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The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

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How does sward height and quality affect the choice of feeding sites and intake in horses ?

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Key words : horses, pastures, intake, feeding choices, sward characteristics

Introduction Grass represents a large part of the diet of horses, which has important consequences for their nutritional management. However, little is known of the factors affecting horse daily intake and patch selection at pasture, including the effect of basic vegetation characteristics such as sward height and quality. As plants grow and mature, their fibre content increases involving a decline in quality. Optimal foraging models predict that herbivores should trade-off between sward accessibility, which determines intake rate, and sward quality, which determines diet digestibility and crude protein content (Fryxell, 1991). In 2006, we quantified the choice of feeding sites and intake levels when sward height varied, while keeping a constant high quality. In 2007, we tested whether these choices and intake levels differed when height and quality varied simultaneously. Our hypothesis is that horses will express a preference for feeding sites allowing the higher nutrient intake rate.

Materials and methods In both years, three groups of 2-yr-old saddle horses (n=9 in 2006, n=6 in 2007) were grazed on a semi-natural pasture that was managed to produce three contrasting swards, in a Latin-square design (three periods). In 2006, the swards differed in height and were of the same quality (short = 6 cm, intermediate = 11 cm and tall = 17 cm; fibre content = 49% NDF). In 2007, the swards varied simultaneously in height and quality (short good = 7cm-56% NDF, medium intermediate = 13 cm-60% NDF and tall poor = 80 cm-62% NDF). The different swards were offered to the animals either alone or in pair-wise tests. Preferences were established from the time spent grazing each sward in pair-wise tests. Daily food intake was measured individually using faecal collection on swards offered alone in 2006 and on each pair-wise test in 2006 and 2007. Instantaneous intake rates were determined on each sward offered alone for both years using trays.

Results and discussion In 2006, the animals spent 65-95% of their daily feeding time grazing on the taller sward where they realised the highest dry matter (DM) instantaneous intake rates. In 2007, sward quality decreased across the periods (the tall poor matured, from 60 to 64% NDF) resulting in contrasting preferences between first and last periods. In the first period, horses spent 62-80% of their 24h feeding time grazing on the taller swards and confirmed year 1 results. In the second and third periods, they gradually switched onto the shorter swards (55-70% of their daily feeding time) even if instantaneous intake rate of digestible DM remained higher on the taller sward. At that time, crude protein (CP) content of the taller sward had, however, decreased to 7% which was not enough to cover horses requirements. Figure 1 illustrates the evolution of horse choices at a daily scale between the short and tall swards. During the first hour of testing, horses selected the intermediate sward where digestible protein intake rate was maximized (medium intermediate = 2.2 g digestible CP/mn > short good and tall poor = 1.5 g digestible CP/mn). Daily voluntary intake of digestible DM and total feeding time were not affected by sward height or by pair-wise choices and averaged 13 g DM/kg LW/day and 14 h/day.

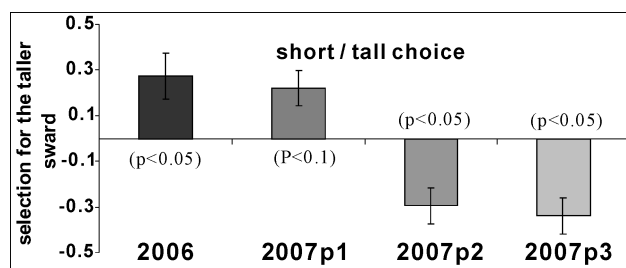


Figure 1 Selection for the taller sward in the short / tall choice by the log₁₀ of the ratio (time spent grazing on the taller sward / time spent grazing on the shorter sward), in 2006 and in 2007 (periods 1 to 3).

Conclusions When swards did not differ in quality (or differ slightly) (2006 and 2007 first period), horses selected the taller swards where they realised higher DM instantaneous intake rates. When taller swards matured (last two periods of 2007), the horses shifted their preferences to high-quality short swards even if instantaneous intake rates of digestible DM remained higher on the taller sward. It therefore appears that sward quality (especially CP content) overrides the effect of sward height, in agreement with previous field observations (Menard et al., 2002).

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