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Investigation into the influence of yearling sale production parameters on the future career longevity and success of New Zealand thoroughbred race horses

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Abstract

Few studies have investigated the influence of yearling sale production parameters on racing performance of Thoroughbred horses. The aim of this study was to quantify the impact of yearling sales parameters, in particular dam (mare) age at the time of conception, on future career success and longevity in a population of Thoroughbred racehorses in New Zealand. A retrospective cohort study was used to investigate racing success and longevity in a population of Thoroughbred horses in New Zealand, over eight and a half racing seasons. Retrospective records of the 2002 born Thoroughbred foals in New Zealand were obtained from the New Zealand Bloodstock (NZB) online database and the New Zealand Thoroughbred Racing (NZTR) database. Logistic regression models using the binary outcomes trial, race and prize money earned were analysed with exposure variables. Cox regression survival analysis was used to investigate the association between the number of race starts and the time to cessation of racing. Linear regression was preformed to assess the effect of exposure variables with the outcome measure prize money earned (*ln*, $NZ).

A total of 513 horses ran in 8,261 flat races, in New Zealand, during the study period. Of all the horses that had at least one race start (n=513), the median number of race starts per horse was twelve (IQR 5-22). The age of a horse's dam (mare) at the time of conception was not significantly associated with; 1) her progeny obtaining a trial or race start, 2) her progeny racing and earning >$1 prize money, 3) the amount of prize money earned by her progeny, and 4) longevity of her progeny's career. Female horses had less race starts during their career (P=0.019) compared to male horses. The median number of race starts for a female was eleven (95% C.I 9-14) whereas, the median number of race starts for a male was thirteen (95% C.I. 10-15). Horses catalogued in the select session were more likely to earn prize money (P=0.029)

compared to horses catalogued in the premier session. Horses catalogued in the festival session were more likely to cease racing compared to horses catalogued in the premier session (P=0.018). The median number of race starts for a horse catalogued in the premier session was ten (95% C.I. 8-14) compared to fourteen (95% C.I. 12-16) for the select session and ten (95% C.I. 8-13) for the festival session. Horses that had started in a trial were more likely to start in a race (P<0.001) and earn prize money (P<0.001) compared to horses that had not started in a trial. As the number of years racing increased the likelihood of a horse ceasing racing decreased (p<0.001). Linear regression showed that total career starts was the greatest predictor in determining the amount of prize money a horse will earn. Horses that had more than twenty-five race starts were more likely to earn more prize money (*ln*) compared to horses that had less than twenty-five race starts (P<0.001).

The results of this study highlight associations, or lack thereof, between yearling sales parameters and outcome measures of performance and may influence the future buyer behaviour in the New Zealand Thoroughbred market.

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List of Abbreviations

>	Two year-old
2YO	Three year-old
3YO	Three year-old or above
3YO+	Average Earnings Index
AEI	Confidence interval
CI	Early Embryonic Death
EED	Gross Domestic Product
GPD	Hazard ratio
HR	International Federation of Horseracing Authorities
IFHA	Inter-quartile range
IQR	Natural logerithmic
ln	Natural logarithmic of prize money in $NZ
ln (prize money $NZ)	Likelihood ratio statistic
LRS	National Yearling Sales Series
NYSS	New Zealand Bloodstock
NZB	New Zealand Racing Board
NZRB	New Zealand Thoroughbred Racing
NZTR	Odds ratio
OR	Performance index
PI	Standard Starts Index
SSI	World Thoroughbred Rankings Conference
WTRC	

More than

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