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Production variables influencing the auction sales price of New Zealand Thoroughbred yearlings

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ABSTRACT

Data were obtained from the New Zealand Thoroughbred studbook and the online sales results for the 2004 National Yearling Sales Series. Across the three sales categories, 477, 523, and 354 yearlings were offered at the Premier, Select and Festival sales, respectively. There were significant differences in the representation of yearlings across the three sales categories based on: sire service fee, vendor category, purchaser country of origin, and dam age. There were fewer fillies catalogued in the Festival sale compared to Select or Premier sales ($P < 0.05$). Within the general linear model, auction price (\log_{10}) was significantly influenced by sales category: Premier (\$71,285, 95% Confidence interval (CI), \$61,801-\$82,224), Select (\$24,831, 95% CI, \$22,233-\$27,733) and Festival (\$9,462, 95% CI, \$8,072-\$11,091, $P < 0.001$). Sales price (\log_{10}) was also significantly influenced by sire service fee, vendor category, purchaser country of origin, and mare age. Colts sold for more than fillies (\$29,040, 95% CI, \$26,668-\$31,695 vs. \$22,542, 95% CI, \$20,370-\$24,945, $P < 0.001$) across all sales categories with an interaction of sales category and gender ($P = 0.003$). These results indicate that in order to optimize gross returns, vendors require colts that are marketed through the Premier sale, from older established broodmares, with a pedigree that appeals to Australian buyers.

Keywords: horse; Thoroughbred; sales; auction; racing.

INTRODUCTION

The New Zealand racing industry generates around \$1,500 million in revenue annually, which represents approximately 1.3% of the total gross domestic product, and provides around 18,000 people in New Zealand with employment (IER, 2004; Fennessy, 2010). This revenue is derived from the production of racing stock, exporting of horses, overseas buyer investments, wagering, government wagering tax, and returns to owners (IER, 2004). The Thoroughbred industry relies heavily on international buyers to sustain market values, with approximately 40% of the total foal crop in New Zealand being exported (C.F. Bolwell, Unpublished data).

Annually, around 1,500 yearlings are offered for sale at the New Zealand Bloodstock National Yearling Sales Series which represents an estimated 24% of the annual foal crop. These yearlings are allocated into one of three sales categories: Premier, Select or Festival. The selection committee meets in August to establish the number of entries and tentatively place nominated yearlings into sales categories based on pedigree. Bloodstock agents from the auction house then go into the field and assess all nominated yearlings based on growth/size and conformation. At the end of the selection process the committee is reconvened to make the final allocation of yearlings into each sales category.

The 2004 National Yearling Sales Series saw 1,113 lots sell for an aggregate of \$60.6 million and a clearance rate of 82%. The average price fetched

for a yearling was \$54,476 with the top price being \$1.1 million. In the 2003-2004 season, 1,797 horses were exported for a total value of \$115 million (NZTBA, 2010). As the sustainability of the local breeding industry can be attributed to the income generated from exports, international recognition is a crucial feature of the New Zealand Thoroughbred industry. Currently New Zealand has an excellent reputation for breeding high class, internationally competitive Thoroughbred racehorses which is represented in the recent success of New Zealand bred horses in group one events in Hong Kong, Singapore, Dubai and Australia (Fennessy, 2010).

The primary focus of the breeding sector of the Thoroughbred industry is to produce foals that are sold at a yearling sale (Chezum & Wimmer, 1997; Neibergs, 2001). As a result, commercial breeders are under considerable pressure to produce a yearling that will maximise sale returns. Previous researchers have examined variables that influence yearling sales price in Britain (Robbins & Kennedy, 2001; Parsons & Smith, 2008), America (Buzby, & Jessup, 1994; Chezum & Wimmer, 1997; Vickner & Koch, 2001) and Australia (Hastings, 1987). However, in contrast to other livestock production industries, there is a paucity of data examining the variables that influence the sales price of New Zealand Thoroughbred yearlings (Buccola, 1982; Chvosta *et al.*, 2001). The aim of this paper is to quantify the impact of different production parameters on yearling sales price in New Zealand.

TABLE 1: Demographic data of the Thoroughbred yearlings offered for sale at the 2004 New Zealand Bloodstock National Yearling Sale Series.

Classification	Sale series				Sale price	
	Premier	Select	Festival	Total	Mean	95% Confidence interval
No. of yearlings						
Offered	515	582	435	1532		
Withdrawn	35	59	81	175		
Sold	401	416	294	1111		
Numbers of yearlings by gender						
Colts	309	332	293	934	\$29,107	\$26,546 - \$31,988
Fillies	206	250	142	598	\$22,181	\$19,906 - \$24,717
Number of yearlings by sire service fee category						
≤\$5,000	1	44	217	262	\$18,407	\$11,376 - \$29,785 ^a
\$5,001 - \$15,000	105	299	211	615	\$21,777	\$20,370 - \$23,280 ^a
\$15,001 - \$30,000	193	193	7	393	\$25,468	\$21,134 - \$28,641 ^a
≥\$30,000	216	46	0	262	\$47,515	\$41,975 - \$53,456 ^b
Yearling birth month grouping						
July - September	233	220	127	580	\$24,928	\$23,321 - \$26,644 ^a
October	72	14	168	254	\$21,086	\$18,197 - \$24,434 ^{ab}
November - December	209	581	435	696	\$21,229	\$19,902 - \$22,644 ^{bc}
Number of yearlings by dam age						
<4 yrs	33	46	26	105	\$28,510	\$24,043 - \$33,728
5 - 12 yrs	393	395	289	1077	\$26,424	\$24,547 - \$28,444
13 - 17 yrs	74	101	92	267	\$23,604	\$21,037 - \$26,485
≥18 yrs	15	40	28	83	\$23,496	\$19,010 - \$28,973
Numbers of yearlings in the Premier sale						
0 - 1	10	102	304	107	\$22,803	\$20,417 - \$25,468
2 - 5	31	50	53	11	\$26,424	\$22,594 - \$30,903
6 - 11	120	165	36	15	\$25,941	\$23,388 - \$28,840
>13	354	265	42	16	\$27,861	\$25,644 - \$30,338
Numbers of yearlings by purchaser country of origin						
New Zealand	191	284	269	744	\$22,674	\$20,869 - \$24,636
Australia	157	85	9	238	\$27,347	\$24,353 - \$30,709
Rest of world	53	46	15	112	\$26,140	\$22,583 - \$30,258

^{a,b,c} Different subscripts indicate values that differ significantly ($P < 0.05$)

MATERIALS AND METHODS

Data on the yearlings offered for sale during the 2004 National Yearling Sales Series were obtained from the online results published by New Zealand Bloodstock Ltd (www.nzb.co.nz). Pedigree and reproductive performance data on the sires and dams of the yearlings offered for sale were obtained from the online database of New Zealand Thoroughbred Racing Inc (www.nzracing.co.nz). Data recorded by the sales company included yearling sales price, or reserve value if passed in, yearling gender, yearling date of birth, vendor, purchaser and identification of sire and dam. The age and parity of the yearling's dam were obtained from the New Zealand Thoroughbred Racing online database, and the sire's service fee was obtained

from the 2002 register of New Zealand Thoroughbred stallions (NZTBA, 2002).

Data manipulation and statistical analysis

Raw data were collated within a customized Microsoft Access database. Data were examined for outliers and validity using descriptive statistics, histograms and scatterplots. Within the database, buyer location was categorized into New Zealand, Australia, and the Rest of the World. Each vendor was categorized according to the number of yearlings offered in the Premier session (0-1, 2-5, 6-11, and >13 yearlings). Yearlings were also categorized according to sire service fee, mare age and parity (Table 1). Continuous variables were skewed and so categories were used.

Sale price was not normally distributed (Kolmogorov-smirnov test) therefore sale price was \log_{10} transformed for analysis. To examine the effect of parameters on sale price a general linear model was used. Within the model sale category, sex, sire grouping, mare age grouping, parity grouping, location grouping, vendor grouping were treated as fixed effects. Differences within categories, if significant were tested with a bonferroni *post hoc* test. All data were tested within PASW Statistic 18 (IBM Corporation, Somers, NY, USA).

RESULTS

The demographics of the yearlings offered for sale at the 2004 annual yearling sales series are presented in Table 1. There were significant differences in sale price across the sale categories ($P < 0.001$) with decreasing mean auction price with each sales category; Premier (\$75,285, 95% Confidence interval (CI), \$61,801-\$82,224), Select (\$24,831, 95% CI, \$22,233-\$27,733) and Festival (\$9,462, 95% CI, \$8,072-\$11,091). There were significantly more colts offered for sale than fillies ($P < 0.05$), and the majority of the yearlings were purchased by New Zealand based purchasers ($P < 0.05$).

Initial screening identified that mare age and parity displayed co-linearity. Because of this only mare age was included in the general linear model. Within the final general linear model ($R^2 = 0.66$, $P < 0.001$) the greatest variance in \log_{10} of auction sales price was explained by the sales category (25%), with significant differences between all three sale categories. Sire grouping had a significant effect on sales price, though this was driven by the significantly higher auction price of yearlings by sires with a service fee \geq NZ\$30,000 compared to the other categories ($P < 0.001$). There was a significant effect of gender with colts selling for more than fillies (\$29,107, 95% CI, \$26,546-\$31,988 vs. \$22,181, 95% CI, \$198,906-\$24,717, $P = 0.001$). There was a significant sale category by gender interaction ($P = 0.002$), with the colts selling for significantly more in the Select and Festival sales ($P = 0.001$), but only a trend for a gender effect in the Premier sales category ($P = 0.084$). The birth month of the yearling had a significant effect on sales price with yearlings born early in the season (July, August or September) (\$24,928, 95% CI, \$23,321-\$26,644) selling for significantly more than later season foals (born November and December) (\$21,229 95% CI, \$19,902-\$22,644, $P = 0.003$). There was no effect of mare age category or interaction of mare age category and sales category. There was a significant effect of vendor category which was driven by a significantly greater yearling sale price for vendors with the most (≥ 13) rather than those with the least

number (0 or 1) of yearlings in the Premier session ($P = 0.045$). Purchaser country of origin had a significant effect on sales price with Australian buyers spending more (\$27,347, 95% CI, \$24,353-\$30,709) than New Zealand buyers (\$22,674, 95% CI, \$20,869-\$24,636), with neither being significantly greater than buyers from the rest of the world (\$26,140, 95% CI, \$22,583-\$30,258).

DISCUSSION

Over the last decade while there have been fluctuations in market price there have not been major changes in the type of yearling offered or purchaser country of origin that would greatly distort the application of these results to other years. It is conceivable that with the increasingly tough recent economic climate that the variables identified here have an even greater role in determining yearling sales price.

Due to the heavy pre-selection of yearlings by the auction sales company, based on yearling pedigree and conformation, it was not unexpected to find that sales category explained the greatest variation in sales price. The pre-selection of yearlings heavily clustered the distribution of sires within sales category, with most yearlings offered in Premier sales being by Shuttle or expensive sires and most in the Festival sales being by moderate or medium priced sires. This in turn influenced the distribution of colts and fillies offered in each sales category. Across all sales there was a gender bias with colts selling for more than fillies, although this was only a trend in the Premier sale but became increasingly significant as the status of the sales category decreased to the Festival sale. Within New Zealand there are limited sales opportunities for fillies from race training. In contrast, there is a ready export market for colts and geldings, irrespective of pedigree quality, that have won a trial or race. The interaction of gender and sales category on sales price identified here may explain the inconsistency in the gender effect on sales price reported in the literature (Hastings, 1987; Robbins & Kennedy, 2001; Vickner & Koch, 2001; Parsons & Smith, 2008).

Within the industry there is considerably pressure to have a horse that is capable of racing in its 2-year-old year. Therefore there is a significant demand by vendors for advanced physical development in yearlings. The birth month data indicates that a premium is placed on an early foal in comparison to a later foal, probably due to the more advanced physical development of the early born yearlings. Previous reports in the literature have demonstrated that greater median height and body condition score can increase sale price (Pagan *et al.*, 2006).

For taxation purposes a mare can be depreciated to zero book value as a 12-year-old. This strongly reflects the distribution of age of the dams of the yearlings presented for sale with 87% of the dams being 12 years or younger when mated to produce the yearlings. There was no effect of mare age on the sales price. This was somewhat surprising as the expectation was that mares retained for breeding after 12 years of age would be expected to be of above average genetic merit. It is possible that the biological effect of lower birth weights, of foals from older multiparous mares (Wilsher & Allen, 2003; Morel *et al.*, 2007) meant less advanced physical development of the yearling at the time of sale, resulting in buyer aversion of progeny from older mares.

Buyer location had a significant effect and was driven by the strong Australian buyer's bench. Australia has typically been a major market for the New Zealand Thoroughbred taking approximately 62% of all Thoroughbreds exported (Fennessy, 2010), despite itself being a major Thoroughbred breeding nation. Australian demand is driven by the disproportionate success of the New Zealand Thoroughbred relative to representation in the Australian racing industry. It has been speculated that the climatic conditions and associated management of young stock in New Zealand produces a robust equine athlete. Data on the positive effect of early exercise on the equine musculoskeletal system implies that the ability to rear young stock at grass in an environment that stimulates exercise may contribute to the durability and success of the New Zealand Thoroughbred (Dykgraaf *et al.*, 2008; Rogers *et al.*, 2008a; Rogers *et al.*, 2008b).

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