



Calving Pattern Tool

What is this tool?

This is a **gap calculator** tool. It assesses your herd’s calving pattern and its impact on herd reproductive performance.

Why use this tool?

Calving pattern has a major impact on herd reproductive performance. Data from the NZ Monitoring Fertility Project 2003 showed that cows that calve in the first three weeks have 6-week in-calf rates around 75% with a not-in-calf rate of 8%. In contrast, cows that calve within 6 weeks of the Mating Start Date could only achieve a 6-week in-calf rate of 50% with about 20% being not-in-calf.

This tool enables you to measure the calving pattern and identify the gap between actual and desired pattern. The tool then enables you to assess the \$ benefits of improved herd reproduction performance from closing this gap.

For more information, see *The InCalf Book*, Chapter 10: “Calving Pattern” and your *InCalf Fertility Focus report*.

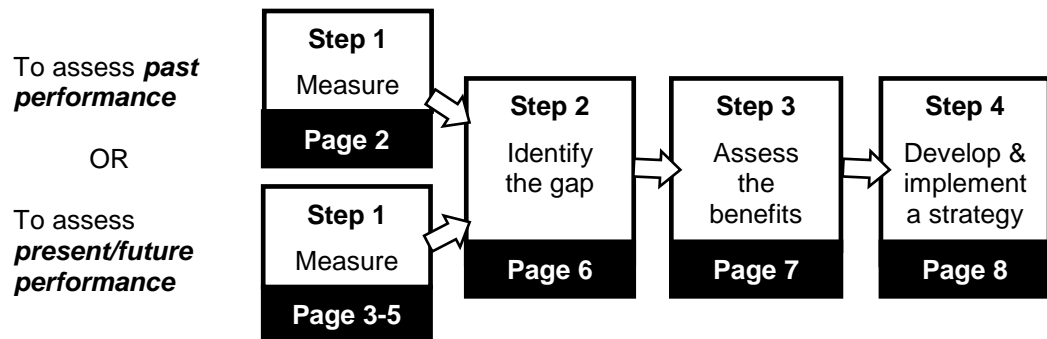



See pages 62-68

How to use this tool

First, choose whether you want to assess **past performance** (the likely impact of a calving pattern on herd reproduction performance in the past) or **present/future performance** (EITHER the likely impact of the calving pattern just completed on the impending herd reproductive performance OR the likely impact of an upcoming calving period on subsequent reproductive performance).

Then work through this tool’s four basic steps:



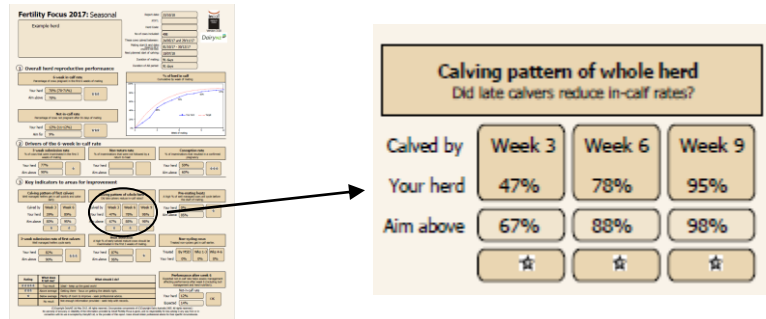
When you see this symbol  you need to fill in some information or do some calculations before continuing.

Assess past performance

Step 1) Measure

If you do have an *InCalf Fertility Focus* report this will automatically calculate the % of cows calved by weeks 3, 6 and 9 (i.e. the calving pattern of the whole herd).

Here's the place to look on your *InCalf Fertility Focus* report.



Now go to Step 2 on page 6



(!) Gestation length is variable

The Planned Start of Calving date is the expected calving date for cows that became pregnant on the Planned Start of Mating of the previous year. It is the first day that cows are due to start calving – 282 days after Mating Start date. Of course, because gestation length varies with a standard deviation of 4.5 days, some cows will calve before the Planned Start of Calving due to this natural variation.

(!) Using the tool in split-calving herds

This tool is not designed for split calving herds (i.e. herds having two or three calving periods each year) where all calving periods are short (e.g. only 6 weeks). In this situation, calving is not spread so changes to calving pattern will have little effect on herd reproductive performance. In split calving herds with a short calving period (e.g. only 6 weeks) and a longer calving period (e.g. 10 weeks or longer) each year, the tool is very useful but should only be applied to the longer calving period. In this situation, the economic values for seasonal calving herds are probably appropriate.

Assess present/future performance

Step 1) Measure

The likely calving pattern for the upcoming calving period can be determined if you have accurate estimates of each cow's due-calving date. Early rectal pregnancy testing and inclusion of gestation length breeding values is the most accurate strategy (*The InCalf Book*, pages 65, 157).

After this step, you will know the cumulative % of the herd that will calve by weeks 3, 6 and 9 in the next calving period. To calculate this, complete Table 2, on page 4, by following the directions below.

Part 1: Complete Table 2 (next page)

Complete Column i

- Complete early rectal pregnancy testing (*The InCalf Book*, page 157) to accurately identify when cows conceived in the most recent mating period.
- Obtain a list of cows in order of due calving date, based on pregnancy testing results:
 - ask your pregnancy testing service provider for this; or
 - alternately, you can obtain this from some farm software or prepare this list manually.
- Cross all cows off this list that will be culled before next calving.
- Work out the Planned Start of Calving date for the upcoming calving period:
 - you will need the Mating Start Date from the recent mating to do this; and
 - either look up a breeding table (e.g. *The InCalf Book*, page 174 or 'mating notebook') or use a Planned Start of Calving date calculator (See Appendix – Planned Start of Calving date calculator, page 9).
- Calculate the calving dates that correspond with the end of Weeks 3, 6 and 9 in the upcoming calving period:

What was your Planned Start of Calving date?		Calving category
	___/___/___(a)	
Add 20 days	___/___/___(b)	This is the end of Week 3 – any cow that calved up to and including (b) calved in the first 3 weeks
Add 21 days more	___/___/___(c)	This is the end of Week 6
Add 21 days more	___/___/___(d)	This is the end of Week 9
		Any cow that calved after (d) calved after Week 9
		Very late (10 ⁺ wks)

- Using the list of cows in due calving date order, count the number of cows that will calve in each category. At this stage, don't include heifers approaching their first calving.
 - This now tells you how many cows (not first calvers) are expected to calve in each calving category.
 - Enter these values in **Column i** in Table 2 below.

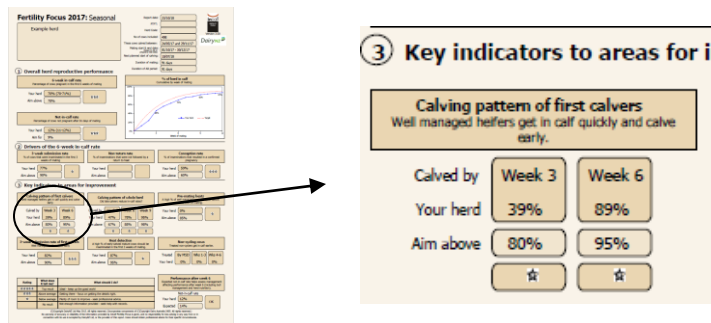
Table 2: Expected calving pattern next season

Week of mating when conceived	Expected calving category at next calving	Column i No. cows (except first calvers)	Column ii No. first calvers due to calve in each category	Column iii Total no. that will calve in each category
Week 1-3	Early	_____	_____	_____ (A)
Weeks 4-6	Medium	_____	_____	_____ (B)
Weeks 7-9	Late	_____	_____	_____ (C)
After Week 9	Very late	_____	_____	_____ (D)
Total no. to calve		_____	_____	_____ (E)

Complete Column ii

- Complete the next column of Table 2 (**Column ii**). This shows how many heifers are due to calve in each category.
- If you did not complete early rectal pregnancy testing of heifers approaching their first calving, make some estimates. You could base your estimates on the previous calving pattern for your heifers. The %'s of heifers calved by Weeks 3 and 6 are in your *InCalf Fertility Focus Report*.

Here's the place to look on your *InCalf Fertility Focus report*:



- Multiply the %'s calved by Week 3 and Week 6 by the total number of first calvers to calve.

(eg. For 50 heifers with the above calving pattern, 76% (0.76 x 50 = 38) will calve by Week 3, 86% (0.86 x 50 = 43) will calve by Week 5; meaning 8 (= 43-38) calved in Weeks 4-6 and the remaining 7 (= 50-43) will be late calvers).

Complete Column iii

- Calculate the numbers that will calve in each category by adding *i + ii* for each category in Table 2 and writing the totals in **Column iii**.
- Add the numbers that will calve in each category to give the total number of cows that will calve; write this number in the 'Total no. to calve' row (E).
- Ensure this total number of cows is the same as your planned number that will calve. If it is not, check all columns for errors and correct.



Part 2: Use numbers from Table 2 to predict the % calved by 3, 6 and 9 weeks in the next calving period.

$$\begin{array}{l} \text{.....(A)} \\ \text{Due early} \\ \text{calvers} \\ \text{(Wks 1-3)} \end{array} \times 100 \div \begin{array}{l} \text{.....(E)} \\ \text{Total no. to calve} \end{array} = \text{.....(F)} \\ \text{Likely \% calved} \\ \text{by Week 3}$$

$$\begin{array}{l} \text{.....(A)} \\ \text{Due early} \\ \text{calvers} \\ \text{(Wks 1-3)} \end{array} + \begin{array}{l} \text{.....(B)} \\ \text{Due medium} \\ \text{calvers} \\ \text{(Wks 4-6)} \end{array} \times 100 \div \begin{array}{l} \text{.....(E)} \\ \text{Total no. to calve} \end{array} = \text{.....(G)} \\ \text{Likely \% calved} \\ \text{by Week 6}$$

$$\begin{array}{l} \text{.....(A)} \\ \text{Due early} \\ \text{calvers} \\ \text{(Wks 1-3)} \end{array} + \begin{array}{l} \text{.....(B)} \\ \text{Due medium} \\ \text{calvers} \\ \text{(Wks 4-6)} \end{array} + \begin{array}{l} \text{.....(C)} \\ \text{Due late} \\ \text{calvers} \\ \text{(Wks 7-9)} \end{array} \times 100 \div \begin{array}{l} \text{.....(E)} \\ \text{Total no. to calve} \end{array} = \text{.....(H)} \\ \text{Likely \% calved} \\ \text{by Week 9}$$

Now go to Step 2 on page 6 

Step 2) Identify the gap

Complete Table 3, below, as follows:

Complete *Column iv*

- If you are assessing a past calving period, record the % calved by Weeks 3, 6 and 9 for your herd either from your *InCalf Fertility Focus report*
- If you are assessing the upcoming calving period, record the likely % calved by Weeks 3, 6 and 9 for your herd from calculations on page 6 (F, G, H).

Complete *Column v*

- Decide your desired % calved by weeks 3, 6 and 9 and record here.

Calculate the three gaps in *Column vi*

- These are the differences between your desired % calved by weeks 3, 6 and 9 and those for your herd.
- It is possible to have a negative gap. This means that more cows had calved/will calve by that stage than you desire. Where this occurs, ensure that the gap is recorded with a negative sign.

Table 3: The gap between actual and desired calving pattern.

	Column iv My herd actual	Column v My desired pattern	Column vi Gap (v – iv)
% calved by Week 3	_____ % (F)	_____ % (67% is industry target)	_____ % (I)
% calved by Week 6	_____ % (G)	_____ % (88% is industry target)	_____ % (J)
% calved by Week 9	_____ % (H)	_____ % (98% is industry target)	_____ % (K)

Now go to Step 3 on page 7 

Step 3) Assess the benefits

Closing the calving pattern gaps can improve herd reproductive performance. Less spread calving can also improve milk income.

Part 1: Estimate the likely effect of closing the calving pattern gaps on herd reproductive performance.

First calculate the increase in 6-week in-calf rate (N) by fully closing the calving pattern gaps identified in Step 2:

$$\begin{aligned} \text{(J) } \dots\dots\dots\% \text{ calved by Week 6 gap} & \quad \times 0.17 = \dots\dots\dots\text{(L)} \\ \text{(K) } \dots\dots\dots\% \text{ calved by Week 9 gap} & \quad \times 0.29 = \dots\dots\dots\text{(M)} \\ & \qquad \qquad \qquad \text{Add (L) + (M) = } \dots\dots\dots\% \text{ (N)} \end{aligned}$$

Next calculate the approximate decrease in not-in-calf rate (Q) by closing these gaps:

$$\begin{aligned} \text{(J) } \dots\dots\dots\% \text{ calved by Week 6 gap} & \quad \times 0.06 = \dots\dots\dots\text{(O)} \\ \text{(K) } \dots\dots\dots\% \text{ calved by Week 9 gap} & \quad \times 0.11 = \dots\dots\dots\text{(P)} \\ & \qquad \qquad \qquad \text{Add (O) + (P) = } \dots\dots\dots\% \text{ (Q)} \end{aligned}$$

(!) The multipliers 0.17, 0.29, 0.06 & 0.11 were derived from the Australian InCalf Study. They are considered appropriate for New Zealand since the relationship between calving pattern and subsequent reproductive performance is equivalent to that shown by the NZ Fertility Monitor Report (2003) data.

Part 2: Estimate the economic benefits of improved herd reproductive performance from closing the gaps in calving pattern.

1. What is closing your 6-week in-calf rate ‘gap’ worth?

$$\text{Gap (N) } \dots\dots\dots \times \text{ *\$4 } \times \dots\dots\dots \text{ cows in herd} = \$ \dots\dots\dots \text{ (R)}$$

*This economic multiplier was estimated through modeling assuming a \$5.50 per Kg MS payout. The financial consequences of empty cows were excluded from this estimate.

2. What is closing your not-in-calf rate ‘gap’ worth?

$$\text{Gap (Q) } \dots\dots\dots \times \text{ **\$10 } \times \dots\dots\dots \text{ cows in herd} = \$ \dots\dots\dots \text{ (S)}$$

**This economic multiplier assumes a \$1000 value differential between an empty and in-calf cow.

3. What is closing your overall herd reproductive performance ‘gap’ worth?

$$\text{Total operating profit (R) } \dots\dots\dots + \text{ (S) } \dots\dots\dots = \$ \dots\dots\dots \text{per year}$$

Step 4) Develop & implement a strategy

Work with your adviser to develop your own farm strategy to achieve these benefits. Be aware that a substantial improvement in calving pattern will probably take two or three seasons of sustained effort in the areas listed below.

1. **Strategies to close the calving pattern gaps**



Strategies to close the calving pattern gaps and achieve a more compact calving pattern are summarised in *The InCalf Book* pages 66-67. They include:

- Ensure that a high percentage of first calvers are due to calve in the first 3 and 6 weeks of calving (page 51). If not, closely monitor growth of your next batch of calves to ensure they meet target liveweights (page 49). Also check bull management (and/or AB management) of the heifers (pages 134, 183).
- Maximise 3-week submission rate (page 28) and conception rate (page 28) to help achieve high 6-week in-calf rates.
- When buying animals, check that they will calve no later than week 6.
- Consider culling later-calving cows.

2. **Costs of closing the calving pattern gaps**

Ensure you consider the costs of closing the calving pattern gaps. Selling cows due to calve late and buying in cows due to calve early, is likely to incur added costs not accounted for in this calculator. Similarly, improving calving pattern by increasing the proportion of earlier-calving heifers may reduce overall milksolids production, because heifers produce less than mature cows.

Also, once the calving pattern gaps have been closed, feed demand will increase earlier and faster. Review whether your farm can currently supply this demand pattern, or whether fundamental changes in key aspects of the farm system (eg. stocking rate, Planned Start of Calving date (page 66), feed supplements) need to be considered. These factors are complex and vary from farm to farm and year to year. You may need help from a farm management adviser to explore these likely effects accurately in your situation.

Appendix

Planned Start of Calving date calculator

- You will need the previous Mating Start Date to do this.
- Either look up a breeding table (*The InCalf Book* page 174 or 'mating notebook') or use the Planned Start of Calving date calculator below:

- 1) Start by selecting the Mating Start Date used for the cows last year.
- 2) Write the date that you started mating in box (a).
- 3) Move on exactly ninth months after that month and write this date in box (b).
- 4) Add 9 days to that date and write in box (c).

	<i>Example</i>	Your Herd
Mating Start Date last year:	15 October	_____ (a)
Move on 9 months:	15 July	_____ (b)
Add 9 days:	24 July	_____ (c)

(c) is the Planned Start of Calving (PSC) date for your herd.

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