



New Electronic Heat Detection for Beef Cattle

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Findings

- # The new HeatWatch system has been under evaluation and has been found to offer a high degree of accuracy in determining estrus in beef cattle.
- # Less expensive heat detection aids are available, including heat patches and chin-ball markers, but require extra effort to be effective.
- # This new electronic technology for cattle should not be overlooked by the beef producer.

Introduction

Accurately detecting heat (estrus) is a critical facet of both artificial insemination (AI) and embryo transfer (ET) programs. Improper and inefficient estrus detection continues to be one of the most costly problems for producers who use AI and ET technologies in their cattle operations. Most often, proper visual heat detection is not implemented because of busy schedules and time constraints or because of untrained or poorly trained ranch personnel.

Research indicates that successful visual estrus detection and subsequent pregnancy rates are directly related to the frequency and duration of each heat check. Most cattle producers limit heat checks to twice daily, usually at dawn and dusk. To insure proper timing of insemination, it is recommended that producers heat check their cattle for not less than 30 minutes, at least four times daily

to identify those females in standing estrus. Because the number of sperm cells used in AI are much lower than those deposited by the bull at natural breeding, and the AI frequency is most often no more than twice for conventional insemination schedules, it is critical that the timing of insemination be based on the onset of standing estrus. However, due to financial constraints, producers often prefer not to pay the cost of trained personnel to heat check their cattle. Therefore, other approaches need to be implemented, if a greater percentage of cattle are to be detected in estrus within producers' herds. The objective of this report is to describe a new heat detection system and to demonstrate its potential effectiveness for use with AI and ET procedures.

New Electronic Detection System

An estrus detection system that checks for estrus 24 hours a day, 7 days a week has been developed using modern radiotelemetry. The HeatWatch system (DDx, Inc., Denver, Colo.) along with a personal computer, determines and reports the onset of standing estrus for each female enrolled in the system. The system consists of individual cow radio transmitters, patches, outside antenna and a personal computer. The transmitter is placed inside a patch that is glued just forward of the tail head on the female. The transmitter number is then logged into the system along with an animal identification code and pasture number. When the female stands to be mounted, a signal unique to that female's transmitter is

sent to the receiver located within a quarter mile radius. The receiver receives signal and sends it to be stored.

The system does have limitations. The main concern has been patch retention. Since many cows may be mounted 100 times or more while in estrus (a rare event), the patch may fall off. A safety feature included in the system monitors the status of transmitters on the animals. Should a transmitter or patch become dislodged from the animal, or have a low battery, a flashing warning is given when the system's computer program is started.

Experimental Approach

When the HeatWatch computer program is initiated, all stored mount data is then down-loaded from the buffer to the computer, organized and presented in multiple formats. Data received by the computer include the animal identification code, date and time of the mount, the duration of the mount and the transmitter identification number. Cows entered into the system's program are sorted into one of five lists based on mounting activity:

- ! **Standing Heat** - an animal receiving at least three mounts over a 4-hour period (default setting) is the base criteria for the *heat* to be entered into the computer.
- ! **Suspect Heat** - an animal that does not qualify for the standing heat list but did have some mounting activity.
- ! **Nonreturn** - a cow that has not returned to estrus by 25 days following mating.
- ! **Inactive** - a cow registered in the system for at least 25 days that has exhibited no mounting activity.
- ! **Brief Cycle** - a cow that returned to heat less than 13 days after her last known standing estrus.

The producer can then access any one of the program's "*Hot Lists*" for evaluation,

with one key stroke. If the "*Standing Heat List*" is chosen from the program, a list is generated on the screen that includes cow identification code, transmitter identification number, number of mounts and time of the onset of standing estrus.

Several studies have been conducted in Louisiana and the Midwest using this new detection system on mixed breed beef cattle. In one study conducted during the mild spring and warm summer months (March through August) in Iowa, transmitters were placed on the tail head region of a group of mixed breed beef cows and heifers having normal-length estrous cycles. These females (slated to be embryo transplant recipients) were in all good body condition and maintained under feedlot conditions during the evaluation interval. These females were observed for estrus twice daily (morning and late afternoon) by trained observers.

Results and Discussion

Studies from around the country over the past 30 years strongly suggests that estrus detection can be improved. When compared with only twice daily observations, several field trials have indicated heat detection with HeatWatch can improve detection rates by as much as 80 percent in cyclic cattle.

Previous studies in North America have indicated that with visual estrus detection, 55 percent to 65 percent of beef cattle came into estrus during the cooler hours of the night. These observations tended not to be confirmed using this new detection system on 816 mid-western crossbred beef cows and heifers. It was found that the onset of standing estrus in 33 percent of the animals began between 6 pm and midnight, while only 20 percent began exhibiting standing estrus between midnight and 6 a.m. (Figure 1). The length of time the animals exhibited standing estrus was found to be more

variable across females than expected, but generally the range was from 6 to 18 hours. Peak duration of standing estrus was between 12 and 14 hours for these females. In this study conducted during spring and summer months, 47 percent of the females exhibited standing estrus for less than 12 hours (Figure 2). These results indicate that for those producers who check heat twice daily for AI, standing estrus for many cows would remain undetected, thus, increasing management cost. Proper timing for AI during estrus has been shown to be very important in a successful beef artificial breeding program.

The HeatWatch system helped markedly in identifying potential recipients for embryo transfer and can increase the number of potential recipients detected in estrus by 25 percent over visual detection alone. The same system that detects estrus on donors for proper timing of insemination also detects estrus on recipients for embryo transfer seven days later. While no estrus detection aids are 100 percent accurate, the system does offer a high degree of accuracy. Improved pregnancy rates, reduced days open and shorter calving seasons would help offset the initial cost of the equipment. For producers who use embryo transfer in their cattle operation, this system offers the ability to more efficiently synchronize recipients with embryos for transfer thus, improving recipient pregnancy rates.

Producers can expect to pay \$3,000 for the receiver, software, training and installation. Transmitters can be purchased for \$55 dollars each or rented for \$12 dollars each for a 60-day breeding season. Should animals be located outside of the quarter mile range of the system or if they are located in hilly terrain, a repeater device to aid in transmission can be purchased for \$800. The patches cost \$3.50 each and a tube of glue at \$7, enough for five animals.

Producers interested in this detection system need an IBM compatible personal computer with a 386 or higher processor. The computer must also have 2 MB of free hard drive space and either a 5.25" or 3.5" floppy disk drive.

Improving heat detection is one of the best ways that a cattle producer can improve breeding efficiency, whether using artificial insemination or embryo transfer procedures. However, good quality, efficient estrus detection is not a simple task. Quality visual estrus detection requires observational skill, time, enthusiasm, patience and persistency of the degree that few busy cattle producers achieve. The new HeatWatch system offers a high degree of accuracy in determining estrus in cattle. However, this accuracy does not come without extra cost. Less expensive heat detection aids are available (heat detector patches and chin-ball markers) but require extra effort to be effective. The final decision ultimately rests with the producer.

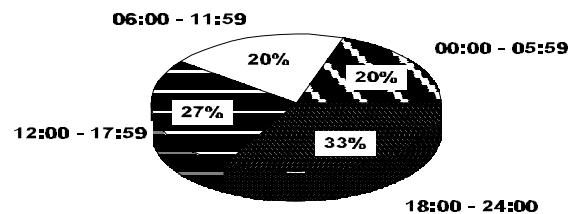


Figure 1. Distribution of the onset of estrus of naturally cycling crossbred beef recipients (n=816).

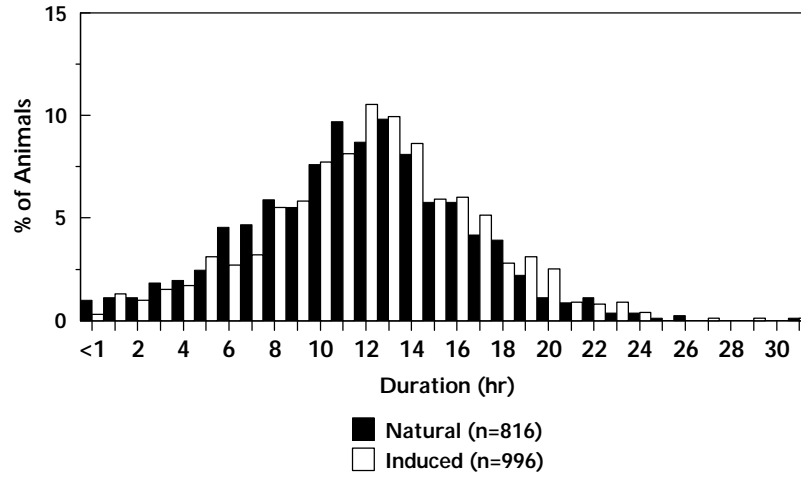


Figure 2. Distribution of the duration of estrus for naturally cycling and prostaglandin induced crossbred beef recipients.

The authors wish to thank the owners and staff of TransOva Genetics, Inc. in Sioux Center, Iowa, for the opportunity and the assistance in completing this study.