

Section 4

AI and Heat Detection in Beef Herds

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Introduction

Artificial insemination offers suckler herd owners access to a range of proven, genetically superior bulls of different breeds.

- ① Why should I use AI?
- ② Why use AI to produce replacement heifers?
- ③ What are the signs of heat?
- ④ Which factors affect the intensity of heat?
- ⑤ What heat detection aids are available?
- ⑥ What type of records are required?
- ⑦ Is there a role for pregnancy scanning?

AI and Heat Detection in Beef Herds

1 Why should I use AI?

- If herd size is small it allows you to avoid the purchase cost and annual maintenance costs of a stock bull.
- AI offers access to a range of proven, genetically superior bulls of different breeds which produce faster-growing calves
- It allows the selective mating of cows/heifers to selected sires strong on particular traits, e.g. proven easy calving bulls on heifers and young cows.
- The production of quality replacement heifers
- AI removes the hazard of having a bull on the farm and the need for special housing.
- The risk of bull infertility is eliminated

2 Why use AI to produce replacement heifers?

Most beef farmers do not have a defined policy for producing quality female replacements with the result that many beef cows are now becoming almost pure-bred. The loss of hybrid vigour, associated with this means a decline in cow fertility and calf vigour as well as a decline in milk production and calf performance.

Checklist

Desirable traits in replacement heifers:

- Reach puberty at 12-13 months of age,
- Have good calving ability,
- Fertility - as both heifers and cows and therefore calve within 365 days each year,
- Possess good mothering ability and adequate milk to produce a 300 kg + calf at seven months of age,
- Have good growth potential and be of good conformation Longevity to remain in the herd for 6-7 lactations.

At least half of the herd should be bred to produce replacements and the remainder bred to terminal sires. For most herds in Ireland this inevitably means the use of AI unless herd size is big enough to justify more than one breed of natural service sire.

Use of AI and selected maternally tested sires will also remove much of the risk associated with the production of replacement heifers. Producing replacements from within a herd greatly reduces the disease risks associated with purchasing replacements.

Checklist

To ensure efficient use of AI you need:

- The ability to detect heat in heifers/cows.
- To be committed to heat detection.
- A strategy: You could use AI at the beginning of the season until sufficient cows are bred to produce the required number of replacements.
- Good facilities that facilitate collecting of individual cows for AI.

3 What are the signs of heat?

Standing to be mounted by herd mates or a bull is the most definite and accurate sign that a cow is in heat. During the period of standing heat, cows stand to be mounted by other cows or move forward slightly with the weight of the mounting cow. Cows that move away quickly when a mount is attempted are not in true heat.



Standing to be mounted by herd mates or bull is the most definite and accurate sign that a cow is in heat

Standing heat may not always be seen so stockmen use other signs of heat in arriving at a decision as to whether or not to inseminate a cow. These **secondary signs of heat** may indicate that a cow is coming in heat, in which case closer attention should be given to her over the following 24-48 hours, or they may indicate a recent heat in which case she should be given close attention 17-20 days later.

1. Discharge of clear mucus: This originates in the cervix and uterus and is a good indication of imminent heat. The passing of long clear elastic strings of mucus indicates an imminent heat while thicker, cloudier mucus indicates a recent heat.
2. Mounting other cows. Cattle that mount other animals may be in, or approaching heat. Generally, cows that are at the mid-cycle stage of their oestrous cycles or that are in-calf perform mounting activity much less frequently.
3. Restlessness: Signs of restlessness such as increased walking, trailing of other cows and bellowing are characteristic of individual cows that are either approaching or are in heat.
4. Swelling and reddening of vulva: Hormonal changes associated with heat cause an increased blood supply to the reproductive organs which in turn causes swelling and reddening of the vulva.
5. Hair loss and dirt marks: As a result of frequent mounting by herd mates, the hair on the tail-head is usually removed and the skin on either side of the tail-head is often scarred and dirty. This indicates that the cow was recently on heat.
6. Blood stains on the tail or vulval area: This is a sign of a recent heat. Such animals should be watched closely for heat 17-20 days later.
7. Decreased feed intake. Cows in, or approaching heat, spend less time feeding.

Key fact

Duration of an oestrous cycle

Oestrous cycle averages 21 days in cows, within a range of 18-26 days, and 20 days in heifers. Following insemination, 10-15% of cows and heifers that fail to conceive return to heat at intervals greater than the normal 20-21 days. This is caused by late (occurring 16 or more days after insemination) embryo mortality in these cows or heifers.

Key fact

How long cows remain in standing heat.

In beef cows and heifers the reported average duration of standing heat is about 10-12 hours with some evidence that it maybe a few hours shorter in animals on concrete slats as opposed to softer underfoot conditions

Table 1. Effect of underfoot surface type (slats or out-wintering pads OWP) on duration of heat and number of mounts

| Underfoot surface | Number of heats | Average duration of standing heat (hours) | Number of Mounts* | |
|-------------------|-----------------|---|-------------------|-------|
| | | | Mean | Range |
| Slats | 18 | 5.6 | 7.62 | 3-29 |
| OWP | 48 | 7.8 | 18.2 | 3-139 |

* Does not include cows with "silent heats".

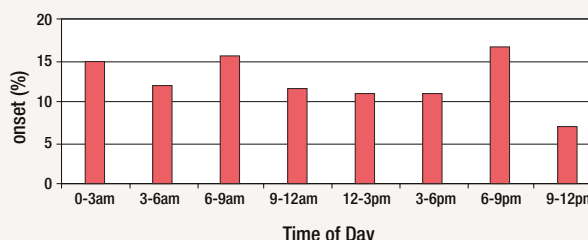


Figure 1. Pattern of heat onset throughout day.

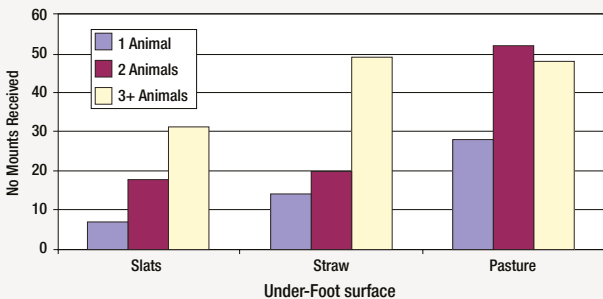
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Key fact

Careful checking for heat in the early morning and late evening minimises the night interval and results in detection of at least 70% of cows in heat. Three further checks during the day, at about 4-5 hour intervals, are needed to detect 90% of the cows in heat.

4 Which factors affect the intensity of heat?

It is generally believed that the intensity of heat, as determined by the extent of mounting, is less in beef cows than dairy cows or heifers and this is due to the presence of the calf with the cow. Other major factors that affect its intensity are the size of the sexually active group and the under-foot conditions on which the animals are kept.



The effect of under-foot conditions and the number of animals on heat simultaneously on the number of mounts received by animals in heat.

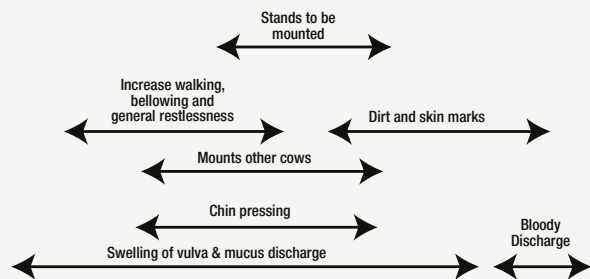
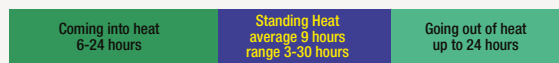
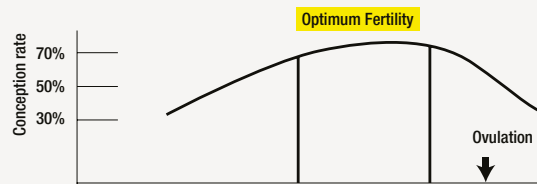
On days when there is only one animal on heat in a group, the numbers of mounts received by a cow is as low as 7 when she is indoors on concrete slats compared with 27 when she is outdoors on pasture. Similarly, the average number of mounts increases with the number of animals in a group that are on heat simultaneously. Again, animals on pasture receive the most mounts when the size of the sexually active group increases.

Are silent heats a problem with beef cows?

There is some evidence that silent heat, defined as an ovulation occurring without any overt signs of standing activity, happens particularly in cows housed on concrete slats.

Key fact

Teagasc have recorded up to 57% of silent heats in cows on concrete slats compared with 22% in cows on out-wintering pads. Research shows that having a teaser bull running with the cows greatly reduces the number of silent heats.



Changes in cow behaviour and signs of heat relative to heat onset, time of ovulation and optimum time for insemination.

Checklist

Factors that affect the expression of heat.

Housing: Cows must have adequate space to allow cow-to-cow interaction to show heat. If the stocking density indoors is too high heat detection is more difficult, and 'false positives' are more likely.

Floor surface: Cows dislike being mounted while standing on concrete, slippy or rough surfaces and prefer softer underfoot surfaces such as grass, dirt or straw bedded yards. Mounting is reduced by almost 50% when cows are on concrete as opposed to softer underfoot conditions and the duration of oestrous activity is reduced by about 25%.

Feet and leg problems: Cows with sore feet or legs, or that have poor structural conformation, exhibit less mounting activity and have fewer “stands”. Such cows may stand to be mounted when not in heat because it is too painful to escape from the mounting cow.

Status of herd mates: The number of cows in heat simultaneously has a major impact on overall heat activity and on the average number of mounts per cow. The number of mounts per cow increases with the number of cows that are in heat simultaneously (up to about 3-4 cows in heat). In smaller and even in larger herds as more cows become pregnant, the likelihood of more than one cow being on heat on any given day is less, thus, making heat detection more difficult.

Key fact



About 10% of the reasons for failure to detect heats are attributable to “cow” problems and 90% to “management” problems. Management problems include too few observations per day, too little time spent observing the cows or observing the cows at the wrong times or in the wrong place, such as at feeding time.

5 What heat detection aids are available?

Vasectomised bulls with chin-ball marking harness

Active vasectomised teaser or detector bulls are very useful in identifying cows coming into, or on, heat. Vasectomy should be carried out 40-60 days before to introduction to the herd. The cost of the vasectomy varies from €90-120 per bull.

Teaser bulls are particularly useful after the first three weeks of the breeding season when fewer cows are in heat each day and when the level of heat-related activity in the herd is reduced as more cows become pregnant.

Bulls should be fitted with a chinball harness 2-3 weeks before turn out with the herd. Teaser bulls require the same management as entire bulls and should be either castrated or disposed of after one season.

Steers

If recently castrated, are useful in identifying cows coming into or in heat.

Heat detection patches

A number of “scratch card-type” patches including Estrus Alert ® and ESTROTECT™ are affixed to the cow’s tail head. Friction from mounting rubs off the silver coating to reveal a bright colored patch underneath. These devices, when properly applied, are very useful as an aid to heat detection. They cost between €1.50 and €2.00 per patch.



Active vasectomised teaser or detector bulls are very useful in identifying cows either coming into or on heat.

When one of the aids is used cows should be observed at least twice daily- early morning and late evening. Otherwise cows should be checked at least three-times daily. Spend a minimum of 20-30 minutes observing them during each observation period.

Disturb the cows and carefully check and record cows that are sliming or exhibiting any signs of restlessness. Early morning and late evening are critical times to check cows.

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Are there any easy ways of bringing cows in for AI?

Poor farm layout, inadequate facilities, lack of labour availability, combined with the difficulty of removing an individual cow(s) (and her calf) from the herd for AI, all militate against the use of AI. It is important that the paddock or field layout makes it as easy as possible to remove a cow from the herd.

A temporary fence, possibly electric, to funnel cows towards the gate and roadway (Fig. 1) is an excellent way of easily removing an individual cow from the herd for AI. Currently this is used on many farms.

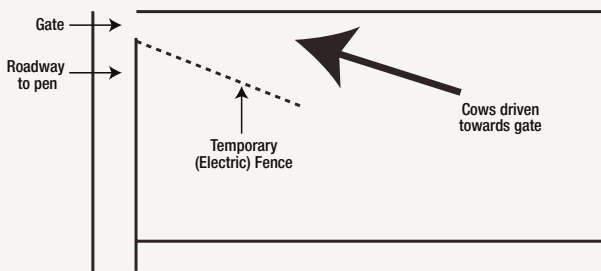


Fig. 1. The use of a temporary (electric) fence to assist getting beef cows out of a field.

6 What type of records are required?

Good breeding records are key to breeding management and are always the first port of call in the investigation of a herd infertility problem.

Checklist

Records should include:

- Calving date,
- Calving difficulty or problems related to calving,
- Heat and breeding dates,
- Sire used,
- Scanning results (where available).

During the breeding season it is important to regularly monitor heat detection efficiency (submission rate) and particularly to identify and possibly treat any cows that are calved more than eight weeks and not yet inseminated.

Submission rate is calculated as the proportion of cows calved at the beginning of the breeding season, that are intended for re-breeding and that are submitted for insemination. A submission rate of at least 80-90% should be achieved in the first 21 days of the breeding period.

A submission rate of less than 80% indicates a problem with heat detection or a high proportion of anoestrous cows. Diagnosis of this problem at such an early stage allows corrective action be taken before much of the breeding period has elapsed. Similarly, conception rates, measured initially by non return rates or cows 30 days bred, and later by scanning results, should be monitored.

Key fact

Heat detection is the key to the successful use of AI. However, it is a repetitive, time consuming task. Where AI is the chosen method of breeding, farmers must be committed to heat detection, at least twice daily (early morning and late evening), for each day of the breeding season. In order to reduce the time involved it is highly recommended that one of the aids described is used.

7 Is there a role for pregnancy scanning?

Pre-service scanning

A single pre-service scanning does not offer worthwhile practical benefits on farm.

Post-service Scanning:

Pregnancy scanning to detect cows in calf can be done reliably from 28 days onward of breeding. A herd scan 1 month after the end of the breeding season will identify:

1. What cows are in-calf and which cows are carrying twins and it is a measure of the success of the breeding campaign.
2. The approximate expected calving dates of pregnant cows. Cows can be grouped according to expected calving date. Labour at calving time can, therefore, be better organised and targeted to ensure adequate supervision of calving.

More targeted feeding over the winter period is possible and empty cows can be sold before winter, saving on valuable feed. Cows that need to be culled can be fed concentrates if necessary to achieve an adequate level of finish.