A novel use of rumination behaviour to monitor oestrus in dairy cows on pasture

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Behavioural expression of oestrus is a welfare characteristic, however its occurrence has declined in dairy cows increasing the need to identify alternate means for oestrus detection. Changes on rumination time (RT) has been linked to oestrous events for free-stalled cows but no studies have been reported in cows on pasture under Chilean conditions. Our aim was to investigate whether RT is related to oestrous events in dairy cows permanently kept on pasture. The study was conducted at Agricultural Research Station of Universidad Austral de Chile, Valdivia. Rumination data from 30 Holstein-Black Friesian dairy cows was automatically recorded using a microphone-based sensor (Heatime® SCR HR- Pro-LD) during 40 days. We observed oestrus behaviour (focal sampling) for 60 minutes two times a day (9:00-10:00 am and 7:00-8:00 pm). The day of oestrus (day 0) was defined by visual observation according the score of Van Eerdenburg *et al*. and confirmed with plasma progesterone concentration (≤1.5 ng/ml). Thirty seven oestrus episodes were confirmed for 24 cows (average 1.5 episodes/animal). We estimated a reference period for RT (mean of RT 3 days before and 3 days after day 0) of 604.29±64.01 min. Mean RT on day 0 was 535.84±64.57 min/day. We observed a drop of 68.45 min, 11.33% lower than the reference period. We used a generalized nested linear mixed model (GLMM) to model the association between RT and cow's factors (parity, age, body condition score, mean milk yield (l/day), oestrus score, and days in milk at the moment of oestrus, confirmed ovulation after oestrus episode, plasma progesterone levels and size of the follicle. We performed multifactorial GLM procedures including a forward stepwise method to build a model of best fit for variables affecting RT. In conclusion, RT is affected by the day of oestrus in dairy cows on pasture. Ethical Committee for the use of Experimental Animals, UACH (99/2013S9-2014).