

The Use of Contact Loggers to Study Social and Oestrus Activity in Brahman and Composite Beef Heifers under Field Conditions.

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Intensification of cattle production systems over the past 60 years has been facilitated by genetic technologies to improve productivity of the animal and quantity of the product (milk and meat). The relative neglect of fertility has in many instances seen a decline in cattle reproductive rates (Kadarmideen *et al* 2000). The many factors influencing the successful outcome of a female's reproductive cycle include amongst others, social interactions and duration and intensity of oestrus, but these traits are difficult to measure (Orihuela 2000). The emerging technologies of radio telemetry with contact (or proximity) loggers (UHF transceivers-receivers), which record the frequency and duration of animal to animal contacts, may be able to provide quantitative information on oestrus activity and therefore clarify many social aspects of reproductive success. The main objective of this paper is to demonstrate the use of contact loggers to record quantitative data on heifer social and oestrus activity under extensive conditions and for eventual use in management and selection decisions.

In 2009, a combination of contact loggers (Sirtrack Ltd), heat-mount detectors (Kamar), ovarian ultrasonography, and field observations were used to study social and sexual activity of a group of 2-year-old maiden heifers (n=85). The 43 Brahman and 42 Belmont Red composite heifers were randomly allocated within breed to 2 paddocks on CSIRO Belmont Research Station in central Queensland. Contact loggers (a read-range to 5m) were deployed for 3 consecutive periods over winter and 3 consecutive periods over the following spring. Each deployment was approximately 15 days duration. The experiment was approved by Animal Ethics Committee (approval no: RH 257-09). Over 3.4 million contact records were processed and queried into a database (MySQL). An additional program (Perl language) was written to flag a change in a heifer's contact behaviour signifying oestrus, and thereby predicting the next date that the heifer will most likely be in oestrus.

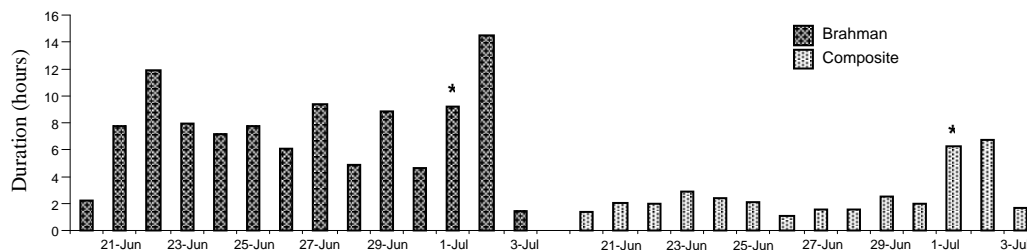


Figure 1. Daily contact duration (hours) of a Brahman heifer (identity: 080038) for deployment 1 (20 June to 3 July 2009) with Brahman and composite cohorts (mounting behaviour was observed on 1 July 2009, indicated by the asterisks above the corresponding bars)

Preliminary analysis of the contact logger data indicated this technology was able to document highly variable social and sexual activity. Heifers preferred social contact within their own breed except during oestrus, when frequency of contact with heifers in oestrus was not affected by breed (Figure 1). The results from heat-mount detectors (Kamar) and ovarian ultrasonography often matched with contact logger data showing high sexual/oestrus activity. Our Perl program correctly predicted the next date for a heifer's oestrus event in most cases. We also investigated and found that Brahman heifers with intense sexual activity were born to sires with a high genetic merit for fertility (BREEDPLAN scrotal size EBVs). This study demonstrated the possible use of contact logger data as a quantitative measure of female reproduction in extensive grazing systems.

Kadarmideen H.N., Thompson R., and Simm G. (2000). *Anim. Sci.* **71**, 411.

Orihuela A. (2000). *App. Anim. Behav. Sci.* **70**, 1.

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