EVOLUTION OF BODY WEIGH AND WITHERS HEIGHT OF LUSITANO HORSES FROM BIRTH TO TWO YEARS OF AGE

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Abstract

Body weight (BW) and withers height (WH) changes were measured on 29 Lusitano foals of four different studs during four consecutive years. Management conditions were similar in all four studs. Mares and foals were kept on pasture. Foals were weighted every 15 days from foaling till 6 months of age. Measurements for WH were made every 15 days since birth till 6 months of age and at 1 and 2 years of age. No significant differences were found (P>0.05) between the two genders for BW and for WH. Average BW at foaling and at 6 months of age was 53±6.4kg and 178±20.7kg, representing 0.105 and 0.356 of mature BW. Average WH at foaling, at 6 months and at 2 years of age was 101±3.4cm, 133±2.5cm and 142±2.5cm (0.628, 0.833 and 0.90 of adult WH respectively). These results may contribute to a better understanding of the growth patterns for the Lusitano breed.

Keywords: Lusitano breed, growth.

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Introduction

The Lusitano breed is widely known throughout the world and plays an important role in equine production in Portugal. The eumetric morphology of this horse and its natural versatility, combined with a gentle temperament are some of the reasons for its success as a saddle horse. Growth rate and body size are used to evaluate nutrition and predict athletic potential and value of horses. Rapid growth has also been recognized as one of the risk factors for some forms of developmental orthopaedic disease (DOD) (Staniar et al., 2004). Foal growth recommendations are based on age, body weigh (BW), mature body weight and average daily gain (NRC, 2007), therefore, monitoring young stock is valuable in assessing nutrition and feeding management and avoiding risks associated with under or overnutrition. Various models have been used to describe growth in horses, either using simplistic or more complex models. Nevertheless, the wide variety of morphological differences between horse breeds necessarily leads to different growth patterns.

Growth studies on the Lusitano have been conducted in these last years, contributing for the knowledge of growth patterns in this particular breed. The apparent slower growth of the Lusitano breed vs. other light breeds has been reported and indicates the need for a deeper knowledge on growth parameters and growth rate. The objective of this study was to evaluate the evolution of growth parameters in Lusitano horses from birth till 2 years of age.

Material and methods

Measurements were made in 29 Lusitano foals during four consecutive years, in four different stud farms. Management conditions were similar between farms, representing the normal breeding conditions in most Lusitano farms in Portugal. Both foals and mares were kept on pasture from 3 days after foaling up to weaning that occurred between 5 and 7 months of age. Both mares and foals were supplemented when breeders considered necessary, and this usually occurred in summer months. After weaning, foals were identified and had sanitary operations and then returned to pasture were they usually stay up to three years of age, time at which they start their training.

The morphometric measurements made were body weight (BW) and withers height (WH). Concerning BW, due to management difficulties only 13 of the 29 foals were measured. Foals were weighted in a scaler every other week from foaling and up to 6 months of age. Average daily gain (ADG) was then calculated as the ration between BW differences and animal's age:

$$ADG = \frac{BW_i - BW_j}{Age_i - Age_j} \quad (1)$$

Concerning WH, every 29 foals were measured. Measures were made using a height stick every other week from foaling up to 6 months of age, and then again at one and two years of age.

Statistical analysis was conducted using SAS. Regression analysis was performed using GLM procedure of SAS.

Results and discussion

Values for BW, WH and ADG (average daily gain) and their evolution along the study period are shown in Table 1.

Table 1. Average values ± sd of BW, WH and ADG and their variation along the study period.

Age (days)	BW (kg)	ADG (kg/d)	WH (cm)
1	52.7±6.4	---	100.7±3.4
15	68.8±8.8	1.07	106.2±2.9
30	83.4±10.7	0.97	110.2±4.5
45	95.9±12.8	0.83	113.0±4.8
60	108.3±16.5	0.83	115.8±4.5
75	119.8±17.7	0.76	119.5±4.8
90	133.4±20.1	0.91	121.5±4.9
105	141.3±20.5	0.53	122.7±4.2
120	153.1±23.0	0.79	125.3±5.2
180	189.4±18.3	0.60	133.3±2.5
1 Year	--	--	137.2±2.3
2 Years	--	--	142.1±2.5

There were no differences (P>0.05) between BW of colts and fillies at birth or during the trial, nevertheless, a tendency was found for BW of colts to be higher than fillies. This is also reported by

other authors (Jones & Hollands, 2005). Nevertheless, Pagan *et al*. (1998) observed a significant difference between colts and fillies using thoroughbreds.

Average BW at foaling was 53.3kg, representing 10.5% of adult BW (500 kg). These values are slightly lower than those found by Fradinho et al. (2007) for the Lusitano breed (57kg) and also close to those found by Pagan et al. (2006; 56kg) for thoroughbred horses. The proportion on adult body weight of 10.5% at birth is in accordance to what is referred by Martin-Rosset and Younge (2006) for light breeds. At weaning (around 180 days of age), average BW was 189.4kg, representing 37.9% of adult BW Considering BW references, again, these values are close to those found by Fradinho et al.(2007), but lower to those referred by Pagan (2006) for thoroughbreds (253.3kg).

ADG values (0.81 kg/d from birth to 180 days of age) are somewhat lower than those found by Pagan *et al.* (1998) for thoroughbreds (1.07 kg/d birth to 180 days of age) but in accordance to those found for the Lusitano breed by Fradinho et al. (2007). These values would indicate a faster growth for the thoroughbreds when compared to the Lusitanos, in fact, if we look at percentage of adult BW, and considering for the thoroughbreds and adult BW of 550kg, we can see that this breed is at 46.1% of its adult BW, indicating a faster growth considering BW.

A linear model was used to fit BW data from foaling to 180 days of age and it is represented on Figure 1.

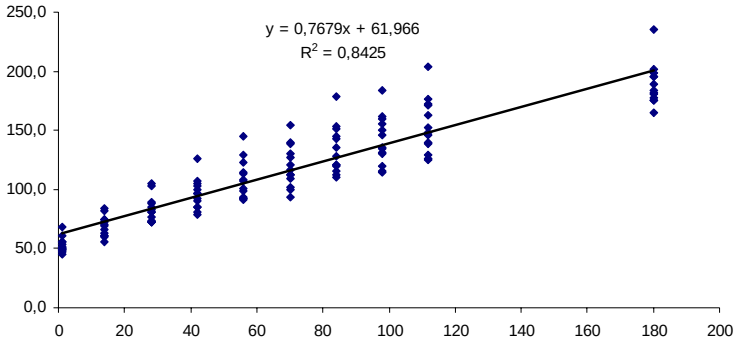

Figure 1. Linear model adjusted to data concerning BW evolution from birth to 180 days of age.

Following the trend for BW, no differences (P>0.05) were found between colts and fillies regarding WH values. Average values at birth of WH were 100.7cm, representing 62.8% of adult WH (162.5cm). These results are similar to those found by Fradinho et al. (2007) for Lusitano foals at birth (101.8cm) and to those found by Pagan (2006) for thoroughbreds (102.7cm). At one year of age, WH was of 137.2cm, representing 84.4% of adult WH. Pagan reports values of 147.2cm for thoroughbreds at one year of age, if we consider the adult WH for this breed would be around 165cm, these values would represent 89.2% of adult WH for the thoroughbreds, higher than for the Lusitano. Finaly, around two years of age, WH is of 142.1cm, representing 90% of adult WH. We adjusted a quadratic model to data, model applied to WH is represented in Figure 2.

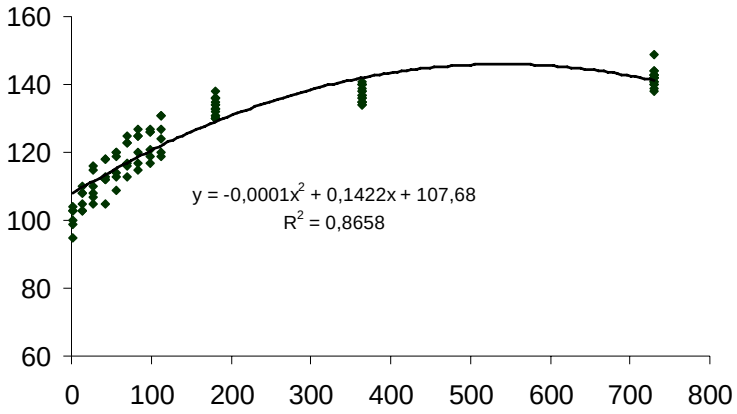

Figure 2. Quadratic model adjusted to data concerning WH evolution from birth to two years of age.

Conclusions

Although no significant sexual dimorphism was found in our study, a tendency was shown for BW and WH to be higher in colts than in fillies. In fact, according to Martin-Rosset (1983) the sexual dimorphism becomes obvious only when animals are 18 months old. Probably with a higher number of animals, this will became statistically different.

Although preliminary, these results are interesting showing a slower growth for the Lusitano breed concerning WH when compared to thoroughbreds, although this does not seem the case for BW. This tendency is very interesting and should indicate different growth patterns for these two breeds, although they both are light breeds.

This morphological evaluation of animals allows us to obtain a more complete report on their growth. For a more complete evaluation of the Lusitano growth, measurements should continue to be conducted in order to add to these data a higher number of animals and measurements.

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