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BODY CONDITION AND LEPTIN IN LUSITANO MARES DURING LATE PREGNANGY AND LACTATION

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Abstract:

The main objective of this study was to evaluate the relationship between leptin and BCS in Lusitano mares during late pregnancy and lactation. BCS was periodically assessed in 18 Lusitano mares from the 9th month of gestation to the 5th month of lactation. At the same time, blood samples were collected for measurement of plasma leptin concentrations. According to BCS, mares were split into two categories: lower BCS (LBCS) and higher BCS (HBCS). Data were statistically analysed by one-way ANOVA (Statistic). HBCS mares presented higher leptin concentrations than LBCS mares, after the 9th month of gestation ($p<0.05$). Leptin concentrations of LBCS mares were lower during the 9th and 10th month of gestation and increased before foaling ($p<0.05$), decreasing afterwards to similar levels to the 9th and 10th months. In HBCS mares, leptin increased from the 9th to 11th month of gestation ($p<0.001$). This was followed by a decrease until the 5th month of lactation ($p<0.05$). There was a positive correlation between BCS and plasma leptin concentrations ($R^2 = 0.48$, $p<0.0001$). These results in Lusitano mares suggest a similar pattern in leptin plasma concentrations during this period, when compared with other light breeds.

INTRODUCTION

Leptin is a hormone synthesized and secreted by the adipose tissue. Besides regulating feed intake, leptin seems to be one of the signals to the brain regarding body's energy and nutritional status (Houseknecht *et al*., 1998). In the horse, peripheral concentration of leptin is positively correlated with body condition and body weight (Buff *et al*., 2002; Ferreira-Dias *et al*., 2005) and appears to be influenced by other physiological processes, such as parturition and lactation (Heidler *et al*., 2003). The main objective of this study was to evaluate the relationship between leptin and body condition score (BCS) in Lusitano mares during late pregnancy and lactation.

MATERIALS AND METHODS

On three stud farms, BCS was periodically assessed by the INRA-HN-IE method (INRA-HN-IE, 1997) in 18 Lusitano mares (6 mares/stud farm) from the 9th month of gestation to the 5th month of lactation. At the same time, venous blood samples were collected for determination of plasma leptin concentrations. Leptin assay was performed by radioimmunoassay (RIA) using a commercial kit (Multi-species Leptin RIA Kit, Linco, USA), previously used for the horse (Ferreira-Dias *et al*., 2005; Romagnoli *et al.*, 2007). Mares were kept on pasture and were supplemented with compound feeds and grass hay or oat straw, according to pasture availability and farm practices. The foaling season occurred between February and May. In each stud farm and according to BCS, mares were split into two groups: lower BCS (LBCS) and higher BCS (HBCS). Data were statistically analysed by one-way ANOVA (Statistic for Windows, Statsoft, Inc., 1995, Tulsa, OK, U.S.A.), and LSD (Least Significant Differences) post-hoc comparison test was performed when $p<0.05$. Pearson's correlation was carried out to evaluate the relationship between plasma leptin concentrations and BCS.

RESULTS

Body condition score and plasma leptin concentrations of LBCS and HBCS mares are presented in Figure 1 (a and b). HBCS mares presented higher leptin concentrations than LBCS mares, after the 9th month of gestation ($p<0.05$). Leptin concentrations of LBCS mares were lower during the 9th and 10th month of gestation and increased before foaling ($p<0.05$). These values decreased afterwards to similar concentrations to the ones presented on the 9th

and 10th months. In HBCS mares, leptin increased from the 9th to 11th month of gestation ($p<0.001$). This was followed by a decrease until the 5th month of lactation ($p<0.05$).

a)

b)

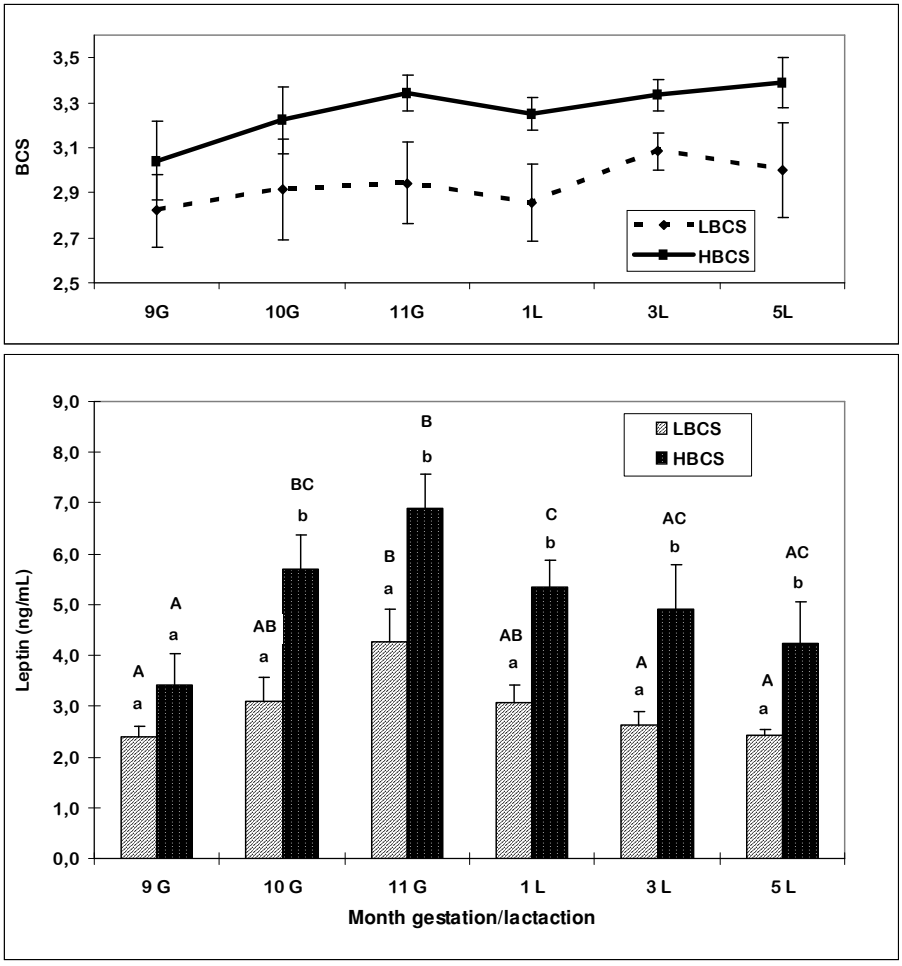

Fig. 1 - BCS (a) and plasma leptin concentrations (b) in LBCS and HBCS mares (mean±SEM). Capital letters indicate significant differences ($p<0.05$) throughout the study within each group. Lower case letters indicate significant differences ($p<0.05$) between groups within each month.

A positive correlation between BCS and plasma leptin concentrations ($R^2 = 0.48$, $p<0.0001$) was observed.

CONCLUSIONS

The decrease in leptin after foaling was already reported for Lipizzan and trotter mares (Heidler *et al.*, 2003, Romagnoli *et al.*, 2007). In the present study, leptin concentrations rose during the last trimester of pregnancy in both groups (LBCS and HBCS), probably associated with the increase in BCS, decreasing thereafter. The positive correlation between BCS and

leptin observed is in agreement with previous studies. These results in Lusitano mares suggest a similar pattern in leptin plasma concentrations during the postpartum period, when compared with other light breeds. However, further research is needed in order to gather more information about leptinemia during the whole reproductive cycle in this breed.

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