Effects of ewe age on offspring development and performance

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

Doctor of Philosophy in Animal Science

at Massey University, Turitea, Palmerston North, New Zealand.

Maria Fernanda Pereira Loureiro

2014

Thesis supervisors

Professor P. R. Kenyon

Professor H. T. Blair

Dr. S. J. Pain

Abstract

Loureiro, M. F. P. (2014). *Effects of ewe age on offspring development and performance.* Doctor of Philosophy in Animal Science, Massey University, Palmerston North.

In New Zealand only approximately 30% of ewe-lambs are bred each year despite the advantages this practice can offer. Farmers have indicated a reason for not breeding ewe-lambs is that the offspring born to ewe-lambs are typically smaller and lighter to at least weaning. However, there is a lack of information on the post-weaning performance of ewe-lamb progeny in New Zealand. The objective of this thesis was to examine the effects of maternal age (ewe-lamb dams vs. adult ewe dams) on the performance of singleton and twin progeny and also the growth of their progeny to weaning. Progeny born to these two dam age classes were monitored to approximately 3.5 years of age. The results of this thesis have demonstrated that the growth and therefore live weight of offspring born to ewe-lamb dams was in general lower compared with those born to adult ewe dams, especially in twins. However, results also show that there is little impact of maternal age on offspring reproductive and lactational performance. Interestingly, there was a reversal of the influence on grand-offspring birthweight, whereby lambs with ewe-lamb granddams were actually heavier at birth. The lighter live weight of ewe-lamb progeny without negative effects on performance may even suggest these animals are more efficient; however, longer-term studies would be required to confirm this. In conclusion, these results indicate farmers can utilise progeny born to ewe-lamb dams without a negative impact on production, and in fact there may be a positive effect on production efficiency.

Acknowledgements

This has been a long journey: a new country, new people, new lifestyle...a new life. This PhD has been a rollercoaster of emotions. I have had heaps of fun moments and quite a few not so fun moments also. One of the most valuable things that I will take away with me after all these years at Massey is the real friendship that I have made.

To start with, I would like to thanks my supervisors, Professor Paul Kenyon, Professor Hugh Blair and Dr. Sarah Pain for the opportunity to work with such a great team. I would also like to thank you for the patience, support, advice and guidance during this journey. Thanks for being an inspiration for me and I have learnt so much during this time.

I am very thankful to Dr. Neville Jopson, Dr. Matthew Perrot, Associate Professor Nicolas Lopez Villalobos, Associate Professor Shinichi Nakagawa, Professor Patrick Morel, Wendy Bain, Dr Chris Rogers, Dr Charlotte Bolwell, Dr Elizabeth (Liz) Duncan, Associate Professor Paul Greewood and Bill Johns for all their help with this thesis. Also I am very grateful for the IVABS staff for all their help, their time spent data collecting on the farm and especially the good chats: Dean Burham, Geoff Purchas, Natalia Martin, Kim Fraser, Evelyn Lupton, Eugene, Saritha Gills and Mike Hogan. Debbie Hill and Kristen Story, I really appreciate your dedication and assistance with the administrative work.

There are numerous others that I had the opportunity to work with and learn new approaches and techniques from: Dr Rebecca Hickson, Dr Rene Corner-Thomas, Dr Penny Back, Chris Spark, Dr Angela Hartman, Nicola Moffatt, Dr Nicola Schreurs, Dr Keren Dittmer, Dr Rao Dukkipati and many others.

My sincere thanks to my friends and office mates: Amy Paten, Lydia Cranston, Lisanne Fermin, Gaby Gronqvist, Javier Roca, Dannie van der Linden, Christian Sauermann, Sharini Sinhadipathige, Doris Adeyinka, Rajesh Sharma, Santosh Sahu, Asmad Kari, Fraser Mulvaney, Kruno Bojanic, Sashwati Ambatkar and Kaylyn Corlett.

This work was funded by grants from Gravida (National Centre for Growth and Development) and Beef and Lamb New Zealand and a Ph.D. stipend from the Gravida (National Centre for Growth and Development) and Helen A Akers.

Acknowledgement

I would like to thank my mother Fátima and my brothers Juliano and João Gustavo for all their support during these years of long distance and for all your comprehension and love. Obrigada por me apoiarem sempre, apesar da saudade.

My very special thanks to George Ricketts my friend, my partner, my love and now my husband. I could not have finished this journey without your patience, your friendly words and motivation. Thanks for being part of my life. Love you and Nina.

Table of contents

List of tables

List of figures