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Popular Article

# Advances In Heat Detection Methods in Cattles and Buffaloes

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## Introduction

Detection of estrus (heat) is often cited as the costliest component and undoubtedly, the major limiting factor to the success of Artificial Insemination (A.I) programs on many dairy farms, also the success of A.I depends on critical close observation of animals to detect heat at appropriate time as late insemination leads to failure of conception; also, the heat detection is the key in the success of an effective breeding program. This was achieved by critical close observation, appropriate timed A.I. and sound record keeping (Roelofs *et al.*, 2010). Incorrect detection of estrus is related to loss of income due to extended calving intervals, longer dry periods, milk loss, increased veterinary cost and slowed genetic progress.

## Advanced Methods of Estrus Detection

**Temperature measurement-** The temperature of skin, deep body, vagina and milk is measured as means of detecting estrus in cattle or buffalo. Radio telemetry based vaginal temperature measurement was also used with reliable result. The ruminal temperature also raised during time of estrus measured by sensor based intra ruminal electronic radio-telemetric bolus (Boehmer, 2012).

**Heat expectancy charts -** This simple management aids allow heat to be recorded and the time of next heat to be predicted so that cow or buffalo can be viewed more closely at the time of the next expected heat. Both manual and computer-based system are developed which assist in easy detection of heat.

**Use of androgenized cow or buffalo -** This cow or buffalo is just like male for estrus detection. The efficiency varies from 39 to 74 percent (Rao *et al.*, 2013).

**Types of Teaser Animals for Heat detection-** The animals are very useful in identifying cows

or buffaloes either coming into or on heat. When one of the aids is used cows or buffaloes should be observed at least twice daily- early morning and late evening. Otherwise, cows or buffaloes should be checked at least three-times daily. Spend a minimum of 20-30 minutes observing them during each observation period. These animals are penile blocked bulls, vasectomized bulls, penis deviated bulls, caudal epidymectonmized bulls or andogenized females.

**Ultra sound for monitoring the ovarian function** - The use of ultra sound technique for monitoring the ovarian function in cattle or buffalo as well as in other mammals has improved the knowledge and understanding of the follicular development and regulation. Ultra sonography can also be used to detect ovulation time with respect to different sign of heat.

**Chin ball marking device** -The consist of a halter that holds a reservoir of paint and on the underside of the halter a roller ball marker that is similar to a giant ballpoint pen or giant marker pen. When the bull or the teaser animal equipped with the CMB mounts a cow or buffalo in estrus, paint is applied to the rump and loins of the cow or buffalo in estrus.

**Tail painting** - Tail painting/chalking is easy method of heat detection; it is commonly used in combination with visual close observation. Fluorescent paint may be used in night for heat detection with artificial provision of electric lamp. The result is not good in buffaloes due to wallowing activity and false positive reading can occur if smearing occurs from false contact with low tree branches or from lying in free stalls. A detection rate of 94 percent was shown to be possible (Rao *et al.*, 2013).



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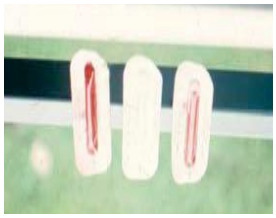
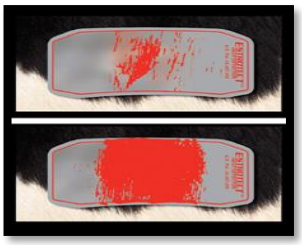
**Pressure-sensitive pads or Heat patch with visible color change** or **Heat detection patches** - These devices, when properly applied, are very useful as an aid to heat detection. The heat patch applied on tail head with fixing device, after mounting the colour of dye changes (Rao *et al.*, 2013). Friction from mounting rubs off the silver coating to reveal a bright colored patch underneath. Which glue to the rump of the cow or buffalo and emit a red liquid when the pad is mounted or trigger a computer-linked response to indicate the cow or buffalo has been ridden.





**Pressure sensitive KaMaR or BeaCon heat detector or KAMAR strips-pressure strips or Kamar®Heatmount® Detector** - It is fitted on sacrum of cow or buffalo. When another animal's mount on the cow or buffalo, the pressure exerted ruptures an internal chamber expelling brightly coloured dye into a larger visible plastic chamber. Pressure strips are useful for identifying cows or buffaloes that are difficult to spot on heat, but are a little more expensive than tailpaint. Once activated they are no longer useful.

**Electronic heat mount detector** - Electronic heat mount detector also known as heat watch system. The data recoded is transmitted to a receiver then recorded by computer for subsequent retrieval. These are essentially an electronic development of the pressure strip. Where a small electronic device slips in to a pouch glued on to tail head of cow or buffalo. The device in corporate a switch or button that is pressed during mounting activity. The simplest devices (for ex. Eco-Dec, Mount Count) require a number of mounts to activate the devices which then flashes or beeps to indicate cows or buffaloes or heifers in heat, the number of sequential flashes being proportional to the number of hours from onset of activity giving an indication of when to inseminate. The efficiency of this system is around 91 percent (Rao *et al.*, 2013).



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**Nedap Smarttag Neck (RealTime Heat Detection, Eating Monitoring, Alert when incorrectly hung and ISO identification (optional)) -** Sniffing and chin resting-neck movements that indicate that a cow is in heat- are easily detected by the Nedap Smarttag Neck. Day and night. The data is available in Real Time via long range data transfer: up to 75 m with the antenna in the barn, or about 500-1,000 m -depending on local circumstances with the Long-Range antenna in the pasture (Meijer and Udink, 2017).


**Pedometer:** A pedometer is a cow or buffalo identification device that incorporates an activity meter, it records restlessness and increase in activity of estrus animals.

**Videotaping or Use of closed-circuit T.V camera -** Cameras are setup in the barn and the herd is continuously monitored the tapes are reviewed for about one hour per day to detect cows or buffaloes in estrus.

**Use of "Nanotechnology" for motion sensing -** Assist in the detection of raised physical activity in cow or buffalo. The activity data is collected every hour for the cows or buffaloes. The data were analyzed using nanotechnology-based intelligence, the software then filters the data against usual activity of herd mate to recognize the cows or buffaloes in estrus and ready to breed. The system is compatible with ear tag identification system, e.g. "Select detect technologies" and "Moo monitor system" device. The message for estrus alert may be received on mobile phone. This method of heat detection is recent updated and advance except the cost of initial investment is high. Accuracy of the system is more than 82 percent (Rao *et al.,* 2013).

**Surveillance-sensor applications -** Systems using optical-electronic sensors, digitized video surveillance and integrated software are currently being developed for the detection of the heat.

**Electronic odour detector -** Principle of the device is based on detection of pheromones related to heat. The pheromones are the natural olfactory signal for bull that cow or buffalo is in heat. Trained dogs were having the ability to detect estrus odour correctly in approximately 80 percent of estrus cow or buffalo. Dog can detect estrus by urine and milk, after being trained with vaginal fluid samples (Fischer-Tenhagen *et al.*, 2011).

**Infra-red spectroscopy and magnetic resonance-spectra -** Infrared spectroscopy and nuclear magnetic resonance spectra are carried out to detect estrus related change (inflammatory reaction) in vaginal mucus, vulva and vestibule (Rao *et al.,* 2013).



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