THE RESPONSE OF CATTLE TO AUDITORY STIMULI

M.L. COFFEY and G.L. KREBS

Muresk Institute of Agriculture, Curtin University of Technology, Northam, WA 6401.

Devices that use sound as a deterrent/repellant are available for use in household and horticultural situations. There are no commercial devices in use to repel farm animals from certain areas. Repelling grazing animals from particular areas is the basis of virtual fencing. Electrical stimuli is considered a means of virtual fencing but this has animal welfare ramifications. A possible alternative to electrical stimuli is the use of auditory stimuli to deter animals from entering a particular area. The aim of this trial was to investigate the reaction of cattle to electronically generated sound as a preliminary stage in the development of virtual fencing.

The methodology of this project was based on that of Talling *et al*. (1998). Two studies were carried out to determine the aversiveness of continuous, high frequency sound to cattle. The normal audiogram of cattle ranges from around 23 Hz to 37 kHz (Heffner1998), with cattle being most sensitive to sounds of 8 kHz (Heffner and Heffner 1992). The first study involved the use of a continuous, uniform signal of 8 kHz played at 95 dB, and the second study a frequency modulated, continuous signal of 20 kHz (modulation of 1 kHz) played at 95 dB.

Two groups of six cattle were used. In addition, a companion animal accompanied each animal during the testing period to reduce isolation stress in the test animals. The protocol was the same in each study. Each of the six animals in the two treatment groups was subjected to 40 consecutive tests, 20 control (no sound) and 20 tests with sound present. Each test totalled five minutes in duration.

The experiment was conducted indoors. The start area (3 m x 6.4 m) was located immediately outside the shed. At the beginning of each testing session the test animal (and companion) was led into the start area and the door opened for the animal to enter the test area (10.5 m x 6.4 m, divided into 2 equal areas, A1 and A2). Once the animal entered the test area the door was shut. Five minutes after the door was opened the animal was returned to the start area. The animal was free to move within the test area (areas A1 and A2) after leaving the start area. To indicate passing from area A1 to A2 (separated visually by a painted line) the animal had to have both front feet over the painted line. During each test the amount of time spent in areas A1 and A2 was recorded as was the number of times the animal crossed from area A1 to A2 or vice versa. Following these 20 control tests, an assessment was made as to which area the animal preferred. For the second group of tests the treatment sound was associated with the animal's preferred side, if it showed a preference, or otherwise allocated randomly. The sound treatment was relayed to the animal whenever it was present in the sound associated area, and switched on when both of the animal's front feet entered this area, either from over the painted line or from the start area. When the animal left this area the sound was switched off.

The cattle displayed no aversion responses to either of the sounds, although they could hear the sounds. There was no difference ($P>0.05$) in the time the animals spent in the area from which the sound was relayed for either the modulated or uniform sound compared with the control. The relaying of the modulated and uniform sound had no effect ($P>0.05$) on the number of crosses during the sound tests. Temperament was assessed at the completion of the experiment and was found to have no effect ($P>0.05$) on the response of cattle to either modulated or uniform sound. Before sound can be incorporated into any virtual fencing concept, a sound must be identified that is capable of causing aversion. It is possible that an intermittent sound of biological origin could meet this requirement.

HEFFNER, H.E. (1998). *App. Anim. Behav. Sci.* **57**, 259-68.

HEFFNER, H.E. and HEFFNER, R.S. (1992). *In* 'Farm Animals and the Environment'. (Eds. C. Phillips and D. Piggins) pp. 159-83 (CAB International: Oxon)

TALLING, J.C., WARAN, N.K., WATHES, C.M. and LINES, J.A. (1998). *Appl. Anim. Behav. Sci.* **58**, 255-66.

Email: g.krebs@curtin.edu.au