Aspects of Puberty and Growth in pasture-raised New Zealand Thoroughbreds born in spring and autumn

A Thesis presented in partial fulfilment of the requirements for the degree of Doctor of Philosophy at Massey Universtiy, Palmerston North, New Zealand

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2003

Abstract

This thesis reports a series of studies conducted to examine the growth and onset of puberty of pasture-raised Thoroughbred horses born in spring and autumn. Current knowledge of the growth characteristics of pasture-raised Thoroughbreds is limited, and there is little information on puberty in horses. An understanding of aspects of growth and the onset of puberty in young, pasture-raised Thoroughbreds born in spring and autumn may be of importance to the New Zealand Thoroughbred industry, with the aim of producing horses for sale in the Northern Hemisphere.

Aspects of growth including the effect of sex, age, birth weight, month of birth, weaning and castration were examined in spring-born Thoroughbreds between birth and 16 months of age, and compared with those born in autumn. All foals had similar growth rates between birth and 5 months of age, after which growth rates were related to seasonal factors. There was little difference in mean body weight between spring and autumn-born horses at the end of the study, despite the 4-month age difference. Body weights were similar to horses in other studies, including supplementary grain-fed Northern Hemisphere horses. Autumn-born horses weaned in the spring had increased growth rate after weaning, whereas spring-born horses had decreased growth rate after weaning in the autumn, indicating that post-weaning growth rate was a factor of seasonal changes.

Puberty was determined by measurement of plasma testosterone and progesterone concentrations. Spring-born fillies and colts were older and heavier than autumn-born fillies and colts at puberty. However, in both spring and autumn-born horses, puberty occurred in October (New Zealand spring) indicating that seasonal changes affect the timing of puberty onset. GnRH challenges were performed every 8 weeks in spring and autumn-born colts from four months of age. Luteinising Hormone concentration followed a seasonal pattern from 4 months of age and was increased in the spring and summer and decreased in the winter months. Testosterone was first detectable in the spring (at 8 and 12 months of age in autumn and spring-born horses, respectively), possibly after a period of Leydig cell maturation.

It appears that, as in some other seasonal-breeding species, horses must reach a threshold body weight at the same time as increasing photoperiod in the spring for puberty to occur, but proof of this requires further study.

The possible implications of this work to the New Zealand Thoroughbred industry, and the suggestions for further research are discussed.

Acknowledgements

I would like to sincerely thank my chief supervisor Professor Elwyn Firth for his guidance, knowledge and infinite patience. Working under his supervision was a privilege and I am extremely grateful for this invaluable learning experience.

I wish to thank my co- supervisors Dr Pete Fennessy and Associate Professor Tim Parkinson. Their enthusiasm, extensive knowledge and continuous support were hugely appreciated.

I am extremely grateful for the assistance, support and encouragement from the Massey Equine team especially Erica Gee, Hilary Shaw, Tracey Faram, Kerry Sanders, Hilary McKinnon, Susanne Dykgraaf, Chris Rogers and Patrick Morel.

Many thanks to Dr Phil Pearce and Dr Margaret Evans for their work and help with the hormone assays.

I am grateful to the Foundation of Research Science and Technology who, in conjunction with the New Zealand Racing Industry Board provided my personal financial support, in the form of a Bright Future Scholarship. Financial support for this project was provided by the Public Good Science Fund.

A huge thank-you to my family and friends. Their support, understanding, encouragement and stability over the last 3 years have been fundamental.

Finally, the most special thanks to my parents, Joy and David – I am hugely appreciative of their love, support, and reassurance – Thank you.

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May 2003

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