STUDY ON THE EVOLUTION OF THE BODY HEIGHT SIZES IN YOUNG HORSES

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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 Radauti Herd, Suceava County. This paper focused on the four sizes: withers height, back height, croup height and tail height. In order to follow the evolution of the growth process, we have done body measurements at birth, at the age of 3 months, 6 months, 12 months, 24 months and 36 months. Data found in this scientific paper may be compared to those in the literature, showing that the Radauti Herd has offered good breeding conditions for Shagya horses.

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

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, Radauti 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 (Gordon Watson et al.,2001; Lupu, 2007; Waren, 1992). Shagya is bred today in Hungary, Czech Republic, Romania, Austria, USA, Croatia, etc.

At the Radauti Herd, the strict specialization in this breed has relatively recently begun, after the transfer of the Gidran Breed from Radauti to Tulucesti (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.

MATERIAL AND METHODS

The biological material is represented by 10 females and 10 males of young Shagya horses, from the Radauti 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, back height, croup height and tail height) 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, 2) and calculated the growth indices (Tables 2, 3, 4, 5; Figures 3, 4, 5), according to the literature. (Cucu et al., 2004; Furtunescu, 1971; Doliş and Gavrilaş, 2008; Mărginean et al., 2005; Moldoveanu et al., 1961; Negruțiu et al, 1969).

Table 1

Data on growth energy

Body size	Withers height (cm)		Back height (cm)		Croup height (cm)		Tail height (cm)	
Age	females	males	females	males	females	males	females	males
Birth	97.3 ± 2.37	100.2 ± 1.57	96.5 ± 2.64	99.6 ± 1.67	99.8 ± 2.14	103.5 ± 1.67	93.3 ± 2.21	97.3 ± 1.67
3 months	111.0 ± 2.55	112.3 ± 2.51	110.2 ± 2.66	110.4 ± 2.32	113.0 ± 2.76	113.2 ± 2.65	107.8 ± 3.00	110.1 ± 2.51
6 months	128.8 ± 1.03	135.0 ± 1.52	123.5 ± 0.97	134.0 ± 1.34	128.4 ± 1.67	135.0 ± 1.97	122.0 ± 1.23	128.5 ± 1.51
12 months	136.6 ± 1.14	143.6 ± 0.64	132.0 ± 1.13	142.1 ± 0.75	135.0 ± 1.60	143.6 ± 0.57	129.9 ± 1.14	139.8 ± 0.45
24 months	147.0 ± 1.24	148.0 ± 1.30	141.0 ± 1.37	144.5 ± 1.64	144.6 ± 1.11	146.7 ± 1.19	135.8 ± 1.50	142.0 ± 1.5
36 months	149.0 ± 1.30	149.8 ± 0.96	146.2 ± 1.30	145.3 ± 0.80	147.5 ± 1.22	148.0 ± 0.96	139.0 ± 1.75	143.3 ± 1.3

The withers height at birth was comprised between 91 cm and 107 cm, with a mean of 97.3 – 102.2 cm. Their height has increased by 22.7 - 31.5 cm, until the age at weaning, when the growth intensity was the highest (27.9 - 29.6%) and the growth coefficient represented 86.44 – 90.12% 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 14.8 - 20.2 cm and the growth intensity diminished by times, until the age of 3 years.

At birth, the back height had a mean value of 96.5 – 99.6 cm. Until the age of 3 years, the thoracic perimeter recorded an increase of 45.7 cm and 51.5%, respectively. The growth intensity was higher until the age of 3 and 6 months, when it was the highest (13.3 - 19.3%), and then it decreased significantly, recording values of only 0.6 - 3.6% at the age of 3 years.

At birth, the croup height measured 99.8 – 103.5 cm, on the average. The highest growth intensity was found during the weaning period. At the age of 6 months, this value was of 12.7 – 17.6%, and then, as in case of the other sizes, it decreased significantly, reaching 0.9 - 2% at the end of the studied period. At weaning, the croup height had 87.05 - 91.22% of the value recorded at the age of 3 years.

Table 2

Growth indices for withers height

Age	Growth energy (cm)		Growth expressed by:							
			AGR (cm)		RGR (%)		GI (%)		GC (%)	
	M	F	M	F	M	F	M	F	M	F
Birth	100.2	97.3	-	-	-	-	-	-	66.89	65.30
3 months	112.3	111.0	12.1	13.7	12.1	14.1	11.4	13.2	74.97	74.50
6 months	135.0	128.8	22.7	17.8	20.2	16.0	18.4	14.9	90.12	86.44
12 months	143.6	136.6	8.6	7.8	6.4	6.1	6.2	5.9	95.86	91.68
24 months	148.0	147.0	4.4	10.4	3.1	7.6	3.0	7.3	98.80	98.66
36 months	149.8	149.0	1.8	2.0	1.2	1.4	1.2	1.4	100	100
Total growth			49,6	51.7	49.5	53.1	-	-	-	-

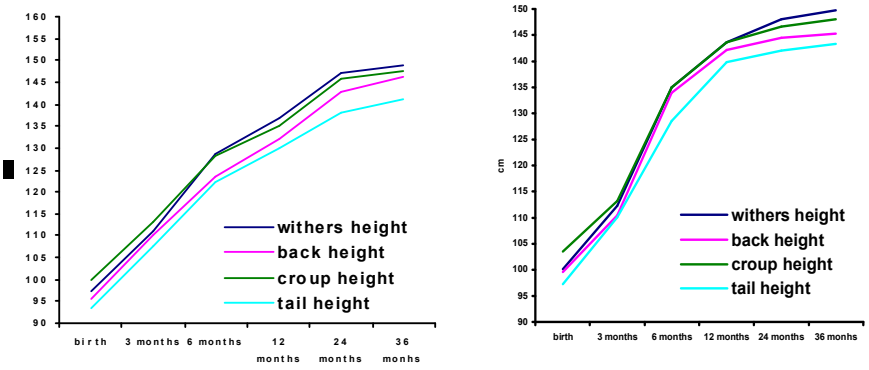

Fig. 1 - Growth curve of withers height, back height, croup height and tail height, from birth until the age of 3 years (females – left; males – right)

At birth, the tail height measured 93.3 – 97.3 cm, on the average. Their tail height has increased by 28.7 – 31.2 cm, until the age at weaning, when

the growth intensity was the highest (14.4 – 15.4%) and the growth coefficient represented 87.77 – 89.67% of the size value reached at the age of 3 years. After weaning and until the age of 3 years, the tail height has increased by 14.8 - 17 cm and the growth intensity diminished until the age of 3 years (0.9 - 2.3%).

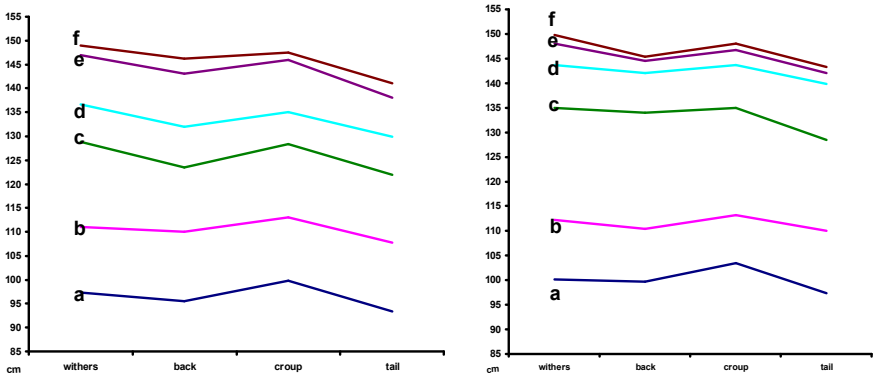

Fig. 2 - Evolution of upper line of the trunk, according to age. (a-birth, b-3 months, c-6 months, d-12 months, e-24 months, f-36 months; females – left; males – right)

Table 3

Growth indices for back height

Age	Growth energy(cm)		Growth expressed by:							
			AGR (cm)		RGR (%)		GI (%)		GC (%)	
	M	F	M	F	M	F	M	F	M	F
Birth	99.6	96.5	-	-	-	-	-	-	68.55	66.01
3 months	110.4	110.2	10.8	13.7	10.8	14.2	10.3	13.3	75.98	75.38
6 months	134.0	123.5	23.6	13.3	21.4	12.1	19.3	11.4	92.22	84.47
12 months	142.1	132.0	8.1	8.5	6.0	6.9	5.9	6.7	97.80	90.29
24 months	144.5	141.0	2.4	9.0	1.7	6.8	1.7	6.6	99.45	96.44
36 months	145.3	146.2	0.8	5.2	0.6	3.7	0.6	3.6	100	100
Total growth			45,7	49.7	45,9	51.5	-	-	-	-

Table 4

Growth indices for croup height

Age	Growth energy(cm)		Growth expressed by:							
			AGR (cm)		RGR (%)		GI (%)		GC (%)	
	M	F	M	F	M	F	M	F	M	F
Birth	103.5	99.8	-	-	-	-	-	-	69.93	67.66
3 months	113.2	113.0	9.7	13.2	9.4	13.2	9.0	12.4	76.49	76.61
6 months	135.0	128.4	21.8	15.4	19.3	13.6	17.6	12.7	91.22	87.05
12 months	143.6	135.0	8.6	6.6	8.3	5.1	6.2	5.0	97.03	91.53
24 months	146.7	144.6	3.1	9.6	2.2	7.1	2.1	6.9	99.12	98.03
36 months	148.0	147.5	1.3	2.9	0.9	2.0	0.9	2.0	100	100
Total growth			44.5	47.7	43.0	47.8	-	-	-	-

Table 5

Growth indices for dock height

Age	Growth energy(cm)		Growth expressed by:							
			AGR (cm)		RGR (%)		GI (%)		GC (%)	
	M	F	M	F	M	F	M	F	M	F
Birth	97.3	93.3	-	-	-	-	-	-	67.90	67.12
3 months	110.1	107.8	12.8	14.5	13.2	15.5	12.3	14.4	76.83	77.55
6 months	128.5	122.0	18.4	14.2	16.7	13.2	15.4	12.4	89.67	87.77
12 months	139.8	129.9	11.3	7.9	8.8	6.5	8.4	6.3	97.56	93.45
24 months	142.0	135.8	2.2	5.9	1.6	4.5	1.6	4.4	99.09	97.70
36 months	143.3	139.0	1.3	3.2	0.9	2.4	0.9	2.3	100	100
Total growth			46.0	45.7	47.3	49.0	-	-	-	-

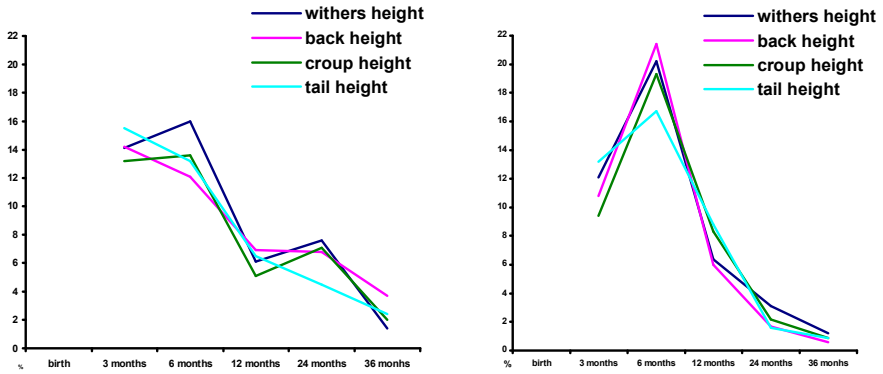

Fig. 3 – Relative growth rate of withers height, back height, croup height and tail height, from birth until the age of 3 years (females – left; males – right)

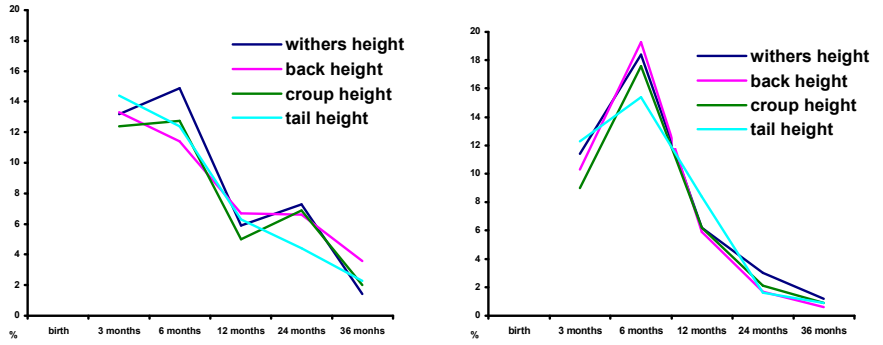

Fig. 4 - Growth intensity of withers height, back height, croup height and tail height, from birth until the age of 3 years (females – left; males – right)

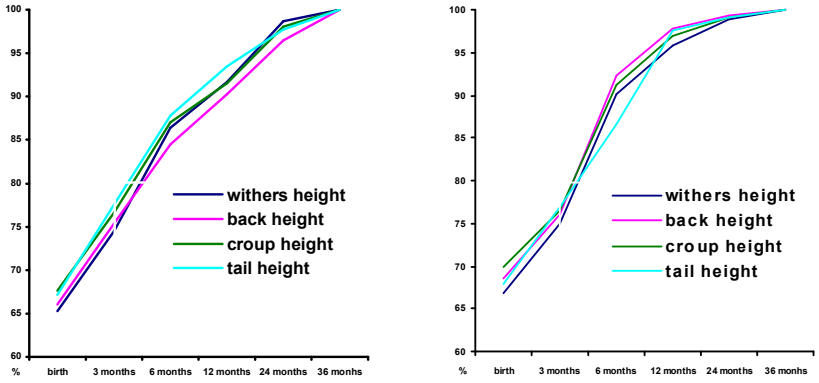

Fig. 5 - Growth coefficient of withers height, back height, croup height and tail height, from birth until the age of 3 years (females – left; males – right)

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; Sadek et al., 2006; Suciu et al., 1975; Velea et al., 1980). These results were close to those recorded for Arabian and Gidran horses, showing that the Radauti 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.

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.

Data obtained between the two sexes did not differ significantly.

Generally, the recorded growth coefficients had values, which were adequate to the breed standards.

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

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