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Responses to short-term exposure to simulated rain and wind by dairy cattle: time budgets, shelter use, body temperature and feed intake

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Abstract

Our objective was to examine how short-term exposure to wind or rain, or the combination of wind and rain, influences behavioural and physiological responses and the motivation for shelter. Twenty-four, non-lactating, pregnant Holstein-Friesian cows were individually housed and allocated one of four treatments (control, wind, rain, wind and rain) created with fans and sprinklers. Feed intake and behavioural and physiological variables were recorded for 22 h. Motivation to use the shelter was assessed by creating a trade-off between time spent feeding while exposed to the weather treatments and time spent in the shelter. Feeding times were manipulated by placing frames with three different mesh sizes over the feed; the purpose of the smaller mesh was to increase the time spent feeding. However, shelter use was unchanged by these costs. Cows reduced their feed intake by 62% when exposed to rain and the combination of rain and wind. Cows spent approximately 50% of their time in the shelters in all weather treatments and spent little time lying, especially under wet conditions (5.9, 4.4, 2.8, and 1.1 [± 1.4 h] per 22 h for control, wind, rain, and wind/rain treatments, respectively; mean [± SED]). Rain alone, and in combination with wind, decreased skin temperature by 26%, on average. The short-term response to wet conditions was characterised by a marked decline in lying time, feed intake and skin temperature. Wind alone had little effect on these responses, but magnified the effect of simulated rain on feeding behaviour. These results indicate that protection from both rain and the combination of rain and wind is likely to be important for animal welfare, but future work is needed to understand when and how to provide protection to pastured dairy cattle.

Keywords: *animal welfare, behaviour, dairy cattle, motivation, physiology, rain and wind*