

Monitoring synchronous lying time in commercial dairy herds using accelerometers

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Synchronous lying behaviour may be an indicator of positive welfare in dairy cows. Low values of synchronous lying, despite sufficient lying space, might indicate reduced cow comfort, disturbances, or competition for resources. However, little is known about whether farms differ in the level of lying synchronicity and how consistent this is within a farm. Moreover, the level of synchrony may vary within the day. Accelerometers used for estrus detection of cows enable continuous recording of lying behaviour, thus enabling continuous monitoring of synchronous lying of dairy herds. We studied the timing and duration of synchronous lying in 8 Dutch Holstein Friesian dairy herds across 1 year, in relation to grazing and milking management (robotic milking, 2x and 3x daily milking). In 'winter' months (November-March), herds were housed; in 'summer' months (May-September), 6 of 8 herds had access to pasture for 5-8 hours per day. April and October were excluded because of variable management. Herds had 1-1.4 cubicles available per cow. After cleaning individual accelerometer data, herd average lying time was computed per 15-min (900 s) interval. An interval was defined as synchronous lying when the herd average lying time > 630 s (i.e. assuming 70% of the herd was lying; threshold based on literature). Daily synchronous lying time was defined as the number of synchronous intervals × 15 min. A general linear model was used to assess effects of farm, season and their interaction on synchronous lying time per day; with Tukey-adjusted pairwise comparisons. Spearman rank correlations were made per farm per season to assess the association between total daily lying time and synchronous lying time. Most synchronous lying occurred between 2AM and 6AM, though this was not true for all farms. Across farms, average synchronous lying time was 2.3 h in summer (range: 1.4 – 4.8 h) and 1.7 h in winter (range: 0 – 5.0 h). Robotic milking did not result in lower synchronous lying time. In 4 out of 6 farms with grazing, synchronous lying time was about 1.5 h higher in summer due to synchronous lying on pasture. On 3 of these farms, synchronous lying time in winter had a median value of 0 h. Total lying time and synchronous lying time showed only low to moderate correlations. Monitoring synchronous lying in dairy herds using accelerometers is feasible and the measure seems consistent over time. Its validity as positive or negative welfare indicator requires further study.