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MINISTRY OF AGRICULTURE, FOOD AND RURAL AFFAIRS

Dairy Cow Heat Detection

New University of Wisconsin research has concluded that your chances of success for detecting heat in high-producing cows is just over half the rate for average milking animals. If you routinely check for heat only once or twice per day, your success rate drops even more.

Wisconsin researchers report that high-producing cows are in estrus for a shorter period of time than lower producing herdmates. A regular, frequent heat detection routine could detect standing heats more successfully.

Heat detection is basic to reproductive success in artificially bred dairy herds, yet estrus detection rates have decreased in recent years. A study of southeastern U.S. Holstein herds, for example, showed heat detection rates dropped to 41.5 per cent in 1999 from 50.9 per cent in 1985.

Reduced heat detection success tends to be blamed on increased herd sizes and more cows per person, as well as higher milk production per cow.

Higher milk production is related to negative energy balance, which occurs when cows simply can't eat enough to replace body weight used to produce milk. Researchers have generally attributed delayed first ovulation and smaller follicle size-factors contributing to reduced fertility rates-to negative energy balance.

Part of the negative relationship between fertility and high milk production may be genetic. However, the genetic component in cow fertility performance tends to be small.

This leads to the question of whether shorter estrus durations make heats more difficult to detect. Dr. Milo Wiltbank and associates in Wisconsin studied lactating dairy cows to measure duration. They used the HeatWatch system that fits cows with radio transmitters, and allows continuous monitoring and recording of mounting activity.

The study monitored 267 early-lactation cows housed in a free-stall barn and milked twice daily. The HeatWatch system let researchers record number of mounts and how often they occurred. They checked ovulation by ultrasonic exam for all detected estruses.

Researchers made comparisons according to lactation number, days since calving, and the amount of milk given 10 days before the day of estrus. That let them make sure the production level was linked closely to when the estrus occurred, not overall lactation milk.

When the cows were grouped according to high and low production, estrus duration [standing to be mounted] was shorter for the high-production group, the researchers found. This group, averaging 46.4 kilograms of milk per day, were in estrus 6.2 hours on average, compared with the lower production group at 10.9 hours.

There was a negative correlation between milk production and estrus duration. The high group had more intense mounting activity, with more mounts during the shorter time period. Still, the lower production group averaged 8.8 mounts versus 6.3 for the high-producing group.

Some interesting and challenging information about estrus events revealed by this study included:

- 15 per cent of recorded estruses consisted of only one standing event;
- estruses with recorded standing events-two or more-were detected on average 93 days after calving, with a range of 50 days when heat detection didn't start until 165 days;
- average duration was 8.7 hours, with an average of 7.6 standing events;
- standing events lasted only 25 seconds per estrus on average.

On the first ovulation 50 days after calving, the HeatWatch system detected no standing activity among 41 per cent of the cows, and only one standing event among 52.6 per cent. Cows that showed no standing activity had higher production.

Many theories have been put forward to explain why high-producing cows have poorer fertility. Wiltbank's study provides another one. He and his team measured circulating levels of reproductive hormones in the cows and found that high-producing animals tended to have lower levels of estradiol and progesterone. Estradiol affects how well a cow shows heat signs. Circulating progesterone levels tend to be low in high-producing cows as well, although their ovaries tend to have higher-than-average amounts of progesterone-producing luteal tissue.

Modelling done as part of this research showed high-producing cows metabolize more estradiol and progesterone through their livers. Since this removes reproductive hormones from circulation more quickly, they are less available to do their job. It could explain the reduced estrus activity.

Wiltbank used the data from this study to predict the probability of successfully detecting standing heat in a cow based on her milk production. With four-times-per-day heat detection, the probability of success is about 90 per cent for cows producing about 35 kilograms of milk per day. For cows producing 45 kg per day, the success rate drops to 50 per cent probability, and results are even poorer when heat detection is carried out just once or twice a day.

It is also interesting to note in this study that cows exhibited recordable standing behaviour at 93 to 95 days after calving on average. This suggests your breeding program may be more successful if you intensify heat detection and breeding between 95 and 120 days.

Recent CanWestDHI data indicate this practice doesn't harm overall profit. An important consideration in managing lactation and calving intervals is to maintain the dry interval at 40 to 70 days. A dry period longer than 70 days has been shown to reduce overall production.

Other considerations for successful heat detection include:

- frequent, regularly timed observation of high producing cows. Bear in mind that cows may only show standing heat for four to six hours and actual standing events may last 25 seconds in total;
- choosing times when and places where cows tend to exhibit mounting behaviour;
- using records to advantage to help identify cows most likely to be in heat;
- using electronic heat mount detectors, tail chalking and die patches to identify mounting activity that otherwise goes unnoticed;
- using timed insemination to supplement a heat detection program or replace it entirely;
- reviewing when you begin breeding cows for the first time after calving and when you have the most success. Delaying breeding by a cycle combined with an efficient program to heat detect and breed cows may be more efficient.

On many dairy farms, spring and early summer put heavy demands on your time, giving you less opportunity to spend on routine milking herd management. Re-examine your procedures and change them as needed to ensure the best odds of successful heat detection.

References

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For more information:
Toll Free: 1-877-424-1300
Local: (519) 826-4047
E-mail: ag.info.omafra@ontario.ca