PLASMA CALCIUM, PHOSPHORUS AND MAGNESIUM IN LUSITANO BROODMARES UNDER EXTENSIVE FEEDING SYSTEMS

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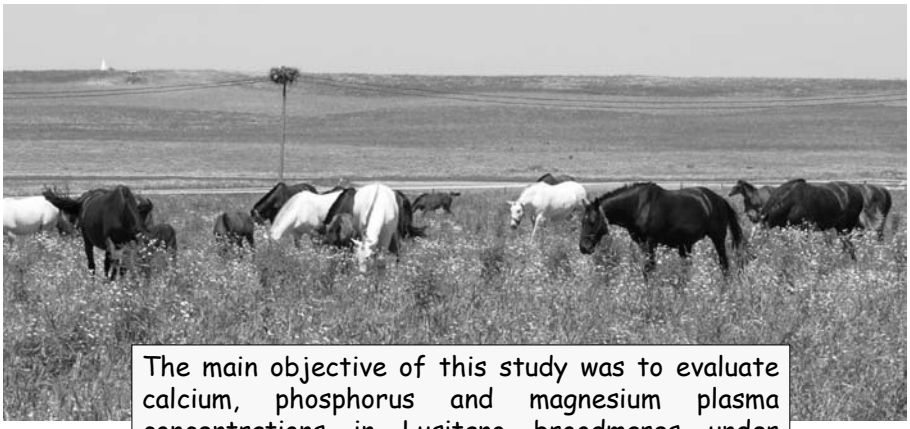
Introduction

- Macro minerals such as calcium (Ca), phosphorus (P) and magnesium (Mg) are of major importance on equine nutrition.
- Beyond their large physiological functions, it is commonly recognized that in late gestation, Ca, P and Mg requirements are increased to meet the needs of fetal growth and tissue development. Also, additional amounts of these macro minerals are needed for milk production.

- There is a limited number of studies concerning biochemical data for broodmares during pregnancy and lactation.

Objective



The main objective of this study was to evaluate calcium, phosphorus and magnesium plasma concentrations in Lusitano broodmares under extensive feeding systems.

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Materials & Methods

- Three groups of mares (belonging to different stud farms) were kept on pasture and were supplemented with compound feeds and grass hay or cereals straw, according to pasture availability and farm practices.

- Supplementary feeds were sampled for mineral content analyses.

Materials & Methods

Blood samples:

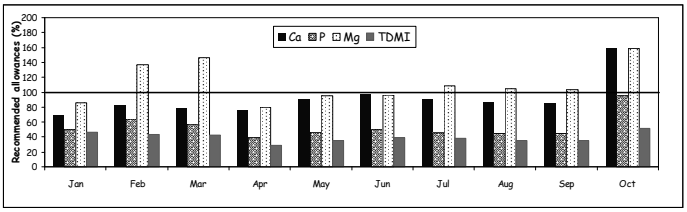
- monthly collected from the 9th month of gestation to weaning;
- plasma concentrations of calcium (Ca), inorganic phosphorus (Pi) and magnesium (Mg) were determined (autoanalyzer – Kone Optima).

Between 8.00 and 11.00 h and before concentrate feeds distribution

Statistical analysis:
one-way ANOVA (STATISTICA); LSD post-hoc comparison test ($p<0.05$).

Results

A



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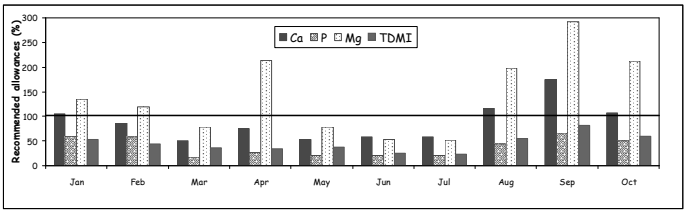

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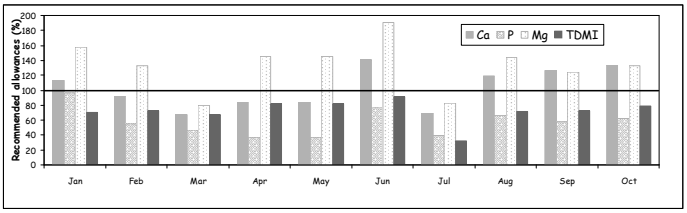
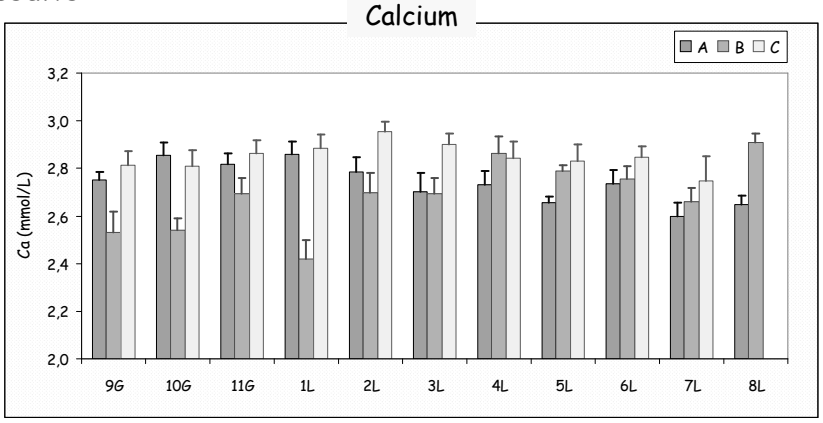


Results

Calcium



A (2.60±0.06 mmol/L – 2.86±0.06 mmol/L)
B (2.42±0.08 mmol/L – 2.91±0.04 mmol/L)
C (2.75±0.1 mmol/L – 2.95±0.04 mmol/L)

Harvey *et al.* (2005) observed a slightly but significant decrease in Ca concentrations during 1st and 2nd months of lactation;

Zdelar-Tuk *et al.* (2005) reported higher Ca concentrations in late gestation when compared with lactation period.

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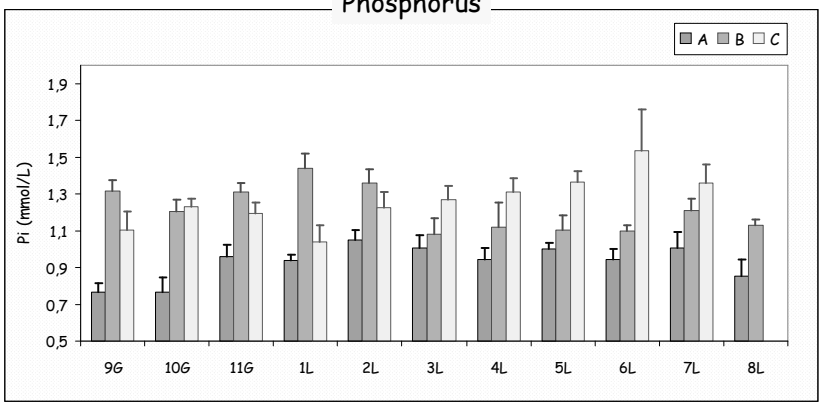
Results

Phosphorus



A (0.77±0.08 mmol/L – 1.05±0.06 mmol/L)
B (1.08±0.08 mmol/L – 1.44±0.08 mmol/L)
C (1.04±0.09 mmol/L – 1.54±0.22 mmol/L)

Harvey *et al.* (2005) observed a significant higher P_i concentrations during lactation period;

Zdelar-Tuk *et al* (2005) reported lower P_i concentrations in late gestation and beginning of lactation.

Results

Calcium/Phosphorus

(compound feeds + hay/straw)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
A	2.0	1.7	1.5	2.3	2.3	2.4	2.5	2.4	2.4	2.1
B	2.5	2.0	3.3	3.5	3.3	3.4	3.3	3.2	3.2	2.6
C	1.8	2.4	2.0	2.6	2.6	2,2	2.1	2.2	2.6	2.6

Values above 2.6 (Ca/P ratio) in diets could be of concern and depress phosphorus absorption (van Doorn *et al.*, 2004)

- The Ca/P could be, in some extend, altered due to the amounts of these macro minerals present in pastures, which were not quantified.

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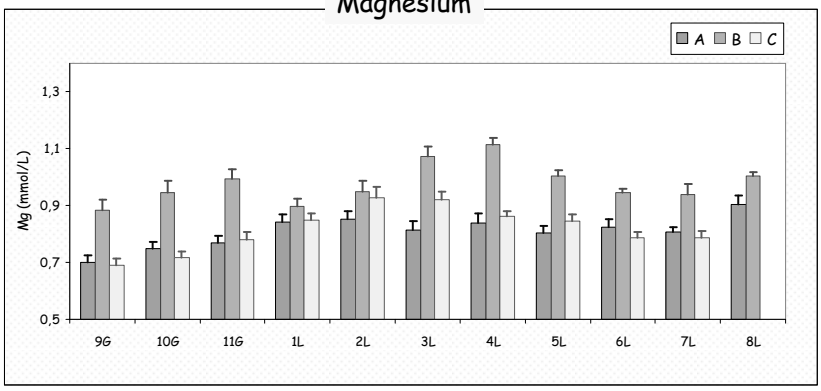
Results

Magnesium



A (0.70±0.02 mmol/L – 0.90±0.03 mmol/L)
B (0.88±0.04 mmol/L – 1.11±0.03 mmol/L)
C (0.69±0.03 mmol/L – 0.93±0.04 mmol/L)

Berlin & Aroch (*In press*) reported no significant differences between Mg concentrations in gestation period and beginning of lactation.

Discussion & Conclusions

- Ca and Mg recommended allowances were occasionally reached and overcome with the amounts of supplementary feeds offered daily, even though values in pastures were not included.

- Although the physiological mechanisms keep Ca, P_i and Mg concentrations in a narrow range, some changes were observed during the considered period in the three stud farms.

- These results provide preliminary data in Lusitano broodmares during late gestation and lactation periods. Values are within the range reported for other light breed mares (Harvey *et al.*, 2005; Zdelar-Tuk *et al.*, 2005; Berlin & Aroch, *In press*) and feeding systems.

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