Use of daily robotic progesterone data for improving fertility traits in Finnish Ayrshire

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Abstract

Currently, cow's ability to return to cyclicity after calving is mostly evaluated using the first insemination measurements, which are highly influenced by management decisions. However, if consecutive progesterone measurements are used the first heat can be estimated accurately even if the cow does not show clear signs of heat. The data from 14 Finnish dairy herds using DeLaval Herd Navigator™ (HN) system were used to study cow's ability of returning to cyclicity after calving. 1230 Ayrshire cows from parities 1-3 were included in the analysis. HN system takes milk progesterone samples automatically during milking and apply biological models to calculate the time of estrus and probability for pregnancy if cow is inseminated. HN use the change in progesterone level from high to low to determine that a heat has occurred and will look for a new heat around 21 days later. In this study the data of first estimated heat based on progesterone data between 1-100d after calving were included. The mean number of days from calving to first heat (CFH) detected by HN varied from 49.9d to 65.8d depending on parity. Most of the cows in the data had been inseminated for the second or third heat identified by the HN system. The mean number of days from calving to first insemination (CFI) varied between 78.9-86.5d and interval from first to last insemination (IFL) between 30.5-38.7d depending on the parity. The mean number of inseminations in HN herds was around 2, which is similar with the estimates from previous studies. When phenotypic estimates were compared to those from previous studies CFI was 4.5d shorter and IFL 10.3d shorter in HN herds for the first parity Ayrshire cows. CFI was 1d and 5.7d longer and IFL was 6.6d and 4.9d shorter in HN herds for parities 2 and 3, respectively. According to previous studies the average cost of CFI is 0.51€/d and IFL is 2.56€/d for the red dairy breed. Heritability estimates were calculated using DMU software and linear animal model for first parity cows being 0.27±0.13, 0.07±0.07 and 0.03±0.06 for CFH, CFI and IFL, respectively. Because of the small number of animals in the data most of the estimates had high standard errors. However, the magnitude of the estimates are in line with previous studies where CFH have found to be more heritable compared to other fertility traits. Results showed that using milk progesterone information to detect heats shortened CFI in first parity cows and IFL in parity 1-3 cows.

Keywords: progesterone, cyclicity, dairy, ayrshire