Reproductive performance and the transition period of Thoroughbred mares in New Zealand: Evidence and implications for future alternative management strategies

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Abstract

The aims of this research were to investigate the reproductive performance of Thoroughbred mares in New Zealand, to examine the use of intravaginal progesterone to manage transitional mares and to develop a potential model for haemorrhagic anovulatory follicle (HAF) development in the mare.

Firstly, a prospective cohort study was performed involving five stud farms in the Waikato region of New Zealand during three consecutive breeding seasons (2006-2008). A total of 1482 individual mares contributed 2007 mare years and 3402 oestrous cycles over the three breeding seasons. The mean first-cycle pregnancy rate was 53.6%, the end-of-season pregnancy rate was 85.3% and the foaling rate was 80.2%. The length of the breeding season was relatively short with 87% of services occurring in the 91 day period between 1st September and 30th November. Multivariable analyses revealed that reproductive performance was influenced by two main mare-related factors; the age of the mare and her reproductive status (dry or foaling). Increasing mare age significantly reduced the first-cycle pregnancy rate, reduced the end-of-season pregnancy rate and increased the interval from the start of the breeding season to conception. In terms of reproductive status, dry mares had a significantly higher first-cycle pregnancy rate and end-of-season pregnancy rate compared with foaling mares. The majority of variation in reproductive performance was associated with mare-level factors and the contribution of the stallion and stud farm was relatively minor.

Transitional mares treated with intravaginal progesterone at the start of the breeding season were served two weeks earlier than untreated control mares. In the first 21 days of the season, 95% of treated mares were served compared with 43% of control mares. Treated mares also conceived earlier and had a higher end-of-season pregnancy rate than control mares. Follicle development in response to intravaginal progesterone treatment

appeared to be mediated through a close temporal association between progesterone, FSH and LH during treatment.

In the last study, transplantation of chorionic girdle into non-pregnant mares resulted in elevated eCG concentrations in all mares and the development of multiple HAFs in the treated mares over a prolonged time-span.

In conclusion, this research has, i) identified the most important factors associated with the reproductive performance of New Zealand Thoroughbred mares, ii) determined that intravaginal progesterone treatment is a suitable management tool for transitional mares and iii) created a model for HAF development in the mare.

Preface

Each chapter of this thesis is set out in the style of the journal to which it has been submitted. Therefore there is some repetition, and there are stylistic differences between chapters in terms of spelling (USA vs New Zealand) and in the layout of each chapter. The submitted manuscripts include other authors. For each chapter, I designed the research, undertook the fieldwork, analysed the data and wrote the manuscripts. I was, however, assisted by my co-authors in the final revision of each manuscript prior to submission.

Approval for the research conducted in this thesis was granted by the Massey University Animal Ethics Committee (Chapters 5 and 6) and the guidelines set forth by the Institutional Animal Care and Use Committee of Cornell University (Chapter 7).

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