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**Assistance at parturition of primiparous, two-year-old,
Angus heifers and the effect of liveweight gain of
heifers in early pregnancy on birth weight of the calf**



A thesis presented in partial fulfilment of the requirements for the degree of

Doctor of Philosophy

in

Animal Science

at Massey University, Palmerston North, New Zealand.

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2009

ABSTRACT

Hickson, R. E. Assistance at parturition of primiparous, two-year-old, Angus heifers and the effect of liveweight gain of heifers in early pregnancy on birth weight of the calf. PhD thesis, Massey University, Palmerston North, New Zealand. 212 pp. 2009.

A simulation showed that calving heifers for the first time at two compared with three years of age increased profitability of a beef breeding herd; however, profitability of calving two-year-old heifers was dependent on the incidence of assistance at parturition. The predominant cause of dystocia (and hence assistance at parturition) in beef breeding heifers is feto-maternal disproportion. This condition could be alleviated by reducing birth weight of calves relative to live weight of heifers. In a survey of farmers, 20% of those currently calving heifers at three years of age indicated that if the need for assistance at parturition was eliminated, they would calve their heifers at two years of age. In two surveys conducted of the same farmers in consecutive years, mean incidence of assistance at parturition in primiparous, two-year-old heifers was 7.0% and 9.5%, and reached 100% in some herds. Mortality rate by four weeks postpartum was 30% for assisted calves and 11% for assisted heifers. Methods of reducing the need for assistance at parturition in primiparous, two-year-old, beef breeding heifers would be of value to the beef cattle industry in New Zealand.

The objective of this research was to identify whether manipulation of liveweight gain of primiparous, two-year-old, Angus heifers in the first trimester of pregnancy could be used to regulate birth weight of calves, and to identify factors contributing to the need for assistance at parturition. Three experiments were conducted in which heifers were fed for various rates of liveweight gain: 1. moderate versus low for the first trimester of pregnancy; 2. a 2 x 2 factorial experiment in which liveweight gain was 1220 high versus moderate for ten days prior to insemination, and moderate versus a loss for the first trimester of pregnancy; 3. high and moderate, moderate and a loss, or moderate and moderate for days 0–42 and 42–90 of pregnancy, respectively.

Birth weight of calves was not affected by treatment in experiments 1 and 3. In experiment 2, birth weight of the calf relative to live weight of the heifer was least in the high-then-low treatment, but subsequent live weight of those calves was also less,

partially negating any potential benefits to production. An additional experiment revealed similar fetal weight at the end of the first trimester for heifers that had moderate or low liveweight gain from 21 days prior to conception.

Probability of assistance at parturition increased with birth weight of the calf and decreased with increased live weight of the heifer. Body dimensions of calves did not affect the likelihood of assistance. Assistance had no effect on subsequent performance of surviving animals.

Manipulation of liveweight gain of heifers in the first trimester of pregnancy did not offer a means of reliably regulating birth weight of calves; however, the impact of assistance at calving did not justify delaying first calving until three years of age. Birth weight and assistance at calving can currently be best managed through selection of appropriate service sires for primiparous heifers.

ACKNOWLEDGEMENTS

In three and a half years working on this project, I have had the opportunity to work with a long list of wonderful, talented people, and I express my sincere appreciation to them all. In particular, I have benefitted from the guidance of Steve Morris, Paul Kenyon and Nicolas Lopez-Villalobos, who have made a huge contribution not just to this thesis, but to my development as a scientist. Thank you.

I gratefully acknowledge the financial support of Massey University and Meat and Wool New Zealand for funding the major research projects, and of AGMARDT and LIC for the provision of my doctoral scholarships. Funding from the McGeorge Research Fund and the Lewis Fitch Veterinary Research Fund is appreciated, as is the contribution of resources from Ambreed Ltd, AFFCO Manawatu, Country-Wide Publications Ltd, and the Angus, Hereford and Simmental breed societies.

The experimental component of this work has involved long hours and hard work by many people. Of particular value were Phil Brooks and Jono Brophy of Massey University's Tuapaka farm, whose patience and good humour in the face of numerous tedious and inconveniently timed tasks played a key role in the success of this project. The enthusiasm and dedication displayed by Kim Fraser has also been invaluable! The assistance of Dean Burnham, Graeme Poole, Ross Bagley, Neil Smith, Geoff Purchas and Andrew Wall is much appreciated. Special mention must go to Davy, Oliver and Valerie Garland and Christie Balcomb, four of the finest stockpersons I know, and to Fraser Mulvaney (a.k.a. "Placenta Claus"), who showed up to help out every time he was asked, even with the most unpleasant tasks. Also thank you to Warren Anderson and Cord Heuer for assistance with the survey and to Barrie Ridler for use of and help with the Grazing Systems Model. There was also an enormous contribution made by the heifers, without which there would have been no project.

I've had the privilege of sharing this experience with a fantastic group of post-graduate students (especially Erica, Christine, Cecilia, René, Dannie, Jeremy, Folusho, Kavitha, Jo, Kathryn and Gina), who made both the office and the field a lot of fun. I'm grateful to Dr Tricia Johnson for setting such a fine example, and to my father, Peter Garland, for introducing me to all that is beef cattle farming (including dystocia in heifers!).

And finally, I have immense appreciation for the unwavering practical and intangible support of my husband, William Hickson. I began this thesis as Rebecca Gale, and I am thrilled and honoured to finish it as Rebecca Hickson.

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LIST OF ABBREVIATIONS AND NOTATION

Abbreviations

- EBV** Estimated breeding value
DM Dry matter
LSM Least squares mean
CI Confidence interval
s.e. Standard error of the mean

Notation

- D_n** The n th day of the experiment, with D_0 being the first day of insemination for heifers in the experiment. Negative values of n refer to days prior to the day of insemination.
- L_n** The n th day of lactation, with L_0 being the mean day of parturition for the heifers considered.
- HM** Heifers fed for high liveweight gain for 10 days prior to insemination and for moderate liveweight gain for the first 93 days of pregnancy (chapter 6)
- HL** Heifers fed for high liveweight gain for 10 days prior to insemination and for liveweight loss for the first 93 days of pregnancy (chapter 6)
- MM** Heifers fed for moderate liveweight gain for 10 days prior to insemination and for moderate liveweight gain for the first 93 days of pregnancy (chapter 6)
- ML** Heifers fed for moderate liveweight gain for 10 days prior to insemination and for liveweight loss for the first 93 days of pregnancy (chapter 6)