**
Land	Electricity-farm	$37,200	$33,295	$3,906	**13**
	Administration	$24,700	$24,629	$71	
	Freight & Cartage	$0	$2,693	-$2,693	
	Rates & Insurance	$21,020	$21,020	$0	
	Repairs & Maintenance	$54,500	$49,135	$5,366	**14**
	Shed Expenses excl. power	$9,850	$9,850	$0	
	Vehicle Expenses	$31,336	$20,441	$10,895	**15**
	Weed & Pest	$500	$1,350	-$850	
Cash Farm Working Expenses		$1,131,197	**$1,099,038**	$32,159	**16**
FWE/kgMS		**$4.04**	**$4.03**		
Depreciation est.		$116,000	$116,000		
Total Operating Expenses		$1,247,197	$1,215,038		
Dairy Operating Profit		$198,114	$192,568	-$5,546	
DOP /ha		**$1,238**	**$1,204**		
Cash Operating Surplus		$314,114	$308,568		
Cash Operating Surplus per ha		**$1,963**	**$1,928.55**		

Notes to Forecast Year End Expenses and Profit:

1. Lower milk production contributing to lower income.
2. General increases in Animal health expenditure - including teat spray, BVD Lameness, Mastitis etc
3. Increases in Herd testing and AI compared to budget and replacement of a Protrack computer
4. LUDF continued to use milk powder as in past years. This makes milk production easily comparable across years, and with the P21 Research Farmlet. In past years it was financially worthwhile but not this year.
5. Purchased grass silage was slightly cheaper than budgeted.
6. Limited silage made on farm (have regrassed instead)
7. Grazing Rotation limited use of GA in spring
8. Lower urea pricing
9. Spreading savings and slightly lower costs than budgeted.
10. Higher electricity on Nth blk, and R/M, more days irrigation
11. Saving by direct drilling rather than cultivating S6. Similar area regrassed as budgeted, but very little undersowing in the spring.
12. No use of casual staff and resignation of a farm assistant before the end of the season.
13. Upgraded milk refrigeration and added silo-wraps.
14. General savings and includes drainage development not yet undertaken
15. Savings in fuel price, fuel usage (less mowing) and vehicle R/M
16. Combination of above reducing expenses by $40,000

Summary: Production related decrease in income (adjusted for payout change) is still forecast to be greater than reduction in expenses.

Driving profitability at LUDF:

LUDF's Profitability is primarily a function of **Payout x Milk Production less Expenses**. LUDF has little impact on the payout – but has many opportunities to influence the other two criteria.

Therefore – high production from efficient use of grazed pasture is critical to achieving profitability. Not achieving desired production will have a significant impact on profitability. (LUDF must achieve production from pasture – it has very few available inputs to otherwise use for production).

Profitability vs Production

Little relationship between production and Profitability BUT

a. Very difficult to achieve high profitability at LOW levels of production
b. Very common to achieve high levels of production but NOT achieve high profitability.

Johnes Disease:

Overview:

- Wasting disease of cattle, sheep and deer
- Infection by Johne's bacteria – *Mycobacterium avium paratuberculosis* (MAP)
- Most new infections in very young animals
- Most disease (in dairy cows) in older animals, 7+ years old
- Jerseys have 3x clinical disease
- Bacteria inflame intestine so nutrients not absorbed
- Signs - lose body condition, persisting diarrhoea, milk production drops, eventual death

Five point dairy toolbox

- Test-and-cull high risk cattle
- Calving and colostrum management
- Calf management pre-weaning
- Replacement heifer management
- Biosecurity and purchasing stock

For further information –

- DairyNZ website www.dairynz.co.nz/animal/health-conditions/johnes-disease/
- JDRC website www.jdrc.co.nz
- Phone 0800 4 DairyNZ
- Your vet

Results from LUDF:

The Herd Test in early March identified 3 Suspect, 7 Positive and 8 Highly Positive cows (18 total). 13 samples were rejected and the remaining 444 cows reported no Ab detection.
The 18 cows were subsequently blood tested, confirming positive for Johnes. 1 has since been culled. LUDF has typically observed 6-7 cow deaths / culls per year, directly identified with Johnes disease.

LUDF has determined to cull all remaining 17 Johnes positive cows and replace with 15 high BW former LUDF cows that were empty at the end of mating last season.

Analysis of cows identified with Johnes at Purata Farms last season showed 30% were subsequently lost over winter, 20% through calving and a further 10% through the remainder of the season (total 60% loss).

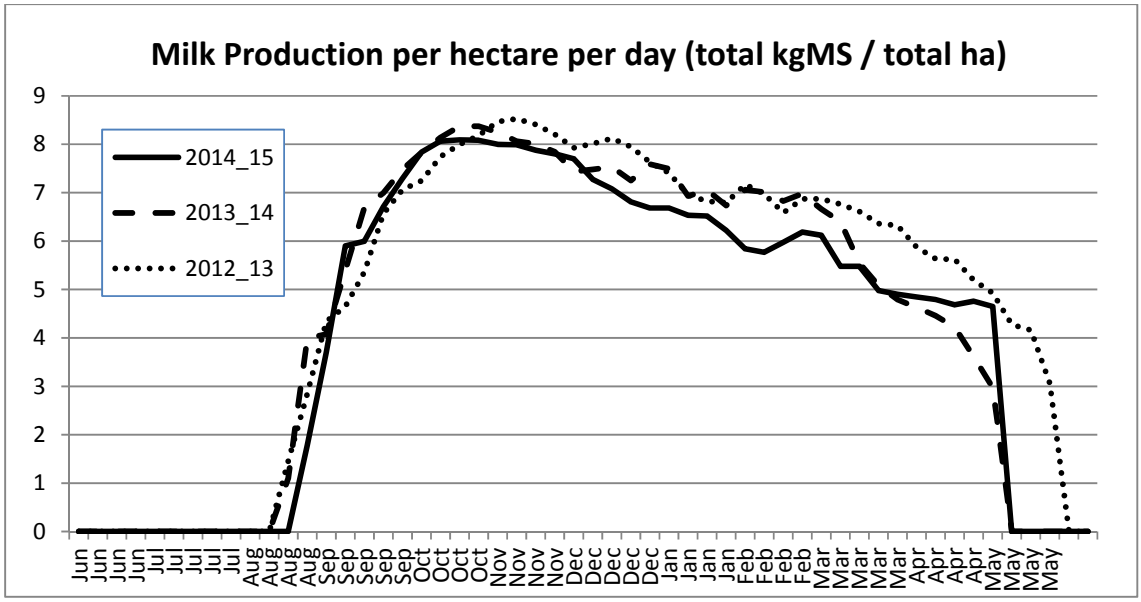
A simple economic analysis shows:

- Revenue from sale of 17 cull cows at $700/cow = $11,900.
- Replacement cost carryover cows – 15 at $1500 = $22,500. Net cost $10,600.

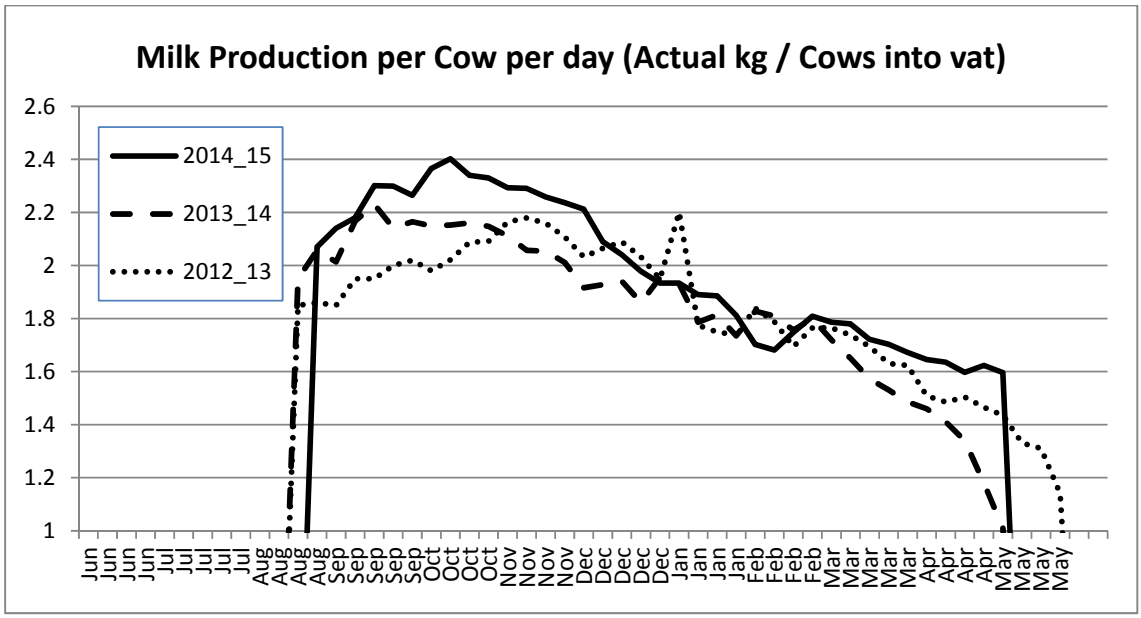
Alternatively, if 60% of the 17 cows die / culled through the season there is a capital loss of 10 x $1500 = $15,000. Presuming half of these are sold at $300/cow recovers $1500. The possible cost of doing nothing is therefore $13,500 – more than the cost of replacing the 17 positive Johnes cows.

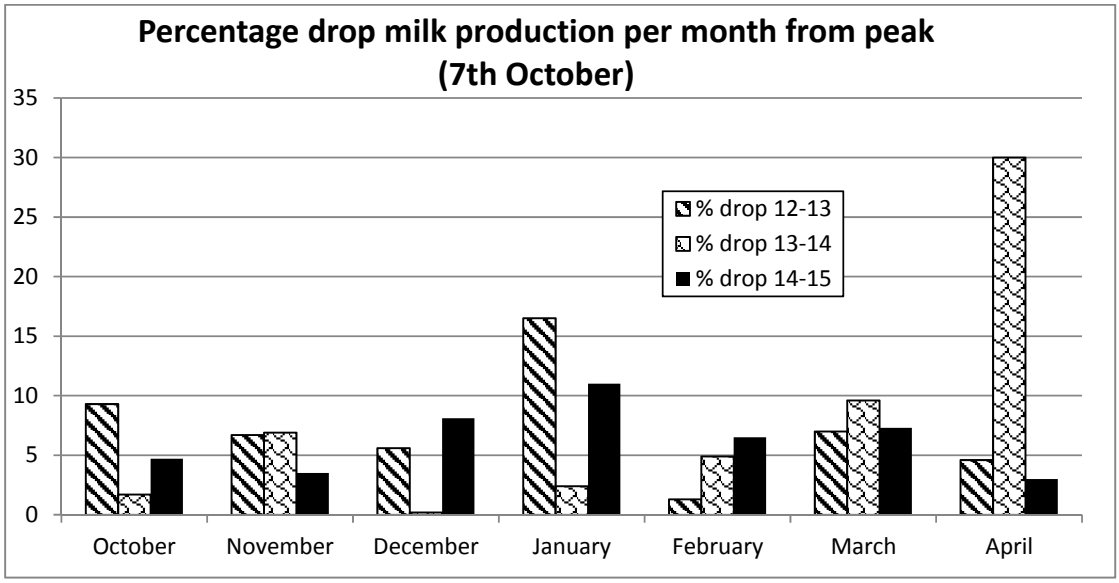
This also lessens the risk of Johnes transferring from these cows to next seasons new born calves.

Seasonal Production Summary:

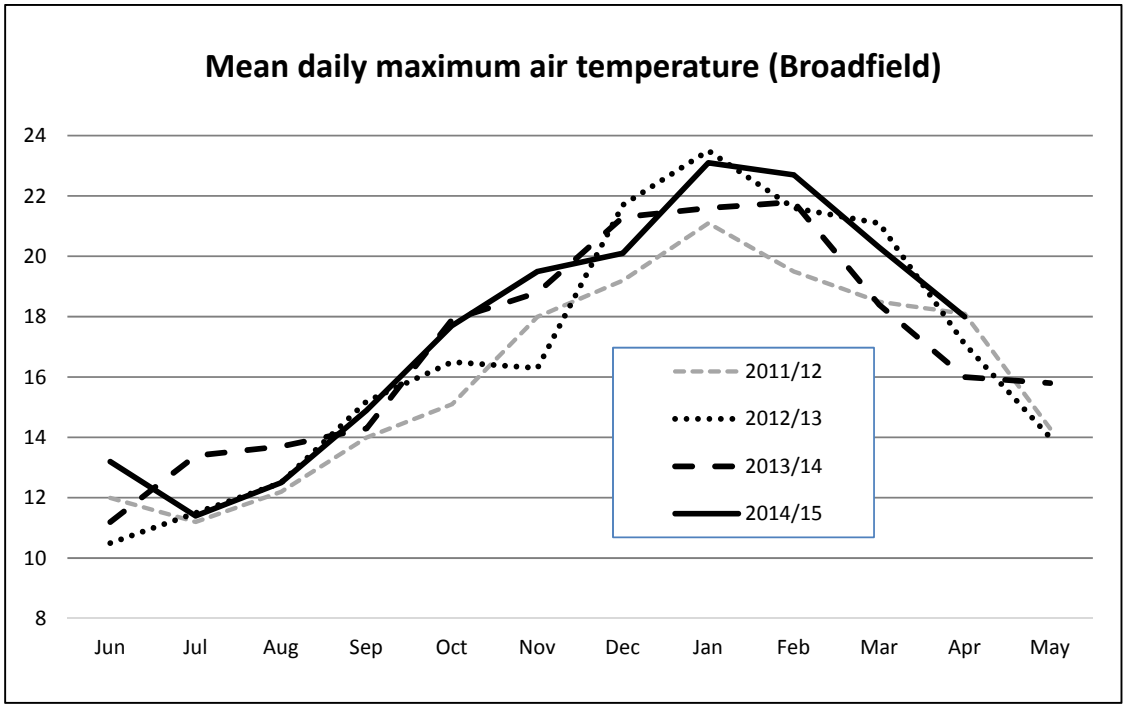


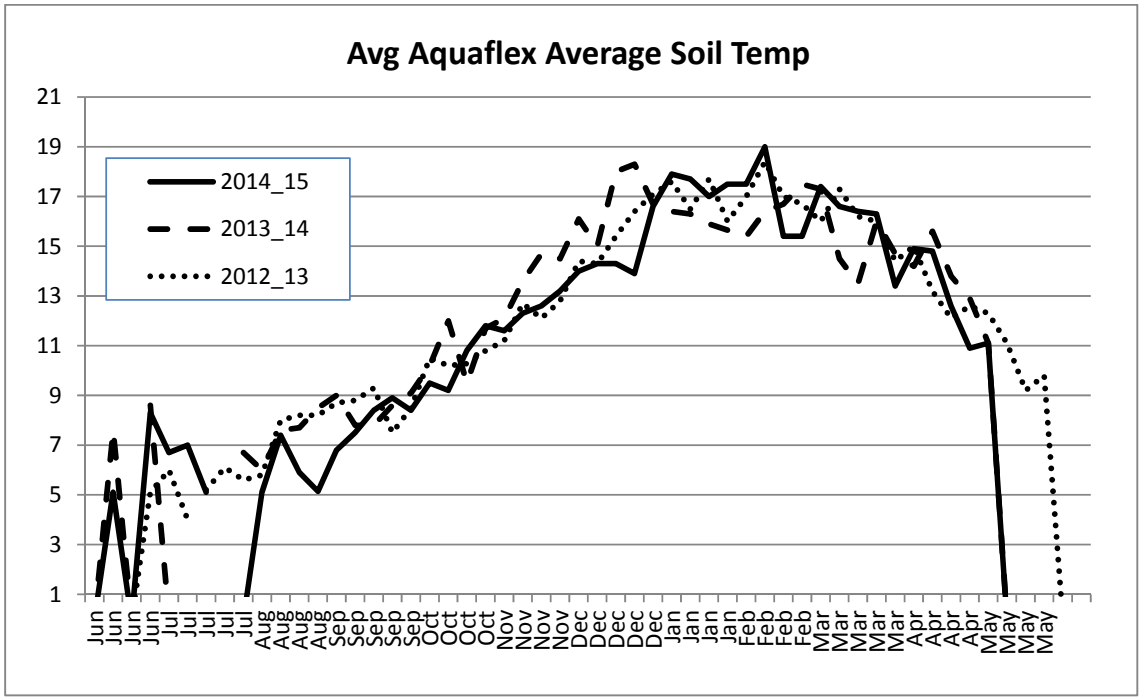
Milk production per hectare this year has largely been similar to past years, in spite of the farm having 11% fewer cows, using 43% less N-fertiliser and consuming 48% less imported feed. This suggests the production has been achieved with greater efficiency than past years.



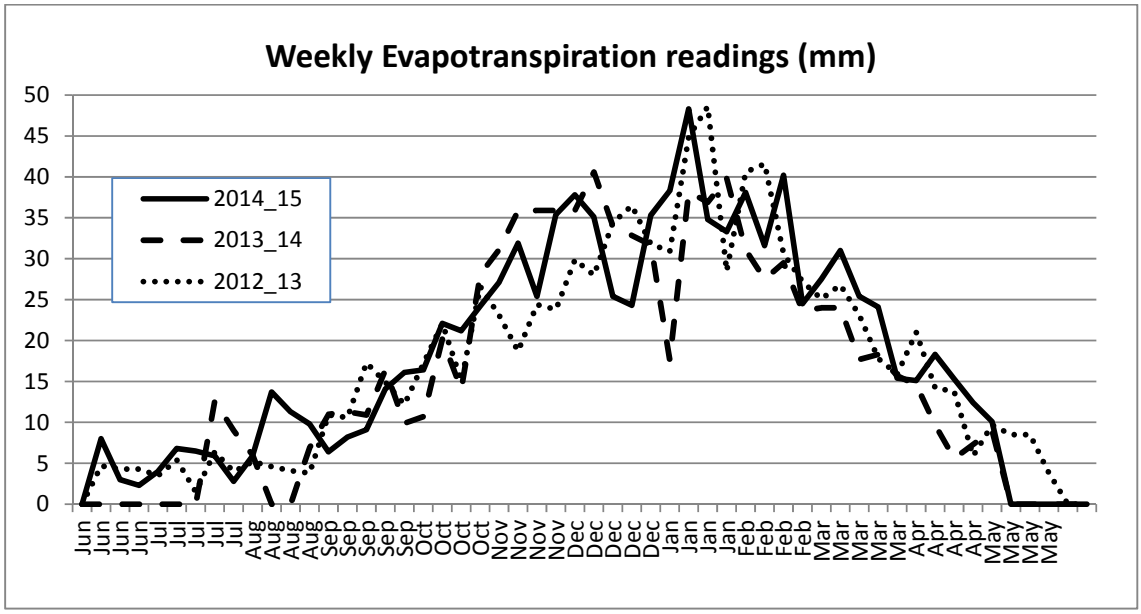


Growing Conditions:

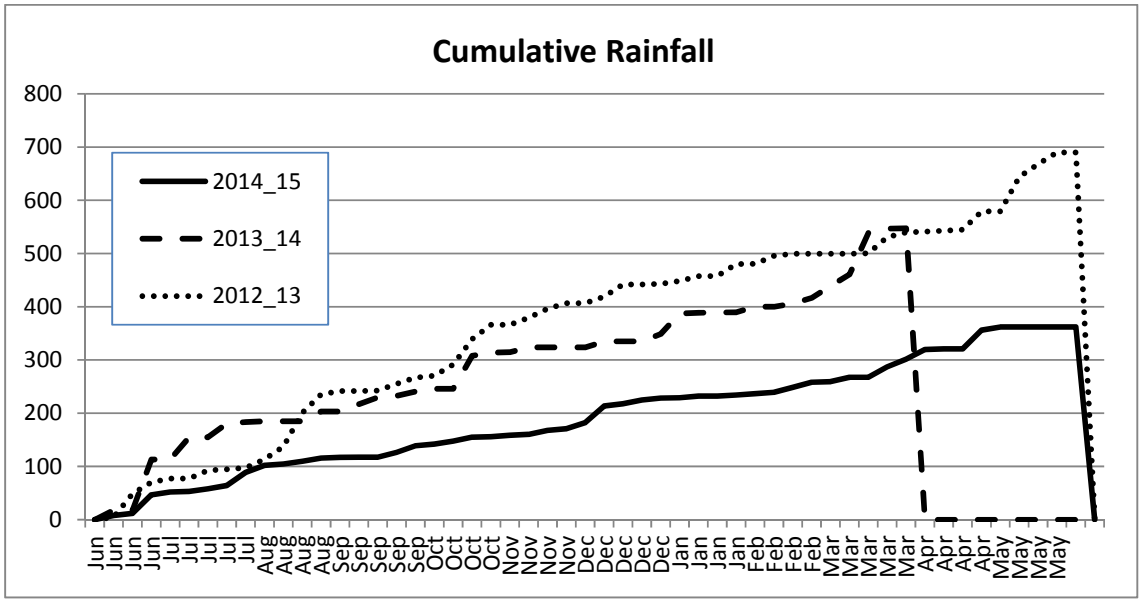


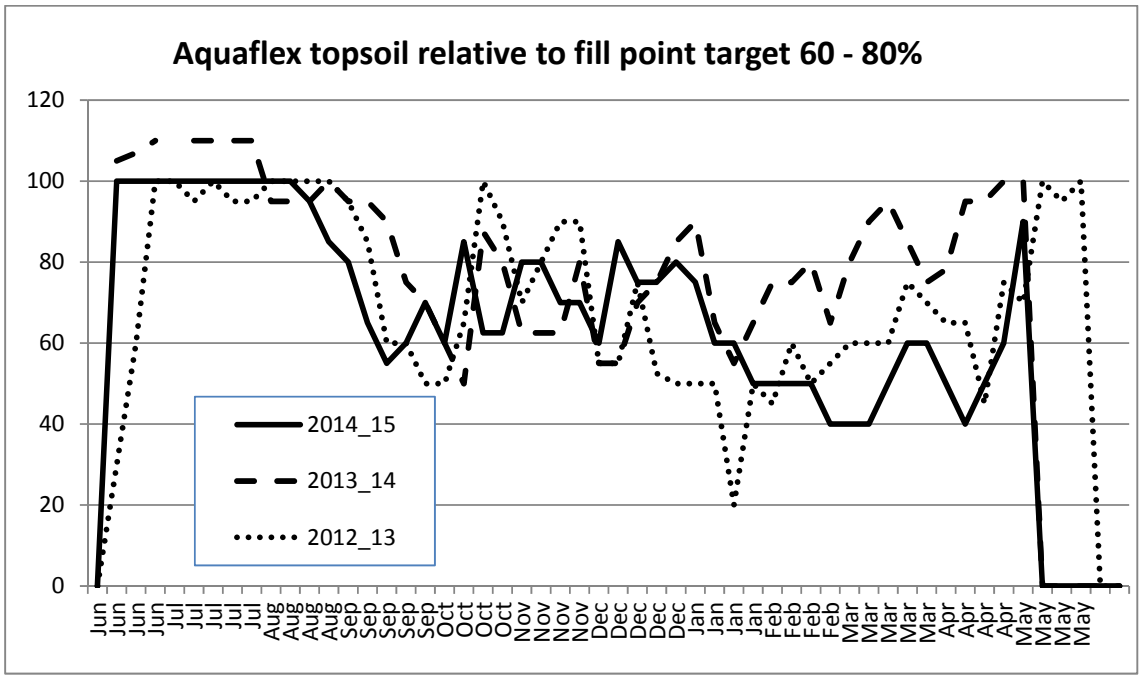


The weekly average soil temperature data shows the 2014/15 season was generally cooler than the past two seasons from August to the end of December. From January to April, soil temperatures were similar or higher than the two past years.

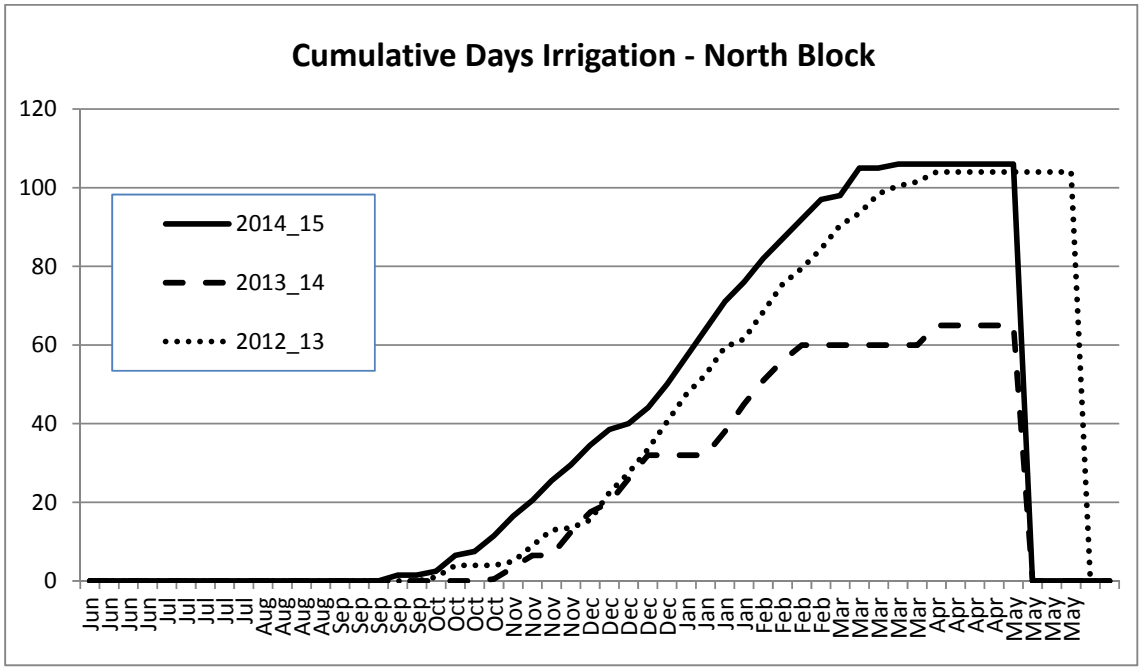


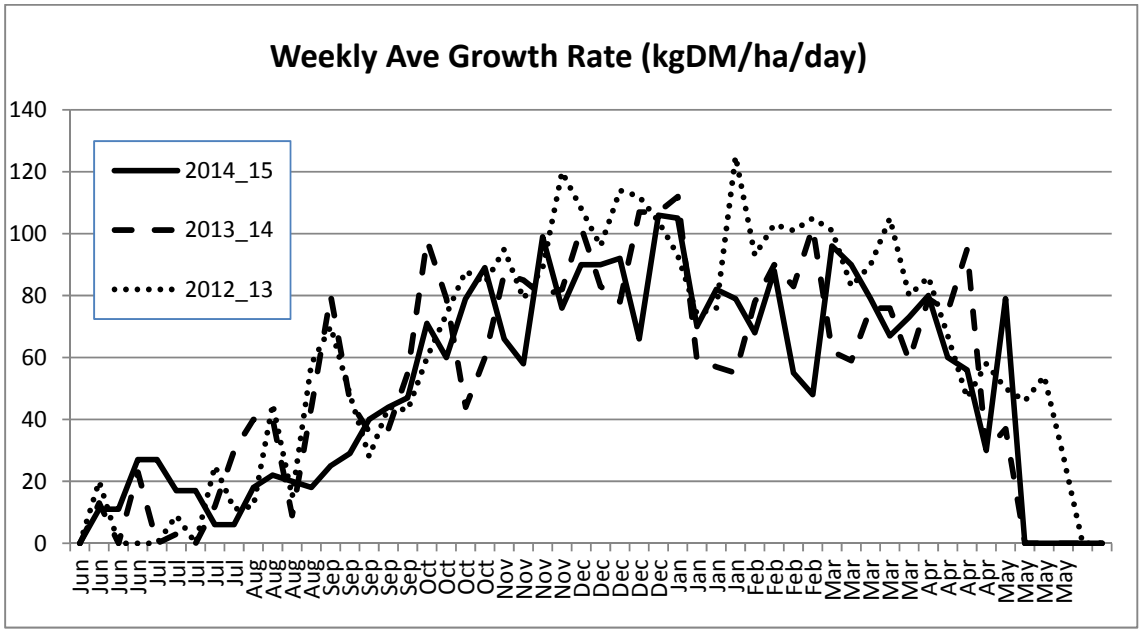
The pivots at LUDF apply 5.5 mm/day, therefore can apply up to 38.5 mm per week; weekly ET above in January shows ET exceeded irrigation through this time.

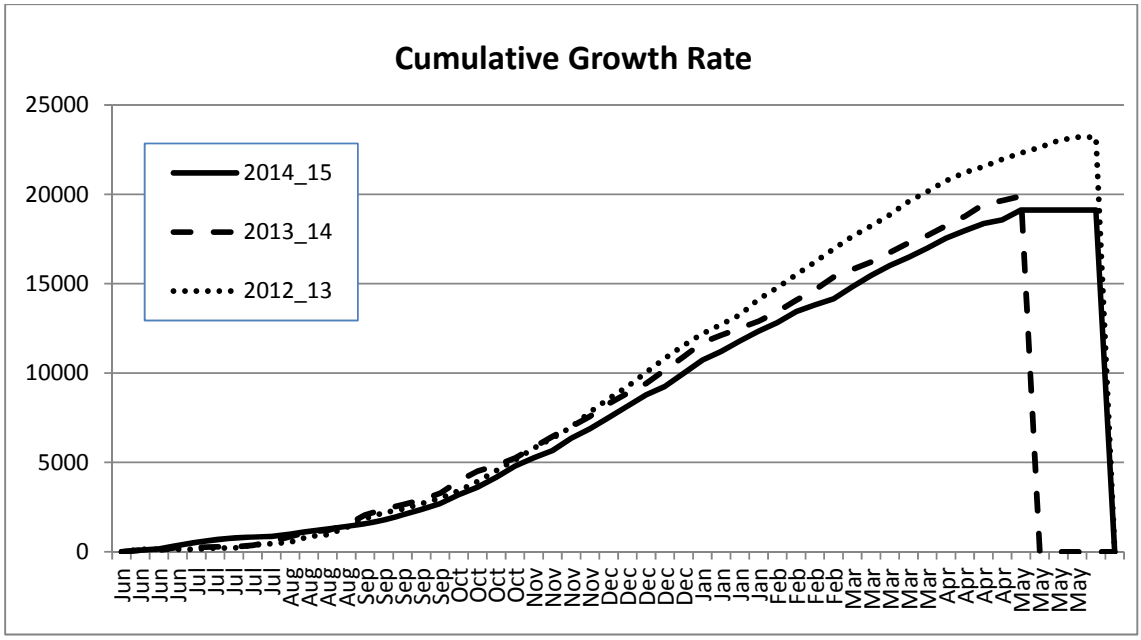




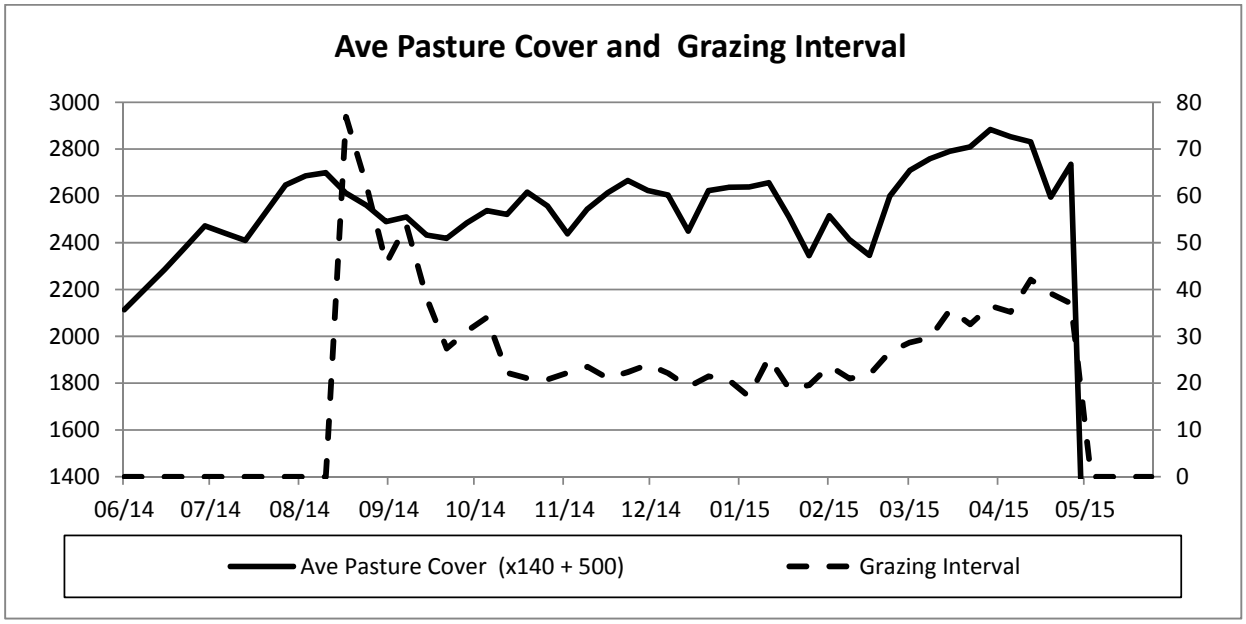
The Aquaflex graph above reflects the inability of the pivots to compensate for ET through January. The farm was then maintained at the lower end of the available soil moisture through February and March to allow additional capacity in the soil for autumn rain, thus limiting the possibility of drainage.







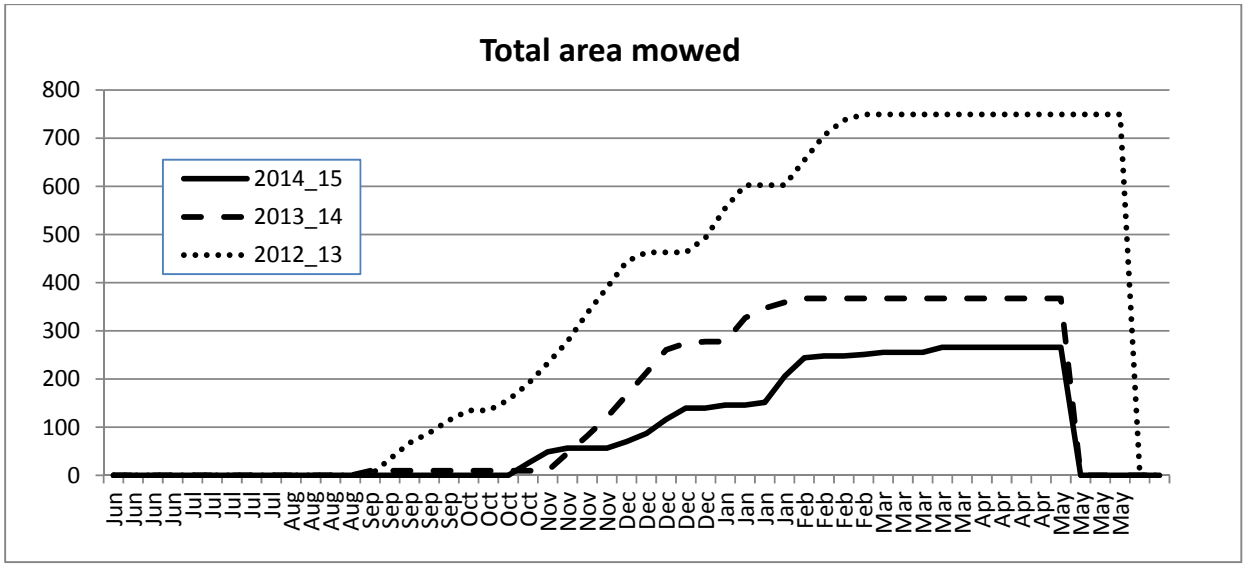
The combination of this seasons weather patterns and the reduced nitrogen inputs (see graphs below) has contributed to the farm growing less total pasture production (estimated from weekly growth rates). As in past years, average weekly growth rates fluctuate throughout the season, making grass management challenging to maintain intake and feed quality.



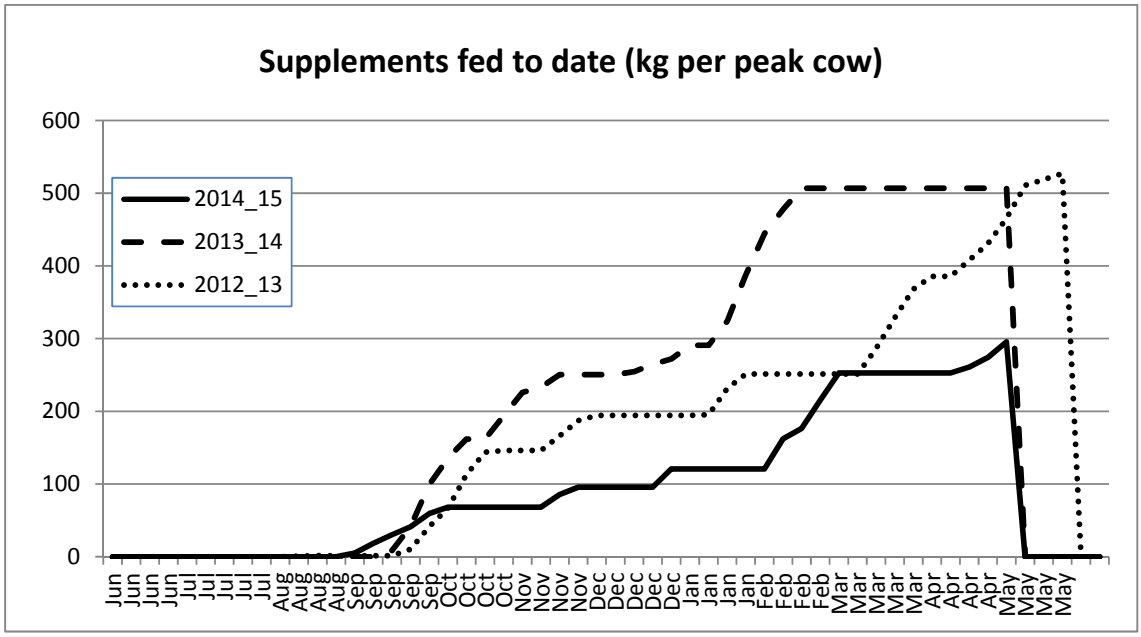
As a result of operating LUDF with little bought in feed and less nitrogen fertiliser (this season), a more conservative position in relation to round length was adopted, largely as the farm couldn't afford to create a major feed deficit and expect to use extra silage to grow out of any deficit. This resulted in the farm requiring higher pre-graze covers and subsequently higher average pasture cover.

Its possible the average pasture cover (as estimated by the rising plate meter) was overestimated on a number of occasions as the grazing time required to achieve target grazing residuals indicated pregrazing mass is likely to have been lower than that estimated by the plate meter. Therefore the average pasture cover may not have been as high as the graph above indicates.

Maintaining pasture quality, in spite of higher pregraze covers and higher average pasture covers was always paramount in making management decisions, and the production achieved this season suggests adequate pasture quality was offered throughout most of the season. See below for additional details of pasture quality.



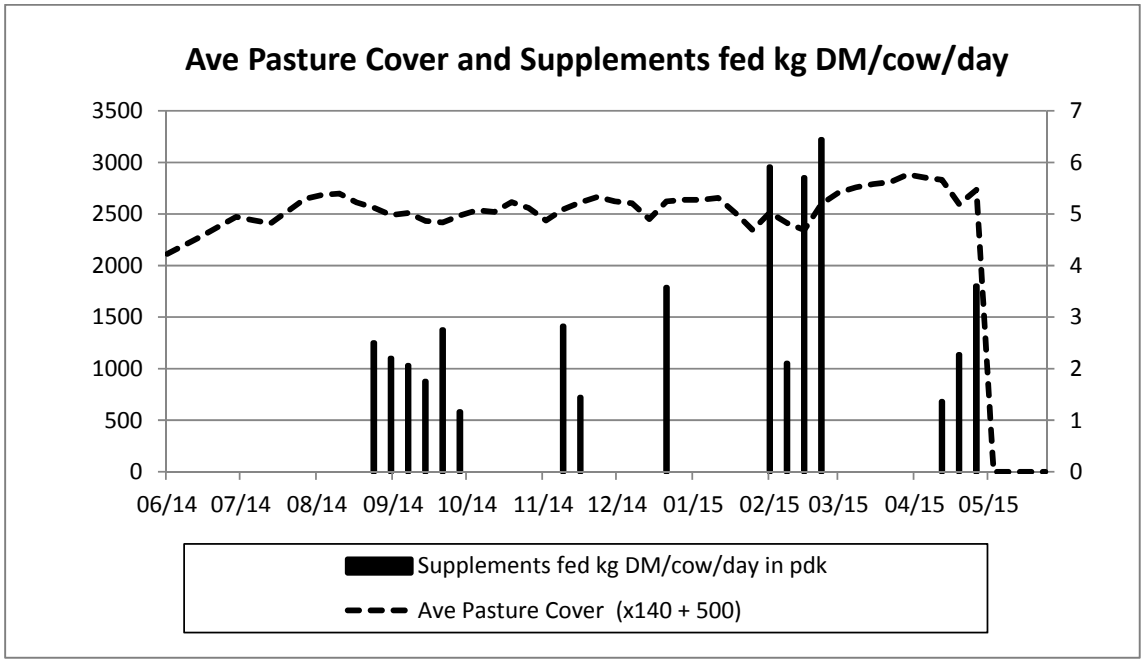
A limited amount of pregraze mowing occurred this season, in part reflecting less nitogen used and less pasture grown. Included in the total area mown is mowing of new grass for weed control (the inclusion of chicory and plantain prevents herbicide use in newly established pasture) and mowing of two paddocks of silage. Weekly pasture monitoring, limited pre-graze mowing and the use of two herds are tools the farm can use to maintain high quality pasture in front of the herd while also helping obtain post grazing residuals.



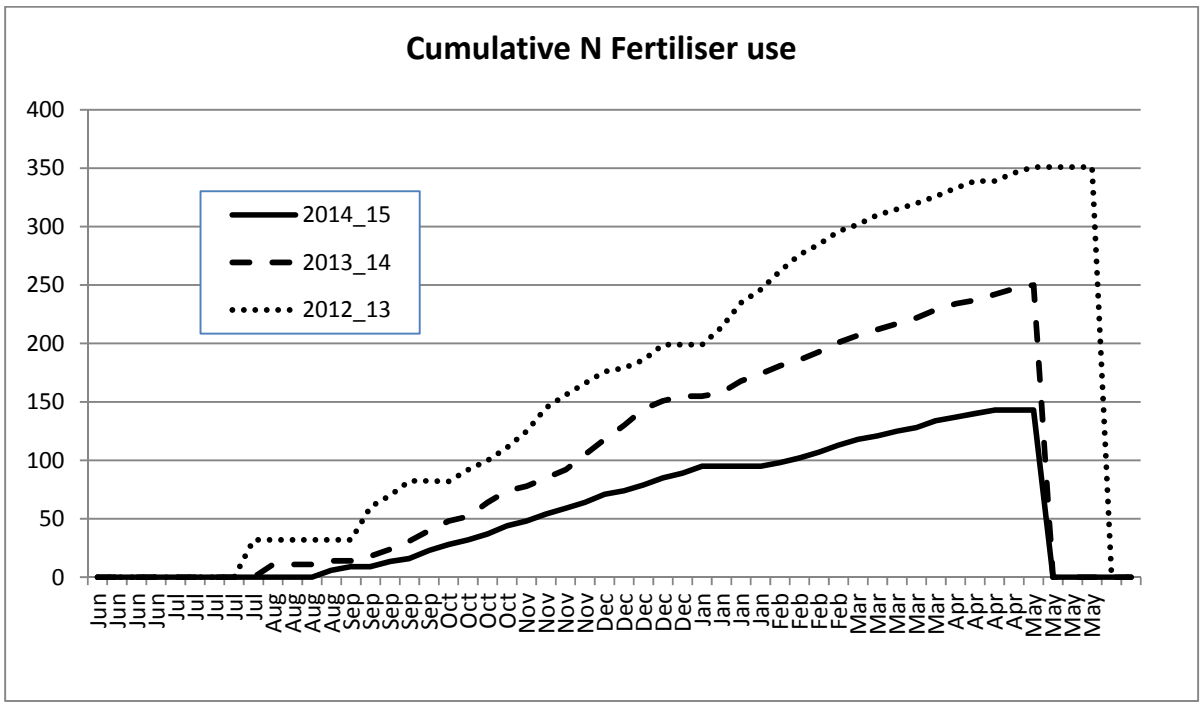
As above, the farm only had 300 kgDM/cow imported supplements (grass / Lucerne silage). Of this, 166kgDM /cow was budgeted to use in the first grazing round if required to ensure the first round finished on or about 23 September. The dry spring and higher initial pasture cover at calving meant that only 60kgDM/cow supplement was used by the end of September, which left a higher proportion of it to be used through the remainder of the season. In addition the farm made approximately 40kgDM/cow silage.

Approximately 150 kg DM/cow silage was fed through February to push the grazing round out from 20 to 30 days, with the remaining silage fed in late April / early May. The on-farm made silage will be fed through May along with lowering the farm average pasture cover to get to the target 2050kgDM APC at the end of May.

Days in milk will not be chased at the cost of BCS, pasture cover, or damaging the ability of the farm to produce pasture next season.



Supplements (along with culling in the autumn) have been strategically used to hold the farms target round length through the season, without either eating lower than target grazing residual, or eroding cow condition. This is also part of ensuring good quality grass was available to cows at all times.



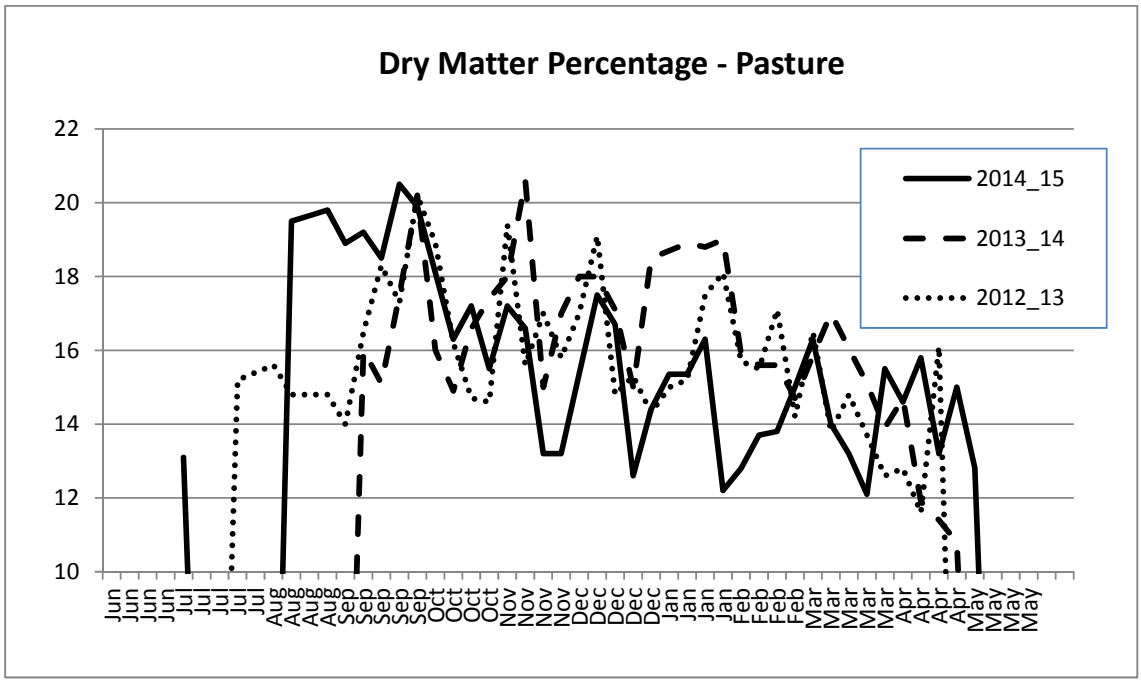
The limited available N for the season required application in a manner most likely to optimise additional pasture from applied N-fertiliser. In practice, as seen in the graph above, minimal N was applied in August or September, compared to up to 40 kg/ha across the whole farm two seasons ago.

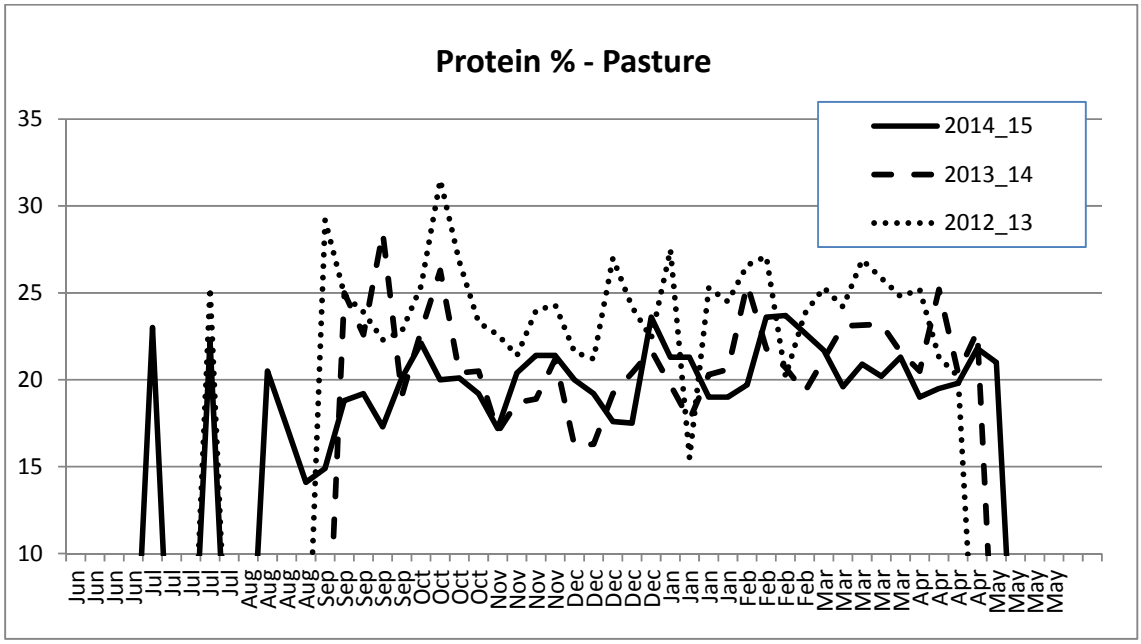
Unlike past seasons, no N-fertiliser was applied prior to grazing with the milking herd in August. The longer first grazing round (finishing 23 September) pushed back the start of the more frequent N-applications following each grazing through the spring.

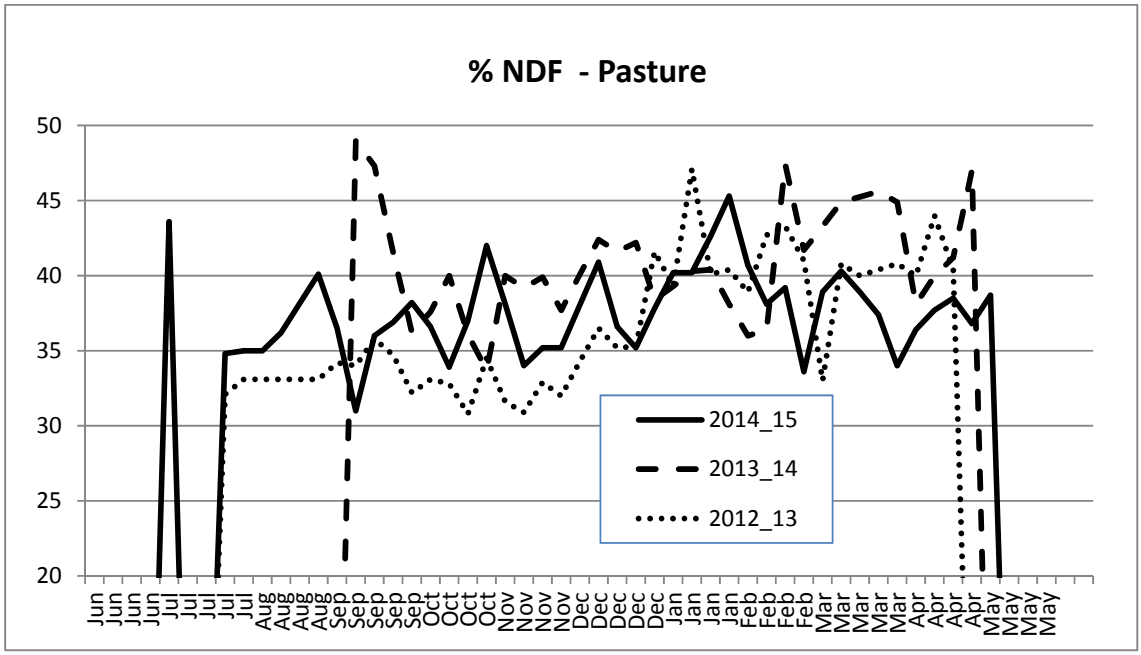
Further, the slightly longer grazing rotation, meant longer intervals between N-applications and therefore one less application over this period.

No nitrogen was applied through January, to maintain 50 kgN/ha for the autumn. Again the increased round length through the autumn pushed the use of N over a longer period, with N-applications finishing on 14th April having applied 143 kgN/ha. Applying N later than this, given the farm was on a 40 day grazing rotation was unlikely to produce pasture for milking cows this season.

Pasture quality:






% NDF - Pasture
50
45
40
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30
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2014_15
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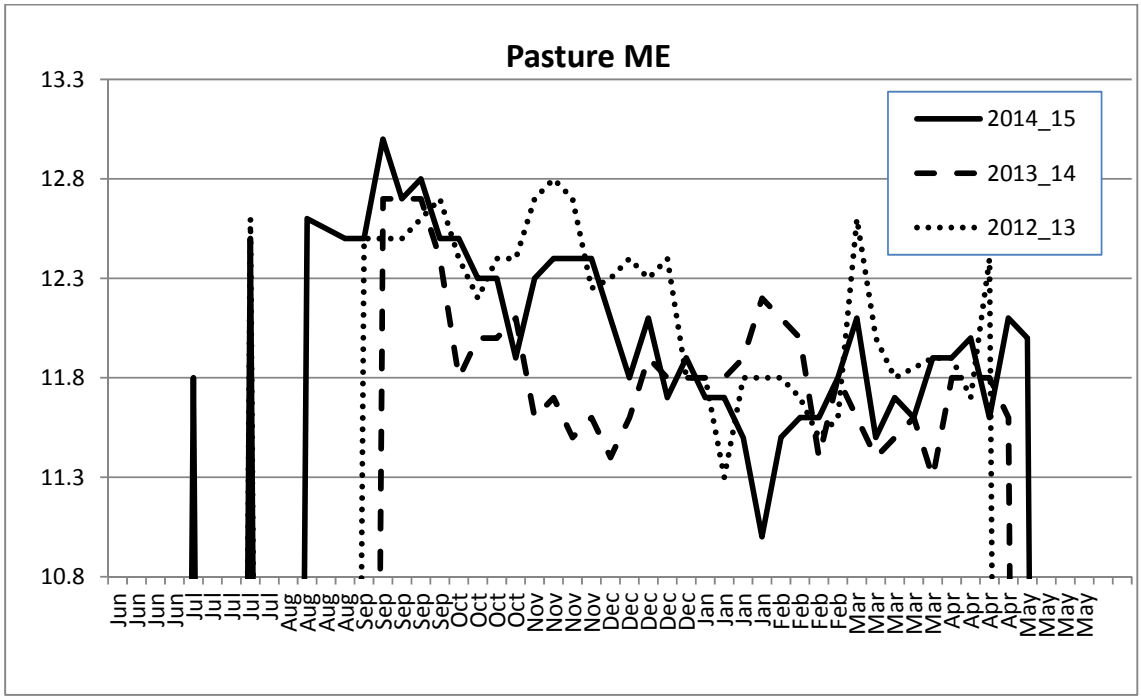
Pasture ME
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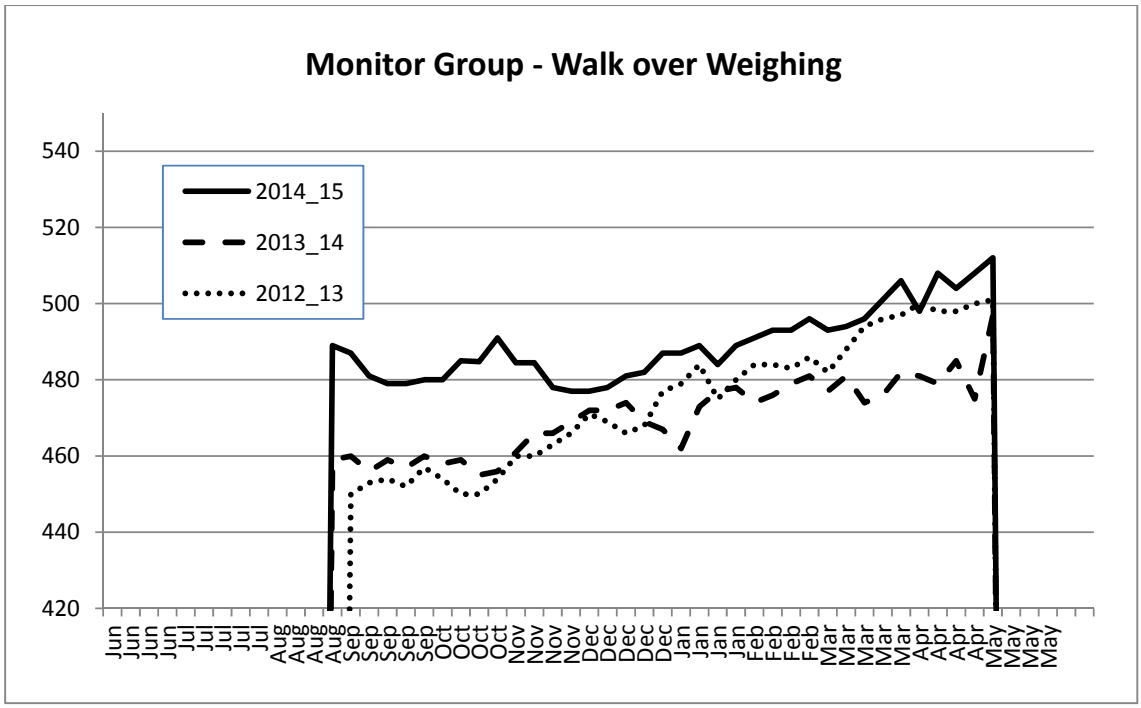
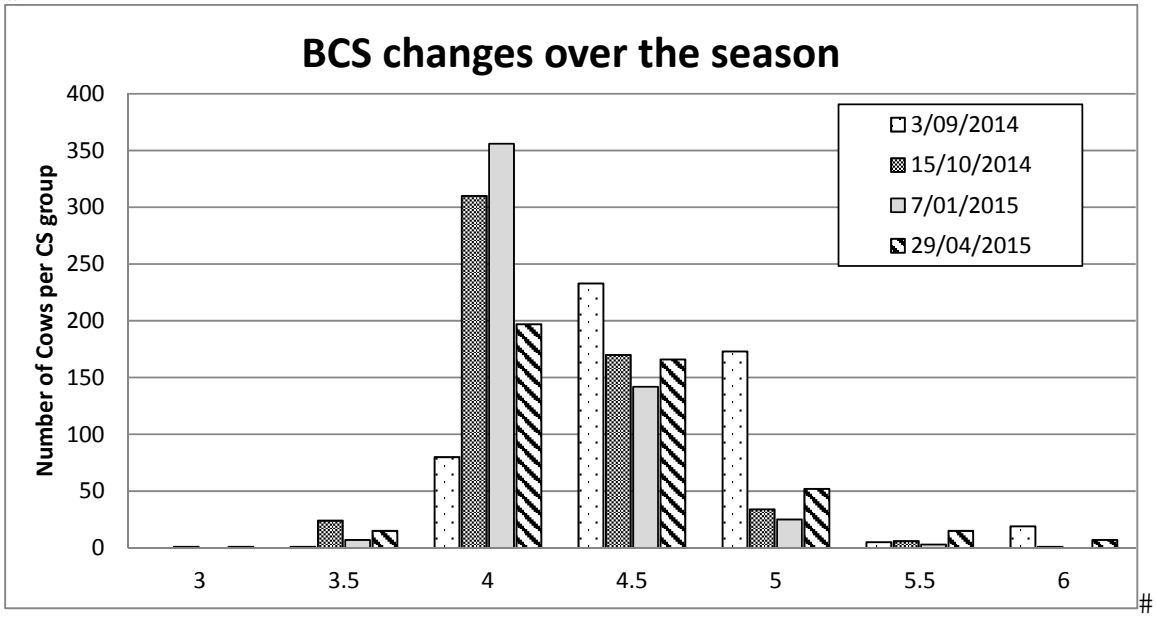
Cow LW and BCS:



Note – the Monitor group will have changed a little in the autumn period as cows are culled.

#

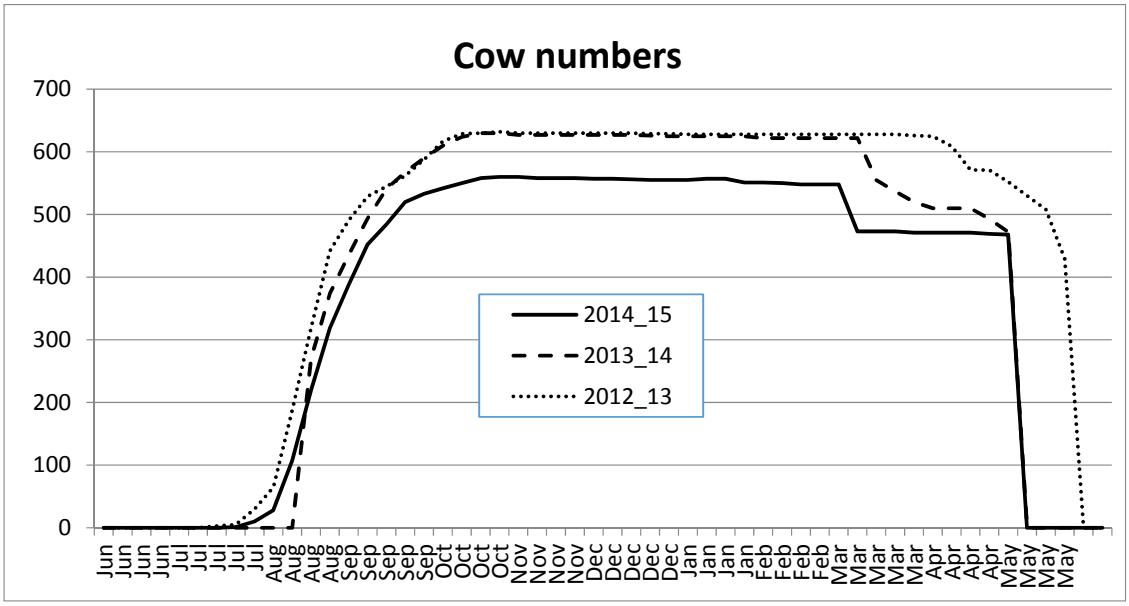


#

Every cow at LUDF is individually condition scored every 2 weeks through the whole season. Selected above are only 4 of these events: early spring, just before mating, early January and late April. Important to note is that the herd started the season with an average BCS of 5 for mixed age cows and 5.5 for R2.

The graph above shows the normal BCS loss during the spring time with the peak number of cows at BCS 4 by early January. The trend shown after this date is of an increase in the number of animals with BCS 4.5 and above and a decrease in animals on BCS 4 or less.

Average BCS at the end of April is 4.36, increasing 0.1 of a condition score from 2 week before. 365 cows (80.2%) are either 4 or 4.5 BCS, giving a very narrow range. Of the remainder, 16 were below BCS 4 and 87 are BCS 5 or greater. A narrow spread of CS heading into winter makes winter management easier.



Dry-off Rules - Presuming good quality feed offered, ie - above maintenance levels.

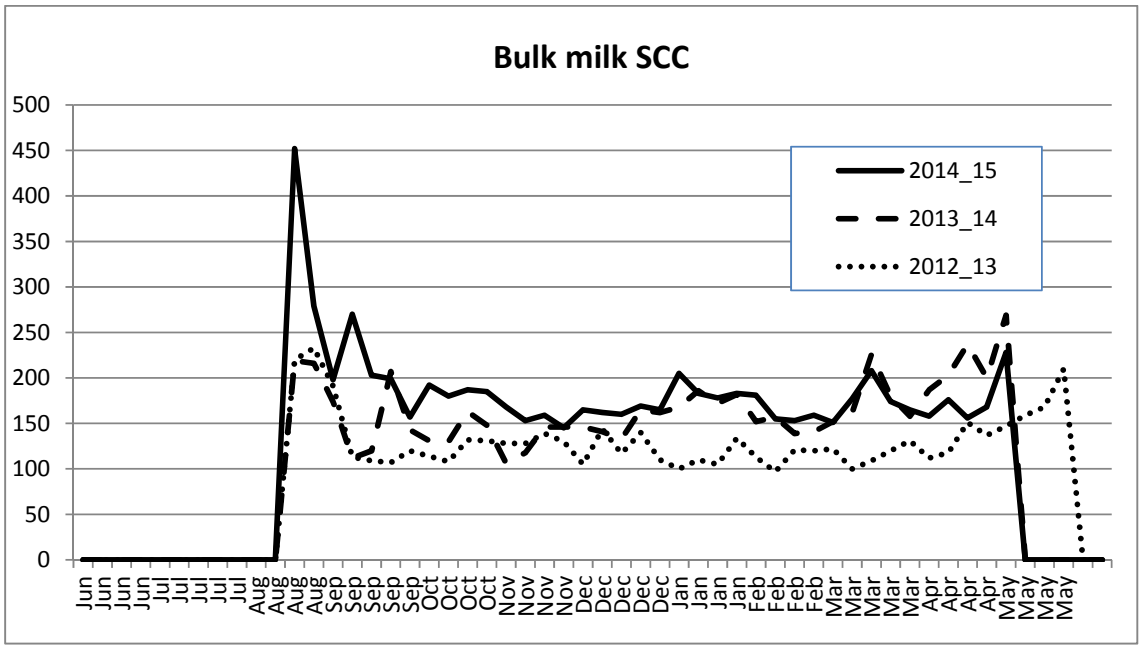
Cows (4 years old and older)

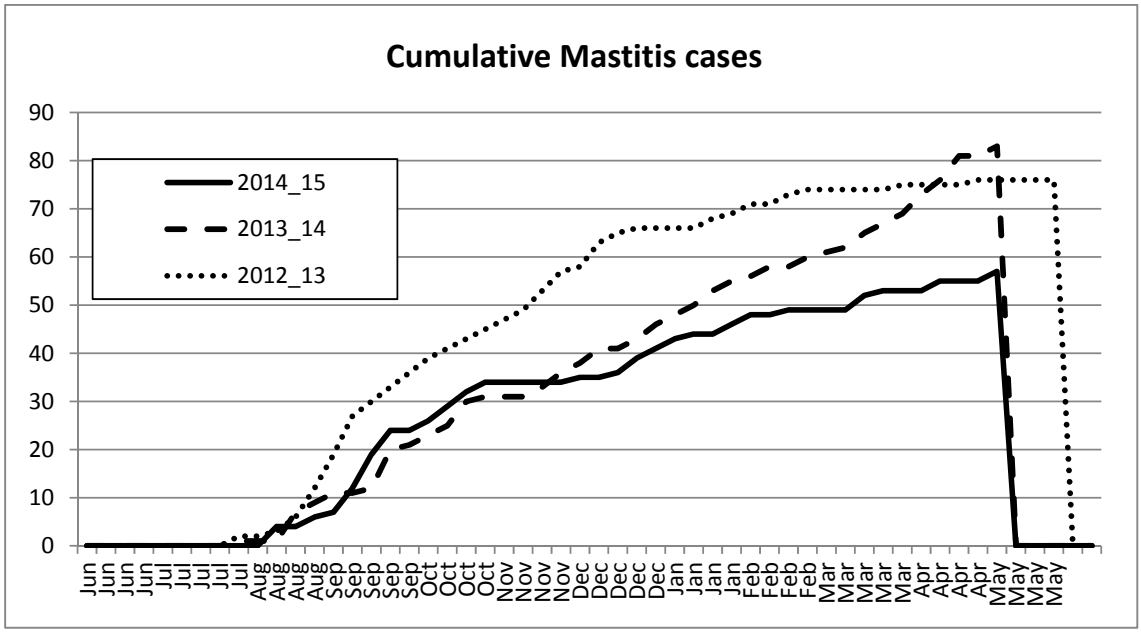
Cow Condition	Dry off time (days before Calving)	Date cow need to be dried off (calving date 1-15 August)	Date cow need to be dried off (calving date 15-30 August)
3.5	100	20 April – 5 May	5-15 May
4	80	10-20 May	20 -30 May
4.5	60	NA	NA

Rising 3 year Old

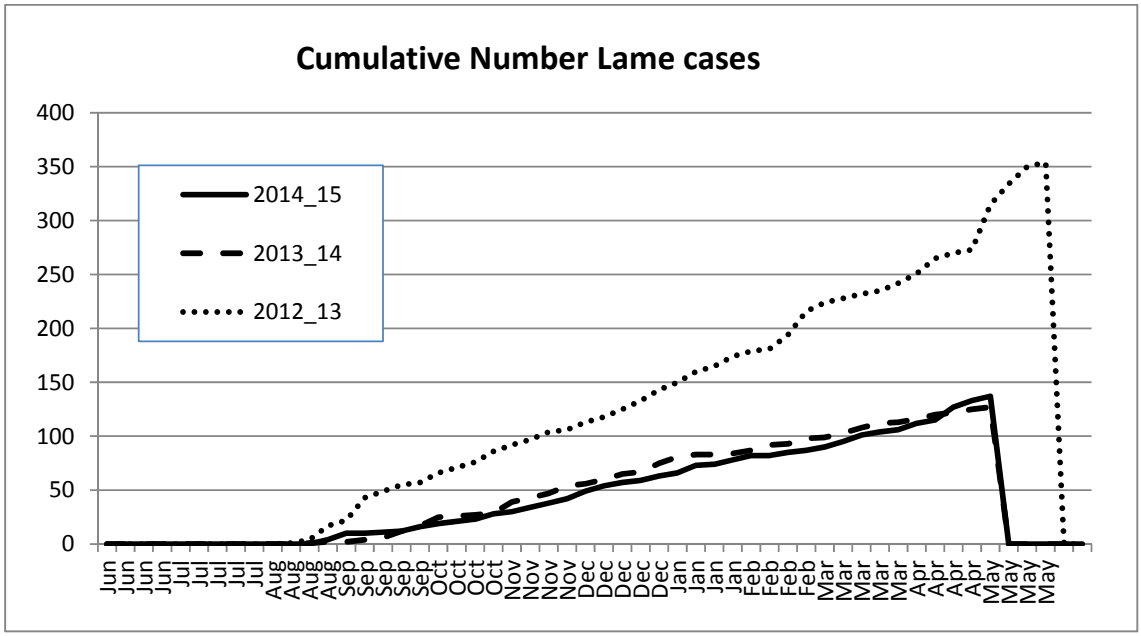
Cow Condition	Dry off time (days before Calving)	Date cow need to be dried off (calving date 1-15 August)	Date cow need to be dried off (calving date 15-30 August)
3.5	120	1-15 April	15-30 April
4	100	20 April -5 May	5-15 May
4.5	80	10-20 May	20 -30 May
5	60	NA	NA

Animal health:





The BMSCC for the season has not been an issue although we have kept a continuous eye on increase SCC through the season and made sure all mastitis cows were identified and treated in a timely manner. We have had a lot less mastitis cases this season than in previous years.



This has been a dry season and lameness has not been an issue for most of it. We have noticed a spike in the cases of lameness lately, which we cannot attribute to anything in particular. Most of the cases are white-line, which are usually related to cows twisting on concrete. After analysing our systems and how things are done daily on farm, we cannot identify the reasons behind this latest spike in cases. It remains constantly under review (as a team) and we try to eliminate potential areas of concern.

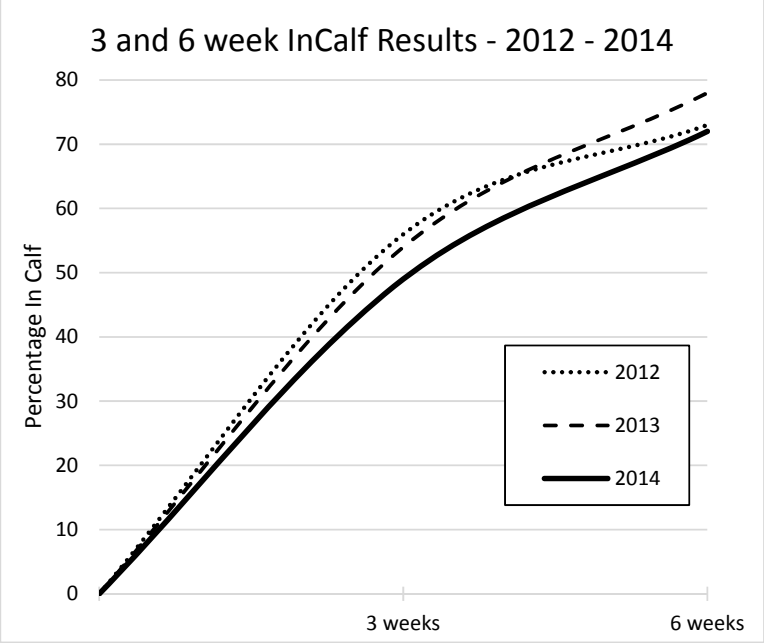
2014 LUDF Reproductive Performance Findings

Overall performance

- 2014- 72% 6 week in-calf rate, 54% conception rate, 89% submission rate
- 2013 was a stand out year reproductively for LUDF
- 2014 - performance similar to the 2012 season, shown in below table

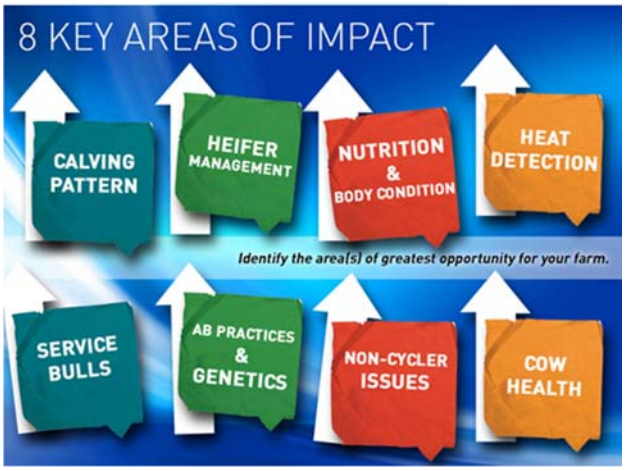
	2011	2012	2013	2014
6 week ICR	73	73	78	72
Conception rate	57	54	61	54
Submission rate	90	90	88	89

- Submission rate has lifted by 1% this season
- What has contributed to the decline in the 6 week in-calf rate is the 7% drop in conception rate
- Reproductive performance over the first three weeks was poorer than the last two seasons, shown below
- Second round performance (week 3-6) did not improve things overall, as shown below



Areas that impact reproductive performance/conception rate

- There are eight key management areas that impact the reproductive performance on farm, they were investigated thoroughly, no conclusive reason was found. Calving pattern was the strongest variable consistently.
- It just takes a small number of minor changes to make a significant change overall



Calving pattern

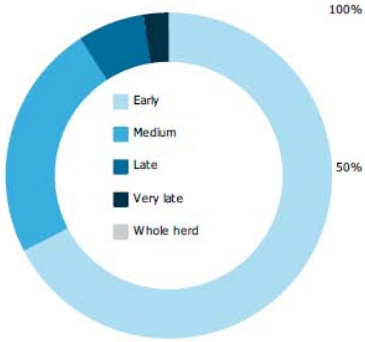
- LUDF's early calvers performed better than other groups and there was also 6% more early calvers compared to last season, so they helped to keep the overall herd performance level up
- The medium calvers (calved 23rd August to 13th Sept), had sub optimal reproductive performance. Their 6 week in-calf rate was 17% behind that of the early calvers (see below table).
    - Target difference in 6 week ICR between early and medium calvers should be 10% or less.
    - This gap was only 8% last season.
    - This medium calver group had a conception rate 13% less than the early calvers.
    - 24% of the herd is medium calvers.
    - All possible causes of poor performance by these medium calvers were looked into and no conclusive reasons for the difference in performance was found.
    - The single strongest variable was simply calving pattern.
- LUDF had 5% less cows calving after week six, compared to the 2013 season, again this helped drive a more compact calving
- As a whole all calving groups performance was better in 2013 than 2014
- **Work on getting as many cows calving in the first three weeks as possible**

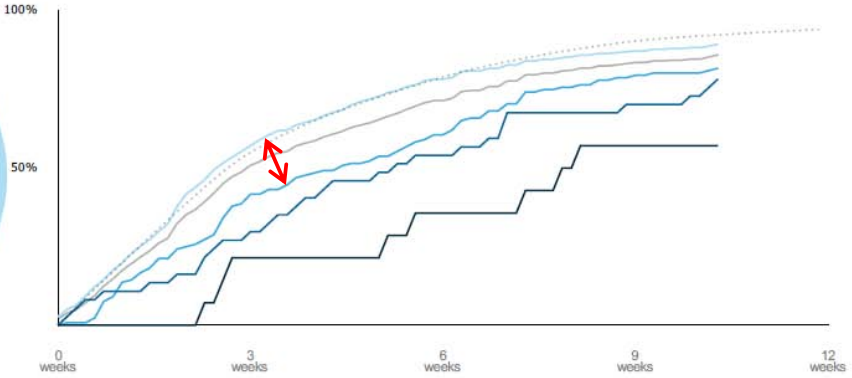
In-Calf Rates for Spring 2014 (BQCY)

In-Calf Rates by Calving Pattern

Reproduction:In-Calf Rates by Calving Pattern

Tell us what you think





In-calf rate

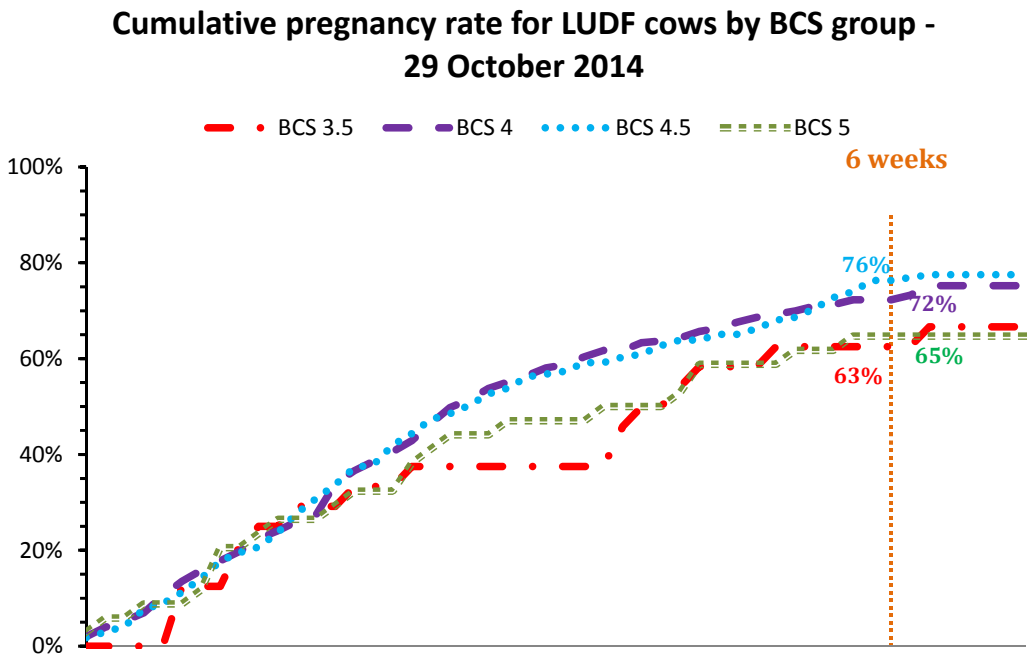
Calving Pattern			Count		3 weeks	6 weeks	9 weeks	9+ weeks	Not in-calf rate
Early calvers	< 3 weeks	23 Aug	378	67%	55%	78%	87%	89%	11%
Medium calvers	3-6 weeks	13 Sep	132	24%	39%	61%	79%	82%	18%
Late calvers	6-9 weeks	4 Oct	37	7%	27%	54%	70%	78%	22%
Very late calvers	9+ weeks	25 Oct	14	2%	21%	36%	57%	57%	43%

Heifer management

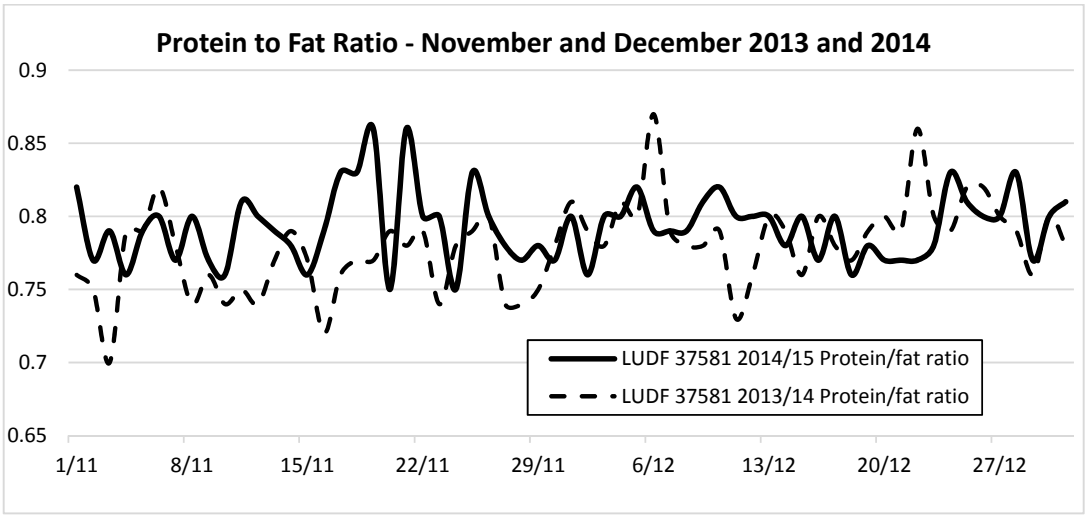
- The 2012-born first calvers reached live weight targets over their life time, calving at above target live weight. It was noted though, that the heifers appeared shorter than normal and were heavily conditioned at an average of 6.0 BCS.
- The in milk heifers were the best performing age group with the highest 6 week in-calf rate at 75%. This was down 7% from last seasons heifers however, possibly due to some clinical ketosis noted in some heifers during early lactation
- **It is important for heifers to achieve liveweight targets and** ensure they are integrated into the herd well at calving and during early lactation.

Nutrition and BCS

- High producing cows got in calf well, with above average results (77% 6 week in-calf rate from the top quartile cows measured on production compared to 72% for the herd overall)
- Cows were at BCS targets at mating, with only 4.6% of cows less than a 4.0. Cows that hit BCS target at mating had the best reproductive performance, as per in-calf recommendations, see graph below. (Note- Caution small numbers in the BCS 3.5 and 5.0 groups, two lines at the bottom.)



- Nutrition/pasture management/pasture quality was very good from calving through until mating, based on observations of feeding levels by the farm management group, as well as weekly quality analysis of pasture samples. Milk Protein:fat ratios (as below, and often used as a 'proxy' for energy balance) remained good through mating.



- The 2008-borns stood out as a group most at risk of reproductive failure, due to their lower 6 week in-calf rate of 64%. Reasons for poor reproductive failure in this age group is unclear, but *may* reflect a greater challenge of metabolic disease during and after calving. Further, 30% of this age group were BCS 5.5 and greater at calving, again potentially increasing risk of metabolic disease.
- **Reaching BCS targets at calving and mating is important. Setting up for optimum BCS at calving starts now pre-dry off/winter time. Feed planning for spring should aim to limit the amount of condition lost between calving and mating, maintain appetite and feed cows well from calving to mating.**

Heat detection

- Heat detection efficiency remains good
- 18% short returns achieved, 5% more short returns from last season
- Manager reported expression of heat in bulling cows was good
- **Heat detection: be accurate and consistent**

Non-cycler issues

- No non-cycler issues at LUDF this year
- 87% of cows had a pre-mating heat recorded, ahead of 85% target and better than the 81% of last season
- No CIDR's used as LUDF's policy over recent years
- **Non-cyclers: recording pre-mating heats helps you identify any issues early so you can be proactive**

Cow health

- 7.5% uterine infections, up from the 1.5% of last season, industry target is less than 5%. These 'dirty' cows pulled reproductive performance down overall by approximately 2%. These cows had a 56% 5 week in-calf rate.
- Milk fever, mastitis and assisted calving cows did not pull reproductive performance down
- Cows were found to be low in selenium in winter and were supplemented in July, cows were considered not to be deficient in selenium through calving.
- Magnesium levels were found to be low in October and will be monitored closely next season
- **Monitor the health status of your herd and record all health treatments (MINDA health app not far away from being released), so problem areas can be identified and worked on**

AB Practices and Genetics

- AB technician performance was within the normal range
- Fertility genetics; Fertility BV positive in herd

Bull management/power

- Once the bulls went out, the in-calf rate gap did not close
- Bull power and management- no cause for concern

Summary points

- Unable to as yet pin point the reason for the drop off in repro preformance at LUDF this year
- Suspect a possible role for sub-clinical metabolic diease in early lactation (low magnesium, low calcium) and LUDF will monitor this more closely in spring 2015.
- Check out your herds reproductive performance on MINDA on the web, www.minda.co.nz and make sure you're opted into MINDA labs to see all the new graphs and information about your herd
- Engage the help and support of your rural professional to help identify focus areas
- For more information on herd fertility register for the 6 week in-calf rate challenge at www.6weeks.co.nz and for further support www.dairynz.co.nz

Summary – Changes to Management at LUDF

	Historically	2014/15 Season
1. Spring Rotation Planner (SRP)	Used in conjunction with silage, N fert and GA, typically finishing mid-September	Proactively managed SRP and held out end first round to 23 September.
2. Rotation Length	Average 22 days Sept – Jan 27 days Sept 22 days Oct - Nov 19 days Dec – Jan 22 days Feb 22 days March 33 days April 11 grazing rounds since beginning September	Average 26 days Sept - Jan 39 days Sept 23 days Oct – Nov 21 days Dec – Jan 23 days Feb 33 days March 38 days April 9.5 grazing rounds since beginning September (14% fewer grazings)
3. Average Pre-Graze Cover	3118 kgDM/ha (average Sept – Jan) 3435 kgDM/ha (average Feb – April)	3328kgDM/ha (average Sept – Jan) 3625 kgDM/ha (average Feb – April)
4. Average Post Grazing Cover	1607 kgDM/ha till end Jan 1690 kgDM/ha Feb – April	1652kgDM/ha till end Jan 1676 kgDM/ha Feb - April
5. Nitrogen Fertiliser Use	200-350kgN/ha year	Limit of 150kgN/ha/year
a. Frequency of N-fertiliser application	Before calving on paddocks with less than 2200kgDM/ha, then after every grazing, limited use mid-Summer	No N pre-calving, Following each grazing till end December, start again end January. Slower Grazing Rotation means less frequent N applications (14% decrease)
b. Rate	25-40kgN/ha/application	25kgN/ha/application
6. Regrassing	Typically 3 paddocks	3 paddocks regrassed
7. Tight Cost Control	Good cost control to keep total expenses low without eroding the future profitability of the farm. High and efficient production from pasture then offsets farm working expenses to produce a lower than average operating cost and a sustainable profit (depending on payout).	
8. Weekly Farm Walk	Actively measure pasture cover weekly, calculate APC, predict future cover, plan and respond to surplus / deficits	
		Continued…

9. Pasture Allocation	Allocate daily area /cow based on Farm walk / APC, milk production, cow response, grazing residual
10. Split Herd	Split herd based on 1/3 - 2/3 split with small herd initially comprising heifers and light CS MA Cows. Through late spring some well-conditioned heifers were moved into the main herd and replaced with light MA cows. Following the early pregnancy scan, light BCS, early calving cows have replaced later calving and / or better BCS heifers. At the end of lactation the small herd may become a group of higher BCS / later calving cows or be merged with the main herd based on rotation length / desired grazing pressure.
11. BCS based drying off protocol	Frequent BCS including adhering to BCS targets for drying off based on current CS and days remaining till calving. Milk production is not / will not be chased at the expense of BCS targets (per individual cow) at calving.
12. Herd Test to identify cow performance	Routine herd testing allows identification of low producing cows, particularly important when considering drying off low producing cows.
13. Heifer mating 2 weeks prior to MA cows	Mating heifers early at LUDF has become part of the successful lift in 6-week InCalf results – as this allows the freshly calved heifer more time to cycle and get back in calf in a timely manner.

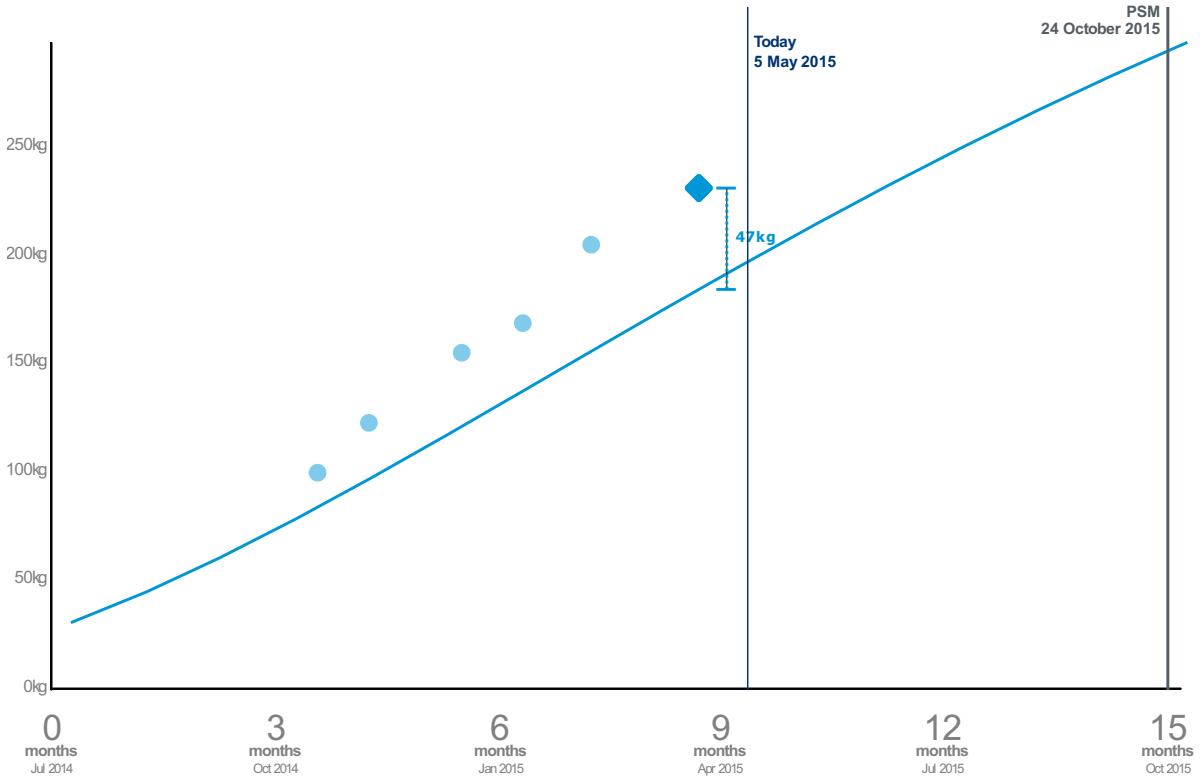
2014 Spring Born

15/04/2015

BQCY

Young stock trend

All 126 animals in this weighing are displayed



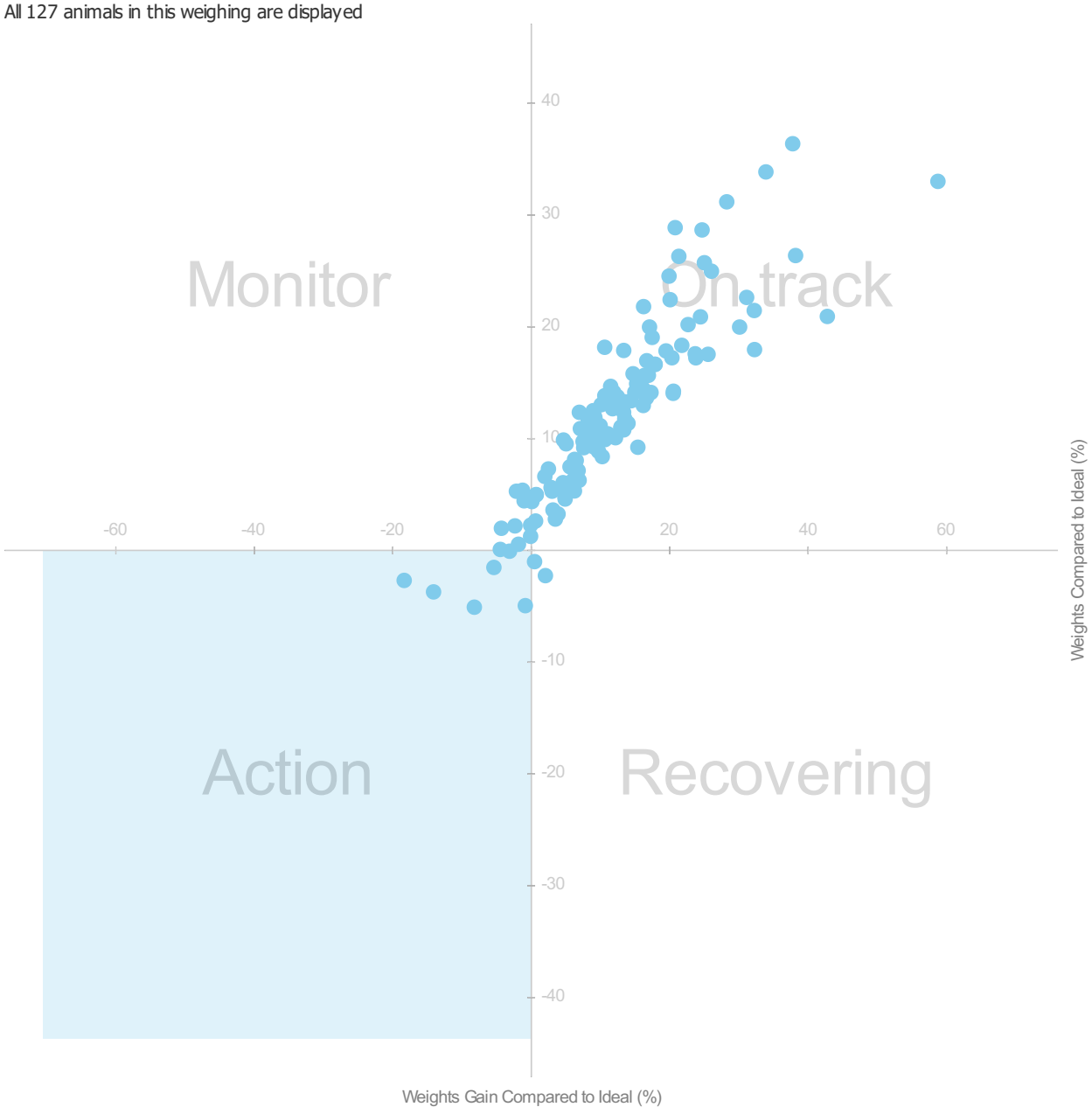
2013 Spring Born

23/04/2015

BQCY

Animal performance

All 127 animals in this weighing are displayed



Take action with these animals

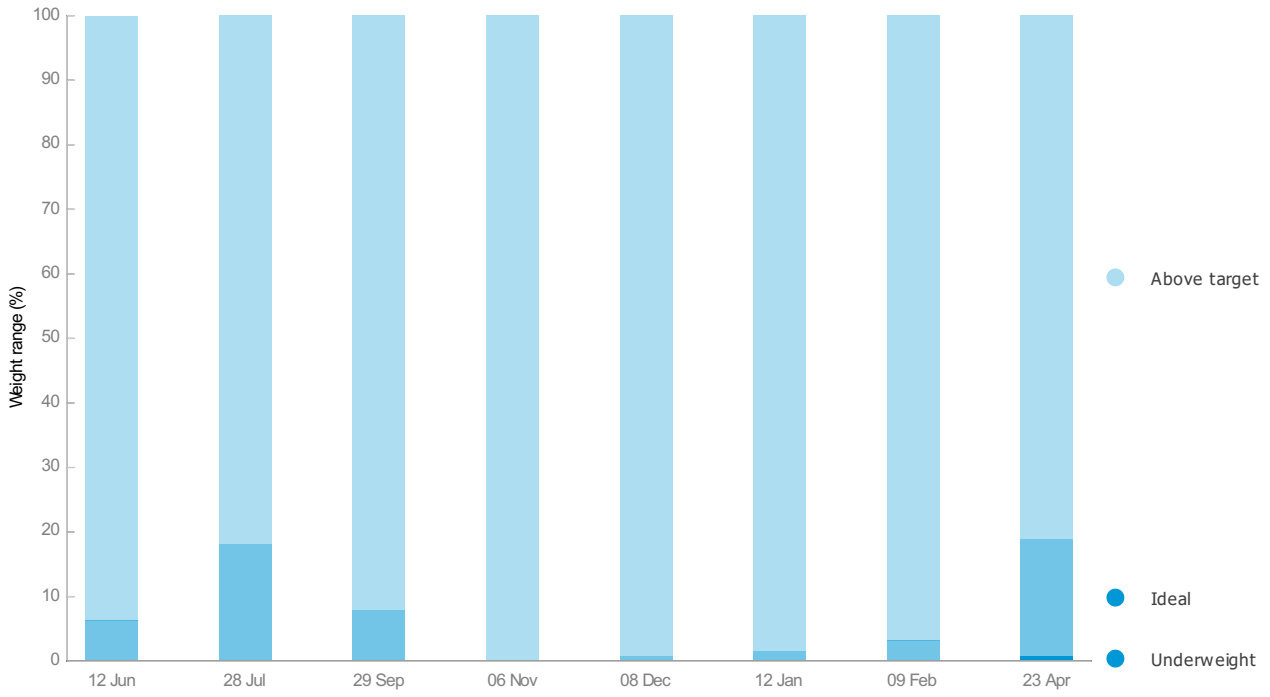
Official Id	AE Breed	Current Weight (Kg)	Weight Gain (Kg/day)	Gain Required by PSC (Kg/day)	Variation from Ideal (%)	Previous Category
BQCY-13-26	HF x J	416	0.29	0.54	-1.52	On Track
BQCY-13-46	HF x J	403	-0.03	0.62	-3.71	On Track
BQCY-13-83	HF x J	417	0.67	0.71	-4.94	Action
BQCY-13-99	HF x J	411	0.32	0.71	-5.08	On Track
BQCY-13-151	HF x J	427	-0.27	0.61	-2.68	On Track
BQCY-13-179	HF x J	432	0.34	0.49	-0.07	On Track

2013 Spring Born

23/04/2015

BQCY

Weight ranges



Range	June 2014		July 2014		September 2014		November 2014		December 2014		January 2015		February 2015		April 2015	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Above target	119	93.7	104	81.9	117	92.1	127	100	126	99.2	125	98.4	123	96.9	103	81.1
Ideal	8	6.3	23	18.1	10	7.9	0	0	1	0.8	2	1.6	4	3.1	23	18.1
Underweight	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.8
Total Animals	127		127		127		127		127		127		127		127	

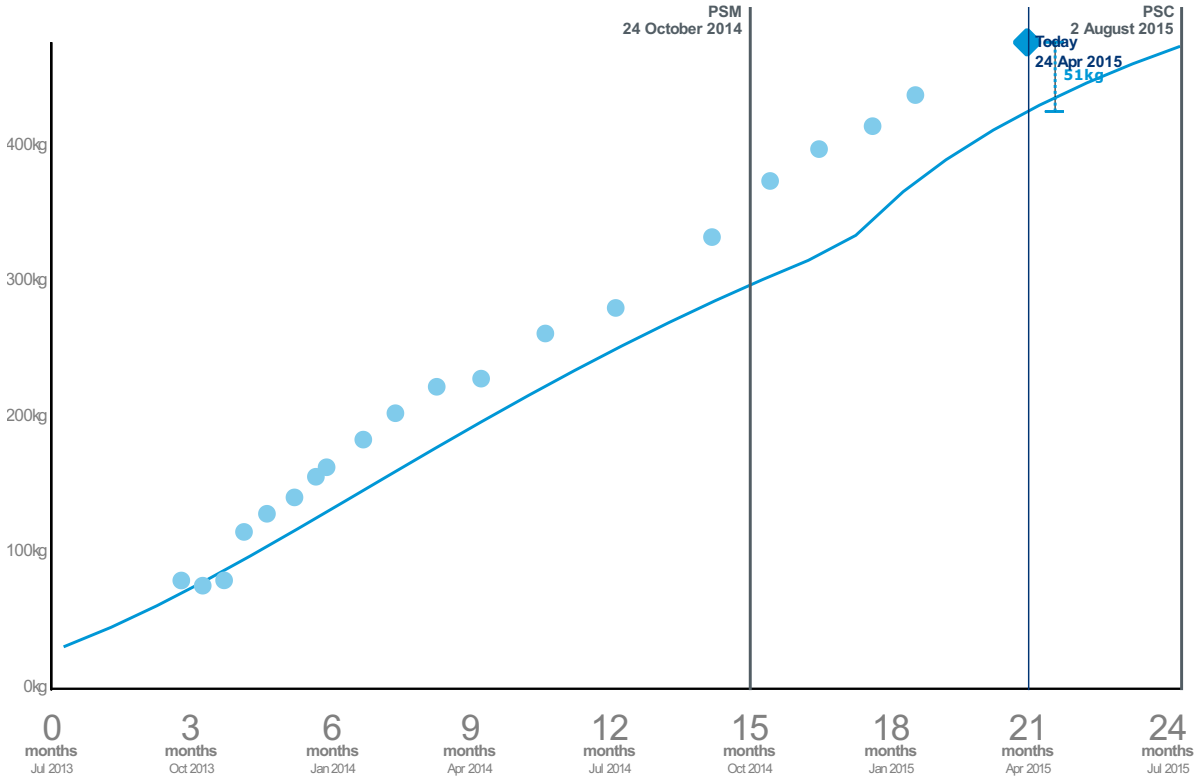
2013 Spring Born

23/04/2015

BQCY

Young stock trend

All 127 animals in this weighing are displayed



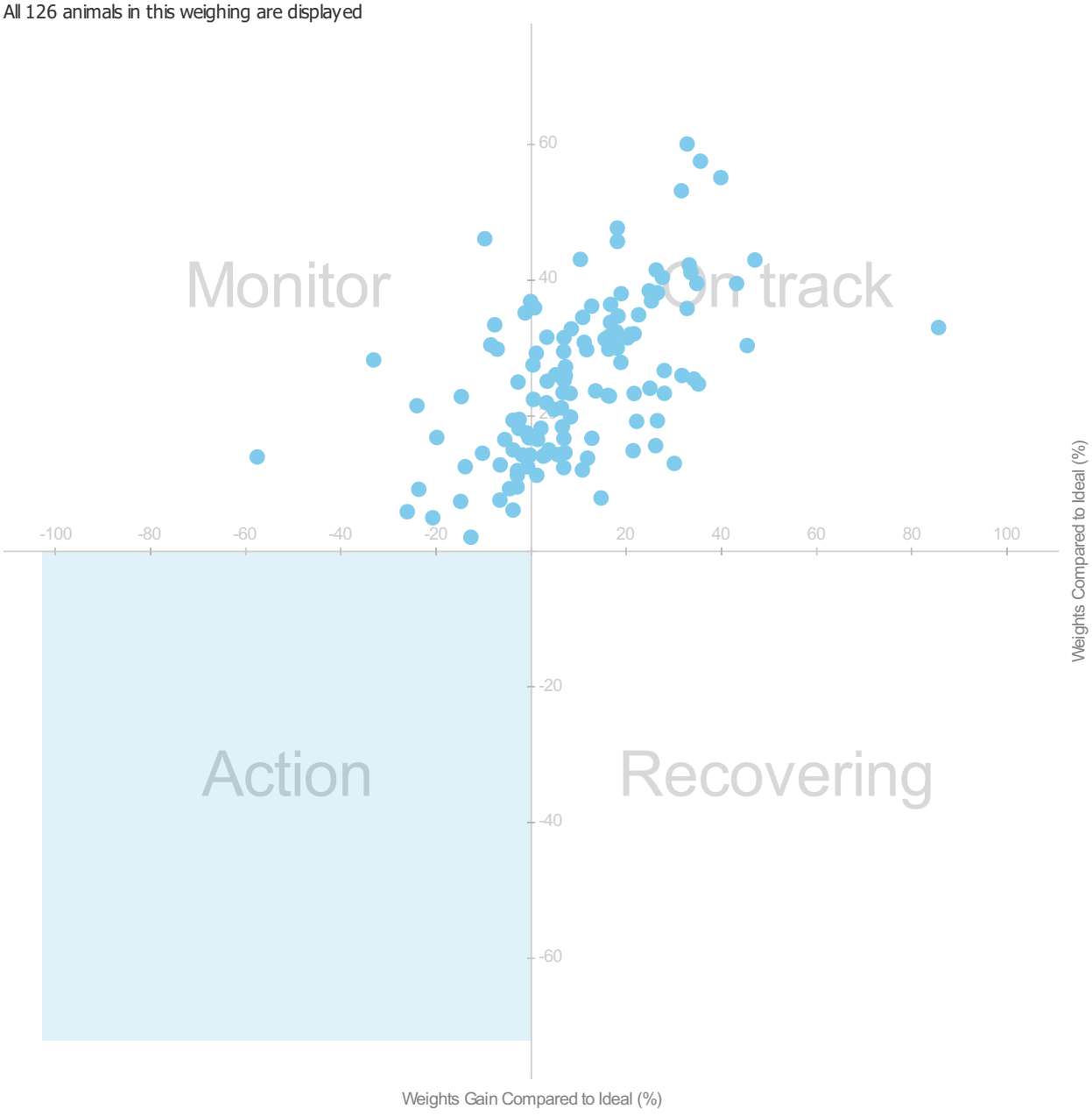
2014 Spring Born

15/04/2015

BQCY

Animal performance

All 126 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

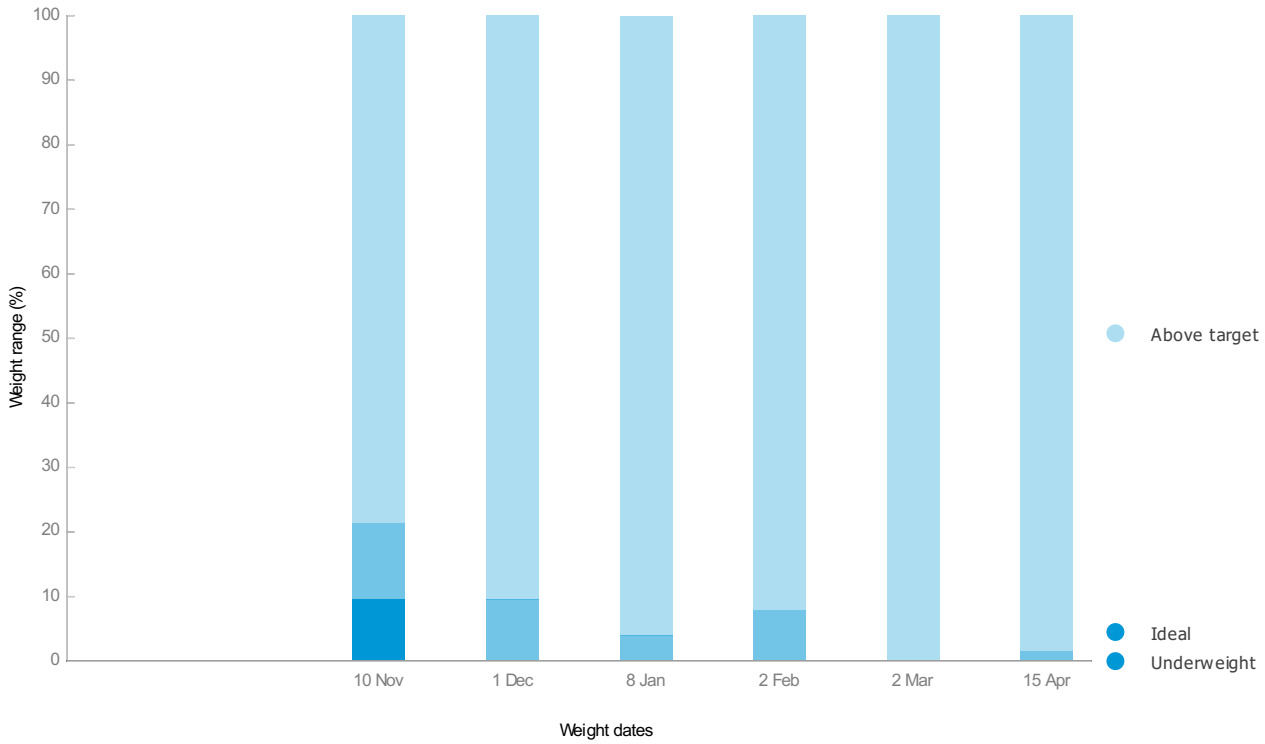
Showing 0 to 0 of 0 entries

2014 Spring Born

15/04/2015

BQCY

Weight ranges



Range	November 2014		December 2014		January 2015		February 2015		March 2015		April 2015	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Above target	99	78.6	114	90.5	121	96	116	92.1	126	100	124	98.4
Ideal	15	11.9	12	9.5	5	4	10	7.9	0	0	2	1.6
Underweight	12	9.5	0	0	0	0	0	0	0	0	0	0
Total Animals	126		126		126		126		126		126	

ECAN - Proposed Land and Water Regional Plan

Variation 1 (Selwyn Waihora) summary

ECan has recently released decisions on Variation 1 of the Land & Water Regional Plan – affecting all farmers in the Selywn Waihora (SW) catchment.

The release of decisions follows a lengthy process over 4 years including public submissions and hearings.

The decisions are relevant for farmers beyond SW – because it is possible that a similar model could be developed in other parts of Canterbury. And regional councils in other parts of the country are looking at the framework to see whether aspects of it can be picked up and applied.

It's possible that the decisions will be appealed to the High Court - but at this stage we are assuming that there won't be significant changes.

It's not DairyNZ's role to be cheerleader for the decisions. But it is our role, together with our industry partners, to provide support to you as the rules are implemented.

What does the plan require?

- Decision provides certainty for CPW to continue to develop, particularly on land that is not yet irrigated.
- Be aware that there are some notable differences for farms that receive water from an irrigation scheme. Or if you farm close to the lake, or in an area that is considered to be a phosphorus or sediment risk area.
- Generally, if you leach less than 15 kgN/ha/yr then the plan provides for some flexibility to increase up to 15kgN/ha/yr - providing you can demonstrate that you're implementing good practice.
- Generally farms that leach more than 15 kg/N/ha will require a resource consent from 2017.
- As part of a resource consent application you will need to:
    - Prepare a Farm Environment Plan (FEP).
    - Demonstrate how you are meeting Good Management Practice (GMP) loss rates.
- Additionally, from 2022 farming activities will need to demonstrate how they will reduce nitrogen losses - *"in the order" of* 30% for dairy farmers and 22% for dairy support. If you can't meet the required reductions by 2022 then further time may be granted.
- So the plan signals two key steps – a requirement that everyone undertakes GMP by 2017; and further reduce N loss below their GMP requirement by 2022.

What is DairyNZ's role going forward?

It is still unclear to us how some of the rules will be implemented. Therefore it is very important that we work with ECan to provide you with greater clarity – so that there is investment certainty for you and your farming business.

It is our view that you should continue to focus on implementing GMP. We are not encouraging you to make farm system changes – particularly until there is greater clarity around how some of the rules will be interpreted.

Familiarise yourself with your nutrient budget and your N loss targets. But don't fixate with your number. Continue to focus on the practices that will help you to run a tidy and efficient farm.

While the plan presents some significant challenges, we have a number of research programmes in Canterbury underway that provides us with confidence that the farm practices and the potential N loss reductions required of you can be achieved over time.

Sustainable Milk Plans (SMPs)

Most, if not all, dairy farmers will require an FEP by 2017.

- DairyNZ has developed an SMP, which is supported by ECan as an approved FEP.
- We are funding farm consultants to help you to prepare a Sustainable Milk Plan.
- As part of the rollout of SMPs, we are also working with CPW – to help them meet their consenting requirements.
- If you would like more details about how to prepare a SMP, come and see myself or contact Megan Hands.

Summary

In summary, continue to focus on GMP.

We will continue to run events to discuss the implications of the plan and what you can do to have some confidence that your farming business can comply with the new rules.

We will be working with ECan to ensure that guidance material is prepared to provide you with greater clarity.

ECan are holding further briefings next week:

7:30pm, Tuesday 12 May at Coalgate Tavern, 125 Bridge St
7:30pm, Wednesday 13 May at Southbridge Rugby Clubrooms, St James St
7:30pm, Thursday 14 May at Lincoln Bowling Club, 162 N Belt
7:30pm, Thursday 21 May at Darfield Community Centre, Illsley Rd

WINTER FEED - DO YOU HAVE ENOUGH? Assess your winter feed now

An update from DairyNZ (see www.dairynz.co.nz for more details)

Winter 2015 will be a challenge for farmers relying on dryland crops as the dry conditions affecting some parts of Canterbury have significantly reduced potential yields. It is difficult to quantify the size of the deficit as every farm is different and it will have a different proportion of dryland area (if any) providing winter feed. We estimated the yield of a few dryland crops to identify how they are progressing and predict what yield we might expect to have at the beginning of winter.

This exercise is a call to action for farmers **"to assess your winter feed now and revise your winter feed budgets"!!!!**

There are a few options farmers could use to close the gap but first you need to quantify the deficit and have a plan to cover a few possible scenarios.

We measured 10 Kale paddocks and 4 Fodder beet paddocks in late March to estimate current yield. Then we predicted potential future growth to 1 June based on growth rate equations derived from crops monitored by Plant and Food scientists. Graphs are provided to allow you to predict growth based on factors closest to your own crops sowing date, soil type and N use. We will be repeating the yield measurements in April and May and reporting those results.

Kale:

Results: Average yield (27th March) = 4.7 tonnes DM/ha.
Projected yield June 1st = 7.9 tonnes DM/ha.
Growth rate (April, May) based on 1st Nov sowing date estimated at 50 kg DM/ha

Key comments and Implications:

1. Dry matter % for most of the kale samples collected was higher (11-15%) than normal (10-12%) but there is quite a lot of variability from paddock to paddock.
2. There is a lot of variability in yield within a paddock which will create issues when it comes time for allocating breaks and could result in less consistent daily dry matter intake and therefore more challenges ensuring cows will gain condition.

Fodder beet:

Results: Average yield (27th March) = 9.4 tonnes DM/ha.
Projected yield June 1st = 11.7 tonnes DM/ha
Growth rate (April, May) based on 1st Nov sowing date estimated at 36 kg DM/ha

Key comments and Implications:

1. There is significant variation in yield between paddocks, 5 to 15 T DM/ha, on this farm, therefore for more accurate feed budgeting on your farm assessments should be made on all paddocks
2. Where there is significant yield variation within paddocks this will create significant challenges when allocating feed, therefore these paddocks should not be used for transitioning cows onto the crop.
3. An individual yield assessment on the area of the paddock that will be used for transitioning is recommended to minimise the risk of health issues during this period.

4. The percentage leaf on the crop will affect the growth potential over the next 2 months especially if more leaf drop occurs so regular monitoring is recommended.
5. Fodder beet growth rates are predicted to be slower in May than Kale

To measure your own crops the following protocols are recommended:

Estimating fodder beet yield

The critical part of the paddock to estimate is the part which will be fed over the first 2 weeks because correct allocation during transition relies on an accurate yield estimate.

1. Pull all the beets from at least 3 different 4 metre long sections of rows in the crop, chosen as a representative sample of the crop which the cows will eat first.

2. Clean any dirt off the roots; cut the tops off and weigh the roots and tops separately

3. Find the average weight per running metre of row for roots and average weight per metre for tops and multiply these numbers by 20,000 [in the case of a 50cm row spacing or by 22,222 in the case of a 45cm row spacing] to get a kg/ha wet weight for roots and one for tops.

> To determine the row spacing for fodderbeet measure the average row width by measuring 10 m across the rows and then counting the number of rows and divide by this. Fodderbeet is commonly 50 cm but this will depend on the accuracy of the tractor driver and the drill used.

4. Send a representative sample of roots and tops away for DM determination [a sample bag with instructions should be available from your rural supply store]. Cut several "average – representative" roots into quarters lengthwise and seal in a plastic bag to minimise moisture loss. Check with your lab, they may want you to weigh the sample before sending it in.

5. Multiply the wet weight kg/ha [step 3] of the roots and tops by their respective DM percentages, add these 2 numbers together to get the kg DM/ha yield.

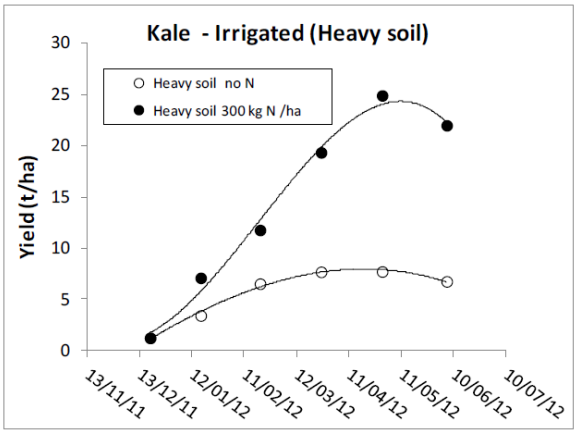
Estimating brassica crop yield

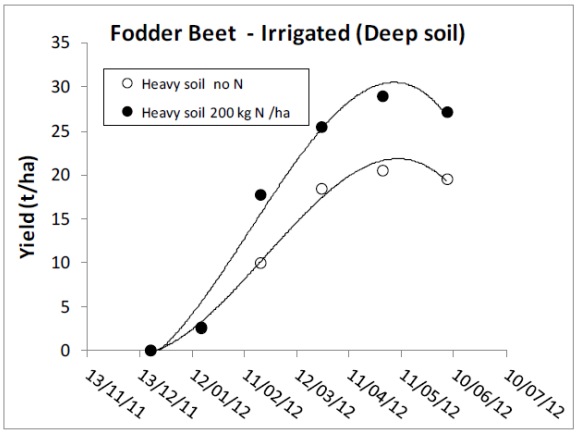
1. Collect at least 6-8 quadrat samples that are representative of the paddock. The more samples the better. Rule of thumb is 1 quadrat/ha.
2. Sample size minimum of 1 m^2 (use a 1 m x 1 m square quadrant or a circle made with a 3.55 m length of alkathene; or for a 2 m^2 sample use 7.1 m length of alkathene to make the circle)
3. Harvest all the material, preferably to ground level for kale as this allows you to factor utilisation into your feed budgeting, within each sample and measure its fresh weight after removing any excess soil. For bulb crops (turnips or swedes), cut off the leaves at the crown and weigh the leaves and bulbs separately. This will allow for more accurate yield predictions by applying individual DM% to each plant part.
4. Determine the DM content – take a sub-sample of plants (or plant parts e.g. leaf & bulb) and send to the lab for DM analysis. As DM% varies greatly estimating will result in under or overestimating the yield
5. Average the DM yield for the quadrat samples (fresh weight x DM%) and multiply by 10,000 for a 1 m^2 sample or by 5,000 for a 2 m^2 sample (e.g. 1.44 kg DM from a 1 m^2 sample equates to 14,400 kg DM/ha or 14.4 tonnes DM/ha).

The graphs below provide the typical growth patterns for a range of Kale and Fodder beet crops across a variety of soil types, sowing date and N fertiliser use. On completing the measurement of your crop, compare it with the most appropriate graph and use it as a guide to assess the likely future yield of your own crop. It is however important to remember that there are a number of factors that will affect the growth of individual crops over the next 6 weeks e.g. nitrogen status, climate, soil temperature, sowing date etc. so we recommend monthly monitoring during April and May for more accurate feed budgeting.

1. Heavy soil (irrigated)

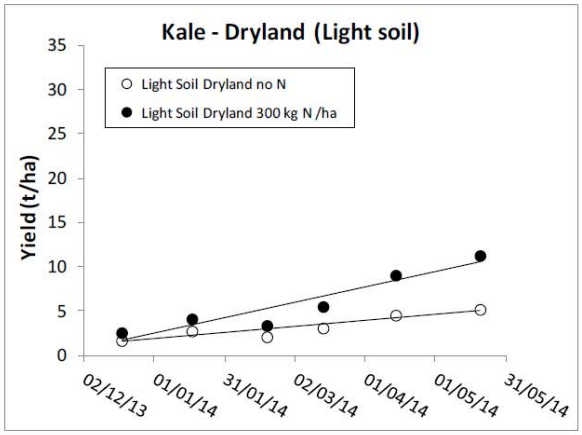
a) N fertiliser effects at PFR (Boundary Road site)

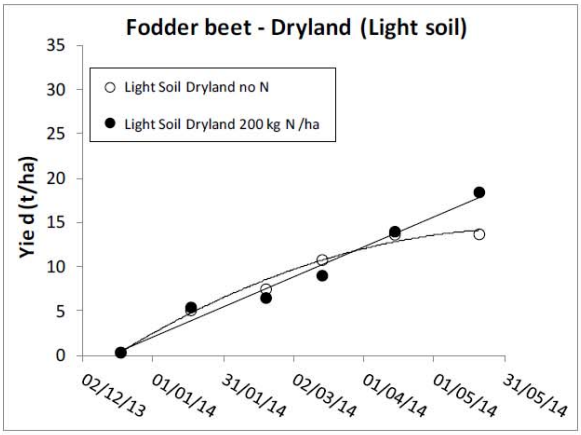




2. Light soil (dryland)

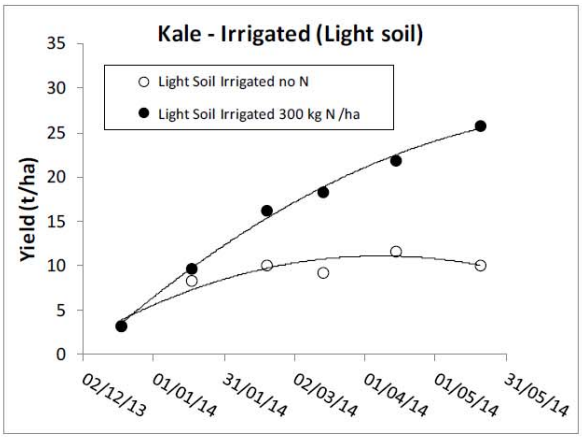
a) N fertiliser effects at Ashley Dene

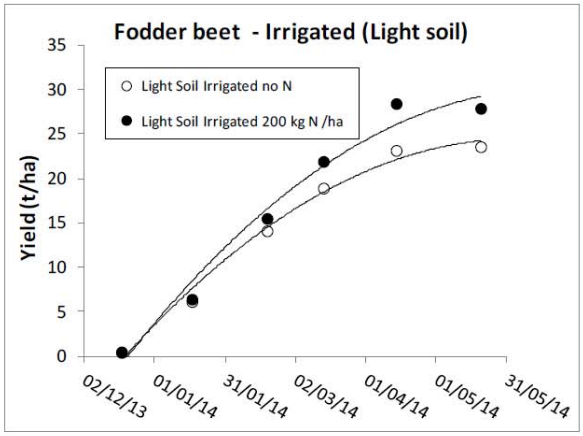




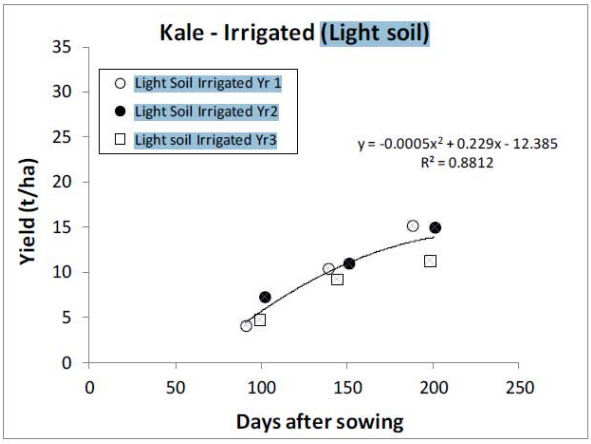
3. Light soil (irrigated)

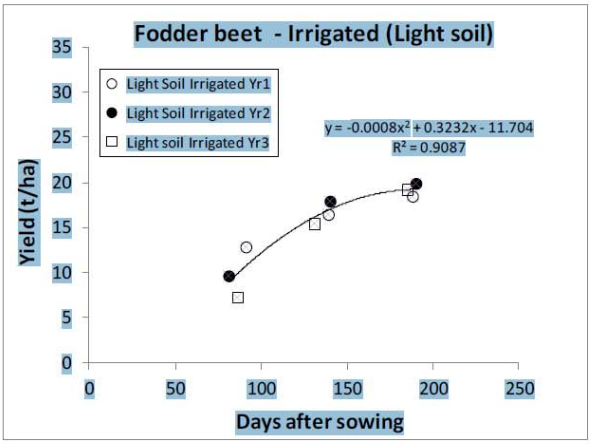
a) N fertiliser effects at Ashley Dene





b) Winter crops (Ashley Dene)





Lincoln University Dairy Farm - Farm Walk notes

Tuesday 05 May 2015

LUDF – focus for 2014/15 Season: Nil-Infrastructure, low input, low N-loss, high profit.
Farm system comprises 3.5 cows/ha (peak milked), 150kgN/ha, 300kgDM/cow imported supplement, plus winter most cows off farm. FWE of less than $1.12million and Target production of 500kgMS/cow.

Critical issues for the short term

1. **Achieve target grazing residuals and cow intakes while managing average pasture cover, shape of the wedge and maintaining pasture quality (especially in paddocks at the top of the wedge).**
2. **Use back-fences on all herds whenever paddock grazing takes more than 36 hours.**
3. **Residual management remains critical.**
4. **Make timely decisions around autumn management: culls, nitrogen use, winter feed, BCS and round length increases**

Key Numbers - week ending Tuesday 5th May 2015

Ave Past Cover	2630 kgDM/ha	Past Growth Rate	36 kgDM/ha/day
Ave Milk Production	1.56 kgMS/cow*	No Cows In Milk	468 (till tomorrow)
Round length	42.4 days	Ave Supplement used	5 kgDM/cow/day
SCC	139,000	6-week InCalf	72%

(* milk to factory from current cows milking)

Herd Management

5. We continue with a single 1 milking herd
6. Average Milk production for the week has decreased marginally (0.04 kgMS/cow/day).
7. BCS done last week. Average BCS came back as 4.36, increasing 0.1 of a condition score from 2 week before. 365 cows (80.2%) are either 4 or 4.5 BCS, giving a very narrow range. Of the remainder, 16 were below BCS 4 and 87 are BCS 5 or greater. This is a good outcome, especially as the farm has run one herd since the beginning of March. The herd will be BCS again Wednesday next week.
8. Average live weight has increased slightly over the last week.
9. There's no new mastitis cases and 8 new lameness cases this week.
10. We will keep monitoring cow condition and we will continue to use our drying off decision rules as presented below. Using these rules below will result in us drying off 27 cows tomorrow. There are also 6 cows to be dried off due to low production and 4 cows that will be dried off due to lameness.

Cows (4 years old and older)

Cow Condition	Dry off time (days before Calving)	Date cow need to be dried off (calving date 1-15 August)	Date cow need to be dried off (calving date 15-30 August)
3.5	100	20 April – 5 May	5-15 May
4	80	10-20 May	20 -30 May
4.5	60	NA	NA

Rising 3 year Old

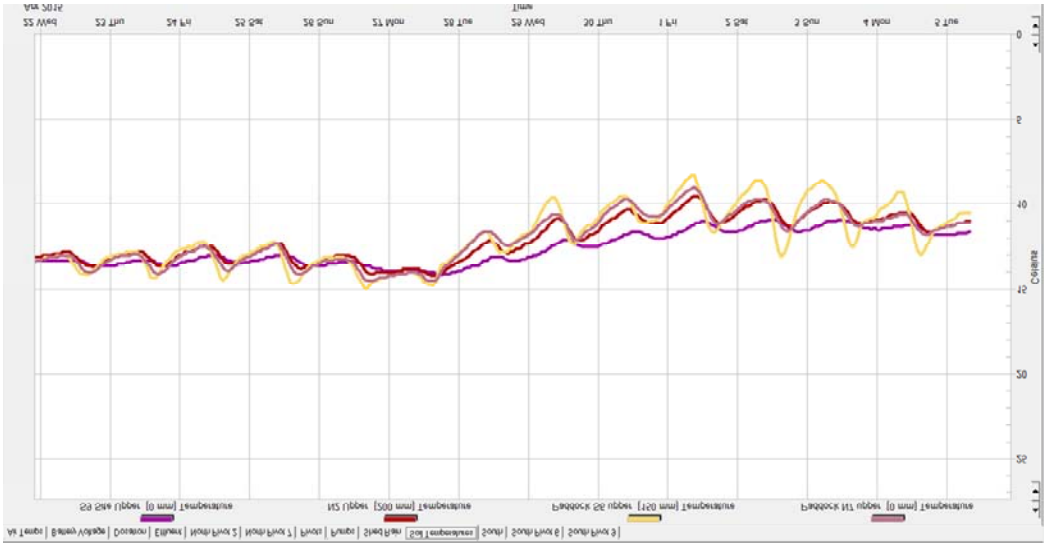
Cow Condition	Dry off time (days before Calving)	Date cow need to be dried off (calving date 1-15 August)	Date cow need to be dried off (calving date 15-30 August)
3.5	120	1-15 April	15-30 April
4	100	20 April -5 May	5-15 May
4.5	80	10-20 May	20 -30 May
5	60	NA	NA

This strategy requires feeding good quality feed to the cows that are being dried off, ie - above maintenance levels.

Growing Conditions

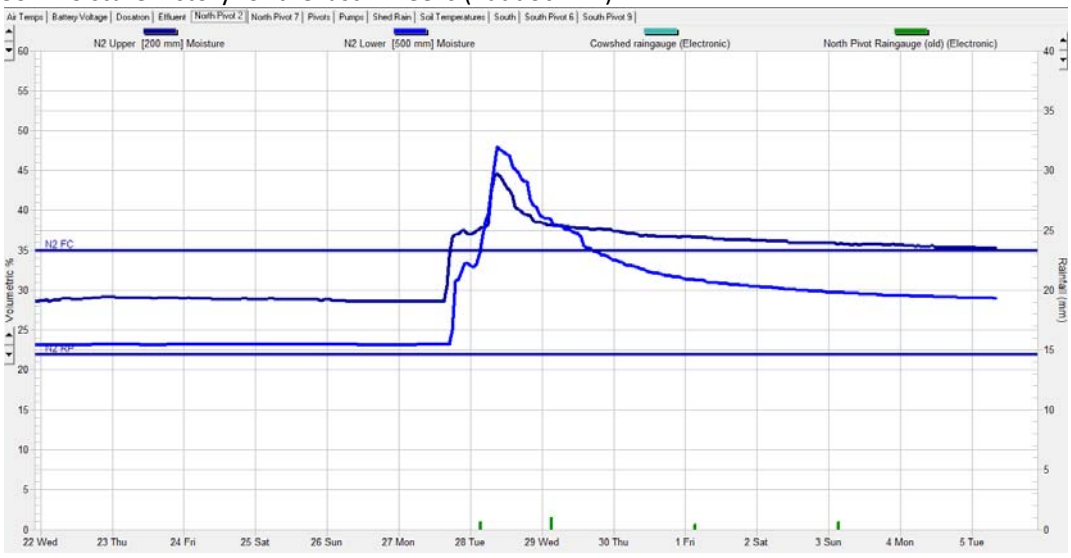
11. 9 am average soil temperature for the week was 10.3 degrees (0.8 degrees lower than last week).

Figure 1: Soil temperature history for the last 2 weeks



12. We have had 4.2 mils of rain this week.

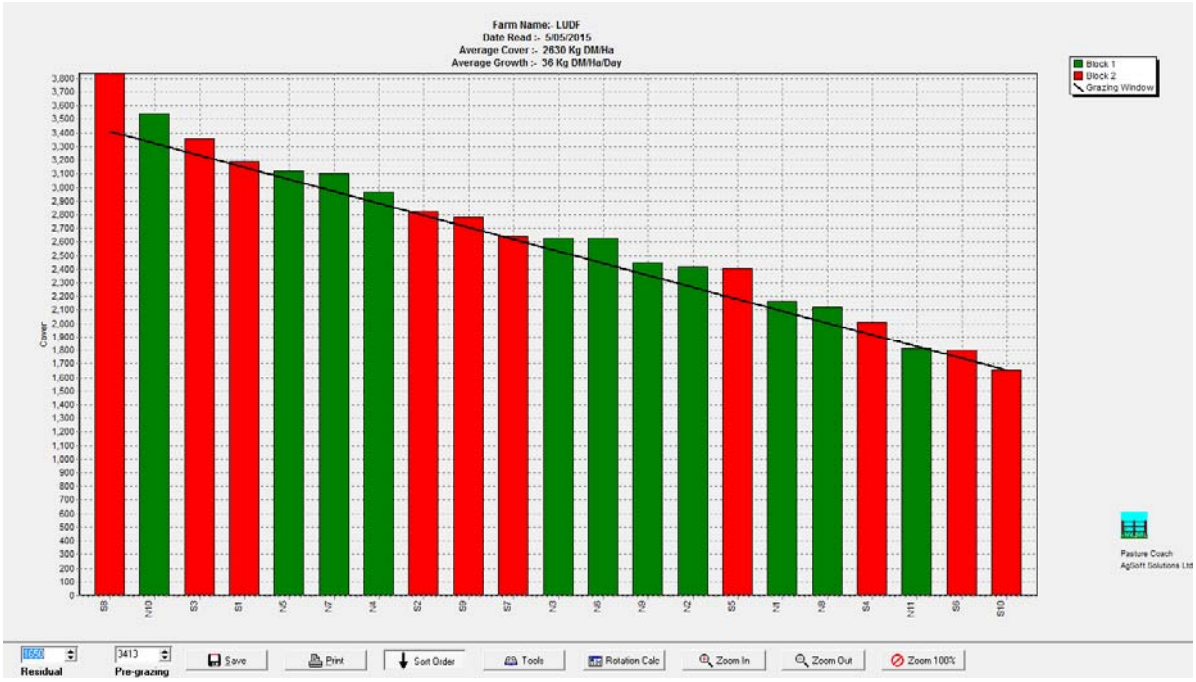
Figure 2: Soil moisture history for the last 2 weeks (Paddock N2).



Pasture Management

13. Area grazed this week was 26.44 ha total, giving a 42.4 day round across 160 ha.
14. 16,456 KgDM silage was fed over the week (an average of 5 kgDM/cow/day).
15. Our current stocking rate is 2.92 cows/ha. Once the next 37 cows are dried off tomorrow, the stocking rate will drop to 2.7 cows/ha
16. Nitrogen fertilizer has now been completed for this season. We have applied 143 KgN per Ha over the whole milking platform (160 Ha). This is slightly below the 150 kgN/ha budgeted but it is now too late in the season to continue applying it (and expect a significant response).
17. Gibberellic acid was applied to 14.7 ha this week, but will now cease.
18. The post-grazing residuals are now typically plating at about 1650 kgDM.
19. The target intake for the milking cows has been reduced to 18kgDM/cow/day. The demand line this week is calculated for a SR of 2.7 that the farm will have as of tomorrow. On this SR, the demand is 48.5 kgDM/ha/day. This requires a pre-grazing target of 3413 kgDM/ha when the round is 40 days (431 cows, on 160 ha, eating 18 kgDM/day, a 40 day round and a post-grazing cover of 1650 kgDM/ha).

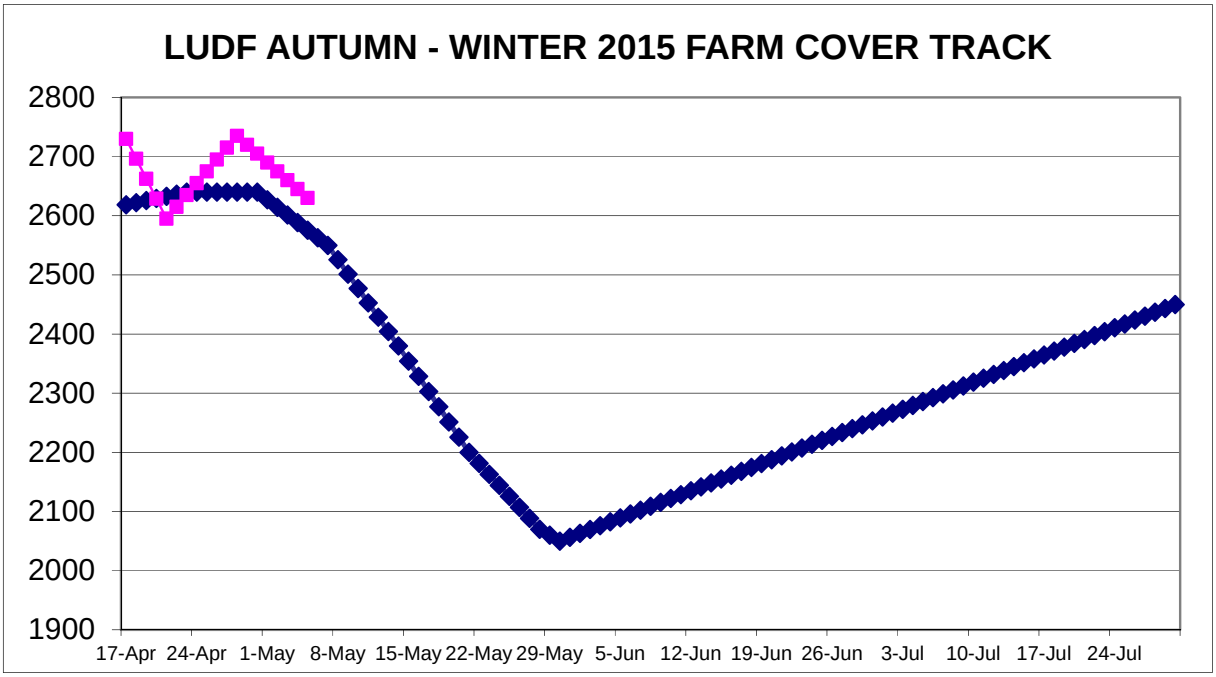
Figure 3: This week's feed wedge:



Feeding Management for the coming week

20. Estimated pasture growth this week, based on the pasture cover as plated is 36 kgDM/ha/day. This is below demand of 48. The feed wedge above would indicate a feed surplus of 17 tonnes DM for the week, if pasture covers are as plated/recorded in Pasture Coach.
21. APC has decreased from 2735kgDM/ha last week to 2630gDM. On observation:
    a. Residuals remain consistent and low and paddocks are tidily grazed, which would suggest that post-grazings are realistically about 1650 kg DM/ha (as reported).
    b. Cows are spending 2 days in each paddock, which is what we expected with the available feed, round length and number of cows.
    c. Dry matter tests are coming back around 14 %
    d. All of the above would suggest that the figures read by the plate meter are reflecting what the cows are finding in the paddocks.

Figure 4: Autumn – Winter Target APC:



22. We will be feeding the last of the silage over the next five days to hold our round length at 40 days. We will then use the difference between current average pasture cover and target pasture cover at dry-off (2050 kgDM/ha) to maintain cows in milk while keeping BCS steadily lifting through fully feeding the cows on grass.
23. Pasture quality: on observation, most paddocks continue to have good quality pasture, with little evidence of decay or dead matter at the bottom. Post-grazings look consistent. This is an outcome of low and consistent residuals all through the season. Urine patches don't seem all that apparent in the grazed paddocks and only slightly apparent in the paddocks with longer covers..
24. The farm still has 28 kgDM/cow silage available (adjusted for current cow numbers) from the silage made on farm. See Autumn feed budget below
25. As we compare the initial budget presented in mid-April with the actual results obtained so far, we can see the following:
    a. The actual deficit has dropped from 101,440 kgDM total to 79,680 kg DM total. This is due to the increased feed surplus, which was more than enough to cope with the increased demand for this first period.
        i. The actual demand is higher than that estimated due to the farm being able to carry more animals than expected.
        ii. The actual pasture growth was higher than the budget. This resulted in a higher feed supply available.
    b. The actual total extra feed available from silage and "eating down' APC has dropped from 124,000 kgDM to 104,868 kgDM. This is due to:
        i. The silage on has dropped to 12,068 due to the use of silage over the last 2 weeks.
        ii. The APC has increased from mid-April, which means that the pasture supplied by dropping APC from the current 2630 kgDM/ha to the desired 2050 kgDM/ha at dry-off, provides more grass available to cows.

c. In summary, even though the total demand has increased due to the higher number of cows carried through April, the increased pasture growth observed during this same period has been enough to cover the increased demand and drop in silage availability, resulting in a small Supply vs Demand as at May 5th increase to 25,188 kgDM from the initially budgeted 22,560 kgDM.

LUDF partial feed budget from late April until season end

	Budget	***Actual***	**Budget**	***Actual***	**Budget**	***Actual***	**Budget**
Dates now until season end	21-30 April		1-10 May		11-20 May		21-26 May
Days in period	10		10		10		6
FEED **DEMAND**							
Numbers of cows in milk	460	*468*	460		440		440
Demand kgDM offered/cow/day	18	*18*	17		16.5		16
Demand kgDM for period (demand, all cows)	82,800	*84,240*	78,200		72,600		42,240

Total DEMAND budget =	275,840	kgDM
Total DEMAND actual+ budget=	*277,280*	*kgDM*

FEED **SUPPLY** from *pasture grown*							
Daily expected growth rates (kgDM/ha/day) across 160ha	40	*54.5*	35		25		15
Total SUPPLY from pasture grown per period (kgDM)	64,000	*87,200*	56,000		40,000		14,400

Total SUPPLY from pasture =	174,400	kgDM
Total SUPPLY actual plus budget from pasture=	*197,600*	*kgDM*

Potential DEFICIT mid-April until 26 May 2015	-101,440	kgDM
Potential DEFICIT early May until 26 May 2015	*-79,680*	*kgDM*

Silage on hand (as at mid-April)	36,800	kgDM
Silage on hand (as at May 5th)	*12,068*	*kgDM*

Pasture supplied by reducing Average Pasture Cover (APC) from 2595kgDM/ha (mid-April) to 2050 kgDM/ha at dry off across 160 ha	87,200	kgDM
Pasture supplied by reducing Average Pasture Cover (APC) from current 2630kgDM/ha (as at May 5th) to 2050 kgDM/ha at dry off across 160 ha	*92,800*	*kgDM*

Total extra feed from silage and "eating down" APC (as at mid-April)	124,000	kgDM
Total extra feed from silage and "eating down" APC (as at May 5th)	*104,868*	*kgDM*

Supply vs Demand (mid-April)	22,560	kgDM
Supply vs Demand (May 5th)	*25,188*	*kgDM*

26. The theoretical surplus above provides enough buffer if growth rates become lower than estimated or utilisation decreases over the next couple of weeks. The expectation is to use the silage now while ground conditions remain firm and silage utilisation should be high, and eat out the pasture cover later in May.
27. We have also evaluated our winter feed situation to see if we needed to change our autumn management or increase BCS at dry-off due to low winter feed availability. In our case, the farm has secured good quality winter grazing on a grass and silage diet, allowing for 0.5 BCS gain during winter.
28. Due to all of the above this week's decisions are:
    a. Hold the target round length to 40 days (4 ha/day)
    b. Use the remaining silage for the next 5 days and then use surplus cover over the next ten days to achieve our drying off cover of 2050 Kg DM/Ha

Data sheet

LUDF Weekly report	7-Apr-15	14-Apr-15	21-Apr-15	28-Apr-15	5-May-15
Farm grazing ha (available to milkers)	160	160	160	160	160
Dry Cows on farm / East blk /Jackies/other	0/4/0	0/4/0	0/2/0	0/2/0	0/2/0
Culls (Includes culls put down & empties)	0	0	3	0	0
Culls total to date	94	94	97	97	97
Deaths (Includes cows put down)	0	0	0	1	0
Deaths total to date	6	6	6	7	7
Calved Cows available (Peak Number 560)	471	471	469	468	468
Treatment / Sick mob total	2	2	0	2	0
Mastitis clinical treatment	2	0	0	2	0
Mastitis clinical YTD (tgt below 64 yr end)	55	55	55	57	57
Bulk milk SCC (tgt Avg below 150)	176	156	168	228	139
Lame new cases	3	12	6	4	8
Lame ytd	115	127	133	137	145
Lame days YTD (Tgt below 1000 yr end)	1317	1422	1499	1527	1639
Other/Colostrum	0	0	0	0	0
Milking twice a day into vat	460	454	458	460	450
Milking once a day into vat	9	15	11	6	18
Small herd	0	0	0	0	0
Main Herd	460	454	458	460	450
MS/cow/day (Act kg / Cows into vat only)	1.64	1.60	1.62	1.60	1.56
MS/cow to date (total kgs / Peak Cows	435	443	454	465	472
MS/ha/day (total kgs / ha used)	4.79	4.68	4.76	4.65	3.41
Herd Average Cond'n Score	4.25		4.26		4.36
Monitor gp LW kg WOW early MA calvers	508	504	508	512	514
Soil Temp Avg Aquaflex	14.8	12.6	10.9	11.1	10.3
Growth Rate (kgDM/ha/day)	60	56	30	79	36
Plate meter height - ave half-cms	16.8	16.7	15.0	16.0	15.2
Ave Pasture Cover (x140 + 500)	2853	2831	2595	2735	2630
Surplus/[defict] on feed wedge- tonnes					
Pre Grazing cover (ave for week)	4152	4236	4052	3718	3773
Post Grazing cover (ave for week)	1700	1700	1700	1700	1700
Highest pregrazing cover	4392	4500	4350	4092	3930
Area grazed / day (ave for week)	4.44	3.71	3.99	4.32	3.77
Grazing Interval	35	42	39	37	42
Milkers Offered/grazed kg DM pasture	19.0	19.0	15.7	14.4	13.0
Estimated intake pasture MJME	222	226	190	174	157
Milkers offered kg DM Grass silage			2	4	5
Silage MJME/cow offered	13	13	12	12	12
Estimated intake Silage MJME	0	0	27	42	59
Estimated total intake MJME	222	226	217	216	216
Target MJME Offered/eaten (incl 6% waste)	0	0	0	0	0
Pasture ME (pre grazing sample)	12.0	11.6	12.1	12	11.9
Pasture % Protein	19.5	19.8	21.8	21	18.5

Pasture % DM - Concern below 16%	15.8	13.2	15.0	12.8	14
Pasture % NDF Concern < 33	37.7	38.5	36.8	38.7	38
Mowed pre or post grazing YTD	251.8	251.8	251.8	251.8	251.8
Total area mowed YTD	266.2	266.2	266.2	266.2	266.2
Supple fed to date kg per cow (560 peak)	252.8	260.8	274.0	295.4	323.0
Supplements Made Kg DM / ha cumulative	139.4	139.4	139.4	139.4	139.4
Units N applied/ha and % of farm	25kgs/13.9%	25kgs/6.6%	0	0	0
Kgs N to Date (whole farm)	141	143	143	143	143
Rainfall (mm)	0	35	6	39	4.2
Aquaflex topsoil rel. to fill pt target 60 - 80%	30-50	40-60	50-70	80-100	70-90

Farm walks occur every Tuesday morning. 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, Charlotte Westwood.

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Focus Day Feedback

1. What is your on farm role?

- [ ] Farm Owner
- [ ] Farm Consultant
- [ ] Sharemilker
- [ ] Rural Professional
- [ ] Farm Manager
- [ ] Farm Staff
- [ ] Other - please specify

Other (please specify)

2. When was the last LUDF Focus Day you attended?

- ○ This is my first
- ○ 2015 - I'm a regular attendee
- ○ I attend when I can but not regularly
- ○ Not for a year or so

3. Did you find the topics covered today useful?

	Very useful	Somewhat useful	Interesting but not useful	Not useful	Waste of time
LUDF Financials	○	○	○	○	○
LUDF Seasonal Update	○	○	○	○	○
Repro Analysis	○	○	○	○	○
Selwyn Waihora Variation 1	○	○	○	○	○
Wintering Summary	○	○	○	○	○

4. Any other comments or suggestions for future Focus Days?

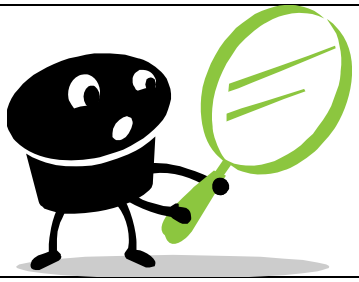
5. Name: (optional)

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.