

## USING SHORT GESTATION SEMEN TO TIGHTEN CALVING SPREAD - ITS NO-BULL!

Sick of those problem late calvers? Don't want to induce anymore? Had enough of the hassle of bulls in the herd?

***Artificial Insemination and Short Gestation Genetic technology can now benefit the Farm System, not JUST the genetic merit of your herd. The Presenters will discuss farm systems using only SGL semen in the later part of the mating period , and will assess the following outcomes;***

- Tighter calving pattern.
- Reduced need for inductions.
- More days in milk.
- More recovery between calving and mating which means better repro performance.
- Less reliance on interventions at mating time because of the increased recovery time.
- Avoiding the necessity of purchasing and handling bulls.

### **What is Short Gestation Length Semen?**

The calving interval of a cow is the sum of the number of days she is empty and the gestation length (GL) of the calf that is born following the successful insemination. One way of reducing the calving interval of a cow is to reduce the gestation length of the calf she is carrying. Reducing the gestation length of progeny of cows that conceive late in the mating season is a way of reducing the need for inductions as a means of maintaining a 365-day calving interval.

Through natural variation some cows will have a shorter gestation length than others. Back in 2001 Dr. Anne Winkelman, a senior scientist at LIC discovered that the heritability of gestation length was 44%. This means that the trait is highly heritable (Protein is 31% heritable) and therefore breeding schemes can be put in place to measure and selectively breed from these animals. Unfortunately the variation in the population was very low (gestation length doesn't vary much between cows), so any breeding scheme would only make small incremental gains each year. The genetics technology has now got to a point where farmers can select from a range of SGL products, some of which will shorten the gestation length by 10 days.

There are a number of short gestation length bulls that are available to farmers. Some bulls have been generated purely for their gestation length and others have a combination of BW and gestation length. Different combinations of will suit different farming operations.

Short Gestation bulls by type and breed	Gestation BV	Gestation length on farm (days)
BW Holstein Friesian bulls	-9	-4.5

BW KiwiCross bulls	-12.4	<b>-6.2</b>
<b>Bulls purely for their Gestation Length (progeny should not enter the milking herd)</b>		
Holstein Friesian	-15.6	<b>-7.8</b>
KiwiCross	-21	<b>-10.5</b>
Jersey	-15.4	<b>-7.7</b>
Hereford x Dairy crossbred bull	-11	<b>-5.5</b>

## DISCUSSION AREAS:

The following discussion looks at some of the practical farm management considerations that should be taken into account when using Short Gestation Length genetics as well as an economic analysis.

### 1.Heat detection fatigue

Short gestation genetics should be used after enough AB inseminations have taken to generate the required AB heifer replacements for the herd. It is the cows conceiving later in the mating period that benefit the most from having their calving dates moved forward. On the majority of commercial dairy farms this means mating for a 2<sup>nd</sup> and or 3<sup>rd</sup> cycle (AB mating for 6-9weeks). This means a longer period of heat detection. The ability, attitude and accountability of the Heat detector is critical to the farm management decision around extending AB and must be proven to be sound before embarking on this option. Many farms are choosing to extend AB and are achieving good results.

- In the 2013/14 season there were just over 120 herds that did 10wks or more AB last spring of which 36 had a detailed Fertility Focus Report.
- They had an average of 66% for their 6wk incalf rate.
- Table 1. is a detailed view of one of these herds (with a 77% 6wk incalf rate) and the conception rate each week is shown.
- We can see a drop off in conception rate in the latter weeks. However, all cows that were mated in the last 3 weeks had more than one mating, the majority had more than 2 matings and 28 of them went up 4 or 5 times. These cows probably had other underlying issues than meant they weren't conceiving.
- Note that conception rate in the 1<sup>st</sup> week was a lower due to a 19% CIDR cow inseminations early in that week.
- Conception rate to CIDRs used = 49% .
- In review, the 1<sup>st</sup> round CR averaged 60% (national targets 60%) and the second round was 55%

**Table 1. Weekly conceptions rates of a herd doing 11 weeks AB**

Week mated	Cow mated (2013)	Cows with an expected calving date +/-10 days of mating	Conception Rate (2013)
Wk 1	501	277	55%
Wk 2	364	226	62%
Wk 3	247	155	63%
Wk 4	169	99	59%
Wk 5	180	101	56%
Wk 6	92	45	49%
Wk 7	103	45	44%
Wk 8	75	35	47%
Wk 9	50	25	50%
Wk 10	48	25	52%
Wk 11	14	5	36%



## 2.Mis-mothering

- Care must be taken not to keep the progeny of particular short gestation length sires.
- These sires with the best gestation length breeding values have not been selected for milk production traits and their calves should not be kept.
- Management strategies should be put in place for these sires such as calving down in two mobs to minimise this risk.
- The Hereford x Dairy cross sires have a white face marker which assists farm staff in correctly identifying the short gestation length calves.
- There are high BW sires that also have short gestation lengths. The progeny of these sires can be kept in the milking herd. Check with your genetics supplier when you are ordering these bulls.

## 3.Economics of SGL Semen

There are both benefits and costs to using short gestation length semen. If the farm extends the AB period using SGL semen there is the obvious cost of more heat detection, more AB inseminations... **BUT....** then there is the advantage of extra days in milk the following season, the fact that less or no natural mating bulls are required etc. To get a better picture on how all these factors interact, the following model has been developed. The inputs and out puts will be different for individual farms so the purpose of this model is to provide you with a framework for understanding the economics.

### EXAMPLE 1.

**Herd Size 1,000 cows with a 85% submission rate and a 55% conception rate.**

## (Standard NZ mating statistics) - 5wks AB followed by 5wks with the natural mating bull

- At the end of 5wks AB there will be 367 cows still to get pregnant.
- With a bull ratio of 1:30 (using 2yr old bulls) 24 bulls are required (2 teams of 12 bulls rotated day on, day off).
- NOTE: if yearling bulls were used the ratio would be 1 bull to every 20 cows that need to get pregnant).

### COSTS

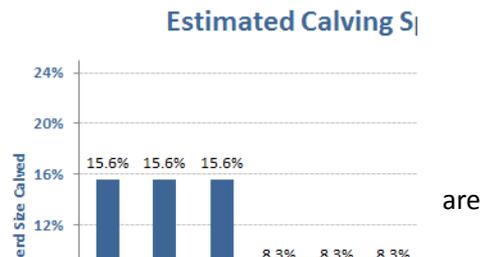
#### Lease Bulls

24 bulls @ \$500

#### Feed

12 KgDM/day @ \$0.20 /kgDM eaten =  
Weeks on farm – 7 weeks (1 wk before they  
needed, 1 wk after they finish)

**BULLS** \$12,000  
**FEED** \$2,822  
**TOTAL** \$ -14,822



#### NOTE:

- Buying bulls as opposed to leasing bulls can make the bull cost neutral , if you are able to buy and sell them for similar pricing. However, the feed costs are still relevant as itemised above.
- There are other negative issues with natural mating bulls that are difficult to quantify and not included in these comparative calculations , e.g Biosecurity risks, OSH staff risks , farm/yard damage, bull deaths or injury e.g severe lameness , low bull fertility ,poor semen quality etc
- The sale of white faced progeny or good Friesian bull calves can be another revenue source from bull matings compared to SGL semen-born calves which are only of bobby calf value. However, these calves will be later-born calves and hence a reduced market/less desirable to calf rearers being so late.

## EXAMPLE 2. Same herd doing 10wks AB with 5wks SGL semen (SGL BV -21)

### COSTS

#### Extra Insemination costs

An additional 435 straws will be required at a cost  
**\$5,960** (\$13.70/straw and insemination)

#### Heat detection aids

2,000 @ \$2.14 for an extra 2 rounds = **\$4,280**

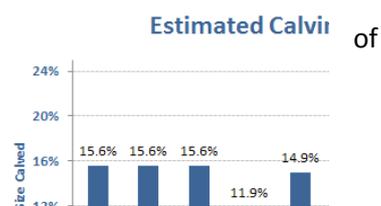
#### Labour

Approximately 2hrs/day \$80 x 35 days = **\$2,800**

#### Extra Spring Feed

239 cows x 10 days x 4kgs more than a dry cow x 0.26c winter feed cost = **\$2,485.6**

**Total Costs= \$15,525**



## **BENEFITS**

239 cows will calve 10 days earlier = 2391 more days in milk the following year  
@ 1.5kgMS/day @ \$7.00/KgMS = \$25,095

**NET BENEFIT: \$25,095 – \$15,525 = \$9,570**

**IN REVIEW : Bulls option COSTS business \$ -14,822**

**SGL AB option BENEFITS business \$9,570**

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## **4.Values around differing scenarios**

There are a number of different factors that can change the outcome of the equation :

- How many weeks of AB a farm does?
- What the reproductive performance indicators are on that farm?

Table 2 below looks at 2 different mating plans and at 3 different reproductive performance levels

- 6wks AB + 4wk with the Bull or SGL
- 5wks AB + 5wk with the Bull or SGL

**Table 2. Economics of different mating plans with different reproductive performance**

AB wks	Bulls/SGL	Submission Rate	Conception Rate	Bull cost	Net benefit from SGL
6	4	90	60	\$ 8,475	\$ 2,934
6	4	85	55	\$ 11,357	\$ 4,356
6	4	80	50	\$ 14,419	\$ 5,087
5	5	90	60	\$ 12,352	\$ 8,312
5	5	85	55	\$ 14,822	\$ 9,570
5	5	80	50	\$ 17,910	\$ 9,903

What is clear is that as the overall reproductive performance level **improves**, the cost of running bulls **decreases** as does the benefit of using SGL semen.....**BECAUSE**.....

- with improved reproductive performance, more cows are getting in calf in the first 6 weeks, which results in less cows that the bull has to get pregnant (and therefore less bulls required)
- Conversely less cows to be inseminated with SGL semen and therefore less days in milk the following season to give the days-in-milk financial advantage.

## **5.Can we quantify the reproductive benefits of earlier calving cows?**

Earlier calving cows not only give you more days in milk, but they have a noticeable impact on improving your reproductive performance. Every day earlier a cow calves, it improves her chance of getting in calf in the first 6 weeks .

Using the calving Pattern Tool in the In-Calf Tool Kit, estimations of the reproduction benefits of improving the herd calving pattern can be made. It is not an exact science so care should be taken when using the results of these calculations. The full calculation is provided in the appendix.

## **CONCLUSION**

Short Gestation Length semen will have different benefits in different farming situations.

- When the reproductive performance of the farm is **high** and not a limiting factor in the business, the value of SGL technology lies in the elimination the natural mating bull, removing the need for inductions, thus capturing extra days in milk by bringing forward the calving date of late cows.
- When the reproductive performance of the farm is **moderate to poor** and is a limiting factor to the business, then the value of SGL is more pronounced (see Table 2.). It has increased benefits of generating extra days in milk , but it also has a positive impact on incrementally improving the mating performance of the herd the following season, by allowing more cows each season more days from calving to mating, hence a faster resumption of cycling.
- Heat detection ability , attitude and accountability is critical to the farm management decision around using AB only , and must be proven to be sound before embarking on this option.
- Care must be taken not to keep the progeny of Low BW short gestation length sires. The sires with the best gestation length breeding values have not been selected for milk production traits and their calves should not be kept. Have a clear management plan in place if you are using these sires e.g. calving down in two mobs.

## APPENDIX .1.

### Quantifying the reproductive benefits of earlier calving cows:

**EXAMPLE:** Herd of 1000 cows, 10 wks total mating (5wks AB + 5wk with the Bull/SGL) using NZ average data, with an 85% SR and 55% CR we get a reproductive benefit of \$7,725

Improving the herd calving pattern using SGL semen will:

- improve the herds overall 6wk In-Calf rate by 1.021% which is worth **\$4,083.73**
- improve the empty rate by 0.364% which is worth **\$3,641.52**
- **TOTAL BENEFIT = \$7,725.25**

**1,000 cow herd, 10wk mating with 85% SR and 55%CR, SGL is -10 days on farm**

This is the expected calving pattern from using either:

- 5wks AB + 5wk Natural Mating bull (Standard)
- 5 wks AB + 5wk SGL AB (SGL)

It is assumed that the heifers will calve down 75% by wk 3 and 92% by wk 6 and 100% by wk 9

Culls over and above empty cows are made evenly from the herd.

Calving Pattern (No. cows calving)			After culls		Addition of 200 heifers	
	Standard	SGL	Standard	SGL	Standard	SGL
Early (1-3 wks)	468	468	450	444	600	594
Medium (4-6 wks)	249	312	231	288	265	322
Late (7-9 wks)	133	93	115	68	131	84
Very late (10+ wks)	24		5		5	
<b>Total cows calved</b>	<b>873</b>	<b>873</b>	<b>800</b>	<b>800</b>	<b>1000</b>	<b>1000</b>

Calving Pattern %	Standard	SGL	Gap
Early (1-3 wks)	60%	59%	
Medium (4-6 wks)	86%	92%	<b>5.15%</b>
Late (7-9 wks)	99.5%	100%	<b>0.5%</b>
Very late (10+ wks)	100%		

#### Increase in 6wk in-calf rate

5.15% calved by week 6 gap x 0.17 = 0.876

0.5% calved by week 9 gap x 0.29 = 0.145

= **1.021**

#### Decrease in Empty rate

5.2% calved by week 6 gap x 0.06 = 0.309

0.5% calved by week 9 gap x 0.11 = 0.055

= **0.364**

#### Closing the 6wk in-calf rate 'gap' is worth:

1.021 x \$4 x 1000 cows calving = **\$4,083.73**

#### Closing the Empty Rate gap is worth:

0.364 x \$10 x 1000 cows calving = **\$3,641.52**

**Total Benefit = \$7,725.25**

[http://www.dairynz.co.nz/page/pageid/2145861791/InCalf\\_Herd\\_Assessment\\_Tools](http://www.dairynz.co.nz/page/pageid/2145861791/InCalf_Herd_Assessment_Tools)

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