DAIRY EXTENSION CENTRE

An Overview of Extended Lactation

Service Provider Forum

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GARDINER FOUNDATION

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Contents

Acknowledgements

The contribution of major funders Gardiner Foundation and DPI Victoria, together with support funding from GippsDairy and DHIA is gratefully acknowledged. EL research was conducted by Chris Grainger, Martin Auldist, Greg O'Brien, Bill Wales, Jock MacMillan and Bill Malcolm.

Extended Lactation: an option for dairy farmers

The use of extended lactation (EL) within Victorian dairy farming systems is now considered commercially viable. With research information now available and farmer experience growing, an informed decision can be taken by farmers and advisors regarding use of EL.

Introduction

It is increasing difficult to maintain a seasonal calving pattern. The modern dairy cow is capable of lactations well beyond the traditional 300 days. This provides dairy farmers with new management options. EL is a system that suits the modern cow.

Which cows are suited to EL?

The modern dairy cow is capable of lactations well beyond the traditional 300 days. This provides dairy farmers with new management options.

Cows with high 300 day lactations, those that lose a lot of condition in early lactation and cows with a high proportion of North American Holstein genetics are suited to EL. Heifers tend to have more persistent lactations than cows.

Will I produce less milk?

On average, persistence of lactation is high for 15 and 18 month inter-calving intervals with less persistence for longer lactations. There is significant variation between animals. With longer inter-calving intervals than 18 months, some cows do not persist to the planned dry-off date. However, the top 50% of cows were found to produce a similar amount of milk solids in a 22 month lactation to the top 50% of herd mates joined for traditional 10 month lactations. The lower 50% produced less milk solids in a 22 month lactation.

Daily milk production is less in the extended lactation phase but the extra days in milk and higher milk solids concentration are compensating factors. Compared to traditional 10 month lactations, 13 and 16 month lactations can produce similar annual milk solids. For lactations of 19 to 22 months, a drop in annual average milk solids production of 2 to 10% has been measured. Cows with lower persistence can become over-conditioned during late lactation and this needs to be managed in the dry period.

Milk in the extended lactation phase is higher in milk solids, with the rise in protein test usually being greater than fat test. Per litre, extended lactation milk is more valuable.

Does feeding affect lactation persistence?

Persistence of lactation is not dependent on a high level of nutrition with similar persistence with a 160 MJ ME/cow/day diet as with a 180 MJ ME/cow/day diet.

Cows in the extended lactation phase are very responsive to supplementary feeding. Cows are able to respond well following periods of reduced feeding. Hence, extended lactations are not dependant on a consistent level of feeding.

Is EL profitable?

Economic analysis has found extended lactation systems can compare favourably with a traditional lactation system under a range of conditions, but as with all things, it depends. Economics of traditional 300 day lactations have been compared to 18 month lactations in a split calving pattern. Key factors associated with higher profitability of EL were lower herd replacement rates/less rearing costs, increased milk income, lower concentrate costs, and less breeding and animal health costs. However, livestock trading was lower than for a traditional calving system. Extended lactation had lower capital costs associated with investment in cattle.

Farmers may consider systems other than those studied.

Why might EL be considered?

- There is considerable intensity of work associated with calving. Less calvings in a life-time means a reduction in workload.
- Most animal health problems and associated costs are associated with calving.
- It is difficult for the modern cow to maintain a 12 month inter-calving interval. The modern cow needs more days open between calving and mating to reach peak reproductive performance. As a result, high culling rates are required to maintain a tight seasonal (annual) calving pattern.
- In an EL system, treatment for non-cycling may not be needed (applies especially to heifers).
- Less heifer replacements are required in an extended lactation system.

- A modern herd of Holstein cows can produce similar annual average milk solids from lactations up to 16 months.
- The top 50% of cows in a herd produce similar annual average milk solids from lactations up to 22 months
- There are price incentives for milk produced outside the peak supply months.

Extended lactation is a system suited to the modern high genetic merit cow. Practical considerations need to taken into account such as the suitability of a changed calving system to the business. Feed demand may change as a result of changing the calving pattern. There may be difficulties milking large numbers of cows through a wet winter on some farms. Retaining a similar number of herd replacements will reduce one of the main economic advantages (ie it is important to reduce replacement numbers to reflect improved retention of adult cows in the herd in order to obtain the full economic benefit).

Some possible uses of Extended Lactation

Tightening the calving pattern / retaining valuable herd members

Delaying the mating of some cows until the next joining period will tighten up the calving pattern, retain valuable cows in the herd, eliminate the need for calving inductions and will require less replacements to be reared to maintain herd numbers. So extending the lactation of selected cows by delaying mating until the next joining period can make good business sense.

The modern high producing cow needs more time between calving and mating. Late calving cows have a low probability of getting in calf within a seasonal calving pattern. High producing and late cows are good candidates for extended lactation. Heifers are better suited than cows, producing slightly more milk in the extended lactation phase than in the first 300 days of a two-year lactation.

Smoothing out the workload

Peak work load associated with a single seasonal calving pattern can be avoided by split calving. Use of extended lactations in a split calving pattern can further reduce workload associated with calving. Cows on 18 months inter-calving intervals have 2/3rds the calvings over a lifetime.

Changing the calving pattern

For some, there is a desire to change the calving pattern in response to changes in feed supply and/or milk price. It is a simple matter to delay the mating of cows; joining them at the appropriate time to move them to the desired calving date.

Deliberate use on high producing cows

High producing cows are in negative body condition for a considerable length of time. It is thought that modern Holsteins require 100 days open to achieve optimum reproductive performance. High producing cows have good lactational persistence and are candidates for deliberate delaying of mating until after 100 days open. This approach requires multiple calving/joining periods within a year.

Further References:

Effects of Varying Lactation Length on Milk Production Capacity of Cows in Pasture-based Dairying Systems; M J Auldist, G O'Brien, D Cole, K L MacMillan and C Grainger, J of Dairy Sci, 2007: 90 : 3234-3241.

Effect of type of diet and energy intake on milk production of Holstein-Friesian cows with extended lactations, C. Grainger, M J. Auldist, G. O'Brien, K. L. MacMillan, and C. Culley**,** J. Dairy Sci. 92 :1479–1492

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Extended Lactation: which cows are suited to EL?

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Which cows are suited?

Although, modern dairy cows are able to milk well beyond 300 day, some cows are more persistent in their lactation than others.

Cows most suited to EL are:

- those with a higher proportion of northern hemisphere Holstein genetics
- those that lose more than a unit of body condition in early lactation
- those that gain less liveweight during a lactation
- those with the highest 300 day milk yields

Heifers are more suited than cows.

Persistence of cows over a 670 day lactation

Studies in Australia and NZ, using 670 day lactations (equivalent to 24-month calving intervals), have found that the proportion of North American Holstein genes and lower liveweight gain over a lactation are both associated with lactational persistency. The best predictor for cows likely to have good EL's was daily yield at 300 days; the best predictors in early lactation were hormonally based and included lower blood glucose, lower IGF and lower insulin concentrations in plasma samples. Surprisingly, higher growth hormone was not as good a predictor as expected.

Factors affecting extended lactation performance

- *% milking at 670 day dry-off vs. % North American Holstein (*% N-H*) genes*

Study	% N-H genes	% milking at dry-off
NZ	<12	15
Ellinbank 1 (Vic)	62	42
Ellinbank 2 (Vic)	64	54
NZ	>88	48

Heifers are more suited than cows as they are able to produce slightly more milk solids in the extended lactation phase whilst cows produce less milk solids in the extended lactation phase than they do in the first 300 days.

Extended lactation persistence

- *heifers vs. cows*

Measure	Heifers	Cows
Milk solids days 1-300, kg	390	505
Milk solids days 301-670, kg	404	385
Milk solids ratio (d301-670/d1-300)	1.04	0.76

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Will I produce less milk with EL?

As with a 300 day lactation, the effect of extended lactation on milk production varies between animals. EL research with Friesian cows found:

- Extra days in milk and higher concentrations of milk solids are factors that compensate for lower daily volume in the extended lactation phase
- Annual average milk solids production does not decrease with an extra 3 months lactation
- Annual average milk solids production decreases by 0 to 3% with an extra 6 months lactation depending on dry off threshold
- Lactations extended by 9 to 12 months are associated with a decline in average annual milk solids production of 2 to 10% making the dry off threshold a much more important decision

Lactation length (months)	Milk Solids kg (F + P) All cows	Difference c.w. 10 months	Milk Solids kg (F + P) Top 50% of cows	Difference c.w. 10 month
10	497		532	
13	497	0	524	-2%
16	492	-1%	527	-1%
19	472	-5%	509	-4%
22	463	-7%	525	-1%

- Dry-off threshold should be considered carefully with economics in mind
- Selecting cows that are suited to EL, rather than applying it to the entire herd, results in relatively low milk solids production loses of ~2%

Results from lactation studies

Research studies have investigated extended lactations up to 670 days (24 month inter-calving interval). Comparisons are reported in terms of milk solids. Volume of milk production is lower in the extended lactation phase. Protein and fat tests are higher in the extended lactation phase. Extended lactation results in extra days in milk (less days dry). The table below illustrates changes in litres milk solids and days in milk.

Lactation yields for cows fed 160 MJME/day @4L/d dry-off

	Milk (kg/cow)	Milk solids (kg/cow)	Days in milk
300 days x 2 years	11060	837	601
670 days	10279	817	652
300 d – 670 day	-7.1%	-2.4%	+51

Milk production from extended lactation cows is higher per lactation due to the extra days in milk. It is more sensible to consider average annualised milk yields (eg annual yield for 18 month inter-calving intervals would be 2/3 the lactation figure). The following tables show the effect of EL on annualised milk solids production.

If EL is applied to the entire herd, dry-off threshold becomes an important decision for lactations beyond 16 months. With an increase in dry-off threshold, there is a slightly higher reduction in average milk production. For a 16 month lactation the decline in annualised milk solids production is 1% using a dry-off threshold of 0.5 kg MS/day and 3% for a threshold of 1.0 kg MS/day. For a 22 month lactation, the decline in annualised milk solids production is 7% using a dry-off threshold of 0.5 kg MS/day and 10% for a threshold of 1.0 kg MS/day.

The following tables also show the affect of EL on milk production when applied to the 50% most persistent, higher producing cows. For the 50% most persistent cows, the decline in milk solids production is relatively low at around 2%. The dry-off threshold was relatively unimportant as most of the top 50% of cows produced 1.0 kg MS/day until the end of their planned lactation.

Effect of lactation length on "annual" milk yields (fat = protein) when fed 180 MJME/day diet @ 0.5 kg MS/day dry-off

Lactation length (months)	Milk Solids kg (F + P) All cows	Difference c.w. 10 months	Milk Solids kg (F + P) Top 50% of cows	Difference c.w. 10 month
10	497		532	
13	497	0	524	-2%
16	492	-1%	527	-1%
19	472	-5%	509	-4%
22	463	-7%	525	-1%

Effect of lactation length on "annual" milk yields when fed 180 MJME/day diet @ 0.75 kg MS/day dry-off

Lactation length (mnths)	Milk Solids kg (F + P) All cows	Difference c.w. 10 month	Milk Solids kg (F + P) Top 50% of cows	Difference c.w. 10 month
10	497		532	
13	496	0	524	-2%
16	487	-2%	523	-2%
19	470	-5%	507	-5%
22	459	-8%	523	-2%

Effect of lactation length on "annual" milk yields when fed 180 MJME/day diet @ 1.0 kg MS/day dry-off

Lactation length (months)	Milk Solids Kg (F + P) All cows	Difference c.w. 10 month	Milk Solids kg (F + P) Top 50% of cows	Difference c.w. 10 month
10	496		532	
13	494	0	524	-2%
16	482	-3%	522	-2%
19	466	-6%	505	-5%
22	444	-10%	523	-2%

The annual average milk yield can be greatly affected by the kg MS/day dry-off threshold and this should be considered carefully due to the impact on economics.

Further References

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Extended Lactation: how long will cows milk?

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How long will cows milk?

- Modern cows are capable of lactations well beyond 10 months
- Lactation persistence varies considerably between cows
- Most cows will milk for 16 months (18 month calving interval)
- Heifers have higher persistence than cows (that is, they have a slower rate of decline and may even have higher daily yields than older cows when lactation lengths exceed 400 days)
- With lactations beyond 16 months, many cows will dry off early

The modern dairy cow is more persistent than cows of years gone by. But how long can we expect cows to milk?

There is considerable variation between cows. Naturally, the number of cows making it to the planned dry-off date depends on the daily milk yield cut-off. Milk in the extended lactation phase is high in fat and protein, so volume is not an accurate indicator of milk income.

The average effect on Friesian cows in Victorian research studies cows is shown in the following tables.

For a 0.35 kg MS/day (4 L/day) cut-off:

- All cows were able to milk for an extra 3 to 6 months
- More than half the cows milked for 22 month/670 day lactations did not make it to the target dry-off date, but most milked to within a month or two.

How many cows made it? 0.35kg MS/day (4L/day) cut-off

Planned months of lactation	% cows milking at planned dry-off
10 months	100
13 months	100
16 months	100
19 months	80
22 months	40*

* 80% were in milk at 21 months

At a higher daily milk production cut-off, there are significantly less cows making it to the dry-off date.

How many cows make it at 0.5 – 1.0kgMS/d cut-off?

Planned months of lactation	% cows milking at planned dry-off			% cows milking at 1 month from dry-off		
Cut off kg MS/d	0.5	0.75	1.0	0.5 kg	0.75 kg	1.0 kg
10 mths	96	92	92			
13 mths	92	88	88			
16 mths	100	75	58	100	83	79
19 mths	63	54	21	83	75	71
22 mths	46	25	25	79	42	42

There is little difference in persistence between 10 month and 13 month lactations. The number of cows making it to planned dry-off for lactations of 16 months or more depends on desired daily milk yield at cut off. All cows can still be producing 0.5 MS/day at the end of 16 month lactations and the majority can produce 0.75 kg MS/day. For 19 month lactations the number persisting to the planned dry-off decreases although the majority get to within 1 month of planned dry-off. Around 25 to 40% of 21 month lactation cows were persistent enough to reach the planned dry-off or within 1 month of planned dry-off. For the longer length lactations, either a longer dry-off should be expected or milk production in the final months should be expected to be 0.5 MS/day or less for a significant number of cows.

Heifers are more persistent than cows as they are able to produce as much milk in the extended lactation phase whilst cows produce less milk in the extended lactation phase than they do in the first 300 days.

Extended lactation performance over a 670 day lactation – heifers vs. cows

Measure	Heifers	Cows
Milk solids day 1-300, kg MS	390	505
Milk solids day 301-670, kg MS	404	385
Milk solids ratio (d301-670/d 1-300)	1.04	0.76

Without selection for Extended Lactation, cows can currently be expected to milk for 13 to 16 months (15 to 18 months between calvings). Calving intervals of 21 to 24 months will see a number of cows drying off before the intended dry-off date. These cows gain more condition in late lactation.

With selection, a much higher proportion of cows would be able to successfully reach dry-off targets.

Further References:

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Extended Lactation: does feeding affect lactation persistence?

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Does feeding affect lactation persistence?

- Special feeding strategies are not required for extended lactation
- Extended lactation can be achieved on the range of nutrition likely to be experienced on farm
- On pasture based diets, lactation persistence is as good on lower grain supplement levels as on higher grain levels
- A Total Mixed Ration (TMR) diet can result in lower lactation persistence unless carefully balanced to avoid excessive liveweight gain
- Cows respond well to additional feeding in the extended lactation phase

Cows in research trials have been fed different levels of nutrition (resulting in different levels of milk solids production). Persistence is similar for cows on different levels of nutrition, indicating extended lactation can be achieved on a range of nutrition levels.

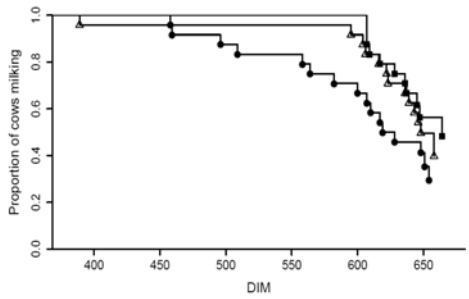
The following table shows the lack of a link between nutrition (reflected as milk solids production over the first 300 days lactation) and persistence (% milking at dry off).

Affect of level of nutrition on % of cows milking to 670 days

Study	Milk solids for days 1-300	% of cows milking at dry-off
Ellinbank 2 (Vic)	444	58
NZ	494	38
Ellinbank 1 (Vic)	505	42
Ellinbank 2 (Vic)	514	50
NZ	556	56
NZ	625	50

The graph below shows the persistence of cows in the extended lactation phase of an Ellinbank study with a target lactation of 670 days in milk. The drop in the proportion of cows milking indicates the level of persistence. Cows on a 160 MJ ME/day grass plus supplement diet (control) were as persistent as those on a 180 MJ ME/day grass with extra supplement diet (high) but more persistent than those on the full total mixed ration (TMR).

Factors affecting EL performance
- % milking at dry-off vs. quality of nutrition



The proportion of cows still milking during a 670 day lactation for cows undergoing lactations of 670-d offered a Control (■), High (Δ) or Full TMR (●) diet.

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Are cows responsive to supplements in the extended lactation phase?

Cows are responsive to supplements in the extended lactation phase.

When using litres as the measure there appears to be a variable response in the first 60 days (0 to 1.8 L/kg DM grain) and 200 days of a lactation (0.8 to 1.9L/kg DM grain).
However, when milk solids response was used, the result is more consistent (0.14 – 0.18 kgMS/kg DM grain).

The early lactation milk response was associated with variable liveweight change. The liveweight change needs to be factored in, as milk production of cows on lower levels of grain feeding was supported by weight loss.

Response to feeding of extra grain in the extended lactation phase was around 0.06 to 0.10 kg MS/kg DM grain (0.6 to 1L/kg). At this stage of lactation, litres response was consistent with milk solids response. Milk response was less in the spring of the extended lactation phase than when cows were fresh. This is most likely due to the high spring pasture allowance and its impact on milk response. In autumn of the extended lactation phase, the response was very good when liveweight gain plus milk response was considered.

Milk and liveweight response to grain feeding during a 670 day extended lactation

When	Milk yield (kg MS/day)	Milk Yield (L/day)	Lwt change (kg/day)	Kg MS/kg DM grain	L/kg DM grain
Spring (60 days)	1.7	22.7	-0.76		
Control	2.0	27.3	-0.67	0.15	1.8
+ 2.5 kg DM grain	2.4	27.3	0.42	0.15	0.9
+ 5 kg DM grain					
Autumn (200 days)	0.9	10.6	0.12		
Control	1.3	15.3	-0.03	0.18	1.9
+ 2.5 kg DM grain	1.6	17.4	0.77	0.14	1.4
+ 5 kg DM grain					
Spring (420 days)	1.1	12.6	-0.60		
Control	1.2	14.1	-0.60	0.06	0.6
+ 2.5 kg DM grain	1.5	16.8	-0.21	0.08	0.8
+ 5 kg DM grain					
Autumn (530 days)	0.7	7.8	0.36		
Control	1.0	10.0	0.86	0.10	0.9
+ 2.5 kg DM grain	1.2	11.8	0.92	0.09	0.8
+ 5 kg DM grain					

The short term economics of responses to grain feeding need to be considered carefully taking into account the value of a litre of milk and liveweight change.

Short term economics should not be used in isolation. Consider whole of lactation economics and other important factors such as cow condition and reproductive performance.

Further References:

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Will there be a change in genetic progress?

- There are both positives and negatives for rate of genetic progress
- Fewer heifer calves will be born in an extended lactation system
- Fewer heifer calves will be required as replacements in an extended lactation system
- More cows will have calves to AI
- More high genetic merit animals will have calves
- Extended lactation allows greater selection pressure

Cows calve less frequently in an extended lactation system. This will result in a slower introduction of improved genetics from an individual cow. However, there are a number of compensating factors that provide a benefit in genetic progress under extended lactation (EL).

EL allows more time between calving and mating. It is estimated that 100 days is now required between calving and mating to achieve optimum reproductive performance and this cannot be achieved for the majority of cows in a seasonal (300 day lactation) calving herd. As a result, in an EL system, more cows will be in calf overall and more will be in calf to first mating.

Given that the first round of cow matings are to AI, more heifer calves will be AI bred in an extended lactation system due to more cows being joined at an optimum period for reproductive performance. This provides a greater choice between heifers retained as breeders.

Higher producing cows are generally in negative energy balance when joined in a traditional calving system and the consequent reduction in pregnancy rates means fewer heifer calves are born to the highest producing cows. By contrast, more heifer AI calves can be expected from an extended lactation system, given cows are joined later when in positive energy balance.

A higher number of first calvers will be in calf due to heifers not being in negative energy balance at joining in an EL system. On average, the genetic merit of the heifers is highest, hence their calves will be of higher genetic merit and this will be another positive for rate of genetic gain under EL.

Higher selection pressure can be applied to an EL system as fewer cows are culled for empty, allowing greater culling for production and other desirable traits.
NOTE In-Calf and other principles of sound breeding management should be used in an extended lactation system

Further References:

Effects of Varying Lactation Length on Milk Production Capacity of Cows in Pasture-based Dairying Systems; M J Auldist, G O'Brien, D Cole, K L MacMillan and C Grainger, J of Dairy Sci, 2007: 90 : 3234-3241.

Effect of type of diet and energy intake on milk production of Holstein-Friesian cows with extended lactations, C. Grainger, M J. Auldist, G. O'Brien, K. L. MacMillan, and C. Culley**,** J. Dairy Sci. 92 :1479–1492

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Extended Lactation uses: delayed mating of part of the herd

The use of extended lactation (EL) within Victorian dairy farming systems is now considered commercially viable. With research information now available and farmer experience growing, an informed decision can be taken by farmers and advisors regarding use of EL.

Introduction

It is increasing difficult to maintain a seasonal calving pattern. The modern dairy cow is capable of lactations well beyond the traditional 300 days. This provides dairy farmers with new management options. EL is a system that suits the modern cow.

Delayed mating of part of the herd

Delaying the mating of some cows in a herd until the next joining period can have many benefits. It can help to

- Tighten up calving patterns
- Eliminate the need for calving inductions
- Help to retain valuable cows in the herd that otherwise wouldn't get into calf
- May require less replacements to be reared to maintain herd numbers
- Reduce cost of Artificial Insemination (AI) of cows that probably won't get into calf
- May reduce the need for bulls
- Reduce the number of phantom pregnancies
- Reduce labour requirements associated with joining and long calving periods.

Another benefit to some farms will be if they are trying to alter calving patterns, then Extended Lactation can be an economical way of achieving this.

Milk income normally works out similar for cows that are in an extended lactation program, due to the extra days in milk, and the nutritional level of the cow's diet doesn't need to be changed to achieve a successful extended lactation.

Individual cows that are likely to be candidates for delaying their mating are;

- Cows that are late calving.
- Cows that have lost a lot of condition
- Cows that are on a falling plane of nutrition
- Sick cows
- Heifers

These categories of milkers are the ones that are hardest to get back into calf; particularly if a tight calving pattern is desired. The modern dairy cow loses weight in early lactation as she puts more energy into making milk and maintenance than she is consuming. During this period in her lactation the cow is less likely to be able to get into calf. Heifers are under more pressure than cows as they are also trying to grow, compete with larger cows for paddock feed and may be losing teeth.

Calving pattern

Many of the modern high producing cows need more time between calving and mating for them to successfully get back into calf. There is much debate whether this is a result of the genetics used or is a management issue. Regardless of the cause many researchers and farmers are finding that allowing more time between when the cow calves and when she is joined achieves a more successful pregnancy rate. Delaying mating of cows that may struggle to get back into calf to the next joining period will improve the calving rate and may also reduce herd rates of phantom pregnancies.

A delayed mating strategy will allow the calving pattern to be tightened by moving cows that don't get into calf in the desired joining period back into the start of the next calving period. This will also reduce the need to induce cows. By not joining cows after a set period of time you may reduce the need to run bulls as cows that are not in calf can go through until the next AI joining period. Also, by identifying cows that are unlikely to get back into calf during the joining period, decisions can be made to deliberately not AI which will reduce some cost and labour.

Milk production

Research has shown that annual milk solids production will be maintained if mating is delayed up to 6 months whilst a modest drop in milk solids occurs if mating is delayed up to 12 months. Fewer litres are produced but milk components are higher and cows have more days in milk (fewer days dry). Research has also shown that heifers produce more milk in their EL phase than their first 300days.

Milk solid production in the first 300days of an extended lactation compared to the extended lactation phase for heifers and cows.

	Heifers	**Cows**
Milk solids (kg) produced from days 1-300	490	505
Milk solids (kg) produced from days 301-670	404	385

Average annual (12month) milk yield for cows that were milked for various length lactations. #

Inter-calving interval (months)	**Annual Average Milk solids (kg fat + protein per cow)**
12	497
15	498
18	495
21	474
24	463

 # E.g. a cow calving every 18months would produce 743 kg milk solids in a lactation which is an annual production of 495 kgs MS (2/3's of 743).

Nutrition and persistence

Cows do not require special feeding to achieve an extended lactation. Persistence is as good on low nutrition as on high nutrition. Successful extended lactation is achieved on the typical range of pasture plus supplements diets fed on Victorian farms. Cows can have a feed pinch and then bounce back when feed is available. Cows are responsive to supplements in the extended lactation phase. Milk response observed during the extended lactation phase is around 0.6 to 1.0L of milk per kilogram of grain. There is also weight gain or reduced weight loss depending on the stage of lactation. This milk is of higher components than earlier in lactation.

Persistence is mostly related to the genetic make-up of individual cows. Cows that have a high proportion of northern hemisphere Holstein genetics appear to be more persistent. Research has not been conducted on Jerseys or cross-bred cows in terms of persistence in an EL system but farmer experience is they are also capable of extended lactations. The number of cows that make it to a target dry off date depends on the daily milk yield cut-off. The lower the targeted daily milk yield cut-off, the more cows that will persist.

Percentage of cows that achieved various target lactation lengths for different cut-off levels.

Months in Milk	% of cows milking at a Cut-off **4L/day**	% of cows milking at a Cut-off **10L/day**
10 months (traditional dry off)	100	100
13 months	100	88
16 months (1.5 year EL)	100	71
19 months	80	46
21 months	80	
22 months (2 year EL	40	29

Note: Milk produced during extended lactation is higher testing.

Retaining cows and replacements

By allowing cows that otherwise wouldn't get into calf in a traditional system to have an extended lactation you are able to retain more of these cows. Most extended lactation cows pay their way in the herd over the full lactation. This offers the advantages of retaining more cows of high genetic merit and possibly reducing the number of replacements that would otherwise be needed to replace the cows that are sold.

Another option available is for cows that go into an extended lactation can be sold during or at the end of the lactation. Cows that are towards the end of an extended lactation are generally heavy and worth more money in the market.

Management issues that may need considering

Feed planning is important if considering extended lactation. If used in a split-calving herd, consideration needs to be made about how the percentage of cows calving at different times of the year will affect your feed plan. Also if you are using extended lactation for a 2 year cycle, can you supply the extra feed required by extended lactation cows milking over their normal dry period?

Other questions that need to be considered are:

- If calving patterns or the number of cows calving at different times change, is the farm capable of handling various scenarios such as milking through wet winters?
- Does the farm have adequate infrastructure to accommodate these changes?

Some cows may get over-fat during an extended lactation, particularly after 16 months of lactation. These fat cows can have health issues at the next calving. A plan will be needed to address this. An example might be to run these cows in a separate mob when dry, to try and reduce condition during this period to around score 5.5.

Further References

Effects of Varying Lactation Length on Milk Production Capacity of Cows in Pasture-based Dairying Systems; M J Auldist, G O'Brien, D Cole, K L MacMillan and C Grainger, J of Dairy Sci, 2007: 90 : 3234-3241.

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