

PRECOCITY AND PERFORMANCE IN BRAZILIAN THOROUGHBRED RACEHORSES

PRECOCIDADE E DESEMPENHO EM CORRIDAS DE CAVALOS PURO-SANGUE INGLÊS BRASILEIROS

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ADDITIONAL KEYWORDS

Genetic correlation. Horserace.

PALAVRAS-CHAVES ADICIONAIS

Correlação genética. Corrida de cavalos.

RESUMO

Correlações genéticas e fenotípicas entre idade à primeira largada (F) e características de desempenho em pista (número de vitórias (NV), número de colocações entre os 5 primeiros lugares (N5), porcentagem de vitórias (PV), porcentagem de colocações entre os 5 primeiros lugares (P5), e número de largadas (NS)) foram estimadas em 1.138 cavalos Puro-Sangue Inglês brasileiros utilizando o programa MTDFREML. Os resultados indicaram que os cavalos com maior mérito genético para NV e PV foram aqueles com menor potencial genético para F. Fenotipicamente, animais com maior NS e N5 foram aqueles com menor F.

SUMMARY

Genetic and phenotypic correlations among age at the first race (F) and racetrack performance traits (number of victories (NV), number of placements in top 5 (N5), percentage of victories (PV), percentage of placements in top 5 (P5), and number of starts (NS)) were estimated for 1.138 Brazilian Thoroughbred using MTDFREML

software. The results indicates that horses with a high genetic merit for NV and PV were those with a low genetic potential for F. Phenotypically, animals with greater NS and N5 were those with lower F.

INTRODUCTION

Low starting age and ability to good performance at an early age are desirable characteristics in racehorse, because they improve the profitability of horse breedings and keeping. In addition, horses beginning their careers at a young age can start more often, and may have better racing results (Saastamoinen and Ojala, 1991), as well as be healthier (Darenius *et al.*, 1983) than horses beginning at older ages. Precocity has also been selected as a breeding goal in some countries: Finland, Germany and Sweden.

The aim of this study was to estimate

the genetic and phenotypic correlations between age at first race and others race track performance traits in throughbred horses in order to contribute to a better understanding of the genetic and phenotypic aspects involved in racing performance and precocity traits of these animals in Brazil.

MATERIALS AND METHODS

The data used in the present study were provided by the study book of the Brazilian Association of Race Horse Breeders (ABCCC), located in the city of São Paulo, Brazil. The information was recorded on chronologic reproduction cards for 36 stallions and on study turf record cards for their 1138 progeny (602 male and 536 female) at the Cidade Jardim (State of São Paulo), Gávea (Rio de Janeiro), Tarumã (Paraná) and Cristal (Rio Grande do Sul) race tracks.

Covariance components were estimated by the restricted maximum likelihood method (REML) for an animal model using the derivate-free process (DFREML) according to Meyer (1989, 1991) and the MTDFREML program described by Boldman *et al.* (1993). This components were estimated by a two traits model using the linear model considered the random effect of the animal (1...1138) and the same set of fixed effects used by Saastamoinen and Nylander (1996): birth moth (1...8 - July to February), birth year (1982...1989), and sex.

The interactions of the fixed effects included in the model did not prove to be important in previous analysis

carried out using GLM procedure of the SAS (1985).

We estimated correlations among age a first race (F) and following racetrack performance traits: number of victories (NV), number of placements in top five (N5), percentage of victories (PV), percentage of placements in top five (P5) and number of starts (NS).

Correlations genetic and phenotypic were estimated from the following equations:

$$r_{FF'} = (\sigma_{ee'} + \sigma_{aa'}) / [(\sigma_{e'} + \sigma_{a'}) \cdot (\sigma_e + \sigma_a)]$$

$$r_{AA'} = (\sigma_{aa'}) / (\sigma_{a'}^2 + \sigma_a^2)^{1/2}$$

Where:

$r_{FF'}$ = phenotypic correlation

$r_{AA'}$ = genetic correlation

$\sigma_{a'}^2$ and σ_a^2 = additive genetic variances components due to the animal

$\sigma_{e'}^2$ and σ_e^2 = environmental variance components

$\sigma_{aa'}$ = additive genetic covariance due to the animal

$\sigma_{ee'}$ = environmental covariance component

RESULTS AND DISCUSSION

The mean of the age at the first race was 1077.73 days with a coefficient of variation of 15.62 percent. Similarly, Saastamoinen (1991) and Saastamoinen and Nylander (1996) reported coefficient of variation of 19.4 percent and 22 percent in Finnhorse and Standardbred, respectively. Males presented age at first race significantly ($p < 0.05$) higher (1096.45 against

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Table I. Correlations among age at the first race and performance traits. (Correlações entre idade a primeira largada e caracteres de desempenho).

F	Genetic	Phenotypic
NV	0.24	-0.05
N5	-0.06	-0.13
PV	0.10	0.02
P5	-0.03	-0.003
NS	-0.06	-0.15

1056.71 days of the females), disagree with Saastamoinen (1991) which reported age younger in males Standardbred and Finnhorse.

The reasons for the variation of age at first start may included slow development and maturing age, the intentions of owners and trainers, injuries and ailments, and lack of talent (Bendroth, 1981; Klemetsdal *et al.* 1985; Saastamoinen, 1991). Horses born in January and February showed

age at first race significantly ($p < 0,05$) higher than others months. In addition, this trait decreased significantly with the years, disagree with the study of Saastamoinen, (1991).

The genetic and phenotypic correlations between age at the first race and others racetrack performance traits are showed in **table I**.

Just the genetic correlations between F; NV and F; PV were positive (0.24 and 0.10, respectively). These results indicates that horses with a high genetic merit for PV and especially NV were those with a low genetic potential for F. The others genetic correlations were negatives and close to zero (-0.03 to -0.06), showing that the animals present high or low genetic potential for N5, P5 and NS regardless of yours ages at first race.

Phenotypically, an only one correlation; between F; PV, was positive (0,02). The highest phenotypic correlations were recorded between F; N5 (-0,13) and F; NS (-0,15), showing that horses with lower age at the first race were those with greater NS and N5.

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