by Jeff Stevenson

Heat detection combined with timed A.I. boosts profit

ONE of the main drivers behind dairy herd profitability is the lactating and replacement herd's reproductive performance. Raising the proportion of time that a cow spends in early lactation — where most of the milk is produced in a lactation curve — is also a key component of profitability.


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Another part of that equation is keeping older, high-producing cows in the herd as long as possible. Minimizing costs to raise replacement heifers and their timely entry into the milking string enhances revenues by reducing their days on feed before first calving. Raising the number of female calves born to replacements also affects dairy farm revenues.

Not one size fits all

Many reproductive management strategies are available for the choosing. What works well on one dairy may not be the solution for the next farm because people and management are what makes things work. Let's look at the relationship between A.I. service rate (the proportion of cows detected in heat each week and submitted for insemination) and the resultant conception rates of inseminated cows and how these factors relate to economics and profit.

Two recent studies conducted at the University of Wisconsin shed some light on this important topic. Researchers compared economic and reproductive performance of programs that combined timed A.I. and different levels of A.I. after heat detection. To do so, they used a sophisticated simulation model that examined the dynamics of contributing variables to profitability. The model included every cow in a herd following daily events of aging, replacement, mortality, pregnancy establishment, pregnancy loss and calving.

The probability of pregnancy depended on the combination of probability of insemination and conception rate. All nonpregnant cows had a probability of pregnancy between the end of the voluntary waiting period and the days-in-milk cutoff for continued A.I. After the cutoff, cows were labeled as do-not-breed and replaced when milk production went below a minimum production threshold.

A similar model was created to represent a replacement heifer herd to simulate and adjust the supply and demand of replacements. The net dollar value (think "profit") of a program was the net sum of milk income over feed cost, replacement and mortality cost, income from newborns and reproductive costs.

One program used 100 percent timed A.I. (42 percent conception rate for the first timed A.I. initiated at 72 days in milk and 30 percent for second and later services). The other 19 programs combined timed A.I. with heat detection (combined programs) in which cows were inseminated based on heat detection between the voluntary waiting period and the onset of a timed A.I. program. These programs ensured all cows were inseminated once by 72 days in milk, and, thereafter, heat detection continued until cows were diagnosed open and started on a timed A.I. program.

The model set the proportion of cows receiving A.I. after heat detection for the 19 combined programs ranging from 30 to 80 percent, at three levels of conception: 25, 30 and 35 percent.

The output included income-over-feed costs, replacement heifer costs, reproductive program costs, value of the calf, and predicted net dollar value of the 100 percent timed A.I. program in comparison with 19 other combined programs.

Compared to a baseline

The net value derived from each of the 19 combined programs was compared with a 100 percent timed A.I. program (set at $0 in the figure). Moving left to right within conception rate groups in the figure shows the negative or positive net value of that program compared with 100 percent timed A.I. when heat-detection rates rose from 30 to 80 percent.

The combined programs with a conception rate of 35 percent for cows receiving A.I. after heat detection had the greatest net value and reproductive performance (decreased days open, calving intervals and days in milk) at all levels of heat detection. The program using 100 percent TAI (timed A.I.) had a greater net value and better reproductive performance than all programs with 25 percent conception rate. It had very similar performance to combined programs with up to 60 percent of cows receiving A.I. after heat detection in the 30 percent conception rate range.

Looked at activity monitors

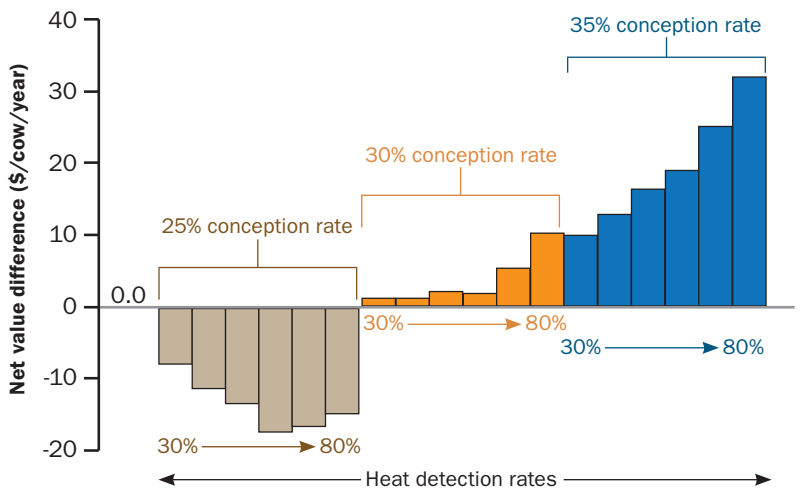
Another study from the Wisconsin group compared combinations of using activity monitors with and without timed A.I. versus a timed A.I.-only group before first A.I. after calving. Cows were inseminated after a voluntary waiting period of 50 days based on greater physical activity for various time periods of 15 to 29 days before being enrolled in a timed A.I. program when they had not been inseminated by 65 or 79 days in milk. These treatments were compared to a 100 percent timed A.I. treatment in which cows received timed A.I. at either 65 or 79 days in milk.

The A.I. service rate and earlier postpartum breeding achieved by 56 to 70 percent of cows inseminated after activity was offset by greater fertility in the 100 percent timed A.I. cows. Submitting cows to a timed A.I. program resulted in 40 percent conception rate and generated more pregnancies than in the activity group. Relatively minor differences in net dollar value were achieved by the various strategies to get cows inseminated at first service after calving.

Any of the strategies could be used on dairy farms to achieve the same goal. Boosting net dollar value usually can occur by raising heat-detection rates, but if the conception rates are poor after A.I. (25 percent), raising heat-detection rates may further reduce net dollar values (see figure).

The bottom line is that incorporating good heat detection methods as the sole source for identifying cows before A.I. or as a supplement to a timed A.I. program adds economic value to your profit and loss statement. Happy A.I. breeding!

Improved heat detection and conception enhance fertility and profit.



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