

STUDY OF THE MAIN BODY DIMENSIONS USED IN THE SELECTION PROCESS, IN THE REPRODUCTIVE NUCLEUS OF PURE ARABIAN HORSES FROM NATIONAL STUD MANGALIA

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Abstract

Study of average performances in a population have a huge importance because, regarding to a population, the average of phenotypic value is equal with average of genotypic value. So, the studies of the average value of characters offer us an idea about the population genetic level. This study have the principal purpose to analyse main body dimensions who are used in selection process: withers height, thoracyc perimether and cannon bone perimether, through the integration of individs in an evaluation class, in accordance with selection methodology (Maftei et al., 2015). The biological material is represented by 73 Pure Arabian horses, 12 males and 61 females, at different ages, owned by Mangalia stood farm, representing the entire reproductive nucleus. The average performances of characters are presented in the paper. We can observe a small grade of variability with some differences between sexes. The average performances of the characters are between characteristic limits of the breed.

Key words: Arabian, breed, height, horses, selection.

INTRODUCTION

Regarding to a population, the study of average performances gives us an idea about the populational genetic level (Marginean, 2012). This is possible because the average of phenotypic values is equal with average of genotypic values (Maftei et al., 2015). The principal purpose of this study is to analyze the reproductive nucleus of Pure Arabian horses, from Mangalia stud, through the main body dimensions that are used in the selection process in this breed.

We analyze the wither's height, the thoracic perimeter and the cannon bone perimeter of individuals. After all this analyzes it was possible to ranking the individuals and to ingrate it in an evaluation class (a quality class), in accordance with the specific methodology (Marginean et al., 2005; Maftei et al., 2015). We must say that this study is just a part of an ample research regarding the history of Pure Arabian horses from Romania.

MATERIALS AND METHODS

The biological material is represented by entire reproductive nucleus of Pure Arabian horses from Mangalia stud, 73 individuals from which 12 sire stallions (Table 1) and 61 broodmares (Table 2). All individuals were analyzed through individual performances, through stallions average performance, through mares average performance, and, most important, through population average performance of body dimensions, related to selection criteria (Popa, 2009; Maftei et al., 2022; Pruna et al., 2021). We analyzed the withers height, the thoracic perimeter and the cannon bone perimeter using somatometric. All measurements were recorded from genealogical register and verified by us in Mangalia stud farm in 2021 using ANIMETER measuring belt and a height measuring stick. Registered data was analyzed from statistical point of view and then was interpreted according to Romanian methodology for ranking and evaluation in Pure Arabian horses,

a methodology that respect W.A.H.O. (World Arabian Horse Organization) demands.

RESULTS AND DISCUSSIONS

Analyzing the presented data, it is easy to observe some differences, for all characters, between stallions (Table 1, Figure 1), between mares (Table 2, Figure 2) and at population level (Figure 3).

Table 1. Registered values of body measurements in stallions

No. cr.	Name	Withers height	Thoracyc perimeter	Canon bone perimeter
1	HADBAN XXXVIII	152	172	18
2	SIGLAVY BAGDADY XXVIII	152	174	19
3	GAZAL XX	153	180	19
4	NEDJARI XIII	154	179	19
5	MERSUCH XXVI	154	178	18.5
6	SIGLAVY BAGDADY XIX	157	176	20
7	MERSUCH XXVIII	159	194	19.5
8	IBN GALAL III	156	190	20
9	GAZAL XXIII	157	185	19.5
10	HADBAN XL	156	183	18
11	EL IMAN I	150	172	19
12	CYGAJ IV	157	185	19.5

Regarding the registered performances in stallion case, we find some significant differences between individual performances. The bigger value of withers height is 159 cm. (stallion Mersuch XXVIII), and the smallest was 150 cm for stallion El Iman I. From this point of view, stallion El Iman I is ranked in the second class (elite) but its maintenance in the reproductive nucleus is justified by the genetic value of the bloodline from which it comes.

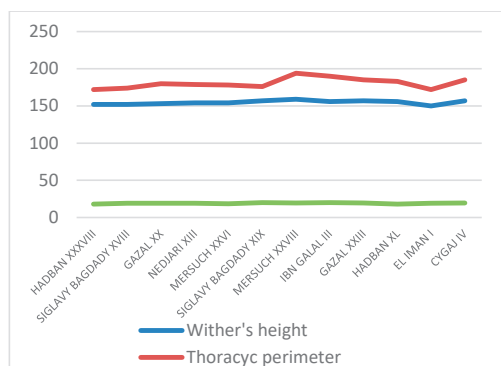


Figure 1. Registered performances in stallions

In case of thoracic perimeter character, the highest value of the character is recorded for stallion Mersuch XXVIII (194 cm), and the

smallest value, 172 cm., was recorded for stallions Hadban XXXVIII and El Iman I.

Table 2. Registered values of body measurements in broodmares

No. cr.	Name	Withers height	Thoracyc perimeter	Canon bone perimeter
1	833 CYGAJ 15	152	168	18
2	834 SIGLAVY BAGDADY XIV - 54	152	168	18
3	835 NEDJARI IX - 83	153	168	18
4	837 SIGLAVY BAGDADY XIV - 52	154	172	18
5	839 IBN GALAL II -3	153	168	18
6	840 IBN GALAL II 4	155	172	18
7	852 CYGAJ 42	150	172	18
8	853 IBN GALAL II 18	157	172	18
9	855 IBN GALAL II 26	155	174	18.5
10	859 CYGAJ 59	154	180	19
11	861 CYGAJ 62	152	173	18
12	863 IBN GALAL II - 34	153	177	18.5
13	879 HADBAN XXXVIII -13	150	169	17.5
14	880 SIGLAVY BAGDADY XXVIII - 11	156	169	19
15	881 MERSUCH XXVI - 7	151	174	18
16	882 IBN GALAL II - 51	155	171	19
17	884 GAZAL XIX - 19	156	175	18.5
18	887 HADBAN XXXVIII - 19	155	177	19
19	889 MERSUCH XXVI - 11	157	170	19
20	891 HADBAN XXXVIII - 26	156	179	20
21	892 CYGAJ I - 9	158	172	19
22	896 NEDJARI XIII-17	154	175	19
23	901 HADBAN XXXVIII - 29	155	174	18
24	902 EL IMAN I - 33	153	178	19
25	903 MERSUCH XXVI - 19	155	168	19
26	905 GAZAL XIX - 25	155	175	19
27	908 SIGLAVY BAGDADY XXVIII - 27	156	172	19
28	909 CYGAJ I-17	152	169	18
29	910 GAZAL XIX - 31	155	172	18
30	911 EL IMAN I - 35	152	174	18
31	912 CYGAJ I - 15	157	179	19
32	914 NEDJARI XIII-22	158	175	18
33	915 EL IMAN I-42	157	173	18
34	916 HADBAN XXXVIII-33	157	175	18.5
35	917 GAZAL XIX-32	156	170	17
36	918 EL IMAN I-46	155	176	18
37	919 EL IMAN I-47	156	177	18.5
38	920 GAZAL XX-33	157	178	18.5
39	921 HADBAN XXXVIII-35	155	172	18
40	922 NEDJARI XIII-28	157	174	18
41	923 NEDJARI XIII-27	154	172	19
42	924 SYGLAVY-BAGDADY XVIII-33	155	169	18
43	926 HADBAN XXXVIII-36	156	174	18
44	927 MERSUCH XXVI-31	154	173	18
45	928 MERSUCH XXVI-32	150	167	17.5
46	929 MERSUCH XXVI-30	155	180	19
47	930 SIGLAVY-BAGDADY XVIII-37	156	180	18.5
48	931 SIGLAVY-BAGDADY XIX-1	156	176	19
49	932 MERSUCH XXVI-34	153	176	19
50	933 CYGAJ 82	155	185	19
51	934 MERSUCH XXVI-36 XISTA	155	175	18.5
52	935 NEDJARI XIII-33	151	174	18
53	936 NEDJARI XIII-35	154	178	18.5
54	937 NEDJARI XIII-3	152	174	17
55	938 SIGLAVY-BAGDADY XVIII-41	153	178	18
56	939 SIGLAVY-BAGDADY XIX-3	157	172	18
57	940 NEDJARI XIII-38	153	178	19
58	941 GAZAL XX-43	150	177	18
59	942 NEDJARI XIII-39	158	180	20
60	943 EL IMAN I-51	152	178	18
61	944 GAZAL XX-45	154	174	18

For cannon bone perimeter, the biggest recorded value was 20 cm. (Siglavy Bagdady XIX and Ibn Galal III).

In the broodmares case, regarding the wither's height character, we find the smallest value at 150 cm. for four mares belonging to four different bloodlines (Cygaj - 42, Hadban XXXVIII - 13, Mersuch XXVI - 32, Gazal XX - 43). The biggest value of character was 158 cm (Nedjari XIII - 39, Nedjari XIII - 22 and Cygaj I - 9). For thoracic perimeter, the biggest value was 185 cm. (Cygaj - 82), and the smallest was 168 cm., recorded at four broodmares belonging

to different bloodlines (Cygaj - 15, Siglavy Bagdady XIV - 54, Nedjari IX - 83, Ibn Galal II - 3). The cannon bone perimeter has the greater value at 20 cm. (Nedjari XIII - 39, Hadban XXXVIII - 26), and the smallest at 17 cm (Nedjari XIII - 36).

Analyzing the national criteria for evaluation and ranking of Pure Arabian horses (Table 3), and the average performances of characters (Table 4), for both sexes, the stallions and also the broodmares from Mangalia stud farm has ranked in the superior class, the RECORD class (Tables 5 and 6).

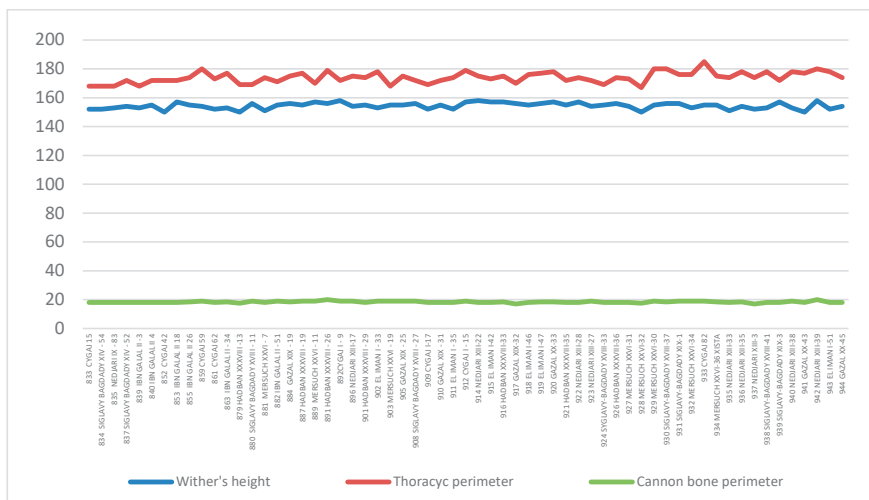


Figure 2. Registered performances in broodmares

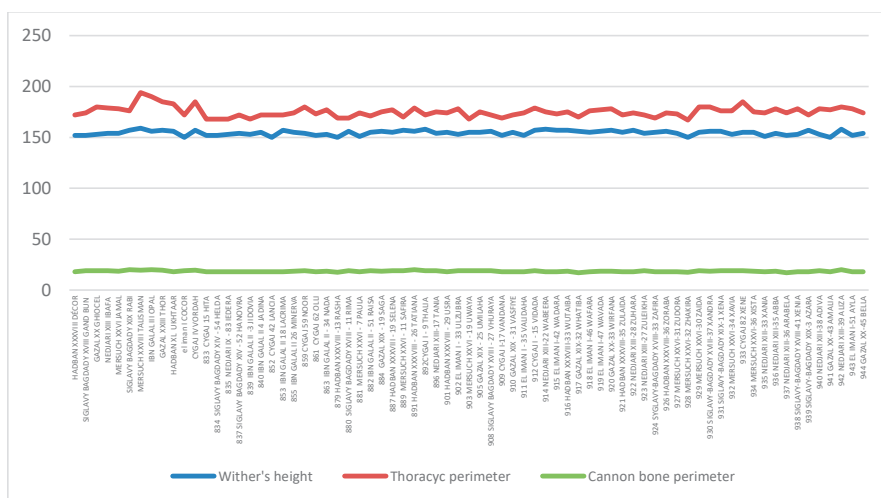


Figure 3. Registered performances in the reproductive nucleus of Pure Arabian horses from Mangalia stud farm

Table 3. Scales and notes for evaluation of Pure Arabian horses in terms of body sizes

Stallions			Note	Mares		
Wither's height	Thoracic perimeter	Cannon bone perimeter		Wither's height	Thoracic perimeter	Cannon bone perimeter
160	180	20.5	9	158	180	20
158	178	20.5	10	156	178	19.5
156	176	20	10	154	176	19
154	174	19.5	9	152	174	19
152	172	19	8	150	172	18.5
150	168	18.5	7	148	168	18
148	166	18	6	146	166	17.5
146	164	17.5	5	144	162	17.5
-	-	-	4	144	160	17

Table 4. Average values of analyzed characters (in cm) and statistics

Specifications		Wither's height	Thoracic perimeter	Cannon bone perimeter
Males	<i>X</i>	154.7500	180.6667	19.0833
	<i>STDEV</i>	2.6671	6.9718	0.6686
	<i>Sx</i>	0.8042	2.1021	0.2016
	<i>cv%</i>	1.7235	3.8589	3.5034
Females	<i>X</i>	154.4098	174.0328	18.3852
	<i>STDEV</i>	2.1477	3.8252	0.6013
	<i>Sx</i>	0.2773	0.4938	0.0776
	<i>cv%</i>	1.3909	2.1980	3.2708
TOTAL	<i>X</i>	154.4658	175.1233	18.5000
	<i>STDEV</i>	2.2241	5.0743	0.6614
	<i>Sx</i>	0.2621	0.5980	0.0780
	<i>cv%</i>	1.4399	2.8976	3.5753

Table 5. Grades of Pure Arabian stallions and broodmares from the reproductive nucleus of Mangalia stud farm

Specification	Wither's height		Thoracic perimeter		Cannon bone perimeter	
	Stallions	Mares	Stallions	Mares	Stallions	Mares
Body dimensions	10	10	9	9	8	8

Table 6. Minimum marks for placing horses in the general ranking class by body dimensions

Body dimensions	Record class		Elite class		1 st class
	Stallions	Mares	Stallions	Mares	Stallions & Mares
Record class	8	7	7	6	6



Figure 4. Pure Arabian broodmares in Mangalia stud farm

CONCLUSIONS

The results obtained after the analysis of the body dimensions of the individuals from the reproductive nucleus of the Pure Arabian breed from Mangalia stud farm, highlighted the right of these genitors to become the ancestors of future generations. Our recommendation are: increasing of reproductive nucleus, maintaining the same strong control of selection process, and why not a very strong control of selection. Also, selection of individuals with wither's height values a little bit bigger could be the answer for low performances of Pure Arabian horses in long racing. However, due to the small values of

variability we can say that the average performances of characters is able to offer us a good and correct image of Pure Arabian horse population from Mangalia stud farm.

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