

Evaluation of Estrus Detection Efficacy and Accuracy by Three Methods in a Confinement or Pasture Management System with Holstein–Friesian Cows

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Introduction

Unlike some dairy industries where synchronization of estrus and ovulation is commonly practiced, dairy producers in Ireland rely on visual observation to detect spontaneous estrus in order to plan timing of artificial insemination (AI). A recent survey found that 59% of dairy producers using AI use estrus detection aids. Tail paint (93.9%) is the most commonly used aid (vasectomized bull 4%, Kamars 0.7%, other 1.4%). Though the majority of cows are bred at pasture, a minority of the national herd is bred while housed. The objective of this experiment was to compare the efficacy of three methods of estrus detection in two management systems.

Materials and Methods

The three methods of estrus detection were visual observation (VO), tail paint (TP) and radiotelemetry-HeatWatch® (HW). Cows were managed in one of two environments (cubicle housing with a total mixed ration (HOUSED) or rotational pasture with concentrate supplementation (GRASS)). The 46 randomly allocated and blocked, spring-calving Holstein-Friesian cows were monitored by the three estrus detection methods simultaneously from ten days postcalving for nine weeks on the same farm. The occurrence of nine selected behaviors associated with estrus was also recorded during the thrice daily 20 minute visual observation sessions. Thrice weekly milk sampling for progesterone analysis (enzymeimmunoassay) was used to determine the dates of true standing estrus events (estrus detection accuracy). Data were analyzed by proc Frequency, Genmod,

Npar1way, Ttest and Univariate, as appropriate, in SAS.

Results

All three detection methods had a higher estrus detection efficacy in the GRASS (VO 59, TP 65 and HW 69%) compared to the HOUSED treatment (VO 20, TP 26 and HW 37%) ($P < 0.001$). There was no difference in the accuracy of estrus detection between treatments. Within each treatment there was no difference between the efficiency and accuracy of the three detection methods. More cows expressed sub-estrus (39 vs 13%) and fewer expressed standing estrus (52 vs 91%) in the HOUSED compared to the GRASS treatment, respectively ($P < 0.05$). The intervals between calving and first, second and third standing estrus were longer in the HOUSED than the GRASS treatment, significantly so for second standing estrus (69 and 55 days, respectively, $P < 0.05$). During the observation sessions there was a higher frequency of standing to be mounted in GRASS than in HOUSED cows (median, Q1, Q3: 3,2,4 and 1,1,1.5, respectively, $P < 0.01$).

Significance

These results have implications for management of spontaneous estrus in confinement systems indicating that irrespective of the estrus detection method employed, significantly less estrous events will be detected than if cows were given access to pasture. An alternative to pasture may be a woodchip based stand-off pad to facilitate natural estrus behavior.