



# Farm Vet News

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Endell Vets Dairy Team

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## Comparison of Heat Detection Methods in Dairy Cows



Modern dairy cows are showing less behavioural traits associated with oestrus, or heat, and for a shorter period of time than they previous were; the proportion of cows showing oestrus by standing to be mounted has reduced from 80% to 50% for a period from 15 hours to 5 hours (Dobson et al., 2008). This, combined with increased milk yields, which has been shown to increase the number of silent heats expressed, is resulting in reduced submission rates and ultimately poorer fertility.

There are a number of reasons attributed to these reductions in oestrus expression and reduced fertility, including but not limited to:

- reduced body condition score, particularly in fresh cows
- cows who suffered from hypocalcaemia, mastitis, retained foetal membranes or endometritis
- lameness

Therefore, everything possible needs to be done to identify when a cow is in heat. There are multiple methods and systems available, which can be adapted to fit your particular farm set up; these are discussed in further detail below and summarised in Table 1.

*Oestrus expression has been shown to be greater in cow groups where a higher proportion of cows are in oestrus at the same time, for example with groups of synchronised cows.*

### WHY IS HEAT DETECTION IMPORTANT?

Improved heat detection is one of the largest contributing factors in generating an increased number of pregnancies in a herd. By better detecting heats, the hope is that we can create those pregnancies earlier in lactation. In turn, this will mean we can reduce the average days in milk (DIM) of the herd, improving feed conversion efficiency and increasing milk yield - all with the same cows, in the same system.

For block calving herds, it is recommended for oestrus detection to begin at least three weeks prior to the start of the breeding period so that problem cows, such as non-bullers, can be identified and veterinary intervention can occur; the principle is the same in all-year-round calving herds, with most farmers starting to record heats during the voluntary waiting period.

Table 1. Various heat detection methods

Summary of available heat detection aids:	
-	Observation of oestrus behaviours
-	Heat mount detectors (e.g. Estroprotect scratch cards and KaMaR)
-	Tail paint
-	Activity monitors (e.g. Pedometers & collars)
-	Serum progesterone

### OESTRUS BEHAVIOUR OF CATTLE

Standing heat, or standing to be mounted, is the single most definitive sign of a cow in oestrus. Other behaviours are attributed to heat, which are included in Table 2, however they are less reliable indicators. Van Eerdenburg et al. (2002) suggested a scoring system attributing points to different behaviours, where cows who are expressing behaviours which accrue greater than 50 points should be served.

Table 2. Adapted from Van Eerdenburg et al. (2002) - Oestrus scoring system [This system can be a useful reminder of oestrus associated behaviours, as well as providing additional confirmation of a cow's eligibility to be served.]

Oestrus Scoring System (Van Eerdenburg et al., 2002)	
Behaviour	Points
Standing heat	100
Mounting head side of another cow	45
Mounting (or attempting to mount) other cows	35
Resting with chin on another cow	15
Sniffing vagina of another cow	10
Being mounted but not standing	10
Restlessness	5
Flehmen	3
Mucous vaginal discharge	3

Table 3 summarises the results of a trial by Holman et al. (2011) which attempted to compare heat detection methods. They clearly demonstrate that observation remains the most reliable indicator of oestrus (largest positive predictive value), but the combination of neck collars plus observation was better yet (86.0 cf 91.7%).

Table 3. Adapted from Holman et al. (2011) - Comparison of different detection methods

	Number of periods of low progesterone	Number of true-positive activations	Number of false- positive activations	Sensitivity (%)	Positive Predictive Value (%)
<b>Individual Detection Methods</b>					
Scratch card	64	23	13	35.9	63.9
KaMaR	67	38	24	56.7	61.3
<b>Observation</b>	<b>58</b>	<b>37</b>	<b>6</b>	<b>63.8</b>	<b>86.0</b>
Neck collar	146	86	6	58.9	93.5
Pedometer	158	100	36	63.3	73.5
<b>Combinations of Detection Methods</b>					
Neck collar + scratch card	57	39	15	68.4	72.2
Neck collar + KaMaR	45	34	20	75.6	63.0
<b>Neck collar + observation</b>	<b>44</b>	<b>33</b>	<b>3</b>	<b>75.0</b>	<b>91.7</b>
Pedometer + scratch card	57	38	26	66.7	59.4
Pedometer + KaMaR	58	44	29	75.9	60.3
Pedometer + observation	43	32	15	74.4	68.1

## Comparison of detection methods

### Oestrus observation

Observing cows for bulling signs has been shown to be the most successful method of heat detection. Van Vliet et al. (1996) showed that five 30-minute observation periods a day identified 86% of visible heats, whereas two 30-minute observation periods a day identified 63% of heats. Observations must be performed separately from other management tasks throughout the day, such as feeding or bedding up. As convenient as it might be to 'observe oestrus' whilst you are bringing cows in for milking, cow bulling behaviours can be masked; cows need loafing space to express true heat. Similarly, cows crowded in a collecting yard may show more mounting behaviours than normal. These are not necessarily a sign of them in heat, and therefore can increase the rate of false positives.

### Activity monitors (such as pedometers & collars)

Whether anklet pedometers or collars are used, heat expression is recorded by a significant increase in activity level.

Once baseline activity has been established, activity data will be captured, usually at each milking, with a warning being set off once the activity threshold has been breached. Compared to other detection methods, these systems tend to involve an initial expense for the collars and data reader to be purchased, however some companies will offer systems on a rental basis. Aberrant changes in herd activity level such as whole herd TB testing or immediately after turn out to grazing can sometimes cause heats to be falsely flagged up, or be missed.

### Tail paint (or chalking)

This heat detection method works on the premise that paint applied to the tail head will be rubbed off when cows stand to be mounted. The paint is required to be topped up daily, however if you continue to chalk cows (with different colours) post service and pregnancy diagnosis, you can monitor non-bullers and conception failure due to early embryonic loss.

The most common reason this method fails is when the chalk isn't topped up regularly. Similarly, paint can be removed if cow brushes are used or if cows lick the paint off each other.

### Heat Mount Detectors

Similar to tail paint, these devices are aiming to identify oestrus mounting behaviours. A number of different methods exist:

- Scratch Card (e.g. Estroject) - mounting removes the silver top layer to reveal a bright colour (usually fluorescent orange or green) underneath.
- Gel type (e.g. KaMaR) - mounting pressure causes a capsule containing fluorescent dye to burst, allowing the dye to fill the whole chamber.

Both methods have similar issues with cow brushes, and it is also not uncommon for cows to knock gel capsules on cubicles when they are getting up or lying down, giving false positive results.

## SUMMARY

As the detection of heat is so vital for the fertility and productivity of your dairy, it can be a good idea to combine the use of multiple heat detection aids instead of relying on one method alone. Combining the use of neck collars with oestrus observation has been shown to identify the greatest number of oestrus events compared to any other method combination (see Table 3). However, it is essential that observations are performed as a standalone task, rather than at the same time as other management practices.

If you would like to discuss heat detection, or anything else relating to the fertility of your dairy, please do not hesitate to contact one of our vets who will be more than happy to discuss it in further detail with you!