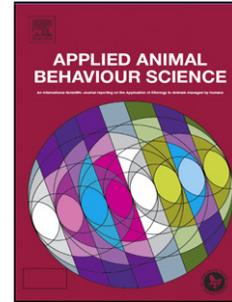# Accepted Manuscript

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Virtual fencing of cattle using an automated collar in a feed attractant trial

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Highlights:

- 12 heifers tested with an automated experimental virtual fencing collar prototype
- Audio and electrical stimuli were delivered based on animal location and movement
- A virtual fence restricted individual cattle from accessing a feed reward
- With increasing fence interactions individuals responded to the audio cue alone
- High individual variation was present in behavioural responses and learning rate

ABSTRACT

Managing grazing cattle can be challenging in environmentally-sensitive areas or when there is limited contact with and control over the animals. Virtual fences – barriers without a physical barrier – represent the potential for animal guidance in locations where physical fences may be unfeasible. In this study automated collars that provided audio and electrical stimuli to cattle were tested on 12 naïve heifers to determine if cattle could be deterred from a feed attractant in a series of 3 test paddocks. All animals were individually trained (no virtual fence line set) across 3 days (each paddock once per day) to walk unrestricted down to a bale of hay. The heifers were then each fitted with the experimental prototype collar device and a virtual fence line was set across the width of each paddock to restrict animals from the hay reward. As the animal approached the virtual fence line the collar emitted a 2.5 s audio cue (785 Hz ± 15 Hz, 58DB). If the animal stopped or turned away no further cues were emitted, if the animal continued forward an electrical stimulus (800 V electrical pulses delivered in less than 1 s) was applied