From weaning to research ready: enhancing Greenfeed Emissions Monitoring (GEM) unit interaction in extensive grazing systems

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Introduction

Voluntary engagement with Greenfeed Emissions Monitoring (GEM) units remains a significant challenge in extensive grazing systems (Hegarty 2019), often leading to prolonged induction periods and limited methane emissions data capture. This pilot study explored whether early-age training of weaned heifers could increase GEM unit utilisation, improve data accuracy, and establish a research-ready cohort for methane-related projects at the Brian Pastures Research Facility.

Methods

Ninety-six Brahman, Droughtmaster and Santa Gertrudis weaner heifers were randomly assigned to trained and control groups (two pens per group, 24 animals per pen) in June 2024. Training involved operant conditioning, using auditory cues paired with lucerne pellet rewards over a 7-day period. Feeders were progressively modified to simulate GEM units. Daily 15-minute observations recorded feeder approach, response to cues, and feeding behaviour.

In January 2025, the heifers participated in a larger methane trial, where they had access to four GEM units, in a 175 ha paddock. Due to project constraints treatment groups could not be separated during this phase however, engagement data was still collected for a period of 21 days during the standard training period.

Results

By Day 7 of the pilot trial, 92% of animals in the trained group, T2, responded positively to auditory cues, with 50% approaching and feeding at the enclosed bunks during the observation period. In contrast, the second trained group, T1, showed a 79% positive response, with 37.5% approaching and feeding. The lower response in T1 was attributed to temporarily reduced feeder access.

In the subsequent 2025 trial, 87% of trained animals voluntarily utilised the GEM units on Day 1 of exposure, compared to 44% of the untrained cohort. By Day 10, daily GEM unit usage was 80% in the trained cohort, while the untrained cohort reached 55%.

Discussion and conclusion

The results suggest that early-age training during weaning increased GEM unit voluntary engagement and usage. Trained animals exhibited greater familiarity and confidence with the units from Day 1 in a subsequent trial 7 months later, visiting more frequently and consistently.

Further research is required to validate this initial trial on the direct impact of early-age training on GEM unit engagement at a larger scale. Additional work would also provide an opportunity to investigate herd social learning as a complementary mechanism to improve the efficiency of methane data capture in extensive grazing systems. By refining training methods and leveraging social learning, it may be possible to reduce the resources required for induction while enhancing the scalability and accuracy of methane measurement practices.

References

Hegarty R (2015) B.CCH.6230 Evaluation and optimisation of GEM units for livestock, MLA Final Report

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