

## Estrus detection tools for cattle

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### Abstract

This study explores various methods and technologies employed in detecting estrus in dairy farming, essential for optimizing reproductive performance and minimizing economic losses. Methods discussed include visual observation techniques, utilization of estrus detection aids such as heat mount detectors, tailhead markings, chin-ball markers, and teaser animals. Additionally, electronic devices like pedometers and Heat Watch systems are examined for their efficacy in detecting estrus based on physical activity and mounting behaviour. Changes in body and milk temperature, as well as vaginal mucus viscosity and electrical resistance, are also highlighted as potential indicators of estrus. The role of pheromonal odour emitted from perineal glands in aiding bull detection of cows in heat is discussed. Understanding and effectively utilizing these estrus detection methods are crucial for enhancing reproductive efficiency and profitability in dairy farming operations.

### Introduction

About 90% of dairy farmers rely on artificial insemination for breeding their herds. However, one of the main challenges they face is the inefficiency in detecting estrus, which significantly impacts reproductive performance and leads to economic losses. This inefficiency can result in failure to identify cows in heat, improper timing of insemination relative to ovulation, or insemination of non-estrus cows. Typically, visual observation is recommended, involving one-hour monitoring sessions in the morning and evening. Additionally, the use of estrus detection aids such as heat mount detectors, tailhead markers, teaser bulls, and electronic devices like pedometers or heat watches can complement visual observation, ensuring continuous monitoring of estrus activity and improving the accuracy of insemination timing.

### Estrus detection aids

**Heat mount detectors:** One type of estrus detection aid is pressure-sensitive heat mount detectors like Kamar, which are attached to the tailhead. These detectors contain a small vial of fluid with a smaller vial of colour that breaks when pressure is applied, indicating mounting

activity. Animals with an activated detector (e.g., showing a red colour) are considered to be in estrus. Another option is self-adhesive heat detection patches with a silver scratch-off surface, such as EstroTECT. When the animal is mounted, the bright signal layer underneath becomes visible, providing an easy way to identify estrus.



**Tailhead markings:** It involves using chalk, coloured wax, crayon, or paint to mark the cow's tailhead. This helps identify cows that have been mounted by other cows, as the paint gets rubbed off or smeared onto the sides of the tailhead and the rump. Compared to rump-mounted alert patches, this method is more cost-effective.



**Chin-ball marker:** It consists of a metal ink reservoir with a sizable ball bearing secured by a harness placed beneath the chin of the marker animal. When this animal mounts and dismounts a cow in heat, it leaves a distinctive mark on the cow's back and rump. The paint reservoir typically contains enough paint for around 25 cows, varying based on mating behaviour. Chin-ball markers are commonly utilized alongside teaser bulls or cows treated with testosterone.

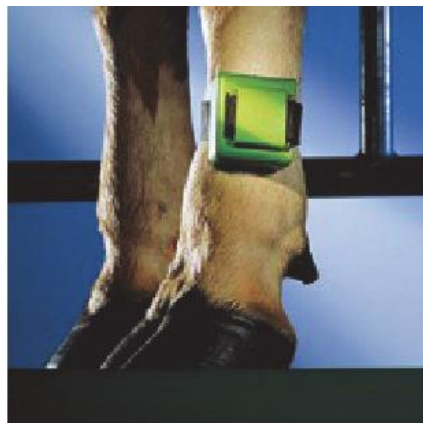
**Teaser animals:** Teaser animals are those capable of identifying and mounting a cow in standing heat but are unable to naturally breed. A teaser bull undergoes surgical alteration, preventing intromission during mounting activity. Various techniques, such as vasectomy,





caudal epididymectomy, penile deviation, and penectomy, can be employed for this purpose. Androgenized cows can also serve as teaser animals. Combining techniques like vasectomy with penile deviation is common. Teaser bulls offer the added benefit of stimulating postpartum cyclicity in cows, thereby reducing the calving to first estrus interval in beef herds. However, drawbacks include the potential for teaser bulls to show preferences for certain cows, potentially missing others in heat. Additionally, some may lose libido over time upon realizing they cannot breed cows they mount. Selecting teaser bulls with a docile temperament is crucial, as they are typically separated from cows before artificial insemination.

**Pedometers:** During estrus, cows typically take two to four times more steps per hour compared to when they're in diestrus. Pedometers, electronic devices affixed to a cow's leg, are used to tally her steps, serving as an indicator of her physical activity. By comparing the resulting step count with her baseline count during non-estrus periods, estrus can be identified when her step count surpasses the baseline values.



**Heat watch:** The Heat Watch system is an electronic radio-telemetric device that is pressure-sensitive. It consists of a sensor-transmitter housed within a cloth tag, which is attached to the cow's tailhead region. This sensor detects the pressure applied by a mounting cow. The transmitter then sends a signal to a receiver connected to a computer, where the data are stored and analyzed. Each transmitter is uniquely coded so that each mounted animal sends a distinct identifying signal to the computer. The system provides reports including the animal's identification, date, time, duration of mounting activity, and indicates which cow is ready for breeding.

**Body and milk temperature:** During estrus, there is a discernible rise in both body and rectal temperature. This change could be linked to increased physical activity during estrus. However, the precise physiological mechanism responsible for this temperature fluctuation throughout the cow's estrous cycle remains unidentified.

**Vaginal mucus electrical resistance:** It is known that the viscosity and electrical resistance of vaginal mucus decrease during the proestrus and estrus phases.

**Electronic nose:** The pheromonal odour emitted from the perineal glands situated near the vagina serves as a crucial factor for bulls in detecting cows in estrus.

### **Conclusion**

Detecting when cows are in estrus and inseminating them at the right time in relation to both estrus behaviour and ovulation is crucial for achieving satisfactory pregnancy rates. This process involves various factors. Presently, combining visual observation with detection aid methods, particularly electronic technology, can significantly improve the efficiency of estrus detection in dairy farming.

### **Acknowledgement**

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