



# Analysis of lameness induced changes in dairy cow behaviour and suitability of ethological parameters for early lameness detection

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## Key words

Dairy cow, lameness, early detection, behaviour, automatic recording

## Aim of the study

The aim of this study was to identify behavioural changes that have the potential to be used as indicators for automatic early lameness detection. Thereby, it was hypothesised that the behaviour of moderately lame cows would be affected in a similar direction as has been described for severely lame cows but to a smaller extent.

## Material and methods

The behaviour of non-lame and moderately lame cows was compared on 17 Swiss dairy farms. On each farm, 5-11 non-lame and 2-7 moderately lame cows were selected for data collection in two 48-h periods (A, B) separated by an interval of 6-10 weeks. Based on visual locomotion scoring, 142 non-lame (locomotion score 1 of 5) and 66 moderately lame (locomotion score 3 of 5) cows were examined in period A and 128 non-lame and 53 moderately lame cows in period B. Between these two periods, the cows underwent corrective hoof trim-ming. Lying behaviour, locomotor activity, and neck activity were recorded by accelerometers (MSR145 data logger), feeding and rumination behaviours by noseband sensors (RumiWatch halter). Furthermore, the frequency of visits to the brush and the concentrate feeder, and the milking order position were recorded.

## Results and significance

In comparison with non-lame cows, moderately lame cows had a longer lying duration, a longer average lying bout duration, and a greater lateral asymmetry in lying duration. Furthermore, average locomotor activity, locomotor activity during 1 h after feed delivery or push-ups, and average neck activity were lower in moderately lame cows. Eating time and the number of eating chews (jaw movements) were reduced in moderately lame compared with non-lame cows, whereas no effect of moderate lameness was evident for ruminating time, number of ruminating chews and boluses, and average number of ruminating chews per bolus. Moderately lame cows visited the brush and the concentrate feeder less frequently, and they were further back in the milking order compared with non-lame cows.

In conclusion, non-lame and moderately lame cows differed in a biologically relevant way in many of the behavioral variables investigated in this study. Therefore, the use of these behavioural changes seems to be promising to elaborate a tool for early lameness detection.

## Publications, posters and presentations

Weigele, H. C.; Gygax, L.; Steiner, A.; Wechsler, B.; Burla, J.-B. (submitted). Moderate lameness leads to marked behavioural changes in dairy cows. *Journal of Dairy Science*.

Weigele, H. C.; Gygax, L.; Steiner, A.; Wechsler, B.; Burla, J.-B. 2016. Lahmheitsbedingte Verhaltensveränderungen bei Milchkühen – Eignung ethologischer Parameter zur Früherkennung, KTBL-Schrift: Aktuelle Arbeiten zur artgemäßen Tierhaltung 511, 197-207.

- Weigele, H. C.; Gygax, L.; Steiner, A.; Wechsler, B.; Burla, J.-B. 2016. Lahmheitsbedingte Verhaltensveränderungen bei Milchkühen – Eignung ethologischer Parameter zur Früherkennung (oral presentation). 48. Internationale Tagung für angewandte Ethologie, 17.-19. Nov. 2016, Freiburg i.Br., Germany.
- Weigele, H. C.; Gygax, L.; Steiner, A.; Wechsler, B.; Burla, J.-B. 2017. Analysis of lameness induced changes in dairy cow behavior and suitability of ethological parameters for early lameness detection (oral presentation). 19th International Symposium and 11th Conference Lameness in Ruminants, 7.-9. Nov. 2017, Munich, Germany.

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