

Improving Heat Detection Efficiency in Dairy Cows

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A successful AI program is reliant on accurate heat detection. Unfortunately, heat detection efficiency is less than 50% in most large dairy herds. It has also been estimated that 5 to 30% of all artificial inseminations occur in cows that are not even in heat. Poor heat detection or misdiagnosis of heat results in lower pregnancy rates, increased days open, and longer calving intervals.

Various heat detection aids have been developed over the years to help dairy producers detect cows in heat. These aids include pedometers, chin-ball-markers, tail paint, Kamar patches and radio telemetric systems (Heat Watch). When used properly in combination with twice daily visual observations, these devices can significantly increase the number of cows detected in heat. However, when used incorrectly, these devices can result in inaccurate heat detection. Additionally, these aids can be very labor intensive or costly.

Studies conducted in the late 1950's showed that there are changes in rectal temperature during the cow's heat cycle due to hormones produced by the ovary. At the onset of heat the rectal temperature sharply increases. Thus, monitoring changes in body temperature may be a simple way to increase the efficiency of detecting heat in dairy cows if an easy method for recording daily body temperature was found.

Indeed, Phase IV Engineering developed a semi-permanent ID bolus that resides in the cow's reticulum. This bolus records changes in reticular temperature. At Colorado State University, we conducted a preliminary study to determine if this reticular bolus could accurately measure changes in internal body temperature that coincided with the onset of heat. Reticular boluses were administered to four cows. These cows were then given Lutalyse to induce heat and observed for signs of visual heat twice daily with the aid of an intact bull for a minimum of 30 minutes. Immediately following each visual heat check, rectal and reticular temperatures were recorded. Both reticular and rectal temperature decreased prior to heat. This decrease was followed by a sharp increase at the time of heat, and then a decline over the next 48 hours after heat. We believe that reticular temperature can accurately measure internal body temperature and that changes in reticular temperature may be a useful indicator of the onset of heat.

How does this system work? Cows with a bolus in their reticulum walk through a portal as they enter the milking parlor. As the cow walks through the portal, the cow ID and temperature are recorded.

Can this tool eliminate the need to watch cows for heat? No. Cows would still need to be visually observed for heat. The change in reticular temperature is only a cue that an individual cow should be watched more closely.

Besides aiding in reproductive management, the device can also be used to monitor herd health. Changes in body temperature may also indicate systemic illness prior to the onset of more obvious signs such as decreased feed intake or milk production, or abnormal milk. Early detection of health problems result in earlier treatment and resolution.