Reproductive Management and Performance Can be Improved by Use of DeLaval Herd Navigator®

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Introduction

The Danish development company Lattec I/S has built an automated sampling and measurement system and software that includes biometric and biological models developed at Biosens, a collaborative R&D effort, started in 2001. The system monitors reproduction, mastitis, ketosis and urea levels on a daily basis. The system is currently being further tested at a number of dairy farms in Denmark, and the system is now on the market in Denmark, The Netherlands and Sweden.

The milk constituent used for tracking of reproductive events is the hormone progesterone, which is measured in the system by a lateral flowtest technique. The biological model developed (Friggens and Chagunda, 2005) can issue a number of warnings to the farmer:

- Time of heat, the likelihood of a prospective insemination being successful and, given the cow was inseminated, the likelihood she has become pregnant.
- Risk of post partum anoestrus, i.e. the cow not coming back to normal cyclicity after calving
- Risk of cystic conditions (follicular and luteal cysts).

The model also takes into account additional risk factors that can alter the likelihood of reproductive events. Testing of the reproduction model shows that one third of model detected oestruses were not detected by external oestrus detection, and that 96% of the time the reproduction model accurately predicted likelihood of pregnancy.

Materials and Methods

The test results reported here came from three Danish test herds. All three herds are commercial herds, all with Danish Holstein cows. Basic production and reproduction figures were extracted from the National Cattle Database, whereas Herd Navigator Specific data were extracted from the Herd Navigator databases in the farms. The data presented covers the period Oct 20, 2008 to Oct 20, 2009.

Results and Discussion

Table 1 presents the overall reproductive traits in the test farms. The heat detection rate expresses the system's ability to detect heats from the onset of measurements which start at 20 days before the end of the voluntary waiting period. The advice to the farmer is then to inseminate 24-36 hours later, also in the absence of visual heat signs. As can be seen from Table 1, the heat detection rate is beyond the requirement to the system (at least 95 %).
The conception rate (defined by number of pregnant cows/ number of inseminations) differs among the herds, and reflects that in herd 1 and 2 inseminations are performed by the owners, and therefore timed more accurately than in herd 3, where a technician performs the insemination.

The testing of the system revealed a far larger number of follicular cysts than were expected from the literature (Garverick 1997). The follicular cyst risk level will have reached 0.9 by appr. 10 days after the latest heat provided that progesterone is still very low, and will allow the farmer to decide on treatment at an early stage. Also, the early warning of embryonic death is of great value to the farmer, as he will be able to immediately rebreed the cow.

Table 1. Farm characteristics and reproductive traits from three Danish Herd Navigator test herds

	Farm 1	Farm 2	Farm 3
# cows	124	201	143
Annual milk yield/cow, kg (pounds)	10,126 (22,324)	9,675 (21,330)	9,711 (21,409)
Heat detection rate with Herd Navigator, %	97	95	97
Conception rate, %	63	55	40
% heats resulting in follicular cysts	12.7	6.8	19.0
% cows with at least 1 follicular cyst incident	27.4	14.4	36.5
% Embryonic Death/inseminations (day 25-45)	15.4	20.7	16.7

The introduction of Herd Navigator has changed the number of Days Open in the test herds, on average by 22 days, as can be seen in Figure 1A. . The change is attributed to the fact that once the cows are past the voluntary waiting period they get bred and become pregnant faster than before, because almost all heats are detected by the system. Figure 1B shows the importance of correct timing of inseminations, as the optimal time is around 1 day after the heat alarm.

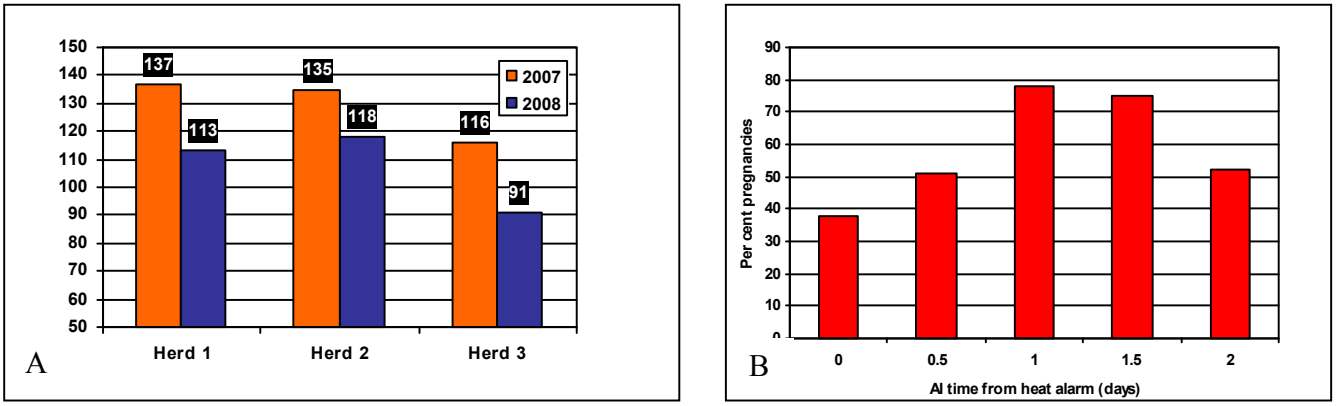

Figure 1. A. Changes in Days Open the year before introduction of Herd Navigator, and in the first year of full alarm service in three Danish test herds . B. Conception rates as a function of timing of inseminations (time from heat to insemination). Herd 1.

References

Friggens, N.C & M.G. Chagunda. 2005. Prediction of the reproductive status of cattle on the basis of milk progesterone measures: Model description. Theriogenology, 64, 155.

Garverick, H.A. 1997. Ovarian Follicular Cysts in Dairy Cows. J. Dairy Sci., 80, 995.