Heat Detection Tool

What is this tool?

This is a **gap assessment** tool. It assesses heat detection efficiency and the likely benefit of improving heat detection on your herd's overall reproductive performance.

Why use this tool?

In a seasonal or split calving herd, a useful indicator of heat detection is the % of mature cows that calved early in the calving period that were subsequently inseminated in the first three weeks of the mating period. This is because these cows are most likely to be cycling, and should be detected in heat during the first round of AB.

The tool uses this indicator to enable you to identify the risk of missed heats in your herd and assess the potential $ benefits of improved herd reproductive performance if this can be achieved by lowering the number of missed heats.

For more information, see ***The InCalf Book***, Chapter 13: Heat detection, and the ***InCalf Fertility Focus report***.

See pages 103-118

How to use this tool

Work through this tool's four basic steps:

To assess ***past and present/ future performance***	**Step 1**	**Step 2**	**Step 3**	**Step 4**
	Measure	Identify the gap	Assess the benefits	Develop & implement a strategy
	Page 2-3	Page 3	Page 4	Page 5

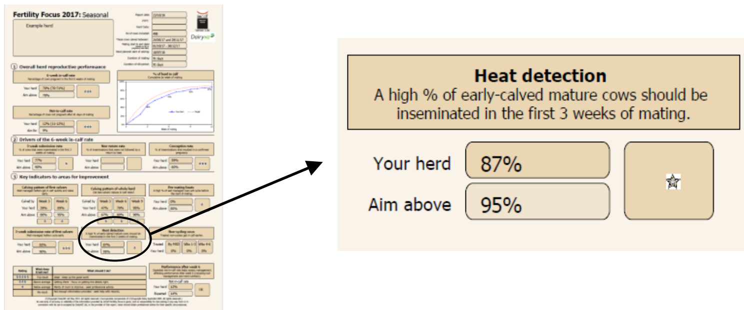
When you see this symbol ✍ you need to fill in some information or do some calculations before continuing.

Proceed to page 2

Step 1) Measure

The *InCalf Fertility Focus report* this will automatically assess your star rating for heat detection. It uses the 3-week submission rate of mature, early-calved cows as a proxy indicator for heat detection efficiency.

Here's the place to look on <u>your</u> *InCalf Fertility Focus report*:



See page 105

Your *Fertility Focus report* says the heat detection efficiency was …………% **(A)**

Go to **Step 2) below**

Step 2) Identify the gap

Part 1: Use Table 1 below to assess your risk level and what you should do.

Table 1: Heat detection risk assessment based on *past* performance.

% early-calved mature cows mated in first 3 weeks of mating	Risk assessment	What you should do
94% or more	**Low:** There is only a low chance that missed heats during the last AB mating period reduced herd reproductive performance.	No changes necessary.
90 – 93%	**Moderate:** There is a moderate chance that missed heats during the last AB mating period reduced herd reproductive performance.	Review heat detection practices ready for the next AB mating period.
Less than 90%	**High:** There is a strong chance that missed heats during the last AB mating period reduced herd reproductive performance by a substantial amount.	<u>*Urgently*</u> review heat detection practices prior to the next mating period. Unless you are confident your strategies to improve heat detection will be effective, consult an adviser.

Risk level: Low / Moderate / High (circle identified level)

Part 2: Estimate the likely effect that your heat detection performance gap had on your herd's overall reproductive performance

- Calculate your heat detection efficiency gap (B):

………………%	-	…………………%	=	……………..% **(B)**
Desired heat detection efficiency (Industry target is 95%)		Actual heat detection efficiency (A)		Heat detection efficiency gap

If heat detection efficiency is low (<90%) and the proportion of non-cycling early-calved mature cows is high (>10%) then you should adjust B by using one of the look-up charts in Appendix 1 or 2, depending on your non-cycling cow treatment policy.

> **(!)** Apart from missed heats, another possible cause of a low 3-week submission rate in early-calved mature cows is a high rate of *early-calved mature* non-cycling cows (and which were not treated early. See Appendix 2 on page 7). Age and time from calving will not be a problem in this group of cows, but nutritional factors such as low body condition at calving and/or inadequate feeding in early lactation or excessive cow health problems are potential risk factors. Other InCalf tools are available to assess each of these areas distinctively.

Proceed to **Step 3) below.**

Step 3) Assess the benefits

Now assess the potential benefits of improving your herd's reproductive performance if this can be achieved by reducing the number for missed heats. These can be estimated by considering the likely $ results from changes in overall reproductive performance.

Part 1: Estimate the likely effect of closing the heat detection efficiency gap on herd reproductive performance.

First calculate the increase in 6-week in-calf rate (C) by fully closing the heat detection efficiency gap identified in Step 2:

Gap (B) ………………. % x 0.53 = ……….% **(C)**

Next calculate the expected decrease in not-in-calf rate (D) by closing this gap:

Gap (B) ……………….% x 0.12 = ……….% **(D)**

> **(!)** The multipliers 0.53 & 0.12 were derived from applying the DairyNZ Whole Farm Model on real commercial herds. Heat detection efficiency levels of between 60 and 100% for the first 6 weeks of the mating period were tested in these herds. The relationships between level of heat detection efficiency and the resulting 6-week in-calf rate and not-in-calf rate (after 12 weeks mating) were then investigated. The above multipliers are the slopes of these linear regression equations, respectively.

Part 2: Estimate the economic benefits of improved herd reproductive performance from closing the gaps in heat detection efficiency.

1. What is closing your *6-week in-calf rate* 'gap' worth?

Gap (C) ………. X *$4 X ………. cows in herd = $ ……..……. **(E)**

*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?

Gap (D) ………. X **$10 X ………. cows in herd = $ ……..……. **(F)**

**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?

Total operating profit (E) ………. + (F) ………. = $ ……..……….per year

Step 4) Develop & implement a strategy

If **low risk** identified in Step 2) then it's unlikely that missed heats have reduced reproductive performance. No changes are necessary.

If **moderate** or **high risk** identified in Step 2) then it's likely that missed heats reduced your herd reproductive performance. The potential economic benefit of reducing the number of missed heats was calculated in Step 3).

- Refer to *The InCalf Book*, Chapter 13, starting on page 103, for further information on heat detection and strategies to improve your heat detection programme.
- Work closely with your adviser to develop your own personal farm strategy to improve your heat detection programme.

Key issues to consider:

- Whether to record heats before mating begins (*The InCalf Book*, pages108-109 and 116-117)
- Use of paddock observations and detection aids (*The InCalf Book*, pages 110-111)
- Heat synchronisation (*The InCalf Book*, pages 117 and 181-186)
- Managing cows not detected on heat (*The InCalf Book*, pages 117, 143-152 and 177-180)

APPENDIX 1

When early calved mature non-cyclers are treated early

Use this look-up chart to estimate the 'true' heat detection efficiency (HDE) if there are non-cycling early calved mature cows that ***are*** treated and set-time inseminated in the first 3 weeks AB.

You will need to know the % of early calved mature cows that were non-cycling and treated early (set-time inseminated within the first 3 weeks mating). Select this percentage in the first column and move horizontally to find the closest HDE% that corresponds to the value of heat detection indicated in your *InCalf Fertility Focus report*. Move up vertically to find the true HDE.

% early calved mature non-cycling cows treated early	True HDE								
	60	65	70	75	80	85	90	95	100
0-5	61	66	71	76	80	85	90	95	100
6-10	63	68	72	77	82	86	91	95	100
11-15	66	70	74	79	83	87	91	96	100
16-20	67	71	75	80	84	88	92	96	100
21-25	70	73	77	81	85	89	92	96	100
26-30	71	75	78	82	86	89	93	96	100

For example:

The *InCalf Fertility Focus report* indicates that heat detection efficiency in your herd was 84%. You do treat non-cyclers early, and they are set-time inseminated within the first 3 weeks AB. On closer inspection, 15% of the early-calved mature cows were treated this way. Select 11-15% in the first column and approximate 84% in that corresponding row. Move vertically up that column and assume 82% as an estimate of the 'true' heat detection efficiency.

APPENDIX 2

When early calved mature non-cyclers are <u>not</u> treated early

Use this look-up chart to estimate the ‘true’ heat detection efficiency (HDE) if there are non-cycling early calved mature cows that are ***not*** treated to be set-time inseminated in the first 3 weeks AB.

You will need to know the % of early calved mature cows that were non-cycling at the planned start of mating (PSM). Select this percentage in the first column and move horizontally to find the closest HDE% that corresponds to the value of heat detection indicated in your *InCalf Fertility Focus report*. Move up vertically to find the true HDE. This value assumes that half of the non-cycling early calved mature cows would have been inseminated anyway in the first 3 weeks AB.

% Early calved mature cows non-cycling at PSM	True HDE								
	60	65	70	75	80	85	90	95	100
0-5	60	65	70	75	79	84	89	94	99
6-10	59	64	68	73	78	82	87	91	96
11-15	59	63	67	72	76	80	84	89	93
16-20	58	62	66	71	75	79	83	87	91
21-25	58	61	65	69	73	77	80	84	88
26-30	57	61	64	68	72	75	79	82	86

For example:

The *InCalf Fertility Focus report* indicates that heat detection efficiency in your herd was 84%. You don’t treat non-cyclers early although you know that around 15% of the early-calved mature cows were not cycling by the planned start of mating. Select 11-15% in the first column and 84% in that corresponding row. Move vertically up that column and assume 90% as an estimate of the ‘true’ heat detection efficiency.