SIDDC
South Island Dairying Development Centre

LINCOLN UNIVERSITY
DEMONSTRATION DAIRY FARM

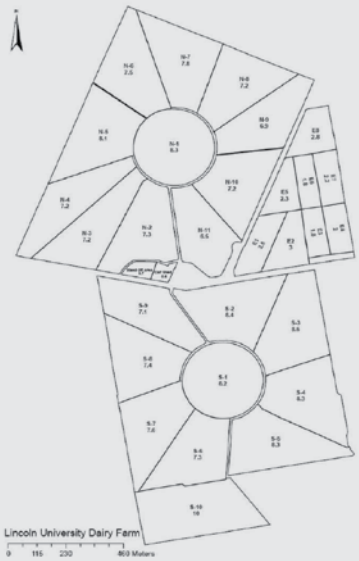
FOCUS DAYS
JULY 2017

STAFF

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

LUDDF 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 LUDDF 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. LUDDF 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 LUDDF 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

LUDDF 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.

LUDDF 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

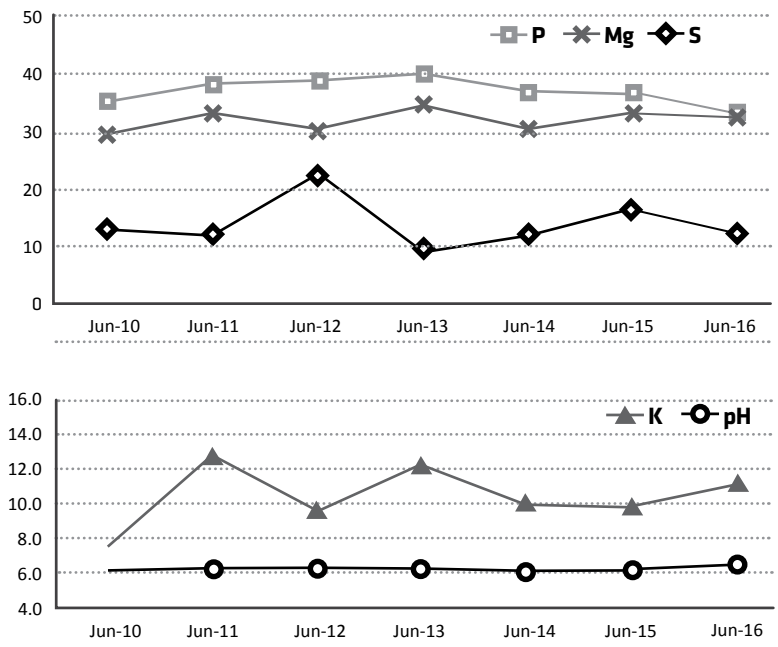
Target Soil Test Ranges:

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

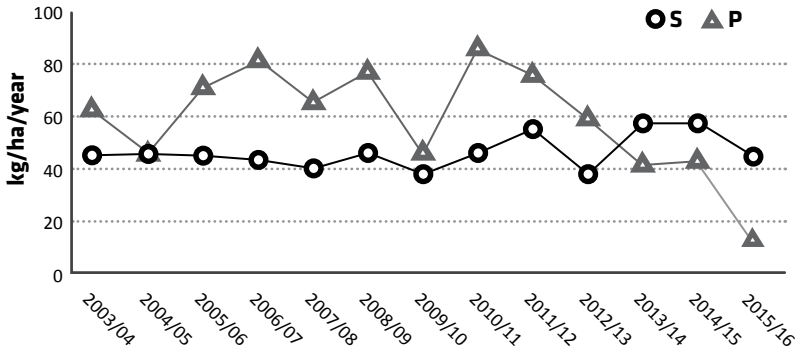
PASTURE

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 – 2015/16



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	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
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-08	Arrow - Alto
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 2016

KiwiX DNA for 365 cows [F8-F16]; Holstein Friesian Daughter Proven for 280 cows [F0-F7 then follow with Jersey bulls. Heifers start mating 10 days early, Syncro + AI the natural mate for 9 weeks. 10 weeks mating for milking herd. Expect to rear 150 heifers.

HERD DETAILS – OCTOBER 2016

Breeding Worth (rel %) 99 / 46
Production Worth (rel%) 128 / 66
Recorded Ancestry 99%

Average weight / cow (Dec)
Herd monitored walk over weighing
488 kg [Dec 2015]

Calving start date 2016
Heifers 18 July, Herd 1 August

Est. Median calving date
12 August 2016

Mating start date
25 October 2016 (heifers 10 days earlier)

Empty rate (nil induction policy) after 10 weeks mating - 14% (2015-16 mating). 6 week in-calf rate 69%.

	2002/03	2003-07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Total kg/MS supplied	228,420	**277,204**	278,560	261,423	273,605	262,112	297,740	300,484	276,019	278,654	289,906
Average kg/MS/cow	381	**425**	409	384	415	391	471	477	440	498	522
Average kg/MS/ha	1,414	**1,720**	1,744	1,634	1,710	1,638	1,861	1,878	1,725	1742	1812
Farm working expenses /kgMS	$2.98	**$2.68**	$3.37	$3.88	$3.38	$3.86	$3.91	$3.84	$4.28	$3.87	$3.47
Dairy operating profit/ha	$1,164	**$2,534**	$8,284	$2,004	$4,696	$6,721	$4,553	$4,665	$7,578	$1200	$1182
Payout (excl. levy) $/kg (Milk price + div)	$4.10	**$4.33**	$7.87	$5.25	$6.37	$7.80	$6.30	$6.12	$8.50F	$4.60	$4.30
Return on assets	4.4%	**6.18%**	14.6%	4.8%	7%	7%	6%	6%	10%	1.6%	1.6%
1 July cow numbers	631	**675**	704	704	685	694	665	650	650	580	578
Max. cows milked	604	**654**	680	683	660	669	632	630	628	560	555
Days in milk	-	**-**	263	254	266	271	272	273	259	263	267
Stocking rate cow equiv./ha	3.75	**4.05**	4.2	4.3	4.13	4.18	3.95	3.94	3.92	3.5	3.47
Stocking rate Kg liveweight/ha	1,838	**1964**	2,058	2,107	1,941	1914	1860	1878	1872	1680	1724
No. cows/weeks wintered off	500/8	**515/7.8**	546/9	547/7	570/9	652/8.4	650/9.8	650/9.8	650/11.4	580/10.7	578/11.6
No. yearlings grazed - On/Off	0/118	**0/157**	0/171	0/200	0/160	0/166	0/141	0/138	0/140	0/126	0/126
No. calves grazed - On/Off	0/141	**0/163**	0/200	0/170	0/160	0/194	0/190	0/156	0/150	0/126	0/155
Past eaten (dairybase) (tDM/ha)	-	**-**	17.9	17.2	16.2	16.9	17.3	16.8	14.9	15.7	16.6
Purch. Suppl - fed (kgDM/cow)	550	**317**	415	342	259	463	359	434	506.8	300	126
Made on dairy/platform (kgDM/cow)	0	**194**	95	64	144	160	154	93	0	40	277
Applied N/160 eff. Ha	-	**-**	164	200	185	256	340	351	252	143	179

Contents

LUDF Farm System Overview:

Strategic Objective

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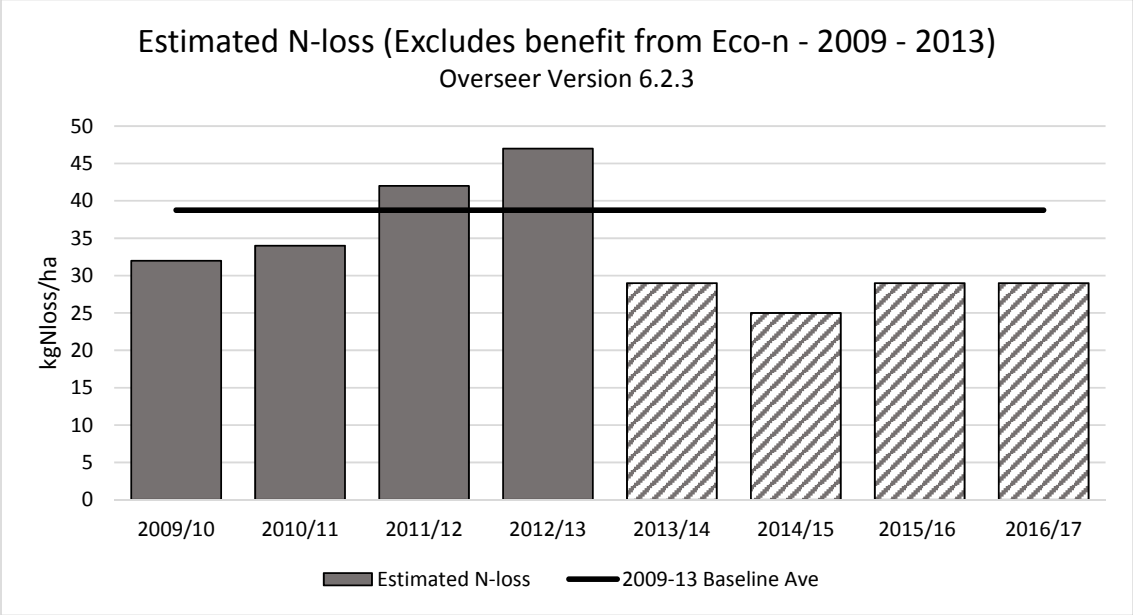
- *LUDF is to accept a higher level of risk (than may be acceptable to many farmers) in the initial or transition phase of this project.*

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.

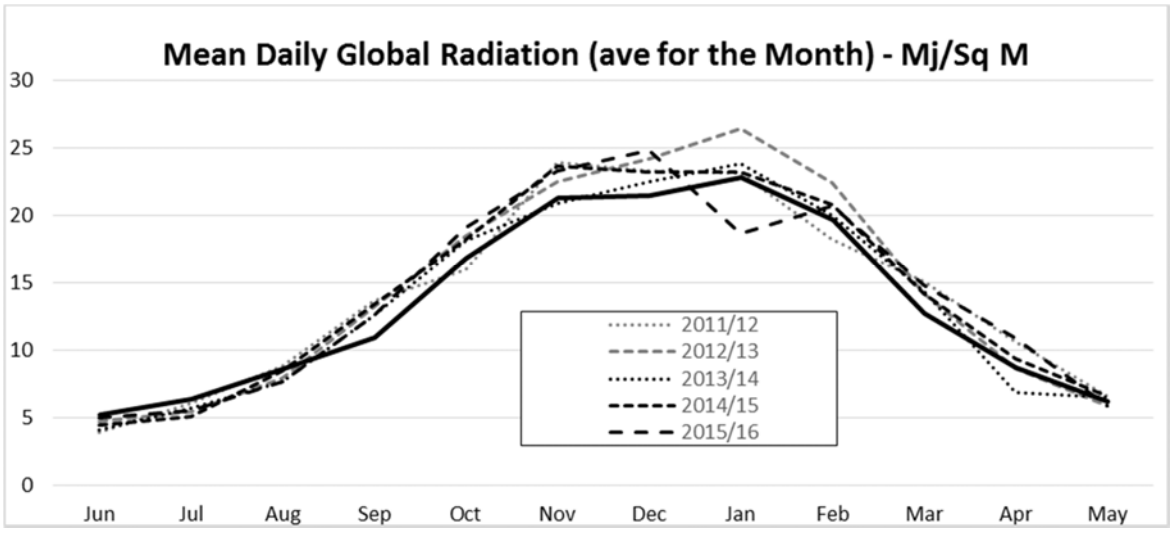
	Ave 11/12 - 13/14	**Ave 14/15 - 16/17**
Peak cows milked	**631**	**557**
Stocking Rate	**3.9**	**3.5**
Total kgMS sold	291414	284916
Per Cow Milk Production	463	512
Milk Production /ha	1821	1781
Total N fert applied kgN/ha	313	165
Total Imported Silage Fed tDM	273	153
Total Imported Silage Fed / peak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

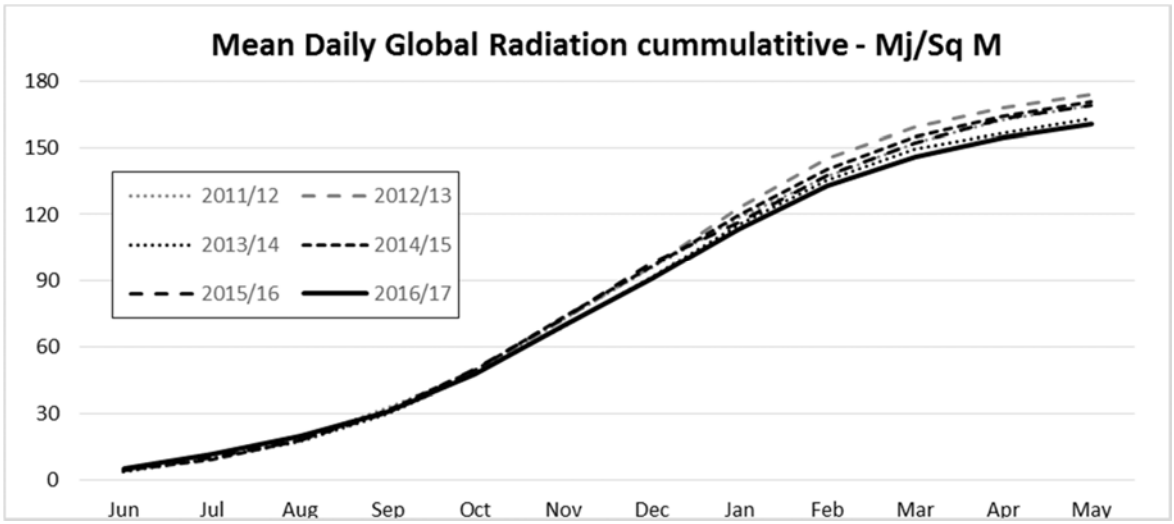
As seen in the summary of results above, LUDF has reduced its imported feed and N-fertiliser use, and through better matching of its stocking rate to feed supply, largely maintaining profitability. Estimated N-losses from Overseer® are shown below.


Estimated N-loss (Excludes benefit from Eco-n - 2009 - 2013)
Overseer Version 6.2.3
kgNloss/ha
50
45
40
35
30
25
20
15
10
5
0
2009/10
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17
Estimated N-loss
2009-13 Baseline Ave

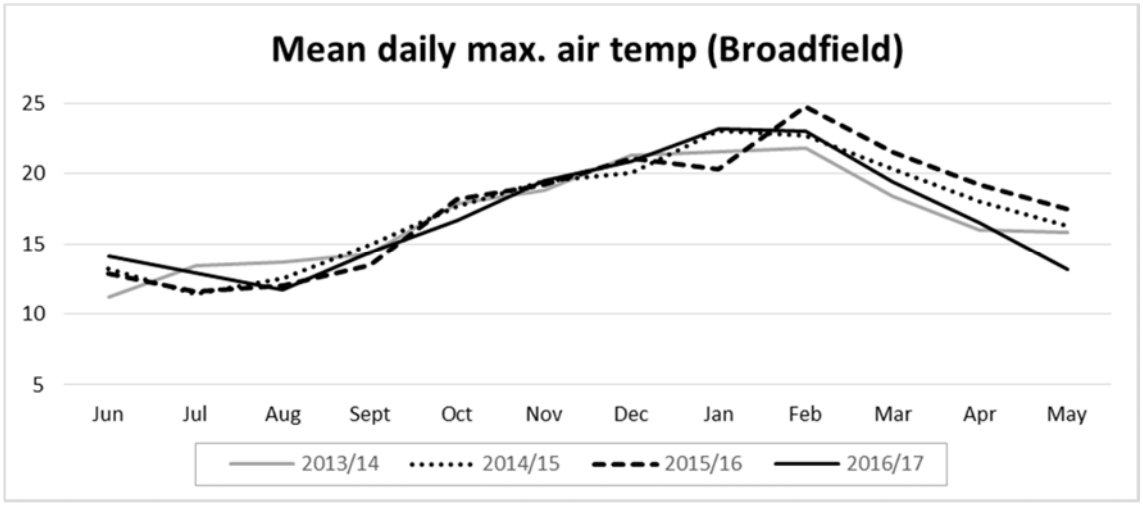
General physical performance of LUDF during the 2016/17 season

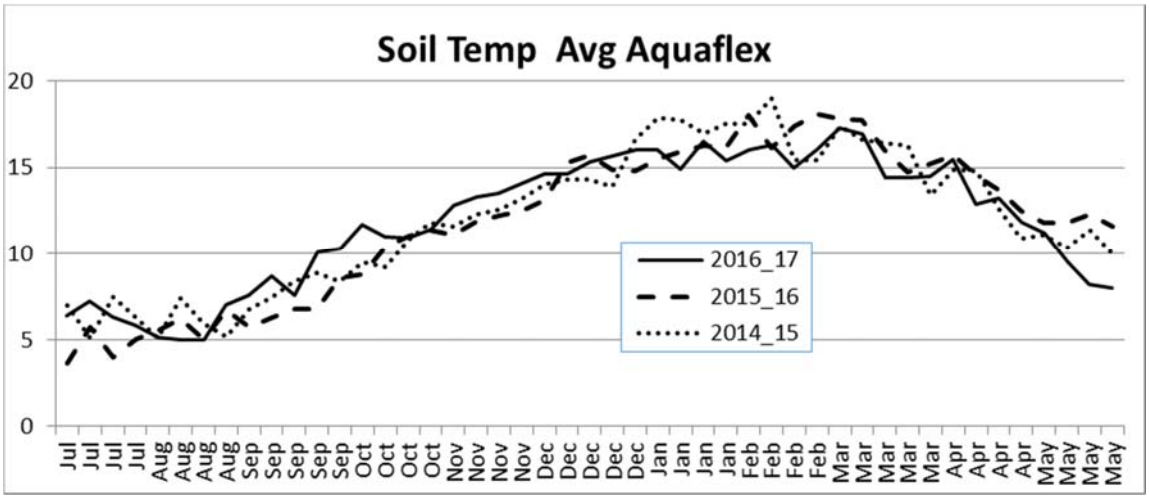
Weather conditions

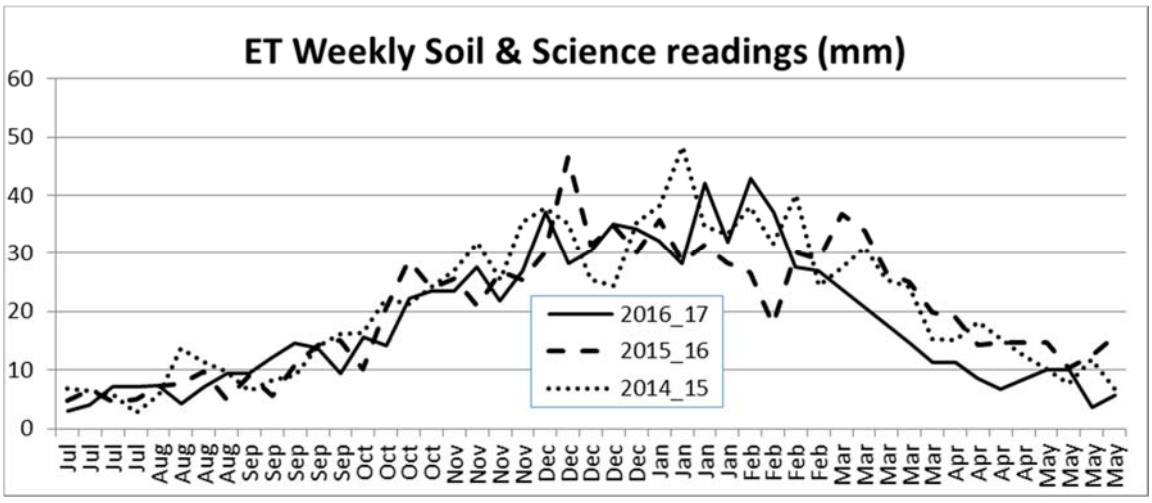




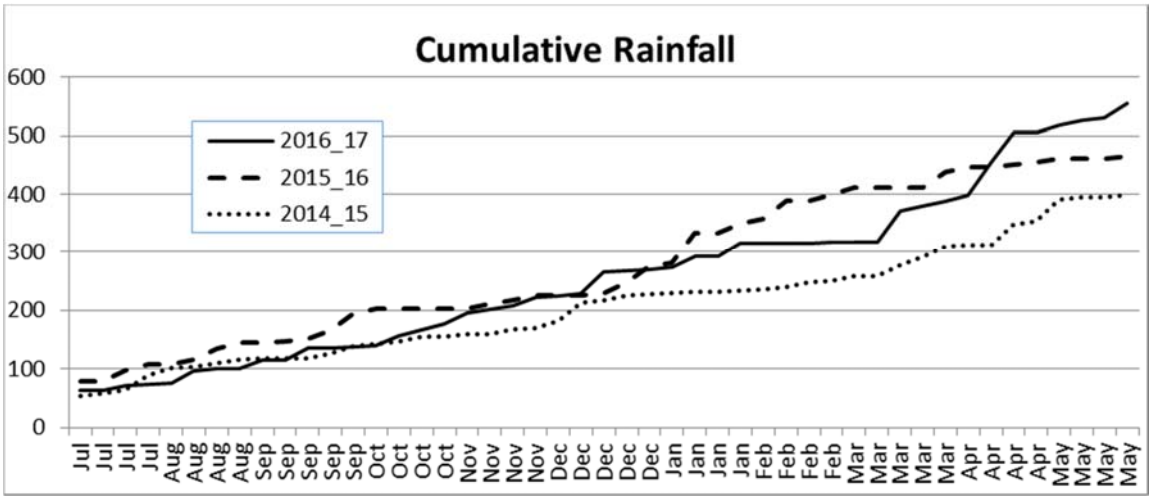
The graphs above show the amount of sunshine hours received during the whole season. Even though the season started with a sunny winter, the amount of sunshine declined since September and remained that way until the end of the season. The lack of sunshine would have had an effect on the pasture quality, and during the month of October-November pasture was characterised by extremely low levels of DM%, which made fully feeding cows to energy requirements (with pasture) a challenge during a key part of the season just before and during mating.



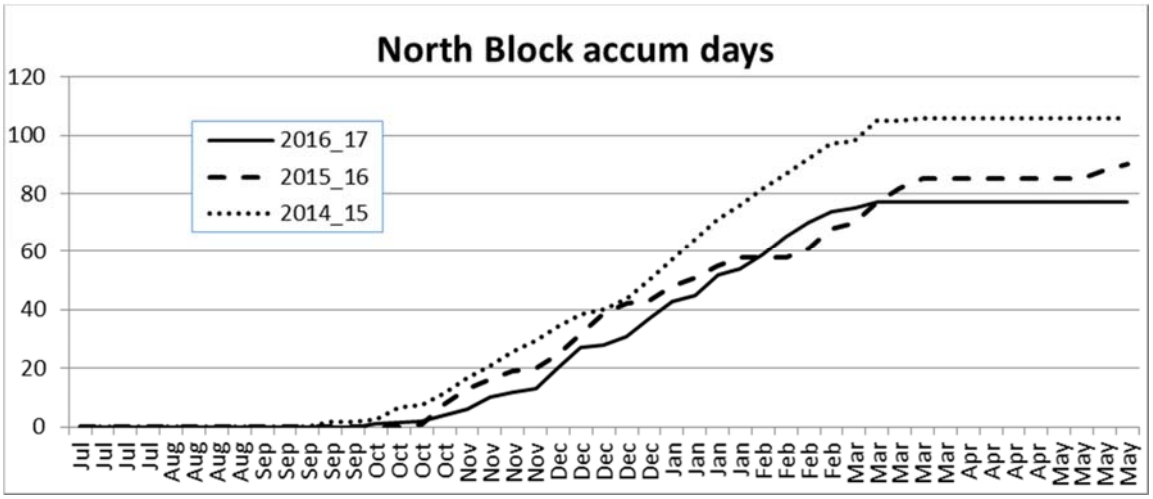


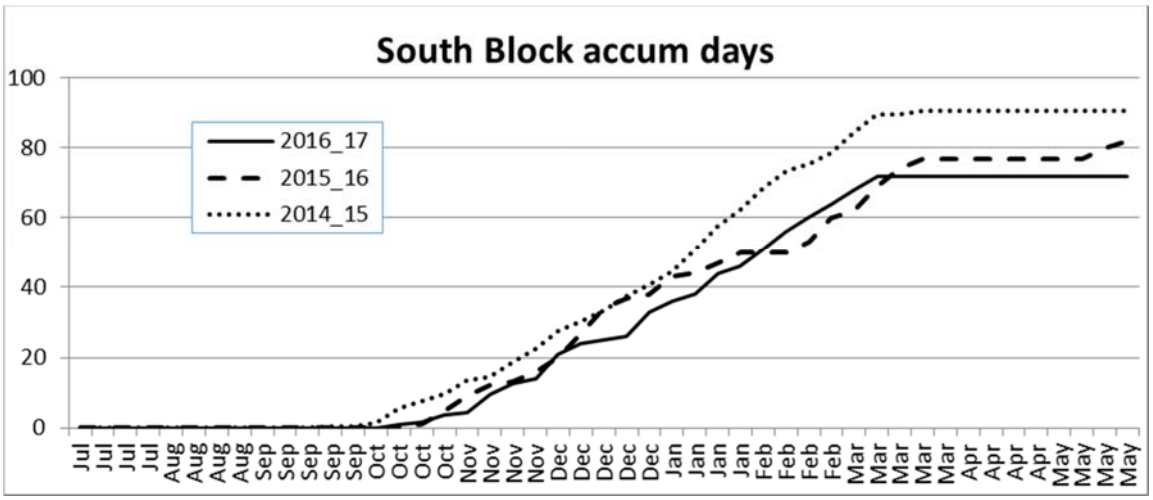


Air and soil temperatures have followed the same pattern as the sunshine hours, with higher temperatures than previous seasons during winter and lower than previous season's after September/October, with the exception of January/February.



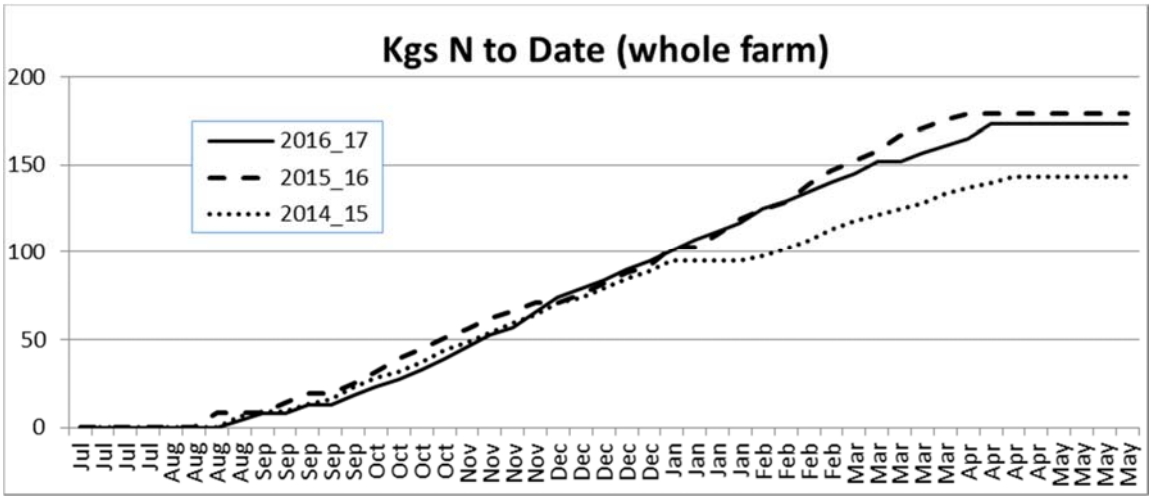
Note the welcome 200mm rain received in March / early April this season.





Light Rainfall created some challenges with silage harvesting and regrassing in the spring, and again in autumn when supplement utilisation and lameness became a key issue.

The combination of generally lower ET plus the autumn rainfall events resulted in less use of irrigation compared to previous seasons.



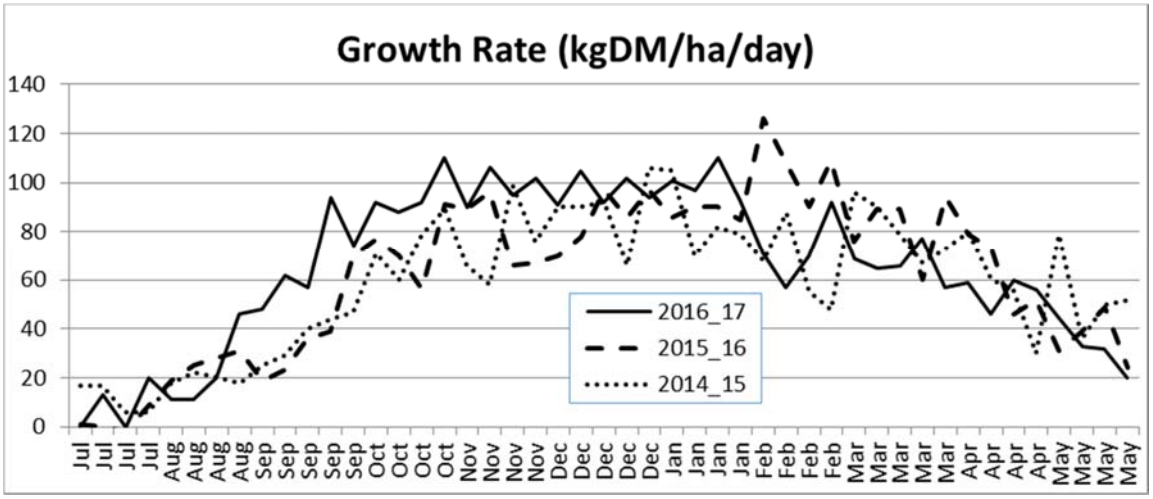
Nitrogen was consistently applied at 25 kgN/ha after each grazing. The run of a faster round for about 6 weeks during October / November resulted in more N being used during this period.

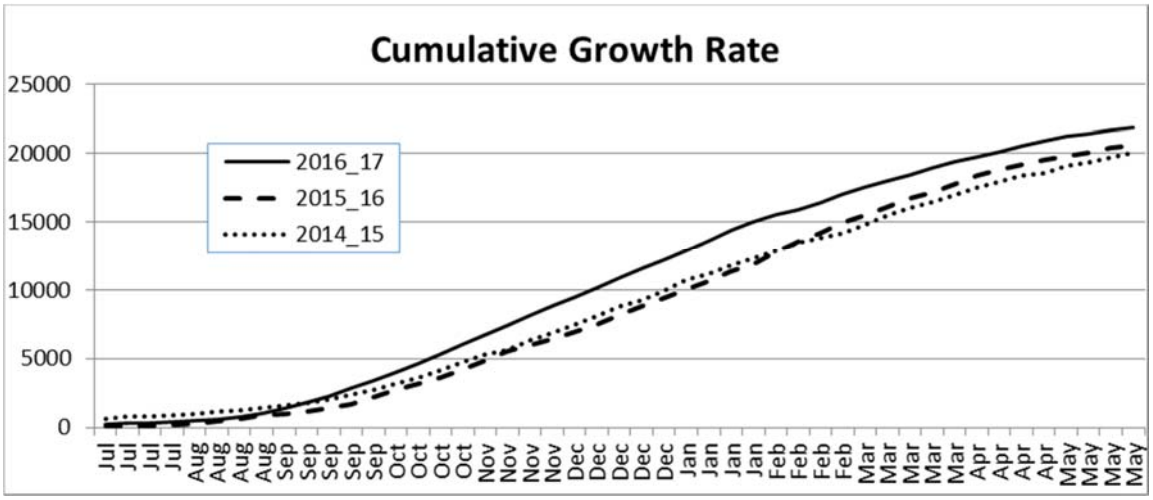
N applications started in late August (as soon as enough area was being grazed), initially as AMMO, then Urea, and finished early April.

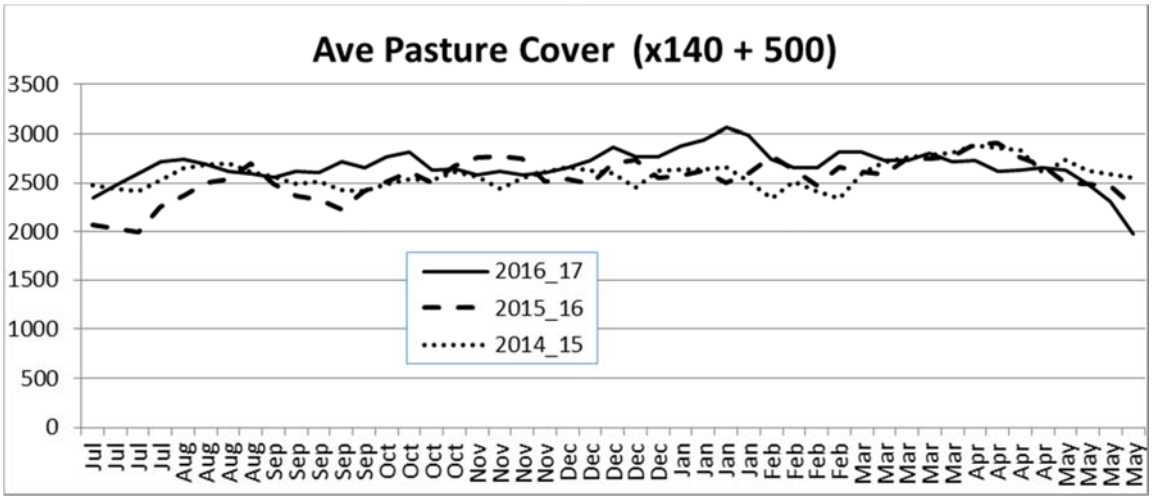
Growth condition

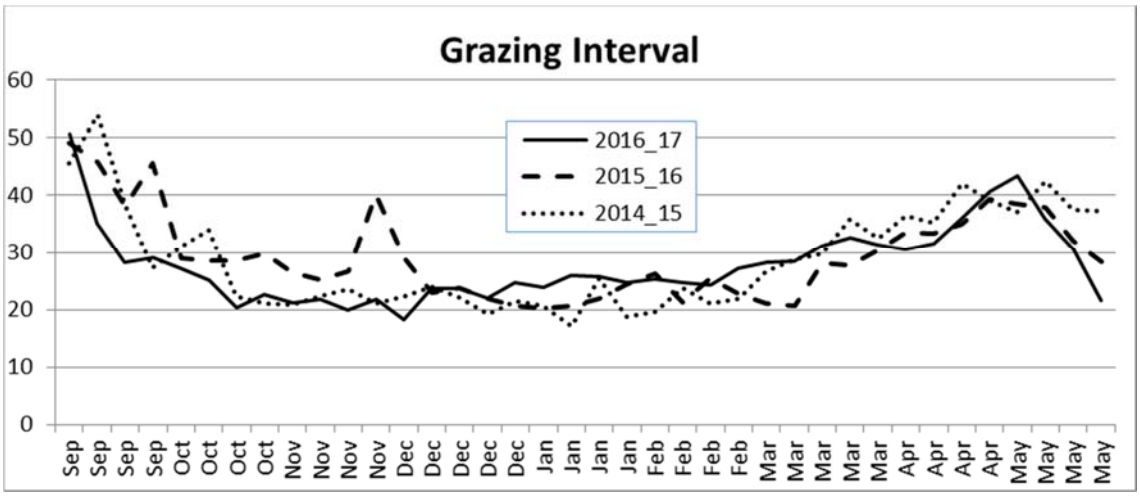
An important note for this season has been the challenge to make sense of the figures gathered from pasture walk readings. From February onwards 3 plate meter readings started being taken and a discussion and agreement achieve after walking every paddock, to see if the information gathered could better fit the calculations for each week.

For the reasons above, we encourage you to exercise caution when reading through the growth and APC graphs which follow.



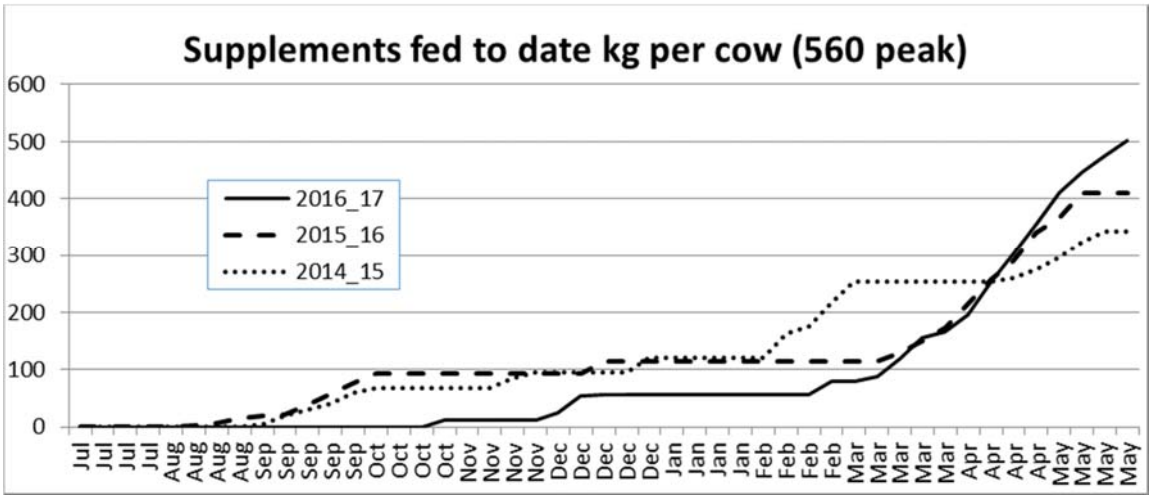






Grazing intervals remained typically between 25-26 days through the whole season after the first grazing round (end September), except during a period of about 6 weeks in October/November. The aim of running this faster round was to avoid seeding of pastures. However, a slowing down of the growth rates through this period resulted in the farm carrying a feed deficit through this key period and supplements were required to get the farm out of the deficit.

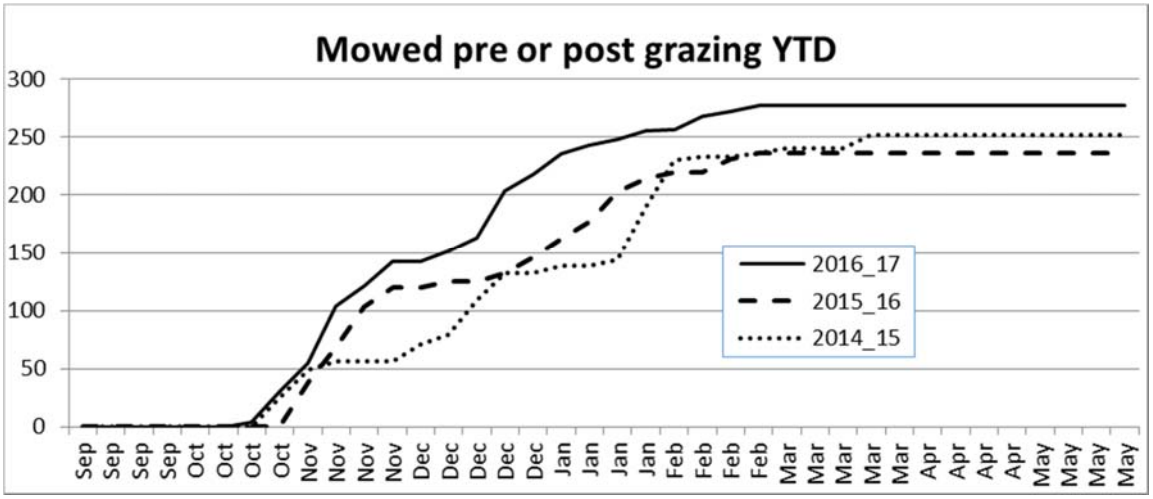
Note supplements fed (below) include imported feed and supplements made on the platform.



In terms of supplement use, the mild winter condition allowed the farm to start the season with surplus to target grass (APC above target at PSC). This and the dry conditions over August/September allowed for good utilisation of the grass at hand, which resulted in managing through the whole of calving without the need to feed supplements out.

Supplements were required in late November/early December, to allow the farm to overcome a feed deficit gained by running a shorter round length, wet weather conditions did not allow for the timely harvest of silage and a slowing down of the growth rates during this period.

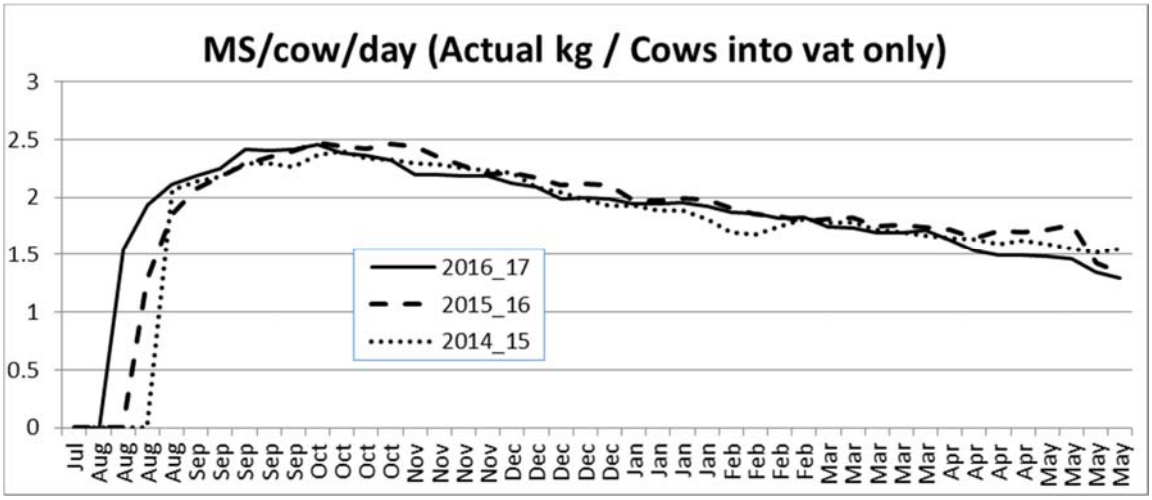
Autumn management again was challenging due to wet weather conditions and supplement were required through the whole period to allow the farm to keep all pregnant and empty stock all the way through to May. With the current pay out, this remained profitable all the way through.

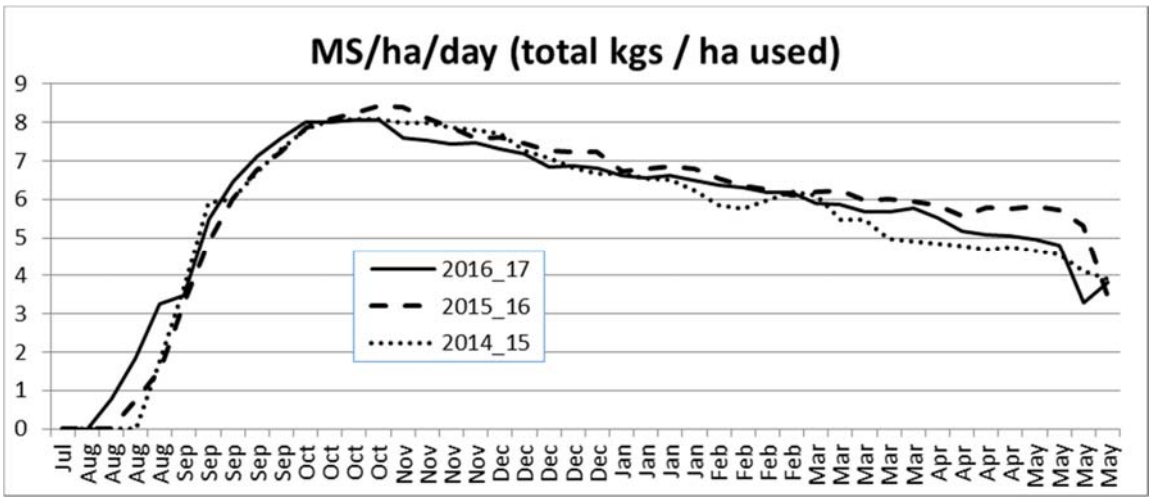


The use of pre and post grazing mowing has remained a key management tool for pasture quality again this season.

Wet weather conditions during October made the harvest of silage challenging, as well the use of pre-graze mowing. Post graze topping was used a bit more often through this season due to consistent rainfall events.

Herd Performance for the season

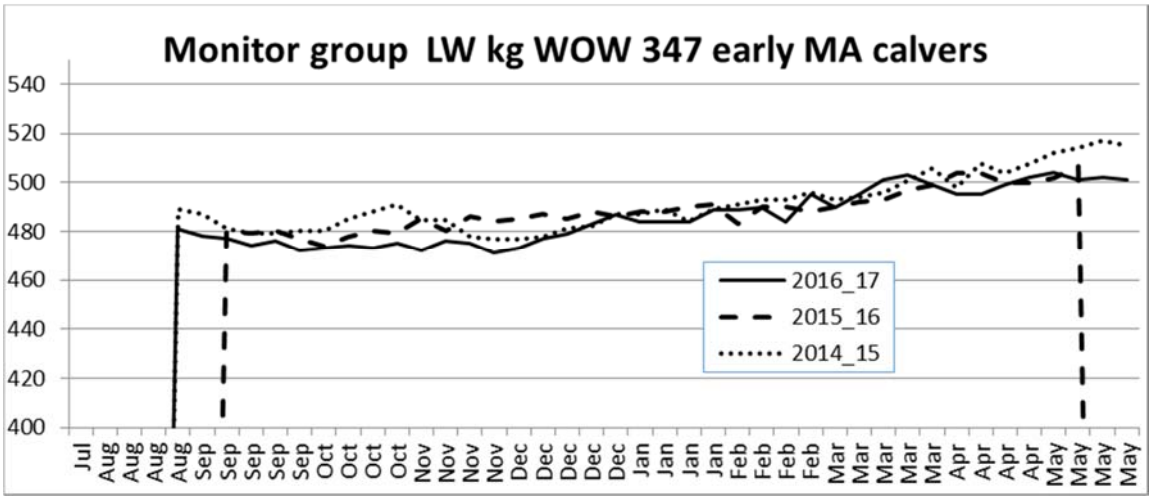




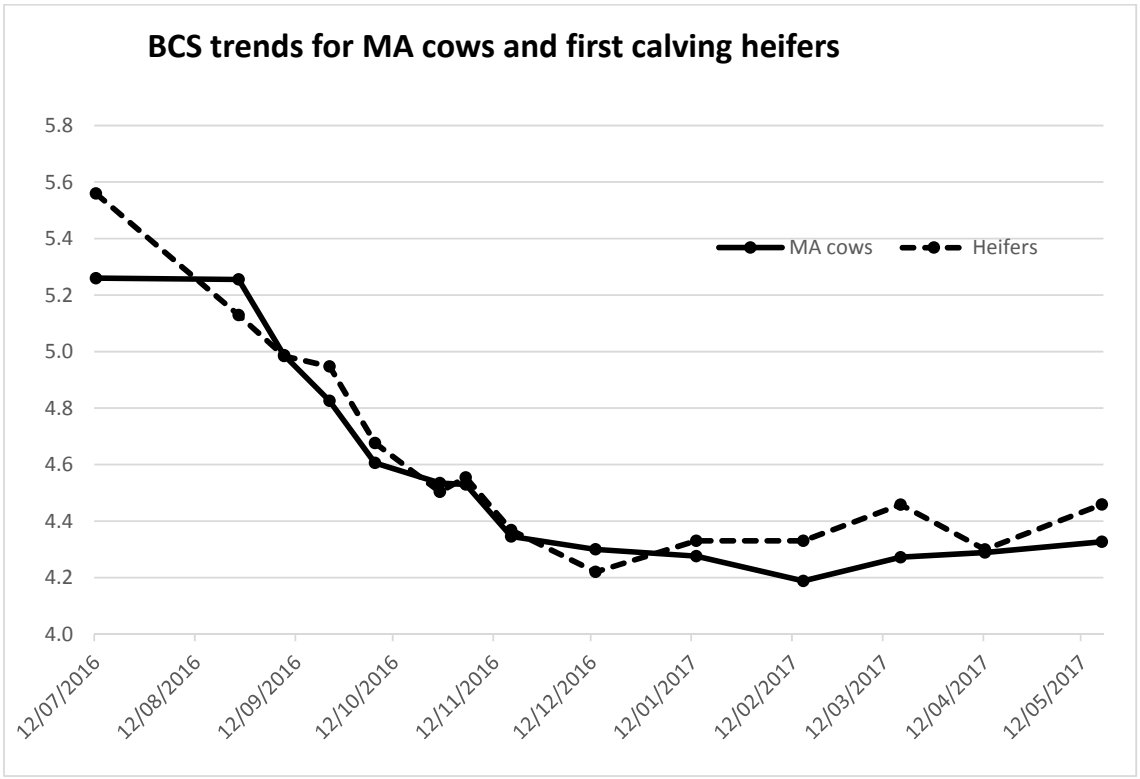
The mild weather through winter saw the herd's performance start ahead of last season's in terms of time, with heifers starting to calve early.

Peak milk, though, presented a different shape from previous years, with peak production reaching the same levels of last season's on an individual basis, but not lasting as long as in previous seasons, which made peak herd performance reach lower levels than before.

A combination of challenging October-November weather, made pasture management tricky; in hindsight silage was dropped out too late, some pre graze mowing was delayed due to wet soils, growth rates were typically lower than anticipated, the farm ran a faster round than was desirable, pastures had low DM% and high NDF in grasses. This meant cows have had to work hard to achieve appropriate ME intakes through the peak period, resulting in lower performance in terms of production as well as challenges in keeping cows fully fed.



Noticeably and in agreement with the above comments, live weights of the monitor group of early calving cows showed the lowest of the last 3 seasons during the October-November period. This was not only a result of the challenging management conditions but also the fact that the first calving heifers suffered the effects of an IBR infection that ran through this same period of October-November. With severe fever and respiratory symptoms, appropriate ME consumption by this herd was not achieved, even when pasture was available to them.



As per the comment above, BCS maintenance was a challenge through the whole season, and more so in the young stock. Heifers lost the 0.5 BCS advantage over their older peers by mid-September. This advantage was not recovered again until February.

The mixed age cows lost an average of 1 BCS between calving and mid-November, and the heifers lost 1.4 BCS between calving and mid-December, this was when the respiratory symptoms started receding.

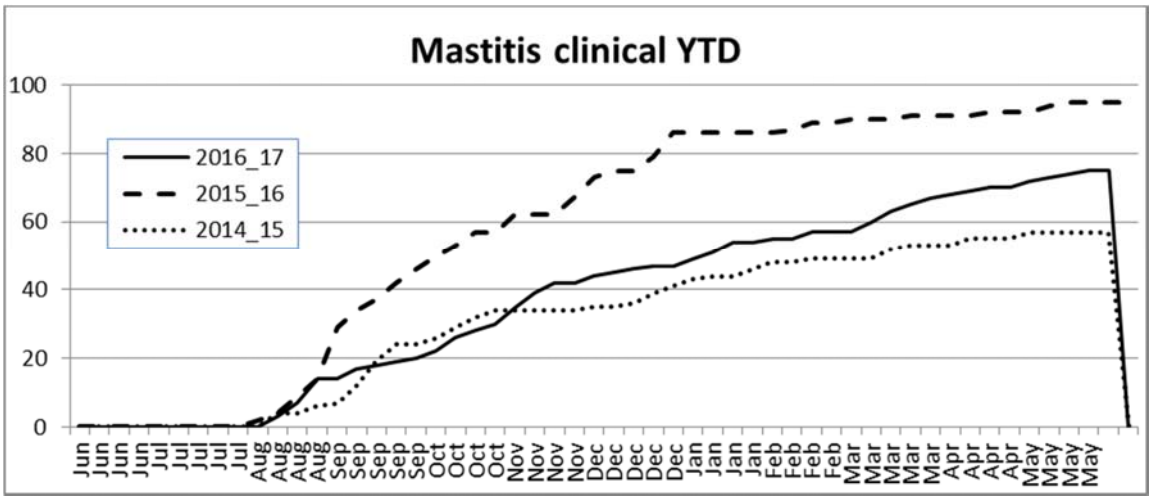
The above, together with the pasture quality and management challenges of the season contributed to the reproductive results shown below.

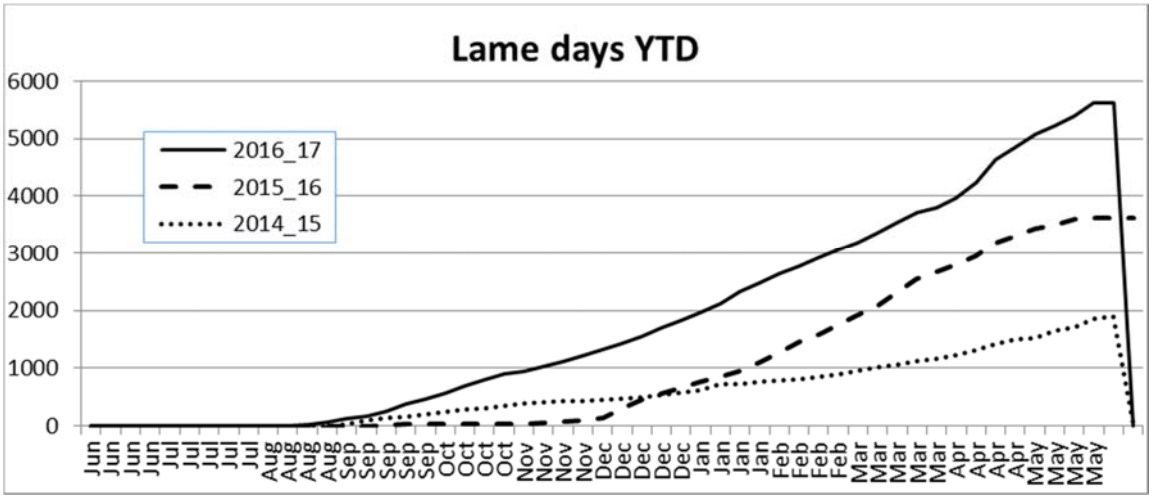
Animal Health

In terms of animal health performance, with the changes in vacuum pressure and teat spray in the previous season, mastitis seems to have been held at more acceptable levels.

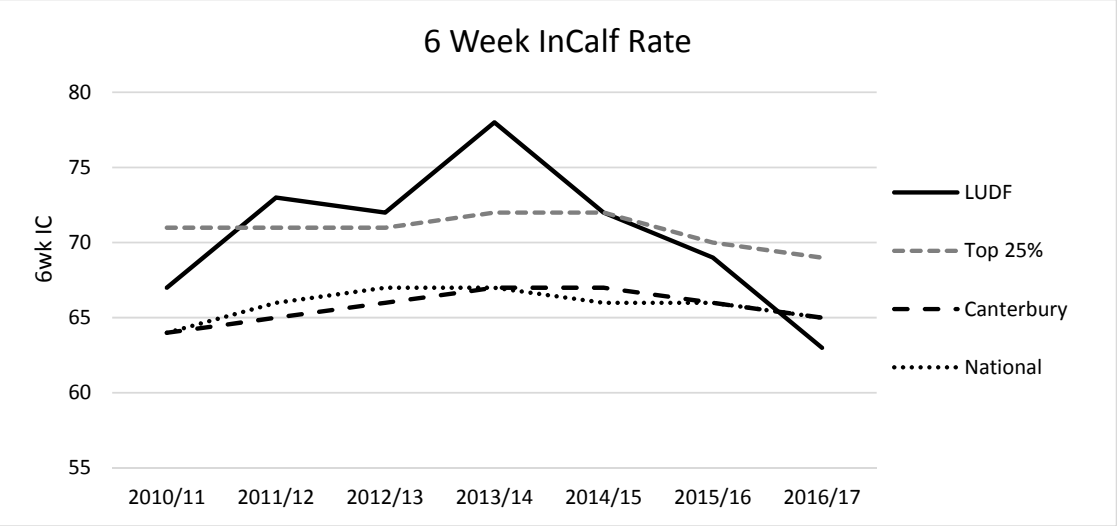
A combination of high not-incalf rates and the Johne's disease screening and culling programme have contributed keeping animals that, under other circumstances could have been culled for high SCC counts.

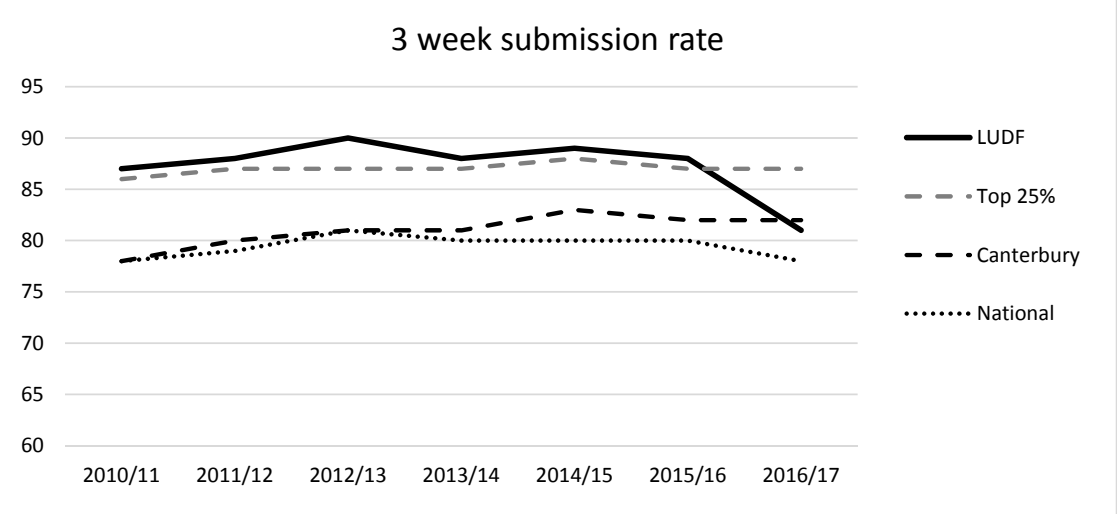
The challenge this season has been the level of lameness that occurred in the herd. Several approaches are being analysed at the moment to tackle this issue for the 17-18 season as this level of lameness does not only cost the business but also impacts on staff.

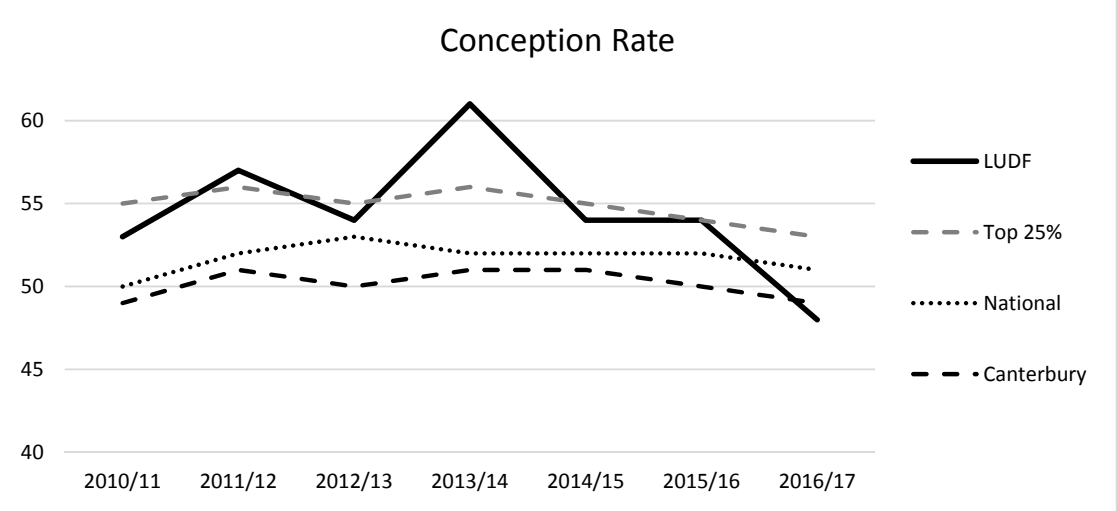




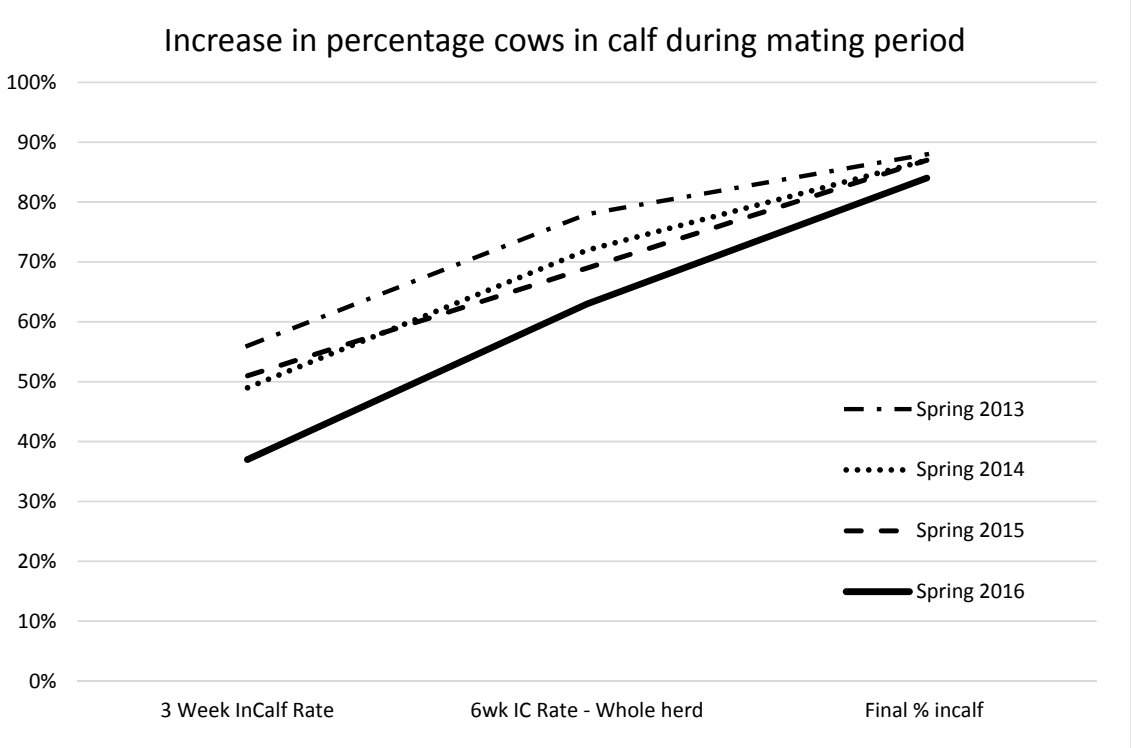
Reproduction Results:







LUDF – reproduction performance during Spring 2016:



Incalf performance at LUDF at the end of the first 3 weeks was 14% below last year, this reduced to 6% behind at the end of 6 weeks and only 3% behind past years performance at the end of mating.

Viewing the farms mating performance in this manner supports the probability that IBR (see February 2017 Focus Day handout) had a significant effect on early reproductive performance, AND that the continued focus on getting cows in calf, including additional bull power for the last 4.5 weeks of mating contributed to a reasonable final in-calf rate – certainly when compared to the early season performance.

Benchmark Farm Summaries 2016/17 Season

Beechbank Dairies Limited

- Beechbank is a 141 ha (effective) milking platform with a 40 aside herring bone shed. The farm is located near Culverden in the Hurunui district
- There are no crops on the milking platform
- The 545 peak cows milked included 23 carryover cows
- The farm is fully irrigated including 109 ha under Pivots, 24 ha under Rotorainers and 8 ha under Sprinklers. The water is from the Hurunui River under the Amuri Irrigation Company scheme.
- The herd is in the LIC Sire proving scheme and rebates from this were discounted to the breeding costs.
- This business has an associated 90 ha support block that provides some supplements for the milking platform and dry stock grazing. The lease cost as well as other running cost for this support block (cropping, fertilisers, irrigation etc.) are included under "Support block lease cost" on Operating Expenses.
- Supplements fed are grass silage, straw and PKE
- The reduced management and labour input from the farm owners is reflected in the value of the Labour adjustment included in the Operating Expenses (0.2 FTE Management and 0.2 FTE labour).

Dry Creek

- This is a third year conversion with 160 ha (effective) area, adjusted to 153.5ha effective milking platform and 6.5ha wintering. The area is fully irrigated (145 ha under pivots, 13 ha under sprinklers, and 2 ha under K-line).
- The farm is located south of Culverden in the Hurunui district.
- There is 11.5 ha of fodder beet in the total 160 ha including 5 ha used as autumn feed and 6.5 ha being used as winter feed. The fodder beet area used in autumn is considered part of the milking platform but the area dedicated to winter feed is considered support block therefore an owned support block adjustment was included in the Operating Expenses. In this report the milking platform area used for Dry Creek is 153.5 ha (160 ha – 6.5 ha).
- The 6.5 ha considered support block for this farm is fully irrigated and fenced (as it is part of the milking platform), so the "owned support block adjustment" was done at $1,500/ha.
- As there has been a small increase in the fodder beet area to be used as winter feed this year compared to last season, there is a small double up in wintering cost in the Operating Expenses.
- Peak cow number was 507 cows milked through a 44 aside herringbone shed. Peak cow numbers include 29 cows from a neighbouring property affected by the November Earthquake.
- Supplements fed are grass silage, Lucerne silage, oats silage, PKE and fodder beet.
- Last winter 160 cows were milked for 20 days in June and this is included in this year's production.
- Pre-graze mowing has been used approximately once on the milking platform area.

LUDF

- This is a 160 hectare farm, milking 555 peak cows this season close to the Lincoln Township.
- The milking shed is a rotary shed with 50 cups, automatic cup removers and Protrack
- There is no crop on the milking platform and cows are typically brought back onto platform as calved animals.
- The farm uses a small support block of 14 hectares across the road (East block) to run springers and dry cows during spring and new born calves when taken out of the calves pens, until such time they are sent to their rearing block in Hororata.
- All grazing and silage from this 14ha block is included as purchased feed for the milking platform.
- Dry cows can also be run at a neighbouring property (Jackies) if necessary
- Starting this winter (2017), cows are wintered on a support block in Hororata on fodder beet.
- All off-platform grazing is accounted for as replacement / cow grazing days off platform and shown in the expenses as a cost at market rates.
- The farm runs a simple system where all supplements are in the form of silage in spring and silage + fodder beet in autumn (new for 2016-17 season)
- Irrigation is primarily with 2 pivots and sprinklers (in the corners); water is sourced from 2 bores and effluent is applied through a separate line under the north block pivot.
- The herd has been using whole herd parentage testing for a number of years and testing and culling for Johne's disease for the past three autumns.

Willsden

- This is a 306 ha platform, milking 1060 peak cows through a 50 bale rotary shed with in-shed feeding system and cup removers.
- The farm is located in the Selwyn district, west of SH1 between Bankside and Te Pirita (free draining stony soils). It is part of a bigger business running 3 other dairy farms and 2 support blocks. All supplements and grazing of young stock and wintering done on these support blocks is charged back to the farm at market rates.
- Irrigation is by pivots and rotorainers and water is source from CPW water scheme.
- Supplements are imported in the form of barley (source from outside the business) and silage (from support blocks)
- The farm has been regrassing 30 % of the platform yearly with the use of a break crops and annual grasses in between perennial planting. This has increased the pressure on the platform ha and keep regrassing consistent year on year. The programme is now finishing. The aim is regrassing 10%-15% of the farm yearly.
- Stock grazing: higher due to carrying a few more stock than planned and then sold in calf as R2 (stock number adjustments done).
- Administration costs are higher than usual due to an overhead costs that covers Operations Manager and General Manager costs.

Canlac

- This is a privately owned equity partnership of 335 ha platform close to the Dunsandel township, milking 1,437 peak cows with a feed pad (which contributes to high depreciation costs)
- Irrigated by 2 main pivots 1 rotorainer and some sprinklers in the corners. Water sourced from CPW scheme and bore if necessary.
- Supplements used in this farm are: maize silage (spring/autumn), grass silage, PKE and fodder beet (in autumn).
- The farm focuses on optimizing grass harvested and utilisation of supplements by only feeding these on the feed pad to minimize wastage.

Acton

- This is a 174 hectare farm run by a 50:50 sharemilker for Dairy Holdings Ltd, just south of the Rakaia River towards the coast.
- The milking shed is a 38 aside herringbone; irrigation is through rotorainers and water supply is bore.
- This year there was an $18,000 cost for the development and maintenance of the well, which only came back to full consented capacity by the end of the season (after a steady decline over the past decade), too late to positively impact this Autumn.
- This is a low cost farming system based on optimizing EBIT results by harvesting as much milk as possible on the first half of the season and dropping demand by early culling in autumn.
- Supplements fed are silage and PKE and only in spring with the higher demands during calving

Melrose farms

- Melrose is a 705 ha farm with 3 milking units and a 215 ha support block, just north of the Rangitata River.
- Fodder beet and Kale are planted in some paddocks of the platform area. Some of it is used for autumn feed and the rest is used for winter feed (hence the difference in the figures between this written part and the tables presented in the hand out)
- All 3 milking shed are rotary (50, 60 and 60 cups) and are fitted with cup removers, Protrack, in shed feeding systems and Ezy Heat cameras.
- All mating has been done through AB as the best use for the Ezy Heat cameras.
- The support block provides all young stock grazing and supplements for the platform.
- There is some winter grazing, barley grain, grass silage and straw costs supplied from outside the business
- All support block costs for this farm have been included in their corresponding category of the operating expenses, on top of an Owned support block adjustment of $1500/ha as this block has good fertility soils, is fully irrigated with good infrastructure.
- This business is in such a position that costs such as capital and maintenance fertilizer or required R&M have not been cut over the past 3 seasons.

- Irrigation is mostly through pivots and sprinklers, and the water is sourced from irrigation schemes.
- Supplements are in the form of barley grain, grass silage, fodder beet and molasses.
- Capital expenditure has continued (Irrigation infrastructure and lanes) which has kept depreciation costs high.
- The herd undergoes Johne's screening (3 times over the last 5 years) and all positive and high positive animals are culled.
- Around 100-120 carry overs are kept through the winter as dry (included into the stock numbers), used as grazing cleaning tool on the farm and then either sold or put back into the herd the following season.
- Focus: getting the K levels up on the farm soils and regrassing 10% of the farm every year with the fodder beet and Kale as break crops.
- There is a full time maintenance FTE included in the wages costs.
- Season 16-17 the farms were run with 1 VOSM and 2 managers. This is changing to 2 VOSM and 1 manager for 17-18.

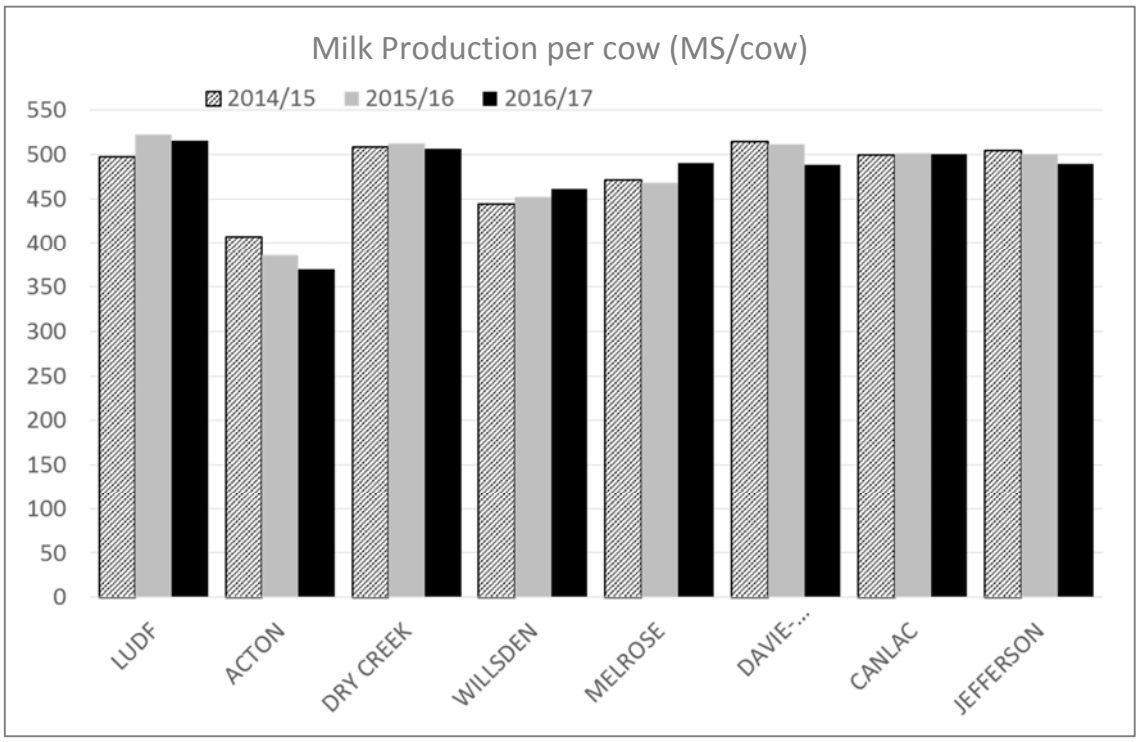
Jefferson Dairies Ltd

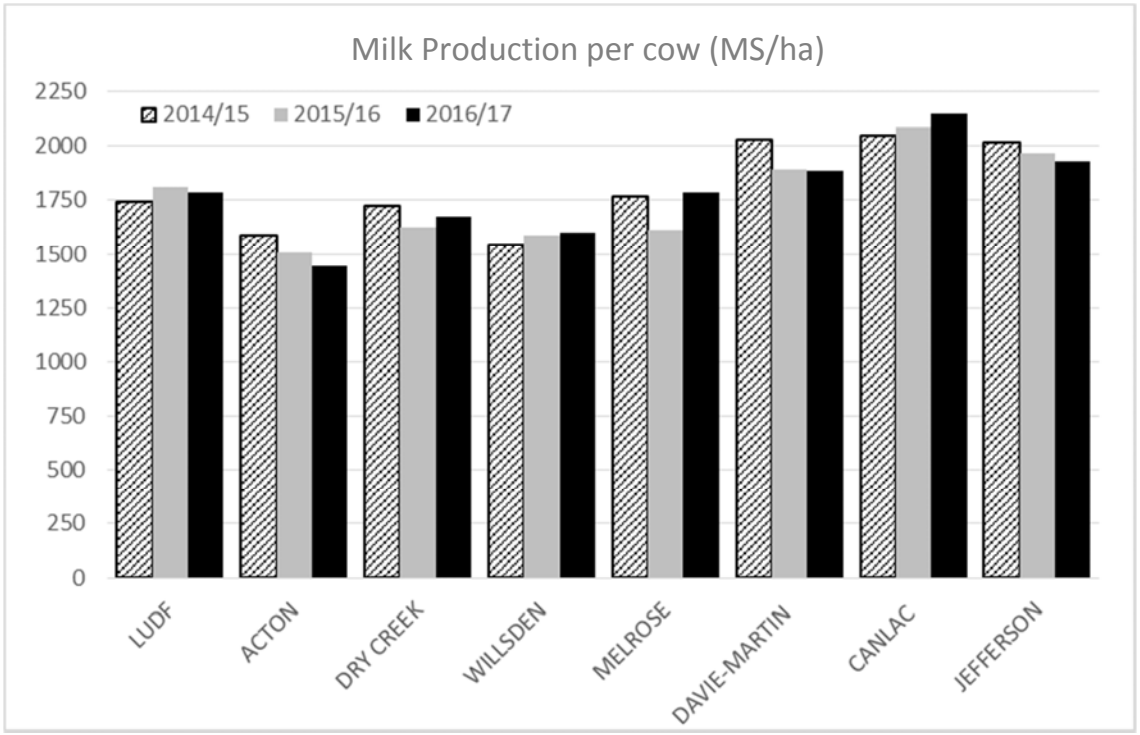
- This is a 140 ha farm, milking 552 peak cows through a 54 rotary shed with Protrack, cup removers, in-shed feeding system and Ezy Heat cameras.
- The camera allow this business to run a full AB mating period with strategic use of beef breed bulls across low PW cows and across all suitable cows from week 6-7 thereafter only short gestation dairy is used. This mating strategy in combination with the support block allows this business flexibility to strategically sell high value stock at suitable times.
- All support block costs that are not directly attributable to growing crops either used at the runoff (e.g. winter feed) or exported to the dairy farm (barley grain, maize and pasture bailage) for this farm are lumped together under the "support bock cost/expenses of the operating costs. These are typically fertiliser for growing pasture, RO R&M for farm & machinery etc.
- The support block for this farm is also fully irrigated and fenced, has pivot irrigation and is on good quality land, so the "owned support block adjustment" was done at $1,500/ha.
- The support block has sufficient capacity to allow this business to feed additional stock so some beef dairy cross steers are reared which are sold when market conditions are favourable either as R1 or R2yr. These are currently instead of surplus AB dairy heifers. The steers are included in the stock number adjustments.
- The whole farm is spray irrigated.
- The supplements used in this farm are in the form of maize silage, grass silage, fodder beet, molasses and barley.
- Regrassing has not happened this year.

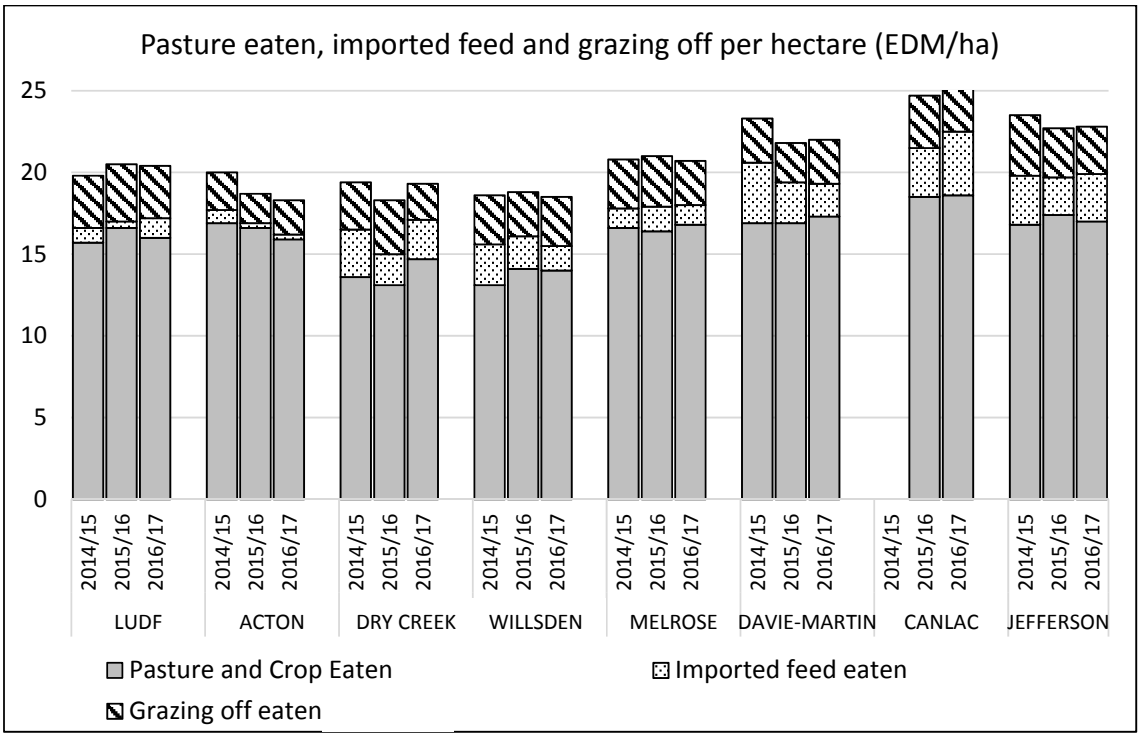
Summary Table - on farm performance:

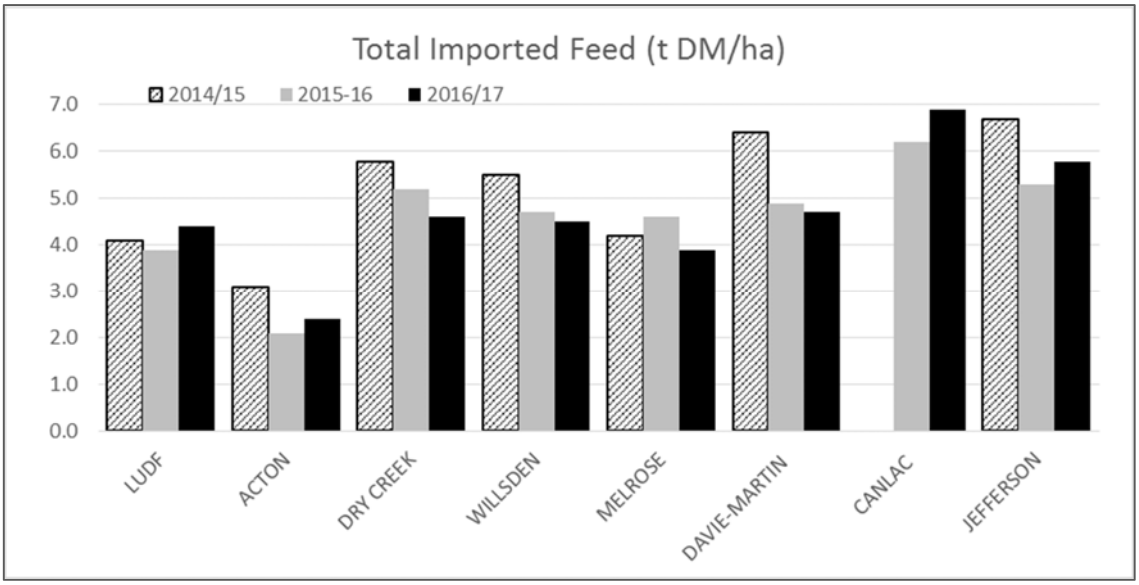
SEASON 2015-16	LUDF	Acton DHL	Dry Creek	Willsden	Melrose	Davie-Martin	Canlac Holdings	Jefferson
Effective ha (MP)	160	174	153.5	306	711	141	335	140
Support Block	0	0	6.5	0	209	90	155	102
Peak cows milked	555	680	507	1060	2592	545	1437	552
Cows/ha	3.5	3.9	3.3	3.5	3.6	3.9	4.3	3.9
Irrigation volume applied	528	482		470			467	385
Total kgMS	286,189	251695	256,959	488,815	1,270,540	266,134	719,198	270,132
kgMS/Cow	516	370	507	461	490	488	500	489
kg MS/ha	1789	1,447	1,674	1597	1,787	1,887	2,147	1,930
kgMS as % of liveweight	103%	82%	108%	98%	103%	98%	102%	95%
10 day peak	2.35	1.66	2.31	2.15	2.27	2.12	2.09	2.1
DIM	265	256	246	263	270	260	277	248
% Drop from peak to End Dec	7.7%	1.50%	5.3%	2.0%	6.0%	4.9%	6.3%	6.2%
Pasture and crop eaten - tDM/ha	16	15.9	14.7	14	16.8	17.3	18.6	17
Imported feed t/ha	1.2	0.3	2.4	1.5	1.2	2	3.9	2.9
Grazing off dry cows – tDM/ha	3.2	2.1	2.2	3	2.7	2.7	3	2.9
Total feed eaten	20.3	18.2	19	18.5	20.7	22.1	25.3	22.8
N use kg/ha	173	256	246	230	258	273	243	293
Length of AB	6	4	6	6	11	10	5	11
Total length mating	11	11	10	11	11	11	12	11
% hormonal intervention	0%	8%	28%	0%	7%	13%	6%	16%
6 week-InCalf rate	63%	60%	61%	68%	68%	63%	68.50%	69%
Not InCalf rate	15%	10%	16%	15%	17%	19%	18%	18%
1st calvers on farm @ end of season	88%	88%	84%	77%	86%	82%	94%	79%

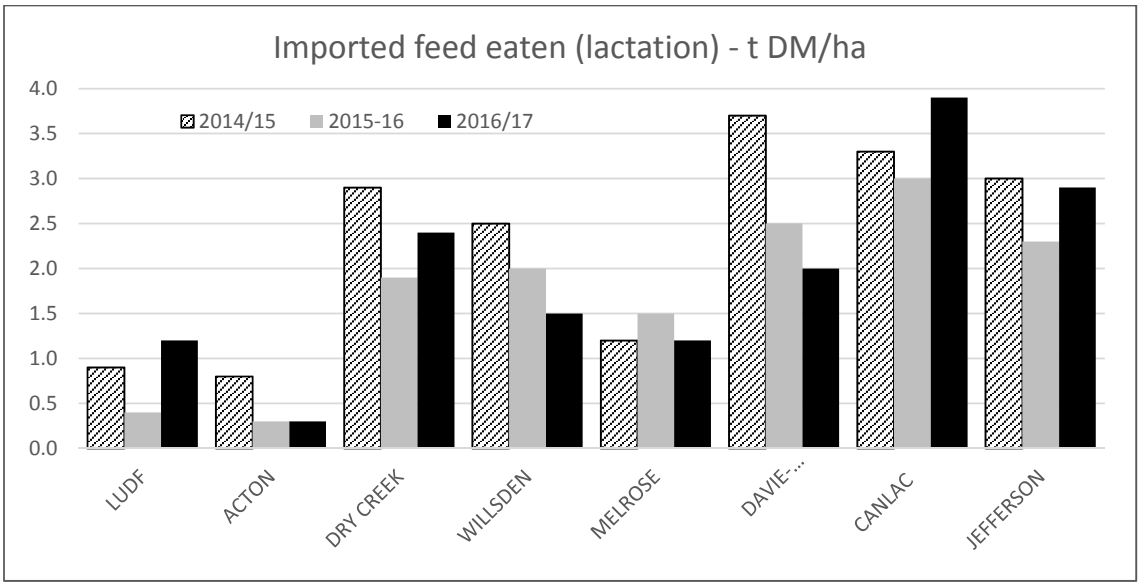
Benchmark Farm Comparisons

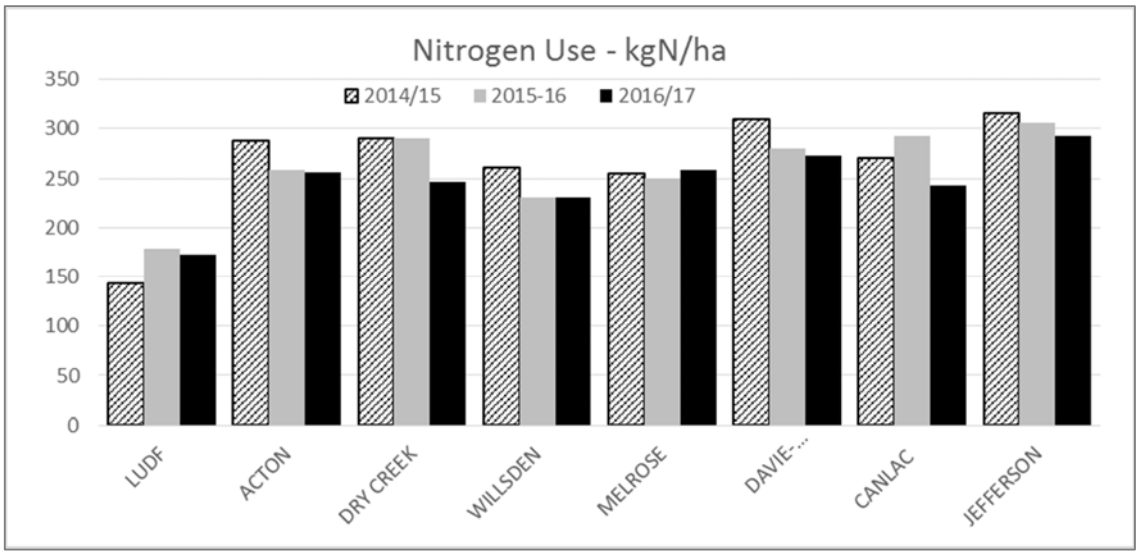


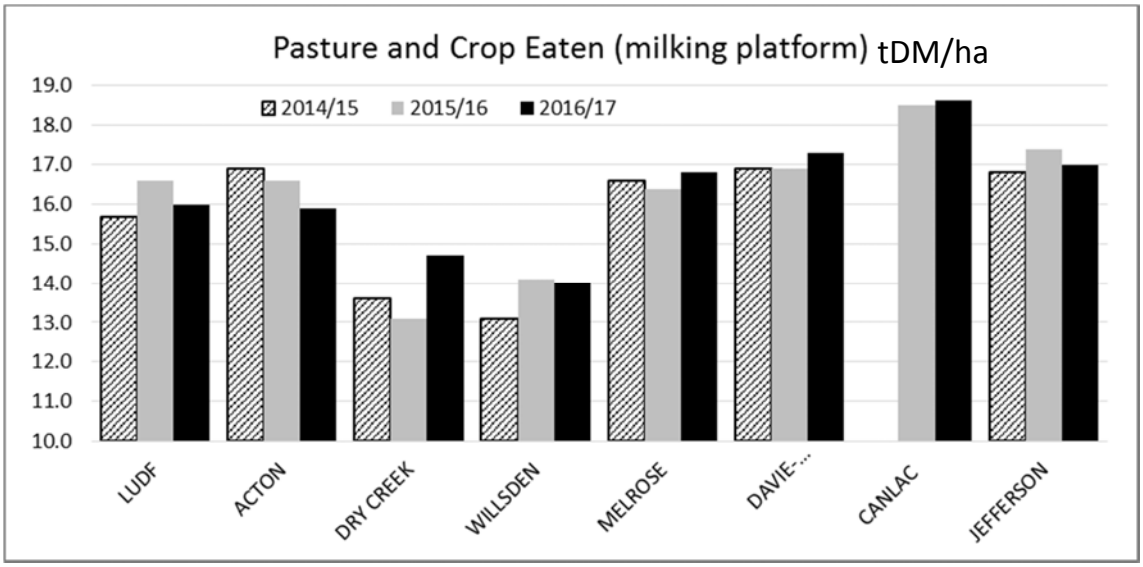


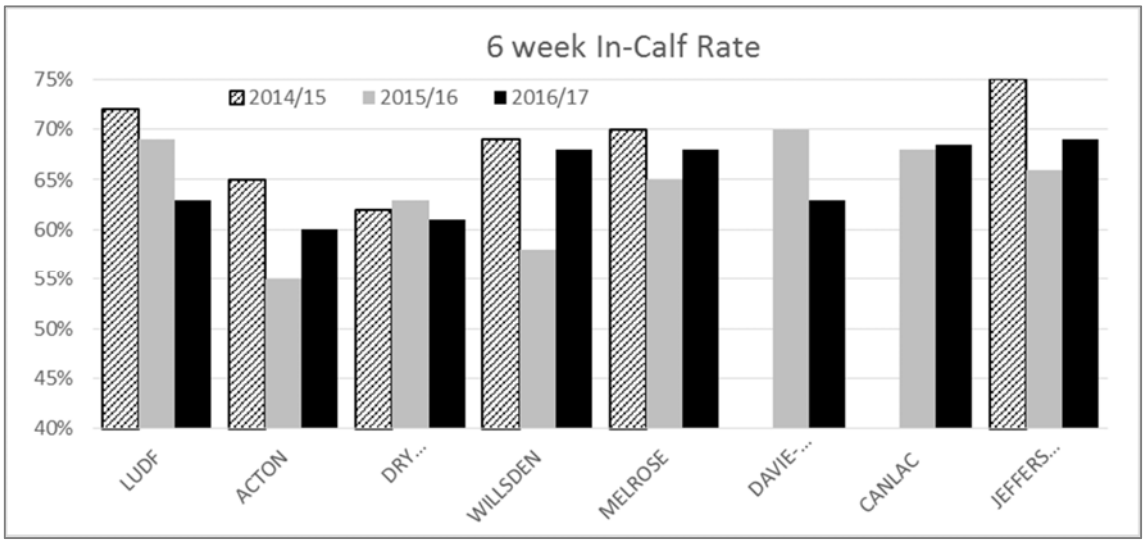

Pasture eaten, imported feed and grazing off per hectare (EDM/ha)
25
20
15
10
5
0
2014/15
2015/16
2016/17
LUDF
ACTON
DRY CREEK
WILLSDEN
MELROSE
DAVIE-MARTIN
CANLAC
JEFFERSON
Pasture and Crop Eaten
Imported feed eaten
Grazing off eaten

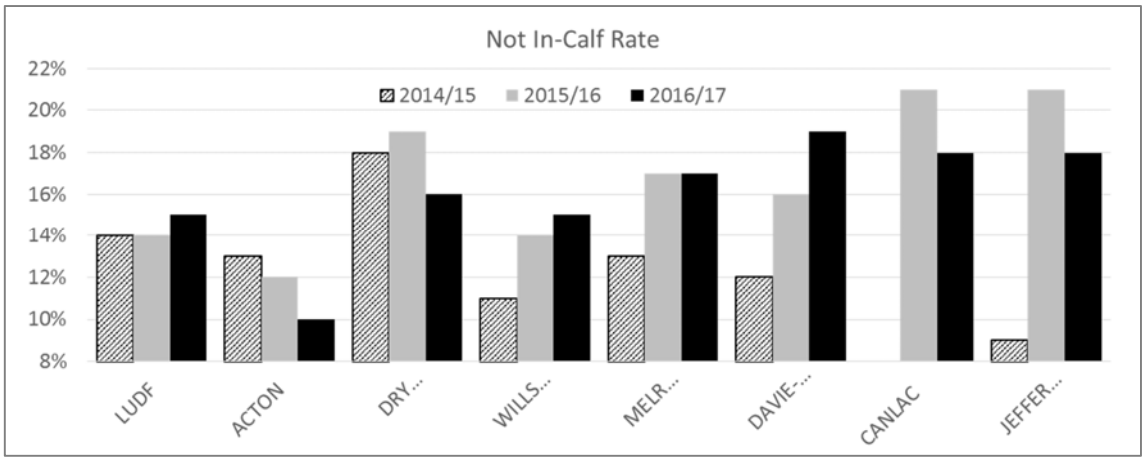

Total Imported Feed (t DM/ha)
2014/15
2015-16
2016/17
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
LUDF
ACTON
DRY CREEK
WILLSDEN
MELROSE
DAVIE-MARTIN
CANLAC
JEFFERSON


Imported feed eaten (lactation) - t DM/ha
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2014/15
2015-16
2016/17
LUDF
ACTON
DRY CREEK
WILLSDEN
MELROSE
DAVIE-...
CANLAC
JEFFERSON


Nitrogen Use - kgN/ha
350
300
250
200
150
100
50
0
2014/15
2015-16
2016/17
LUDF
ACTON
DRY CREEK
WILLSDEN
MELROSE
DAVIE-...
CANLAC
JEFFERSON

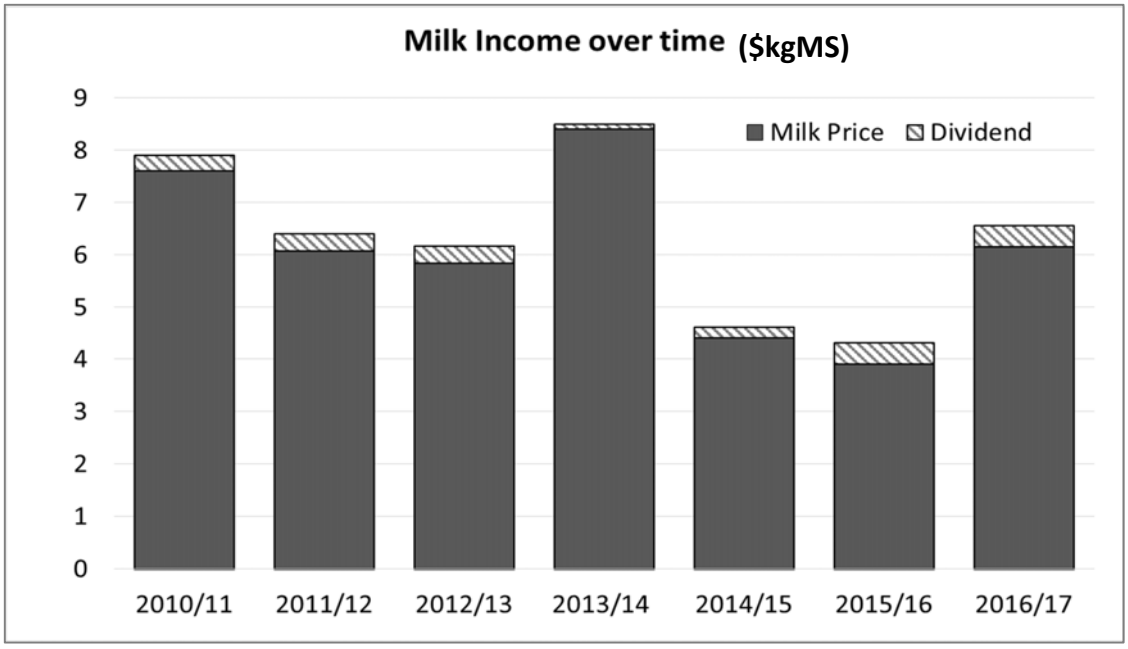

Pasture and Crop Eaten (milking platform) tDM/ha
19.0
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
2014/15
2015/16
2016/17
LUDF
ACTON
DRY CREEK
WILLSDEN
MELROSE
DAVIE-...
CANLAC
JEFFERSON

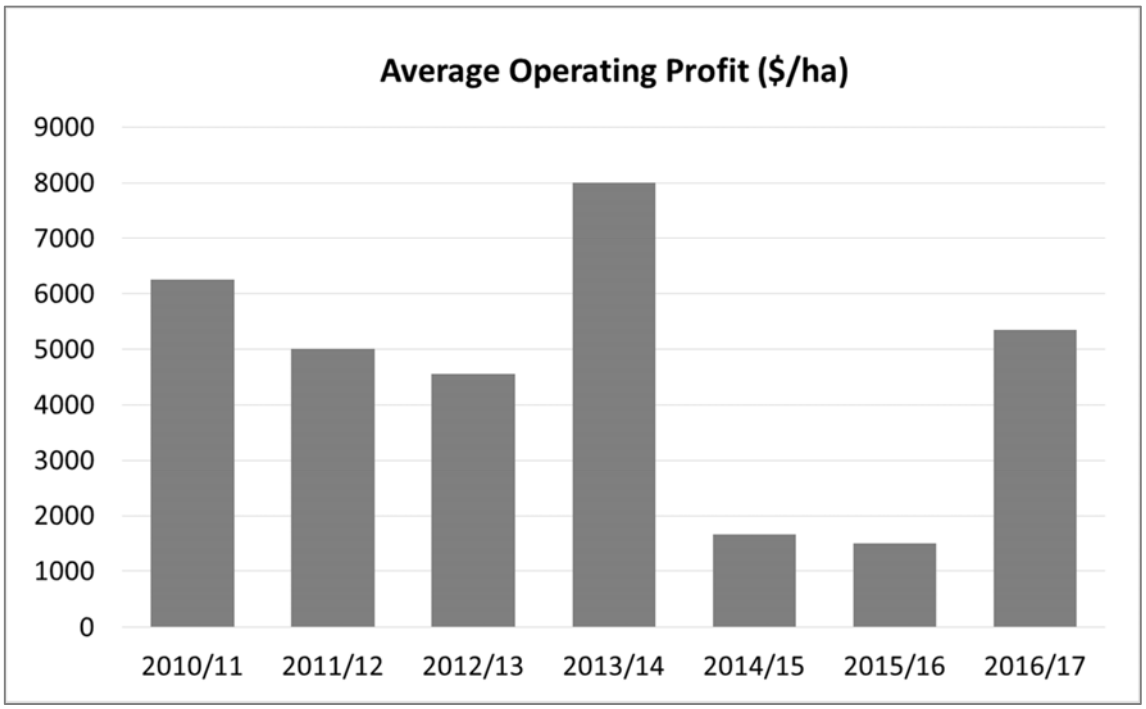


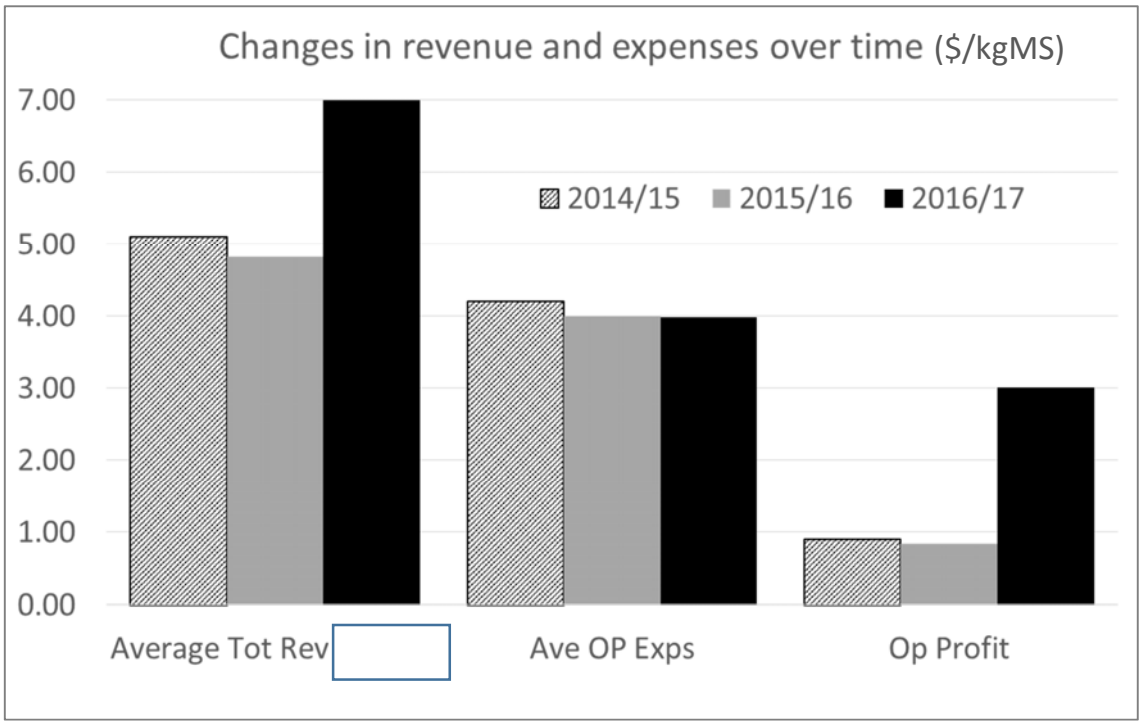


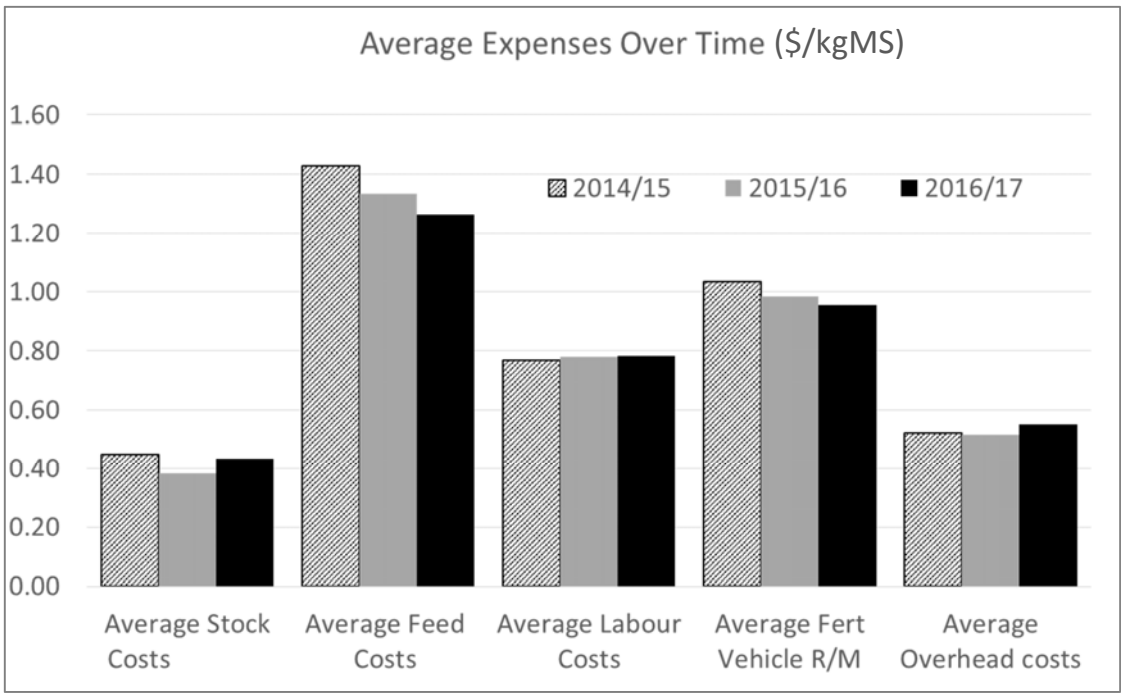
Note the mating period varies from 10 to 12 weeks across these farms. See page 19 for details.

Profitability: Overview - Recent Years



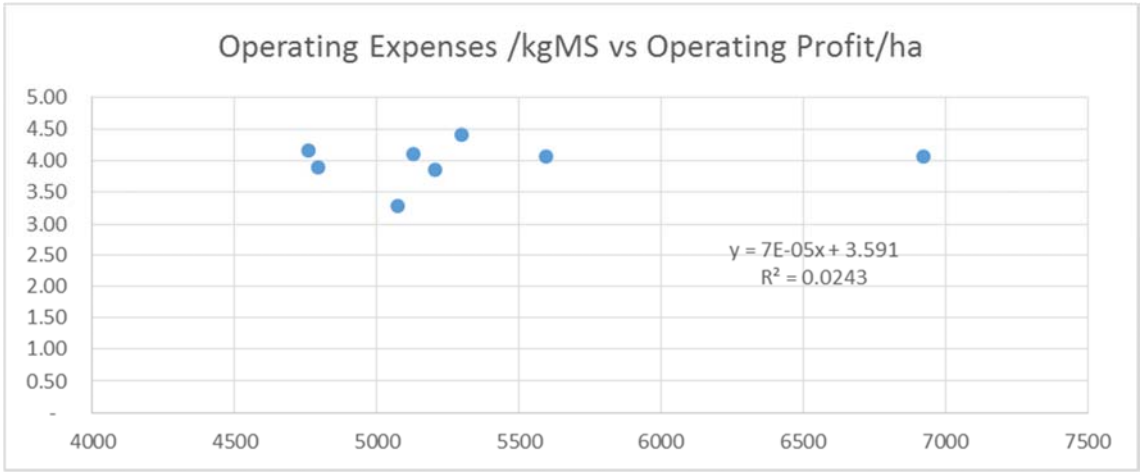


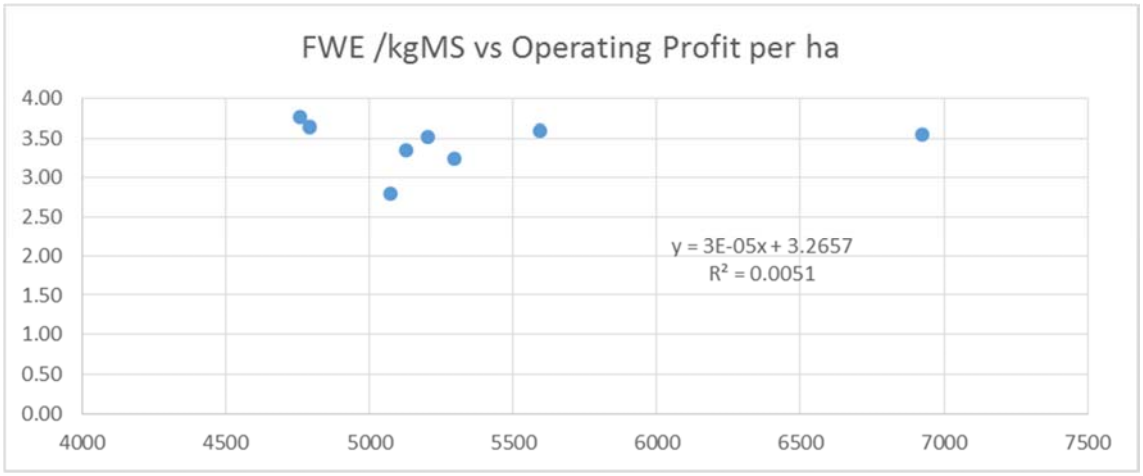

Changes in revenue and expenses over time ($/kgMS)
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2014/15
2015/16
2016/17
Average Tot Rev
Ave OP Exps
Op Profit


Average Expenses Over Time ($/kgMS)
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2014/15
2015/16
2016/17
Average Stock Costs
Average Feed Costs
Average Labour Costs
Average Fert Vehicle R/M
Average Overhead costs

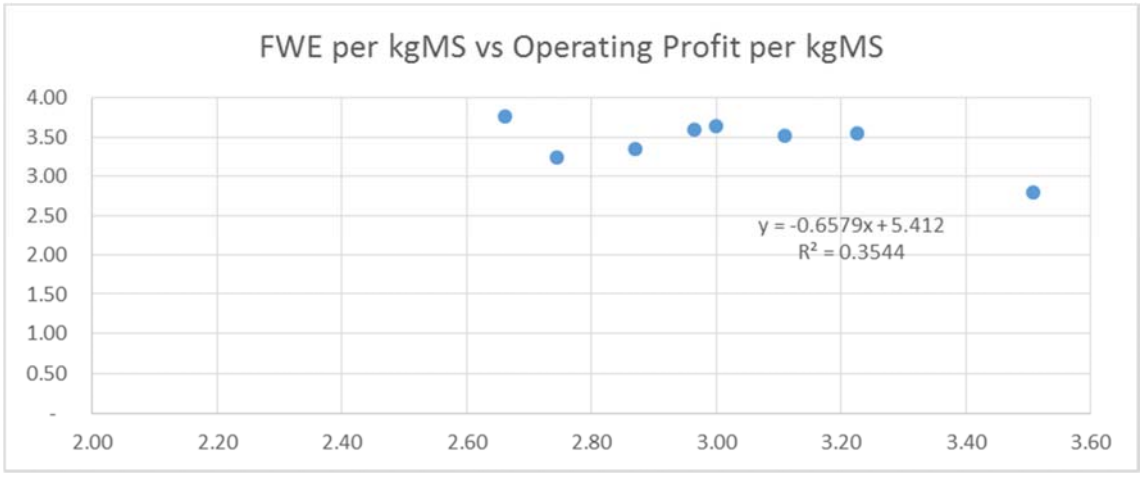
2016-17 Profitability Analysis:

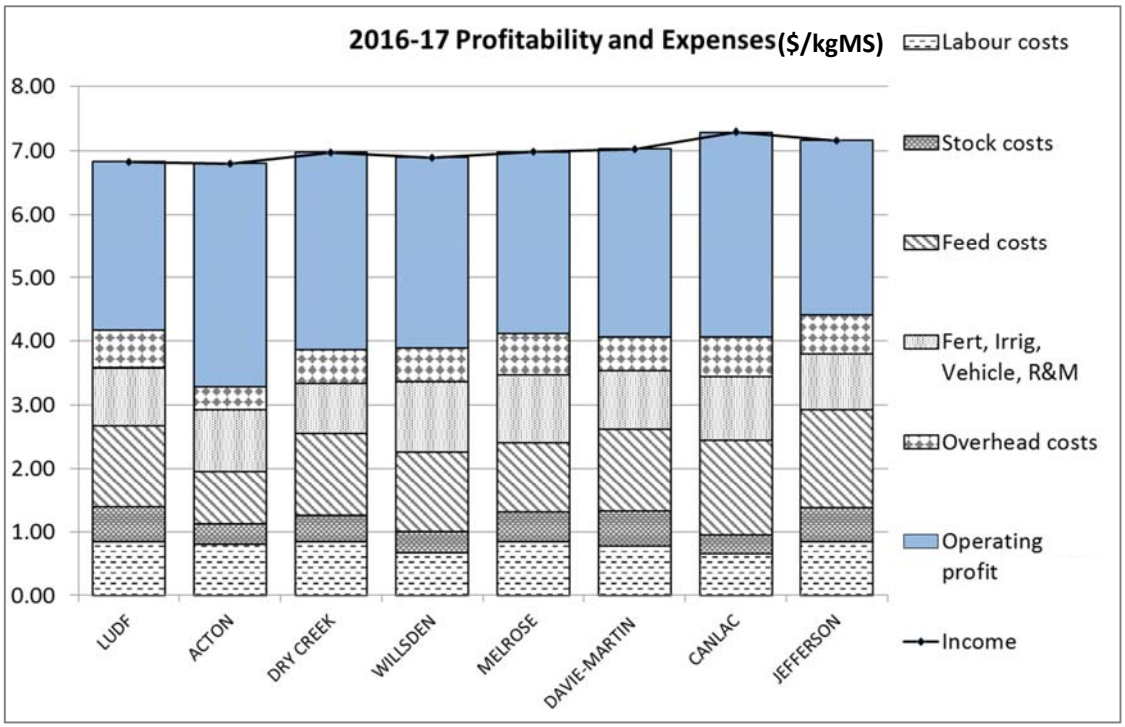
Operating Expenses per kilogram milk-solids is not strongly indicative of overall operating profit per hectare:

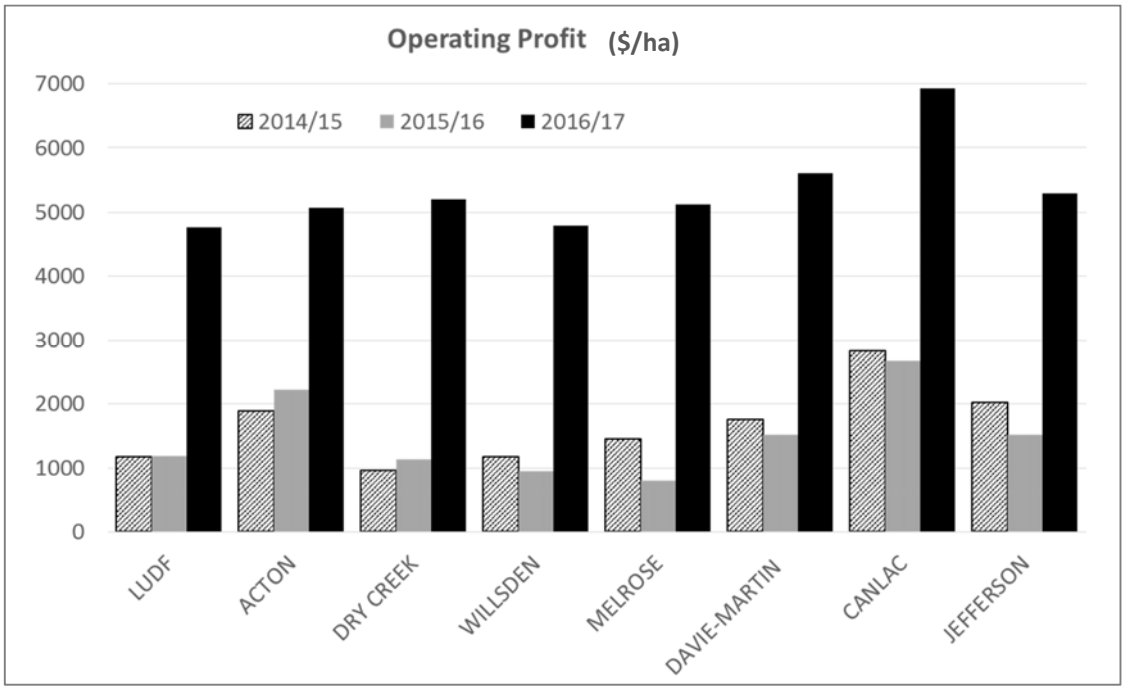


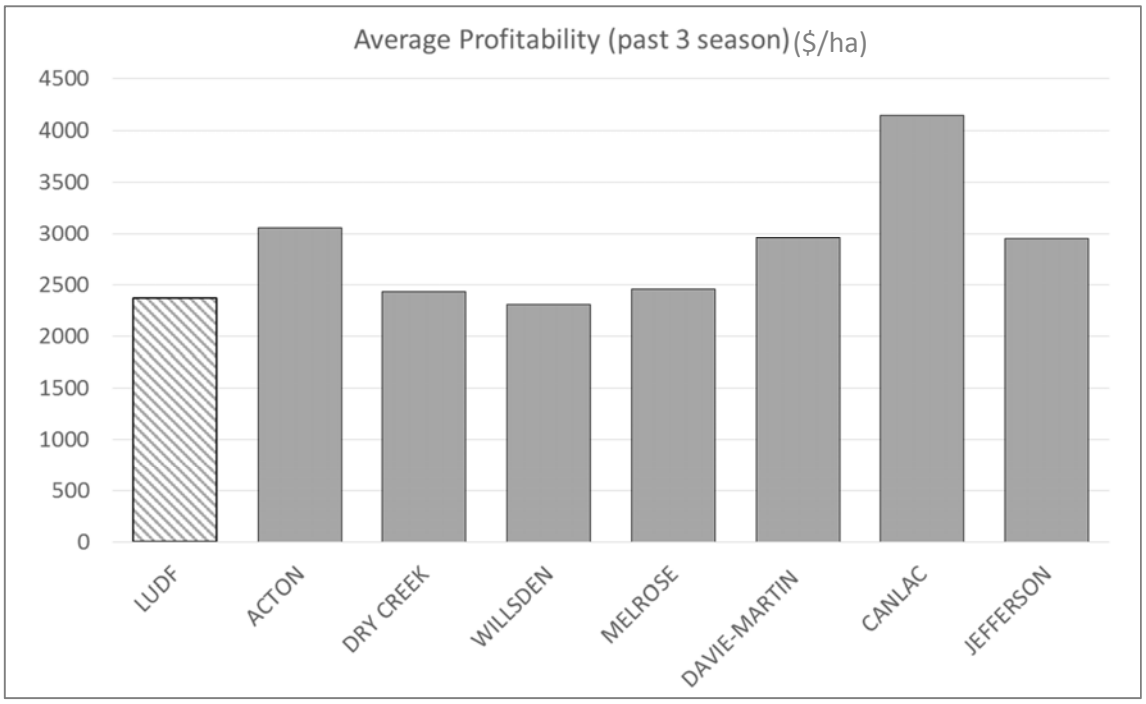


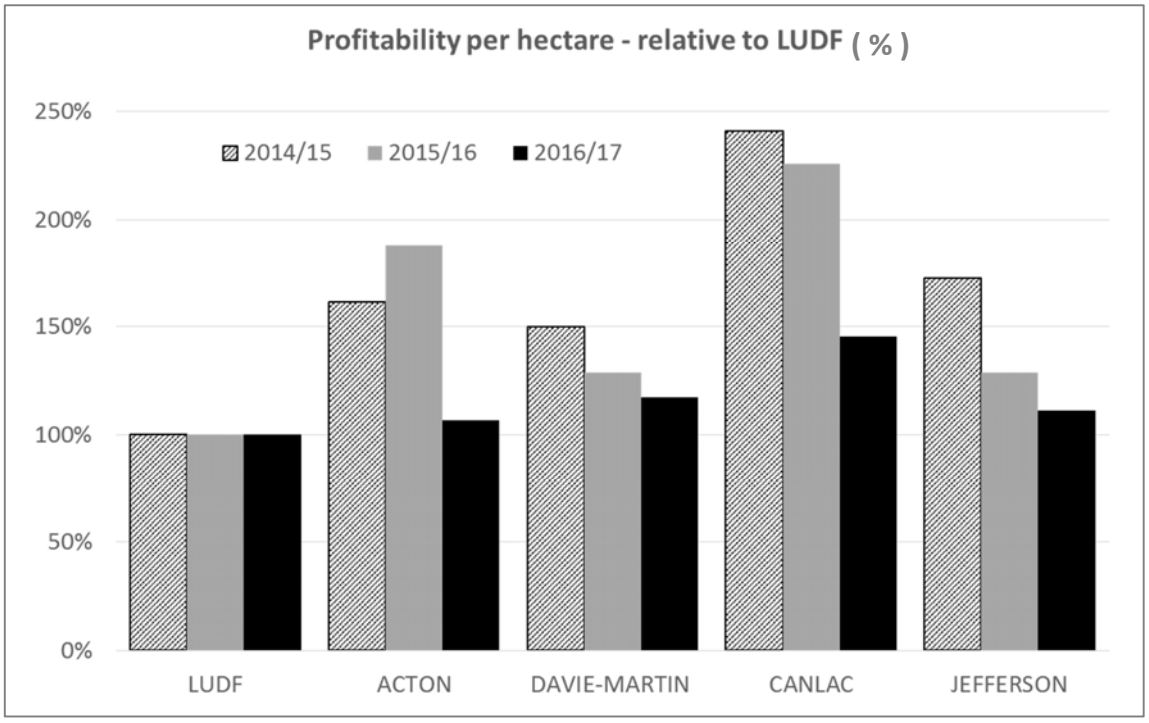
Similarly, Farm Working Expenses are a poor indicator of operating profit per hectare (above) or operating profit per kgMS (below) in this sample of farms.

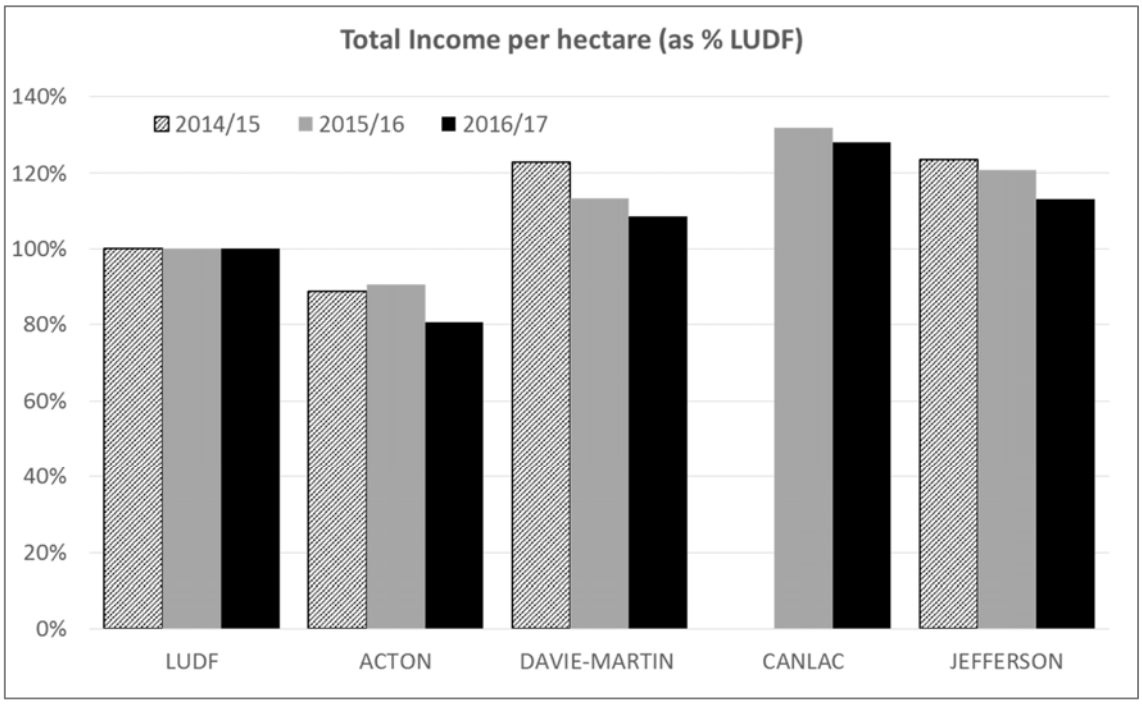


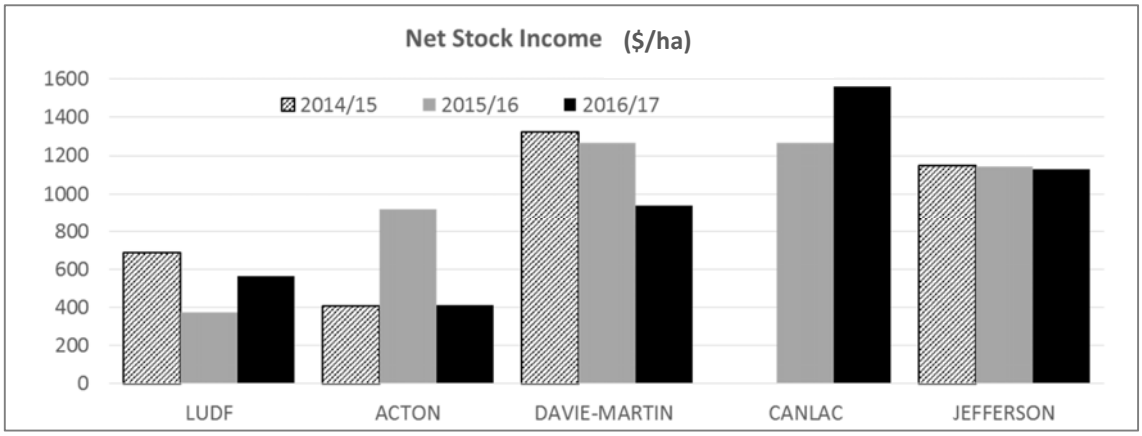

2016-17 Profitability and Expenses ($/kgMS)
Labour costs
Stock costs
Feed costs
Fert, Irrig, Vehicle, R&M
Overhead costs
Operating profit
Income
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
LUDF
ACTON
DRY CREEK
WILLSDEN
MELROSE
DAVIE-MARTIN
CANLAC
JEFFERSON

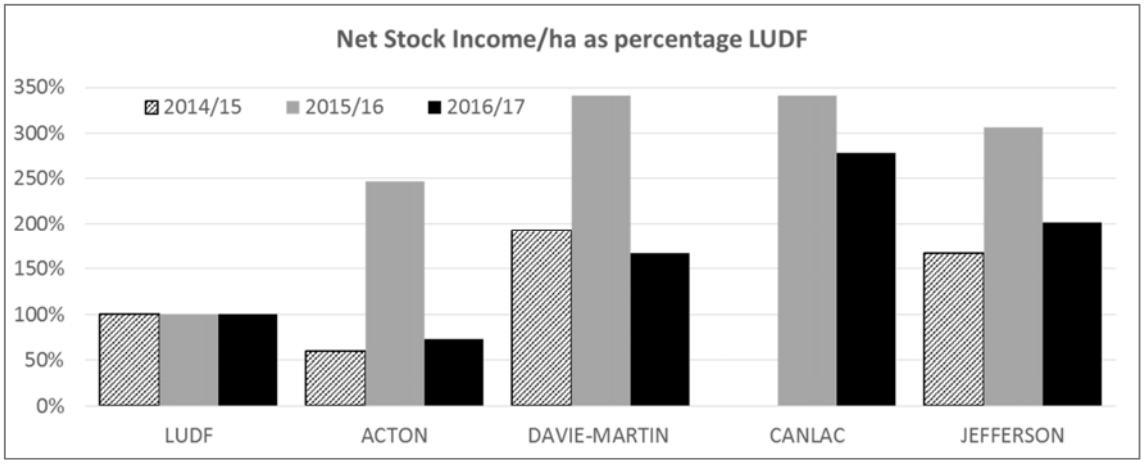

Operating Profit ($/ha)
2014/15
2015/16
2016/17
7000
6000
5000
4000
3000
2000
1000
0
LUDF
ACTON
DRY CREEK
WILLSDEN
MELROSE
DAVIE-MARTIN
CANLAC
JEFFERSON

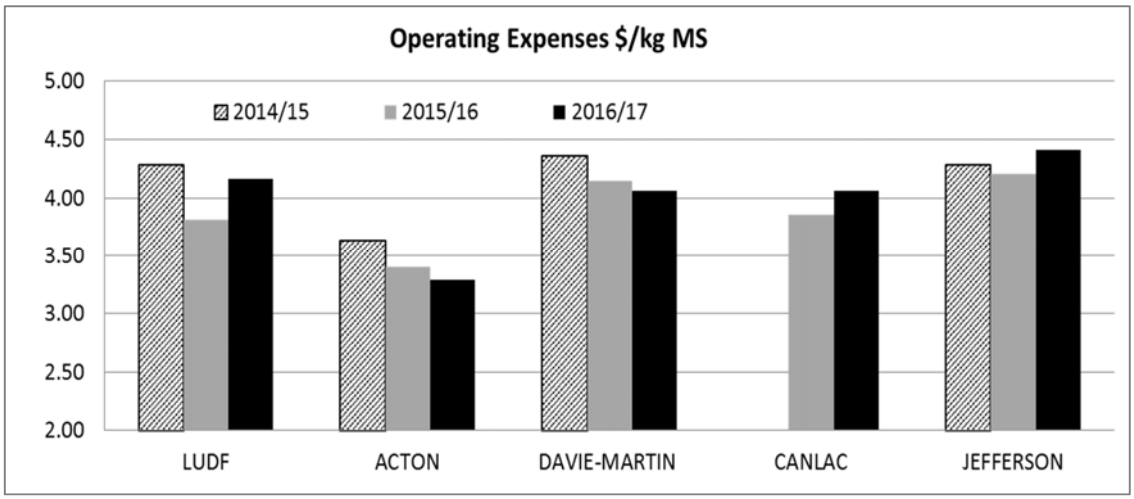

Average Profitability (past 3 season) ($/ha)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
LUDF
ACTON
DRY CREEK
WILLSDEN
MELROSE
DAVIE-MARTIN
CANLAC
JEFFERSON

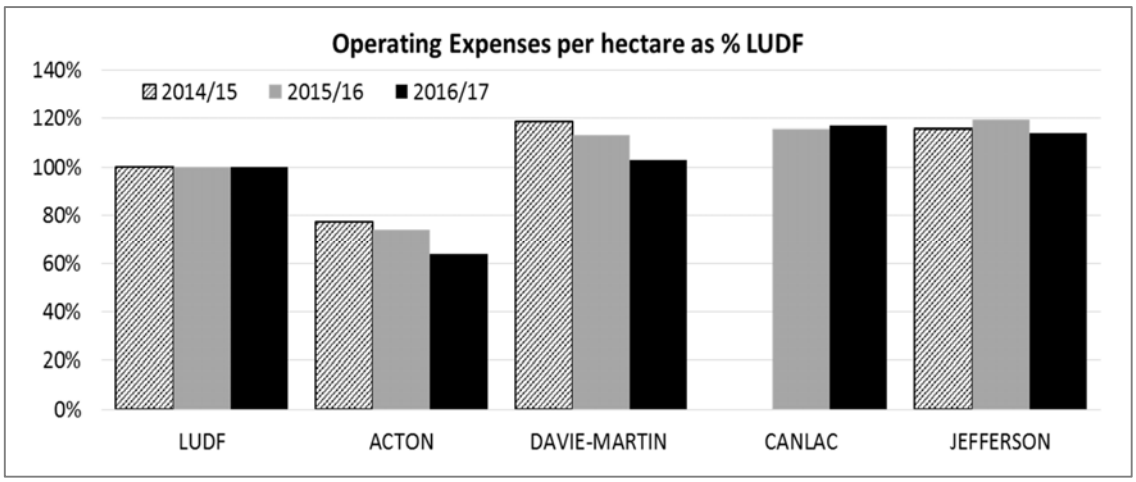

Profitability per hectare - relative to LUDF (%)
250%
200%
150%
100%
50%
0%
2014/15
2015/16
2016/17
LUDF
ACTON
DAVIE-MARTIN
CANLAC
JEFFERSON

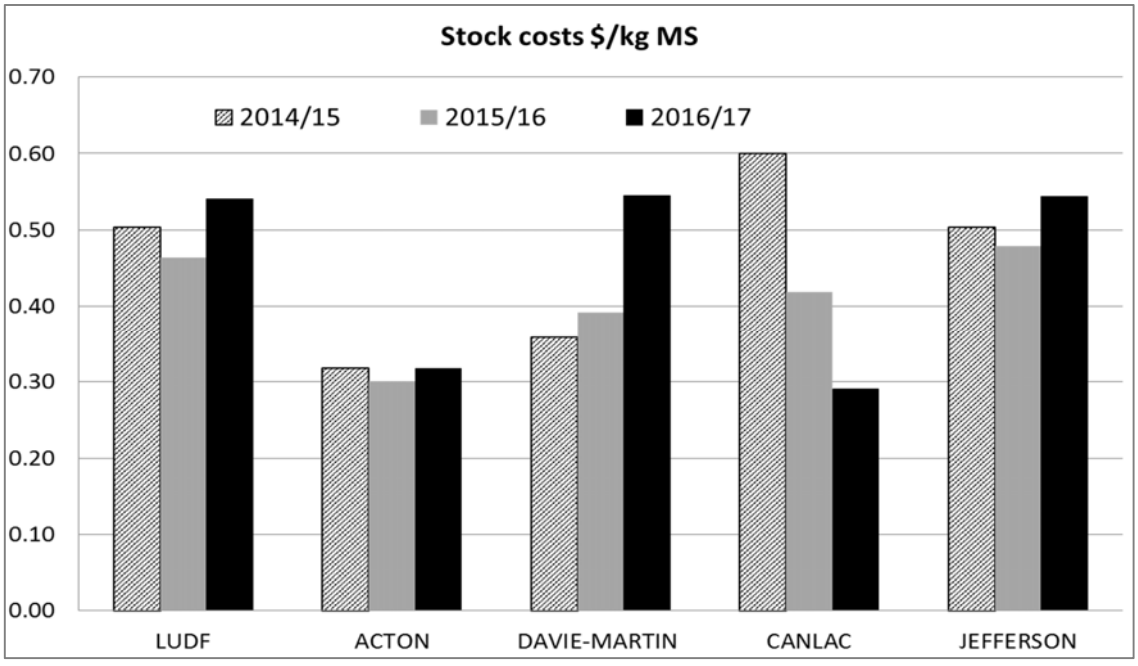

Total Income per hectare (as % LUDF)
140%
120%
100%
80%
60%
40%
20%
0%
2014/15
2015/16
2016/17
LUDF
ACTON
DAVIE-MARTIN
CANLAC
JEFFERSON

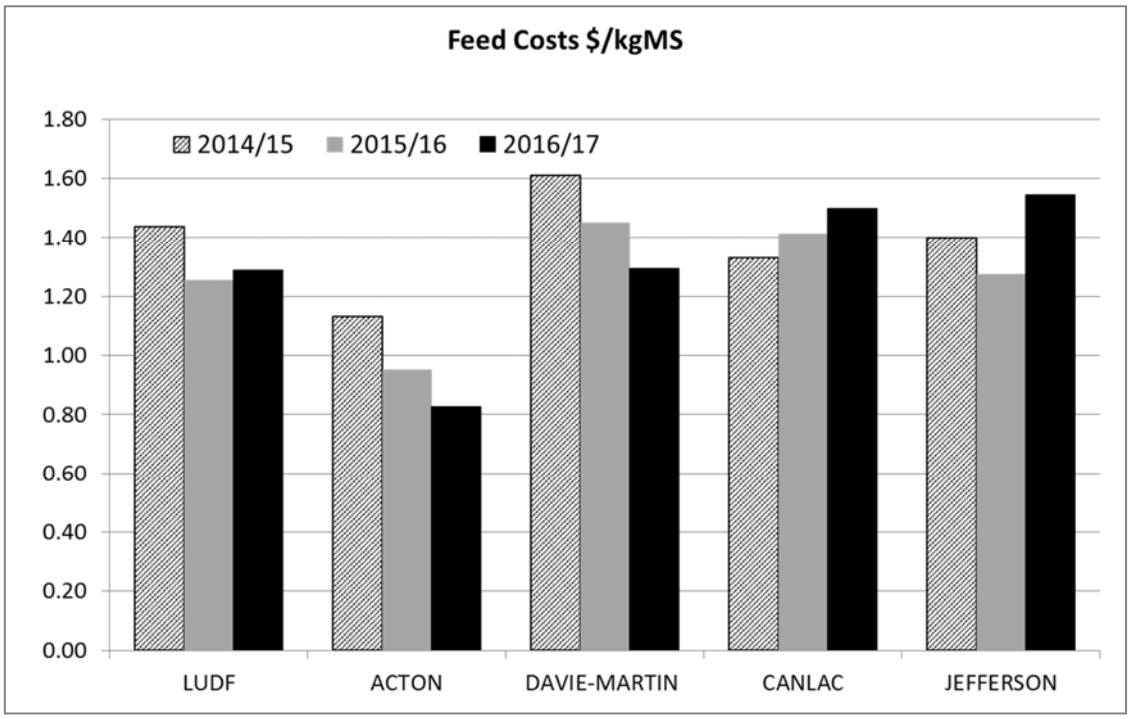

Net Stock Income ($/ha)
1600
1400
1200
1000
800
600
400
200
0
2014/15
2015/16
2016/17
LUDF
ACTON
DAVIE-MARTIN
CANLAC
JEFFERSON

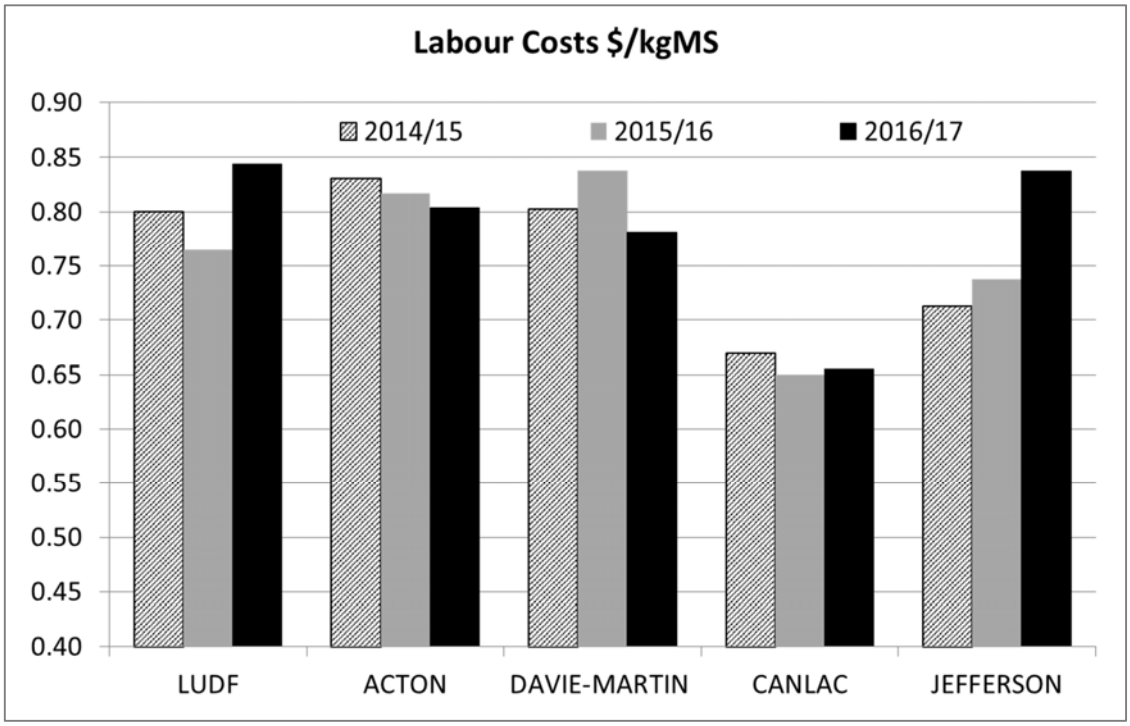

Net Stock Income/ha as percentage LUDF
350%
300%
250%
200%
150%
100%
50%
0%
2014/15
2015/16
2016/17
LUDF
ACTON
DAVIE-MARTIN
CANLAC
JEFFERSON

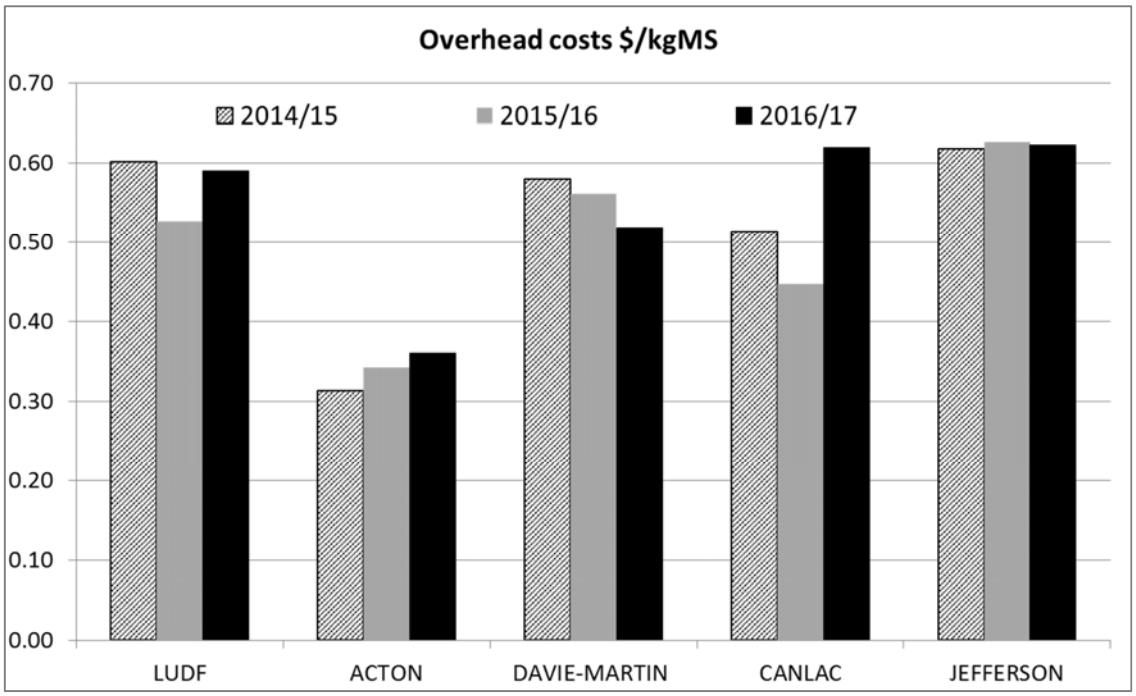

Operating Expenses $/kg MS
5.00
4.50
4.00
3.50
3.00
2.50
2.00
2014/15
2015/16
2016/17
LUDF
ACTON
DAVIE-MARTIN
CANLAC
JEFFERSON

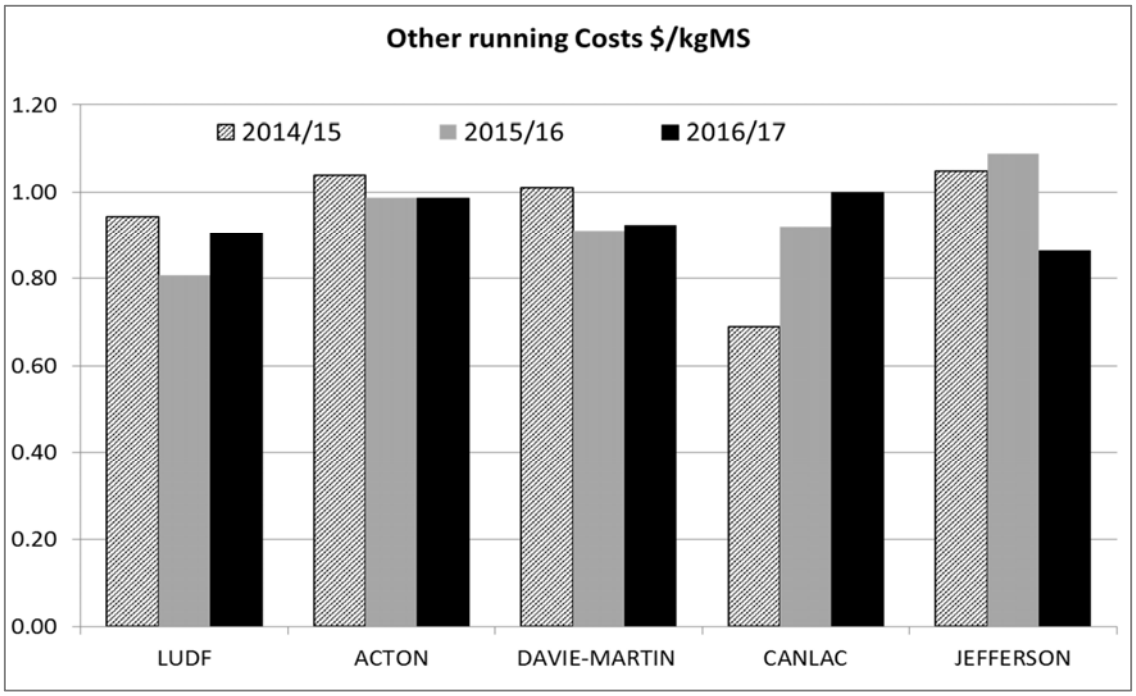

Operating Expenses per hectare as % LUDF
140%
120%
100%
80%
60%
40%
20%
0%
2014/15
2015/16
2016/17
LUDF
ACTON
DAVIE-MARTIN
CANLAC
JEFFERSON

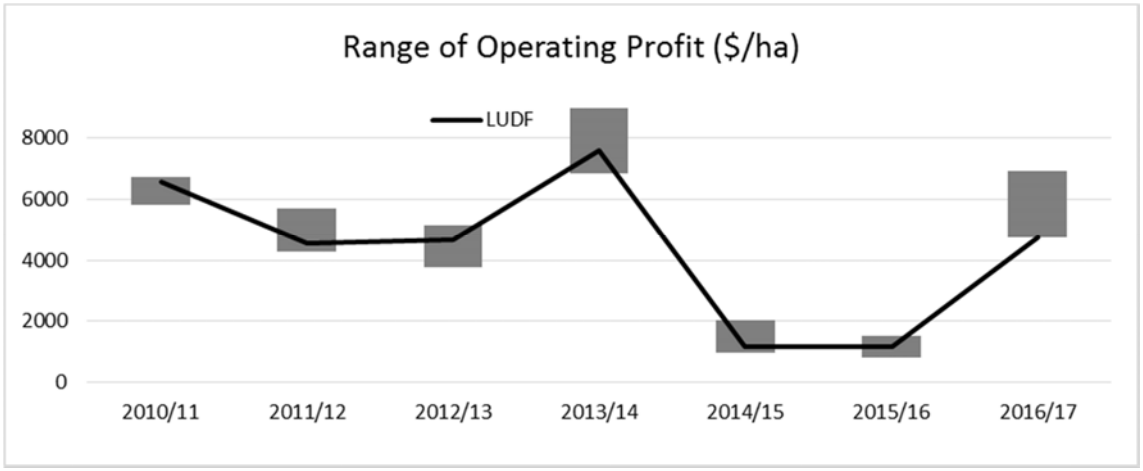

Stock costs $/kg MS
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
2014/15
2015/16
2016/17
LUDF
ACTON
DAVIE-MARTIN
CANLAC
JEFFERSON

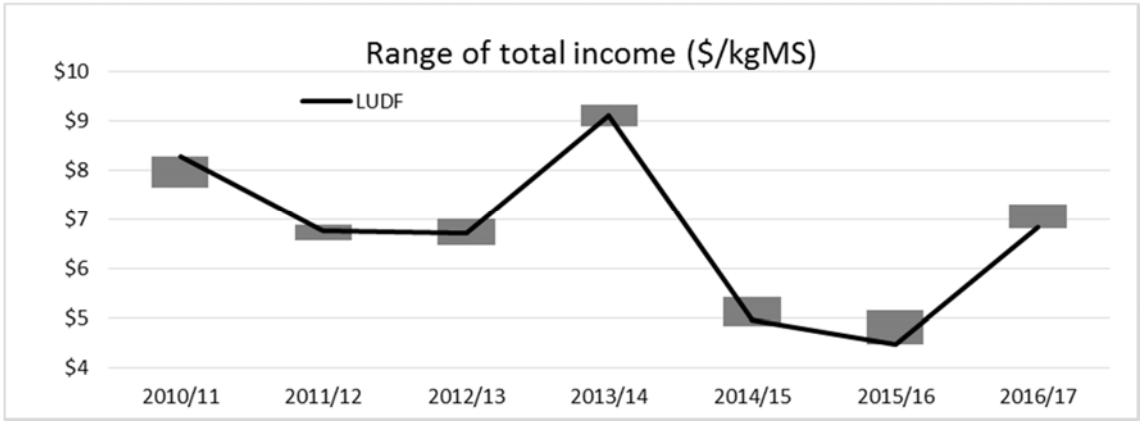

Feed Costs $/kgMS
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2014/15
2015/16
2016/17
LUDF
ACTON
DAVIE-MARTIN
CANLAC
JEFFERSON

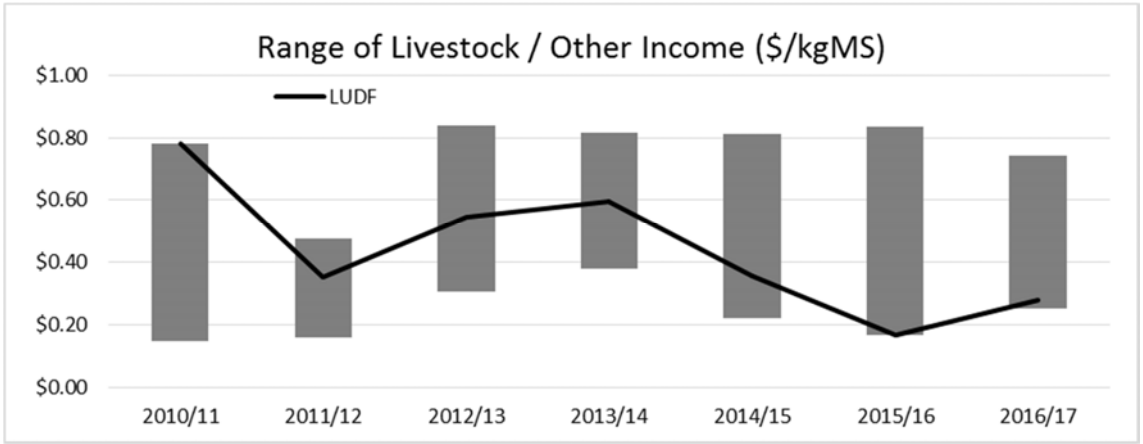

Labour Costs $/kgMS
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
2014/15
2015/16
2016/17
LUDF
ACTON
DAVIE-MARTIN
CANLAC
JEFFERSON

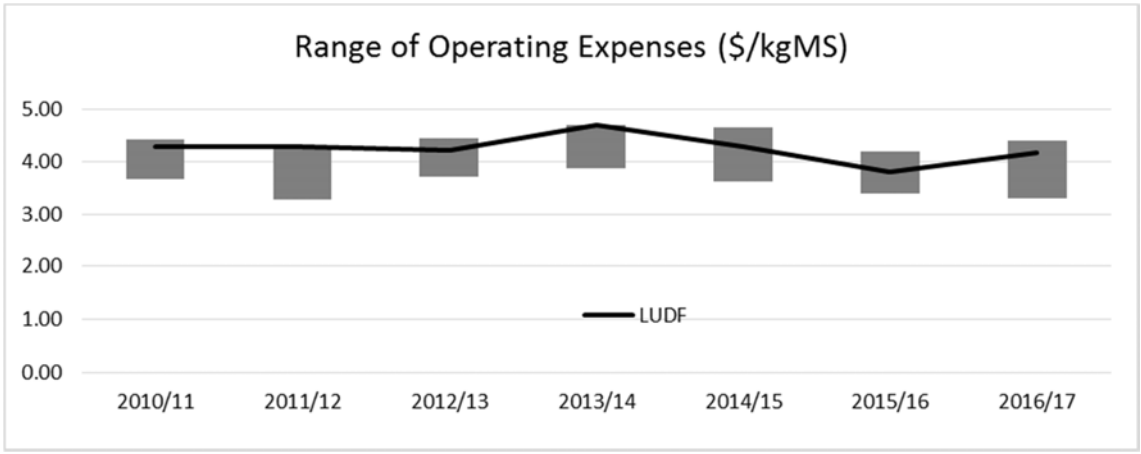

Overhead costs $/kgMS
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
2014/15
2015/16
2016/17
LUDF
ACTON
DAVIE-MARTIN
CANLAC
JEFFERSON

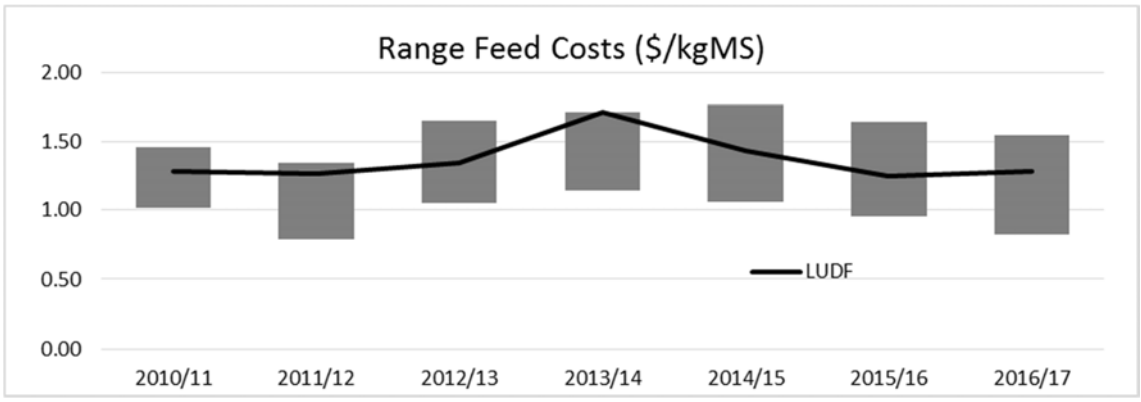

Other running Costs $/kgMS
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2014/15
2015/16
2016/17
LUDF
ACTON
DAVIE-MARTIN
CANLAC
JEFFERSON

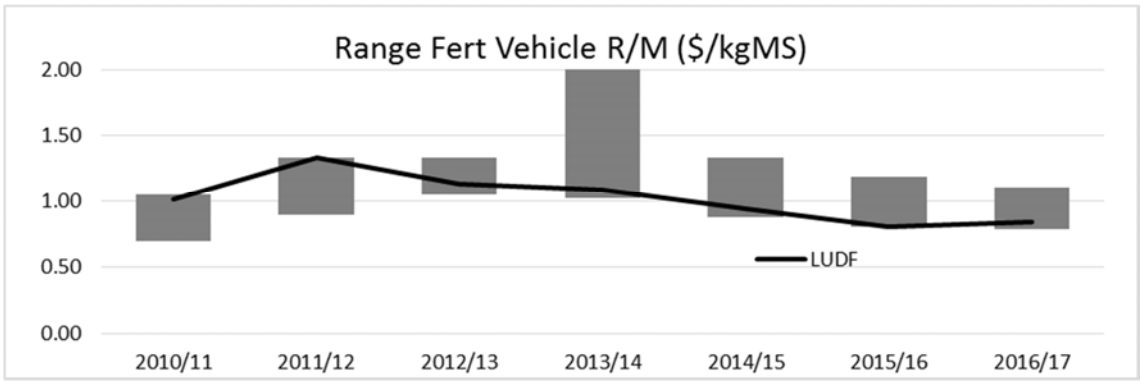

Range of Operating Profit ($/ha)
LUDF
8000
6000
4000
2000
0
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17

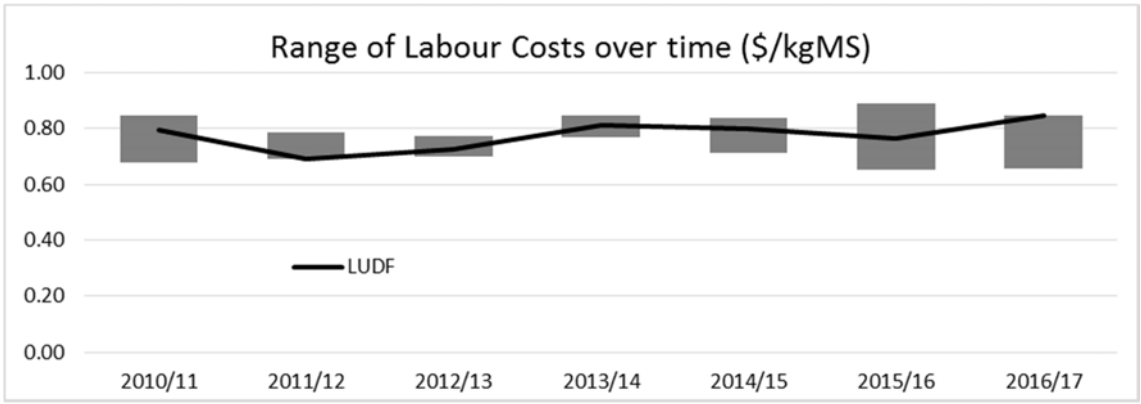

Range of total income ($/kgMS)
LUDF
$10
$9
$8
$7
$6
$5
$4
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17

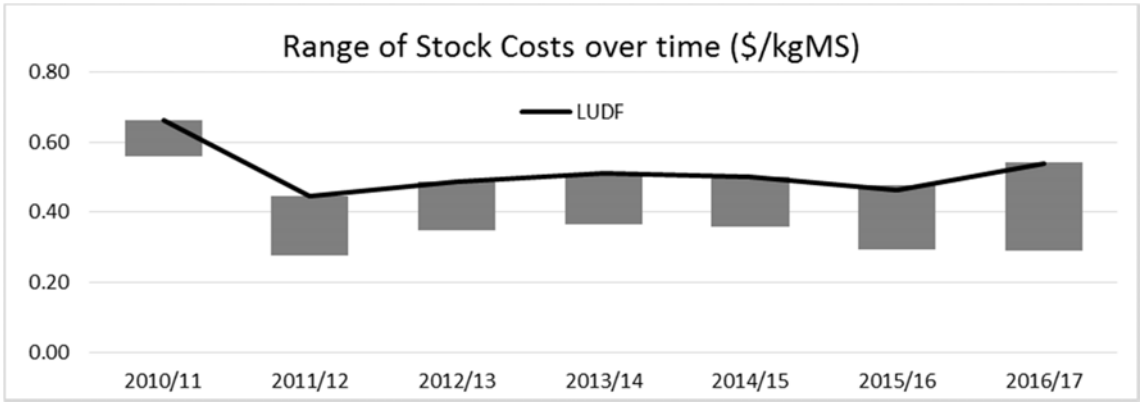

Range of Livestock / Other Income ($/kgMS)
LUDF
$1.00
$0.80
$0.60
$0.40
$0.20
$0.00
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17

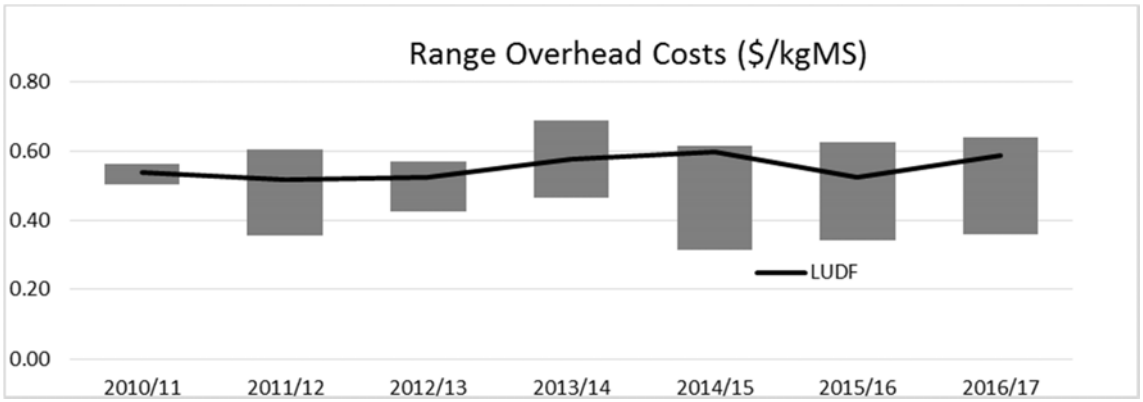

Range of Operating Expenses ($/kgMS)
5.00
4.00
3.00
2.00
1.00
0.00
LUDF
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17


Range Feed Costs ($/kgMS)
2.00
1.50
1.00
0.50
0.00
LUDF
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17


Range Fert Vehicle R/M ($/kgMS)
2.00
1.50
1.00
0.50
0.00
LUDF
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17


Range of Labour Costs over time ($/kgMS)
1.00
0.80
0.60
0.40
0.20
0.00
LUDF
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17





An example of variance: Net Stock Income ($/ha)

	LUDF	CANLAC	ACTON
Stock Sales	$796/ha	$1144/ha	$782/ha
Less Stock Purchased	$212/ha	$188/ha	$612/ha
Plus Stock Adjustment	- $22/ha	+ $607/ha	+ $243/ha
Net Stock Income	$562/ha	$1563/ha	$413/ha

Higher stocking rate supports higher stock income, plus 6% retained stock contribute to CANLAC's net stock income

Compare to Acton, purchased R2yrs and retained 3% more stock (than opening number).

Individual Farm Data - Income and Expenses per hectare:

TOTALS PER HECTARE	Davie-Martin	Dry Creek	LUDF	Willsden	CANLAC	Acton	Melrose	Jefferson
INCOME								
Milk income ($6.15/kgMS)- levy	11,540	10,235	10,936	9,767	13,126	8,844	10,926	11,797
Dividends ($0.40/kgMS)	755	694	715	639	859	579	715	772
Stock Sales	964	886	796	601	1,144	782	739	1,173
Stock Purchased	- 131	- 235	- 212	- 200	- 188	- 612	- 273	- 181
Stock Adjustment	107	141	- 22	190	607	243	315	138
Net stock income	940	747	562	591	1,563	413	781	1,130
Other Income	26	28	-	14	104	3	57	115
TOTAL INCOME	**13,261**	**11,679**	**12,214**	**11,011**	**15,652**	**9,839**	**12,479**	**13,814**
OPERATING EXPENSES								
Wages	1,240	1,406	1,509	1,070	1,407	770	1,371	1,197
Labour Adjustment Unpaid	81	-	-	-	-	22	21	109
Labour Adjustment Management	153	-	-	-	-	371	101	310
Total Labour Costs	1,474	1,406	1,509	1,070	1,407	1,163	1,494	1,615
Animal Health	457	275	465	183	219	140	417	531
Breeding and Herd Improvement	135	192	272	186	236	118	238	326
Farm Dairy	116	220	54	75	32	63	88	60
Electricity (Farm Dairy and Water Supply	320	8	175	84	137	139	107	133
Total Stock Expenses	1,028	695	967	528	624	460	850	1,049
Net Made/Purchased/Cropped	780	933	511	544	844	88	1,089	1,400
Feed Inventory Adjustment	40	- 66	-	- 7	179	50	39	- 41
Calf Feed	35	63	142	17	100	9	102	-
Total Supplement Expenses	856	930	653	555	1,289	147	1,230	1,359
Young stock grazing	-	863	761	666	844	488	-	-
Winter cow Grazing	488	318	890	799	1,088	561	279	84
Support Block lease	1,099	-	-	-	-	-	-	447
Owned Support Block Adjustment	-	64	-	-	-	-	441	1,093
Total Grazing and Support Block Expens	1,587	1,244	1,650	1,466	1,932	1,048	720	1,624
TOTAL FEED Expenses	2,443	2,174	2,304	2,020	3,221	1,195	1,950	2,983
Fertilizers	585	235	203	213	195	139	556	241
Nitrogen	361	265	241	255	374	324	217	350
Irrigation (electricity/rates)	65	244	285	856	1,008	533	418	290
Regrassing	0	287	69	80	127	8	76	41
Weeds and Pests	2	1	13	25	-	11	97	30
Vehicle	325	88	69	46	60	62	66	77
Fuel	-	57	63	27	53	65	49	103
R&M land and buildings	342	59	220	121	158	55	353	400
R&M Plants and equipment	-	68	391	143	142	214	48	68
Freight and General (incl farm travel)	63	12	65	-	30	17	33	67
Total Other Farm Working Expenses	1,743	1,315	1,619	1,765	2,147	1,426	1,913	1,668
Administration	208	89	156	244	230	76	178	151
Insurance	-	96	59	73	60	88	82	119
ACC	-	37	42	40	60	31	47	49
Rates	144	68	72	70	53	62	71	96
Depreciation	625	592	725	408	925	265	764	786
Total Overheads	977	882	1,055	835	1,328	521	1,143	1,201
Total Operating Expenses	**7,665**	**6,474**	**7,453**	**6,218**	**8,728**	**4,765**	**7,350**	**8,517**
Operating Profit	**5,596**	**5,205**	**4,760**	**4,793**	**6,924**	**5,074**	**5,128**	**5,297**
Farm Working Expenses Total	**6,766**	**5,885**	**6,728**	**5,816**	**7,624**	**4,058**	**5,983**	**6,260**

Individual Farm Data - Income and Expenses per kgMS:

TOTALS PER MILKSOLID	Davie-Martin	Dry Creek	LUDF	Willsden	CANLAC	Acton	Melrose	Jefferson
INCOME								
Milk income ($6.15/kgMS)- levy	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11
Dividends ($0.40/kgMS)	0.40	0.41	0.40	0.40	0.40	0.40	0.40	0.40
Stock Sales	0.51	0.53	0.44	0.38	0.53	0.54	0.41	0.61
Stock Purchased	- 0.07	- 0.14	- 0.12	- 0.12	- 0.09	- 0.42	-0.15	- 0.09
Stock Adjustment	0.06	0.08	- 0.01	0.12	0.28	0.17	0.18	0.07
Net stock income	0.50	0.45	0.31	0.37	0.73	0.29	0.44	0.59
Other Income	0.01	0.02	-	0.01	0.05	0.00	0.03	0.06
TOTAL INCOME	**7.03**	**6.98**	**6.83**	**6.89**	**7.29**	**6.80**	**6.98**	**7.16**
OPERATING EXPENSES								
Wages	0.66	0.84	0.84	0.67	0.66	0.53	0.77	0.62
Labour Adjustment Unpaid	0.04	-	-	-	-	0.02	0.01	0.06
Labour Adjustment Management	0.08	-	-	-	-	0.26	0.06	0.16
Total Labour Costs	0.78	0.84	0.84	0.67	0.66	0.80	0.84	0.84
Animal Health	0.24	0.16	0.26	0.11	0.10	0.10	0.23	0.28
Breeding and Herd Improvement	0.07	0.11	0.15	0.12	0.11	0.08	0.13	0.17
Farm Dairy	0.06	0.13	0.03	0.05	0.02	0.04	0.05	0.03
Electricity (Farm Dairy and Water Supply)	0.17	0.00	0.10	0.05	0.06	0.10	0.06	0.07
Total Stock Expenses	0.54	0.42	0.54	0.33	0.29	0.32	0.48	0.54
Net Made/Purchased/Cropped	0.41	0.56	0.29	0.34	0.39	0.06	0.61	0.73
Feed Inventory Adjustment	0.02	- 0.04	-	- 0.00	0.08	0.03	0.02	- 0.02
Calf Feed	0.02	0.04	0.08	0.01	0.05	0.01	0.06	-
Total Supplement Expenses	0.45	0.56	0.37	0.35	0.60	0.10	0.69	0.70
Young stock grazing	-	0.52	0.43	0.42	0.39	0.34	0.00	-
Winter cow Grazing	0.26	0.19	0.50	0.50	0.51	0.39	0.16	0.04
Support Block lease	0.58	-	-	-	-	-	0.00	0.23
Owned Support Block Adjustment	-	0.04	-	-	-	-	0.25	0.57
Total Grazing and Support Block Expenses	0.84	0.74	0.92	0.92	0.90	0.72	0.40	0.84
TOTAL FEED Expenses	1.29	1.30	1.29	1.26	1.50	0.83	1.09	1.55
Fertilizers	0.31	0.14	0.11	0.13	0.09	0.10	0.31	0.13
Nitrogen	0.19	0.16	0.13	0.16	0.17	0.22	0.12	0.18
Irrigation (electricity/rates)	0.03	0.15	0.16	0.54	0.47	0.37	0.23	0.15
Regrassing	0.00	0.17	0.04	0.05	0.06	0.01	0.04	0.02
Weeds and Pests	0.00	0.00	0.01	0.02	-	0.01	0.05	0.02
Vehicle	0.17	0.05	0.04	0.03	0.03	0.04	0.04	0.04
Fuel	-	0.03	0.04	0.02	0.02	0.04	0.03	0.05
R&M land and buildings	0.18	0.04	0.12	0.08	0.07	0.04	0.20	0.21
R&M Plants and equipment	-	0.04	0.22	0.09	0.07	0.15	0.03	0.04
Freight and General (incl farm travel)	0.03	0.01	0.04	-	0.01	0.01	0.02	0.03
Total Other Farm Working Expenses	0.92	0.79	0.90	1.10	1.00	0.99	1.07	0.86
Administration	0.11	0.05	0.09	0.15	0.11	0.05	0.10	0.08
Insurance	-	0.06	0.03	0.05	0.03	0.06	0.05	0.06
ACC	-	0.02	0.02	0.03	0.03	0.02	0.03	0.03
Rates	0.08	0.04	0.04	0.04	0.02	0.04	0.04	0.05
Depreciation	0.33	0.35	0.41	0.26	0.43	0.18	0.43	0.41
Total Overheads	0.52	0.53	0.59	0.52	0.62	0.36	0.64	0.62
Total Operating Expenses	**4.06**	**3.87**	**4.17**	**3.89**	**4.07**	**3.29**	**4.11**	**4.41**
Operating Profit	**2.96**	**3.11**	**2.66**	**3.00**	**3.23**	**3.51**	**2.87**	**2.75**
Farm Working Expenses Total	**3.58**	**3.52**	**3.76**	**3.64**	**3.55**	**2.81**	**3.35**	**3.24**

Summary of LUDF Management Practices – Changes over time

	Historically	Season 2014-15	Season 2015-16	Season 2016-17
Peak cows	630 (3 season's average)	560	555	555
Replacement wintered as R2		127 (23%)	102 InCalf (18%) + 40 carry overs purchased	150 + 8 carry overs remaining in the herd
6-weeks InCalf	75% (3 season's average)	72%	69%	63%
Not InCalf rates	12% (3 season average)	13%	13%	15%
Spring Rotation Planner (SRP)	Used as a guideline in conjunction with silage, N, fert, GA. Typically ending mid-September	Proactively managed SRP, holding the first round out to the 23rd September. APC at start of calving actual: 2600 kdDM/ha	Proactively managed SRP, holding till balance date on 29th September. APC at start of calving 2500 kgDM/ha	Proactively managed SRP, holding till balance date on 29th September. APC at start of calving 2750 kgDM/ha
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	Average 26 days Sept-Jan 39 days September 23 days Oct-Nov 21 days Dec-Jan 23 days Feb 33 days March 38 days April	Average 29 days Sept-Jan 41 days September 29 days Oct-Nov 22.5 days Dec-Jan 22 days Feb 28 days March 37 days April	Average 26 days Sept-Jan 36 days September 22 days Oct-Nov 24 days Dec-Jan 26 days Feb 31 days March 36 days April
	Approx 12.3 grazing rounds	Approx 10.4 grazing rounds (15% fewer grazings)	Approx 10.1 grazing rounds (18% fewer grazings than historically)	Approx 10.3 grazing rounds (16% fewer grazings than historically)
Average Pre-grazing covers	3118 kgDM/ha (average Sept-Jan) 3435 kgDM/ha (average Feb-Apr)	3328 kgDM/ha (average Sept-Jan) 3625 kgDM/ha (average Feb-Apr)	3388 kgDM/ha (average Sept-Jan) 3555 kgDM/ha (average Feb-Apr)	3575 kgDM/ha (average Sept-Jan) 3580 kgDM/ha (average Feb-Apr)
Average post-grazing cover	1607 kgDM/ha till end Jan 1690 kgDM/ha Feb-April	1652 kgDM/ha till end Jan 1676 kgDM/ha Feb-April	1625 kgDM/ha till end Jan 1650 kgDM/ha Feb-Apr	1600 kgDM/ha till end Jan 1740 kgDM/ha Feb-May

Phosphate fertilizer	Maintenance	Maintenance	Below maintenance (cost control)	Maintenance
Nitrogen fertilizer Use	200-350 kgN/ha	143 kgN/ha (intention was no more than 150 kgN/ha)	179 kgN/ha (intention was to use 160 – 170kg N/ha while remaining below N Baseline)	173 kgN/ha (intention was to use 160 – 170kg N/ha while remaining below N Baseline)
Frequency of N-fert application	Before calving on pdks 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 14% decrease in number of applications	No N pre-calving Following each grazing from start of September through to late March.	No N pre-calving Following each grazing, but starting late August and finishing early April.
Time and amount of N used		95 kgN/ha to end Dec 3 kgN/ha January 21 kgN/ha February 19 kgN/ha March 7 kgN/ha April	103 kgN/ha to end Dec 26 kgN/ha January 29 kgN/ha February 21 kgN/ha March None in April	95 kgN/ha to end Dec 30 kgN/ha January 20 kgN/ha February 16 kgN/ha March 12 kgN/ha April
Last N application	8 May/23 April/ 29 April	14 April	24 March	11 April
Application Rates	25-40 kgN/ha/application	25 kgN/ha/application for all applications	25 kgN/ha/application Sept-Feb 20 kgN/application through March	25 kgN/ha/application for all applications
Overseer Est N-loss (Version 6.2.1)	40 kgN	25 kgN	29 kgN (mostly due to carrying more cows in autumn)	29 kgN (mostly due to carrying more cows in autumn)
Regrassing	Typically 3 paddocks (15% of the area)	3 paddocks regrassed (15% of the area)	1 paddock regrassed (5% of the area)	1 paddock regrassed (5% of the area)
Gibberellic Acid	Apply immediately following grazing from late August till late Sept/early Oct and again in March/April	As previously used except that slower grazing rotations result in less ability to apply GA in a	Slow first grazing rotation resulted only 1 paddock receiving GA	No GA used

	periods based on suitable conditions	timely manner following grazing.		
Area pre-graze mown	534 ha (3.3 times, average 2 seasons)	245 ha (1.5 times)	236 ha (1.5 times)	218 ha (1.3 times)
Supplements harvested from the platform		22 tDM 40 kgDM/cow 14 ha	154 tDM 280 kgDM/cow 80 ha	57.8 tDM 104 kgDM/cow 30 ha
Autumn cows in milk **March** **April** **May**		 470 468	 546 536	 539 539 409
Milk production	291,414 Average 3 seasons	278,654	289,906	286,189
Average production/cow	463 kgMS/cow Average 3 seasons	499 kgMS/cow	520 kgMS/cow	516 kgMS/cow
Average milk production/ha	1,821 kgMS/ha Average 3 seasons	1,742 kgM/ha	1,812 kgMS/ha	1,789 kgMS/ha
Tight cost control	Good cost control to keep total expenses low without eroding future profitability of the far. High and efficient production from pasture offsets farm working expenses to produce a lower than average operating cost and a sustainable profit (relative to payout)		Good cost control overall. Maintenance fertiliser reduced to 1/3 farm based soil tests and payout	Good cost control overall. Normal maintenance fertiliser and expenditure
Weekly farm walk	Actively measure pasture covers weekly, calculate APC, predict future cover, plan and respond to surplus/deficits			
Pasture allocation	Allocate daily area/cow based on farm walk/feed wedge/APC, milk production, cow response, grazing residual. Move to new break / paddock when grazing residuals achieved.			
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 would be moved into the main herd and replaced by low BC MA cows. Following early pregnancy scan and BCS event, the small herd typically becomes all light BCS, early calving cows to assist condition score gains for the following season. The small herd may be merged with the main herd as cow numbers drop through Autumn or become a herd of culls to follow the main herd.			Same as before + small herd in late autumn became high BCS, late calving cows or empty cows used to tidy paddock up before dry off.

BCS autumn dry-off rules	Frequent BCS including adhering to BCS targets for drying off based on current CS and days remaining till next calving. Milk production is not/will not be chased at the expense of BCS targets (per individual cow) at calving
Herd test to identify cows performance and disease risk	Routine herd testing allows identification of low producing cows, particularly important when considering drying off low producing cows
Heifer mating 2 weeks prior to MA cows	Mating heifers early at LUDF has become part of the reproduction management at LUDF to aid 6weeks InCalf results – this allows the freshly calved heifer more time to cycle and get back in calf in a timely manner.

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