

Examining the racing performance and longevity in the Hungarian Thoroughbred population

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Abstract

The aim of the study was to examine the factors affecting longevity (as the number of years spent in race) in the Hungarian Thoroughbred horse population, and to investigate the total earnings won during lifetime and per start. The performance data was collected from 3,029 Thoroughbred horses (1,704 female, 1,674 male) born between 1996 and 2018 in Hungary with full known racing career. A multivariate generalized linear model was used to estimate the effect of sex of the horses, age at first start and the month of birth to longevity, expressed by the number of starts and years spent in race. Age of the horses at first start had a significant effect on the years spent in race, thereafter the model was dissected into age groups initiating a more accurate research. This showed that birth month also have a momentous effect on the examined traits in case of 2-year-old horses. Age of the horses at first start also affected the lifetime earnings. Sex of the horses had no effect on longevity in 2-year olds however, males are more likely to race because female horses tend to win less money.

Keywords: age at first start, longevity, racing horses, racing performance, sex, Thoroughbred

Introduction

A global industry was built around Thoroughbred horses. In each year, almost 110,000 foals are born worldwide creating a significant economic value and generating jobs in horse breeding as well as in the horse racing industry (Albrecht et al., 2013). Training and preparing for competitions require lots of time and financial inputs, thus it is reasonable to study longevity, as an important fitness trait and examine the length of the productive life of an individual. Thoroughbred horses usually start their career as a 2-year-old without the maturity of the musculoskeletal system and get injuries due to the high-speed during racing (Evans et al., 1992). In spite of the high costs of rearing and training, only the 50% of the racehorses are able to continue racing for two years after their first start (Sobczynska, 2007). Patterson-Kane et al. (1997) previously reported that this intensive training and racing at such a young age can increase the magnitude of the loading cycles by

tendons which are able to accelerate the ageing process in the superficial digital flexor worsening the chances of the horse to stay in race condition for a long time.

In the breeder's point of view, selection to body conformation also has a serious impact on the racing performance (Kashiwamura et al., 2001) as the breeding goal is to breed fast, healthy horses with high endurance and strength being able to keep the performance level for years which are mainly determined by the morphology of the body. Several studies dealt with the length of competitive life of horses (Posta et al., 2014; Solé et al., 2017), however creating simultaneous calculations containing earnings of total life performance and the effect of the first start may require different methods due to the different racing systems of racehorses and sport horses.

The aim of the study was to examine the effect of the age at first start to longevity and racing performance expressed in earnings in the Hungarian Thoroughbred population.

Materials and methods

Data collection

The analysis was carried out on an active racehorse population of the Hungarian Thoroughbreds, having recorded lifetime performance data between 1996 and 2018. The database contained the total number of race starts of the horses including 3,029 individuals (1,553 fillies and 1,476 colts) having altogether 52,244 runs during their whole career. The class level information consisted of the exact age of the horse (in months), the sex (females and for the easier statistic evaluation geldings were recorded as stallions) and the race year. The database contained import horses, which started the racing career abroad, having their first start, mostly after 3.5 years of age. So the age at first start was maximized in 43 months to eliminate them from the study. Qualification races were also excluded from the analysis due to the fact that these kind of races do not involve earnings. The dataset consisted of the information of racehorses performing after 2 years of age, for examining the whole career, then dissected to age groups by years for further evaluation.

Statistical analysis

A multivariate generalized linear model was used to estimate the effect of sex of the horses, age at first start and the month of birth to longevity, which can be described as an interval between the first and last start, expressed in years.

The year and month of birth were recorded and the age at first start was calculated along with all starts during their lifespan. The data analysis was carried out with R software, version 3.4.4. (R Core Team, 2018). Career earnings were log transformed for the analysis followed the method of Chico (1994) and the computed earnings were calculated by halving the earnings with an increase of one in rank (the fifth receive the half of the fourth, the sixth the half of the fifth and so on). Normal distribution of the earnings was obtained by applying a logarithmic transformation (Langlois, 1980). Interactions between sex and career earnings were also included in the model.

Results and discussion

The most informative indicator of longevity in horse racing is the years-spent-in-race, due to the fact that as long as the horse is healthy it runs in competition. The descriptive statistics of the two examined sexes are summarised in Table 1.

Table 1. Descriptive statistics of the examined traits in both sexes of the horses (n = 3,029)

Sex	Obs.	Var.+	n	Mean	S.D.	Min	Max
Female	1,704	Starts	1,553	16.32	15.66	1	119
		Y Race	1,553	2.4	1.29	1	13
		Earn Start	1,553	50,112	126,480	0.1	11,510
		Earn long	1,553	765,566	1,335,665	0.1	74,300
Male	1,674	Starts	1,476	15.83	16.56	1	127
		Y Race	1,476	2.52	1.54	1	11
		Earn Start	1,476	82,995	248,791	0.1	15,000
		Earn long	1,476	982,139	1,858,509	0.1	73,058

+Starts - number of starts during the racing career; Y Race (years) - years spent in race; Earn Start (EUR) - earnings per one start; Earn long (EUR) - total earnings during the whole career.

The proportion of the males and females are roughly the same however, the colts have slightly more starts and they spend a bit more time in race on average. It can be a result of the better stress tolerance and regenerating ability, thus they can run more frequently. Bailey et al. (1999) observed similar parameters for Thoroughbred racehorses in the USA.

Further investigations have been made if the number of starts depends on the age at first start or the birth month. The results are summarised in Table 2.

Among these parameters, the age at first start and the sex had a significant effect on the examined variables. Sobczyńska et al. (2007) studied the polish Thoroughbred population with a similar framework, experiencing that the birth month had no effect on longevity.

Table 2. Effect of sex of the horses, birth month and the age at first start to the years spent in race (n = 3,029)

Name	Variable	Levels	Pr>F
Sex	Y Race	2	0.0027
Birth month	Y Race	6	0.59
Age at first start	Y race	20	<0.001

Y Race - years spent in race.

On the other hand, decomposing the total database into age groups, birth month and the age at first start also affected the number of starts and the years spent in race for 2-year-olds in the present study. Despite, as the horses were getting older the significant effect of the birth month disappeared between sexes to the number of starts and the years spent in race.

Examining the racing performance for the Hungarian population, age at first start has a serious impact on the total earnings (Figure 1). The ideal age for these horses to earn more prize is in between 23 and 29 months and according to the results, these horses also spend more time in competition compared to those racehorses which start their career at 30 to 42 months of age.

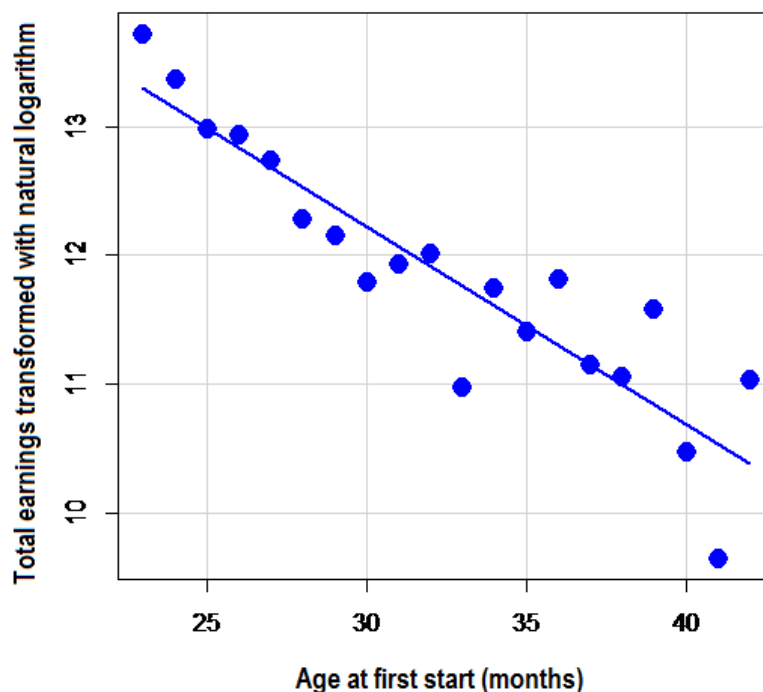


Figure 1. Total money earned during the productive life depending on the age of the horses at first start in the whole population

Sex of horses had no significant effect at 2 years of age to the total winnings, in turn, it was demonstrated that males are more likely participating in competitions later on. Considering the colts are faster than fillies, they provide to win more money.

Conclusions

The present study proved that sex has no effect on years spent in race and the total number of starts. Most of the horses spent 2-3 years in competition, being 5 years at the end of their career. The ability to begin the racing career early is a desirable feature nonetheless this should not encourage to train younger horses for the sake of the development of the musculoskeletal system. The optimal start of the racing carrier for the Thoroughbred horses in Hungary is between 23 and 29 months of age. For the successful racing carrier it has to be considered by the breeders, trainers and owners.

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