



**Focus Day**  
Wallacetown  
Community Centre

# Information Handout

## 20 October 2011

Sponsored by:



For further information visit: [www.siddc.org.nz](http://www.siddc.org.nz) [Sthld Demo Farm]





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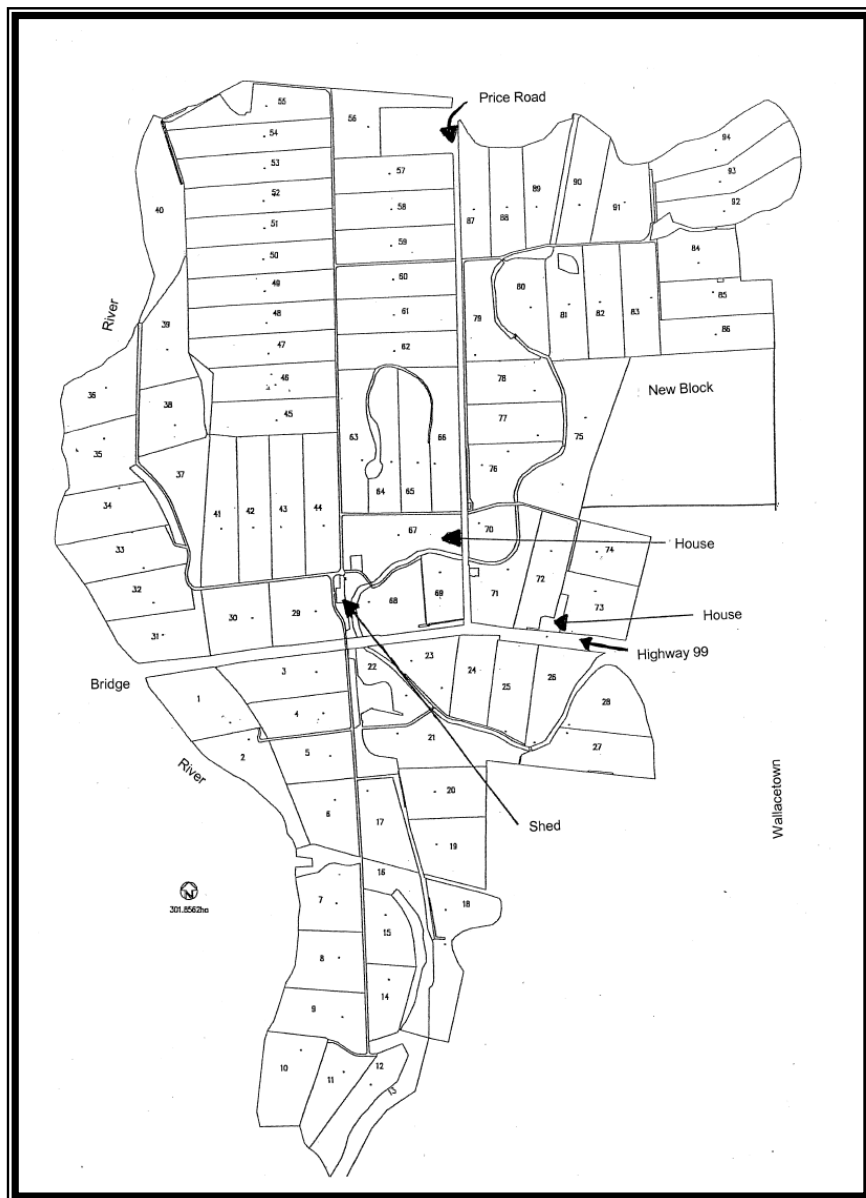
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Partnering with:



Research & Extension support from:



### Management Team

**Barry Bethune, Farm Manager**  
**Sherwin Calos, 2 IC**  
**Dexter Mag-Abo, Farm Assistant**  
**Jerome Pellazar, Farm Assistant**

For further detail visit the SIDDC website

[www.siddc.org.nz](http://www.siddc.org.nz)

'Sthld Demo Farm'

re information on the Farm Walk Notes, Weekly Data, Production graphs, Monitor Farm Weekly Summaries etc.

### 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, including busy State Highway
5. Underpasses may be slippery

Please follow instructions given by event organisers or farm staff

## VISION STATEMENT

**Economical, social and environmental sustainable solutions for the  
Southern South Island dairy farming community.**

## INTRODUCTION

The 295 hectare property was leased by Southland Demonstration Farm Limited (SDF), controlled by the Southland Demonstration Dairy Farm Trust, on 1<sup>st</sup> June 2007, to operate as a commercial demonstration farm which provides a focal point for the dissemination of information to Southern South Island dairy farmers.

The milking platform is approximately 260 ha, with a further 35 ha (approximately) per year of brassicas and fodder beet for winter feed. The farm winters 790 -800 cows and supplies Fonterra's Edendale Factory targeting annual production of 300,000 kg/MS [1000 kgMS per total ha / 1150kgMS/ha of the milking platform].

## KEY OBJECTIVES

1. Economic sustainability [profit] of Southern South Island dairying.
2. Environmental sustainability [land, water, animals] of Southern South Island dairying.
3. Social sustainability [labour] of Southern South Island Dairying.
4. To provide a central focal point for the dissemination of information to assist farmers to meet the challenges going into the future.

## CLIMATE

	Spring	Summer	Autumn	Winter	Annual
Mean Annual Maximum Temperature (°C)	14	18	15	10	14
Mean Annual Minimum Temperature (°C)	5	9	5	1	5
Mean daily temperature (°C)	10	13	10	5	10

## SOILS

Soil Types	% Farm
Makarewa - Heavy poorly drained gley soil	42%
Makarewa moderately deep	8%
Mataura - Recent flood plain soil, Silty - Well drained	19%
Tomoporakau - Poorly drained silt loam prone to water logging	16.5%
Northope - Imperfectly drained silt loam, variations in topsoil	13%
Edendale - Deep well drained Soil, Silt Loam	1%
Gore – well drained alluvium base, Silt Loam topsoil	0.5%

### SOIL TEST AVERAGE RESULTS

Date	pH	OlsenP	K	Sulphate Sulphur	Mg	Ca	Na	Organic S	TBK
<b>2007/08 Average</b>	<b>6.1</b>	<b>29.8</b>	7.4	<b>7.5</b>	<b>10.7</b>	<b>23.2</b>	<b>12.7</b>	<b>6.5</b>	<b>1.8</b>
2008/09 Effluent	6.3	28.5	9.0	5.5	31.0	14.5	18.5		5.2
2008/09 Non Effluent	6.0	34.1	6.9	9.9	22.0	11.3	13.7		3.6
2009/10 Effluent	6.0	35.5	10.0	8.5	36.0	14.5	16.5		
2009/10 Non Effluent	5.9	34.6	5.8	9.6	22.1	11.1	9.9		3.6
2010/11 Effluent	5.9	35.0	7.0	8.3	27.8	12.3	14.5		
2010/11 Non Effluent	5.9	34.4	5.7	8.9	20.2	9.0	8.3		

### RECENT FERTILISER APPLICATIONS

<b>2008/09</b>	N	P	K	S	Lime
Non Effluent	180+	41	20	50	250kg/ha
Effluent	100	27	0	32	250kg/ha

<b>2009/10</b>	N	P	K	S	Lime
Non Effluent	170	38	40	35	400kg/ha
Effluent	120	18	0	22	400kg/ha

<b>2010/11</b>	N	P	K	S	Lime
Non Effluent	180+	41	40	48	400kg/ha
Effluent	100+	18	0	22	400kg/ha
New Grass Paddocks	197	64	40	77	400kg/ha

### PASTURES / PASTURE RENEWAL

Pastures are progressively being renewed each year through a renewal programme that incorporates both winter crops such as swedes, kale and fodder beet and short term ryegrasses prior to new permanent pasture being sown. Half of the winter-crop area is returned to new pasture each year and the other half cropped for a second season. The farm has re-grassed approximately 1/3 of the property in the past 4 seasons. Each new pasture is a perennial ryegrass/white clover combination, with strategic placement of particular cultivars across the farm differing in ploidy (diploid/tetraploid), flowering date and more recently different novel endophytes. A small area of the farm was sown directly in short term ryegrass without clover to increase the amount of re-grassing on the farm and address some of the weed issues on farm. The ryegrass acts as a forage crop in its own right, this will be wintered cropped and returned to permanent ryegrass / white clover. Permanent pastures are sown at 20kg/ha diploid ryegrass and 25kg/ha tetraploid ryegrass with 6kg/ha white clover.

### STAFFING & MANAGEMENT

SDF has a part time farm supervisor (15 hours/week), full time farm manager, 2IC and two farm assistants. Additional relief staff employed as required to assist with calf rearing and relief milking.

The normal roster is 8 on / 2 off till Christmas, 9 on / 3 off after Christmas  
 Milking Times – Morning: cups on 5.00 am Afternoon: cups on 2.30 pm

## HERD DETAILS AND MATING PROGRAMME

Cows AI for 6 weeks followed by bulls. Heifers - AI to Friesian or Cross-Bred for 2 weeks then run with Jersey bulls.

Breeding Worth: 84/47

Production Worth: 92/62

Ancestry: 93%

Calving start date: 10 August 2010

Calving date – Mid point: 22 August 2010

Mean Calving date: 25 August 2010

Mating start date: Heifers – 20 October 2010, Cows – 30 October.

## PRODUCTION DETAILS / FINANCIAL RESULTS

Farm Details	2007/08	2008/09	2009/10	2010/11	2011/12
Milking Platform area (ha)	273	264	259	262	
Winter crop area (ha)*	22	31	36	33	
Total kg/MS supplied	290,200	256,300	285,200	275,450	
Average kg/MS/cow	399	352	399	364	
Average kg/MS/ha (Total Farm)	984	869	967	934	
Average kg/MS/ha (Milking Platform)	1063	971	1101	1052	
Est. Pasture Eaten (Dairybase) (tDM/ha)					
Purch. Suppl - fed [kgDM/cow]	144	287	0	0	
Made on dairy-platform [kgDM/cow]					
Applied N / 295 eff. Ha		148	166	195	
1 July cow numbers	778	803	810	814	789
Max. cows milked	728	728	715	755	
Stocking rate Cows / Milking platform ha	2.7	2.8	2.8	2.9	
Stocking rate Kg liveweight / ha					
Cows wintered on farm	628	375	398	814	789
No. Yearlings grazed On / Off					
No. Calves grazed On / Off					
Farm Working Expenses / kgMS	\$3.31	\$4.83	\$3.85	\$4.12	
Dairy Operating Profit / Total farm area	\$4,264	\$392	\$2,488		
Dairy Operating Profit/ Milking Platform	\$4,607	\$438	\$2,833		
Payout [excl. levy] \$/kg (incl Dividend where appropriate)	\$7.62	\$5.2	\$6.37	\$7.90	

Dated: July 2011

## Southland Demo Farm - Spring 2011

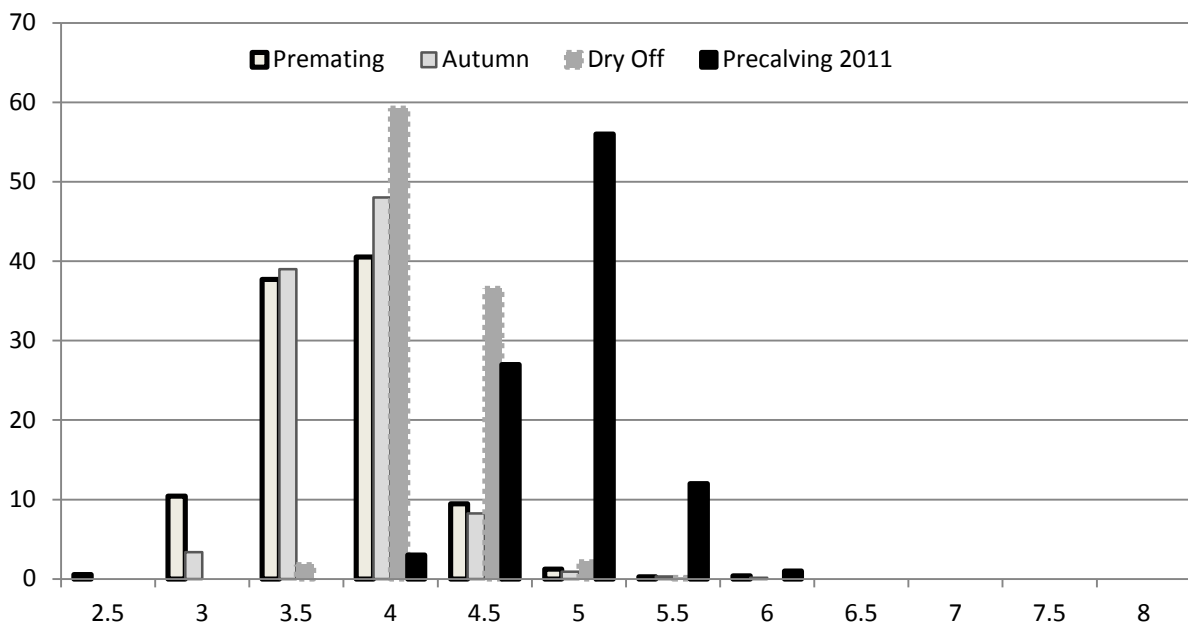
The spring of 2010 will be remembered for the big snow dump in mid-September. This year has seen some snow on two occasions, but none as bad as last year. This 2011 season was however challenging due to wet conditions. It can perhaps best be described as the season after the mild winter, with above average winter growths and the higher covers.

### Body Condition Score

All cows were wintered at home on either fodderbeet, swedes or kale plus baleage. Last year the cows ended the winter with an average BCS 5 but with a wide spread. The aim this year was to actively manage cows during winter to achieve not only an average BCS 5, but reducing the spread around BCS 5. The DairyNZ crop calculator was used to allocate sufficient crop and baleage to achieve the required weight gains.

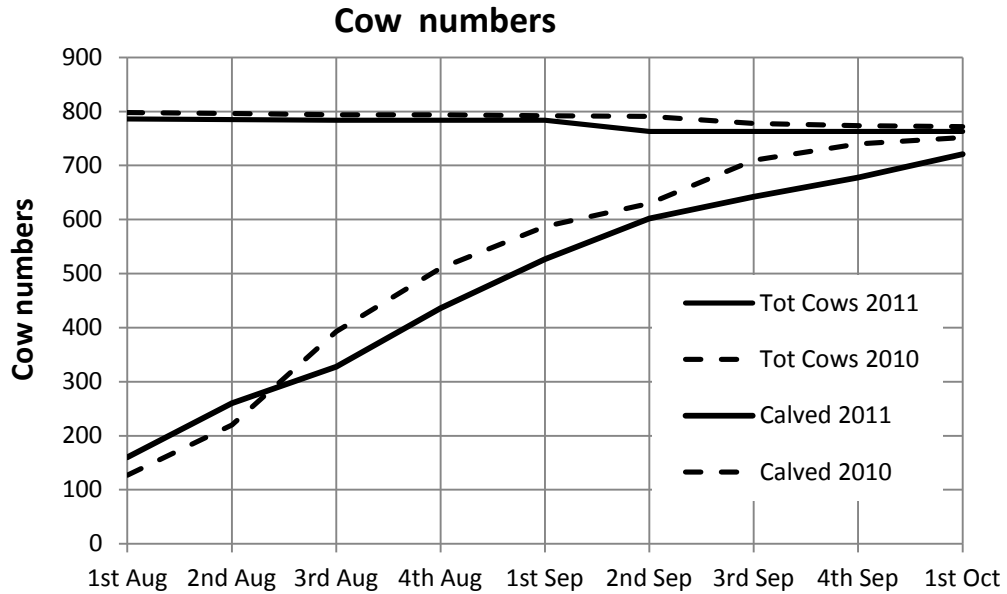
The graph below shows the cows BCS at pre-mating, early autumn, dry off and end of winter. Cows gained no condition between pre-mating (October) and early autumn. Steps were taken to improve BCS during autumn (OAD, preferential feeding and early drying off depending on BCS). This moved the average BCS from 4 in early autumn to 4.5 at dry off. Cows were run in mobs (based on BCS) over winter and fed to achieve 5 BCS by end of winter. The graph clearly shows that cows achieved the average of 5 BCS with a very small range around the 5 BCS.

**BCS change during the year**



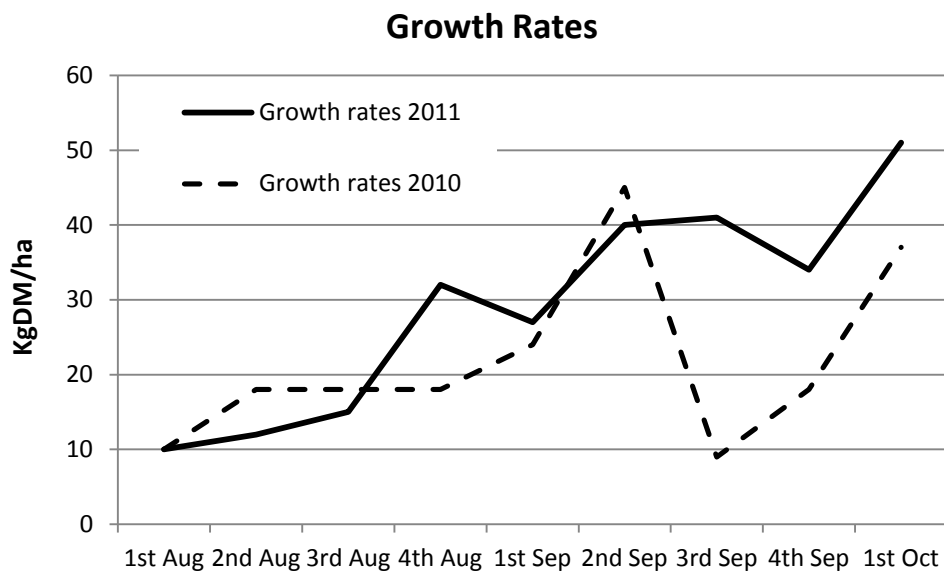
### Cow Numbers and Calving Spread

The cow numbers are slightly lower than last season – 789 wintered compared to 803 last season. The number of cows calving in the first two weeks of August was higher than last season due to mating the heifers 10 days earlier after PG treatment. Thereafter, the numbers of cows calving were lower than the previous season and by the 1<sup>st</sup> week in October, there were 30 fewer cows in milk than the previous season. The slower calving spread is a combination of less inductions and less cows cycling early last season. This is illustrated below.



### Pasture Growth Rates

The variability in growth rates is illustrated below. This variability was the main reason for moving the end of the first round back a week. Finishing the first round too soon, together with a down turn in growth rates, can result in a serious lack of cover with reduced milk production and greater weight loss in cows. In order to ensure sufficient pasture cover for the 2<sup>nd</sup> round, cows were followed with nitrogen when possible. This had to be delayed for 3 weeks in September due to wet conditions.



### Average Pasture Covers

The APC at the end of last season was around 1900 -2000kgDM/ha. The farm normally grows around 400kgDM/ha over the winter, but produced 700kgDM/ha this past winter. This obviously resulted in a higher APC (2600kgDM/ha) at the start of calving. The purpose of the first round planner is to ensure that all paddocks get grazed to an even and consistent post grazing residual of around 1500-1600kgDM/ha by 25 September. The APC cannot be reduced by speeding up the round or the 1<sup>st</sup> round will end sooner than planned, with insufficient re-growth and covers for the 2<sup>nd</sup> round. The APC should not be reduced by taking the residuals much lower neither. The plant reserves are in the stubble, and grazing too low, will reduce the re-growth and seriously limit covers for the 2<sup>nd</sup> round.

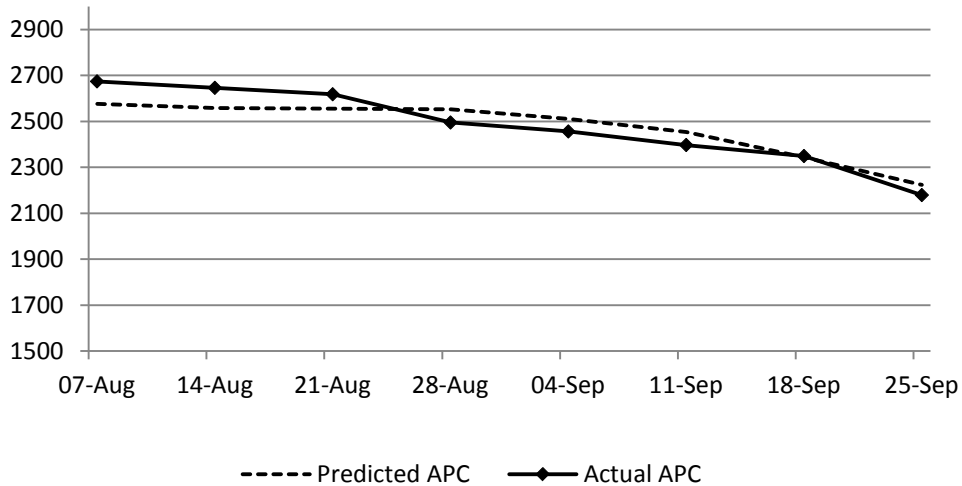
**What is the ideal APC at the end of the first round?**

It stands to reason that it should be the same as the ideal APC for the start of the 2<sup>nd</sup> round. Fortunately this can be easily calculated as follows:

$$\text{Pre-grazing covers} = \text{SR} \times \text{Round length} \times \text{Intake/cow} + \text{residual} = 2.9 \times 25 \times 19 + 1600 = 2975\text{kgDM/ha}$$

If the pre-grazing covers need to be 2900kgDM/ha and the residuals are 1600kgDM/ha, then the average pasture cover required is the average of the pre-grazing cover and residual (2900+1600/2) or 2250kgDM/ha. This season the actual APC followed the planned APC very closely.

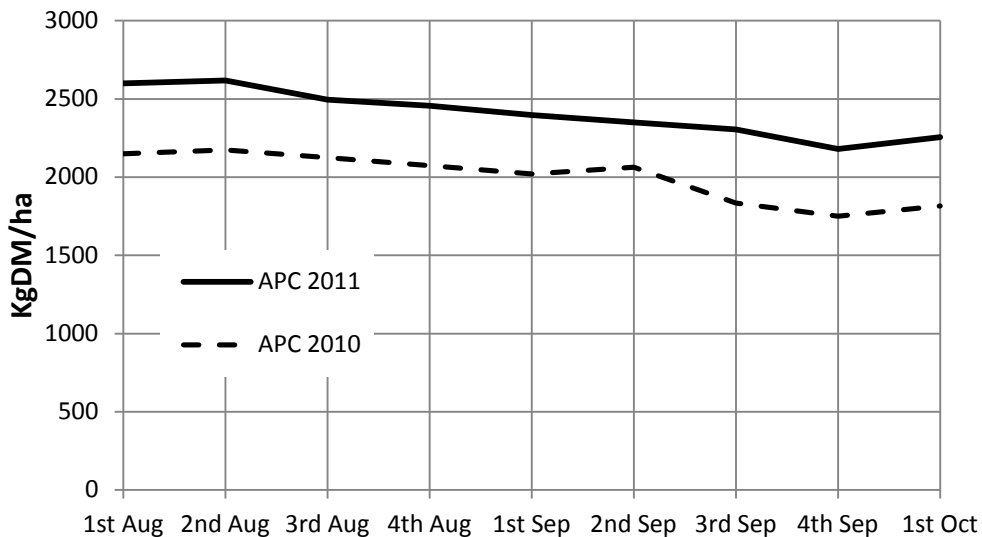
**Predicted vs Actual APC**



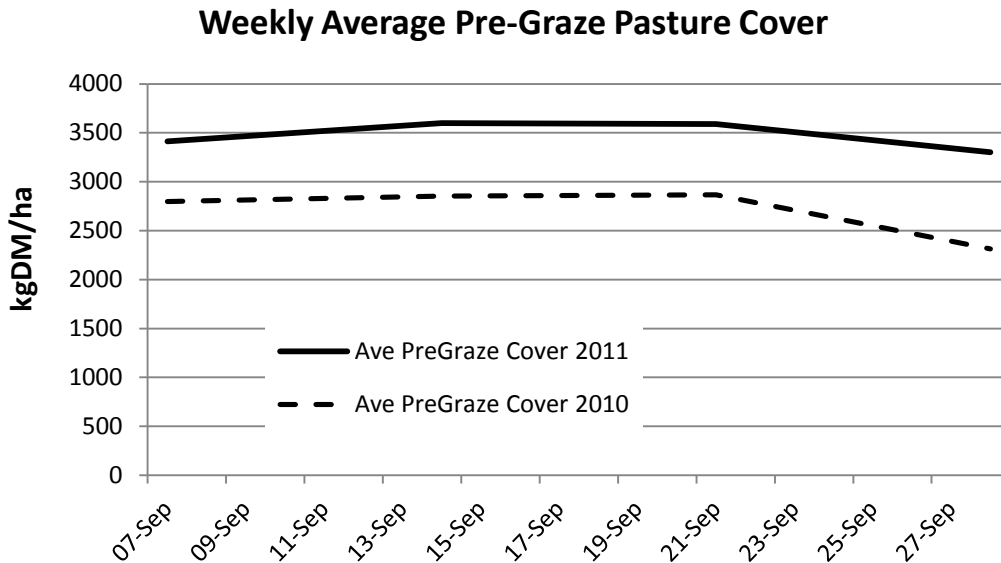
Had the farm experienced less growth during winter, the starting covers would have been lower requiring more supplements to be used during the first round.

The feed wedges for the 1<sup>st</sup> round are shown on Page 16. The wedges clearly show how the higher covers move to the top (right side) of the wedge as the round progresses. If the allocated grazing area is limited, it stands to reason that covers need to be higher. This is the purpose of saving grass through winter. The series of wedges clearly show how the higher cover paddocks are grazed off during the first round, while showing the re-growth for the 2<sup>nd</sup> round. It is important to keep the paddocks re-growing to meet the pre-grazing targets for the 2<sup>nd</sup> round. If these targets are not met, cows would be underfed or require more supplement.

**Average Pasture Cover**

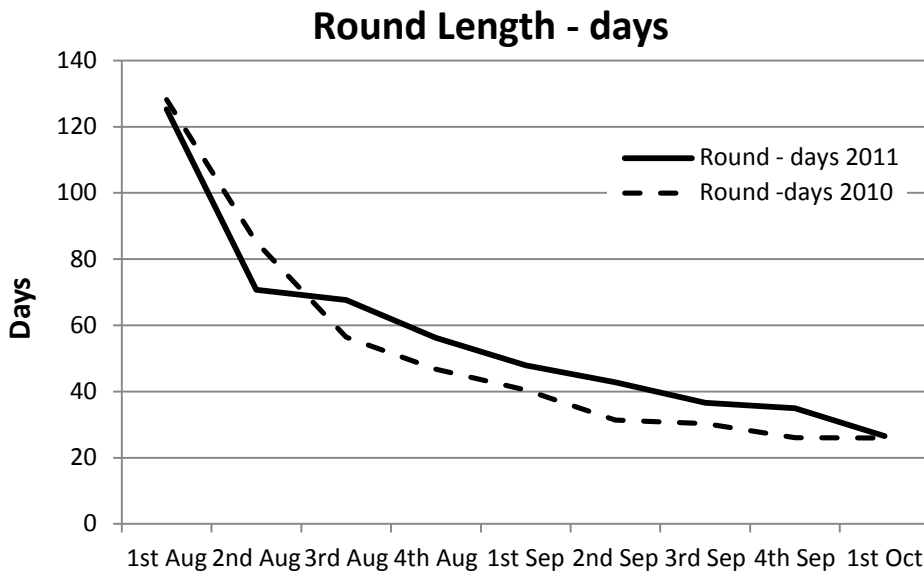


This season the end of the first round was planned for a week later (25<sup>th</sup> September). Compared to last season, average pre-grazing covers were higher due to the higher winter growth. This possibly could have led to slightly lower quality. Cows were slower to peak this season, but production has improved and should be more consistent as cows are opened up in 2<sup>nd</sup> round. Pre-grazing covers in the 2<sup>nd</sup> round are slightly lower than in the graph, but on target.



### Round length

The round lengths used during the 1<sup>st</sup> round were determined by the end date of the 1<sup>st</sup> round, as well as the daily demand of the cows. This season the 1<sup>st</sup> round was planned to end a week later (25<sup>th</sup> Sep) than last season's actual end date.

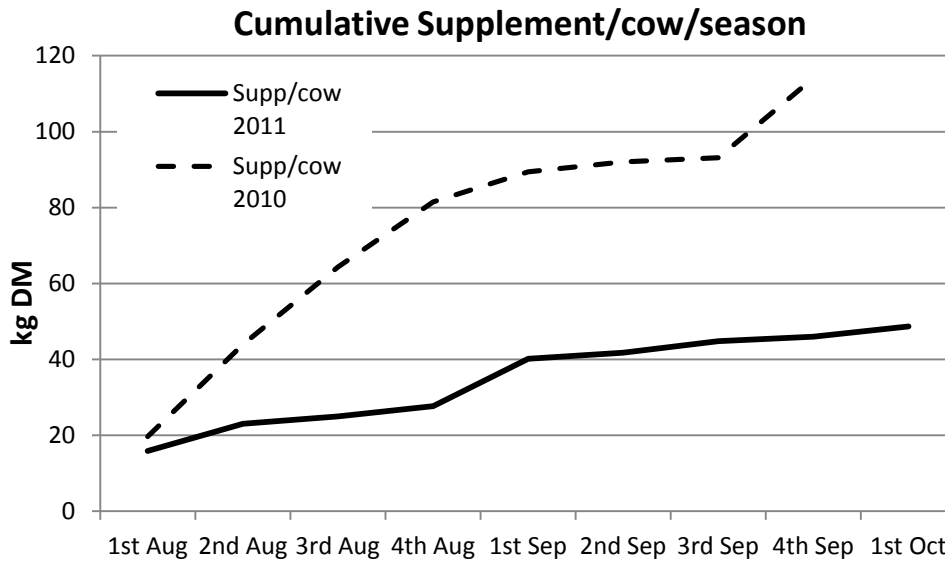


### What round length is suitable during the 2<sup>nd</sup> round?

This was determined by the actual growth rates expected during the 2<sup>nd</sup> round. SDF data indicates that pasture grows at around 50kgDM/day during the 2<sup>nd</sup> round period – first 3 weeks in October. In 20 days the pasture would re-grow by 1000kgDM, similarly 25 days re-growth is 1375kgDM/ha. Adding the 1600kgDM residual indicates pre-grazing covers of 2600 and 2975kgDM/ha respectively. Using the same formula as used earlier, we can determine that the pre-grazing covers required at the start of the 3<sup>rd</sup> round need to be around 2700 kgDM for a 20 day round, or 2975 kgDM/ha for a 25 day round. A 20 day round would therefore not ensure high enough pre-grazing covers for the 3<sup>rd</sup> round, hence a 25 day round will be followed during the 2<sup>nd</sup> round. A round length of between 20-25 days is anticipated for the 3<sup>rd</sup> round.

## Supplements

The cumulative amount of supplement fed per cow for this season and last season are shown below.



The graph above illustrates how much less supplement was used this season compared to last season. By the end of September 2011 around 50kgDM/cow was used, compared to 110kgDM/cow last season. At a 2.9 SR, this difference can be explained by a 175kgDM/ha difference in covers between the 2 seasons, i.e. 2600kgDM/ha APC compared to 2400kgDM/ha initial APC.

### Use of Supplements through In-shed feeder

This season an in-shed feeding system was installed. A total of 15 tons of PKE/Barley mix was purchased, but due to the higher covers a few tons still remain. Once again, the cows at SDF were very reluctant to eat PKE.

The farm's policy is to produce as much milk from grass as possible. The use of supplements in the shed will be determined by the cow demand and pasture availability. Supplements will be used to fill genuine deficits. Pre-grazing covers and residuals will be the guide.

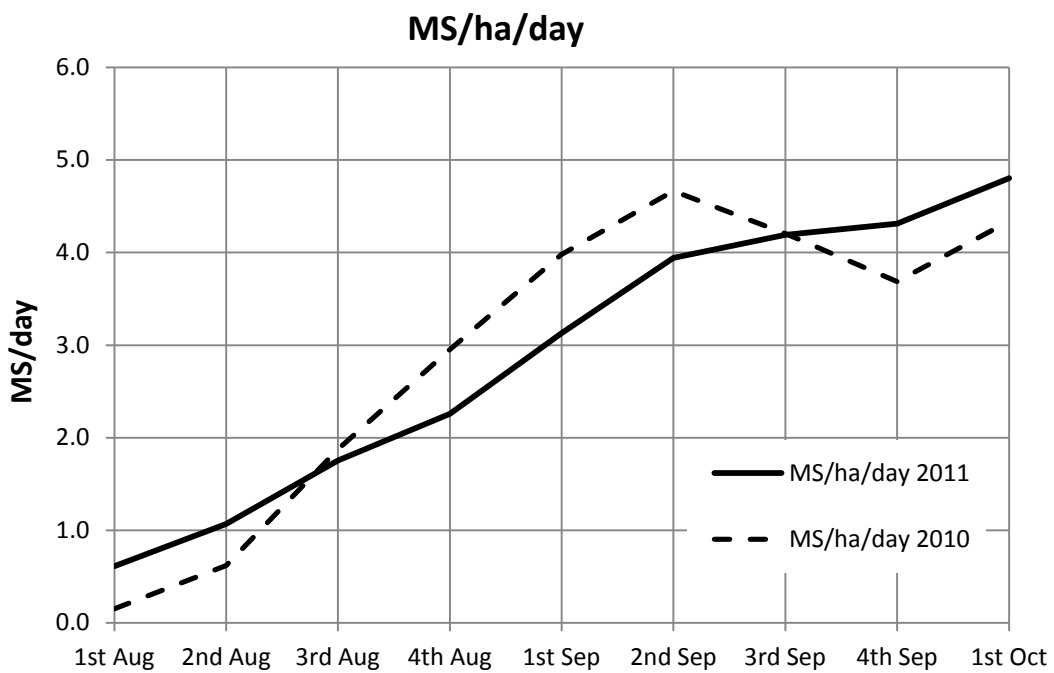
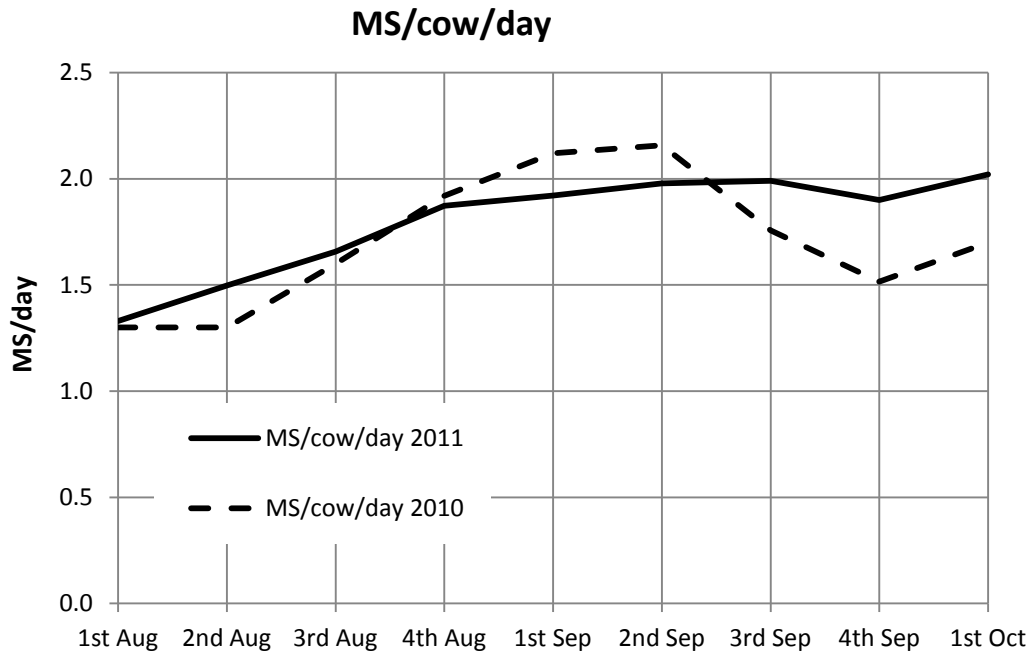
### Example

760 cows have a demand of 19kg/cow/day and offered 10.5ha/day on a 25 day round.

Pre-grazing covers required:  $2.9 \times 19 \times 25 + 1600$  residual = 2975kgDM/ha. If pre-grazing covers are lower, say 2900kgDM/ha, a deficit of  $75\text{kg/ha} \times 10.5\text{ha} = 787\text{kgDM}$  will be experienced. The deficit divided by number of cows ( $787\text{kg DM}/760$  cows = 1kgDM) will be the amount of supplement offered in the shed. Should the residual of 1600kgDM/ha not be achieved (say 1675kgDM/ha residual), the amount of supplement will be reduced until acceptable residuals are achieved.

### Milk Solids Production

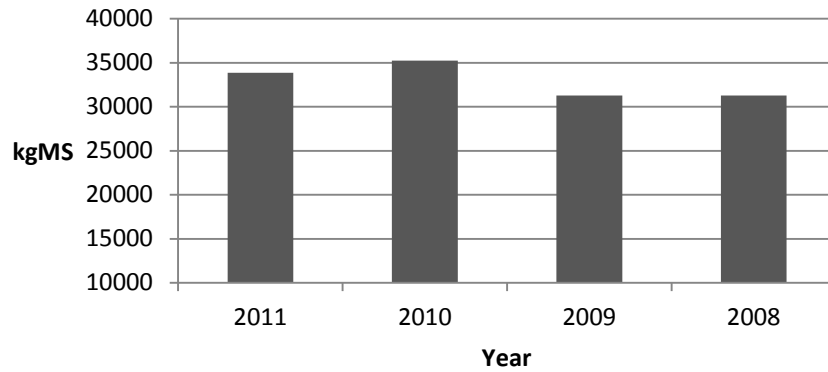
Milk solids production until end of September, both per cow and per hectare, was slightly lower than last season, but by start of October exceeded last season STD. The cows took longer to peak this season. This could be due to a number of factors. Firstly, the initial flush of cows calving were mostly heifers. Secondly, the first round ended later this season than in 2010. Last season cows peaked earlier with larger areas allocated (faster round), but production fell away shortly thereafter, mainly due to the effects of the snow and lower covers.



The effect of more cows in milk and a faster round (more area offered) on MS/ha is shown above. Last season, cows were offered more area/day by the 2<sup>nd</sup> week in September and the quality was likely to be better. However, this turned against the farm with the lack of pasture from the 3<sup>rd</sup> week of September reducing production/ha.

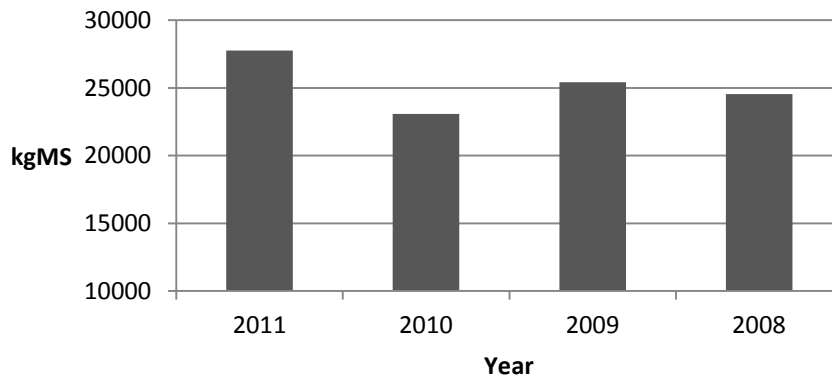
The first round's cumulative milk production was slightly lower than last season. This was due to slower calving and longer first round this season.

### 1st Round MS Production 1/8 - 24/09



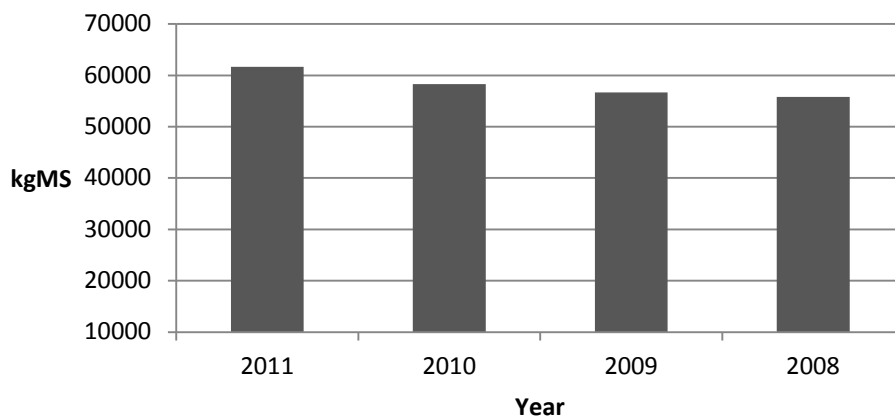
This season's second round milk production is the highest in the past 4 seasons – in fact the highest in 7 seasons – and considerably higher than last season. This is mainly due to having a good feed wedge and enough quality pasture at the start of the 2<sup>nd</sup> round.

### 2nd Round MS Production 25/09 - 15/10



Production over the 1<sup>st</sup> and 2<sup>nd</sup> round (1 August – 15 October) shown below, is the highest achieved thus far at SDF.

### MS Production 1/08 - 15/10

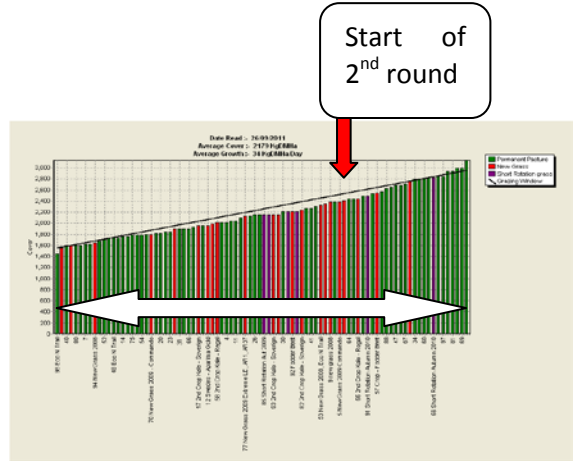
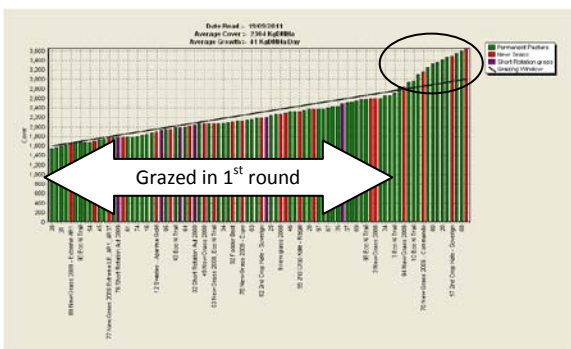
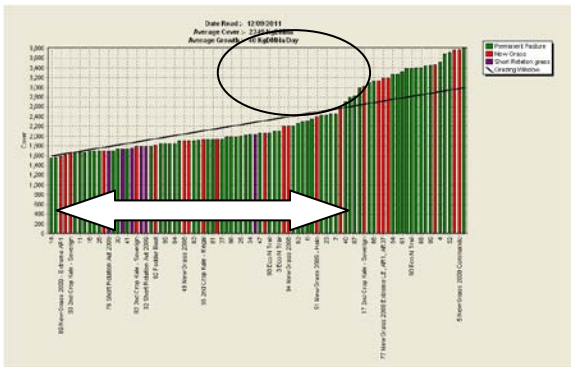
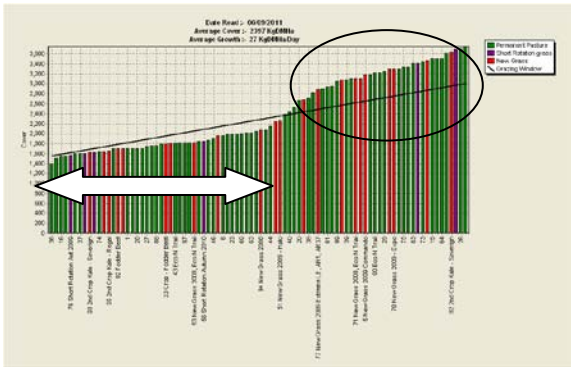
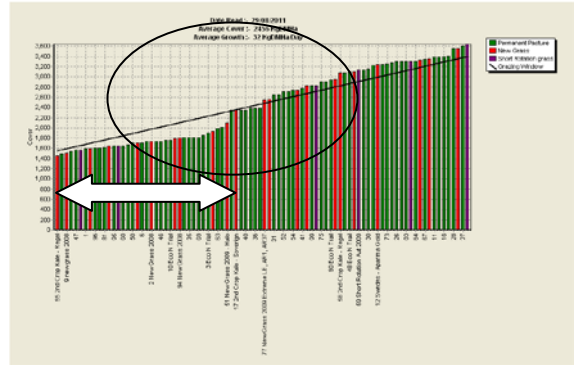
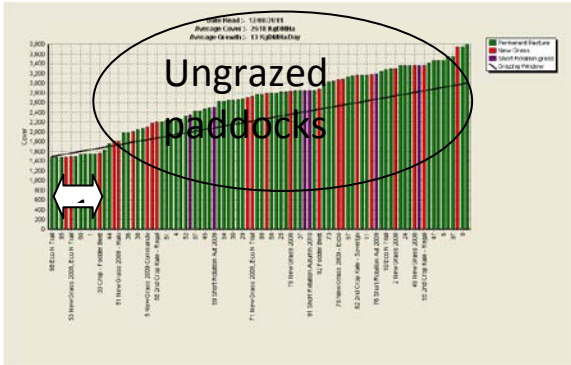


Managing pasture covers and ensuring sufficient quality pasture available for the cows has been key in achieving better results. Only 15 tons of supplementary feed was fed through the shed during this period, and accounts for less than 1500kgMS during this period.

### **Conclusions**

- The first round at SDF needs to end on or around the 25th September
- Higher APC at start of calving can considerably reduce the amount of supplement required but possible loss of pasture due to bad weather needs consideration
- A faster 1<sup>st</sup> round can produce more milk, but can reduce amount of pasture available in 2<sup>nd</sup> round if the 1<sup>st</sup> round ends too early
- In a year with lower APC at the start of the season, the 1<sup>st</sup> round will still end on the 25<sup>th</sup> September – but more supplement will be used to fill any deficit
- The end of the 1<sup>st</sup> round does not necessarily mean balance date – there could be deficits during the 2<sup>nd</sup> round depending on the weather and growth rates
- Round length in 2<sup>nd</sup> round needs to be 25 days to allow for sufficient re-growth (20 days is likely be too fast for SDF)
- If less supplement is to be used, the APC required will be higher than normally expected, but maintaining residuals is not to be compromised

Appendix: The weekly changes in feed wedge on SDF during the first round



## SDF Farm Walk Notes

Tuesday, 11 October 2011

Total Effective Ha: 295ha

Winter Crop Ha: 33ha

Area in Grass Ha: 262ha

## ISSUES FOR THE SHORT TERM

1. Pasture allocation during 2<sup>nd</sup> round – speed up round to 23 days
2. Supplement according to residual – cut back if residual increases
3. Record pre-mating heats
4. Metri check cows
5. Mineral supplementation
6. Follow cows with N

## COW NUMBERS

1. 763 cows on farm – 0 deaths – 7 deaths to date & 19 culls
2. 746 cows have calved – 25 in past week
3. 675 milked TAD; 26 in colostrums mob; 25 in penicillin mob
4. 17 Springer's on grass

## MILK PRODUCTION

	This week	↑ or ↓ compared to last week	↑ or ↓ compared to last year
Per cow (kgMS/cow/day)	2.1	↑ 0.8	
Per ha (kgMS/ha/day)	5.4	↑ 0.6	
kgMS/day	1416	↑ 157	
Month to date %			↑16
Season to date %			↑3

5. 52,890kgMS delivered to date. Production is now 3% ahead of last season.
6. Cows average weight was 472 kg. Average weight needs to be interpreted with caution. Proportionally more heifers (lighter weights) calve earlier with heavier mature cows calving later. This can affect average weights during the first round.
7. SCC 141k cells/ml

## FEEDING LEVELS

8. Colostrums and milkers were offered 135m<sup>2</sup>/day plus 0.9kg Barley/PKE mix and no silage. Area will be increased and no further PKE will be bought for the time being.
9. The round will be sped up to 23 days as growth rates have continued to increase.

$$\text{Pre-grazing covers} = \text{SR} \times \text{Round length} \times \text{intakes} + \text{residual}$$

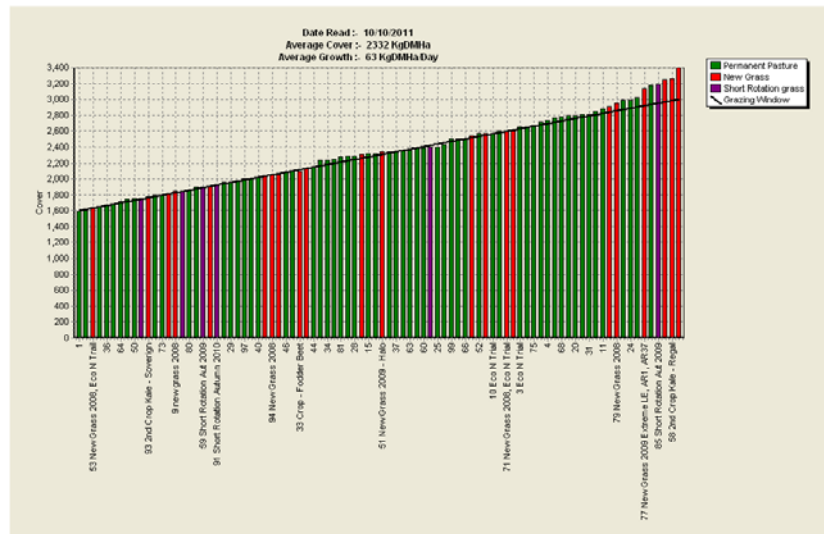
10. Pre-grazing covers need to be 2950kgDM/ha –  $2.9 \times 23d \times 20\text{kg} + 1600$

$$\text{Area used } 11.5\text{ha/day} - 23 \text{ day round} - 150\text{m}^2/\text{cow}$$

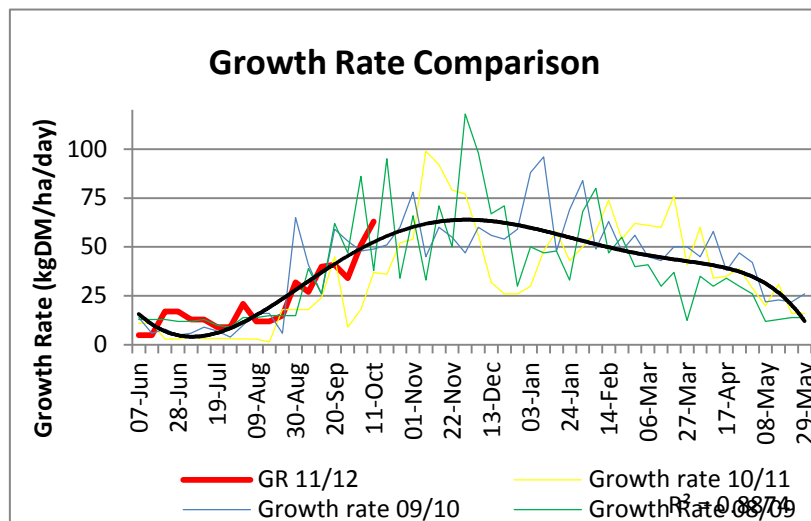
## PASTURE GROWTH AND AVERAGE PASTURE COVER

1. Average growth rate was 63kgDM/ha/day.

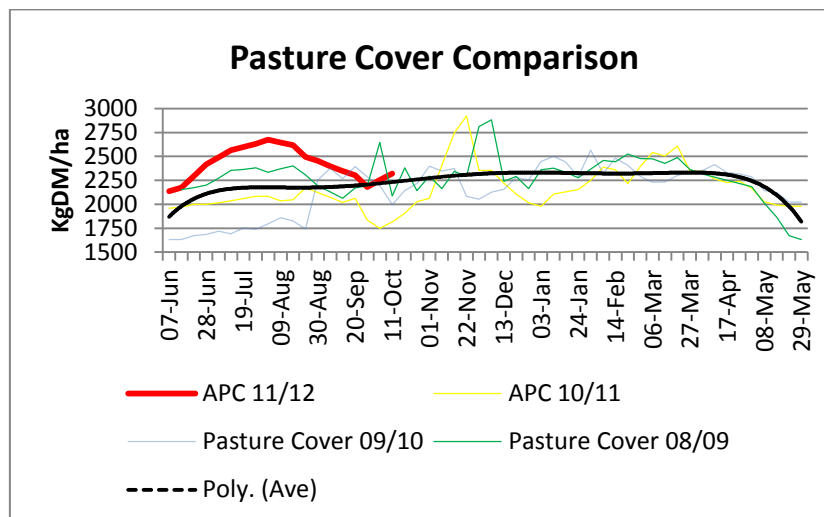
- APC is 2,332kgDM/ha. Pre-grazing covers averaged 3,050kgDM/ha with residuals of 1,653kgDM/ha. Consideration was given to shutting up 3 paddocks for baleage, but the round was speeded up to 23 days.



- Growth rate for this week in graph below.



- Below is a graph comparing the pasture cover for this year compared to the last two seasons.



### NITROGEN AND FERTILISER USE

5. No N applied this week.
6. Cows will be followed with urea.

### ANIMAL HEALTH & BCS

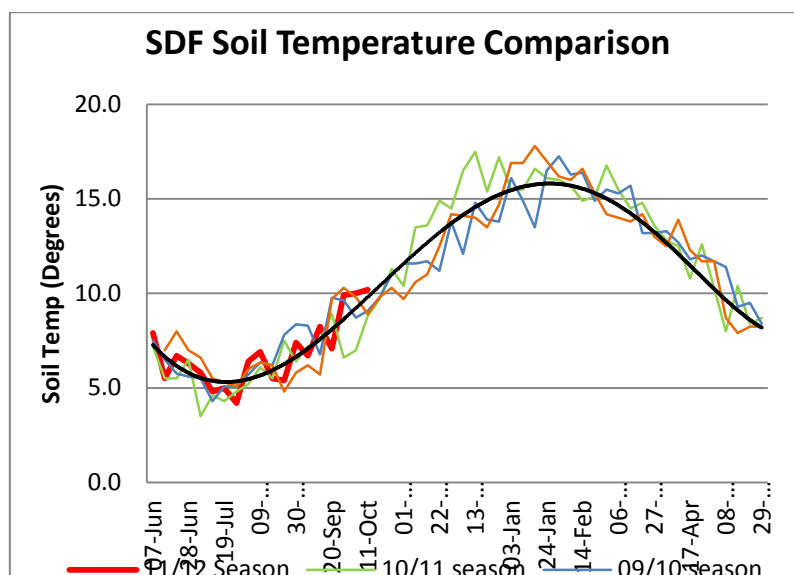
7. 26 cows are being treated for lameness, 10 for mastitis, and 15 for other causes.
8. Springers pastures are dusted with magnesium oxide.
9. Colostrum cows pastures are also dusted with magnesium oxide plus lime flour.

### MATING

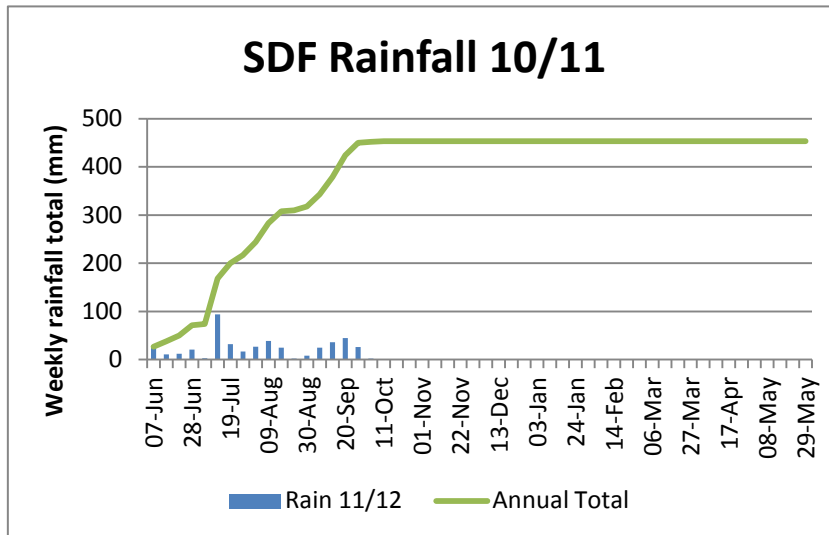
10. Cows were tail painted on the 4<sup>th</sup>. An average of 25 cows has been on heat per day.
11. PSM is 1 Nov for a PSC on 10 Aug.
12. Heifers will be mated 10 days earlier. AB will commence on 21<sup>st</sup> and heifers cycling naturally will be mated for 7 days. After the 7 days, heifers that have not yet been bred, will receive a PG injection and be AB'd the following 3-4 days. Thereafter bulls will be run with the heifers.
13. All cows will be monitored for signs of heat over the next 3 weeks. Any cows that have not yet cycled (and calved for longer than 28 days) will be CIDR treated on the 28<sup>th</sup>. These cows will AB mated in first week of November, allowing them at least 1 more chance of being artificially bred. This will be repeated on the 22<sup>nd</sup> for non-cyclers that have been in milk for longer than 28 days.
14. Bulls have been tested for fertility and BVD. Bulls will be withdrawn on 20 January ensuring no cows calve after 31 October. No more than 32 cows will be induced next year.

### CLIMATE DATA AND COMPARISONS

15. Soil temperatures at 9 am have averaged 10.2°C for the previous week – up 0.2C.
16. The graph below shows how the average weekly 9am (10cm) soil temperature is tracking throughout the season and compares against the last two seasons.



17. The farm had a total of 1mm rain the past week.
18. The graph below shows the weekly rainfall and accumulated total for the season.



#### FUTURE MANAGEMENT PLANNING

The WEEKLY management meeting will be on **Wednesday, 19 October 2011 @ 11am.**

On behalf of the **Management Group** Barry Bethune (Farm Manager), Sharn Roskam (Farm Supervisor), and Howard de Klerk (Consultant - DairyNZ).

<b>Southland Demonstration Farm Weekly Data</b>					
Farm Area	295	295	295	295	295
Sprayed out					
Date (Totals at end of period)	13-Sep	20-Sep	27-Sep	4-Oct	11-Oct
Total ha used	262	262	262	262	262
Total Cows Wintered (July 1st Total)	789	789	789	789	789
Farm grazing ha (available to milkers) (eff ha)	262	262	262	262	262
Crop ha/New Grass being planted	33.14	33.14	33.14	33.14	33.14
Peak cows milked	760	760	760	760	760
Dry Cows on grass/ Crop / off farm	161/0/0	121/0/0	85/0/0	42/0/0	17/0/0
TOTAL DRY COWS	161	121	85	42	17
Dry cow (kg DM grass/crop/baleage)	11/0/3	11/0/3	14/0	14/0	14/0
Springers (kg DM grass/crop/baleage)	10/0/4	11/0/3	14/0	14/0	14/0
Culls (Includes culls put down & empties)	19	0	0	0	0
Culls total to date	19	19	19	19	19
Deaths (Includes cows put down)	2	0	0	0	0
Deaths total to date	7	7	7	7	7
Calved Cows available(ave for week)	602	642	678	721	746
Treatment or Sick mob total	51	77	59	70	71
<i>lame, mastitis, other, colostrum</i>	6/11/1/33	10/10/9/48	12/8/6/33	20/8/6/36	26/10/15/20
Milking twice a day into vat	551	565	619	651	675
Milking once a day into vat	0	0	0	0	0
Total Cows Milked into vat	551	565	619	651	675
TOTAL COWS IN MILK	602	642	678	721	746
TOTAL COWS	763	763	763	763	763
Days in Milk actual cow days/Peak Cows	19.5	25.2	30.5	36.9	43.7
Milksolids to factory 3-day average per day	1033	1098	1130	1259	1416
MS/cow/day (Actual kg / Cows into vat only)	1.98	1.99	1.90	2.02	2.10
Milksolids to factory season to date	19621	27157	34994	43504	52890
MS/cow to date (total kgs / Peak Cows	25.8	35.7	46.0	57.2	69.6
MS/ha/day (total kgs / Total ha used -)	3.94	4.19	4.31	4.81	5.40
MS/ha to date (total kg / Total ha used)	75	104	134	166	202
Average Bulk Milk Somatic Cell Count	147	154	130	138	141
Cond'n Score					4
Monitor Group LW (kgs)					472
Soil Temp (average for week) 10cm	8.25	7.07	9.9	10	10.2
Growth Rate (kgDM/ha/day)	40	41	34	51	63
Plate meter height - ave half-cms	13.21	12.89	11.99	12.54	13.09
Ave Pasture Cover (x140 + 500)	2349	2304	2179	2255	2332
Pre Grazing cover (ave for week)	3598	3591	3300	3021	3077
Post Grazing cover (ave for week)	1630	1639	1647	1647	1653
Highest pregrazing cover	3822	3822	3700	3700	3300
Area grazed / day (ave for week)	6.12	7.16	7.5	9.85	9.9
Grazing Interval	42.8	37	35	27	26
Pasture ME (pre grazing sample)	-	-	-	-	-
Pasture % Protein	-	-	-	-	-
Pasture % DM	-	-	-	-	-
Pasture % NDF	-	-	-	-	-
Supplements Type	Silage	Silage/PKE/Barley	PKE/Barley	PKE/Barley	PKE/Barley
Supplements fed kg DM/cow/day in pdk	1.67	0.5 / 0.9	0.9	0.9	0.9
Supplements fed to date kg per peak cow	41.81	50.57	57.62	63.42	69.22
Supplements Made On Kg DM / ha cumulative	0	0	0	0	0
Supplement Purchased in Kg DM / ha cumulative	0	35	35	58.6	58.6
Units N applied/ha and % of farm	38/20%	0	0	40 / 40%	0
Kgs/ha N to Date	29.96	29.96	29.96	45.91	45.91
Rainfall (mm)	36	45	26	2	1
Effluent spreading - paddock no.	59	58	58	48	47
Effluent - Ha for week/rate(mm)	2.98	3.04	3.04	3.19	3.16
Stock Water Consumed litres / cow / day	68*	65*	52	80*	74
Total water used (for week)	558,000*	511,000	484,000	601000*	584,000
* Water Leaks					

# Reproductive failure

## – do cows need more feed to get in calf?



John Roche, Chris Burke, Susanne Meier, and Caroline Walker, DairyNZ Animal Science Team

### Summary

- Cow fertility has declined significantly over the last two decades for many reasons
- Nutrition is important for getting cows in calf. This does not mean you will get more cows in calf by feeding supplements during the breeding season
- Achieving body condition score (BCS) targets at calving is the most important nutritional influence on getting cows in calf. Late lactation and dry cow nutrition are, therefore, very important
- Transition cow management to reduce liver inflammation in early lactation may be important in reducing uterine infections
- Supplements are unlikely to improve fertility when grazing residuals are 1,500-1,600 kg DM/ha or greater
- Starch (grain) or sugar (molasses)-based supplements in early lactation have inconsistent effects on post-calving anoestrus and some reports suggest these supplements will reduce embryo survival following insemination
- High protein intake does not reduce conception rates in pasture-based systems.

### Background

Getting lactating cows in calf has never been easy. It has become even harder over the last 25 years.

- **USA:** inter-calving interval increased by 1 month and services per conception increased 33%<sup>1</sup>
- **Ireland:** services per conception increased by 14%<sup>2</sup>
- **UK:** calving rate to first insemination declined from 56% to 40%<sup>3</sup>
- **New Zealand:** 6-week re-calving rate declined from 70% to 50%<sup>4</sup>.

These studies indicate a reduction in conception rate and an increase in embryo mortality over the last 25 years, while longer post-calving anoestrous intervals and reduced expression of oestrus have also contributed to the decline<sup>1,5</sup>.

During the same period, milk production/cow has increased and cows now tend to lose more BCS in early lactation. Because of this, many people have associated failure to get cows in calf with negative energy balance in early lactation and assume that feeding cows more pasture (higher post-grazing residuals) or feeding particular supplements in early lactation will improve reproduction. DairyNZ staff recently reviewed the scientific literature on the effect of nutrition on fertility for pasture-based cows. The following is a summary of their findings.

## Reproductive failure – influence of genetics

Comparisons between New Zealand cows and those of North American ancestry offered the same diet proved a strong effect of cow genetics in reproductive failure. Supplements do not correct the poor reproductive performance of the North American cow. New Zealand cows cycle later<sup>6</sup> after calving but have higher conception rates and, as a result, higher pregnancy rates than North American cows. Although North American cows lose more BCS in early lactation<sup>6,7</sup> the difference in BCS does not explain the increased reproductive failure. Detailed experiments at DairyNZ have discovered that there are important differences between these strains in the:

- a. length of their reproductive cycle
- b. concentration of important hormones circulating in blood
- c. expression of key genes in the uterus that enable the embryo to grow and survive.

It is unlikely that these genetic effects can be overcome by nutrition. However, there is significant research effort into discovering genetic markers that will allow the rapid selection of bulls for improved fertility in the future.

## Reproductive failure – influence of nutrition

Many nutritional factors have been suggested as contributing to the decline in fertility in New Zealand.

**Body condition score:** Body condition score at calving is, arguably, the most important nutritional factor associated with getting cows pregnant. Cows that are fatter at calving, cycle earlier and tend to be fatter at mating<sup>8</sup>. However, cows that are too fat lose excessive condition after calving and are less likely to conceive. For this reason, it is recommended that mature cows calve at BCS 5.0; this ensures they cycle early, lose no more than 1.0 BCS unit between calving and mating, and are greater than BCS 4.0 at mating<sup>8</sup>. Younger cows (heifers and second calvers) tend to be healthier and less prone to disease (mastitis and endometritis)<sup>8,9</sup> if they calve a little fatter than mature cows (BCS 5.5).

It is important, therefore, to pay attention to nutrition during late lactation, at drying off time and in the dry period to ensure that cows reach recommended BCS targets.

**Transition period:** Nutrition during the transition between dry/pregnant and lactation influences liver health after calving. This may affect the incidence of uterine infection and, in particular, subclinical endometritis and these effects may be present for more than six weeks post-calving<sup>10</sup>.

Subclinical endometritis is an inflammation of the lining of the uterus (endometrium) more than 21 days post-calving, but with no obvious signs that the cow is not well (i.e. no uterine discharge, near normal milk production, eating and ruminating normally, etc). New Zealand data indicate that subclinical endometritis can affect 30 to 40% of cows, even in well managed herds, and can reduce reproductive performance. The worst affected cows (up to 20% of the herd) will have a 20% lower conception rate to first service (from 54% to less than 35%)<sup>9,10</sup> and conception is delayed by more than 20 days<sup>10</sup>. There is some evidence that this endometritis may be associated with transition cow nutrition<sup>9</sup>, but this is not certain.

Cows are healthier in early lactation if they achieve a BCS of 5.0 a month pre-calving and are partially restricted in the weeks before calving<sup>11,12,13,14</sup>. Best practice management of the transition cow is not to feed her as much as she can eat before calving, as has been recommended in the past<sup>15</sup>. Springers should consume 80% of their energy requirements each day during the 2 to 3 weeks before calving (i.e. they should be offered approximately 90% of their energy requirements to account for wastage). These recommendations are also appropriate for heifers<sup>11</sup>.

*NOTE: this is not appropriate management for cows that have not achieved a BCS of 5.0.*

**Intake:** Many believe that cows fed only pasture cannot eat enough to meet demand and that supplements will, therefore, improve energy balance<sup>16</sup>. It is true that cows cannot eat sufficient DM in early lactation to meet energy requirements for milk production; they will be in negative energy balance and will, therefore, lose BCS.

*(cont'd p4)*



(cont'd from p3)

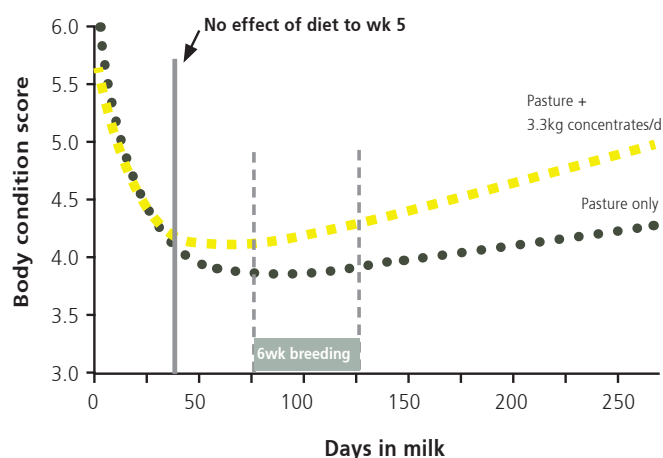
This is primarily controlled by genetics, and feed amount or feed type have little effect on BCS loss in the first 4 to 5 weeks of lactation<sup>7,8</sup> (Figure 1).

Although a negative energy balance during mating will reduce the likelihood of a cow getting in calf, the effect on fertility is not as great as many think. DairyNZ data<sup>17</sup> indicate a reduction of 4% in 6-week in-calf rate if cows lose 2.0 BCS units between calving and mating compared with cows that lose 1.0 unit. Furthermore, in a large study in which cows had a 40 to 50% restriction for the first two weeks of mating, cows had a 6-7% lower pregnancy rate to first service and 6-week in-calf rate<sup>18</sup>. Although such a decline in fertility is important, this was a very severe restriction. Results indicate that a poor feeding level in early lactation is not the main reason for poor fertility and that supplementation per se will not greatly improve in-calf rates.

Supplementation can influence BCS from week six of lactation onwards (Figure 1), but the effect is small<sup>7</sup>; results from New Zealand studies suggest that feeding cows 290 kg of a maize grain-based concentrate (i.e. 13 MJ ME/kg DM) increased cow BCS by 0.25 units<sup>7</sup> at the start of mating and cows gained more condition through mating (0.1 BCS units over 42 days<sup>7</sup>) than if they were offered pasture alone (Figure 1). This difference in BCS and in BCS change, however, would only be expected to increase the 6-week in-calf rate by 1%<sup>17</sup>.

Collectively, results suggest that low DM intake in early lactation is not the major cause of reproductive failure in New Zealand. If cows are grazing to residuals of 1,500-1,600 kg DM/ha, offering supplements will not improve reproduction. If cows are grazing to residuals below 1,500 kg DM, providing cows with energy supplements will very likely improve milk production and reproduction.

**Figure 1.** Effect of supplementing cows with 3.5 kg/d of a concentrate feed throughout lactation on BCS gain compared with cows grazing fresh pasture<sup>7</sup>.



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### Supplementing with starch/sugar in early lactation:

Although there is evidence that increasing the amount of starch (e.g. cereal grain) or sugar (e.g. molasses) in the cow's diet in early lactation results in a shorter period of anoestrus<sup>19,20</sup>, the effect is inconsistent. A large amount of data indicates no benefit of supplementation with starch or sugar on post-calving anoestrus<sup>21,22,23,24</sup> when cows are grazing to residuals of 1,500-1,600 kg DM/ha. In addition, DairyNZ data<sup>25</sup> indicate that supplementing cows with starch in early lactation increases the production of fat in the liver, a factor believed to reduce cow health<sup>26</sup> and possibly reduce conception rate<sup>9</sup>. There is also evidence that supplementation with starch (e.g. grain), or sugar-based (e.g. molasses) feeds can reduce embryo survival following insemination<sup>27</sup>.

**Too much protein in pasture:** Although there is evidence internationally that too much rumen degradable protein reduces conception rates, evidence from pasture-fed cows and heifers<sup>28,29,30</sup> do not agree. In these studies, higher crude protein pastures or higher blood urea nitrogen concentrations did not reduce fertility. These studies included blood and milk urea nitrogen concentrations three to four times higher than would be regarded as problematic in the United States. The reason for this inconsistency is unclear, but available data suggest that dietary protein is not a major factor effecting reproductive failure in New Zealand.

### Conclusions

There are many reasons why cows do not get in calf. However, nutrition of the cow during breeding tends to be over-emphasised.

Late lactation and dry cow nutrition to achieve a BCS of 5.0 at calving in mature cows and BCS 5.5 for heifers and second calvers is arguably the most important nutrition-related influence on fertility in the New Zealand system. There is also evidence that level of feeding pre-calving and its effect on liver health may affect reproduction.

Other feeds are not better than pasture in early lactation. Therefore, if grazing residuals are 1,500-1,600 kg DM/ha or greater, supplementation will not improve reproduction.

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