Using the Fabdec Heat Time Electronic Oestrus Detection System to Predict Optimal Time for Artificial Insemination in Holstein Dairy Cattle.

Abstract

Introduction: A 9 month observational study was undertaken, assessing the usefulness of The Heat Time System for predicting optimal time to serve Holstein Dairy cattle. 

Materials and Methods: Activity monitors continuously assess cows’ behaviour. Twice daily cows pass through readers, which identify increased activity above a pre-set threshold (oestrus). For each cow detected in oestrus, the following data was collected from their individual activity bar graph:

1. Number of bars from onset of increased activity to artificial insemination (AI).
2. Number of bars from peak activity to AI.

Previous studies have investigated using pedometers/mount detectors to improve accuracy of oestrus detection, but there has been limited research into their use in determining optimum time for insemination.

Maurie et al (1997) studied 171 breedings using pedometers, optimum time for insemination was 11.8 hours (range 6-17 hours) after onset of increased activity. Drumfield et al (1998), studied 2661 inseminations using the Heat Watch mount detector. AI 4 – 12 hours after onset of standing activity achieved highest conception.

Results: Results suggested optimal time to AI cattle was 12 hours after onset of increased activity (47.21% conception rate) with the optimal range 4 – 14 hours. The highest conception rate (56.23%) occurred when the cow was served at peak activity.

Discussion/Conclusions: Activity monitors are useful tools in oestrus detection, identifying and choosing the optimal time for AI, in order to achieve the highest chance of conception.

Brief Literature Review

High performing cattle have developed shorter oestrus cycle duration and lower intensity, making achieving reproductive goals harder emphasizing the importance of detecting and serving cattle at the appropriate time.

Efficiency of visual observation is estimated to be 50-70% (Rorie et al 2002). With this in mind various devices have been manufactured to improve oestrus detection (including the Fabdec Heat Time System).

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Objective

To investigate using the Heat Time System to predict optimal time for AI in dairy cattle.

Materials and Methods

Using a 250 cow holstein dairy herd in Cumbria, data was collected from all cows shown to be in oestrus by the Heat Time System. This totalled 229 services from 124 cows.

- Neck collars contain an electronic tag which continuously monitors cow activity levels (body movements and intensity) storing it in 2 hour time periods. (see Fig 1.)
- Data is downloaded twice daily (via reader at parlour entrance) and comprises of cow’s activity graph. These cows were subsequently served upon exiting the parlour.
- For each cow served the following were recorded (see below for an illustration of the cow in heat):
  1. Number of bars from onset of increased activity to artificial insemination (AI).
  2. Number of bars from peak activity to AI.

As each bar represents a 2 hour period, it was possible to calculate time from either onset of increased activity/peak activity to AI. Data from 229 services was subsequently correlated with results of ultrasonographic pregnancy diagnosis.

Results: Data from 229 inseminations, from 124 cows were analyzed (no of services/cow ranged from 1 – 7). 67 of the services resulted in pregnancy (conception rate was 29.26%). Two sets of data were collected, these are discussed below separately:

1. No of bars from onset increased activity to AI
2. No of bars from occurrence peak activity to AI

Results suggested optimal time to AI cattle was 12 hours after onset of increased activity (47.21% conception rate) with the optimal range 4 – 14 hours. The highest conception rate (56.23%) occurred when the cow was served at peak activity.

Conclusions: Activity monitors can be useful tools in both oestrus detection and identifying the optimal time for AI.

Good heat detection and conception rates are imperative to aid farmers in achieving target pregnancy rates. Results suggest that the time from peak activity to AI has a bigger affect on conception rate than time from onset of increased activity to AI. For every increase in 1 unit of time from peak activity occurrence to AI, the likelihood of becoming PD+ increases by 20%, therefore farmers should aim to serve cattle as close to peak as possible.

The recommendation is that farmers should observe the graphs on each cow and aim to AI cattle as close to peak activity as possible and be aware that the optimal time from onset of increased activity to AI to achieve conception is 12 hours (range 4 – 14 hours after onset). So the best scenario would be to serve a cow 12 hours after onset of increased activity, and when the cow is at peak activity at 12 hours after onset.

References

1. Drumfield EA et al, 1996. Timing of insemination for dairy cows detected in oestrus by a radiotelemetric estrus detection system. (Ovary Synchrony: 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180)