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PARTIAL RESULTS REGARDING THE MORPHO-PRODUCTIVE EVALUATION OF PURE ARABIAN HORSES FROM NATIONAL STUD FARM MANGALIA

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Abstract

This study is just a part of an ample research which aims to create a monography of the Pure Arabian horses in Romania. At this stage, in this article, we present the results of research on energetic capacity (speed). Unfortunately, the Pure Arabian horses from the Mangalia National Stud do not perform competitive activities on the racetrack (as would be the case). Due to this situation, we had to use the times recorded in the qualifying races on the stud's racetrack. Certainly, if more performances had been recorded for each individual, the situation would have been completely different.73 Pure Arabian horses were studied, including 12 sire stallions and 61 broodmares. These 73 horses represent the entire reproductive nucleus of the Pure Arabian horse breed from the Mangalia stud farm. The results obtained from the statistical analyses were evaluated in accordance with the national criteria for grading and ranking of Purebred Arabian horses. The average performance of individuals from reproductive nucleus of the breed was 1'17"45/km, 1'17"53 for broodmares, amd 1'17 for sire stallions.

Key words*: Arabian, hippodrome, horse, Mangalia, Pure.*

INTRODUCTION

Maybe the most important horse breed in Romania and in the world (from economically and genetically point of view) is the Pure Arabian (Maftei et al., 2022a). In Romania it is bred in Mangalia National stud farm, in a special environmental condition (Marginean et al., 2005).

One of the most important steps in horse selection is the evaluation of productive performance. In horses, the productive performance is energetic capacity.

From a breed to another, depending of breed specialization, the productive test is different. For Pure Arabian horses this test is represented by the speed of horse on the racetrack (time/km). The evaluated criterion is the record, meaning the best performance achieved by a specimen during its lifetime, expressed in minutes, seconds and fractions of a second/kilometer. (Marginean et al., 2012).

In Romania all this horse selection work is regulated by National Agency for Animal Breeding and Reproduction (Criteria for assessment of breeding horses, no. 2 from 16th July 2008).

For Pure Arabian horses, the grading criteria require three tests:

A. A flat gallop running test over 2400 meters with 65-70 kg in the saddle;

B. A dressage test in which are assessed gaits (straightness and regularity), impulse, elasticity, suppleness, obedience, attention, confidence, accuracy of movements, and transitions;

C. A trotting speed test: individual harnessing at the carriage, on 15 km, with 450 kg of drawn weight.

In this paper we take into account only the record of individuals for criteria speed in gallop on 2400 meters (test A).

MATERIALS AND METHODS

The sample was represented by the entire reproductive nucleus of Pure Arabian Horses from Mangalia National Stud. It was analyzed 61 broodmares and 12 sire stallions (Table 1 and Table 2), belonging to 8 bloodlines (Gazal, Hadban, Mersuch, Cygaj, El Iman, Ibn Galal, Nedjari, Siglavy Bagdady).

The performances and statistics were analyzed separately by sexes, but also cumulatively for the entire reproductive nucleus.

Table 1. Broodmares performances

Name	*Birth Date*	*Record (sec./km)*
833 CYGAJ 15	08.04.2000	76.05
834 SB* XIV - 54	11.09.2000	73.8
835 NEDJARI IX - 83	27.02.2001	74.4
837 SB* XIV - 52	05.04.2000	74.43
839 IBN GALAL II -3	20.03.2002	76.23
840 IBN GALAL II 4	26.03.2002	73.91
852 CYGAJ 42	15.09.2004	79.25
853 IBN GALAL II 18	14.09.2004	78
855 IBN GALAL II 26	20.03.2005	78.1
859 CYGAJ 59	20.09.2006	79
861 CYGAJ 62	17.03.2007	80
863 IBN GALAL II - 34	21.01.2006	79.4
879 HADBAN XXXVIII -13	14.01.2009	79.21
880 SB* XVIII - 11	06.04.2009	79.25
881 MERSUCH XXVI - 7	10.09.2008	78.8
882 IBN GALAL II - 51	16.02.2009	80
884 GAZAL XIX - 19	12.04.2010	79.66
887 HADBAN XXXVIII - 19	19.03.2010	80
889 MERSUCH XXVI - 11	06.05.2010	79.15
891 HADBAN XXXVIII - 26	25 05 2011	79.95
892CYGAJ I - 9	25.03.2011	79.57
896 NEDJARI XIII-17	29.04,2011	79.1
901 HADBAN XXXVIII - 29	10.06.2012	78.36
902 EL IMAN I - 33	25.04.2012	79.59
903 MERSUCH XXVI - 19	07.06.2012	79.58
905 GAZAL XIX - 25	21.04.2012	79.71
908 SB* XVIII - 27	23.03.2013	79.21
909 CYGAJ I-17	20.04.2013	76.18
910 GAZAL XIX - 31	09.06.2013	77.32
911 EL IMAN I - 35	15.02.2013	78.35
912 CYGAJ I - 15	23.02.2013	71.58
914 NEDJARI XIII-22	29.03.2014	78.1
915 EL IMAN I-42	24.04.2014	77
916 HADBAN XXXVIII-33	25.04.2014	78.17
917 GAZAL XIX-32	09.05.2014	79
918 EL IMAN I-46	20.05.2014	80
919 EL IMAN I-47	26.05.2014	79.35
920 GAZAL XX-33	26.05.2014	79.61
921 HADBAN XXXVIII-35	05.02.2015	80.9
922 NEDJARI XIII-28	08.02.2015	80.1
923 NEDJARI XIII-27	31.01.2015	80.12
924 SB* XVIII-33	09.02.2015	80.17
926 HADBAN XXXVIII-36	21.03.2015	79.53
927 MERSUCH XXVI-31	26.03.2015	79.57
928 MERSUCH XXVI-32	04.04.2015	79.90
929 MERSUCH XXVI-30	02.03.2015	70.1
930 SB* XVIII-37	10.02.2016	76.15
931 SB* XIX-1	21.01.2016	76.45
932 MERSUCH XXVI-34	03.03.2016	72.35
933 CYGAJ 82	10.03.2016	72
934 MERSUCH XXVI-36	29.04.2016	72.45
935 NEDJARI XIII-33	12.05.2016	71.85
936 NEDJARI XIII-35	03.02.2017	74.79
937 NEDJARI XIII-36	04.02.2017	75.3
938 SB* XVIII-41	14.12.2016	77.82
939 SB* XIX-3	18.03.2017	79.99
940 NEDJARI XIII-38	09.04.2017	77.87
941 GAZAL XX-43	29.04.2017	75.57
942 NEDJARI XIII-39	03.05.2017	76.8
943 EL IMAN I-51	12.12.2017	75.07
944 GAZAL XX-45	14.02.2018	76.27
SB - SIGLAVY BAGDADY*		

In Table 2 are presented performances of the sire stallions from reproductive nucleus of Pure Arabian horses from Mangalia National Stud.

Table 2. Sire stallions performances

Name	*Birth Date*	*Record (sec./km)*
HADBAN XXXVIII	29.04.1996	79.02
SIGLAVY BAGDADY XVIII	18.03.1999	76.06
GAZAL XX	17.05.1999	77.15
NEDJARI XIII	18.02.2001	75.21
MERSUCH XXVI	12.02.2002	74.24
SIGLAVY BAGDADY XIX	30.04.2009	77.09
MERSUCH XXVIII	11.05.2011	77.85
IBN GALAL III	14.03.2007	76.49
GAZAL XXIII	09.06.2011	75.21
HADBAN XL	24.04.2012	77.42
EL IMAN I	29.03.2005	80.8
CYGAJ IV	06.03.20	77.52

Table 3 presents the scales for the analyzed character of the breed under this study.

Table 3. Scores for speed (gallop)

2400 m, gallop in seconds/km	*Points*
Under 74	10
Between 74.01 and 76	9
Between 76.01 and 78	8
Between 78.01 and 80	7
Between 80.01 and 81	6
Between 81.01 and 82	5
Between 82.01 and 83	4
Between 83.01 and 84	3
Between 84.01 and 85	2

RESULTS AND DISCUSSIONS

At the sire stallions category, the slowest time (60.8 second/km) was achieved by the stallion El Iman I, (7 points). The fastest stallion was Mersuch XXVI with a time of 74.24 second/km, obtaining 9 points.
In Table 4 are presented the statistics of the character in sire stallions.

Table 4. Statistics calculated for the energetic capacity trait in sire stallions

Statistics	***Values***
X	77.01
STDEV	1.7809
Sx	0.5370
CV %	2.3128

The distribution of performances, for sire stallions is graphically represented in Figure 1.

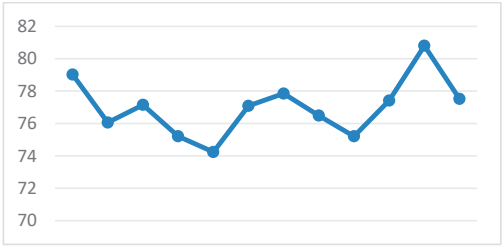

Figure 1. Distribution of performances at the sire stallions level

At the broodmares level (Figure 2), the slowest mare was 921 Hadban XXXVIII-35 with a time of 80.9 seconds/km (received a score of 7 points), and the fastest female was 935 Nedjari XIII-33 with a time of 71.85 seconds/km (received a score of 10 points).

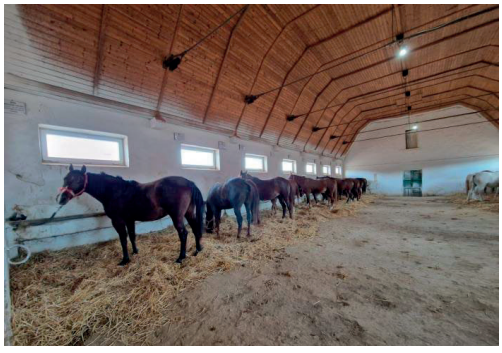

Figure 2. Pure Arabian broodmares in stable (own source)

In Table 5 are presented the calculated statistics for broodmares, and in Figure 3 is presented the distribution of performance for the same sex.

Table 5. Statistics calculated for the energetic capacity trait in broodmares

Statistics	***Values***
X	77.53
STDEV	2.6655
Sx	0.3441
CV %	3.4379

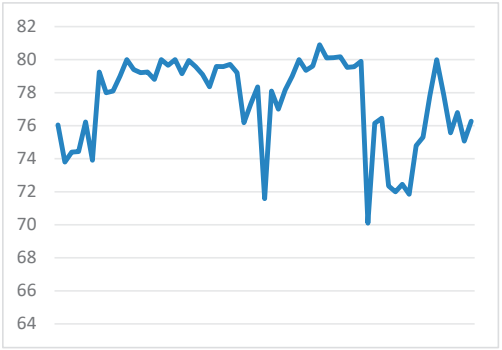

Figure 3. Distribution of performances at the broodmares level

In Figure 4 is presented one of the most valuable sire stallions from reproductive nucleus of Pure Arabian horses from Mangalia National studfarm.

Figure 4. Pure Arabian sire stallion in Mangalia National Stud (own source)

For the entire reproductive nucleus of Pure Arabian horses from Mangalia National stud, the data are presented in Table 6 and are graphically presented in Figure 5.
It is observed that the coefficient of variability calculated separately for males and females as

well as for the entire reproductive nucleus of the breed, is in the range of 0-15%.
The spread of the data is small, meaning that the average is representative and the analyzed nucleus is homogeneous in terms of productive performance (Popa, 2009; Maftei et al, 2022b).

Table 6. Calculated statistics for entire reproductive nucleus of the breed

Statistics	*Values*
X	77.645
STDEV	1.944543648
Sx	0.22453656
CV %	2.504402921

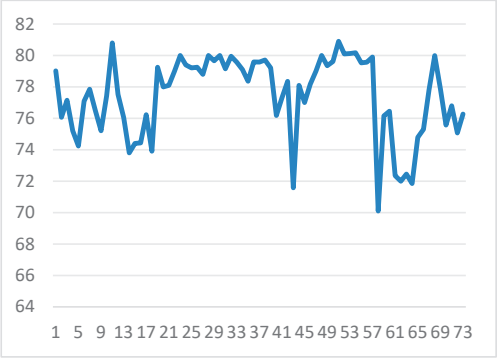

Figure 5. Distribution of performances at the reproductive nucleus level

In order to have a more accurate overview, Tables 7 and 8 presents the performances achieved by individuals from the reproductive nucleus separated by bloodlines and by sexes.

Table 7. The score obtained for the character studied and the classification in the stallion's ranking class (by bloodlines)

Bloodline	*No. of individuals*	*Points*	*Ranking*
Hadban	2	7	I
		8	E
Siglavy-Bagdady	2	8	E
		8	E
Gazal	2	8	E
		8	E
Mersuch	2	9	R
		8	E
Nedjari	1	9	R
Ibn Galal	1	8	E
El Iman	1	7	I
Cygaj	1	8	E

Table 8. The score obtained for the character studied and the classification in the broodmares ranking class (by bloodlines)

Bloodline	*No. of Individuals*	*Points*	*Ranking*
Hadban	2	7	I
		8	E
Siglavy-Bagdady	2	8	E
		8	E
Gazal	2	8	E
		8	E
Mersuch	2	9	R
		8	E
Nedjari	1	9	R
Ibn Galal	1	8	E
El Iman	1	7	I
Cygaj	1	8	E

In Table 9 is presented the minimum scores that are required to access quality class (a ranking class, like Record, Elite or First class) for reproductive horses, a class which will allow to be a member of the reproductive nucleus of the breed.
Regarding the ranking (quality) classes in horses, they are defined by National Agency for Animal Breeding and Reproduction - through the regulations and national legislation in force at this time (Criteria for assessment of breeding horses, no. 2 from 16th July 2008), as follows:

Table 8. Minimum requirement for energetic capacity in Pure Arabian horses to became to a ranking class

Class/character	*Energetic capacity*	
Record*	Stallions	9
	Mares	8
Elite*	Stallions	8
	Mares	7
First class**	Stallions	7
	Mares	6

Record* - The record class includes horses with exceptional qualities within the breed and which can contribute to its improvement;
Elite**- The elite class includes the most representative horses of the respective breed, whichmeet all the requirements and are good breeders;
First class*** - Class I includes horses that generally meet the requirements of the breed.
The statistical analysis of the recorded performances reveals that the average is representative, both at the level of stallions and mares as well as at the level of the entire reproductive nucleus.

The coefficient of variability is in the range of 0-15%, which means that the spread of the data is reduced.
Do not forget that, for Pure Arabian Horses, the heritability for racing times is very low (Orhan, 2010). Another characteristic in Pure Arabian Horse exploitation is the selection. Ropka-Malik et al., in 2019, shows that "the selection in Arabian horses has historically focused on maintaining the breed's usability together with preserving a desirable type".

CONCLUSIONS

The performances presented were achieved at the age of 3.5 years, on the stud's racetrack, in the so-called qualification race.
The coefficient of variability is in the range of 0-15%, which means that the spread of the data is reduced.
The times are poor, compared to the performances recorded in the Purebred Arabian horse races, but it must be taken into account that these performances were recorded by individuals who does not have sustained training. Practically this is the only productive performance of the specimens from the reproductive nucleus of the breed. However, there are products of this reproductive nucleus, which perform in profile races obtaining very good times, but benefiting from sustained training.
It is obvious that the concerns of the specialists at the Mangalia stud farm are not those of improving productive performance, in particular speed on the racetrack. However, we must say that the lack of a hippodrome for public gallop races also contributed to this situation. Moreover, as is known internationally, the Mangalia stud farm is preserving the old Pure Arabian breed, being considered the successor of the Babolna stud farm, having a core unaltered by the passions of galloping races or, even worse, of shows. We hope that this strategy will continue in the future with all the pressures that are put by some "specialists", more interested in the pecuniary side and less in the importance of conserving genetic resources.
We recommend:
- continuing the breeding work towards the conservation of the breed and the preservation of the current type of Arabian Horse bred in Mangalia National Stud;
- continuing the system of intrafamily selection and interlineal crossing;
- increasing the number of bloodlines simultaneously with the increase in the number of broodmares;
- developing the sports segment and participating in profile competitions for a better appreciation of the energetic capacity but also for a better media coverage of the Pure Arabian horses bred in the Mangalia National Stud.

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