

The Importance of Estrus Detection in Beef Herds



An efficient and accurate estrus detection program can improve your operation's financial health.

by Jason Nickell and Tracy Jennings

Optimizing reproductive efficiency is a basic requirement for sustaining a beef cow herd. At the root of this effort is the producer's awareness of estrus activity within the group of interest. Whether it be heifers or post-partum cows, females must be cycling to have the opportunity to become pregnant. Assuming they have been fed and managed to achieve cyclicity, then an efficient and accurate estrus detection program is critical toward achieving artificial insemination (AI) success which directly impacts the financial health of the operation.

Estrus detection efficiency is defined as the ability to identify females in estrus who truly are in estrus.¹ By optimizing estrus detection efficiency (i.e. finding more females in estrus that are truly in estrus) producers may increase the number of estral females exposed to AI within a given timeframe, increase the number of early pubertal heifers exposed to a bull in a natural breeding system and increase the overall accuracy of identifying donors and recipients within embryo transfer scenarios.

Visual observation

Visual observation (VO) is the traditional standard practice for estrus detection and involves the identification of a female bovid's willingness to stand and be mounted by herdmates. However, the timeframe of standing estrus is short ranging between 12-24 hours. Additionally, approximately 50% of estrus events occur between the hours of 6 p.m. and 6 a.m. and likely go unnoticed.²

Therefore, although prevalent, the practice of VO is "inefficient" for detecting estrus. Prior data indicate VO estrus detection efficiency is <75% in beef herds (i.e. <75% of females truly in estrus will be detected by VO).² Therefore, the inability to efficiently detect females in estrus has a tremendous impact on heifer selection, AI programs, calving distributions, weaning weights and potential calf value (AI vs. bull-bred offspring). In addition, the labor needs demanded by VO methods can be substantial

and its availability (and skill set) varies among production systems.

Given the limitations of a strict VO estrus detection method, producers can leverage alternative practices that improve estrus detection efficiency. Several VO aids are available to producers and improve estrus detection by providing the human caretaker with visual cues or proxies indicating specific females are likely in heat despite failing to observe standing estrus activity. Mounting-activity detectors, such as tail paint/chalk or colored patches are placed on the animal's tailhead and if removed or a color change is observed, indicate riding activity has likely taken place. Alternatively, "teaser" or "gomer" bulls (surgically modified males equipped with a marking device that identifies which females have been mounted) can also be utilized for estrus detection.

Prior work has observed the use of these VO aids improve heat detection efficiency compared to strict VO by identifying estrus events at night or that otherwise may have been missed by human caretakers. However, despite these improvements provided by VO aids, mounting-activity detectors still require an additional trip through the chute for application and may face ambiguity in user interpretation. Marker animals involve another layer of cost and management for producers. In either case, large labor requirements (although less than strict VO practices) are still necessary to maximize the value provided by these VO aids.

Automated estrus detection

The use of automated estrus detection (AED) provides the producer with the next generation of estrus detection methods by providing 24/7 estrus monitoring while reducing labor demands. In general, an AED system utilizes multiple biometric parameters (e.g. activity, rumination, temperature) as proxy measurements for true estrus activity. Therefore, the goal of AED is to improve estrus detection efficiency and accuracy while reducing the cost of labor.

The SenseHub Beef system, developed by Allflex Livestock Intelligence, is an example of an AED system that incorporates a female bovid's activity and rumination data to identify individuals in estrus. In parallel, the technology provides the user with a timeframe of when to optimally breed the individual female which may provide opportunities for additional management decisions (e.g. semen choice). Females in herds utilizing this AED system are outfitted with tag technology that alerts the user when individual females are identified as being in estrus. In a 2017 study, the likelihood of a beef heifer or cow truly being in estrus based on an alert coming from this AED system was 100% while that of a female identified by VO (performed three times daily in this study) was 84%.³ Therefore, when comparing this AED system versus VO, not only did the AED system display superior efficiency and accuracy but also significantly reduced the necessary labor to detect estrus three times daily.

Summary

Maintaining an efficient beef herd starts with efficient reproduction practices. Visual observation performed by human caretakers is the standard approach but is fraught with inaccuracy and labor demands. VO aids provide an upgrade to estrus detection but still require large labor resources and may struggle with subjectivity due to differences in user to user interpretation. AED provides an option for producers to improve estrus detection efficiency and accuracy while simultaneously reducing labor burdens.

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¹ Rorie RW, Bilby TR, Lester TD. Application of electronic estrus detection technologies to reproductive management of cattle. *Theriogenology* 2002;57:137-148.

² Downing ER SD, Couch D, LeFever DG, Whittier JC, Geary TW. Methods of estrous detection to increase pregnancies using the select synch protocol. *Colorado State University Beef Program Report: Colorado State University*, 1998;175-179.

³ Nelson ST, Haadem CS, Nodtvedt A, et al. Automated activity monitoring and visual observation of estrus in a herd of loose housed Hereford cattle: Diagnostic accuracy and time to ovulation. *Theriogenology* 2017;87:205-211.