

Effect of cow factors and daily walking distance on commonly used lameness indicators

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There has been debate that common lameness scoring methods are unreliable, partly because factors unrelated to lameness can affect locomotion. We investigated the effect of cow factors (CF: parity, breed, lactation stage, milk production) and daily walking distance (DWD) on frequently used lameness indicators (LI).

Seventy-two cows (parity 1-6; 42 Holstein-Friesian (HF), 30 Nordic Red (NR)) were locomotion scored (LS; 1-12 times/cow, in total n = 402) every two weeks in a 7 month study. LI could be non-present (0), present (1) or obviously present (2). The overall LS was based on the sum of the LI scores (0=0; 1=1; 2=2-4; 3= >4). The cows were housed in a freestall barn with slatted floors, and their position was recorded continuously (0.5 – 7 months/cow) with 1.2Hz sample rate. DWD was calculated from filtered positioning data. The effect of CFs and DWD on LIs was analyzed with backwards stepwise regression using linear mixed model with cow as a random effect. Six and a half percent of the cows were scored as 0 (4 % of NR; 8 % of HF), 23 % as 1 (26 %; 20.8 %), 53 % as 2 (56 %; 50.4 %) and 18 % as 3 (14 %; 20.8 %).

Cows with higher parity had higher scores ($p < 0.002$) in tender placement of the hooves, back arch, reduced speed, irregularity in step timing, irregularity in step placement, abduction and head movement. Aging itself may affect the locomotion, but it is also possible that older cows have more claw disorders. HF cows had more abduction ($p < 0.0001$) and irregularity in step placement ($p = 0.008$), while NR cows reduced tracking up ($p < 0.0001$). Overall LS spread quite evenly across the breeds and it is possible that some of LI differences are due to anatomical differences in two breeds. In early lactation tracking up was lower ($p < 0.0001$), while the lactation progressed back arching increased ($p = 0.06$). Larger udder in early lactation may hinder the hind leg movement. The DWD was lower when back arch ($p = 0.002$) and reduced speed ($p = 0.0003$) scored higher. In this study the cause of lameness was not investigated, and thus here the LI may be affected both by lameness and cow factors.

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