DAIRY FARMING WITH REDUCED INDUCTIONS

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Introduction

The New Zealand (NZ) dairy industry is reliant on seasonal pasture production and a concentrated calving interval to best match pasture supply and animal demand. To achieve this goal, some farmers induce lactation in late calving cows. This has animal welfare implications, which could result in non-tariff trade barriers to NZ dairy products (Blackett, Compton and Glassey, C. 2006, Stevens, J., Burton, L, Rendel, J. 2000). Additionally there are concerns with drug residues in the milk from herds where a large percentage of cows are induced.

New standards were introduced in the 2010-11 season by the NZ Veterinarians Association (NZVA), Dairy NZ, Dairy Companies Association of NZ (DCANZ) and Federated Farmers. In the 2011-12 season the level of inductions within an individual herd will not exceed 8% reducing to 4% in 2012-13. There will be requirements for information about the stage of pregnancy; the age of the cow (under eight years old) and body condition score (4.5 to 6.5).

Although this reduction may seem onerous, the NZVA has stated that only 3% of the national herd was induced in the season just finished, with 98% of farms being under 15% (Benny 2011). A survey of Canterbury dairy farmers in 2008 found that 36% operate a nil induction policy (Pangborn, 2008).

With reduced levels of inductions farmers will be forced to adopt an eight week mating system if they are to maintain the traditional calving patterns. If the number of late calving cows cannot be reduced to fewer than 4%, then a larger number of cows will be culled. If a pregnant cow is worth $2,000 and a non-pregnant cow $500 there could be significant capital losses.

The purpose of this paper is to review the basics of getting cows in calf and strategies for reduced inductions, discuss the results of the nil induction policy of the Lincoln University Dairy Farm (LUDF), and look at the plan of one Canterbury farm to meet the new guidelines.

Why do we have inductions?

Because it is easy and has economic benefits. Sometimes it covers for bad husbandry practices---thin cows, unhealthy cows, poor heat detection, poor conception rates and the increased stresses put on modern cows. Our cows may walk too far, spend too much time in the yard at the shed, be in negative energy balance longer, produce too much milk, suffer from heat

and/or cold stress and are genetically programmed to produce milk at the expense of reproduction.

Financial Implications of reduced inductions

The eight week in calf rate for a large Canterbury vet practice this year was 66%-86% (Arthur, personal communication. Donald Arthur is a veterinarian with the Selwyn Rakaia Vet service). If for example a farm obtains a 76%, in-calf rate at eight weeks, then in a herd of 500 cows there will be 120 cows to be bred by bulls. If the bulls are left in the herd so that the total mating season is 12 weeks and a further 50% become pregnant, there will be about 60 late calving cows. Since only 40 of these can be induced (8% of 500), a farmer has to hope that the other 20 will calve in late September/early October. Under this scenario the 60 empties (12% of the herd) will be culled. The situation will be worse under 4% inductions. Additionally, if the letter of the law is carried out, then any cow over the age of eight cannot be induced.

Table 1. Effect on in-calf rates for a 500 cow herd for the 2011-12 season (8% inductions)

	66%	**76%**	**86%**
# in calf in 8 weeks	330	380	430
+ # in calf in 12 weeks that can be induced (8%)	40	40	35
Late calvers (October)	45	20	0
Empties	85	60	35
% culled for being empty	17%	12%	7%

In all scenarios the percentage of cows culled for being empty are under the industry standard culling of 20% (which is the number of heifer replacements generally reared). However in the 66% scenario there is very little scope for selective culling. In addition a cow that calves in late September/early October will produce at least 50 kg milk solids less than her earlier calving herd mates. With no late calving cows the 86% scenario should not result in lost milk production.

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For the 76% herd the loss in milk production will be $6,500 at a milk price of $6.50 (20 cows x 50 kg ms x $6.50). In the 66% scenario the loss will be $14,625 (45 cows x 50 kg ms x $6.50).

Table 2. Effects on in-calf rates for a 500 cow herd for the 2012-13 season (4% inductions)

	66%	**76%**	**86%**
# in calf in 8 weeks	330	380	430
+ # in calf in 12 weeks that can be induced (4%)	20	20	20
Late calvers (October)	65	40	15
Empties	85	60	35
% culled for being empty	17%	12%	7%

Loss in milk production will be $4,875 for the 86% herd (15 cows x 50 kg ms x $6.50). For the 76% herd the loss will be $13,000 (40 cows x 50 kg ms x $6.50) and for the 66% herd the loss will be $27,625 (85 cows x 50 kg ms x $6.50). This does not take into account the problems associated with cows calving in October.

What do we know that can reduce the losses?

1. Getting the basics right.

Programmes such as "In-Calf" provide a template for achieving reproductive success. Areas covered are:

- Calving systems
- Measuring performance
- Setting targets
- Calf and heifer management
- Body condition and nutrition
- Heat detection
- Dealing with non-cyclers
- Sire selection and AB
- Bull management
- Cow health
- Mating dates, pregnancy testing and culling

If you follow the In-Calf Manual and can honestly say that you are doing everything correctly, you should be well on your way to improved reproductive performance. Obviously

the results achievable through In-Calf should be the goals of all farmers as induction levels are legally reduced. However, in reality most farms are going to need to look at some form of farming system change.

2. *What do successful non-inducers do?*

Paton (2006) interviewed eight farmers (9 farms) in South Canterbury who practiced a nil induction policy and had an average empty rate of less than 10%. The farms production levels were similar to the district averages. The breed of cow, New Zealand or overseas genetic base and Breeding Worth varied between the farms. The midpoint of calving ranged between 2 and 3 weeks. The calving period ranged from 41 -56 days. Paton found that these farms had the following similar characteristics:

a) Body condition score was monitored closely on all nine farms, with this being done regularly by consultants on seven of the farms.
b) All farmers were feeding some silage during the lactation, ranging from 228-600 kg DM per cow. High energy supplements (molasses, cereal grains or a high energy milk by-product) were used on seven of the farms, mainly during the spring at up to 2 kg per day. On four farms high energy supplement feeding continued throughout the lactation.
c) Winter feeding was controlled by the herd owner in all but one case, and in seven of the nine cases winter grazing was on an owned or leased runoff. Winter feed sources were pasture, kale, rape and annual ryegrass, grass silage and/or straw. Winter intakes 'down the throat' ranged from 12-15 kg DM/cow/day for older cows, and 11-15 kg DM/cow/day for younger cows.
d) Use of minerals was widespread.
e) Reproductive tract disorders were minimal, and only one herd identified lameness as a problem. Bulk milk somatic cell counts ranged from 80,000 to 180,000 cells/ml.

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3. *Results from the Lincoln University Dairy Farm (LUDF).*

The LUDF has operated a nil induction policy since the 2003-04 season. A number of strategies have been used to improve the reproductive performance including treating anoestrus cows, synchronizing and using AB on heifers and rearing more heifers to account for higher empty rates (+25% heifers reared). Results are shown in Table 3.

Table 3. Selected reproductive statistics for the Lincoln University Dairy Farm

	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11
PSC to mid point (days)	22	23	14	12	16	15	9**	13**
Anoestrus % treated	36.7%	24.3%	14.5%	17%	8%	23%	0	0
Mating period (days)			15	16	15	10	10	10
6 week in calf rate %			65%	67%	66%	67%	74%	72%
% empty cows	17%	20.5%	16%	14%	14%	20%	13%	13%

** PSC was eight days later
Compiled from data supplied by V Serra (DairyNZ)

Although these results may be less than desirable, they do show that over time a nil induction programme can achieve acceptable reproductive results. From a profitability standpoint a comparison of the LUDF to a selection of high performing Canterbury farms showed that the LUDF had about 20 cents/kg ms of higher breeding and heifer grazing costs that can possibly result from the nil induction policy.

Strategies to cope with reduced inductions.

2. *Increased emphasis on body condition score.*

Cows calving at BCS 4.0 compared with BCS 5.0 are 7% less likely to be cycling at the planned start of mating (PSM). Cows that have not started cycling by the PSM have a 16% lower 6-week in calf rate and a 6% greater empty rate (Roche 2011). Rodgers et.al (2011) used the Farmax modelling programme to assess the profitability of various methods to increase body condition score. Scenarios involved drying off early, additional supplements in late lactation/dry period and OAD milking. In all cases the BCS was increased from 4.25 to 5.0 and resulted in improved operating profits, partially the result of increased reproductive efficiency.

2. Genetics

It is commonly thought by farmers that crossbred animals become pregnant more easily. An analysis of survivability between lactations derived from LIC Dairy Statistics (1997-98 and 2007-08) by Pangborn and Woodford (unpublished) found that survivability between lactations is highest in the crossbred population, suggesting that crossbreeding could be a tool to increase fertility. Likewise, using bulls with higher Breeding Values for fertility and BCS will be helpful in the long term.

3. Use of carryover cows

Some farmers have adopted the policy of carrying over non-pregnant cows. Pangborn and Woodford (2010) reported data for a herd with a large percentage of cows that had been carried over in a non-lactating state for a season. When compared to 'normal' herd mates and 2 year olds, production rates were as shown in Table 4.

Table 4. Production of carryover trial herd

	Total Milksolids
MA normals	420
MA carryovers	462
2 year olds	341

It is proposed that the extra BCS of the carryover cows allows them to produce at a higher level than 'normal' cows of a similar age group and at a much higher level than 2 year olds. Comparing this scenario to the LUDF method of rearing extra heifers leads to the conclusion that the inclusion of carryover cows could lead to higher production levels for the farm or at least similar production levels with less cows.

However there are problems with carryover cows. In this study 17% did not become pregnant during the year they were carried over and in the subsequent lactation 20% failed to

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become pregnant. An analysis of the costs of carrying over cows showed that in the year of analysis, the costs for carrying over a cow and raising a heifer was approximately the same.

The silver bullet

Sorry---there isn't one. The information presented above has given ideas about the extent of the problem and have also provided ideas that can be incorporated into a farm reproductive plan. The plan below is just one way of trying to manage the system on a particular farm. Be aware that this farm (like all farms) has special conditions that will only apply to it.

The plan

1. Calves are reared as per the In-calf programme. Additionally this herd vaccinates for BVD. No late born calves (after Sept 5th) will be reared.
2. Yearlings are weighed regularly, vaccinations repeated, heifers drenched as necessary and minerals provided. Jersey bulls are put with the yearlings a week before AB starts for the main herd.
3. A consultant will score the herd and mark all 3.5 BCS cows in mid-March to be dried off. BCS 4 cows will be put on OAD by mid-April and dried off on May1. Culls will be away by May 1. The herd will be dried off by May 25. Liver samples from culls will be analysed for the mineral status of herd.
4. The wintering programme will change. One third of the cows (2 year olds and thins) will be on grass/baleage, with the balance fed Kale (12 kg offered), baleage (2 kg) and straw (1 kg). More attention will be paid to the assessment of crop yield and the daily allocation. Seventy percent of the cows will be grazed on properties controlled by the farm.
5. AB for seven weeks to take pressure off bulls. The purchase of bulls is to be contracted months before the mating season and bulls must meet minimum weight standards and testicle circumference. They will also be tested and vaccinated for BVD.
6. Metricheck herd in late September.
7. Cows will be adequately fed at all times. Supplements available include Baleage, PKE and Barley. All feed costs are analyzed on a MJ ME basis. Supplementation on this farm is to fill feed gaps, not push production higher.
8. Cows are supplemented with minerals at all times (Mg, Se, Co, Cu, Zn), except when grazing off.
9. A crossbreeding programme will be pursued.
10. Rather than rear more heifers, the farm will continue to rear heifers equal to 20% of the herd. However, empty rising 3 and 4 year olds with average or above Production Worth will be carried over due to the availability of cheap grazing.

11. More proactive use of scanning. In consultation with veterinarian and consultant the use of CIDR's, partial synchronisation and other tools is being evaluated.
12. The stocking rate will be reduced from 3.75 cows/ha to 3.5 cows/ha.

Conclusions

The removal of induction technologies from NZ dairy farming in many cases will have significant effects on current farming systems. In the first instance farmers should try to improve their 'cow management' as suggested by Paton and outlined in the 'In-Calf' programme.

However, it is recognized that improving 'cow management' is easier said than done and for many dairy farmers a number of different techniques will need to be adopted. The methods adopted and implementation will depend on the farm and farmer.

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