

STUDIES OF QUANTITATIVE GENETICS AT THE POPULATIONS OF HORSES USED IN THE EQUESTRIAN SPORTS FROM ROMANIA

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Abstract

The quantitative characters have a complex genetic determinism, their forming and control being mainly due to the major genes (Mather, 1941). This determines distinguishable effects on the phenotype that they control, only through the action cumulated with other such genes, where the denomination of polygenes with cumulative or additive action is derived from.

In our country, the cumulative genetic researches regarding horses are relatively few, which is projected in the elaboration of some modern programs of genetic improvement of horse populations.

For the horses used in the equine sports in Romania, the most recent researches were carried out by our team, whose analyses and conclusions are presented synthetically in the present paper.

A common characteristic of the heritability of characters at the Sports Horse, resulted from our researches, is represented by the degree of strong genetic determination for the analyzed characteristics, which is in correspondence with the data mentioned in the specialty literature.

It can be considered that the actions of genetic improvement within the analyzed populations, have been led towards the direction of hereditary fixing of characters which determine the body format, the body mass and the increase of energetic capacity; also, the stronger genetic variability within these populations of horses ensures a rapid effect of selection and an increased safety in obtaining the desired selection effect.

Key words: horses, equestrian, equine, sports, entertainment

INTRODUCTION

The quantitative characters have a complex genetic determinism, their forming and control being mainly due to the major genes (Mather, 1941).

Significant aspects of the hereditary transmission of quantitative characters were first emphasized by Emerson and East (1913), aspects that represent specific laws of heredity.

The results of all the researches carried out with the purpose to study the heredity behaviour of quantitative characters in animals confirmed the hypothesis of polygenic heredity and in consequence, the Mendel transmission laws.

The study of heritability of characters in horses, although it does not know the same

amplitude as in the case of bulls, sheep, pigs or birds developed together with the scientific improvement and elaboration of optimized genetic improvement programs.

In the foreign literature, the study of heritability of morphological characters and skills of obstacle, dressage, complete test horses is very much approached, but the researches regarding heritability of characters and horses used in the trot and gallop courses are much more numerous.

The estimates of heritability of riding performances for the horses in France, Germany and Sweden vary between $h^2 = 0.04$ for the dressage hierarchy (Philipsson, 1976) and $h^2 = 0.71$ for the score in jumps. (Bade and col., 1975). The majority of researchers estimate a weak genetic

determinism for the performances in jumps ad dressage, which means that the genetic improvement of these performances must be based on the selection according to ascendants, collateral relatives and descendants.

In our country, the cumulative genetic researches regarding horses are relatively few, which is projected in the elaboration of some modern programs of genetic improvement of horse populations.

The following were preoccupied by this aspect: V. Ujică, E. Călinescu and N. Pipernea for the breeds Huțul, Gidran, Bucovina Horse and Romanian Pony in Moldavia area; Gh. Georgescu, Șt. Popescu Vișor, I. Aphaideanu, C. Drăgănescu, Gh. Mărginean, H. Grosu, Al. Șonea in the breeds Romanian Trăpaș , Romanian Sports Horse, Arabian breed and Englis Pure blood; I. Vintilă, Gh. Lunguescu for the breeds Nonius and Ardenez from Banat; N. Marcu, C. Velea, Gh. Mureșan for the breeds Furioso North-Star and the Semi-heavy horse of Transylvania, and more recently V. Ujică, I. Dulugeac and M. Doliș, whose analyses and conclusions will be presented in the following paragraphs.

MATERIAL AND METHOD

In conformity with the research protocol, we took in the study the horse population used in the equine sports and exploited under the conditions of breeders and private sports associations.

On this biological material, totalling 41 Romanian Sports Horses (10.8% from the total per country), we determined and analyzed the main morphological conformation characteristics – constitution, age structure, appurtenance to sports clubs and associations in the country, the colours and colour particularities, the performances achieved in the internal and international competitions.

At the same time, we analyzed the origin and genetic structure of the population, identifying the genetic families with at least 3 individuals semi-brothers and paternal semi-sisters.

In the first stage, we calculated the average values and the estimates of researched characteristics' variability, and in the following stage we established the percentage of genetic variability in the population, using as work method the analysis of the variation per group of half-brothers and paternal half-sisters, and also the REML method, whose results will be presented in the following lines.

RESULTS AND DISCUSSIONS

The heritability (h^2) of the main morphological characteristics. In table 1 figure 1 we present the values of the heritability coefficients for the characters analyzed in the Romanian Sports Horse.

Table 1
The heritability of the main morphological characters at the Romanian Sports Horse

Specification	h^2
Height at withers	0,77
Depth of thorax	0,74
Oblique length of the body	0,86
Length of head	0,68
Length of neck	0,59
Length of the croup	0,63
Width of the chest	0,81
Width of the croup at hips	0,70
Thorax perimeter	0,84
Shank perimeter	0,91
Body weight	0,58

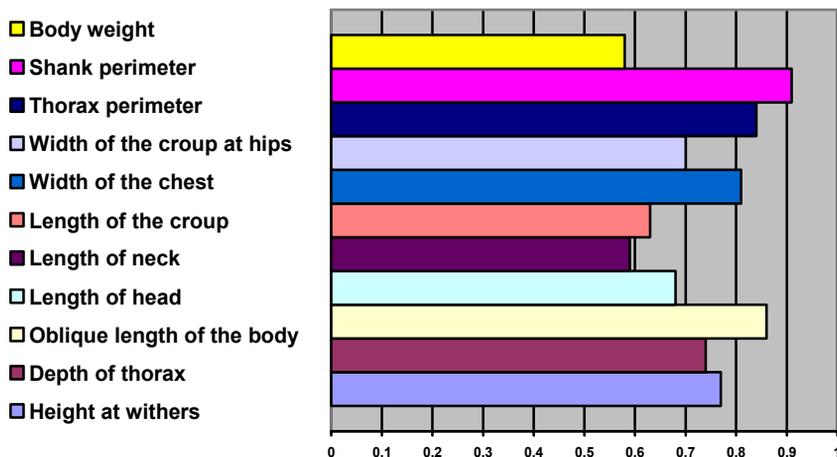


Fig. 1. The heritability of the main morphological characters at the Romanian Sports Horse

Examining the values of the heritability coefficients for the analyzed morphological characters, it results they have a different genetic determination, as a result of the genetic interrelations specific to each character and variability of genotypes that make up the groups of the studied animals.

A common characteristic of the heritability of characters at the Sports Horse, resulted from our researches, is represented by the degree of strong genetic determination for the analyzed characteristics, which is in correspondence with the data mentioned in the specialty literature.

The high genetic determination quota for the morphological characters reflects, on the one hand, the genetic variability of the female biological material, and on the other hand, the high variation between the male reproducers.

The environment, in the case of these characters participates with a more reduced quota in determining the total variation, which will determine orientations, methods and different managerial systems in the selection process and the genetic improvement compared with the characters with weak hereditary transmission.

The stronger determination of the hereditary variation for the morphological characters emphasizes the reduced influence of the environment factors and the high quota of genetic determination of the respective characteristics' variabilities.

CONCLUSIONS

It can be considered that the actions of genetic improvement within the analyzed populations, have been led towards the direction of hereditary fixing of characters which determine the body format, the body mass and the increase of energetic capacity; also, the stronger genetic variability within these populations of horses ensures a rapid effect of selection and an increased safety in obtaining the desired selection effect for the obstacle, dressage or complete riding test horses.

As a consequence, the use of the values of the own phenotype in the appreciation of the genotype for these characters is efficient and useful from the zootechnical point of view.

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