

ANALYSIS OF REPRODUCTIVE PARAMETERS IN ARABIAN SHAGYA MARES FROM RĂDĂUȚI STUDFARM

Claudia Pânzaru^{1*}, I. Gîlcă¹, M. Doliș¹, R. Radu-Rusu¹

¹University of Agricultural Sciences and Veterinary Medicine Iași, Romania

Abstract

The study based on 50 Shagya Arabian mares (Mersuch, El-Sbaa, Koheilan, Shagya, Siglavly-Bagdady, Dahoman, Hadban and Gazal bloodlines), reared in Rădăuți studfarm, regarding gestation, foaling-interval and natality, had the purpose to follow the dynamics of these parameters between 2002-2016 years. The extremes of gestation length were found in Dahoman bloodline (300 and 366 days), while the only significant difference ($p < 0.05$) occurred between Shagya and Dahoman bloodlines. The mare gestation lasts between 310-340 days; in the studied population, the average gestation length was found toward the upper limit (339.5 days). Foaling-interval (FI) registered minimal values in Dahoman line (284 days) and maximal ones in El-Sbaa lines (1424 days), whereas no significant differences occurred. FI standard is comprised between 337-338 days, if the mare is mated 8 days post-partum. In the studied population, the average FI was 472.7 days, indicating a intense difference against the species standard, probably due to the reproduction management practices. The natality had the lowest value in Shagya bloodline (54.90%) and the highest one in Mersuch (72.22%). The average natality in mares is 60% while 65.04% was the average calculated for the 50 Shagya Arabian mares.

Consequently, we suggest optimizing the horses' reproductive activity in Rădăuți studfarm, decreasing thus foaling-interval value and favoring in mating those mares whose gestation duration is closer to the species average value.

Key-words: Shagya Arabian, gestation, foaling-interval, natality

INTRODUCTION

The purpose of the study was to see if some reproduction parameters analyzed at Shagya Arabian horse breed, from Rădăuți studfarm, indicate significant differences between genetic lines and if the breed can be found in the species standard.

Rădăuți studfarm currently holds 286 Shagya Arabian horses [4] placed in its 3 sections: Rădăuți where the training livestock can be found, Mitoc (Frătăuții Noi village) where the breeding stock is and Brodina where the male youth is located.

The reason why Rădăuți studfarm was set in the first place, in 1792, was to produce valuable horses for the Austrian army, that is why they were transferred from Vășcăuți, 1400 horses (pregnant mares, stallions, foals, young and working horses), in the 16

sections the studfarm had at that time; the stallions that founded the stock from Rădăuți were Barberino male and the two Pure Arabian horses, Hussein and Manachi. [5]

When the Rădăuți studfarm was rebuilt in 1919 the reproduction process started with 4 stallions from Gazal, Siglavly-Bagdady I, Dahoman XXII and Shagya XV bloodlines and 31 mares; in 1924 was drawn up the first studbook, following to be brought descendants of El-Sbaa and Beck in 1936-1941. [4]

Regarding the foundation of Shagya Arabian breed, the literature indicates the fact that it was first established in the Mezohegyes studfarm, in Hungary, in 1785, in its enclosure named Babolna, which became independent in 1809 to be able to breed only Arabian horses. In 1834, the stallion Shagya arrived from Syria to establish the Shagya Arabian breed with the oriental mares. The following years, there were multiple breeding with valuable

*Corresponding author:

panzaruclaudia@yahoo.com

The manuscript was received: 03.10.2017

Accepted for publication: 22.01.2018

stallions, including in Rădăuți studfarm to strengthen this new breed. [1]

Regarding the reproduction parameters in *Equus caballus* species, the literature indicates that gestation (the period of time between fecundation and birth) has to be 310-340 days [2], and for half-breeds between 337-339 days [7]; however, it can be influenced by heredity, the sex of the product, by the age of mare, by the conditions during the gestation or by the precocity of female etc. Therefore, the mares that are at their first pregnancy and the old ones, those with a male foal and those which are grown in temperate and cold areas, the gestation length is bigger, whilst the precocious ones, those with female or twin foals, fed excessively and which live in warm climates, shown smaller values for this parameter[7]. The foaling-interval (the period between two consecutive births) has a length of 337-338 days [2] and the natality a value around 60% [3].

The values found in this study, regarding these parameters, draw attention on the need of improving them, because there's a constant need of developing the reproduction process, especially in studfarms whose main purpose is to provide high quality horses.

MATERIALS AND METHODS

The studied biological material consisted of 50 mares reared in Rădăuți studfarm, which started breeding in 2002 and which belong to Mersuch, El-Sbaa, Koheilan, Shagya, Siglavy-Bagdady, Dahoman, Hadban and Gazal bloodlines.

Arabian Shagya horse breed is suitable for riding, endurance, jumping over obstacles, recreation, hippo therapy and among the objectives of improving it include: increasing body size (in mares - 156 cm withers, 178 cm thoracic perimeter, 19.5 cm shinbone perimeter and in stallions - 158 cm withers, 178 cm thoracic perimeter and 20.5 cm shinbone perimeter); increasing energy capacity in gallop races, reproductive indices and constitutional resistance. In this regard, a

study conducted between 1992-2003 on Dahoman, El-Sbaa, Gazal, Hadban, Koheilan, Mersuch, Shagya, Siglavy-Bagdady and Nedjari genetic bloodlines, composed of 8 batches of stallions and 9 batches of mares and performed in order to analyze the objectives of the mentioned amelioration, indicated that at the time progress was already recorded on some indices and performances identified in gallop races. There was an increase in population average on the withers height on Gazal, El-Sbaa, Hadban and Nedjari genetic bloodlines, and on thoracic and shinbone perimeter values, were bigger Gazal and Hadban genetic lines, compared to the average of the population. Regarding the performance obtained on the gallop race of 2400 m, males and females Koheilan and Gazal bloodlines have achieved the best results.[4]

Data retrieved from Rădăuți studfarm, by calculating the main estimators-descriptors (average, variance, standard deviation, standard error of average, coefficient of variation) at the genetic line level and by making interline comparisons, using the unifactorial ANOVA algorithm.

RESULTS AND DISCUSSION

From the table 1 it can be observed that the minimum absolute gestation length (300 days) and the maximum absolute length (366 days), were both found at Dahoman bloodline.

Regarding the average values in this study, the average gestation length was 336.2 ± 1.97 days (Hadban mares)... 341.9 ± 1.86 days (Gazal mares). Also, the females from other genetic lines were close to the average minimum length (Dahoman: 336.5 ± 1.70 days and Mersuch: 336.6 ± 2.79 days) or de maximum (Shagya: 341.8 ± 1.55 days). Given the gestation length limits at half blood breeds, described in literature, is between 337-339 days [2], can be claim that only Koheilan and Siglavy-Bagdady bloodlines were in this interval.

Table 1 Gestation length of analyzed mares from the 7 bloodlines (days)

Bloodline	N	\bar{X}	$\pm StDev$	$\pm s_{\bar{x}}$	V%	Min.	Max.
Mersuch	12	336.6	9.681	2.795	2.88%	317	353
El-Sbaa	48	338.6	13.23	1.909	3.91%	302	360
Koheilan	28	338.9	10.32	1.95	3.04%	306	357
Shagya	27	341.8	8.029	1.545	2.35%	321	358
Siglavy-Bagdady	30	337.7	9.52	1.738	2.82%	321	357
Dahoman	41	336.5	10.88	1.699	3.23%	300	366
Hadban	19	336.2	8.587	1.97	2.55%	319	358
Gazal	22	341.9	8.717	1.859	2.55%	327	361

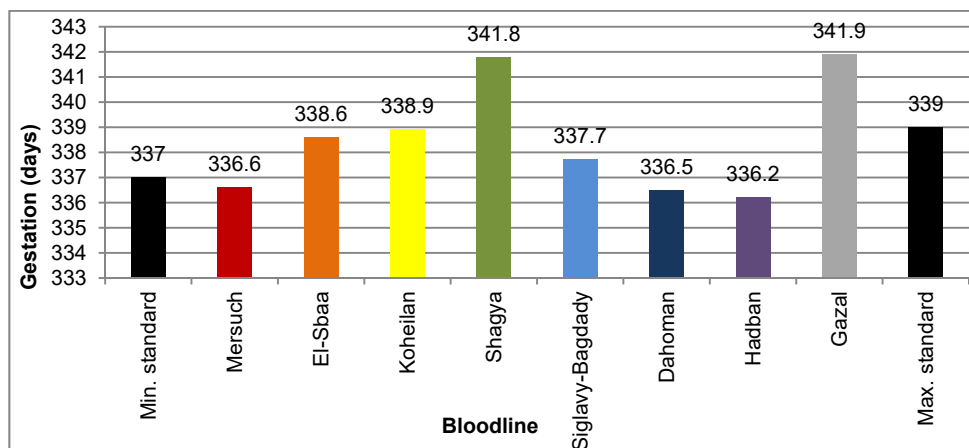


Fig. 1 Average gestation length in studied mares (days)

The fig. 1 shows that the medium length of gestation had the minimum value at Hadban bloodline and the maximum at Gazal, which was influenced probably by the reproduction management or by the sex of the product.

For all analyzed genetic lines, the calculated coefficient of variation oscillated between 2.55-3.91% and indicated a reduced influence of individuality within the lines regarding gestation length, revealing a homogeneous character.

However, using the variance analysis algorithm, the unifactorial variant, significant statistical differences were observed significant statistical differences ($p < 0.05$) between the average gestation length, found at Shagya and Dahoman bloodlines.

The table 2 shows that the individual value for the foaling-interval registered a

minimum at Siglavy-Bagdady bloodline (232 days) and a maximum at El-Sbaa (1424 days).

The average values calculated oscillated between 409.0 ± 41.58 days (Gazal bloodline) și 539.4 ± 66.39 days (Hadban bloodline).

There were noticed individual oscillations quite wide between the bloodlines and within the bloodlines, which led to the calculation of very large coefficients of variation (27.3-44.38%) meaning an absolute heterogeneity. It remains to be determined whether this lack of uniformity is due to mares or poor management of breeding, knowing the fact that the foaling-interval should have as few days as possible.

In all the situations (fig. 2), foaling-interval has exceeded the limit found in the literature (337-339 days) by 21.36-60.06% [7].

Table 2 Foaling interval values (days)

Bloodlines	n	\bar{X}	$\pm StDev$	$\pm s_{\bar{x}}$	V%	Min.	Max.
Mersuch	12	412.1	112.5	35.57	27,30%	342	722
El-Sbaa	48	468.1	196.1	29.57	41,90%	259	1424
Koheilan	28	481.9	172.4	37.63	35,78%	319	903
Shagya	27	526.1	222.6	47.45	42,31%	348	1081
Siglavy-Bagdady	30	459.7	160.3	31.44	34,87%	232	810
Dahoman	41	485.5	195.9	32.64	40,34%	284	1101
Hadban	19	539.4	239.4	66.39	44,38%	349	1151
Gazal	22	409.0	171.5	41.58	41,92%	345	1068

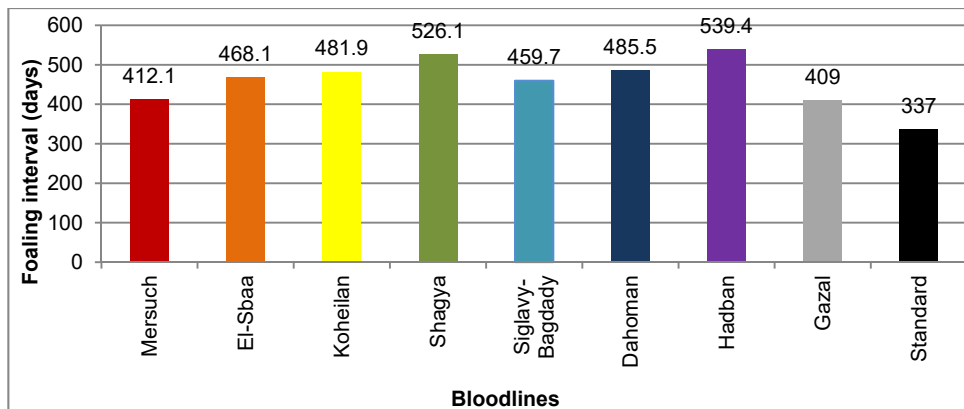


Fig. 2 Average foaling-interval values in the studied mares (days)

Table 3 describes the situation of natality percent, which in this study had a minimum value of 54,90% at Shagya bloodline and a maximum of 72,22% at Mersuch, regarding that the average of this parameter for this species is around 60%. [3]

Table 3 Calculated natality values

Bloodline	Matings	Foalings	Natality (%)
Mersuch	18	13	72,22
El-Sbaa	77	51	66,23
Koheilan	48	28	58,33
Shagya	51	28	54,90
Siglavy-Bagdady	41	29	70,73
Dahoman	60	42	70,00
Hadban	31	19	61,29
Gazal	21	14	66,67

All the bloodlines were around the 60% value considered the average natality percent in horses, excepta smaller number found in two of the studied bloodlines and a higher than that in the other 6 (amplitude of -8.5% ... +23.7%) (fig. 3).

A high natality value indicates a good development of the reproduction process because the productivity of a studfarm is translated in obtaining the biggest number of births from the mating that were made.

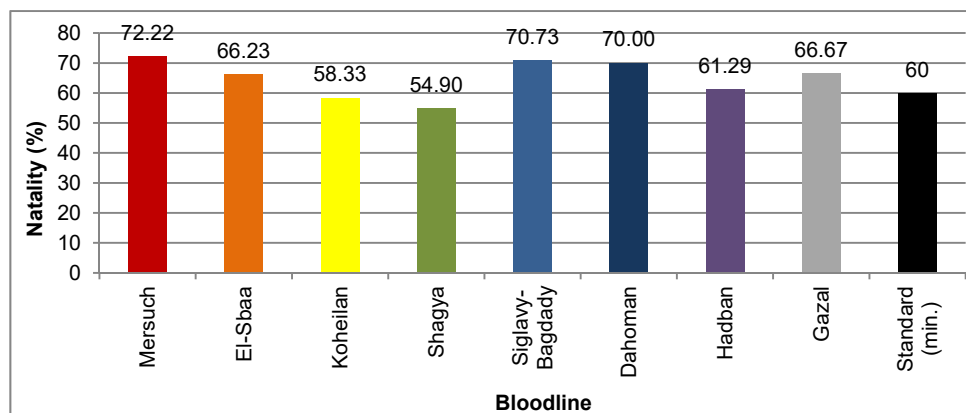


Fig. 3 Natality of analyzed mares (%)

CONCLUSIONS

Regarding the results, it can be noticed that the minimum length of average gestation was identified at Hadban bloodline, the maximum at Gazal bloodline and the foaling-interval had the minimum value at Siglavy-Bagdady bloodline and the maximum at El-Sbaa; the natality registered a minimum at Shagya bloodline and the maximum at Mersuch bloodline.

Whereas the optimization of reproduction process and productivity in studfarms are closely related to the improvement of these parameters, we highly recommend to follow the maintenance requirements of pregnant mares (specific nutrition, optimal housing conditions regarding also a favorable microclimate, daily care, careful handling in light activities etc.), to keep a minimum service-period length for an optimum foaling-interval, to try to match the reproduction pairs as best as it can and to find the right sowing time. The idea is to seize the gestation length

within the acceptable limits, to reduce the value of foaling-interval to the minimum and to increase the natality percent so that the results of the breeding process to be satisfying.

REFERENCES

- [1] Dulugeac I., 2005: Sport horses, Arena Publishing, page 78
- [2] Dumitrescu I., 1986: Horse reproduction, Ceres Publishing, Bucharest, page 123
- [2a] Hafez E.S.E., Hafez B., 2013: Reproduction in farm animals. John Willey & sons Publishing house, USA.
- [4] Manole I., Radu-Rusu C., 2004: Contributions to the knowledge of the main morpho productive traits of the Arabian horses from Rădăuți studfarm, Scientific papers, 47thvol, Animal Husbandry Series, page 434-441.
- [5] Rădăuți studfarm registers
- [6] Schipor G., 2007: Rădăuți studfarm under two sub empires, Cygnus Publishing, Suceava, page 13
- [7] Velea C., Târnoveanu I, Marcu N., Bud I., 1980: Horse breeding, Dacia Publishing, Cluj Napoca, page 209.