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STUDY ON THE EVOLUTION OF THE BODY SIZES IN YOUNG HORSES OF THE SHAGYA BREED

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ABSTRACT – The scientific paper belongs to a larger project, which has as aim to study the growth and development of young horses. Thus, based on the body measurements done at different periods, we followed the evolution of main growth indices in Shagya young horses, under conditions of the Rădăuți Herd, Suceava County. Among the numerous body sizes, this paper focused only on the three sizes that are of special interest for the classification works of horses: withers height, thoracic perimeter and shinbone perimeter. Our results have shown that on the entire studied period, height had a mean relative growth of 53.1% in females and of 49.5% in males; the highest growth was recorded until the age of 6 months (14.9% in females and 18.4% in males). The relative growth of the thoracic perimeter was, on the average, of 74.1% in females and of 73.5% in males, the greatest growth being found at the age of 12 months (18.9% in females and 17.2% in males). The shinbone perimeter had a mean relative growth of 56.3% in females and of 57.9% in males, the highest growth being of 21.7% at the age of 6 months in females and of 16.2% at the age of 12 months in males. Data found in this scientific paper may be compared to those in the literature, showing that the Rădăuți Herd has offered good breeding conditions for Shagya horses.

Key words: growth, horses, indices, Shagya, young horses

REZUMAT - Contribuții la studiul evoluției unor dimensiuni corporale la tineretul cabalin din rasa Shagya. Această lucrare face parte dintr-un proiect mai amplu, care are ca scop studiul procesului de creştere şi dezvoltare a tineretului cabalin. Astfel, pe baza măsurătorilor corporale efectuate la diferite intervale de timp, s-a urmărit evoluția principalilor indici de creştere la tineretul cabalin (generația 2004) din rasa Shagya, în condițiile oferite de Herghelia Rădăuți, jud. Suceava. Din multitudinea dimensiunilor corporale urmărite în acest sens, în lucrarea de față au fost supuse analizei doar cele trei dimensiuni, care interesează în mod special şi în lucrările de bonitare a cabalinelor, şi anume: înălțimea la greabăn (talia), perimetrul toracic şi perimetrul fluierului. Rezultatele obținute arată că talia, pe întreaga perioada studiată, a avut o viteză relativă de creştere medie de 53,1% la femele, respectiv de 49,5% la masculi, intensitatea cea mai mare de creştere înregistrându-se până la vârsta de 6 luni

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(14,9% la femele, 18,4% la masculi). Viteza relativă de creştere în privinţa perimetrului toracic a fost în medie de 74,1% la femele, respectiv de 73,5% la masculi, intensitatea de creştere înregistrând maximul la vârsta de 12 luni (18,9% la femele, 17,2% la masculi). Perimetrul fluierului a avut o viteză relativă medie de creştere de 56,3% la femele şi de 57,9% la masculi, intensitatea de creştere atingând un maxim de 21,7% la vârsta de 6 luni, în cazul femelelor, respectiv 16,2% la vârsta de12 luni, în cazul masculilor. Datele prezentate în această lucrare sunt comparabile cu cele din literatura de specialitate, ceea ce indică faptul că Herghelia Rădăuţi oferă bune condiţii pentru creşterea rasei Shagya.

Cuvinte cheie: cabaline, creştere, indici, Shagya, tineret

INTRODUCTION

Shagya, which for a long time was only a variety of the Arabian Breed, was acknowledged as a breed in 1978, when W.A.H.O. (World Arabian Horse Organization) considered all the horses that were bred according to the methodology from Babolna, Rădăuți and Topolcianky as being assimilated to the Shagya Arabian horses. In the origin certificate of the Shagya Arabian horse, at the fourth generation, no more than nine horses from 16 offspring can be Purebred Arabian horses (Antal, 2007).

Although having a high percent of Arabian blood, the Shagya horse differs from the Purebred Arabian horse by its great height, stronger framework skeleton and specific structure of a robust horse (Watson et al., 2001; Lupu, 2007; Waren, 1992).

Shagya is bred today in Hungary, Czech Republic, Romania, Austria, USA, Croatia, etc.

At the Rădăuți Herd, the strict specialization in this breed has relatively recently begun, after the transfer of the Gidran Breed from Rădăuți to Tuluceşti (1998). Having in view the little information found in literature about the specific features of the Shagya Breed, which is often mistaken for the Purebred Arabian Breed, we carried out a study on the detailed knowledge of growth and development of young horses from this breed.

MATERIALS AND METHODS

The biological material is represented by 20 heads (10 females and 10 males) of young Shagya horses, born in 2004 at the Rădăuți Herd. We followed their growth until the age of 3 years.

In order to follow the evolution of the growth process, we have done body measurements (withers height, thoracic perimeter and shinbone perimeter) at birth, at the age of 3 months, 6 months, 12 months, 24 months and 36 months. The obtained data after the body measurements were processed and statically interpreted, using the classical methods (arithmetic mean, standard deviation of mean, analysis of variance, etc.).

The increase in the analysed body sizes was evaluated according to the following growth indices: growth energy, absolute growth rate (AGR), relative growth rate (RGR), growth intensity (GI) and growth coefficient (GC).

RESULTS AND DISCUSSION

Data of body measurements were processed and centralized in *Table 1*. According to these data, we have made the growth curve for each body size (*Figure 1*) and calculated the growth indices (*Tables 2, 3, 4; Figures 2, 3, 4*), according to the literature (Cucu et al.,2004; Furtunescu, 1971; Doliş and Gavrilaş, 2006; Mărginean et al., 2005; Moldoveanu, 1961; Negruțiu et al., 1969).

In females, the height at birth was comprised between 91 cm and 106 cm, with a mean of 97.3 cm. Their height has increased by 31.5 cm, until the age at weaning, when the growth intensity was the highest (27.9%) and the growth coefficient represented 86.44% of the size value reached at the age of 3 years. After weaning and until the age of 3 years, the height has increased by 20.2 cm and the growth intensity diminished by 2.5 - 10.6 times, until the age of 3 years.

Table 1 – Data on growth energy

Age	Body size		
	Withers height (cm)	Thoracic perimeter (cm)	Shinbone perimeter (cm)
Females			
Birth	97.3 ± 2.37	98.2 ± 1.30	11.2 ± 0.18
3 months	111.0 ± 2.55	110.8 ± 2.88	12.2 ± 0.16
6 months	128.8 ± 1.03	129.3 ± 2.11	15.1 ± 0.48
12 months	136.6 ± 1.14	156.3 ± 1.99	16.3 ± 0.18
24 months	147.0 ± 1.24	162.0 ± 2.72	16.9 ± 0.24
36 months	149.0 ± 1.30	171.0 ± 2.23	17.5 ± 0.21
Males			
Birth	100.2 ± 1.57	98.9 ± 1.82	11.4 ± 1.08
3 months	112.3 ± 2.51	108.2 ± 3.11	12.3 ± 0.14
6 months	135.0 ± 1.52	128.0 ± 2.76	14.2 ± 0.38
12 months	143.6 ± 0.64	152.1 ± 0.85	16.7 ± 0.10
24 months	148.0 ± 1.30	163.8 ± 3.14	17.6 ± 0.35
36 months	149.8 ± 0.96	171.6 ± 1.90	18.0 ± 0.34

In males, the withers height of newborn foals was between 91 cm and 107 cm, with a mean of 100.2 cm. Until weaning, the height has increased, on the average, by 22.7 cm. In that period, the highest growth intensity was recorded, being achieved 90.12% of the size reached at the age of 3 years. After weaning and until the age of 3 years, height increased by only 14.8 cm, the growth intensity being much diminished (by 3% during 1-2 years and by 1.2% during 2-3 years).

Table 2 – Growth indices for withers height

Age	Growth energy (cm)		Growth expressed by:							
			AGR (cm)		RGR (%)		GI (%)		GC (%)	
	F	M	F	M	F	M	F	M	F	M
Birth	97.3	100.2	-	-	-	-	-	-	65.30	66.89
3 months	111.0	112.3	13.7	12.1	14.1	12.1	13.2	11.4	74.50	74.97
6 months	128.8	135.0	17.8	22.7	16.0	20.2	14.9	18.4	86.44	90.12
12 months	136.6	143.6	7.8	8.6	6.1	6.4	5.9	6.2	91.68	95.86
24 months	147.0	148.0	10.4	4.4	7.6	3.1	7.3	3.0	98.66	98.80
36 months	149.0	149.8	2.0	1.8	1.4	1.2	1.4	1.2	100	100
Total growth			51.7	49.6	53.1	49.5	-	-	-	-

F-females; M-males

At birth, the thoracic perimeter in females had a mean value of 98.2 cm. Until the age of 3 years, the thoracic perimeter recorded an increase of 72.8 cm and 74.1%, respectively. The growth intensity was higher until the age of 12 months, when it was the highest (18.9%), and then it decreased significantly, recording values of only 4.7% at the age of 3 years.

In males as in females, the growth of the thoracic perimeter depended on the evolution of thoracic cage width and depth. At birth, the thoracic perimeter had values comprised between 89 and 107 cm and the mean was of 98.9 cm. Until the age of 3 years, we observed an increase of 72.7 cm and 73.5%, respectively, in the thoracic perimeter. The growth intensity was higher at the age of 3-12 months (16.8-17.2%), and then it has diminished significantly until the age of 3 years (7.4-4.7%).

Table 3 – Growth indices for the thoracic perimeter

Age	Growth energy (cm)		Growth expressed by:							
			AGR (cm)		RGR (%)		GI (%)		GC (%)	
	F	M	F	M	F	M	F	M	F	M
Birth	98.2	98.9	-	-	-	-	-	-	57.43	57.63
3 months	110.8	108.2	12.6	9.3	12.8	9.4	12.1	9.0	64.80	63.05
6 months	129.3	128.0	18.5	19.8	16.7	18.3	15.4	16.8	75.61	74.59
12 months	156.3	152.1	27.0	24.1	20.9	18.8	18.9	17.2	91.40	88.64
24 months	162.0	163.8	5.7	11.7	3.6	7.7	3.6	7.4	94.74	95.45
36 months	171.0	171.6	9.0	7.8	5.6	4.8	5.4	4.7	100	100
Total growth			72.8	72.7	74.1	73.5	-	-	-	-

F-females; M-males

Table 4 – Growth indices for the shinbone perimeter

Age	Growth energy (cm)		Growth expressed by:							
			AGR (cm)		RGR (%)		GI (%)		GC (%)	
	F	M	F	M	F	M	F	M	F	M
Birth	11.2	11.4	-	-	-	-	-	-	64.00	63.33
3 months	12.2	12.3	1.0	0.9	8.8	7.9	8.4	7.6	69.60	68.33
6 months	15.1	14.2	2.9	1.9	24.3	15.4	21.7	14.3	86.51	78.89
12 months	16.3	16.7	1.2	2.5	7.5	17.6	7.2	16.2	92.97	92.78
24 months	16.9	17.6	0.6	0.9	3.9	5.4	3.8	5.2	96.57	97.78
36 months	17.5	18.0	0.6	0.4	3.6	2.3	3.5	2.2	100	100
Total growth			6.3	6.6	56.3	57.9	-	-	-	-

F-females; M-males

At birth, the females' shinbone perimeter measured 11.2 cm, on the average. Until the age of 3 years, this body size recorded an increase of 6.3 cm, respectively, 56.3%. The highest growth intensity was found during the weaning period. At the age of 6 months, this value was of 21.7%, and then, as in case of the other sizes, it decreased significantly, reaching 3.5% at the end of the studied period. At weaning, the shinbone perimeter had 78.89% of the value recorded at the age of 3 years.

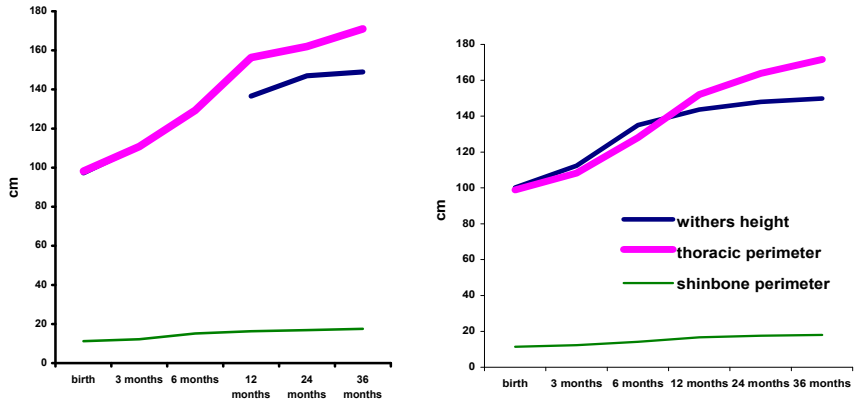

Fig. 1 – Growth curve of withers height, thoracic perimeter and shinbone perimeter, form birth until the age of 3 years
(females – on the left; males- on the right)

In males, the shinbone perimeter at birth had values comprised between 11 cm and 12.5 cm, having a mean of 11.4 cm. In the analysed period, this body size has recorded an increase of 6.36 cm and 57.9%, respectively. As in case of the thoracic perimeter, the highest increase was recorded at the age of 3-12 months (14.3-16.2%). At weaning, the shinbone perimeter had 78.89% of the value recorded at the age of 3 years.

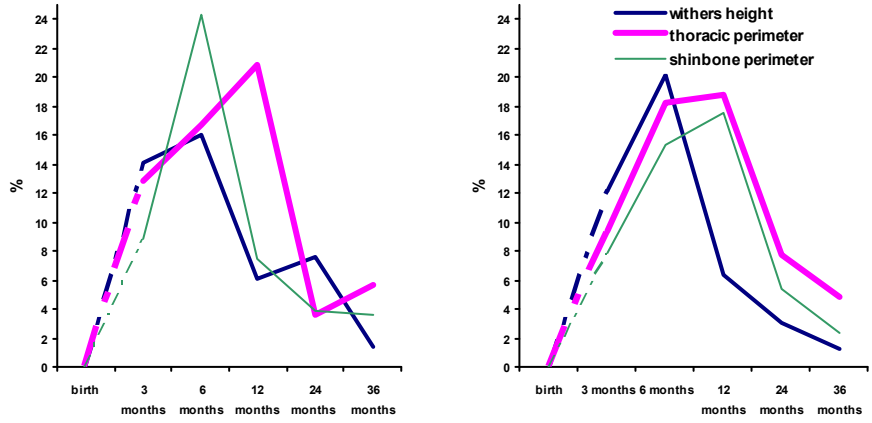

Fig. 2 – Relative growth rate of withers height, thoracic perimeter and shinbone perimeter from birth until the age of 3 years
(females – on the left; males – on the right)

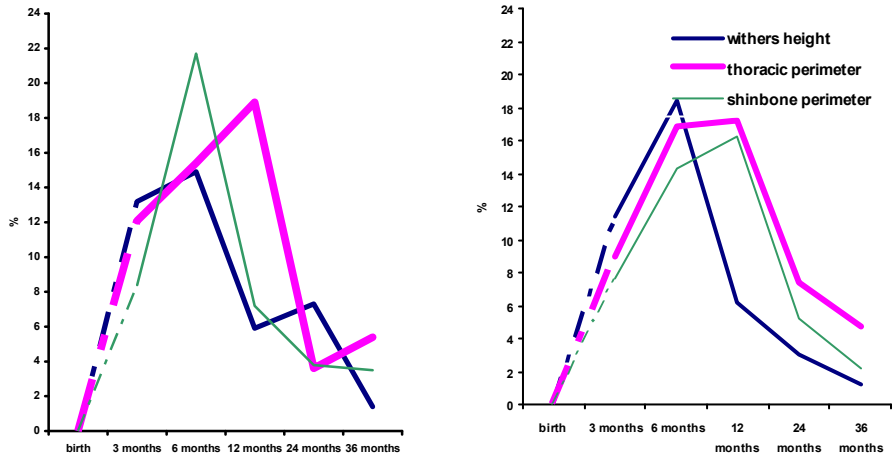

Fig. 3 – Growth intensity of withers height, thoracic perimeter and shinbone perimeter, from birth until the age of 3 years
(females – on the left; males – on the right)

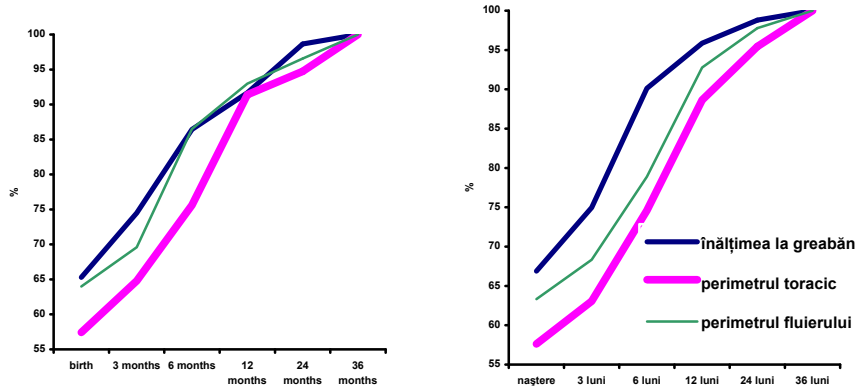

Fig. 4 –Growth coefficient of withers height, thoracic perimeter and shinbone perimeter, from birth until the age of 3 years
(females – on the left; males – on the right)

The obtained results during the three years of investigations on the evolution of three studied body sizes were similar to those from literature concerning young horse husbandry (Georgescu et al., 1982; Georgescu and Petrache, 1990; Gharahveysi et al., 2008; Negruțiu et al., 1969; Suciu et al., 1975; Velea et al., 1980). These results were close to those recorded for Arabian and Gidran horses, showing that the Rădăuți Herd offered the best conditions for Shagya breeding.

CONCLUSIONS

Each body area has a genetically determined growth rate and potential, found in tight connection with the other areas. When reaching the age of adult, each body area gives the horse the harmonious aspect and the body size typical of the breed.

The values of growth indices were not influenced by the genre of studied samples, the obtained values of the two genres being very close.

Growth has known the highest intensity during the first year of horse life, especially until the age of 6 months (suckling period); then, the intensity has greatly diminished.

Generally, the recorded growth coefficients had values, which were adequate to the breed standards, but we also noticed a few deviations, like the fact that the growth rate and the growth intensity, respectively, which should record the highest values during the first 3 months of life, had lower values than those found at the age of 3-6 months.

The results obtained in this work may be compared to those found in the literature.

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