The Old School, Brewhouse Hill, Wheathampstead,
Hertfordshire AL4 8AN, UK

Animal Welfare 2011, 20: 339-346
ISSN 0962-7286

Associations between open-field behaviour and stress-induced hyperthermia in two breeds of sheep

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Abstract

*In sheep (*Ovis aries*) and other farm animals, routine husbandry procedures can cause negative emotions, such as fear, which are generally considered to reduce animal welfare. The open-field test (OFT) is the most widely used test to measure fearfulness in animals. The induction of psychological stress is often accompanied by an elevation of core body temperature, referred as stress-induced hyperthermia (SIH) and both OFT and SIH were used in this study to measure fearfulness in sheep: the aim being to examine associations between behaviour in the OFT and the SIH response, using data from two breeds of sheep tested repeatedly over time. Twenty-four ewes from two breeds, Lacaune and Ripollesa, were tested for 10 min with all behaviours recorded throughout. Rectal temperature was measured immediately prior to the start of the test (T1) and 10 min after its completion (T2). SIH was measured as the difference between T2 and T1. Sheep were tested over three periods of three experimental days each. Ewes of both breeds showed consistent changes in behaviour in the OFT and a clear SIH response. Bleats and visits to the water bucket showed a clear pattern between rounds. Differences between T1 and T2 were found, T2 was higher than T1 suggesting that exposure to a novel arena caused SIH. Breed differences were found whereby T2 was 0.12°C higher in Ripollesa than Lacaune. These findings have implications for selection programmes, creating the possibility of selecting less fearful animals that will cope better with handling procedures that may induce fear. Further, they also demonstrate the importance of using both behavioural and physiological variables to evaluate fear.*

Keywords: *animal welfare, fear, open-field test, sheep, stress, stress-induced hyperthermia*