

## **Assessing cattle personality and welfare in dairy cattle through activity monitors: fear and social behaviours**

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There are many commercial systems which utilise tri-axial accelerometer-based activity monitors for oestrus monitoring, resulting in long term continuous recording of activity. Research has suggested that this data can be used to detect disease states through changes in activity patterns. However, this data may also be used to characterise the temperament or personality traits of individuals, such as fearfulness or sociality, which can aid management and improve welfare. This project investigated how individual differences in levels of fearfulness and sociability in dairy cattle might be reflected in home pen activity patterns as recorded by the IceQube activity monitor (IceRobotics Ltd., South Queensferry, UK). One hundred Holstein dairy cattle were fitted with an IceQube. The study consisted of a 40 day period in which home pen activity, visits to the robotic milker and milk yield was recorded, followed by a 62 day test period in which the cows received two novel arena/novel object (NANO) tests and two social isolation tests (SOC). Behaviours recorded in the tests were significantly associated with spontaneous home pen behaviour in the 40 day period. Measures of activity during the SOC test, such as the number of times the cow moved into an area 5m from social companions was associated with shorter standing bouts, longer overall standing duration in a day, lower milk yields and less variability in the daily number of lying bouts ( $R^2_{adj}=0.19$ ,  $F_{4,68}=5.08$ ,  $P=0.001$ ). Cows which scored highly for neophobia (ie responded fearfully to the novel arena and novel object) in the NANO test were older, had more lying bouts and a greater variation in the duration of their average lying bout ( $R^2_{adj} = 0.15$ ,  $F_{3,75} = 5.32$ ,  $P = 0.002$ ). Cows which scored highly on boldness in the NANO test were older cows with less variation in their average lying bout duration ( $R^2_{adj} = 0.11$ ,  $F_{2,75} = 5.63$ ,  $P = 0.005$ ). To conclude, significant relationships exist between behaviours in short-term personality tests and home pen activity recorded over several weeks. The results suggest that activity monitors can be used assess personality traits in cattle that contribute to welfare.

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